OCCUPATIONAL FRAMEWORK

SECTION C: MANUFACTURING

DIVISION 30: MANUFACTURE OF OTHER TRANSPORT EQUIPMENT

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Occupational Framework
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ABSTRACT

The Manufacture of Other Transport Equipment sector (C30) is a significant contributor to the economy, requiring a skilled workforce to meet its demands. The main objective of this research is to develop an Occupational Framework (OF) for C30. This framework will include five groups: Building of ships and boats, Manufacture of railway and rolling stock, Manufacture of air and spacecraft and related machinery, Manufacture of military fighting vehicles, and Manufacture of transport equipment n.e.c. The study utilized an exploratory sequential mixed-method research approach, combining qualitative and quantitative data to gain a deeper understanding of the complexities of the industry. The research involved various methods, such as document review, Focus Group Discussion (FGD), survey, and industrial engagement. A total of 166 respondents from variety of organisations in the industry participated in the survey. The FGD sessions were used to generate qualitative data on the job areas and titles, while the survey method provided quantitative data on the current state of the industry, including the skilled worker requirements, competency in demand, jobs in demand, emerging skills, occupations related to Industrial Revolution 4.0 (IR 4.0), related issues and challenges that hinders the growth of this sector. The FGD were conducted in two sessions, with the first session focusing on the identification of occupational structures and the second session focusing on the occupation responsibilities and the identification of occupational description for job in demand. An industrial overview was reported, highlighting the definition and scope of the sector, current analysis of the local sector, and industry trends. Industrial engagement with industry experts and stakeholders ensured that the OF accurately reflected the competency requirements of the sector. Industrial engagement with industry experts and stakeholders ensured that the OF accurately reflected the competency requirements of the sector. The study identified 44 total job areas and 200 job titles, with 193 job titles being relevant to IR 4.0 and 55 job titles classified as critical job titles in the industry. The OF that has been developed will serve as a reference basis for the development of the National Occupational Skills Standard (NOSS) document and guide the development of curricula for universities and skills training institutes. The research provides valuable insights into the competency requirements of the workforce in this sector, offering a roadmap for the development of skills training programs and certification standards that will support the growth of this important sector.

ABSTRAK

Sektor Pembuatan Kelengkapan Pengangkutan Lain (C30) merupakan penyumbang penting kepada ekonomi dan memerlukan tenaga kerja mahir untuk memenuhi permintaannya. Objektif utama penyelidikan ini adalah untuk membangunkan Rangka Kerja Pekerjaan (*OF*) untuk C30. Rangka kerja ini akan merangkumi lima kumpulan: Pembinaan kapal dan bot, Pembuatan keretapi lokomotif dan *rolling stock*, Pembuatan kapal udara dan kapal angkasa serta jentera yang berkaitan, Pembuatan kenderaan tempur tentera, dan Pembuatan peralatan pengangkutan n.e.c. Kajian ini melibatkan pelbagai kaedah, seperti semakan dokumen, Perbincangan Kumpulan Berfokus (*FGD*), tinjauan, dan libat urus industri. Bahagian tinjauan kajian mengumpul data daripada 166 responden yang mewakili pelbagai organisasi dalam sektor ini. Sesi *FGD* digunakan untuk menjana data kualitatif mengenai bidang pekerjaan dan jawatan, manakala kaedah tinjauan menyediakan data kuantitatif mengenai keadaan semasa industri, termasuk keperluan pekerja mahir, kecekapan yang tinggi permintaan, pekerjaan yang tinggi permintaan, kemahiran baru muncul, pekerjaan berkaitan kepada teknologi *IR*, serta isu dan cabaran yang menghalang pertumbuhan sektor ini. *FGD* dijalankan dalam dua sesi, dengan sesi pertama memfokuskan pada pengenalpastian struktur pekerjaan dan sesi kedua memfokuskan kepada tanggungjawab pekerjaan dan deskripsi pekerjaan untuk pekerjaan yang permintaannya tinggi. Tinjauan keseluruhan industri dilaporkan, menonjolkan definisi dan skop sektor, analisis semasa sektor tempatan dan arah aliran industri. Libat urus industri dengan pakar industri dan pihak pemegang taruh memastikan OF mencerminkan keperluan kecekapan sektor tersebut dengan tepat. Kajian ini mengenal pasti 44 jumlah bidang pekerjaan dan 200 jawatan, dengan 193 tajuk pekerjaan adalah relevan dengan teknologi *IR* dan 55 jawatan diklasifikasikan sebagai tajuk pekerjaan kritikal dalam industri. OF ini akan menjadi asas rujukan untuk dokumen Standard Kemahiran Pekerjaan Kebangsaan (NOSS), dan panduan pembangunan kurikulum di universiti dan institut latihan kemahiran. Penyelidikan ini memberikan pandangan berharga tentang keperluan kecekapan tenaga kerja dalam sektor ini, menawarkan pelan hala tuju untuk pembangunan program latihan kemahiran dan piawaian persijilan yang akan menyokong pertumbuhan sektor penting ini.

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ABBREVIATION

12 MP	Twelfth Malaysian Plan
4IR	National Fourth Industrial Revolution (4IR)
AMIM	Association of Marine Industries of Malaysia
COL	Critical Occupation List
DoSM	Department of Statistic Malaysia
EPU	Economic Planning Unit
FGD	Focus Group Discussion
ICA	Industrial Coordination ACT
IMP3	Third Industrial Master Plan
IIP	Index of Industrial Production
IR 4.0	Industrial Revolution 4.0
ISIC	International Standard Industrial Classification of All Economics
MASCO	Malaysia Standard Classification of Occupation
MCO	Movement Control Order
MIDA	Malaysian Investment Development Authority
MIGHT	Malaysian Industry-Government Group
MIMA	Maritime institute of Malaysia
MITI	Ministry of International Trade and Industry
MQA	Malaysian Qualifications Agency

MQF	Malaysian Qualification Framework
MSIC	Malaysia Standard Industrial Classification
n.e.c	Not Elsewhere Classified
NOSS	National Occupational Skills Standard
OA	Occupational Analysis
OC	Occupational Competency
OCD	Occupational Competency Description
OF	Occupational Framework
OR	Occupational Responsibilities
OS	Occupational Structure
PEMANDU	Performance and Management Delivery Unit
PENJANA	National Economic Recovery Plan
RINA-IMarEST	Malaysia Joint Branch of the Royal Institute of Naval Architects – Institute of Marine Engineering, Science and Technology
SME	Subject Matter Expert
SPKM	Sistem Pensijilan Kemahiran Malaysia
Talentcorp	Talent Corporation Malaysia Berhad
TVET	Technical and Vocational Education and Training
UNIDO	United Nations Industrial Development Organization

GLOSSARY

Aircraft	An aircraft is a machine that is designed to be able to fly through the air. There are many different types of aircraft, including airplanes, helicopters, gliders, airships, and unmanned aerial vehicles (UAVs). Each type of aircraft is designed to perform specific functions and is used for different purposes, such as commercial air travel, military operations, scientific research, and recreation.
Emerging industrial economies (EIEs)	EIEs is a group of countries com- posed of low- and middle-income economies with the most dynamic manufacturing sector.
Gross Domestic Product (GDP	Gross domestic product (GDP), or value added, is the value of the goods and services produced by the nation's economy less the value of the goods and services used up in production. GDP is also equal to the sum of personal consumption expenditures, gross private domestic investment, net exports of goods and services, and government consumption expenditures and gross investment.
Index of industrial production (IIP)	Index of industrial production (IIP) Indicator that describes changes in the volume of goods produced in industrial sectors over time. Its main purpose is to provide a measure of short-term changes in value added over a given reference period.
Job	Job is defined as a set of tasks and duties performed by a person.
Malaysian Industry Classification Standard (MSIC) 2008	The industrial classification of productive economic activities in Malaysia is registered by the Department of Statistics Malaysia (DoSM).
Malaysian Skills Certification System (SPKM)	Policies, Standard mechanisms and procedures involved in awarding a Certificate by KPPK.
Manufacturing Activity	The term "manufacturing activity" is defined by the Industrial Co-ordination Act 1975 as "the making, altering, blending, ornamenting, finishing or otherwise treating or adapting any article or substance with

	a view to its use, sale, transport, delivery or disposal; and includes the assembly of parts and ship repairing but shall not include any activity normally associated with retail or wholesale trade."
Manufacturing Value Added	Manufacturing value added (MVA) This is a national accounts aggregate measuring the exclusive and exhaustive contribution of manufacturing to GDP.
Occupation	"Occupation" is defined as a set of jobs whose main tasks and obligations are characterised by a high degree of similarity. In other words, persons who perform similar main tasks are considered doing the same type of work and are classified in the same occupational group, regardless of the level of authority, responsibility or work experience.
Occupational Analysis	Process considers industry requirements as well as studies of relevant occupational structures.
Rolling stock	Rolling stock includes tenders, motors, coaches, wagons, trucks, trolleys, carriages of any kind and locomotive and other kinds of engine used on a railway.
Shipbuilding	Shipbuilding is defined as constructing ships and other floating vessels and it normally takes place at a dedicated facility called a shipyard. Shipbuilding and ship repairs activities, both commercial and military, are referred to as "naval engineering".
Weaponry	Weaponry refers to weapons and military equipment collectively, including firearms, ammunition, bombs, missiles, and other devices used for offense or defence in armed conflict. The term can be used to describe the weapons and equipment of an individual, group, or nation. For example, one might talk about the weaponry of a particular army or the weaponry used in a specific conflict.
Weapon Turrets	A turret is a mounting platform from which weapons can be fired that affords protection, visibility and ability to turn and aim.

CHAPTER I

INTRODUCTION

1.1 Introduction

This chapter is the introductory section of the Occupational Framework (OF) and includes a preview of the context's background, the problem statement, objectives of the study, scope of study, significance of study, and the chronological arrangement of each chapter.

1.2 Research Background

The Malaysian Investment Development Authority's (MIDA) statement in 2020 stated that the manufacturing sector remains a crucial component of Malaysia's economic transformation. Despite global economic uncertainties, this sector's contribution to the country's export revenue and job creation has ensured continued growth. MIDA emphasizes that Malaysia's manufacturing sector will continue to focus on talent pool development and Industry 4.0 initiatives, enabling mature industries to thrive while opening new opportunities for other sectors. The government's efforts, including the implementation of the National Fourth Industrial Revolution (4IR) policy under the Twelfth Malaysia Plan (12MP), will further enhance job creation and increase the demand for skilled talent.

The Ministry of International Trade and Industry (MITI) said the manufacturing sector is the most affected industrial sector hit by Covid-19 (MIDA, 2021). Due to the implementation of the Movement Control Order (MCO) to control COVID-19 transmissions, industries in the sector were not permitted to operate during this time. However, since the government has allowed the manufacturing sector to operate at 100%

capacity, its performance in 2022 improved even more. This allows businesses to increase production while also improving production efficiencies and effectiveness. The government according to has launched a number of programmes to help employers and employees, micro, small, and medium enterprises (MSMEs), graduates, and young people deal with the effects of the COVID-19 pandemic.

On 7 February 2023, the Department of Statistics Malaysia (DoSM) released the performance report for the Manufacturing Sector in 2022. According to the data, the sector's sales value surged by 15.8% to reach RM1,800.7 billion as compared to the previous year. Additionally, the number of employees increased by 3.4%, totalling 2.34 million individuals, while salaries and wages rose by 5.2% to RM94.5 billion. The sales value per employee also increased by 12.1%, amounting to RM771,048. In December 2022, the Industrial Production Index (IPI) recorded a growth of 3.0%, following a 4.8% increase in November 2022. The Manufacturing industry played a significant role in this expansion, contributing 3.1% to the overall growth.

ASEAN Statistical Yearbook 2021 showed there is a decrease in Index of Industrial Production (IIP) and Annual Change of IIP for all manufacturing industries in ASEAN countries, for the year 2010-2020. The top three countries are Philippines (IIP = 187.0 (2019) 163.3 (2020) Annual Change= -12.7%), Thailand (IIP=102.1 (2019);92.6 (2020); Annual Change = -9.3) and Vietnam (IIP=109.1(2019);103.3(2020); Annual Change= -5.3). Consequently, the revenue in Manufacture of Other Transport Equipment in United States of America is projected to amount to US$0.53tn in 2023. An annual growth rate of 0.06% is expected (CAGR 2023-2025) and the total number of enterprises amounted to 14,33k in 2018 (Statista,2023). Whereas revenue in Manufacture of Other Transport Equipment in Germany is projected to amount to US$79.97bn in 2023, with an annual growth rate of 6.66% is expected (CAGR 2023-2027) and the total number of enterprises amounted to 1,28k in 2019 (Statista, 2023).

C30 Manufacturing of other transport equipment is an important contributor to Malaysia's economy as it generates export revenue and creates employment opportunities. The production of transport equipment such as aircraft, ships, and trains require a high level of technical expertise and advanced manufacturing capabilities, which in turn, create high-value job opportunities for skilled workers.

In addition to providing employment opportunities, the C30 Manufacturing of other transport equipment industry plays a crucial role in generating export revenue for Malaysia. This industry exports products to countries all over the world, contributing to Malaysia's trade surplus and helping to support the country's economic growth.

Furthermore, the C30 Manufacturing of other transport equipment industry also supports the development of related industries, such as logistics and transportation. The growth of these industries leads to further job creation and economic development, as well as the establishment of supporting infrastructure, such as ports and airports (Malik and Said, 2018). Overall, the C30 Manufacturing of other transport equipment is an important sector for Malaysia's economy, creating high-value jobs, generating export revenue, and supporting the development of related industries.

The C30 industry plays a critical role in Malaysia's manufacturing sector, and its growth potential has been recognized by the government's initiatives and policies. The National Fourth Industrial Revolution (4IR) policy under the Twelfth Malaysia Plan (12MP) has emphasized the need to focus on the manufacturing industry to achieve the country's Industry 4.0 goals (Sivakumar and Jason,2019). One of the key points of the 12MP is Graduate Marketability Strategic Plan 2021-2025 and Job Creation Strategic Plan 2021-2023 to be introduced to address mismatch in labour market, labour issues in certain industries (Twelfths Malaysia Plan, 2022). The development of a comprehensive Occupational Framework for C30 manufacturing can bridge the skill gap by identifying critical job titles and required competencies. This framework will provide guidance to educational institutions and individuals seeking to enter the C30 manufacturing industry, ensuring that the industry has the necessary skilled workforce to maintain its competitiveness and sustainability. The government's continued support and investment in the C30 industry will further enhance Malaysia's position as a key player in the global manufacturing landscape.

This Occupational Framework (OF) document serves as the foundation for creating occupational standard for Section C Division 30 Manufacture of other transport equipment. In addition, the OF specifies the Occupational Structure that includes the industry-specific task and job titles based on the industry requirements. The OF also will define the Occupational Description, Occupational Responsibilities, Job and

competencies in demand, emerging skills and skills related to industrial revolution. The information in the OF document will serve as a guide for industry participants in identifying available jobs within this occupation sector in order to create the appropriate organizational chart in their respective companies and offer new job opportunities. In relation to this, Department of Skills Development under the Ministry of Human Resource has taken the initiatives to develop Occupational Framework for this industry.

1.3 Problem Statement

The manufacturing sector in Malaysia is facing significant challenges, including declining competitiveness compared to neighbouring Asian countries, a shortage of skilled workers, and over-dependence on low-skilled foreign workers in industries such as C30 manufacturing (Narayanasamy, 2021; The Edge Market, 2022). To address the talent management challenge in the C30 industry, organizations need to create talent management strategies and people management practices that align with business objectives and incorporate behaviour-led execution strategies (Nazery, 2017). However, there is a mismatch between the skills of technical and vocational education and training (TVET) graduates and the industry's manpower needs (Nazery, 2017; The Edge Market, 2022).

Graduates from technical and vocational education and training (TVET) institutions are a potential source of skilled labour for the industry. However, as mentioned earlier, there is a mismatch between the skills and knowledge of graduates and the demands of the industry (Ibrahim and Nashir, 2022). This can be attributed to the lack of coordination and alignment between TVET institutions and the industry, resulting in inadequate human resources to meet industry demand. Therefore, according to Valiente, Zancajo, and Jacokis (2020), improving the alignment and collaboration between TVET institutions and the industry can contribute to addressing the skills gap and producing a more competent and relevant workforce for the C30 manufacturing industry of other transport equipment in Malaysia (Ibrahim and Nashir, 2020).

Despite the significance of the C30 manufacturing sector for other transport equipment, there is a lack of a clear occupational framework that covers all the five groups (301, 302, 303, 304, and 309). This has resulted in various challenges for these industries,

including a shortage of skilled labour, difficulties in job matching, and inadequate training and development programs for employees. Here are the challenges faced by the five groups of the C30 manufacturing sector that highlight the need for a comprehensive occupational framework:

a) Building of ships and boats (Group 301): The shipbuilding industry in Malaysia has been facing significant challenges in recent years due to a lack of skilled workers, rising labour costs, and intense competition from other Asian countries (MITI, 2015). These challenges have made it difficult for companies to remain competitive and sustain their operations, highlighting the need for a comprehensive occupational framework to address the skill shortages and improve the industry's competitiveness.
b) Manufacture of railway and rolling stock (Group 302): The railway industry in Malaysia has been struggling with various challenges such as outdated infrastructure, lack of investment, and insufficient human capital (Yap, 2021). These challenges have resulted in a slowdown of the industry's growth and have made it difficult to attract and retain skilled workers. A comprehensive occupational framework can address the skill shortages and help to modernize the industry to remain competitive.
c) Manufacture of air and spacecraft and related machinery (Group 303): The aerospace industry in Malaysia has experienced rapid growth in recent years but has been facing challenges such as a shortage of skilled workers, lack of funding, and insufficient local supply chain (Mazlan et al., 2020). These challenges have made it difficult for the industry to sustain its growth and meet the demands of customers. A comprehensive occupational framework can address the skill shortages and help to strengthen the local supply chain to remain competitive.
d) Manufacture of military fighting vehicles (Group 304): The defence industry in Malaysia has been facing challenges such as insufficient funding, lack of skilled workers, and inadequate local supply chain (Ng, 2020). These challenges have made it difficult for the industry to develop and produce advanced defence technologies to meet the needs of the military. A comprehensive occupational framework can address the skill shortages and

help to strengthen the local supply chain to meet the demands of the military.

e) Manufacture of transport equipment n.e.c. (Group 309): The transport equipment industry in Malaysia has been facing various challenges such as a shortage of skilled workers, lack of investment, and intense competition from other countries (Tan, 2019). These challenges have made it difficult for companies to remain competitive and sustain their operations. As a result, there is a need to develop a comprehensive occupational framework that addresses the specific skill requirements, training needs, and job opportunities within the C30 manufacturing sector, to ensure that these industries can remain competitive and sustainably grow in the long run.

The 2020/2021 Critical Occupations List (COL) has undergone a significant reduction, with 42 critical occupations identified, representing a decrease of 28% from the previous year's list of 58 occupations (TalentCorp, 2022; ILMIA, 2019). This decrease is primarily attributed to the adverse effects of the COVID-19 pandemic, which has had a major impact on the global economy. As a result, numerous industries have implemented hiring freezes, and some are even forced to undertake retrenchment measures to maintain their operations during this unprecedented time.

Despite the negative impact of the pandemic on the global economy, it has also generated a high demand for certain jobs. The 2020/2021 Critical Occupations List (COL) highlights this trend with the inclusion of seven (7) critical occupations that have not appeared in previous versions of the list. Notably, most of these new critical occupations are related to the digital industry, and their sudden surge in demand can be attributed to the pandemic's effects. A total of 16 critical occupations (38%) in the 2020/2021 COL have appeared in all six (6) editions of the COL.

Manufacturing Professionals are one of the occupations that have appeared in COL annually and the job titles are Quality Assurance Executive, Quality Assurance Analyst, Quality Control Executive, Production Executive, Warehouse Executive, Supply Chain/ Procurement Specialist, Production Specialist, Logistic Executive, Logistic Coordinator, Quality Control Analyst and Operation Coordinator (Talent Corp, 2022). Some of these job titles are related to manufacturing professionals in the Manufacturing of Other Transport Equipment industry. COL 2021/2022 also reported that the three top

skills for manufacturing professionals are interpersonal and communication skills, technical skills and teamwork. Top reasons of hard-to-fill are applicants lack the required credential or certification, applicants lack relevant job experience and too few or no applicants.

Hence, the repeated appearance of certain critical occupations on the list emphasizes their importance, and failure to address the resulting shortages may hinder Malaysia's growth prospects. To overcome this challenge, policymakers must prioritize measures such as enhancing curricula and training programs to develop the skillsets required by the current or future talent pool. Additionally, temporary opportunities for expatriates may be necessary to bridge the current gap. Moreover, the inclusion of occupations such as Mathematicians Actuaries & Statisticians, which encompass job titles like data analyst, data scientist, and big data analyst, highlights a shift in Malaysia's job market towards Industrial Revolution 4.0 requirements. Therefore, the development of a comprehensive occupational framework for C30 manufacturing that considers the demand for critical job titles and skills would aid in identifying the skill gaps and formulating targeted policy measures to address them.

This research highlights the challenges faced by the five groups of the C30 manufacturing sector and proposes the need for a comprehensive occupational framework to address these challenges. The problem also emphasizes the potential impact of the research, which could help improve job matching, training programs, and employment opportunities in these industries, leading to more sustainable growth and development.

1.4 Objectives of Study

The objectives of the study are as below:

a) To establish Occupational Structure (OS) for the Manufacture of Other Transport Equipment sector based on MSIC 2008 by examine job areas, job titles and relevant competency level;
b) To determine Occupational Responsibilities (OR) that outline the main work activities and tasks for each job titles;
c) To determine Occupational Descriptions (OD) for each job title in demand

based on the proposed OS;

d) To identify the critical jobs titles in the Manufacture of Other Transport Equipment section; and
e) To propose job titles related to the Industrial Revolution 4.0 (IR 4.0) for the Manufacture of Other Transport Equipment section.

In order to achieve the above objectives, a mixed-methods research approach was employed using multiple data collection techniques, including document review, focus group discussion, brainstorming, and survey methods.

1.5 Scope of Study

The scope of work for this study covers the occupation in the MSIC 2008 for Section C Division 30 Manufacture of other Transport Equipment industry in Malaysia. Under this section there are 5 groups namely Group 301: Building of ships and boats; Group 302: Manufacture of railway locomotives and rolling stock; Group 303: Manufacture of air and spacecraft and related machinery; Group 304: Manufacture of military fighting vehicles; and Group 309: Manufacture of transport equipment n.e.c..

The scope of C30 manufacturing of other transport equipment includes the production and assembly of ships, boats, railway locomotives and rolling stock, aircraft and spacecraft, military vehicles and other transport equipment not classified elsewhere. However, it does not cover routine maintenance or repair activities, which typically fall under different categories. The activity of production involves creating or making a new product or item from raw materials, components, or parts. This process may involve various steps, such as designing, planning, sourcing materials, manufacturing, testing, and quality control. The goal of production is to create a finished product that meets the desired specifications, requirements, and standards of the customer or end-user. This study will be conducted in Malaysia with the participation of experts from various organisations in the Manufacture of Other Transport Equipment industry.

1.6 Significance of Study

The findings of this study will serve as a standard reference document for other transport equipment manufacturing industries, such as the building projects of ships and boats, the

production of aircraft and other aerospace equipment, railroad equipment, army vehicles, motorcycles, and bicycles, as well as other transport equipment n.e.c. The OF document resulting from this study will present the occupational structure, job area and job titles, occupational job descriptions and responsibilities, critical jobs, and necessary competencies for this industry. This study also compiled a list of the in-demand skills, emerging skills, and technology-related skills required for this industry. This OF document can be utilised by the government, the private sector, investors, employers, and employees to enhance skills training and individual development plans.

1.7 Structure of Chapters

This chapter concludes with a brief overview of the overall study which includes:

a) Chapter 1: Introduction

   This Chapter serves to introduce the background of the research, problem statement, research objectives, scope of study and summary of the major contents in each Chapter for this OF.

b) Chapter 2: Literature Review

   Review about the research is explained in this chapter to give further understanding about the research. The information is gained from different sources such as Department of Statistics Malaysia and others.

c) Chapter 3: Methodology

   This chapter clarifies the process of researching this topic adopted in this study. It identifies its analytical framework beginning with its methodology and methods of study implementation which include document review, focus group discussions and surveys population and sampling, instruments used, and data collection and procedures, as well as chapter conclusions.

d) Chapter 4: Findings

   Analysis of results of findings, OS, OC, OCD, mapping of the OS with existing NOSS and chapter conclusions are reported in this chapter.

e) Chapter 5: Discussion, Recommendations and Conclusion

   This Chapter explain about the discussion, summary and conclusion on the

research done. Besides that, recommendation from the expert in the industry are also listed here.

CHAPTER II

LITERATURE REVIEW

2.1 Introduction

The purpose of this study is to develop the occupational framework for Section C Division 30 The Manufacture of Other Transport Equipment that covers five main areas: 301Building of ships and boats; 302 Manufacture of railway locomotives and rolling stock; 303: Manufacture of air and spacecraft and related machinery; 304: Manufacture of military fighting vehicles; 309: Manufacture of transport equipment n.e.c The objectives of this study is to develop Occupational Structure, Occupational Description and responsibilities and to identify job and competencies in demand and emerging skills for this sector. This study will also review the relationship between technology and the industrial revolution in this sector.

This chapter present the literature review that was carried out to understand the current scenario of Other Transport Equipment Manufacturing Industries in Malaysia, government policies and legislation, development plan, supporting government bodies, associations, training institutions and competitiveness at international level. Findings in this chapter were obtained via literature review, document review and focus group discussion with industry experts to obtain insight on the matters at hand from a practitioner's perspective. A survey questionnaire was also used to obtain findings for this research.

2.2 National Skills Development Act 2006 (Act 652)

On June 29, 2006, the National Skills Development Act (Act 652) was formally gazetted. Its purpose is to encourage the growth and enhancement of a person's talents necessary for a profession through skill training and to address other related issues. In other words, the Act acts as national legislation for starting, developing, and putting into effect Malaysia's criteria for skill and training development. The Department of Skills Development (DSD) is the only organisation entrusted with initiating, supervising, and overseeing all processes and procedures put in place under Malaysia Skills Competency Standards (MSCS). In contrast, this Act promotes the implementation of MSCS. The National Skills Development Act is an act to promote, through skills training, the development and improvement of a person's abilities, which are needed for vocation; and to provide for other matters connected there with. The national occupational skills standards shall be used:

a) to develop national curriculum for skills training programmes,
b) for the purposes of conducting skills training, all accredited programmes shall conform to the national occupational skills standards,
c) shall be used as a measure of proficiency leading to the award of a Certificate, and
d) may be utilized in any other way as the director General deems fit.

Under the MSCS, six processes are in place to serve the common objective of contributing to the growth of skilled labour in Malaysia. The system includes identifying the industry-driven and required skills needs, the development of four public documents: 1. the Occupational Framework (OF), 2. the National Occupational Skills Standard (NOSS), 3. Written Instruction Materials (WIM), and 4. Questions and Assessments, followed by 5. the implementation of training at industries and training institutes, and finally 6. a review of industry needs. The whole cycle of the MSCS is depicted in Figure 2.1 below.

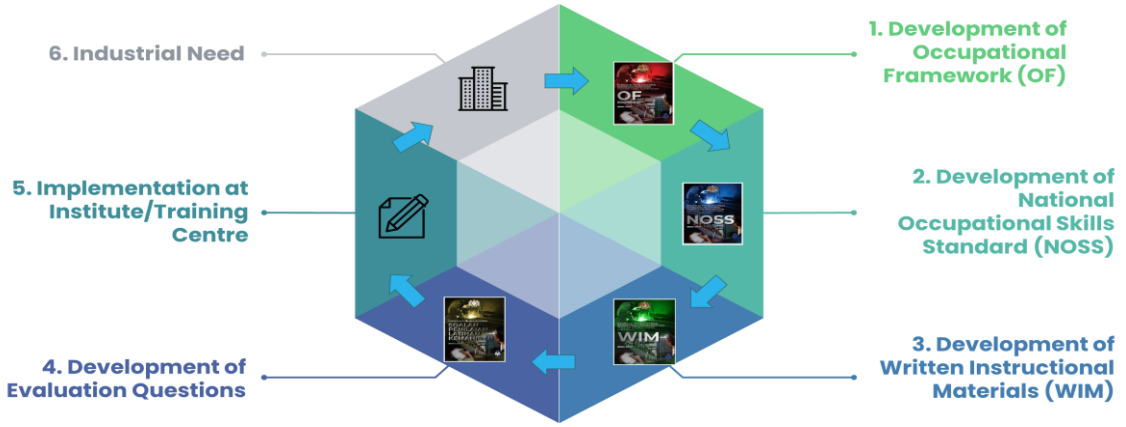

Figure 2.1: Cycle of Malaysian Skills Certification Ecosystem

Source: Department of Skills Development

2.2.1 Occupational Framework

The Occupational Framework (OF) is a document that outlines an Occupational Structure (OS) that comprises job areas and job titles according to the job level of an industry in Malaysia. Through the OF document, the critical jobs, job in demand, competencies in demand, jobs related to technology advancement that related to current industries are discussed, as well as the Occupational Responsibilities (OR) and Occupational Description (OD). OF is developed to cover various types of industries from small, medium and large industries and it also a step in the process of creating relevant NOSS. The classification of an OF is based on Malaysian Standard Industrial Classification (MSIC 2008).

2.2.2 National Occupational Skills Standard (NOSS)

The National Occupational Skills Standard (NOSS) is a document that outlines the competency requirements for a skilled worker working in Malaysia for a certain field and job level as well as the path to achieve those skills (DSD, 2020). NOSS is developed according to the current needs of the job field as well as in line with the career structure in a job field in the industry. It is developed by a group of experts, industry practitioners and skilled workers in their respective fields according to the related industry under the guidance of a trained and certified facilitator. NOSS also outlines the minimum knowledge and skill requirements in terms of competence to perform tasks, functions and roles by a skilled worker according to their respective job fields. As of December 2022,

there are 3,549 NOSS; 2,062 active NOSS (2000 NOSS + 33 NCS + 29 NDTS) (DSD, 2022).

2.2.3 Written Instructional Materials (WIM)

WIM is a document prepared by the instructor for the use of instructors and trainees to assist the teaching and learning process. The purpose of WIM is to (a) be the main learning material in the teaching and learning process: (b) ensure that the Learning Outcome in the Competency Unit (CU) set is achieved; and (c) help the instructor build self-confidence and prepare to carry out the teaching session.

2.2.4 Evaluation Questions

In terms of teaching and learning, assessment can be defined simply as a systematic process to determine the extent to which the objectives of teaching and learning in the lecture room and laboratory are achieved (DSD, 2020). Assessment in the context of the Malaysian Skills Certification System (MSCS) is a process of assessing the level of knowledge and skills as well as safety/environmental attitudes/practices of a candidate who follows a skills training program implemented at a JPK accredited centre. Assessment is done by using various suitable methods to assess the skills of a candidate as desired. The three key characteristics of evaluation are validity, reliability, and representativeness (CIAST, 2021b). Validity refers to the extent to which an assessment measures what it is intended to measure, reliability refers to the consistency and stability of assessment results over time, and representativeness refers to the extent to which an assessment accurately reflects the skills and knowledge required for the job or task being evaluated. The evaluation fully satisfies the requirements specified by NOSS/NCS.

2.2.5 Implementation at Institute / Training Centre

Accredited Centre means a skills training provider, whether a training institution or a workplace (workplace) that has been approved by JPK to conduct skills training and offer Malaysian Skills Certification for certain fields and skill levels based on NOSS (DSD, 2020). There are two categories of Certified Centres, Public Accredited Centre and Private Certified Centre. The programs offered are based on the National Employment Skills Standard (NOSS) that has been developed. Skills training means work-based and

industry-oriented activities that aim to provide knowledge, skills and attitudes required for the implementation of a task or work effectively, efficiently, and includes review, extension, updating and specific training related to work (DSD, 2020).

2.2.6 Industrial Need

When it comes to skills development in the industrial sector, there are specific skills and competencies that industries require in order to enhance their productivity, efficiency, and profitability. The nature of these skills may be either technical or non-technical, and they vary depending on the industry in question. To develop a training curriculum or written instructional material that meets the needs of the industry, the training centre may design a program that is either full-time or customized to meet the specific needs of the industry. It is important for the training centre to have a clear understanding of the skills required by the industry in order to develop an appropriate training program. Additionally, it is necessary to conduct a basic assessment of the retraining needs of instructors and trainers to ensure they are equipped with the necessary skills to meet the current industry demands (DSD, 2020).

2.3 Malaysia Standard Industrial Classification (MSIC) 2008

Malaysia Standard Industrial Classification 2008 (MSIC) Ver. 1.0 is a classification of all economic activities in Malaysia which adopts the International Standard Industrial Classification (ISIC) Revision 4 released in December 2006, with the necessary modifications to meet national requirements. It replaces the MSIC 2000 which was based on ISIC Revision 3.

The main purpose of the MSIC is to provide a set of activity categories that can be used for the collection and presentation of statistics according to such activities. Industries are then formed by grouping units with a common primary activity, according to specified similarity criteria. MSIC can then be used to produce statistics by activity or by industry, for enterprises as well as for establishments or kind of activity units.

The objective of an industrial classification system is to classify data in respect of the economy according to categories of activities and the characteristics of which will be similar. MSIC is a classification of kinds of economic activity and not a classification of

goods and services or a classification of occupations.

2.3.1 Scope of Occupational Framework Based on MSIC 2008 – Manufacture of Other Transport Equipment

Based on the MSIC 2008 classification, the Manufacture of Other Transport Equipment is categorized under the section C and division 30 (C30). The scope of Occupational Framework for C30 includes the manufacture of transportation equipment such as ship building and boats manufacturing, the manufacture of railroad rolling stock and locomotives, air and spacecraft and the manufacture of parts thereof. Table 2.1 presents the summary of C30 scope based on the category, while Table 2.2 shows the description of scope based on MSIC 2008.

Table 2.1: C30 – Manufacture of Other Transport Equipment scope based on MSIC 2008 category.

Category	Code	Description
Section	C	Manufacturing
Division	30	Manufacture of Other Transport Equipment
Group	301	Building of ships and boats
	302	Manufacture of railway and rolling stock
	303	Manufacture of air and spacecraft and related machinery
	304	Manufacture of military fighting vehicles
	309	Manufacture of transport equipment n.e.c.

Table 2.2: Description of scope based on MSIC Classification for Division C30 (MSIC, 2008)

CLASSIFICATION	CODE	DESCRIPTION
SECTION	C	Manufacturing
DIVISION	30	MANUFACTURE OF OTHER TRANSPORT EQUIPMENT This division includes the manufacture of transportation equipment such as ship building and boat manufacturing, the manufacture of

CLASSIFICATION	CODE	DESCRIPTION
		railroad rolling stock and locomotives, air and spacecraft and the manufacture of parts thereof.
GROUP	301	Building of ships and boats This group includes the building of ships, boats and other floating structures for transportation and other commercial purposes, as well as for sports and recreational purposes.
CLASS	3011	Building of ships and floating structures
ITEM	30110	Building of ships and floating structures Includes: (a) building of commercial and passenger vessels (b) building of ferry-boats (c) building of cargo ships, tankers, tugs, etc. (d) building of warship (e) building of fishing boats and fish-processing factory vessels (f) building of hovercraft (except recreation-type hovercraft) (g) construction of drilling platforms, floating or submersible (h) floating docks, dock fender and deck fender, pontoons, coffer-dams, floating landing stages, buoys, floating tanks, barges, lighters, floating cranes, non-recreational inflatable rafts, etc. (i) manufacture of sections for ship and floating structures (j) factory rebuilding of ships Excludes: (a) manufacture of parts of vessels, other than major hull assemblies: -manufacture of sails, see 13922 -manufacture of ships' propellers, see 25999 -manufacture of iron or steel anchors, see 25999 -manufacture of marine engines, see 2811 (b) manufacture of navigational instruments, see 26511 (c) manufacture of lighting equipment for ships, see 2740 (d) manufacture of amphibious motor vehicles, see 29102 (e) manufacture of inflatable boats or rafts for recreation, see 3012 (f) specialized repair and maintenance of ships and floating structures, see 3315

CLASSIFICATION	CODE	DESCRIPTION
		(g) ship-breaking, see 38301 (h) interior installation of boats, see 43306
CLASS	3012	Building of pleasure and sporting boats
ITEM	30120	Building of pleasure and sporting boats Includes: (a) manufacture of inflatable boats and rafts (b) building of sailboats with or without auxiliary motor (c) building of motor boats (d) building of recreation-type hovercraft (e) manufacture of personal watercraft (f) manufacture of other pleasure and sporting boats, such as canoes, kayaks, rowing boats, skiffs, etc. Excludes: (a) manufacture of parts of pleasure and sporting boats: -manufacture of sails, see 13922 -manufacture of iron or steel anchors, see 2599 -manufacture of marine engines, see 2811 (b) building of sailboats with or without auxiliary motor (b) manufacture of sailboards and surfboards, see 3230 (c) maintenance, repair or alteration of pleasure boats, see 3315
GROUP	302	Manufacture of railway locomotives and rolling stock This group includes manufacture of electric, diesel, steam and other rail locomotives, manufacture of self-propelled railway or tramway coaches, vans and trucks, maintenance or service vehicles, manufacture of railway or tramway rolling stock, not self-propelled, manufacture of specialized parts of railway or tramway locomotives or of rolling stock, manufacture of mechanical and electromechanical signalling, safety and traffic control equipment for railways, tramways, inland waterways, roads, parking facilities, airfields, etc., manufacture of mining locomotives and mining rail cars and manufacture of railway car seats.
CLASS	3020	Manufacture of railway locomotives and rolling stock
ITEM	30200	Manufacture of railway locomotives and rolling stock

CLASSIFICATION	CODE	DESCRIPTION
		Includes: (a) manufacture of electric, diesel, steam and other rail locomotives (b) manufacture of self-propelled railway or tramway coaches, vans and trucks, maintenance or service vehicles (c) manufacture of passengers coaches, goods vans, tank wagons, self- discharging vans and wagons, workshop vans, crane vans, tenders, etc. (d) manufacture of bogies, axles and wheels, brakes and parts of brakes, hooks and coupling devices, buffers and buffer parts, shock absorbers, wagon and locomotives frames, bodies, corridor connections, etc. (e) manufacture of mechanical and electromechanical signalling, safety and traffic control equipment for railways, tramways, inland waterways, roads, parking facilities, airfields (f) manufacture of mining locomotives and mining rail cars (g) manufacture of railways car seats (h) factory rebuilding of locomotives and railroad cars Excludes: (a) manufacture of unassembled rails, see 24109 (b) manufacture of assembled railway track fixtures, see 25999 (c) manufacture of electric motors, see 27101 (d) manufacture of electrical signalling, safety or traffic-control equipment, see 27900 (e) manufacture of engines and turbines, see 28110
GROUP	303	Manufacture of air and spacecraft and related machinery This group includes manufacture of airplanes for the transport of goods or passengers, for use by the defence forces, for sport or other purposes, manufacture of helicopters, manufacture of gliders, hang-gliders, manufacture of dirigibles and hot air balloons, manufacture of parts and accessories of the aircraft of this group such as major assemblies such as fuselages, wings, doors, control surfaces, landing gear, fuel tanks, nacelles, etc., airscrews, helicopter rotors and propelled rotor blades, motors and engines of a kind typically found on aircraft, parts of turbojets and turboprops for aircraft, manufacture of ground flying trainers, manufacture of spacecraft and launch vehicles, satellites, planetary probes, orbital stations, shuttles,

CLASSIFICATION	CODE	DESCRIPTION
		manufacture of intercontinental ballistic missiles (ICBM), overhaul and conversion of aircraft or aircraft engines and manufacture of aircraft seats.
CLASS	3030	Manufacture of air and spacecraft and related machinery
ITEM	30300	Manufacture of air and spacecraft and related machinery Includes: (a) manufacture of airplanes for transport of goods or passengers, for use by the defence forces, for sport or other purposes (b) manufacture of helicopters (c) manufacture of gliders, hand-gliders (d) manufacture of dirigibles and hot air balloons (e) manufacture of parts and accessories of the aircraft of this class: -major assemblies (e.g. fuselages, wings, doors, control surfaces, landing gear, fuel tanks, nacelles, lighting equipment, etc.) -airscrews, helicopter rotors and propelled rotor blades -motors, engines and parts of a kind typically found on aircraft -parts of turbojets and turbo propellers for aircraft (f) manufacture of aircraft seats (g) manufacture of ground flying trainers (h) manufacture of spacecraft and launch vehicles, satellites, planetary probes, orbital stations, shuttles, etc. (i) manufacture of intercontinental ballistic missiles (ICBM) (j) overhaul and conversion on aircraft or aircraft engines (k) factory rebuilding of aircraft Excludes: (a) manufacture of parachutes, see 13922 (b) manufacture of military ordinance and ammunition, see 2520 (c) manufacture of telecommunication equipment for satellites, see 2630 (d) manufacture of aircraft instrumentation and aeronautical instruments, see 26511 (e) manufacture of air navigation system, see 2651 (f) manufacture of lighting equipment for aircraft, see 2740 (g) manufacture of ignition parts and other electrical parts for

CLASSIFICATION	CODE	DESCRIPTION
		internal combustion engines, see 27900 (h) manufacture of pistons, piston rings and carburettors, see 2811 (i) manufacture of aircraft launching gear, aircraft carrier catapults and related equipment, see 2829
GROUP	304	Manufacture of military fighting vehicles This group includes manufacture of tanks, manufacture of armoured amphibious military vehicles and manufacture of other military fighting vehicles.
CLASS	3040	Manufacture of military fighting vehicles
ITEM	30400	Manufacture of military fighting vehicles Includes: (a) manufacture of tanks (b) manufacture of armoured amphibious military vehicles (c) manufacture of other military fighting vehicles Excludes: manufacture of weapons and ammunitions, see 2520
GROUP	309	Manufacture of transport equipment n.e.c. This group includes the manufacture of transport equipment other than motor vehicles and rail, water, air or space transport equipment and military vehicles.
CLASS	3091	Manufacture of motorcycles
ITEM	30910	Manufacture of motorcycles Includes: (a) manufacture of motorcycles, mopeds and cycle fitted with an auxiliary engine (b) manufacture of engines for motorcycles (c) manufacture of sidecars (d) manufacture of parts and accessories for motorcycles (e) manufacture of scooters Excludes:

CLASSIFICATION	CODE	DESCRIPTION
		(a) manufacture of bicycles, see 30920 (b) manufacture of invalid carriages, see 30920
CLASS	3092	Manufacture of bicycles and invalid carriages
ITEM	30920	Manufacture of bicycles and invalid carriages Includes: (a) manufacture of non-motorized bicycles and other cycles, including (delivery) tricycles, tandems, children's bicycles and tricycles (b) manufacture of parts and accessories of bicycles (saddles etc.) (c) manufacture of invalid carriages with or without motor (d) manufacture of parts and accessories of invalid carriages (e) manufacture of baby carriages (f) manufacture of wheelchairs Excludes: (a) manufacture of bicycles with auxiliary motor, see 3091 (b) manufacture of wheeled toys designed to be ridden, including plastic bicycles and tricycles, see 3240
CLASS	3099	Manufacture of other transport equipment n.e.c.
ITEM	30990	Manufacture of other transport equipment n.e.c. Includes: (a)manufacture of hand-propelled vehicles (luggage trucks, handcarts, sledges, shopping carts, etc.) (b) manufacture of vehicles drawn by animals (sulkies, donkey-carts, hearses, etc.) Excludes: (a) works trucks, whether or not fitted with lifting or handling equipment, whether or not self-propelled, of the type used in factories (including hand trucks and wheelbarrows), see 2816 (b) decorative restaurant carts, such as desert cart, food wagons, see 3100

2.4 Malaysian Occupational Skills Qualification Framework (MOSQF)

The Malaysia Occupational Skill Framework (MOSQF) is a comprehensive system that classifies and organizes occupational skills and competencies in Malaysia. The framework organizes occupational skills and competencies into eight (8) different levels, ranging from entry-level to expert-level. Each competency level corresponds to different level of complexity, knowledge and autonomy required to demonstrate the competence commensurate to that level's knowledge, experience and versatility in application as depicted in the Table 2.3. These levels align with the different stages of an individual's career development, from early-stage apprenticeships to advanced levels of proficiency.

Table 2.3: Malaysian Occupational Skills Qualification Framework (MOSQF) Table

Level	Level Descriptors
8	Achievement at this level reflects the ability to develop original understanding and extend a sub-area of knowledge or professional practice. It reflects the ability to address problematic situations that involve many complexes, interacting factors through initiating, designing and undertaking research, development or strategic activities. It involves the exercise of broad autonomy, judgement and leadership in sharing responsibility for the development of a field of work or knowledge, or for creating substantial professional or organisational change. It also reflects a critical understanding of relevant theoretical and methodological perspectives and how they affect the field of knowledge or work.
7	Achievement at this level reflects the ability to reformulate and use relevant understanding, methodologies and approaches to address problematic situations that involve many interacting factors. It includes taking responsibility for planning and developing courses of action that initiate or underpin substantial change or development, as well as exercising broad autonomy and judgment. It also reflects an understanding of theoretical and relevant methodological perspectives, and how they affect their sub-area of study or work.
6	Achievement at this level reflects the ability to refine and use relevant understanding, methods and skills to address complex problems that have limited

Level	Level Descriptors
	definition. It includes taking responsibility for planning and developing courses of action that are able to underpin substantial change or development, as well as exercising broad autonomy and judgment. It also reflects an understanding of different perspectives, approaches or schools of thought and the theories that underpin them.
5	Achievement at this level reflects the ability to identify and use relevant understanding, methods and skills to address broadly-defined, complex problems. It includes taking responsibility for planning and developing courses of action as well as exercising autonomy and judgment within broad parameters. It also reflects the understanding of different perspectives, approaches or schools of thought and the reasoning behind them.
4	Achievement at this level reflects the ability to identify and use relevant understanding, methods and skills to address problems that are well defined but complex and non-routine. It includes taking responsibility for overall courses of action as well as exercising autonomy and judgment within fairly broad parameters. It also reflects the understanding of different perspectives or approaches within a sub-area of study or work.
3	Achievement at this level reflects the ability to identify and use relevant understanding, methods and skills to complete tasks and address problems that are well defined with a measure of complexity. It includes taking responsibility for initiating and completing tasks and procedures as well as exercising autonomy and judgments within limited parameters. It also reflects awareness of different perspectives or approaches within a sub-area of study or work.
2	Achievement at this level reflects the ability to select and use relevant knowledge, ideas, skills and procedures to complete well-defined tasks and address straightforward problems. It includes taking responsibility for completing tasks and procedures and exercising autonomy and judgment subject to overall direction or guidance.

Level	Level Descriptors
1	Achievement at this level reflects the ability to use relevant knowledge, skills and procedures to complete routine and predictable tasks that include responsibility for completing tasks and procedures subject to direction or guidance.

2.5 Background of Manufacture of Other Transport Equipment Industry

The C30 industry, which encompasses the manufacture of other transport equipment, is a significant contributor to Malaysia's economy. This industry is characterized by its diverse range of applications, including the production of ships, railway and rolling stock, aerospace and defence equipment, and other forms of transport equipment, such as bicycles and motorcycles.

In Malaysia, the C30 industry is a key driver of economic growth and development, contributing to the country's industrialization and technological advancement. The industry is also a significant source of employment and investment, with many multinational companies operating in the country, such as Honda, Toyota, and Boeing.

The significance of the C30 industry in Malaysia is reflected in its contribution to the country's exports, particularly in the aerospace and defence sector. According to the Malaysia External Trade Development Corporation (MATRADE), the aerospace sector accounted for RM 13.5 billion in exports in 2020, representing a significant increase from the RM 8.2 billion recorded in 2016 (MARTRADE, 2021).

The shipbuilding industry in Malaysia has significant potential for growth, especially in the offshore oil and gas sector. The Ministry of International Trade and Industry (MITI) has reported that Malaysia has the capability to manufacture various types of seagoing vessels, including floating production storage and offloading (FPSO) units, drilling rigs, and support vessels (MITI, 2021). The Malaysian shipbuilding sub-sector encompasses companies that manufacture seagoing vessels and marine equipment. These companies also offer related services such as ship design and the

upgrade/conversion of vessels. With its strategic location and skilled workforce, Malaysia is well-positioned to tap into the growing demand for seagoing vessels worldwide, particularly in the offshore oil and gas industry. The expansion of the shipbuilding industry is expected to have positive ripple effects on the Malaysian economy, creating job opportunities and contributing to the development of related industries and infrastructure (Menhat et al., 2021).

The railway and rolling stock industry is an important sub-sector of the C30 industry in Malaysia. The industry comprises the manufacturing of locomotives, coaches, wagons, and other railway equipment, as well as the maintenance, repair, and overhaul of existing rolling stock. The Malaysian railway industry has been growing steadily in recent years, with the government's focus on expanding the country's railway network and improving its transportation infrastructure.

The designing, manufacturing and assembling activities shown in Figure 2.2 can be divided into several tiers, where generally the top tier is held by the final integrator who designs and manufactures full train systems for rail operators such as high-speed trains, metros, trams, and monorails. The second tier of the rail industry includes companies that manufacture major systems and subsystems, including as propulsion systems, bogies, and others. The first and second tiers are supported by various suppliers of parts and components.

More than thirty companies in Malaysia are involved in the design, manufacturing, and assembly of rail-related products. In 2010, the group's total sales were RM427 million, and it employed 408 technical employees and 529 non-technical employees. SCOMI is a local manufacturer that is currently capable of constructing a complete train system. (MIGHT, 2014). The company has successfully delivered and supported the monorail systems in Malaysia which is operated by Rapid Rail. In addition, it has also managed to secure contracts from Brazil and India. Hartasuma is another local company that is competent to do assembly, and it has secured a contract to construct Bombardier's train parts for the Kelana Jaya Line LRT. Another participant, SMH Rail, is capable of flash butt welding of rail track and axle manufacturing and, to a lesser extent, refurbishment of locomotives, whereas PSI In-Control specialises in systems integration and consequently offers integrated communication solutions, and Sutera Teknik

specialises in heating, ventilation, and air conditioning (HVAC) equipment. There are also a host of other smaller but capable players (MIGHT, 2014).

Figure 2.2: Manufacturing tiers of railway and rolling stock industry (MIGHT, 2014)

The industry has attracted significant investment from both domestic and foreign players, including Chinese companies such as CRRC and China Communications Construction Company. One of the most significant developments in the railway industry in Malaysia is the construction of the East Coast Rail Link (ECRL) project. This 665-kilometer railway line, which is expected to be completed by 2027, will connect the east coast states of Kelantan, Terengganu, and Pahang to the west coast states of Selangor and Negeri Sembilan, and eventually to the port of Klang. The ECRL project is estimated to cost RM 44 billion and is expected to generate significant economic benefits for the country (Bernama, 2021).

The rolling stock industry in Malaysia has also seen growth in recent years, with the establishment of new manufacturing facilities and the acquisition of advanced technologies. For example, in 2018, CRRC Zhuzhou Locomotive Co. Ltd. and Malaysia's

Eversendai Corporation Berhad established a joint venture to manufacture metro trains in Malaysia (China Daily, 2018).

With 25,000 workers currently employed in rail-related activities, the sub-sector aims to employ 68,000 by 2030. The Government's vision for the Malaysian rail sub-sector is that by 2030, the industry will be a strong and sustainable business, capable of satisfying the demands of national rail transportation. It also hopes that Malaysia can become a competitive global industry player that optimises the use of indigenous resources and technologies. Thus, the Government supports these initiatives and will assist local companies to advance to the next level by way of technology transfers.

The significance of the railway and rolling stock industry in Malaysia is reflected in its contribution to the country's transportation infrastructure, economic development, and employment opportunities (International Railway Journal, 2018). The industry also has the potential to generate significant export revenue, particularly to other developing countries in the region.

The aerospace industry in Malaysia has experienced significant growth and is now the second-largest in Southeast Asia, providing over 27,500 jobs (MIDA, 2020b) mainly in the maintenance, repair, and overhaul (MRO) and aero-manufacturing subsectors. Between 2017 and 2019, the Malaysian Investment Development Authority (MIDA) approved 31 projects with a total investment value of RM3.54 billion, resulting in the creation of 4,038 job opportunities (MIDA, 2020b).

Initially, the Malaysian aerospace industry was small and focused on the domestic market, but it has since expanded to include over 230 domestic and foreign companies that generated RM16.2 billion in total revenue in 2019. The industry is projected to contribute RM20.4 billion in revenue for MRO services, RM21.2 billion for aero-manufacturing, and RM13.6 billion for engineering and design services by 2030.

Malaysia ranks among the top three in the Asia-Pacific region for MRO services and is expected to remain competitive due to its strategic location and accessibility to the region, as well as its low costs and availability of skilled labour.

The Malaysian military vehicle industry has been growing steadily in recent years,

with the government's focus on strengthening the country's defence capabilities and improving its domestic defence industry. The industry has attracted significant investment from both domestic and foreign players, including companies such as DefTech and DRB-Hicom Defence Technologies.

One of the most significant developments in the Malaysian military vehicle industry is the development of the DefTech AV8 Gempita, an eight-wheeled armoured personnel carrier designed and manufactured by DefTech. The AV8 Gempita is the first military vehicle designed and manufactured in Malaysia and is used by the Malaysian Army (Army Technology, 2021).

The manufacture of bicycles and motorcycles in Malaysia is also an important sub-sector of the C30 industry, supporting the country's growing cycling culture and promoting environmental sustainability. According to the Malaysian Industrial Development Authority (MIDA, 2020b), Malaysia is the largest bicycle producer in Southeast Asia, exporting over 90% of its production to markets such as Europe, the United States, and Japan.

In summary, the C30 industry in Malaysia is a vital component of the country's economy, driving industrialization, technological advancement, and employment opportunities. Its significance is reflected in its contribution to Malaysia's exports, particularly in the aerospace and defence sector, and its potential for growth in the shipbuilding and offshore oil and gas sectors.

The significance of the manufacture of military vehicles in Malaysia is reflected in its contribution to the country's defence capabilities, as well as its potential to generate significant export revenue. The industry has also created employment opportunities and helped to develop the country's engineering and manufacturing capabilities.

2.6 Industry and Market Analysis

The C30 manufacturing of other transport equipment industry in Malaysia includes various sub-sectors, such as shipbuilding, railway and rolling stock, air and spacecraft, military vehicles, and other transport equipment. These sub-sectors play a vital role in Malaysia's economy, generating significant revenue and providing employment

opportunities.

a) C301 Building Ships and Boats

The Shipbuilding and Ship Repair (SBSR) industry is a sub-sector of the wider marine transport industry, encompassing various activities related to the production of vessels and marine equipment. These activities include shipbuilding, designing, repairing, maintaining, converting, and upgrading vessels and marine equipment. Malaysia boasts over 100 shipyards that primarily focus on the construction of small to medium-sized vessels.

In 2021, Malaysia experienced a 12.2% decrease in exports of ships, boats, and floating structures, with total revenue amounting to RM0.72 billion compared to RM0.82 billion in 2020 (MITI, 2022). The primary export markets for these products, including tugs and pusher craft, yachts and other vessels for pleasure or sports, cruise ships, cargo ships, barges, light vessels, dredgers, floating docks, and floating structures, were the United States, Indonesia, the United Arab Emirates, India, and Singapore.

On the other hand, imports of cruise ships, cargo ships, barges, light vessels, dredgers, floating docks, and floating structures fell by a significant 91.4% to RM0.89 billion in 2021, down from RM10.31 billion in 2020 (MITI, 2022). These imported items were mainly sourced from China, the United States, Brunei Darussalam, Japan, and Singapore.

b) C302 Manufacture of Railway and Rolling Stock

According to the Malaysia International Trade and Investment report in 2020, Malaysia's exports of ships, boats, and floating structures decreased by 12.2% to RM0.72 billion in 2021 from RM0.82 billion in the previous year (MITI, 2022). The top markets for these products, including pleasure and sports vessels, cargo ships, dredgers, and floating docks, were the United States, Indonesia, the United Arab Emirates, India, and Singapore. In contrast, Malaysia's imports of these items fell drastically by 91.4% to RM0.89 billion in 2021, down from RM10.31 billion in 2020. Major imports such as cruise ships, barges, light vessels, and floating structures were primarily sourced from China, the United States, Brunei Darussalam, Japan, and Singapore (MITI, 2022).

Between January and September 2021, the SBSR industry approved two new projects and one expansion project with a total investment value of RM28.3 million (MITI, 2022). The demand for commercial vessels was the driving force behind these investments, and they are expected to create additional job opportunities for local residents. The government's initiatives to enhance the railway infrastructure in Malaysia are expected to drive further growth in this sub-sector. Between January and September 2021, the SBSR industry in Malaysia approved two new projects and one expansion project, totalling RM28.3 million (MITI, 2022). These investments were made in response to the demand for commercial vessels and are expected to create more job opportunities for local residents.

c) C303 Manufacture of Air and Spacecraft

A total of two (2) new projects worth a total RM104.7 million were approved in the aerospace sector in 2021, comprising RM65 million in FDI and RM39.7 million from domestic investors (MITI, 2022). These projects, which involve the aerospace manufacturing sector supplying to Tier 1 and Tier 2 companies, are expected to generate 247 job opportunities. With the concerted and coordinated implementation of industrial development strategies, the Malaysian aerospace industry is poised to contribute an annual revenue of RM30 billion and create 30,000 highly skilled jobs by 2025 (MITI, 2022).

d) C304 Manufacture of Military Vehicles

The manufacture of military vehicles sub-sector in Malaysia has been identified as having significant growth potential. In 2019, the sector's total exports amounted to RM 353 million, representing a 4.2% increase from the previous year. The sector's total investments amounted to RM 64 million, with the majority of investments being in the manufacture of military vehicles and components.

e) C309 Manufacture of Other Transport Equipment n.e.c

The manufacture of other transport equipment n.e.c sub-sector in Malaysia has shown steady growth in recent years. In 2019, the sector's total exports amounted to RM 3.3 billion, representing a 2.1% increase from the previous year. The sector's total

investments amounted to RM 194 million, with the majority of investments being in the manufacture of bicycles and components.

In terms of regional market analysis, the Asia-Pacific region is expected to dominate the market for transport equipment, driven by the increasing demand for transport infrastructure and the expanding industrialization and urbanization in the region. The global market for aerospace and defence is also expected to show steady growth, driven by the increasing demand for air travel and the modernization of defence systems.

In conclusion, the C30 manufacturing of other transport equipment industry in Malaysia presents significant growth opportunities, driven by the expanding global demand for transport equipment and the government's initiatives to support the industry. The shipbuilding and ship repair sub-sector, railway and rolling stock sub-sector, and the manufacture of air and spacecraft sub-sector are expected to lead the growth in the industry, while the other sub-sectors also present growth potential. The government's supportive policies, such as the SBSR industry incentives and the National Aerospace Industry Coordinating Office, have also contributed to the growth of the industry by attracting foreign investments and promoting local capabilities.

However, the industry also faces challenges such as intense global competition and the need for continuous innovation to keep up with changing consumer demands and technological advancements. It is essential for the industry players to invest in research and development, improve their supply chain management, and maintain high-quality standards to remain competitive in the global market.

Overall, the C30 manufacturing of other transport equipment industry in Malaysia has a promising future, driven by the country's strategic location, skilled workforce, and supportive government policies. As the global demand for transport equipment continues to grow, Malaysia has the potential to become a significant player in the industry, providing high-quality products and services to the world.

The value of Malaysian manufacturing sales in December 2022 was RM156.3 billion, up 8.6% from RM143.9 billion in December 2021 (DoSM, 2022b). The gain in sales value for December 2022 was led by a number of subsectors, including

Manufacturer of Other Transport Equipment with the sales value of RM1.7 billion (10.9%) (DoSM, 2022b).

The performance of the Industrial Production Index (IPI) in 2022 increased by 6.9% compared to the year before (DoSM, 2022c). The major contributor to the growth was by the indexes for manufacturing (8.2%), whereby the manufacture of other transport equipment n.e.c. contribute to 13% from the overall in 2022 (DoSM, 2022c). This indicate that this industry's demand is substantial and rising.

2.6.1 Growth of Manufacturing of Other Transport Equipment Industry

Table 2.4 illustrates the sales value and percentage change of C30 Manufacturing of other transport equipment, based on the most recent data published by DoSM on 7 February 2023. DoSM reported that the total sales value for C30 in the year 2021 increased by 8.9% and with a total sales value of RM 14,103 million; and in 2022 the total sales value increased to RM15,690 million and annual percentage change is 11.3%.

In terms of sub sector, total sales value also increased for shipbuilding industry in the year 2021 (Total sales value = RM5,121million: Annual Percentage change = 50.7%) and for the year 2022 (Total Sales value= RM5,169 million;0.9%) there's a slight increase compared to the year 2020.

However, the total sales value for C302,303,304 and 309 only increased for the year 2022 (Total Sales Value = RM 10,521 million; Annual Percentage Change = 17.1%) and not for the year 2020 (Total Sales Value = RM9,546 million; Annual percentage Change = -9.3%) and for the year 2021 (Total sales reduce to RM 8,983 and Annual percentage Change = -5.9%).

Based on the data and explanation, the manufacture of other transport equipment is advancing, expanding in demand, and contributing to the expansion of the Malaysian market.

Table 2.4: Sales Value and Percentage Change of C30 Manufacture of Other Transport Equipment at Industry Level (DoSM, 2023)

Group Code	Group Description / Period	2020		2021		2022	
		Sales Value (million)	Annual Change (%)	Sales Value (million)	Annual Change (%)	Sales Value (million)	Annual Change (%)
301	**Building of ships and boats**	**3,399**	**-20.5**	**5,121**	**50.7**	**5,169**	**0.9**
302,303, 304 & 309	**Manufacture of railway locomotives, rolling stock, air and spacecraft, related machinery, military fighting vehicles and transport equipment n.e.c**	**9,546**	**-9.3**	**8,983**	**-5.9**	**10,521**	**17.1**
	Manufacture of motorcycles[1]	*2,352*	*-32.1*	*2,041*	*-13.2*	*2,577*	*26.3*
	Manufacture of bicycles and invalid carriages[2]	*2,240*	*26.1*	*2,317*	*3.4*	*2,879*	*24.3*
	Other industry[3]	*4,955*	*-6.2*	*4,625*	*-6.6*	*5,066*	*9.5*
C30	**Total**	**12,945**	**-12.5**	**14,103**	**8.9**	**15,690**	**11.3**

2.6.2 Value Chain Related to Manufacture of Other Transport Equipment

Value chain analysis is a powerful tool for understanding the key activities and costs involved in a manufacturing process, and for identifying opportunities to enhance competitiveness and optimize performance. In the case of the manufacturing of other transport equipment, conducting a value chain analysis can provide insights into how to

[1] Group of class 3091 for Group 309 according to MSIC 2008.
[2] Group of class 3092 for Group 309 according to MSIC 2008.
[3] Group of class 3099 for Group 309 according to MSIC 2008.

create and sustain a competitive advantage in this industry. Figure 2.3 shows illustrates the value chain model for manufacturing of other transport equipment industry and activities related to them.

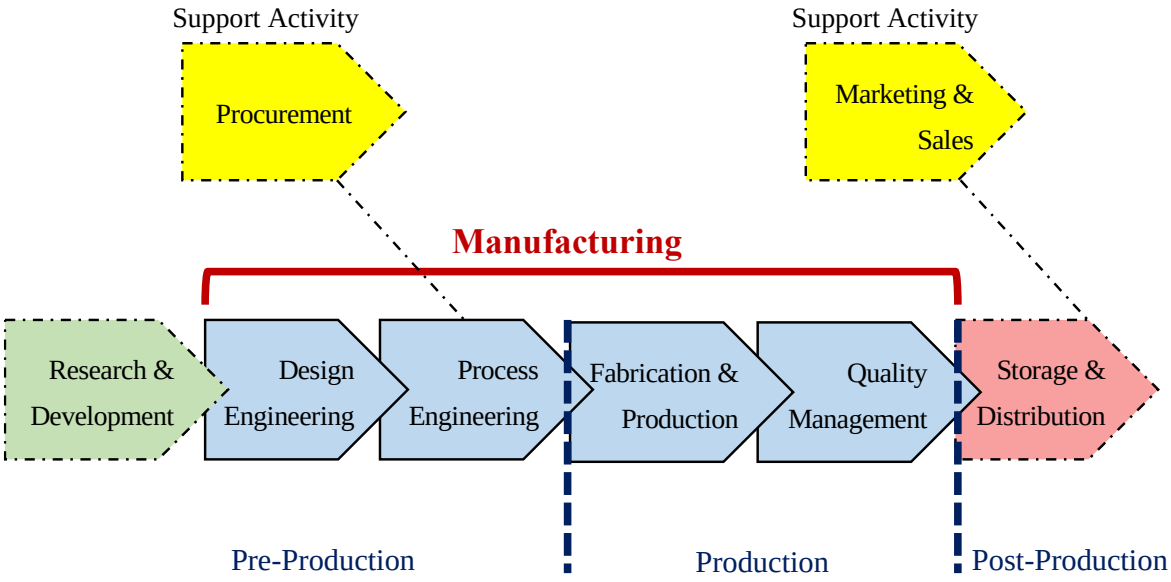

Figure 2.3: Value chain for manufacturing of other transport equipment. (Adapted from the Stan Shih commodity chains and added value concept (Rodrigue, 2020))

The value chain for the manufacturing of other transport equipment is divided in to three sections, which are the pre-production, production and post-production. It begins with research and development and end with the storage and distribution. In between the begin and the end, is the manufacturing process, which include the design engineering, process engineering, fabrication and production, and quality management. While there are also support activities during the pre-production process which is the procurement stage, and post-production process which are marketing and sales of a product.

The most important area in this study, which related to the scope of the study, is the manufacturing stage. The design and development stage involves the creation of blueprints and plans for the transport equipment, as well as testing (prototype) and refining of the plan. The process engineering stage defines the planning, designing and improving of manufacturing and assembly processes of the transport equipment. The fabrication and production stage involves the fabricating and assembly the transport

equipment products to a complete product. The quality management stage involves testing and evaluations to ensure that the product meets all the required specifications and standards before handing over to the customer.

Therefore, manufacturing process which include design engineering, process engineering, fabrication and production, and quality management is a vital component in ensuring the advancement and competitiveness of the C30 industry.

2.6.3 Employment Statistics

The total number of employees in the Manufacturing sector augmented 3.4 per cent in December 2022, accounted for 2,335,435 persons (December 2021: 2259,619 persons). During the same reference month, the number of employees rose 0.3 per cent from 2,328,070 persons which registered in the previous month (DoSM, 2022a).

Salaries & wages paid in December 2022 amounted to RM8,561.5 million, grew 5.4 per cent or RM440.0 million as against to the same month of 2021. As compared to the preceding month, the total salaries & wages paid increased 8.5 per cent (RM671.7 million) from RM7,889.9 million in November 2022 (DOSM, 2022a).

The employment data for the industry of manufacturing other transport equipment indicates a steady increase as shown in Table 2.5. The total number of employees in the Manufacturing of Other Transport Equipment Division rose 4.4 per cent in December 2022, accounted for 43,427 persons (December 2021: 41,596 persons).

Table 2.5: Number and Annual Percentage Change of Paid Employees of Manufacture of Other Transport Equipment (DoSM, 2023)

C30 Group Code	Group Description/ Period	2020		2021		2022	
		Number	Annual Percentage Change (%)	Number	Annual Percentage Change (%)	Number	Annual Percentage Change (%)
301 (30110 & 30120)	**Building of ships and boats**	**12,296**	**-1.2**	**12,847**	**-0.6**	**13,936**	**8.5**
302, 303, 304 & 309	**Manufacture of railway locomotives, rolling stock, air and spacecraft, related machinery, military fighting vehicles and transport equipment n.e.c**	**28,327**	**-12.4**	**28,749**	**1.5**	**29,491**	**2.6**
	Manufacture of motorcycles[4]	*11,021*	*-7.6*	*11,399*	*3.4*	*11,782*	*3.4*
	Manufacture of bicycles and invalid carriages[5]	*3,467*	*-23.0*	*3,222*	*-7.1*	*3,464*	*7.5*
	Other industry[6]	*13,839*	*-12.9*	*14,129*	*2.1*	*14,244*	*0.8*
C30	**Total**	**41,252**	**-9.2**	**41,596**	**0.8**	**43,427**	**4.4**

[4] Group of class 3091 for Group 309 according to MSIC 2008.
[5] Group of class 3092 for Group 309 according to MSIC 2008.
[6] Group of class 3099 for Group 309 according to MSIC 2008.

2.7 NOSS Relevant to MSIC 2008 Section C, Division 30

To date, DSD has developed thirty-seven (37) NOSS under the Section C Division 30. The details of the existing NOSS title relevant to the Manufacturing of Other Transport Equipment are provided in Table 2.6.

Table 2.6: Summary of NOSS developed under Section C, Division 30.

MSIC Group	Relevant NOSS	
C301 - BUILDING OF SHIPS AND BOAT 22 NOSS	1. Hull	1. Ship Hull Construction Management (TP-024-5:2012) 2. Ship Hull Construction Coordination (TP-024-4:2012) 3. Ship Hull & Super Structure Construction (TP-026-3:2013) 4. Marine Hull Senior Technician (TP-024-3) 5. Marine Hull Technician (TP-024-2) 6. Marine Mechanic (R-010-1) 7. Ship Hull Construction and Maintenance Management (Metal) (C301-001- 5:2018) 8. Ship Hull Construction and Maintenance Coordination (Metal) (C301-001-4:2018) 9. Marine Hull Fabrication, Installation and Maintenance Supervision (Steel) (TP-028-3:2014) 10. Marine Hull Fabrication, Installation and Maintenance (Steel) (TP-028- 2:2014)
	2. Boat Making (Fiber Glass)	1. Fiberglass Boat Manufacturing Management (TP-022-5:2016) 2. Fiberglass Hull and Superstructure Manufacturing Coordination & Administration (TP-022-4:2016) 3. Fiberglass Hull and Superstructure Manufacturing (TP-022-3:2014)
	3. Ship Building &	1. Ship Piping System Construction & Maintenance Management (C301-002-5:2018) 2. Ship Piping System Construction & Maintenance

MSIC Group	Relevant NOSS	
	Repair- Piping System	Coordination (C301-002-4:2018) 3. Piping Fabrication, Installation and Testing Supervision (TP-029-3:2014) 4. Piping Fabrication, Installation and Testing (TP-029-2:2014)
	4. Ship Building & Ship Repair	1. Marine Electrical Installation, Operation and Maintenance Supervision (TP-035-3:2014) 2. Marine Electrical Installation, Operation and Maintenance (TP-035-2:2014)
	5. Duyung Traditional Boat Maker	1. Duyung Traditional Boat Maker Supervisor (TP-080-3) 2. Senior Duyung Traditional Boat Maker (TP-080-2) 3. Duyung Traditional Boat Maker (TP-080-1)
C309 - MANUFACTURE OF TRANSPORT EQUIPMENT N.E.C. 15 NOSS	1. Motorcycle Body Assembling	1. Automotive Production Management (TP-410-5:2016) 2. Automotive Assembly Control (TP-410-4:2016) 3. Motorcycle Assembly Operation (TP-510- 3:2013)
	2. Motorcycle Final Inspection	1. Motorcycle Final Supervisor (TP-513-3) 2. Motorcycle Final Inspector (TP-513-2)
	3. Motorcycle Engine Assembling	1. Motorcycle Engine Assembling Supervisor (TP-512-3) 2. Motorcycle Engine Assembling Senior Operator (TP-512-2) 3. Motorcycle Engine Assembling Operator (TP-512-1)
	4. Motorcycle Plating	1. Motorcycle Plating Supervisor (TP-511-3) 2. Senior Motorcycle Plating Operator (TP-511-2) 3. Motorcycle Plating Operator (TP-511-1)

MSIC Group	Relevant NOSS	
	5. Motorcycle Painting	1. Motorcycle Painting Operation (TP-010-3:2013)
	6. Motorcycle Fabricator (Welding)	1. Motorcycle Fabrication (TP-500- 3:2013)
	7. Remotely Operated Vehicle (ROV) Design and Construction	1. Remotely Operated Vehicle (ROV) Design and Construction Management (C309-001-5:2019) 2. Remotely Operated Vehicle (ROV) Design and Construction (C309-001-4:2019)

2.8 Industry Comparison Between Malaysia and Selected Countries

This section provides an overview for the selected Asian countries, US, Europe countries and ASEAN countries. According to United Nations Industrial Development Organization (UNIDO, 2022), the top five countries with the largest manufacturing sector and their share in Manufacturing Value Added (MVA) are China, United States of America, Japan, Germany and India. However, Malaysia, Cambodia, Indonesia, Myanmar, and Viet Nam are among the list of countries included in emerging industrial economies (EIEs). In 2020, at the height of the pandemic, this group's MVA grew by 2.6 per cent, while in 2021 it picked up speed and reached 8.0 per cent. (UNIDO, 2022).

The data in Table 2.7 shows the latest data from the United Nations Industrial Development Organization (UNIDO, 2023). UNIDO reveals that China's Index of Industrial Production (IIP) has increased to 133.0, with a 1.6% change compared to the previous month and a 2.9% change compared to the same month of the previous year. This suggests a positive trend in China's industrial production. In contrast, Japan's IIP has risen slightly to 88.1, indicating a stable trend, with a 0.9% change compared to the previous month and a 0.8% change compared to the same month of the previous year. India's IIP has dropped to 107.4, showing a negative trend, with a -7.0% change compared

to the previous month and a -1.6% change compared to the same month of the previous year. Similarly, the Republic of Korea's IIP has decreased to 68.9, indicating a negative trend, with a -6.3% change compared to the previous month and a 2.8% change compared to the same month of the previous year. In summary, the latest data highlights a strong performance of China's industrial production, stability in Japan's production, and negative trends in the Republic of Korea and India.

Table 2.7: Manufacturing of Other Transport Equipment: Index of Industrial Production (IIP) for Selected Asian Countries (January 2023).

ASIAN COUNTRIES (2023			
Country	**Index of Industrial Production (2015=100): (seasonally adjusted)**	**Growth Rate (%) Compared to previous month**	**Growth Rate Percentage (%) Compared to same month previous year**
China	133.0	1.6	2.9
Japan	88.1	0.9	0.8
Republic of Korea	68.9	-6.3	2.8
India	107.4	-7.0	-1.6

Source: United Nations Industrial Development Organization (UNIDO,2023). Latest Trends

Table 2.8 showed the latest trend data from UNIDO, as of January 2023. The data shows that the total manufacturing Industrial Production Index (IIP) for the United States of America (USA) is 100.7. This represents a 0.9% increase compared to the previous month and a 2.9% increase compared to the same month last year. Additionally, the data for the manufacturing of other transport equipment in the USA shows an IIP of 98.7. This represents a 1.1% increase compared to the previous month and a significant 10.2% increase compared to the same month last year.

This data suggests that the manufacturing sector in the USA is experiencing overall growth, as demonstrated by the increase in the total manufacturing IIP. However, the manufacturing of other transport equipment is growing at a faster rate compared to the rest of the manufacturing sector. This could be due to various factors, such as an increase in demand for transportation equipment or the introduction of new technologies and innovations in this industry. Overall, the data indicates a positive trend in the USA's manufacturing sector, with growth in both the total manufacturing IIP and the

manufacturing of other transport equipment.

Table 2.8: Manufacturing of Other Transport Equipment: Index of Industrial Production (IIP) for United States of America (January,2023).

	Index of Industrial Production (2015=100): (seasonally adjusted)	**Growth Rate (%) Compared to previous month**	**Growth Rate Percentage (%) Compared to same month previous year**
Total Manufacturing	100.7	0.9	0.3
Other Transport Equipment	98.1	1.1	10.2

Source: United Nations Industrial Development Organization (UNIDO,2023). Latest Trends

The data in Table 2.9 represents the growth of manufacturing of other transport equipment in several European countries as of January, 2023. Based on the latest trends data from UNIDO for January 2023, there are varying trends in the manufacturing of other transport equipment in selected Europe countries. Starting with Germany, the Industrial Production Index (IIP) for other transport equipment was at 131.1, which is a 1.1% decrease compared to the previous month but a 5.3% increase compared to the same month the previous year. This indicates that while there was a decline in production in the short term, the sector has experienced overall growth compared to last year.

Table 2.9: Manufacturing of Other Transport Equipment: Index of Industrial Production (IIP) for Selected Europe Countries. (January,2023).

Country	**Index of Industrial Production (2015=100): (seasonally adjusted)**	**Growth Rate (%) Compared to previous month**	**Growth Rate (%) Compared to previous month**
Germany	131.1	-1.1	5.3
France	87.5	-9.5	5.5
Italy	123.4	0.6	10.4
Spain	106.1	-2.0	10.2

Source: United Nations Industrial Development Organization (UNIDO,2023). Latest Trends

For France, the IIP for other transport equipment was at 87.5, which is a significant 9.5% decrease compared to the previous month, but a 5.5% increase compared

to the same month the previous year. This suggests that the sector experienced a sharp decline in production in the short term, but overall growth in the longer term. Moving on to Italy, the IIP for other transport equipment was at 123.4, which is a slight 0.6% increase compared to the previous month, but a substantial 10.4% increase compared to the same month the previous year. This indicates that the sector has been consistently growing in both the short and long term. Finally, for Spain, the IIP for other transport equipment was at 106.1, which is a 2.0% decrease compared to the previous month but a 10.2% increase compared to the same month the previous year. This indicates that while there was a decline in production in the short term, the sector has experienced significant growth compared to last year.

Overall, the trends in the manufacturing of other transport equipment in selected Europe countries show varying degrees of short-term fluctuations but consistent long-term growth. The COVID-19 pandemic has impacted the manufacturing industry worldwide, including in Europe, leading to supply chain disruptions, reduced demand, and labour shortages. However, with the easing of restrictions and the rollout of vaccines, the sector has been slowly recovering. The growing demand for electric and hybrid vehicles, along with increased focus on sustainability and environmental regulations, has spurred investments in the development and production of other transport equipment. In addition, the rise of digitalization and automation has increased efficiency and productivity in the manufacturing process, while government policies and initiatives have encouraged collaboration and innovation in the sector.

IIP for selected ASEAN countries are shown in Table 2.10 for the year 2016 – 2021. According to the IIP data for 2021, the Manufacture of Other Transport Equipment industry in Indonesia had an IIP reading of 134.1, indicating a 31.2% annual increase from the previous year. This industry includes the production of various types of transport equipment, such as ships, aircraft, and railway vehicles. Malaysia's IIP reading for the same industry in 2021 was 118.3, with a 24.2% annual increase from the previous year. The difference between Indonesia and Malaysia's IIP values was about 13%. Thailand's IIP reading for Manufacturing of other transport equipment was 89.5, indicating a 19.0% annual increase from the previous year. Singapore had the lowest IIP reading in 2021, with an IIP of 89.0 and an annual change of 17.6%. These IIP values are based on a certain

year as the base year, such as 2010 = 100, and the data was provided by ASEAN Statistical Yearbook 2022. The IIP statistics are important indicators of the performance and productivity of different industries in a country and can provide insights into economic trends and potential opportunities or challenges for businesses.

Table 2.10: Manufacture of Other Transport Equipment: Index of Industrial Production (IIP) 2016 – 2021 (Source: ASEAN Statistical Yearbook 2022)

Country /Year	2016	2017	2018	2019	2020	2021
Indonesia IIP	71.7	75.2	77.2	73.6	102.2	134.1
Annual Change in Percent (%)	0.5	4.9	2.7	-4.6	38.8	31.2
Malaysia IIP	247.9	258.8	104.7	109.7	95.2	118.3
Annual Change in Percent (%)	-4.6	4.4	-59.5	4.8	-13.2	24.2
Singapore IIP	95.7	94.1	97.0	100.0	75.7	89.0
Annual Change in Percent (%)	1.0	-1.7	3.1	3.1	-24.3	17.6
Thailand IIP	100.0	101.9	112.1	105.8	75.2	89.5
Annual Change in Percent (%)	1.3	1.9	10.0	-5.6	-28.9	19.0
Viet Nam	107.2	108.9	104.0	94.9	90.2	100.2
Annual Change in Percent (%)	2.9	1.6	-4.5	-8.7	-5.0	11.1

2.9 Industrial Revolution 4.0 Related to Industry Under Manufacture of Other Transport Equipment

The growing of the manufacturing industries around the world including Malaysia is driven by the Industrial Revolution 4.0 (IR 4.0). Technologies have been seen rapidly evolved in the recent years which in turn, improve drastically on manufacturing industries particularly in terms of the productivity, efficiency, cost reduction and quality. The technology advancement does help to increase more research and development activities, as well as new skills and talent among workers globally (MITI, 2018b).

According to MITI (2018b), there are nine (9) important technologies advancement pillars that were outlined under the IR 4.0 as shown in Figure 2.4. As the IR 4.0 is the driven factor with the main focus is to manufacturing industries, thus, all the pillars under the IR 4.0 are relevant to all industries under the Manufacture of Other

Transport Equipment (C30) group.

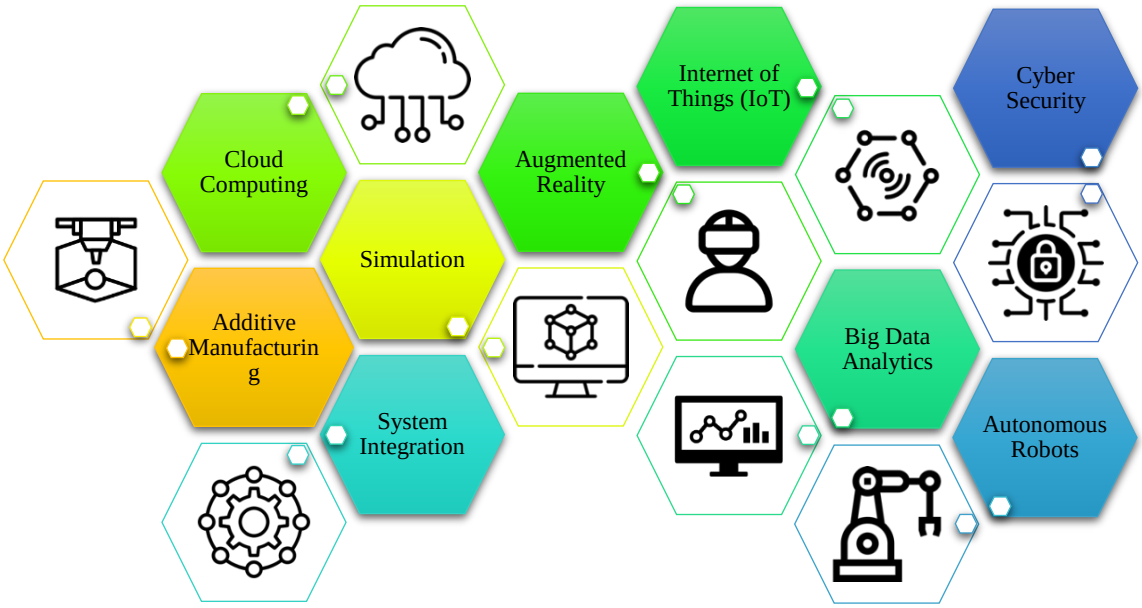

Figure 2.4: The nine (9) important pillars of technology advancement under the IR 4.0.

The following are brief explanation and some examples that elaborates the relevancy of IR to the industries under the C30 group:

1) C301 Technology in Ship Building Industry:

The shipbuilding industry has seen significant technological advancements in recent years, including the use of advanced materials, such as composites, that make ships lighter and stronger (Noury et al., 2002). There has also been an increase in automation and robotics in shipbuilding, which has led to increased efficiency and reduced costs. Additionally, there has been a growing focus on digitalization in the shipbuilding industry, including the use of digital twins, simulation tools, and virtual reality, which has improved design and testing processes (Marine Digital, 2023b).

Industry 4.0 technologies such as Internet of Things (IoT), artificial intelligence (AI), and digital twins can be used in shipbuilding to improve production efficiency, reduce costs, and enhance safety. For example, IoT sensors can be used to monitor the performance of ship engines, hulls, and other critical systems in real-time, allowing for

predictive maintenance and reducing downtime (Schimek, 2016). Digital twins can be used to create virtual replicas of ships, allowing for simulations and testing before physical production begins. Additionally, AI algorithms can be used to optimize ship designs and reduce the amount of materials and energy used in production (Marine Digital, 2023a).

2) C302 Manufacture of Railway and Rolling Stock:

The manufacture of railway and rolling stock has also seen significant technological advancements, including the use of lightweight materials, such as aluminium and composites, which improves energy efficiency and reduces emissions (Rungskunroch et al., 2019). Additionally, there has been a focus on the development of more efficient propulsion systems, such as electric and hybrid powertrains, and the integration of advanced sensors and monitoring systems, which improves safety and reduces maintenance costs. The use of artificial intelligence and predictive maintenance systems has also led to improved reliability and reduced downtime (Yuan et al., 2019).

Industry 4.0 technologies such as IoT, big data analytics, and machine learning can be used in the manufacture of railway and rolling stock to improve product quality, reduce costs, and increase efficiency. For example, sensors and IoT devices can be used to collect data on equipment performance and maintenance needs, allowing for predictive maintenance and reducing downtime (Mazali, 2018). Big data analytics can be used to analyze customer demand and optimize production schedules. Machine learning algorithms can be used to identify potential quality issues before they occur, reducing defects and improving product quality (Mazali, 2018).

3) C303 Manufacture of Air and Space Craft:

The manufacture of air and space craft has seen a significant focus on advanced materials, such as carbon fibre composites and lightweight alloys, that improve performance and fuel efficiency. There has also been a focus on the development of more advanced propulsion systems, such as electric and hybrid engines, and the integration of advanced sensors and monitoring systems, which improves safety and reduces maintenance costs. Additionally, the use of data analytics and artificial intelligence has

improved design processes and led to more efficient and effective production methods.

Industry 4.0 technologies such as IoT, AI, and 3D printing can be used in the manufacture of air and space craft to improve production efficiency, reduce costs, and enhance safety. For example, IoT sensors can be used to monitor the performance of aircraft engines, avionics, and other critical systems in real-time, allowing for predictive maintenance and reducing downtime. AI algorithms can be used to optimize aircraft designs and reduce the amount of materials and energy used in production. 3D printing can be used to produce complex parts and prototypes quickly and cost-effectively.

4) C304 Manufacture of Military Vehicles:

The manufacture of military vehicles has seen advancements in areas such as lightweight materials, advanced armor, and improved propulsion systems. Additionally, there has been a focus on the development of more advanced communication and control systems, as well as the integration of artificial intelligence and autonomous technology, which has improved the functionality and capabilities of military vehicles.

Manufacture of Military Vehicles: Industry 4.0 technologies such as IoT, AI, and robotics can be used in the manufacture of military vehicles to improve production efficiency, reduce costs, and enhance functionality. For example, IoT sensors can be used to monitor the performance of military vehicles and identify potential maintenance needs before they become critical. AI algorithms can be used to optimize the design and performance of military vehicles, improving their functionality and reducing their environmental impact. Robotics can be used to automate certain manufacturing processes, reducing labor costs and improving consistency.

5) C309 Manufacture of Other Transport n.e.c:

This category includes the manufacture of bicycles and motorcycles, which has seen advancements in areas such as lightweight materials, improved suspension systems, and more efficient engines. There has also been a focus on the integration of advanced sensors and monitoring systems, as well as the use of electric and hybrid powertrains,

which improves efficiency and reduces emissions.

Industry 4.0 technologies such as IoT, AI, and automation can be used in the manufacture of bicycles and motorcycles to improve production efficiency, reduce costs, and enhance performance. For example, IoT sensors can be used to monitor the performance of bikes and motorcycles, identifying potential maintenance needs and improving safety. AI algorithms can be used to optimize designs and reduce the amount of materials and energy used in production. Automation can be used to improve the speed and consistency of production processes, reducing costs and improving quality.

2.10 Key Stakeholders

A stakeholder is a party that has an interest in a company and can either affect or be affected by the business. The primary stakeholders in a typical corporation are its investors, employees, customers, and suppliers.

However, with the increasing attention on corporate social responsibility, the concept has been extended to include communities, governments, and trade associations. Stakeholders can be internal or external to an organization. Internal stakeholders are people whose interest in a company comes through a direct relationship, such as employment, ownership, or investment. External stakeholders are those who do not directly work with a company but are affected somehow by the actions and outcomes of the business. Suppliers, creditors, and public groups are all considered external stakeholders.

2.10.1 Government Agencies and Regulatory Bodies

Malaysia has a highly centralised government; however, there are many different departments with responsibilities in the energy, environment, and transport areas. These are the Government Agencies and regulatory bodies that are empowered by the legislations according to the scope and powers given in the related acts that directly regulates the Manufacture of Other Transport Equipment Division in Malaysia. Table 2.11 is the list of key stakeholders for this Division.

Table 2.11: Government Agencies and Regulatory Bodies

NO	GOVERNMENT AGENCIES & REGULATORY BODIES	ROLES AND FUNCTION
1	Ministry of Transport (MOT)	The Ministry of Transport is responsible for the formulation and implementation of policies, strategies and programs for transportation, which covers land (private), aviation and maritime sectors. These will ensure better services in providing an efficient, safe and effective transportation system towards strengthening multimodal transportation as well as enhancing the count's competitiveness.
2	Civil Aviation Authority of Malaysia (CAAM)	Previously known as Department of Civil Aviation (DCAM) and was formed in 1969 under The Ministry of Transport and responsible as the major technical regulator in charge of overseeing Malaysian civil aviation's safety, maintenance, and security as well as its enforcement.
3	Land Public Transport Agency (APAD)	The Land Public Transport Agency (APAD) is an agency under the Ministry of Transport Malaysia responsible for planning and defining land-based public transport policies, programs and strategies to enhance the country's public transportation system which is the core of the National Key Result Area (NKRA). This includes determining policies and planning rail, bus and taxi services and transporting goods through rails and roads.
4	Marine Department Malaysia	The Marine Department is a government Department under the purview of the Ministry of Transport Malaysia. The objective is to manage administrative related to shipping and ports including maritime affairs within Malaysian waters.
5	Ministry of International Trade and Industry (MITI)	The Ministry of International Trade and Industry (MITI) is responsible for the international trade, industry, investment, productivity, small and medium enterprise, development finance institution, halal industry, automotive, steel, strategic trade. Its functions include: • To develop and implement policies on industrial development, international trade and investment • To attract quality foreign and domestic investments • To promote and increase Malaysia's exports of high

NO	GOVERNMENT AGENCIES & REGULATORY BODIES	ROLES AND FUNCTION
		value-added goods and services by strengthening bilateral, regional and multilateral trade relations and cooperation • To enhance national productivity and competitiveness, particularly in manufacturing and services sectors • To ensure a conducive business ecosystem to facilitate trade and investment • To provide credible standardisation, accreditation and conformity assessment services to enhance societal and environmental well-being as well as facilitate trade and economic growth • To promote and accelerate adoption of digitalisation and innovative technologies, including data-driven policies, towards growing globally competitive industries • To facilitate the development of small and medium enterprises, including homegrown industries, and the Bumiputera community to become globally competitive and integrate into the global value chain
6	Malaysia Automotive Robotics and IoT Institute (MARii)	MARii is an agency under the MITI. Serving as the focal point, coordination centre and think tank for the nation's automotive industry, it functions to enhance technology, human capital, supply chain, market outreach and aftersales capabilities of all automotive stakeholders and ecosystem. MARii works closely with all stakeholders to spur technology adoption, innovation and capacity building for Malaysian businesses and talent within the automotive and overall mobility sector, through the strategic policy research and deployment technology programmes catered to various levels of business and social strata, in a multitude of sectors such as advance design, smart manufacturing, data sciences, intelligent transport systems and Moblity-as-a-Service (MaaS).
7	Malaysian Investment Development Authority (MIDA)	Incorporated as a statutory body under the Malaysian Industrial Development Authority (MIDA) Act, the establishment of MIDA in 1967 was hailed by the World Bank as "the necessary impetus for purposeful, positive, and coordinated promotional action" for Malaysia's industrial development. Today, MIDA is Malaysia's cutting-edge, dynamic and pioneering force in opening pathways to new frontiers around the globe. MIDA are

NO	GOVERNMENT AGENCIES & REGULATORY BODIES	ROLES AND FUNCTION
		also strongly supported by Department of Environment, Tenaga Nasional Berhad, and Telekom Malaysia Berhad. MIDA evaluates the following applications for projects in the manufacturing sector and selected services sub-sectors: • Manufacturing licenses • Tax incentives • Expatriate posts • Duty exemption on raw materials and components • Duty exemption on machinery and equipment for the agricultural sector and any selected services sectors • Regional establishments
8	Malaysia External Development Corporation (MARTRADE)	MATRADE's mission to promote Malaysia's export has enabled many local companies to carve new frontiers in global markets. Today as we continue to put the spotlight on capable Malaysian companies on the international stage, we are helping make the phrase 'Made-In-Malaysia' synonymous with excellence, reliability and trustworthiness.
9	National Aerospace Industry Corporation Malaysia (NAICO Malaysia)	The National Aerospace Industry Corporation Malaysia (NAICO Malaysia), an agency under the Ministry of International Trade and Industry (MITI), will spur the development of the industry's ecosystem, and ensure cohesion and coordination of initiatives implemented under the Malaysian Aerospace Industry Blueprint (MAIB) 2030 and Aerospace Industry Framework of the 12th Malaysia Plan (12MP).
10	Malaysian Aerospace Council (MAC)	The Malaysian Aerospace Council (MAC) is a national level steering body which is dedicated to the development of the Aerospace Industry in Malaysia.
11	Ministry of Human Resource (MoHR)	The Ministry of Human Resources, abbreviated MoHR, is a ministry of the Government of Malaysia that is responsible for skills development, labour, occupational safety and health, trade unions, industrial relations, industrial court, labour market information and analysis, social security.

NO	GOVERNMENT AGENCIES & REGULATORY BODIES	ROLES AND FUNCTION
12	Department of Skills Development (DSD)	To coordinate and regulate the implementation of skills training to produce K-Workers for the purpose of employment and recognition at national and international levels. To research and develop job competency standards and expertise to continuously improve the quality of skilled human resources who can contribute to the economic growth of the country.
13	Department of Occupational Safety and Health (DOSH)	A department under the Ministry of Human Resources. This department is responsible for ensuring the safety, health and welfare of people at work as well as protecting other people from the safety and health hazards arising from the activities from various sectors. As a government agency, the department is responsible for the administration and enforcement of legislations related to occupational safety and health of the country, with a vision of becoming an organisation which leads the nation in creating a safe and healthy work culture that contributes towards enhancing the quality of working life.
14	Malaysian Industry-Government Group for High Technology (MIGHT)	The Malaysian Industry-Government Group for High Technology (MIGHT) was launched on 22 February 1993. MIGHT is a market-driven technological partnership think-tank with emphasis on market intelligence initiatives using foresight practices and methodology to identify technology and business opportunities. MIGHT acts as a key interlocutor in bringing together policy and technology nurturing via catalytic interventions programmes. Programmes and initiatives include building strategic partnerships and alliances, technology acquisition and capacity building through policy interventions and flagship programmes.
15	Malaysian Research Accelerator for Technology & Innovation (MRANTI)	The Malaysian Research Accelerator for Technology and Innovation (MRANTI), a convergence of Technology Park Malaysia (TPM) Corporation Sdn Bhd and the Malaysian Global Innovation and Creativity Centre (MaGIC), is Malaysia's central research commercialisation agency that fast-

NO	GOVERNMENT AGENCIES & REGULATORY BODIES	ROLES AND FUNCTION
		tracks the development of technology innovations from ideas to impact. MRANTI serves as a connector, incubator and catalyst to enable early-stage ideation to mature entities to commercialise and scale. MRANTI offers innovators and industry access to world-class integrated infrastructure, interventions & programmes, partnerships and a suite of resources. In doing so, MRANTI aims to expand Malaysia's funnel of innovation supply, and unlock new R&D value by ensuring effective transitions in the commercialisation lifecycle. It will also link academia with industry and the public sector to streamline market-driven R&D efforts for mission-based outcomes.
16	Ministry of Natural Resources, Environment and Climate Change	Ministry of Natural Resources, Environment and Climate Change is a ministry of the Government of Malaysia that is responsible for energy, natural resources, environment, climate change, land, mines, minerals, geoscience, biodiversity, wildlife, national parks, forestry, surveying, mapping and geospatial data
17	Department of Environment (DOE)	DOE is under The Ministry of Natural Resources, Environment and Climate Change. The main function of the DOE is to prevent, eliminate, control pollution and improve the environment, consistent with the purposes of the Environmental Quality Act 1974 and the regulations there under DOE is also responsible for the implementation of the resolutions decided by the conventions of the international environment such as Vienna Convention for the protection of the Ozone Layer 1985, Montreal Protocol on Substances That Deplete the Ozone Layer, 1987, the Basel Convention on the Transboundary Movement of Hazardous Waste and Their Disposal Act 1989 and other areas while the success of programs of bilateral cooperation and multilateral cooperation between Indonesia, Singapore and other ASEAN countries on environmental management.
18	Selangor Darul Ehsan Aerospace Industry Coordination Office (S-DAICO)	Selangor Darul Ehsan Aerospace Industry Coordination Office or S-DAICO is a division under Invest Selangor Berhad and responsible for the coordination, execution, management and monitoring of the Selangor Aerospace Growth, Development as well as promotion.

NO	GOVERNMENT AGENCIES & REGULATORY BODIES	ROLES AND FUNCTION
19	Ministry of Defence Malaysia (MinDef)	Oversees and regulates the production, and distribution of military equipment, including military vehicles, to ensure they meet the necessary standards and requirements for use by the Malaysian Forces.
20	Malaysian Industry Council for Defence, Enforcement and Security (MIDES)	MIDES has been tasked with coordinating the development direction of the Defence, Enforcement, and Security industries and discussing issues and challenges faced by Defence, Enforcement, and Security industry companies. Additionally, MIDES also performs its operational functions by auditing, monitoring, and ensuring that the level of development and technological expertise of each of its member's Defence, Enforcement and Security companies grows. MIDES comprises 56 government and private agencies such as the Ministry of Defence, Ministry of Finance, Ministry of Home Affairs, SME Corp Malaysia, and others. In addition, MIDES has seven sub-sectors or working groups: Automotive, Maritime, Aerospace, Cyber Security, Weaponry, Common Use, and Safety and Security Working Group.
21	Directorate General Technical Airworthiness (DGTA)	The Directorate General Technical Airworthiness (DGTA) was formally approved and established by the Government in July 2010. With the approval for DGTA to become a state agency which is responsible for regulating the technical airworthiness of state-registered aircraft. The establishment of DGTA hence provided a management system and regulatory framework for state technical airworthiness.

2.10.2 Industry Association & Professional Bodies

This section discusses the activities of various industry associations and professional bodies involved in the Manufacture of Other Transport Equipment. The scope of the review covers professional services that are provided to the industry. Regulation of these professional services will add value to the industry and ultimately to the whole economy. Related industry associations and professional bodies are listed in Table 2.12.

Table 2.12: List of Related Industry Associations and Professional Bodies for The Manufacture of Other Transport Equipment Industry

NO	ORGANIZATION	OVERVIEW, ROLES, FUNCTIONS AND RESPONSIBILITIES
1.	Malaysia Aerospace Industry Association (MAIA)	MAIA represents its members to the Government and global industry, It comprises of top management of member companies who are entrusted to draw the guidelines for the group with the emphasis on capacity development and international market penetration. Companies can leverage MAIA for assistance for growth and access into new markets, networking within industry and championing the industry's interest with focus on public policy development. Issues and concerns from members are addressed in the Technical Sub-committees (TSC). The TSCs are the main drivers of activities in the Association. There are 6 TSCs – Manufacturing, Maintenance, Repair and Overhaul (MRO), Human Capital, Research & Technology (R&T), Small & Medium-Sized Enterprises and Drone/Urban Air Mobility (UAM).
2.	Association of Marine Industries of Malaysia (AMIM)	The Association of Shipbuilders and Repairers of Malaysia (ASROM) was established in 1984 and later changed their name to the Association of Marine Industries of Malaysia (AMIM) in 1997. AMIM is a The Association of Shipbuilders and Repairers of Malaysia (ASROM) was established in 1984 and later changed their name to the Association of Marine Industries of Malaysia (AMIM) in 1997. AMIM is a non-governmental organisation (NGO) that represents a vast sector of the Malaysian marine industry, which comprises of shipbuilding, ship repair and marine-related industries. Entrusted by its members, AMIM's primary mission is the protect and promote the interest of its members, to assist in the development of Shipbuilding and Ship Repair (SBSR) and marine-related industry, as well as to collaborate in efforts towards continuous improvement of maritime standards for the benefit of all.
3.	Board of Engineers Malaysia (BEM)	The Board of Engineers Malaysia (BEM) is a statutory body constituted under the Registration of Engineers Act 1967 with perpetual succession and a common seal, which may sue and be sued. It was formed in 23rd August 1972. BEM primary role is to facilitate the registration of Engineers, Engineering Technologists, Inspectors of

NO	ORGANIZATION	OVERVIEW, ROLES, FUNCTIONS AND RESPONSIBILITIES
		Works, Sole Proprietorships, Partnerships and Bodies Corporate providing professional engineering services and; to regulate the professional conduct and practice of registered person in order to safeguard the safety and interest of the public.
4.	Technological Association Malaysia (TAM)	The Technological Association Malaysia is an organisation for all levels and disciplines of technologists, from the professionals to students and everyone whose career is technological in nature. The TAM also aims to bring about a clearer understanding and appreciation of technology and to instill among members an impelling desire to achieve professional competence and the highest standard of technological skills.
5.	The Institution of Engineers Malaysia (IEM)	The Institution of Engineers, Malaysia (IEM) was established in 1959 and its primary function is to promote and advance the science and profession of engineering in any or all of its disciplines and to facilitate the exchange of information and ideas related to engineering.
6.	Malaysia Board of Technologists (MBOT)	Malaysia Board of Technologists (MBOT) is a professional body that gives Professional Recognition to Technologists and Technicians in related technology and technical fields. Based on Act 768, MBOT expands its function vertically and horizontally whereby MBOT looks at technology-based profession that cuts across discipline based from conceptual design to a realized technology and covers from Technicians (with MQF Level 3 to Advanced Diploma Level 5) up to Technologists (Bachelor's Degree and above). As a whole, these professionals (Technologists and Technicians) have integrated roles from concept to reality.
7.	Motorcycle and Scooter Assemblers and Distributors Association of Malaysia (MASAAM)	Motorcycle and Scooter Assemblers and Distributors Association of Malaysia was established in 1997. MASAAM functions include: • Promote the development of the powered two-wheeler industry in Malaysia.

NO	ORGANIZATION	OVERVIEW, ROLES, FUNCTIONS AND RESPONSIBILITIES
		• Coordinate meetings and discussions with all government bodies on issues related to powered two-wheeler industry. • Promote the development of the manufacture of component parts for two-wheelers. • Encourage and coordinate contacts with other domestic, regional and international organizations. • Compile, create and maintain database and statistics in relation to motorcycles. • Enhance knowledge and awareness to members and the public at large in relation to the motorcycle industry • Support activities towards promotion and awareness on road safety and intellectual property right.

2.10.3 Research & Training Institutions

Manufacturers will improve their internal operations and the ties among suppliers, stakeholders, and customers by investing in research and development. A company's technological advancement, employee satisfaction, and capacities all significantly improve as a result of investment in research and development. Training Centres are a place where people undergo skills training for work. Table 2.13 are research and training institutions related to the Manufacture of Other Transport Equipment.

Table 2.13: List of Research Institute for The Manufacture of Other Transport Equipment

NO	RESEARCH & TRAINING INSTITUTIONS	OVERVIEW, ROLES, FUNCTIONS AND RESPONSIBILITIES
1	Public Institutions	Public Institutions are government-funded higher education institutions under the purview of the Ministry of Education Malaysia. They can generally divided into three major categories as follows: • Public universities offer undergraduate and postgraduate programmes, and sometimes pre-university foundation year and diploma courses. They can be divided into 3

NO	RESEARCH & TRAINING INSTITUTIONS	OVERVIEW, ROLES, FUNCTIONS AND RESPONSIBILITIES
		major groups: Research Universities, Focused Universities and Comprehensive Universities. • Polytechnics and community colleges which offer programmes at certificate and diploma. Polytechnics in Malaysia which can be divided into three categories: Premier Polytechnics. Conventional Polytechnics and METrO Polytechnics These polytechnics provide skilled in the fields of engineering, information communication technology, commerce, accountancy, visual graphic design and hospitality at Diploma, Advanced Diploma and Bachelor levels to meet the demand of the public. The Community College provides skills training in technical and vocational (TVET) fields including trade, mechanics, electricity, and other fields to meet the high industry demand for skilled labour. • Public colleges which offer certificate and diploma level programmes.
2	Institut Latihan Jabatan Tenaga Manusia (ILJTM) Institut Latihan Perindustrian (ILP) Institut Teknikal Jepun-Malaysia (JMTi) Pusat Latihan Teknologi Tinggi (ADTEC)	Institut Latihan Jabatan Tenaga Manusia (ILJTM) consists of Institut Latihan Perindustrian (ILP), Pusat Latihan Teknologi Tinggi (ADTEC) and Institut Teknikal Jepun-Malaysia (JMTI). The Institut Latihan Perindustrian (ILP) is a training institute for the production of skilled labour to meet the demands of the industrial sector in Malaysia. ILP is manage by the Department of Human Resources has been producing national talent from the training certificate level to the Advanced Diploma in various skill courses. Instutut Teknikal Jepun-Malaysia (JMTI) in Penang offers program at Diploma and Advanced Diploma level.There are 5 main programs offered which are Electronic Engineering Technology Program, Computer Engineering Technology Program, Mechatronic Engineering Technology Program, Manufacturing Engineering Technology Program and Precision Machining Engineering Technology Program. Apart from that, JMTi also offers programs at the Malaysian Skills Certificate (SKM) and Malaysian Skills Diploma (DKM) levels. JMTi also actively conducts short-term courses for the community, public and private employees. Pusat Latihan Teknologi Tinggi (ADTEC) main business is to provide a formal technical training for the SPM/SPMV and SKM holders. Its main priority is to provide the path for those who want to be trained skill workers in high technology technical fields and those who want to upgrade their knowledge to be coherent with the rapid changing technology and technical skills.

NO	RESEARCH & TRAINING INSTITUTIONS	OVERVIEW, ROLES, FUNCTIONS AND RESPONSIBILITIES
3	Youth and Sports Skills Training Institution (ILKBS) Institut Kemahiran Tinggi Belia Negara (IKBN) Institut Kemahiran Belia Negara (IKBN)	Youth and Sports Skills Training Institution (ILKBS) The Institute Kemahiran Belia Negara (IKBN) and the Institute Kemahiran Tinggi Belia Negara (IKTBN) are a skill-based institution housed under the Ministry of Youth and Sports Malaysia. Some of the ILKBS Technology Program courses offered are Automotive Technology, Electric Technology, Information Technology, Electronic Technology, Mechanical Technology and Maritime Technology.
4	Technical and Vocational Education and Training (TVET) Institution MARA Institute Kemahiran MARA (IKM) Kolej Kemahiran Tinggi MARA (KKTM) MARA Japan Industrial Institute (MJII) GIATMARA German-Malaysian Institute (GMI)	MARA Technical and Vocational Division is accountable for developing and maintaining TVET educational programmes that prepare students for occupations important to Malaysia's economic development. These programmes are categorised into 12 different clusters and are geared towards the students of the institutions under its purview which are Kolej Kemahiran Tinggi MARA, MARA-Japan Industrial Institute and Institusi Kemahiran MARA throughout the country. With the support of partners in education and industry, each programme includes the academic and technical skills required to be successful in today's economy. Students who have completed their studies from these institutions may be able to launch their careers in a completely new direction by furthering their studies locally or abroad. Some of the courses offered are International Welding & Inspection Certification Centre (IWICC) located at Institute Kemahiran MARA (IKM) Jasin, Industry Diploma Manufacturing of Aerospace Composite at KKTM Masjid Tanah and Diploma in Manufacturing Engineering (Manufacturing Design) at KKTM Kuantan and Aerospace Composites Manufacturing at Simpang Ampat, Melaka The establishment of GIATMARA aims to provide technical and vocational skills training to youths in rural areas and in towns to enable them in acquiring skills as preparation to become skilled work force and technical entrepreneurs in meeting the needs of the industry and needs of economic development as well as entrepreneurship within local areas and in the country.
5	Science and Technology Research Institute	STRIDE is a department under the Ministry of Defence. Working to provide technical support and scientific expertise

NO	RESEARCH & TRAINING INSTITUTIONS	OVERVIEW, ROLES, FUNCTIONS AND RESPONSIBILITIES
	for Defence (STRIDE)	to the Ministry of Defence. Technical services provided by STRIDE is as follows: • Manage and conduct Research & Development (R&D). • Assist in developing and validating defence procurement specifications. • Technical assessment of defence procurement. • Conduct operational research and advising in the development of defence capabilities. • Perform failure analysis of components, materials and equipment. • Testing, measurement and inspection laboratory and field. • Technical consultation. • Calibration and measurement precision.
6	National Rail Centre of Excellence (NRCoE)	The Role of National Rail Center of Excellence (NCRoE) is to provide a centralized platform to: • Implement the Human Capital Development (HCD), Rail Industry Development Program (RIDP), Testing and Certification (T&C), and Research and Technology (R&T) by remaining sustainable in general. • Become the facilitator for Rail Industry Development in Malaysia. • Become the Hub and the front-line interface for international and local industry players to interact and to provide professional advice on Rail Industry, leveraging on ICP. NRCOE shall operate as an entity under auspices of Ministry of Transport to facilitate and implementing a strict governance between the government, agencies, academia and industry player.
7	Malaysia Rail Academy (MYRA)	MYRA established in 1973, is committed to providing educational training and human capital development in railway-related services. It is also a research-centric apart from offering academic opportunities through comprehensive programmers with its academic board.
8	Aerospace Malaysia	Established in 2011, AMIC core business is to embark on collaborative R&T projects, in collaboration with industries and research institutes in the aerospace sector. The establishment of AMIC's as an industry-led research centre

NO	RESEARCH & TRAINING INSTITUTIONS	OVERVIEW, ROLES, FUNCTIONS AND RESPONSIBILITIES
	Innovation Centre (AMIC)	serves one of the key recommendations laid out in the National Aerospace Blueprint 1997. Operating in collaboration with its partners, AMIC's main role is to provide universities, industries and research institutes strategic directions and focus areas for research in aerospace-related domains. The centre will play a key role in securing Malaysia's contribution to the development of global aerospace industries. AMIC R&T activities reflect the current challenges faced by aerospace industry in Malaysia in as well as their future opportunities. Three research themes namely "Sustainable Aviation", "Factory of The Future", and "Training of The Future" were selected to shape a path towards the sustainability of Malaysia aerospace industry.
9	SIRIM Berhad – SIRIM Industrial Research	SIRIM is a premier industrial research and technology organisation in Malaysia, wholly-owned by the Minister of Finance Incorporated. With over forty years of experience and expertise, SIRIM is mandated as the machinery for research and technology development, and the national champion of quality. SIRIM has always played a major role in the development of the country's private sector. By tapping into our expertise and knowledge base, we focus on developing new technologies and improvements in the manufacturing, technology and services sectors. SIRIM nurture Small Medium Enterprises (SME) growth with solutions for technology penetration and upgrading, making it an ideal technology partner for SMEs.
10	The Maritime Institute of Malaysia (MIMA)	MIMA is a policy research institute set up by the Malaysian Government to look into matters relating to Malaysia's interest at sea, and to serve as a national focal point for research in the maritime sector. Established in 1993, MIMA was incorporated under the Companies Act 1965, as a company limited by guarantee and not having a share capital, with its own Board of Directors. MIMA's Roles: The Institute takes a comprehensive approach in dealing with maritime issues. Its role is to deal with national, regional and global maritime matters affecting Malaysia MIMA task is to complement the efforts of the various government agencies involved in the maritime sector by mobilising expertise to assist and support them in national

NO	RESEARCH & TRAINING INSTITUTIONS	OVERVIEW, ROLES, FUNCTIONS AND RESPONSIBILITIES
		maritime policy planning and implementation. It will be both advisory and consultative. MIMA is to give public education and information dissemination. MIMA also has an active programme involving the cross-exchange of ideas with its counterparts overseas.

2.11 Government Legislation, Policies & Initiatives

2.11.1 Government Legislation

The manufacturing industry in Malaysia is governed by the Industrial Co-ordination Act 1975. The Industrial Co-ordination Act 1975 imposes several requirements on companies that are, or intend to be, involved in the manufacturing industry.

The compliance requirements are imposed to facilitate proper regulation of the manufacturing industry by relevant authorities. It also ensures that companies manufacture products that are not at odds with national economic and social objectives. It further encourages an orderly development of the manufacturing industry and minimises manufacturing activities and practices that would be potentially harmful to society, such as hazardous waste management, pollution and other environmental concerns. This article explores the regulatory compliance aspect of the manufacturing industry in Malaysia.

The term “manufacturing activity” is defined by the Industrial Co-ordination Act 1975 as “the making, altering, blending, ornamenting, finishing or otherwise treating or adapting any article or substance with a view to its use, sale, transport, delivery or disposal; and includes the assembly of parts and ship repairing but shall not include any activity normally associated with retail or wholesale trade.” Table 2.14 elaborates other related legislations, by-laws and policies that are directly related to Manufacture of Other Transport Equipment industry.

Table 2.14: List of Legislation for Manufacture of Other Transport Equipment Industry

NO	GROUP	LEGISLATION	DESCRIPTION
1	C301, C302, C303, C304, C309	Factories and Machinery Act 1967 (Revised 1974)	An Act to provide for the control of factories with respect to matters relating to the safety, health and welfare of person therein, the registration and inspection of machinery and for matters connected therewith.
2	C301, C302, C303, C304, C309	Occupational Safety and Health Act 1994	This Act is for securing the safety, health and welfare of persons at work, for protecting others against risks to safety or health in connection with the activities of persons at work.
3	C301, C302, C303, C304, C309	Promotion of Investments Act 1986	These Acts cover investments in the manufacturing, agriculture, tourism (including hotel) and approved services sectors as well as R&D, training and environmental protection activities. The direct tax incentives grant partial or total relief from income tax payment for a specified period, while indirect tax incentives are in the form of exemptions from import duty, sales tax and excise duty.
4	C301, C302, C303, C304, C309	Industrial Coordination Act 1975	An Act to provide for the co-ordination and orderly development of manufacturing activities in Malaysia, for the establishment of an Industrial Advisory Council and for other matters connected therewith or incidental thereto.
5	C301, C302, C303, C304, C309	Trade Act of 2011	An Act for the purpose of promoting good trade practises by prohibiting false trade descriptions and false or misleading statements, conduct, and practises in relation to the supply of goods and services and to provide for matters connected therewith or incidental thereto.
6	C301, C302, C303, C304, C309	Environmental Quality Act 1974	This Act is for the prevention, abatement, control, and enhancement of the environment, and for purposes connected therewith.
7	C301, C302, C303, C304, C309	Employment (Amendment) Act 2022	Amendments to Malaysia Employment Act 1955 came to effect on 1 January 2023, seeing the introduction of reduced working hours, rules around flexible work arrangements, extended maternity and paternity leave regulations, and more. The purpose of the amendment is to (1) increase and improve the protection and welfare of employees. (2) Ensuring that labour law provisions are in accordance with international labour standards.

NO	GROUP	LEGISLATION	DESCRIPTION
8	C301, C302, C303, C304, C309	National Wages Consultative Council Act 2011 (Act 732) Amendment 2022	Provides an important framework for the determination of minimum wage rates in Malaysia and ensures that wages policies in the country are developed through a consultative and collaborative process involving all relevant stakeholders.
9	C301, C302, C303, C304, C309	Industry Relation Act (Act 1967)	An Act to promote and maintain industrial harmony and to provide for the regulation of the relations between employers and workers and their trade unions, the prevention and settlement of any differences or disputes arising from their relationship, and generally to deal with trade disputes and matters arising therefrom.
10	C301	Malaysia Shipping Ordinance 1952 (Amendment 2017)	An Act to amend the Merchant Shipping Ordinance 1952 and to extend specified provisions to the Federal Territory of Labuan and the States of Sabah and Sarawak, and to provide for matters connected therewith.
11	C302	Railway Act 1991	Railway Act 1991 commenced after the revocation of Railway Ordinance 1948. This act cover railway matters in Sabah, Sarawak and Wilayah Persekutuan Labuan. Railway Act 1991 also became the body Act to the establishment of the Railway Asset Corporation.
12	C302, C304, C309	Road Transport Act 1987 (Act 333)	This is a Malaysian laws which enacted to make provision for the regulation of motor vehicles and of traffic on roads and other matters with respect to roads and vehicles thereon; to make provision for the protection of third parties against risks arising out of the use of motor vehicles; to make provision for the co-ordination and control of means of and facilities for transport; to make provision for the co-ordination and control of means of and facilities for construction and adaptation of motor vehicles; and to make provision for connected purposes.

2.11.2 Government Policies & Initiatives

1) National 4IR Policy (Industry4WRD)

Industry4WRD is a national policy framework in Malaysia aimed at transforming the country's industrial sector through the adoption of Industry 4.0 technologies and practice

which involves the integration of advanced technologies such as the Internet of Things (IoT), artificial intelligence (AI), robotics, and big data analytics into manufacturing and other industrial processes. The Industry4WRD policy framework was launched in 2018 and is led by the Ministry of International Trade and Industry (MITI). The main objectives of the policy are to:

a) Increase the adoption of Industry 4.0 technologies and practices among Malaysian manufacturers.
b) Improve the competitiveness of Malaysian industries through greater efficiency, productivity, and innovation.
c) Develop a highly skilled workforce capable of working with advanced technologies.
d) Attract more foreign direct investment (FDI) into Malaysia's industrial sector.

To achieve these objectives, the Industry4WRD policy framework provides a range of support measures and incentives to help Malaysian companies adopt Industry 4.0 technologies and practices. These include grants and funding for research and development, tax incentives for investments in Industry 4.0-related projects, and training and skills development programs for workers (MITI, 2018a).

The target group of this initiative is to manufacturing industries including the manufacture of other transport equipment industries. Through the benefits given such as grants and funding for research and development, tax incentives and training and skills development programs for employees, this initiative could help boost the industry towards technology advancement while improve the efficiency, productivity and innovation of the industries (MITI, 2018a).

2) National Automotive Policy (NAP) 2020

The National Automotive Policy (NAP) 2020 is a policy framework for the automotive industry in Malaysia that was launched in February 2020 by MITI. The main objective of the policy is to transform Malaysia into a hub for the production and export of next-generation vehicles, including electric and connected vehicles (MITI, 2020).

Some key initiatives in NAP 2020 are as follow:

a) Supporting the development of next-generation vehicles, including electric vehicles (EVs) and connected vehicles, through incentives such as tax breaks, grants, and funding for research and development.
b) Encouraging the adoption of green mobility solutions by promoting the use of low-emission vehicles, such as hybrid and electric vehicles, and investing in the necessary infrastructure to support these vehicles.
c) Promoting the growth of the local automotive industry by encouraging the development of local supply chains and promoting local entrepreneurship.
d) Strengthening the regulatory framework for the automotive industry by introducing new regulations to improve safety, quality, and environmental standards.
e) Developing the necessary skills and expertise in the automotive industry by promoting education and training programs for workers.

The NAP 2020 reflects to the C309 group of manufacture of other transport equipment n.e.c. where the development of next-generation vehicles as well as the new regulation to improve safety, quality and environmental standards did include motorcycle industries (MITI, 2020).

3) The Malaysian Rail Supporting Industry Roadmap 2030

The Malaysian Rail Supporting Industry Roadmap 2030 is an initiative by the Malaysian Industry-Government Group (MiGHT) to chart the way forward for the rail industry development in Malaysia until 2030. The aim is to develop the supporting industries for the rail transportation and to promote the development of a comprehensive rail supply chain ecosystem in Malaysia (MIGHT, 2014). Figure 2.5 below show the summary of Malaysian Rail Supporting Industry Roadmap 2030.

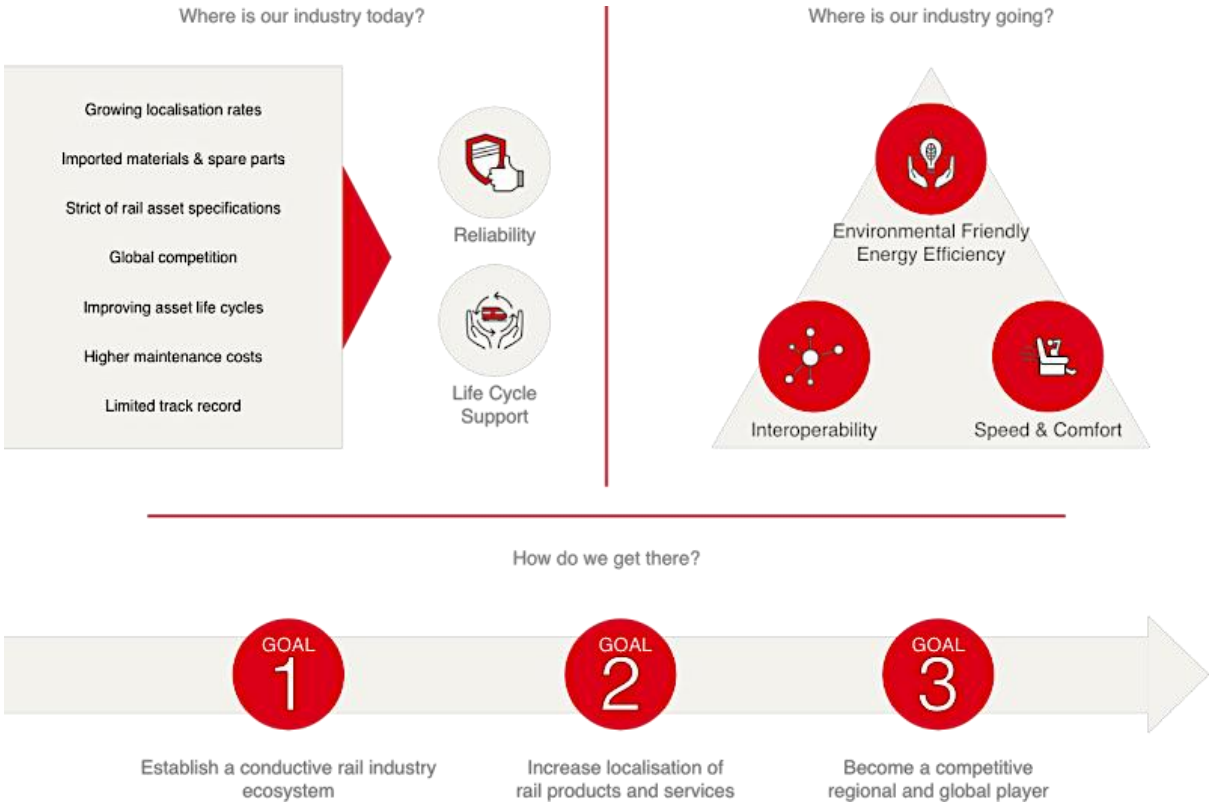

Figure 2.5: Summary of Malaysian Rail Supporting Industry Roadmap 2030 (MIGHT, 2014)

Currently in the industry, there are limited numbers of local capabilities in design, manufacturing and assembly activities related to rolling-stocks and railway systems, while some major parts of rolling stocks are imported from foreign countries (MIGHT, 2014). Thus, this initiative could help promoting and supporting the growth of the rail transportation sector and their supporting industries, while create new opportunities for local capabilities and workers.

4) Malaysian Aerospace Industry Blueprint 2030 (MAIB2030)

Malaysian Aerospace Industry Blueprint 2030 was launched in 2015, represents a comprehensive and forward-looking plan for the development of the aerospace industry in Malaysia (MIGHT, 2015). Some key strategies include strengthening the supply chain, promoting research and development to industries, developing human capital through skilled and knowledgeable workforce, attracting foreign investment and strengthening industry collaboration with government agencies, research institute and private

companies in promoting knowledge sharing.

This blueprint covers the whole aerospace area including maintenance, repair and overhaul (MRO), aero-manufacturing, system integration and education and training. Under the aero-manufacturing, it includes the engineering and design, aerostructure, avionics equipment, engines and airframe equipment. This blueprint will benefit the aerospace industries in Malaysia and through focusing to the key areas, it will lead Malaysia as a major player in the global aerospace industry in the years to come.

2.12 Conclusion

The industry of "Manufacture of Other Transport Equipment" is an important part of economic growth and development. As Malaysia progresses towards embracing the 4IR, the manufacturing sector will continue to focus on shifting towards higher value-added, diverse, and complex products. Among the key industries that will drive growth is aerospace. In addition, focus will be given to growth along the value chain in shipbuilding. In line with the National Policy on Industry 4.0 (Industry4WRD), efforts will also be made to leverage digital technology and enhance mechanisms to boost productivity. In gearing up for the 4IR, emphasis will also be given to capitalising on the benefits of disruptive technologies. The sector is expected to grow at a 5.7% annual rate, led by the export-oriented subsector, with Malaysia's Industrial Production Index (IIP) surging 13.6 percent in August 2022, fuelled by the Manufacturing sector. On a year-on-year basis, the manufacturing sector's output increased by 15.2 percent in August 2022 after recording a growth of 14.9 percent in July 2022. One of the main subsectors contributing to the growth in the Manufacturing sector in August 2022 were Transport Equipment and Other Manufactured Products (53.6%) (DoSM, 2022b).

CHAPTER III

METHODOLOGY

3.1 Introduction

This chapter clarifies the process of researching this topic adopted in this study. It identifies its analytical framework beginning with its methodology and nature, location of the sample, population and sampling, instruments used, and data collection and procedures. The methodology is applied to produce deliverables that consist of Occupational Structure (OS), Occupational Responsibilities (OR), Occupation Description (OD), jobs in demand, critical jobs, competency in demand, jobs relevant to the industry and technology revolution as well as the emerging skills.

3.2 Research Approach and Design

The researcher has chosen to use a mixed methods approach, which combines both qualitative and quantitative techniques to better understand their research topic. However, integrating these two different types of data presents a significant challenge, as highlighted by Creswell and Creswell (2017). Quantitative research involves the collection and analysis of numerical data to describe, explain, predict, or control phenomena, requiring a structured approach to manage complex data processing. On the other hand, qualitative research aims to explore phenomena by examining multiple facets simultaneously, using inductive reasoning to develop hypotheses and theories.

By combining quantitative and qualitative methods, the researcher can capitalize on the strengths of each approach, leading to a better understanding of the phenomenon

under investigation. This approach offers many advantages, including increased awareness of research objectives and improved instrumentation for data collection. Moreover, using multiple methods to study the same phenomenon can increase both the validity and reliability of the results. The exploratory sequential mixed methods approach is one such method where the researcher first conducts a qualitative research phase to explore participant views and then uses the findings to inform a second quantitative phase. However, selecting the appropriate qualitative findings and sample for both phases pose challenges.

In summary, using mixed methods research offers many benefits by combining the strengths of quantitative and qualitative approaches. However, careful consideration and planning are required to overcome the challenges of integrating these methods effectively. The research design is shown in Figure 3.1.

The mixed methods design involves three steps as follows:

Phase 1: Information Gathering

Phase 1 involves information gathering, which includes three main tasks. The first task is to conduct a document review to gather relevant information that will be used to develop Chapters 1, 2, and 3 of this research. This may include reviewing academic literature, reports, and other sources of information related to the research topic. Document review is a systematic approach to studying literature and documents on a research topic, where researchers extract and assess relevant information for accuracy and reliability. This step helps identify gaps in existing research, providing a foundation for the study. Identifying the research problem in this phase requires a review of literature and defining the research question to ensure that it is focused and relevant. It is critical to articulate the research problem clearly for a well-designed and executed study.

The second task is to develop a survey questionnaire construct. A well-designed questionnaire should meet the research objectives. From the focus group discussion, a reliable instrument will be constructed and proposed to be used in the actual field survey. Based on the research objectives that were developed by the research team, a set of predefined questionnaire items will be created to collect data from study participants.

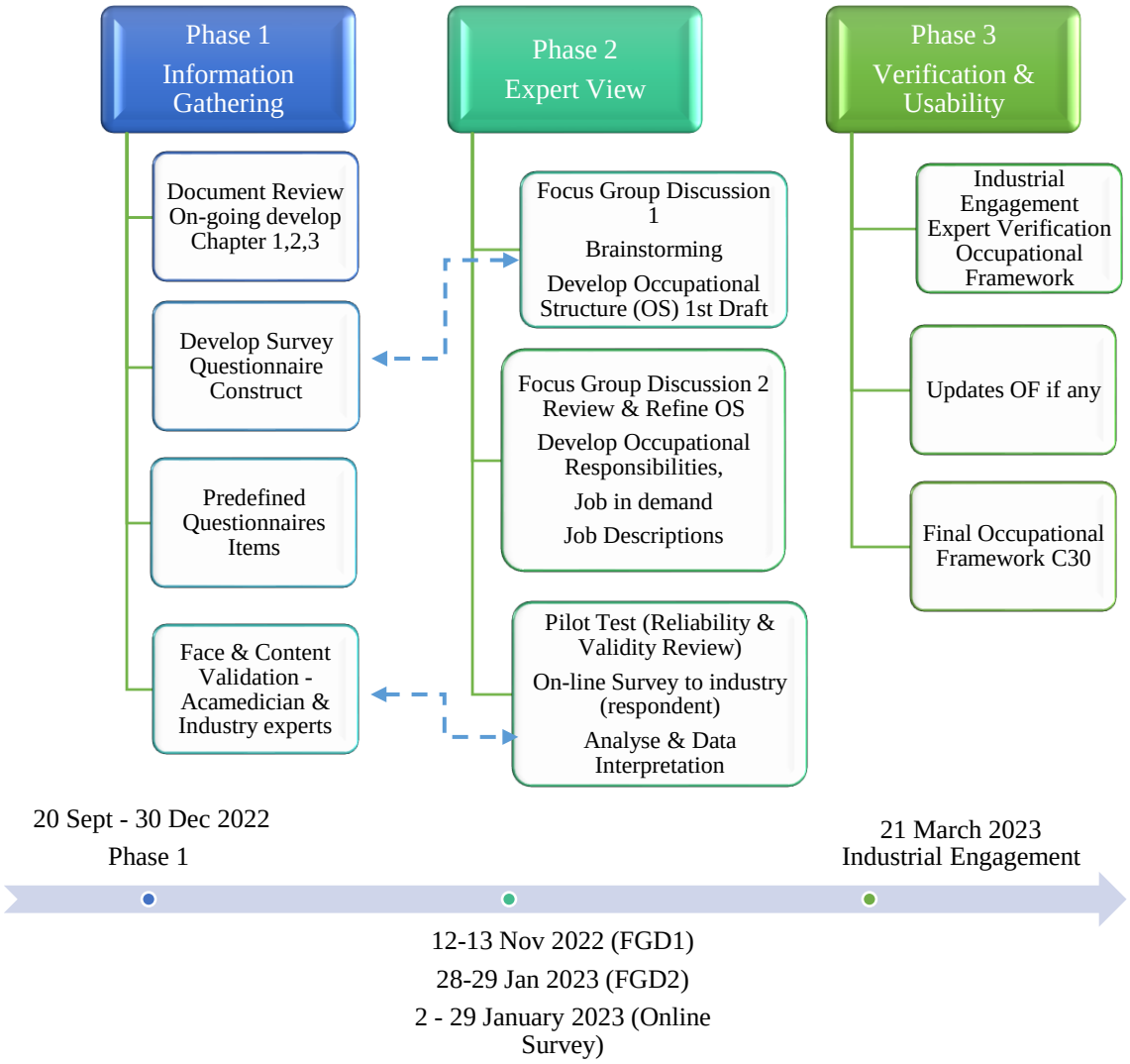

Figure 3.1: Phases of Research Methodology for Manufacturing of Other Transport Exploratory Sequential Mixed Methods Methodology

The third task is to ensure the quality of the survey questionnaire by conducting face and content validation with academic and industry experts. This means that survey questionnaire was shared with experts in industry C30 to obtain feedback on the clarity and relevance of the questionnaire items. The feedback received will be used to make any necessary revisions to the questionnaire to ensure that it accurately measures the constructs of this research.

Overall, Phase 1 is a crucial step in the research process as it lays the foundation for the rest of this study. By conducting a thorough document review, developing a well-constructed survey questionnaire, and ensuring its quality through validation, the

researcher can ensure that the study is built on a solid base of relevant and accurate information.

Phase 2: Expert View

The main task in Phase two is to conduct Focus Group Discussion (FGD). FGD will be the method use for qualitative data collection. In this phase, minimum of 10 industry experts were selected from managerial level personnel from the Manufacture of Other Transport Equipment Industry to participate in both FGD sessions. They were selected representing the five areas in Division 30 industry with almost similar in experience and occupation. The researcher will be the moderator to ensure group thinking or if there is one or two persons dominating the discussion. A separate brainstorming session will be conducted to experts that could not attend the FGD session. FGD 1 was conducted on 12-13 November 2022. The objective of FGD 1 was to develop Occupational Structure (OS) for each group in C30 and questionnaires construct that will be used in subsequent survey. An assistant researcher will assist researcher to take note the group discussion. A draft copy of the report will be given to the members for verification as soon as the discussion session ends.

During FGD 2, there were 13 experts invited to review the draft OS and develop occupational responsibility (OR) for all job titles identified for C30 and to develop occupational description for job in demands for C30 groups. FGD 2 was conducted on 28-29 January 2023.

The second task in this phase is to conduct a pilot test to the prospective respondents once the reliable instrument was verified. Sakeran (2013) suggested that to ensure reliability of the instrument Cronbach's Alpha value of above 0.7 should be achieved. Actual data collection will be carried out from 2nd to 29 January 2023. Both self-administered and internet survey will be carried out at nationwide for generalisation purposes. Sample from the establishment will be collected at random to be representative. The survey was distributed online via experts contact. The real on-line survey was then conducted.

Phase 3: Verification and Usability

The third phase of this research project focuses on industry engagement, which

aims to verify and test the usability of the proposed occupational framework for C30 Manufacturing of other transport equipment. Representatives from the industry were invited to participate in this phase of the research, including shipbuilding, manufacturing of railway rolling stock, aerospace, military vehicles, and other transport equipment n.e.c.

During the industry engagement phase, the researcher will seek feedback from industry representatives on the proposed framework, including its relevance, comprehensiveness, and applicability to their respective sectors. The researcher will gather insights on the strengths and weaknesses of the framework and identify areas for improvement.

The feedback from industry representatives will be used to refine and finalize the occupational framework, ensuring that it accurately reflects the skills and competencies required for C30 Manufacturing of other transport equipment. Ultimately, our goal is to create a framework that is practical, useful, and relevant to industry stakeholders, and we believe that the insights gained from industry engagement will be critical to achieving this objective.

A research approach is the procedure selected by the researcher to collect, analyze, and interpret data. There are three approaches to research: quantitative, qualitative, and mixed methods. A typical design might start out with a qualitative segment such as a focus group discussion alerting the researcher to issues that should be explored in a survey of program participants, followed by the survey, which in turn is followed by in-depth interviews to clarify some of the survey findings. In this study, the method used to collect the required qualitative data are Document Review, Focus Group Discussion and Survey method were used to collect the required quantitative data. The research approach for this study is Mix Methods and are shown in Figure 3.2.

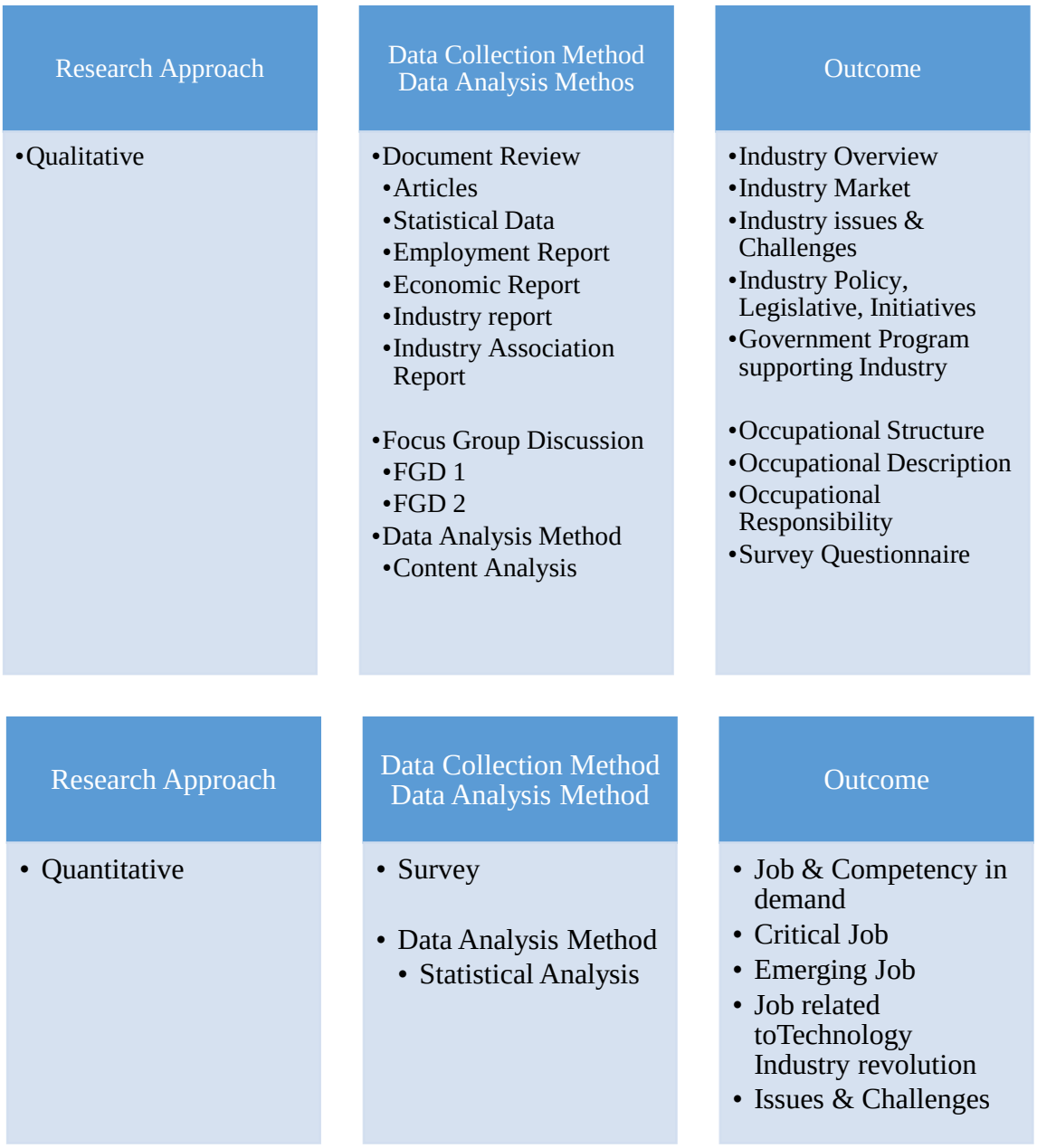

Figure 3.2: Overall Research Design – Research Approach, Data Collection Method and Data Analysis Technic.

3.2.1 Document Review

Document review is a way of collecting data by reviewing existing documents (CDC,2018). The documents may be internal to the organization or may be external. Documents may be hard copy or electronic and may include reports, program logs, performance ratings, funding proposals, meeting minutes, newsletters, and marketing

materials. This strategy requires a thorough examination of current literature, papers, and documents that address the objectives of the study. In order to gain a deeper understanding of the business and fulfil the research goals, the researcher conducts a systematic search that includes not only looking at the work of other researchers but also professional trade reports, the internet, and articles. This strategy will also give a general overview of the sector pertinent to industrial revolution and technology requirements and industry demands.

1) Data Collection Strategy

There are two main sources for data collection in Document Review:

a) Economic Database; and

b) Database from other agencies.

2) Economic Database

Some information related to labour and market situation that are highly relevant to this study and the following information were requested from Department of Statistics Malaysia (DoSM); MSIC 2008; Occupation categories at 1-digit MASCO 2020; and Critical Occupational List (COL) by Talent Corporation Malaysia.

When reviewing data from self-administered and online surveys, the information from the Economic Database serves two purposes: (1) it gives a quick overview of the current state and future prospects of the C30 Manufacture of Other Transport Equipment industry; and (2) it acts as a control group and baseline database.

3) Database From Other Agencies

Economic database information from other (local and international) sources pertinent to the Manufacturing of Machinery and Equipment was compiled and analysed. According to our preliminary findings, the following database contains pertinent data for the sector. The Economic database information from other agencies (local and international) that are relevant Manufacture of Other Transport Equipment industry were collected and analysed. According to our preliminary findings, the following database contains pertinent data for the sector. NOSS registration, MIDA, and MITI are local

databases. The ASEAN Yearbook and data from United Nations Industrial Development Organization (UNIDO) are international databases.

4) Data Analysis Procedure

Based on the secondary data from all the report, the following analysis were carried out.

a) Examining the economic performances of the industry by looking at several macroeconomic indicators (such as GDP, employment and output);
b) Analysing the industry outlook in relation to regional and global perspectives;
c) Determining the profile of the current and future workforce (such as occupations, and salaries and wages); and
d) Reviewing technological development in the industry (such as robotic & automation as well as element of IR 4.0).

3.2.2 Questionnaire Design

The questions for this research were created using feedback from focus groups and are based on five essential pieces of critical information: competency in demand, employment in demand, developing skills, technology and the industrial revolution, and connected challenges. To gather the necessary data for achieving the research objectives, the questionnaire includes of closed-ended 5-point Likert scale questions, dichotomous scales, multiple choice, and open-ended questions.

3.2.3 Focus Group Discussion with Industry Experts

Focus group discussions (FGDs) are facilitated discussions, held with a small group of people who have specialist knowledge or interest in a particular topic (INTRAC, 2017). Focus group discussion is frequently used as a qualitative approach to gain an in-depth understanding of social issues. The method aims to obtain data from a purposely selected group of individuals rather than from a statistically representative sample of a broader population. Focus group discussion is a commonly used method. Focus group discussion is a technique where a researcher assembles a group of individuals to discuss a specific topic, aiming to draw from the complex personal experiences, beliefs, perceptions and

attitudes of the participants through a moderated interaction

In this research two FGD sessions was conducted to understand the context of various industries from the experience of the experts involved in the manufacturing of other transport equipment. FGD 1 was conducted on 12-13 November 2022 (FGD1) and FGD2 was conducted on 28-29 January 2023 (FGD2). The objectives of FGD 1 are to understand the occupational structure for C30 groups and to build the construct for questionnaire survey and also to understand the issues and challenges of the C30 industry. Only three (3) OS are successfully developed while two (2) others are unable to develop as the experts from those industries did not attend the session. Nevertheless, two separate brainstorming session was conducted at experts' location (24 November 2022) at KTMB, Kuala Lumpur and 05 January 2023 at DEFTECH, Shah Alam) to develop the remaining OS which were not developed during the FGD 1 session. The details result and explanation of the OS are discussed in Chapter 4.

List of experts involved in FGD 1 and brainstorming session are tabulated as in Table 3.1 and Table 3.2, and some photos of the session are shown in Figure 3.3 and 3.4.

Figure 3.3: FGD 1 session with industrial experts

Figure 3.4: Brainstorming sessions with C302 and C304 industry experts

Table 3.1: List of experts for FGD 1

List of Experts for Focus Group Discussions 1			
No.	**Name**	**Organisation / Company / Agency**	**Representing Group C30 Manufacturing of Other Transport Equipment**
1	Muhammad Fauzan Bin Mat Yusoff	Head of Electrical and Electronic Ship Sector THHE Fabricator Sdn. Bhd	C301 Building of Ships and Boats
2	Noor Asha Bin Abdul Rashid	Chairman of the Technical Committee Association of Marine Industries of Malaysia (AMIM)	C301 Building of Ships and Boats
3	Muhammad Amzar Danish Bin Chairil	Executive Malaysia Automotive Robotics and IOT Institute (MARii)	C302 Manufacture of railway and rolling stocks
4	Raja Khairul Iskandar Bin Raja Aman	Senior Operation Manager Spirit AeroSystems Malaysia Sdn. Bhd.	C303 Manufacture of air and spacecraft and related machinery
5	Ayu Hazwani Binti Ramman	Executive National Aerospace Industry Corporation Malaysia (NAICO Malaysia)	C303 Manufacture of air and spacecraft and related machinery

List of Experts for Focus Group Discussions 1			
No.	**Name**	**Organisation / Company / Agency**	**Representing Group C30 Manufacturing of Other Transport Equipment**
6	Noor Rulhuda Binti Hashim	Executive National Aerospace Industry Corporation Malaysia (NAICO Malaysia)	C303 Manufacture of air and spacecraft and related machinery
7	Mohd Yusaini Bin Ahmad	Operation Manager Hicom Diecastings Sdn. Bhd.	C309 Manufacture of transport equipment n.e.c.
8	Salehudin Bin Daud	Manager APM Auto Electrics Sdn. Bhd.	C309 Manufacture of transport equipment n.e.c.

Table 3.2: List of experts for brainstorming session

No.	**Name**	**Organisation / Company / Agency**	**Representing Group C30 Manufacturing of Other Transport Equipment**
1	Shairil Izwan Bin Herman	Quality Manager Hyundai Rotem, Apex Comm, Posco Consortium (HAPC)	C302 Manufacture of railway and rolling stocks
2	Ir. Mohd Kholel Manaf	General Manager Keretapi Tanah Melayu (KTM) Berhad	C302 Manufacture of railway and rolling stocks
3	Mohd Suhaimi Omar	Senior Manager DRB-HICOM Defence Technologies (DEFTECH)	C304 Manufacture of Military Vehicles
4	Col. Ir. Mohd Pauzi Bin Deris	Head Engineering support and Technology Division DRB-HICOM Defence Technologies (DEFTECH)	C304 Manufacture of Military Vehicles
5	Mohamed Rithavuddeen bin Seyed Rahmathulah	Head of Human Capital DRB-HICOM Defence Technologies (DEFTECH)	C304 Manufacture of Military Vehicles

The second FGD (FGD 2) was conducted on 28-29 January at Mines Resort Hotel, Balakong and was attended by 13 experts from all industry groups for C30. The objectives of the FGD 2 are to finalize the draft OS (developed during FGD 1), discuss survey results in terms of jobs in demand and critical jobs, and most important to develop the Occupational responsibilities (OR) for all related job titles in the C30 industries and occupational description (OD) for job in demand.

All the objectives in FGD 2 are managed to be completed during the session. Details explanation and result of the outcome of FGD 2 are discussed in chapter 4. The list of experts that involved in FGD 2 is shown as in Table 3.2 and some photos during the session are presented in Figure 3.5.

Figure 3.5: FGD 2 session with industrial experts

Table 3.3: List of experts for FGD 2

List of Experts for Focus Group Discussions 2			
No.	**Name**	**Organisation / Company / Agency**	**Representing Group C30 Manufacturing of Other Transport Equipment**
1	Muhammad Fauzan Bin Mat Yusoff	Head of Electrical and Electronic Ship Sector THHE Fabricator Sdn. Bhd.	C301 Building of Ships and Boats
2	Noor Asha Bin Abdul Rashid	Chairman of the Technical Committee Association of Marine Industries of Malaysia (AMIM)	C301 Building of Ships and Boats
3	Muhammad Amzar Danish Bin Chairil	Executive Malaysia Automotive Robotics and IOT Institute (MARii)	C302 Manufacture of railway and rolling stocks
4	Shairil Izwan Bin Herman	Quality Manager Hyundai Rotem, Apex Comm, Posco Consortium (HAPC)	C302 Manufacture of railway and rolling stocks
5	Raja Khairul Iskandar Bin Raja Aman	Senior Operation Manager Spirit AeroSystems Malaysia Sdn. Bhd.	C303 Manufacture of air and spacecraft and related machinery
6	Ayu Hazwani Binti Ramman	Executive National Aerospace Industry Corporation Malaysia (NAICO Malaysia)	C303 Manufacture of air and spacecraft and related machinery
7	Noor Rulhuda Binti Hashim	Executive National Aerospace Industry Corporation Malaysia (NAICO Malaysia)	C303 Manufacture of air and spacecraft and related machinery
8	Mohd Nazri Bin Nordin	DRB-HICOM Defence Technologies (DEFTECH)	C304 Manufacture of military vehicles
9	Mohd Suhaimi Omar	Senior Manager DRB-HICOM Defence Technologies (DEFTECH)	C304 Manufacture of military vehicles
10	Mohd Yusaini Bin Ahmad	Operation Manager Hicom Diecastings Sdn. Bhd.	C309 Manufacture of transport equipment n.e.c.
11	Salehudin Bin Daud	Manager APM Auto Electrics Sdn. Bhd.	C309 Manufacture of transport equipment n.e.c.

List of Experts for Focus Group Discussions 2			
No.	**Name**	**Organisation / Company / Agency**	**Representing Group C30 Manufacturing of Other Transport Equipment**
12	Hafidz Bin Mohd Azhar	Senior Manager (Technical Training & Development) Hong Leong Yamaha Sdn. Bhd.	C309 Manufacture of transport equipment n.e.c.
13	Muhamad Shahril Bin Zakariah	Technical Manager Boon Siew Honda	C309 Manufacture of transport equipment n.e.c.

The following analyses have been carried out during both of the FGD sessions.

a) Examine the potential workforce challenges faced by the overall industry and any important sub-sectors.
b) Establish the available job title and career path for each of the job area as determined in the MSIC 2008 and new job area as required by the industry.
c) Determine the demand and supply of talent in the Manufacture of Other Transport Equipment industry and its' related activities based on NOSS and MQA standards.
d) Determined the generic job description and responsibility for each of the job title.
e) Analysis of future trend of the occupational demand by various skill categories including TVET related occupations.
f) Review of initial findings obtained from the self-administered and internet survey.

The following results are produced from both of the FGD sessions:

a) Occupational Structure (OS) for the five groups in C30 that consist of job area, job titles and job levels, Job Description and Critical Job Titles;
b) Definition and Occupational responsibilities for all job areas;
c) Occupational Descriptions for all Job in demand;
d) Critical job titles for C30; and
e) Job titles related to industrial revolution technology.

3.2.4 Survey Instrument

A quantitative survey was used in addition to the data elicited from the Focus Group Discussions (FGD) with industry experts and secondary resources to classify the jobs in demand, critical jobs, competency in demand, jobs relevant to the technology and industrial revolution, and emerging skills. The survey also gathered information on issues concerning the manufacturing of other transport equipment activities.

The instrument used to collect the data was an online questionnaire survey. Close-ended questions with 5-point Likert scales, dichotomous scales, and multiple choice, as well as open- ended questions to capture opinions, were used in the questionnaire to obtain the necessary information to achieve the research objectives. A self-administered questionnaire in the form of a Google Form was deployed, and respondents answered the questions without the intervention of the researcher at any time and from any location within the time frame specified.

Before being deployed, the questionnaire was face validated by two panels: an academic to validate the structure of the questions, grammar, and translation accuracy, and an industry panel to validate the suitability of the content, including any jargon or terms used. The survey questionnaire comprises of six sections:

Section 1: Demographics Profile of the respondents

This section gathers the demographic background of the respondents such as age, gender, location of the company, years of service in the sector, and current employment group.

Section 2: Competency in Demand

This section looks into the overall skill sets required for workers in the industry to perform their current and future job. Another goal of this section is to identify the factors contributing to the skills gap of the current graduates and current workers.

Section 3: Jobs in Demand

This section aims to identify which worker categories are in short supply or oversupply. This section also reports the critical job as well as elucidates the factors contributing to the shortage of workers.

Section 4: Emerging Skills

This section identifies the emerging skills predicted to be imperative to the industry based on factors leading to the need for such skills.

Section 5: Technology and Industrial Revolution

This section tries to determine whether industry players and labour are ready for the industrial revolution. The pillars or technology drivers of the industrial revolution are given and respondents must assess how relevant each aspect is in their field of duty.

Section 6: Related Issues

This section explores the industry's most common problems or challenges. The questionnaire is attached in Annex 1.

3.2.5 Population & Sampling Procedure

The population of this research refers to the total number of paid employees at managerial level for the Manufacture of Other Transport Equipment industry in Malaysia. Sampling is the process of choosing objects from a population such that the characteristics of the sample can be applied to the population as a whole. However, despite the fact that the numbers of paid employees (43,427 persons) engaged in the Manufacture of Other Transport Equipment operations have been published by DOSM (2022), it is still unknown how many people work in managerial positions.

Roscoe (1975) stated if the methodology attracts large amounts of qualitative information, such as interview, case study or repertory test, then practical constraints may mean that the researcher needs to settle for a small sample size. Substantially, it also been suggested the recommended sample size in between 30 to less than 500 are acceptable due to sufficient items in questionnaires that consists of 20 to 25 questions. Thus, with a minimum of 30 sample size and 80% response rate, a total of 200 questionnaires will be distributed for this research among managerial workforce in the Manufacture of Other Transport Equipment organizations that consists of 5 group.

3.2.6 Measures and Instrumentation

Before the survey questionnaire could be utilised, it was crucial to prove its validity and

reliability because these factors could affect how accurate the results were and how credible the research's conclusions were. The questionnaire was face vetted by two panels before it was released: an academic panel to check the questions' organisation, grammar, and translation precision; and an industry expert to check the content's applicability, including any industry-specific jargon.

Cronbach's alpha is a measure of internal consistency reliability that indicates the extent to which the items in a survey questionnaire are measuring the same underlying construct. Alpha values range from 0 to 1, with higher values indicating greater reliability.

A Cronbach's alpha value of 0.94 for this survey is considered very high and suggests that the items in the questionnaire are highly consistent and reliable in measuring the construct of interest. This means that respondents' answers to the questions in this survey are likely to be consistent and accurate, which increases the validity of the research results.

3.2.7 Data Collection Strategy

Three techniques exist for conducting surveys: online surveys, offline surveys, and face-to-face or in-person surveys conducted during visits to the industry. However, in this study, data was collected mainly using online surveys. Emails and text messages were used to distribute the survey. From December 15 to 30, 2022, a pilot test was carried out. Twelve (12) participants responded to the survey. Ferber and Verdoorn (1962), as mentioned in Mumtaz et.al. (2017), suggested that a sample of 12 individuals is sufficient. One important aspect of this research is determining the sample size. Roscoe (1975), stated that the appropriate sample size for most reports is ranging between 30 and 500. Hence, the research data collected from 166 respondents for this study is sufficient to represent the population.

3.2.8 Data Analysis Procedure

For this study, two different types of data were gathered: qualitative data from document reviews and focus group discussions and quantitative data from surveys. The focus group discussions and document review produced descriptive information. Data from the document review were reported in the literature review, while information from the focus

group was tabulated and presented as Occupational Structure (OS), Occupational Responsibilities (OR), and Occupational Description (OD).

The survey's data were tabulated after being extracted. The frequency and percentage (%) reporting descriptive statistical analyses have been performed for the demographic profile of the respondents, in-demand skills, critical jobs, emerging skills, jobs relevant to IR 4.0, and issues pertaining to C30 industries.

3.3 Conclusion

The justification of the chosen research methodology and data collection method (document review, focus group discussions, and survey questionnaires) was covered in this section. Document review was chosen because it can provide details about the setting in which research participants operate and can be used to support or contradict evidence from other sources. Survey questionnaires were used because it is anticipated that a survey will yield a representative sample of the intended audience. Finally, focus group discussions are used in this research since they are a quick and effective technique to learn information while also generating new ideas through free discussion among the respondents. The findings on the Occupational Structure, Occupational Responsibilities and Description and competency in demand as identified by the FGD and industry surveys are presented in the next chapter, Chapter 4 Findings.

CHAPTER IV

FINDINGS

4.1 Introduction

This chapter presents the research findings based on the data collected from document review, focus group discussions (FGD) with subject matter experts and survey questions received from the study samples. The findings are presented according to the objectives of this study, as described in Chapter 1. The first objective is to establish an Occupational Structure (OS) for the Manufacture of Other Transport Equipment sector based on MSIC 2008 by examining job areas, job titles, and relevant competency levels. The second and third objectives are to determine Occupational Responsibilities (OR) that outline the main work activities and tasks for each job title and to determine Occupational Descriptions (OD) for each job title in demand based on the proposed OS. This research will also present the jobs in demand and the critical job titles in the industry, as well as investigate the competencies in demand and job titles pertinent to the technology and industrial revolution. In this chapter, we also show how the OS relates to the National Occupational Skills Standards (NOSS) that are already in place.

4.2 Finding Analysis

This section provides the findings from the analysis of the document review, the focus group discussions (FGD) with the industry subject matter expert (SME) representatives, and the survey with the employees of the Manufacture of Other Transport Equipment industry to develop the Occupational Framework (OF) for the industry. The discussion in this section will cover the five (5) main groups under Division C30 of MSIC 2008, which

are:

Group 301: Building of ships and boats
Group 302: Manufacture of railway and rolling stock
Group 303: Manufacture of air and spacecraft as well as related machinery
Group 304: Manufacture of military fighting vehicles
Group 309: Manufacture of Transportation equipment n.e.c

4.2.1 Document Review

As per the findings of the document analysis in Chapter 2, it has been concluded that there is an urgent need to update the Occupational Framework (OF) for the manufacturing of other transport equipment industry. Although some National Occupational Skills Standards (NOSS) have been developed for certain groups in C30, the OF for C30 has not been published by the Department of Skills Division.

In addition, due to the high cost of capital investment required, many players in the industry are still lagging behind in adopting Industry 4.0 technology, and workers need to be empowered with new technology and IR tools to improve production processes and overall competitiveness.

In Chapter 2, several stakeholders have been identified as relevant to the C30 industry. These stakeholders include industry players, government agencies, training and educational institutions, and certification bodies.

The government has a critical role to play in the development and growth of the C30 industry. It can provide policies, regulations, and financial incentives to support the industry's growth and development. For instance, the government can offer tax breaks or subsidies to companies that invest in Industry 4.0 technology or provide training to workers.

Furthermore, there are various policy and regulatory frameworks that affect the C30 industry, such as environmental regulations and safety standards. Compliance with these regulations can be expensive and time-consuming, and there is a need for streamlined regulatory frameworks that are supportive of the industry's growth.

Training and educational institutions are also crucial stakeholders in the C30 industry. They are responsible for providing the necessary skills and knowledge to workers in the industry. However, the current skills mismatch identified in the document analysis means that the skills being taught may not align with the needs of the industry. Therefore, there is a need to strengthen the link between educational institutions and industry players to ensure that the training being offered is relevant and up-to-date.

Certification bodies also play an essential role in the C30 industry, as they provide recognition and assurance of quality to industry players and customers. However, the lack of standardization across the value chain, as identified in the document analysis, means that there is a need for more harmonization and standardization of certification requirements.

In conclusion, the C30 industry is impacted by various stakeholders, policies, and regulations, and there is a need for collaboration among all stakeholders to ensure the industry's sustainable growth and development.

4.2.2 Focus Group Discussion (FGD) 1

FGD 1 was conducted on 12-13 Nov 2022 at The Mines Resort Hotel and 8 invited experts from industries related to C30, attended these two days sessions. The objectives of FGD 1 are to discuss and develop the occupational structure, determining the competencies in demand, emerging skills, job related to IR, and issues related for C30 groups comprising of all 5 related industries.

Only 3 OS are successfully developed while 2 others are unable to develop as the experts from those industries did not attend the session. Nevertheless, two separate industrial engagement with experts from the remaining industries were conducted to develop the remaining OS. The details result and explanation of the OS are discussed in this chapter. The remaining data collected during this stage is to feed the purpose of developing the survey questionnaire for the next stage of the study.

4.2.3 Survey Result

The survey questionnaire was emailed to industry agencies from January 9 to January 29, 2023, and it collected 166 responses within this three-week period. According to Roscoe's (1975) suggestion, a sample size of 30 to 500 is appropriate for most survey research. Therefore, the number of respondents gathered from the C30 industry accurately represents an appropriate sample size.

Table 4.1 presents the demographic information of the respondents, indicating that they represented almost all the groups in Division C30.

Table 4.1: Respondents' Demographic Profile (n=166)

Profile	Item	Quantity	Percentage (%)
Age	Below 20 years old	0	0
	20 – 29 years old	12	7.1
	30 – 39 years old	47	28.6
	40 – 49 years old	57	34.3
	Above 50 years old	50	30
Gender	Male	130	78.6
	Female	36	21.4
Years of Experience	Below 5 years	14	8.6
	6 – 10 years	31	18.6
	11 – 20 years	52	31.4
	21 – 30 years	47	28.6
	Above 30 years	22	12.9
Position in Organisation	Specialist / Director / General Manager / Senior Manager	66	40
	Manager / Engineer / Executive	66	40
	Assistant Engineer / Assistant Manager / Supervisor	26	15.7
	Others (Line leader / Team leader)	7	4.3
Organization Location	Johor	2	1.4
	Kedah	2	1.4
	Melaka	2	1.4
	Pahang	17	10
	Perak	12	7.1
	Pulau Pinang	2	1.4
	Selangor	103	61.4
	Sarawak	12	7.1
	Terengganu	2	1.4
	Wilayah Persekutuan Kuala Lumpur	12	7.1

Profile	Item	Quantity	Percentage (%)
Type of Manufacture of Other Transport Equipment industries	Building of Ships and Boats	34	20.5
	Manufacture of Railway and Rolling Stock	32	19.3
	Manufacture of Air and Spacecraft and Related Machinery	37	22.3
	Manufacture of Military Fighting Vehicles	33	19.9
	Manufacture of Transportation Equipment n.e.c.	30	18.1

The demographic profile indicates that majority of the respondents are over 40 years old and have at least 11 years of experience in their respective industries. Additionally, most of the respondents hold management-level positions and are based in the Selangor area. The number of industries represented by the respondents are almost consistent across all five industries, with an average of 33 respondents per industry.

This section only discussed on the demographic profile of the survey. The remaining results including the job in demand, competencies in demand, job relevant to IR, emerging skills, and issues related to C30 industries are discussed later in this chapter.

4.2.4 Focus Group Discussion (FGD) 2

The second FGD (FGD 2) was conducted on 28-29 January at Mines Resort Hotel and was attended by 13 experts from all industry groups for C30. The objectives of the FGD 2 are to finalize the developed OS, discuss survey results in terms of jobs in demand and critical jobs, as well as develop the job responsibilities and description for all related job titles in the C30 industries. All the objectives in FGD 2 are managed to be completed during the session. Details explanation and result of the outcome of FGD 2 are discussed later in this chapter.

4.3 Occupational Structure (OS)

Occupational Structure (OS) refers to the aggregate distribution of occupations in society, defined by skill level, economic function, or social rank.

Based on the Focus Group Discussion (FGD) with the experts' representative from every industry related to C30 group, OS for each group of C301, C302, C303, C304

and C309 have been successfully developed. Table 4.2 summarize the overall number of job titles in C30 group. 44 job areas managed to be listed during the FGD, with 200 overall job titles were identified, 55 critical job titles and 193 job titles relevant to industrial revolution within the Manufacturing of Other Transport Equipment industries.

Based on the FGD 1 discussion with the industrial experts, there are 44 major areas involved in the Manufacture of Other Transport Equipment industries starting from design until the commissioning stage.

Table 4.2: Overall Job Areas and Titles in C30: Manufacture of Other Transport Equipment

Occupational Structure (OS)	**Total Identified Job Areas**	**Total Identified Job Titles**	**Total Job Titles Relevant to Industrial Revolution**	**Total Critical Job & Relevant to Industrial Revolution**
C301: Building of Ships and Boats	11	46	43	6
C302: Manufacture of Railway and Rolling Stock	8	33	29	9
C303: Manufacture of Air and Spacecraft and Related Machinery	11	54	54	26
C304: Manufacture of Military Fighting Vehicles	10	47	47	6
C309: Manufacture of Transport Equipment N.E.C.	4	20	20	8
TOTAL	**44**	**200**	**193**	**55**

Building of Ships and Boats (C301) contains 11 major job areas that are essential and important to the shipbuilding process. The explanation of the job areas is as follows:

1. Shipbuilding Design – the process of creating a plan or blueprint for the building of a ship, involving various aspects including the ship's purpose, specifications, size, shape, and materials, and some others. It is a guidance for the ship's construction.
2. Production Planning - The process of developing a detailed plan for the ship's construction. It comprises defining the materials, equipment, and labour

required to construct the ship, as well as the order and timing of each construction process.

3. Hull and Outfitting Production - the process of constructing the hull, or main body, of a ship, as well as outfitting it with the necessary equipment and furnishings to make it operational.
4. Shipbuilding Mechanical Installation - the process of installing the various mechanical systems and components that are required to operate a ship including the installation of engines, propellers, and other propulsion systems, as well as auxiliary systems such as electrical, plumbing, and HVAC systems.
5. Shipbuilding Piping Fabrication – the process of creating the piping systems that are required to transport fluids and gases throughout a ship including the design, fabrication, and installation of pipes, valves, and fittings that are used to control the flow of fluids and gases.
6. Shipbuilding Electrical & Instrumentation (E & I) Installation – the process of installing the electrical and instrumentation systems and components that are required to operate a ship including the installation of electrical power distribution systems, lighting systems, communication systems, and navigation equipment.
7. Shipbuilding Heating, Ventilation, Air Conditioning (HVAC) Installation – the process of installing the HVAC systems and components that are required to regulate the temperature, humidity, and air quality inside a ship. This includes the design, fabrication, and installation of air ducts, ventilation fans, heating and cooling equipment, and filtration systems.
8. Shipbuilding Carpentry Fabrication – the process of fabricating the various wooden structures and components that are required to construct a ship including the design, fabrication, and installation of decks, cabins, furniture, and other wooden structures.
9. Shipbuilding Painting – the process of painting the interior and exterior surfaces of a ship including the application of protective coatings to the ship's hull, decks, and superstructure to prevent corrosion and damage from the marine environment.
10. Quality Assurance and Quality Control – the processes that are put in place

to ensure that a ship is built to the required specifications and standards.

11. Testing & Commissioning Harbour Acceptance Trial and Sea Trial (HAT and SAT) – the processes that are conducted to ensure that the ship is ready for operation. HAT, and SAT processes are important to ensure that the ship meets the required specifications, is safe to operate, and performs as expected.

Manufacture Of Railway and Rolling Stock (C302) includes 8 major job areas that are essential and important to the construction process. The explanation of the job areas is as follow:

1. Design Preparation / Design and Development – the process of designing and developing the various types of vehicles that are used on railways, such as locomotives, passenger cars, and freight cars.
2. Architecture Design – the process of designing the interior and exterior layout of a train or other railway vehicle, including the allocation of space for passengers, seating arrangements, and the placement of equipment and amenities.
3. Rolling Stocks Quality, Safety, Health & Environment Control – the measures put in place to ensure that railway vehicles are built to the required standards and meet the necessary regulatory requirements. These measures are designed to ensure the safety and wellbeing of passengers, crew, and the environment.
4. Rolling Stocks Mechanical Engineering – the engineering activities involved in designing, developing, and fabricating the mechanical components and systems of railway vehicles including the design and development of locomotives, passenger cars, freight cars, and other railway vehicles.
5. Rolling Stocks Electrical & Electronic Engineering – the engineering activities involved in designing, developing, and fabricating the electrical and electronic systems of railway vehicles including the design and development of control systems, propulsion systems, communication systems, and other electrical and electronic systems.
6. Rolling Stocks Communication & Signalling Engineering – the engineering activities involved in designing, developing, and producing the

communication and signalling systems of railway vehicles. This includes the manufacture of mechanical and electromechanical signalling, safety and traffic control equipment.

7. Rolling Stocks Testing & Commissioning – the process of verifying that railway vehicles are built to the required standards and are safe, reliable, and efficient before they are put into service.
8. Production Engineering – the engineering activities involved in the manufacture and assembly of railway vehicles. This includes the design and optimization of production processes, the assembly of individual components into finished products, and the integration of different systems and subsystems.

Manufacture of Air and Spacecraft and Related Machinery (C303) comprises 11 major job areas that are essential and important to the construction process. The explanation of the job areas is as follow:

1. Aircraft Part Engineering Design – the engineering activities involved in the design and development of individual components or parts that make up an aircraft. These parts include the fuselage, wings, engines, landing gear, and various other systems and subsystems.
2. Aircraft Part Tooling Engineering – the engineering activities involved in the design and development of the tools and equipment required to manufacture aircraft parts. These tools and equipment are used in various stages of the manufacturing process, from casting and forging to shaping and drilling.
3. Aircraft Part Industrial Engineering – the engineering activities involved in the optimization of the manufacturing processes for aircraft parts. This includes the analysis and improvement of the production flow, efficiency, and productivity of the manufacturing process.
4. Aircraft Part Sheet Metal Engineering – the engineering activities involved in the design and manufacture of aircraft parts made from sheet metal that are used in a wide range of aircraft components, including wings, fuselage, engine nacelles, and control surfaces.
5. Aircraft Composites Part Laminating – the engineering activities involved in

the manufacturing process of composite materials used in aircraft parts.

6. Aircraft Part Machining – the engineering activities involved in the manufacturing process of aircraft parts through machining operations. Machining is the process of removing material from a workpiece to obtain a desired shape or size using various cutting tools and techniques.
7. Aircraft Part Mechanical Assembly / Final Assembly – the engineering activities involved in the final assembly of aircraft components and parts to create a finished aircraft product involving assembling all the individual parts and systems, such as engines, landing gear, avionics, and control systems, into a fully functioning aircraft.
8. Aircraft Part Surface Treatment – the engineering activities involved in the surface preparation and finishing of aircraft parts to ensure that they meet the required standards for corrosion resistance, wear resistance, and appearance. The surface treatment process involves several stages, including cleaning, preparation, coating, and finishing.
9. Aircraft Part Testing (Non-Destructive Test (NDT)) – the engineering activities involved in the inspection and testing of aircraft parts without causing damage to the parts themselves. The goal of NDT is to identify any potential defects or weaknesses in the materials or structure of the parts to ensure their safe and reliable operation.
10. Aircraft Part Painting – the application of paint and coatings to aircraft parts to provide protection from corrosion, wear, and weathering.
11. Aircraft Part Quality Inspection - the engineering activities involved in the inspection and testing of aircraft parts to ensure that they meet the required quality standards. Quality inspection is a critical part of the manufacturing process and is designed to ensure that the aircraft parts are safe, reliable, and meet the requirements of the customer and regulatory agencies.

Manufacture of Military Fighting Vehicles (C304) contains 10 major job areas that are essential and important to the construction process. The explanation of the job areas is as follow:

1. Platform/Hull Design, Development and Prototyping First Unit Vehicle

(FUV) – the engineering activities involved in the design, development, and prototyping of a new military vehicle platform or hull. The platform or hull is the basic structure or frame of the vehicle, which supports the engine, transmission, suspension, and other components.

2. Weapon and Turret Design, Development and Prototyping FUV – the engineering activities involved in the design, development, and prototyping of new weapon systems and turrets including designing the physical structure of the weapon and turret, as well as developing the electronic systems and controls required to operate them.
3. Electrical, Electronic and Communication Design and Development – the engineering activities involved in the design, development, and integration of electrical, electronic, and communication systems in military vehicles. These systems are critical for the effective operation of military vehicles and include a wide range of components and subsystems such as power distribution, communication systems, sensor systems, and control systems.
4. Industrial Engineering – the application of engineering principles and techniques to optimize the manufacturing processes involved in the production of military vehicles. This includes the design of the production line, selection of appropriate materials, and optimization of the production processes to ensure maximum efficiency, quality, and safety.
5. Production Planning & Control – the process of organizing and directing the resources and activities involved in the production of military vehicles to ensure that they are manufactured on time, within budget, and to the required quality standards.
6. Bodywork Welding – the process of joining two or more metal pieces together to form the body of a military vehicle. This process is critical in the manufacturing of military vehicles, as the body of the vehicle provides protection to its occupants and must be able to withstand extreme conditions and potential impacts.
7. Assembly Process – the process involves assembling various components and subsystems of the vehicle to create a complete military vehicle that meets the required specifications. This process includes a wide range of activities,

including mechanical assembly, electrical and electronic assembly, and final installation of systems and components.

8. Bodywork Painting – the process of applying paint and coatings to the body of a military vehicle. The purpose of bodywork painting is to protect the vehicle body from corrosion, abrasion, and other forms of wear and tear, as well as to enhance the vehicle's appearance.
9. Manufacturing Quality Control – the set of processes and procedures aimed at ensuring that each vehicle produced meets the required standards of quality and performance.
10. Pre-Delivery Inspection (PDI) & Final Acceptance Test (FAT) – the critical steps in the production and delivery of military vehicles, and they ensure that the vehicles are safe, reliable, and ready for deployment in the field.

Manufacture Of Transport Equipment n.e.c. (C309) covers 4 major job areas that are essential and important to the production process. The explanation of the job areas is as follow:

1. Design and Development – the process of creating and improving the transport equipment. This process involves conceptualization, design, prototyping, testing, and refinement of the product to meet the needs of the consumer and comply with safety and regulatory standards.
2. Process Engineering – the planning, designing, and improvement of manufacturing and production processes for various types of transportation equipment. This involves the development and implementation of efficient and effective methods for producing transportation equipment.
3. Product Validation – a series of tests and evaluations to ensure that the product meets all the required specifications and standards. This process typically includes functional testing, performance testing, reliability testing, safety testing, and environmental testing. Product validation is an essential part of the product development process, and it helps to ensure that the final product meets customer needs and expectations.
4. Transport Equipment Production & Assembly – the process of assembling individual parts and components of a transport equipment, into a complete

and functioning unit. This process typically involves the use of automated assembly lines, as well as skilled workers who are responsible for installing and testing various systems and components.

The OS of each group is tabulated, presented, and summarised from Table 4.3 to Table 4.16, which present the overall job areas and job title. In the table are also shown critical job titles, job titles relevant to Industrial Revolution 4.0 (IR 4.0), and the combination of both. C30 is a manufacturing group; hence, most of all job titles are relevant to IR 4.0, as IR 4.0 is directly related to the manufacturing industry.

Table 4.3 and Table 4.4 is the OS for C301 and Table 4.5 is the summary of Job Level for each Job Area in C301. The summary table reported that there are eleven job areas identified and a total of 46 job titles for C301.

Table 4.3: Occupational Structure – C301 (1 / 2)

SECTION	**(C) MANUFACTURING**					
DIVISION	**(30) MANUFACTURE OF OTHER TRANSPORT EQUIPMENT**					
GROUP	**(301) BUILDING OF SHIPS AND BOATS**					
AREA	**SHIPBUILDING DESIGN**	**SHIPBUILDING PRODUCTION PLANNING**	**SHIPBUILDING HULL & OUTFITTING PRODUCTION**	**SHIPBUILDING MECHANICAL INSTALLATION**	**SHIPBUILDING PIPING FABRICATION**	**SHIPBUILDING ELECTRICAL & INSTRUMENTATION (E & I) INSTALLATION**
LEVEL 8	NJT	NJT	NJT	NJT	NJT	NJT
LEVEL 7	NJT	NJT	NJT	NJT	NJT	NJT
LEVEL 6	Head of Shipbuilding Design*	Head of Shipbuilding Planning*	Head of Shipbuilding Hull & Outfitting*	Head of Shipbuilding Mechanical*	Head of Shipbuilding Piping*	Head of Shipbuilding E & I*
LEVEL 5	Shipbuilding Naval Architect**	Shipbuilding Project Planner*	Shipbuilding Hull & Outfitting Engineer*	Shipbuilding Mechanical Engineer*	Shipbuilding Piping Technical Executive*	Shipbuilding E & I Engineer*
LEVEL 4	Shipbuilding Senior Draughtman*	NJT	Shipbuilding Hull & Outfitting Supervisor*	Shipbuilding Mechanical Supervisor*	Shipbuilding Piping Supervisor*	Shipbuilding E & I Supervisor*
LEVEL 3	Shipbuilding Draughtman*	NJT	Shipbuilding Hull & Outfitting Welder**	Shipbuilding Mechanical Technician*	Shipbuilding Piping Technician*	Shipbuilding E & I Technician*
LEVEL 2	NJT	NJT	Shipbuilding Hull & Outfitting Fitter**	NJT	Shipbuilding Piping Fitter**	Shipbuilding E & I Installer*
LEVEL 1	NJT	NJT	Shipbuilding Hull & Outfitting Helper	NJT	Shipbuilding Piping Helper	No Job Title

NJT – No Job Title | Jobs relevant to technology and industrial revolution |** Critical Jobs and jobs relevant to technology and industrial revolution*

Table 4.4: Occupational Structure – C301 (2 / 2)

SECTION	**(C) MANUFACTURING**				
DIVISION	**(30) MANUFACTURE OF OTHER TRANSPORT EQUIPMENT**				
GROUP	**(301) BUILDING OF SHIPS AND BOATS**				
AREA	**SHIPBUILDING HEATING, VENTILATION, AIR CONDITIONING (HVAC) INSTALLATION**	**SHIPBUILDING CARPENTRY FABRICATION**	**SHIPBUILDING PAINTING**	**SHIPBUILDING QUALITY ASSURANCE & QUALITY CONTROL**	**SHIPBUILDING TESTING & COMMISSIONING HARBOUR ACCEPTANCE TRIAL & SEA TRIAL (HAT & SAT)**
LEVEL 8	NJT	NJT	NJT	NJT	NJT
LEVEL 7	NJT	NJT	NJT	NJT	NJT
LEVEL 6	Head of Shipbuilding HVAC*	Head of Shipbuilding Carpentry*	NJT	Head of Shipbuilding QAQC *	Head of shipbuilding Testing & Commissioning *
LEVEL 5	Shipbuilding HVAC Engineer*	Shipbuilding Carpentry Engineer*	Head of Shipbuilding Painting*	Shipbuilding QAQC Engineer*	Shipbuilding Testing & Commissioning Engineer**
LEVEL 4	Shipbuilding HVAC Supervisor*	Shipbuilding Carpentry Supervisor*	Shipbuilding Painting Inspector*	Shipbuilding QAQC Supervisor*	NJT
LEVEL 3	Shipbuilding HVAC Technician*	Shipbuilding Carpenter**	Shipbuilding Painting Supervisor*	Shipbuilding QAQC Technician*	NJT
LEVEL 2	NJT	Shipbuilding Carpenter Helper	Shipbuilding Painter and Blaster*	NJT	NJT
LEVEL 1	NJT	NJT	NJT	NJT	NJT

NJT – No Job Title | Jobs relevant to technology and industrial revolution |** Critical Jobs and jobs relevant to technology and industrial revolution*

Table 4.5: Summary of Job Titles in C301

JOB AREA	JOB LEVEL							
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
SHIPBUILDING DESIGN	NJT	NJT	1	1	1	1	NJT	NJT
SHIPBUILDING PRODUCTION PLANNING	NJT	NJT	NJT	NJT	1	1	NJT	NJT
SHIPBUILDING HULL & OUTFITTING PRODUCTION	1	1	1	1	1	1	NJT	NJT
SHIPBUILDING MECHANICAL INSTALLATION	NJT	NJT	1	1	1	1	NJT	NJT
SHIPBUILDING PIPING FABRICATION	1	1	1	1	1	1	NJT	NJT
SHIPBUILDING ELECTRICAL & INSTRUMENTATION (E & I) INSTALLATION	NJT	1	1	1	1	1	NJT	NJT
SHIPBUILDING HEATING, VENTILATION, AIR CONDITIONING (HVAC) INSTALLATION	NJT	NJT	1	1	1	1	NJT	NJT
SHIPBUILDING CARPENTRY FABRICATION	NJT	1	1	1	1	1	NJT	NJT
SHIPBUILDING PAINTING	NJT	1	1	1	1	NJT	NJT	NJT
SHIPBUILDING QUALITY ASSURANCE & QUALITY CONTROL	NJT	NJT	1	1	1	1	NJT	NJT
SHIPBUILDING TESTING & COMMISSIONING HARBOUR ACCEPTANCE TRIAL & SEA TRIAL (HAT & SAT)	NJT	NJT	NJT	NJT	1	1	NJT	NJT

DETAILS	LEVEL							
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
IDENTIFIED JOB TITLES (PER LEVEL)	2	5	9	9	11	10	0	0
TOTAL IDENTIFIED JOB TITLE	46							
CRITICAL JOB TITLES (PER LEVEL)	0	2	2	0	2	0	0	0
TOTAL CRITICAL JOB TITLES	6							
JOB TITLES RELEVANT TO TECHNOLOGY & INDUSTRIAL REVOLUTION (PER LEVEL)	0	4	9	9	11	10	0	0
JOB TITLES RELEVANT TO TECHNOLOGY & INDUSTRIAL REVOLUTION	43							

Table 4.6 and Table 4.7 present the Occupational Structure (OS) for C302 and Table 4.8 is the summary of Job Areas and Job Titles for each level. Data presented showed that there is eight (8) Job Areas for C302 and thirty-three (33) job titles for C302. The summary table show there's no Job Title for Level 1. Most of the Job Titles are at Level 4, 5 and 6.

Table 4.6: Occupational Structure – C302 (1 / 2)

SECTION	**(C) MANUFACTURING**		
DIVISION	**(30) MANUFACTURE OF OTHER TRANSPORT EQUIPMENT**		
GROUP	**(302) MANUFACTURE OF RAILWAY AND ROLLING STOCK**		
AREA	**ROLLING STOCK DESIGN PREPARATION / DESIGN AND DEVELOPMENT**	**ROLLING STOCK ARCHITECTURE DESIGN**	**ROLLING STOCKS QUALITY, SAFETY, HEALTH & ENVIRONMENT CONTROL**
LEVEL 8	NJT	NJT	NJT
LEVEL 7	NJT	NJT	NJT
LEVEL 6	Head of Technical*	Head of Technical*	Head QHSE**
LEVEL 5	Senior Engineer*	Senior Engineer*	Senior QHSE**
LEVEL 4	Engineer*	Engineer*	QHSE Engineer*
LEVEL 3	NJT	NJT	NJT
LEVEL 2	NJT	NJT	NJT
LEVEL 1	NJT	NJT	NJT

NJT – No Job Title | Jobs relevant to technology and industrial revolution |** Critical Jobs and jobs relevant to technology and industrial revolution*

Table 4.7: Occupational Structure – C302 (2 / 2)

SECTION	**(C) MANUFACTURING**				
DIVISION	**(30) MANUFACTURE OF OTHER TRANSPORT EQUIPMENT**				
GROUP	**(302) MANUFACTURE OF RAILWAY AND ROLLING STOCK**				
AREA	**ROLLING STOCKS MECHANICAL ENGINEERING**	**ROLLING STOCKS ELECTRICAL & ELECTRONIC ENGINEERING**	**ROLLING STOCKS COMMUNICATION & SIGNALLING ENGINEERING**	**ROLLING STOCKS TESTING & COMMISSIONING**	**ROLLING STOCK PRODUCTION ENGINEERING**
LEVEL 8	NJT	NJT	NJT	NJT	NJT
LEVEL 7	NJT	NJT	NJT	NJT	NJT
LEVEL 6	Head of Technical*	Head of Technical**	Head of Technical**	Head of Technical*	Head of Production**
LEVEL 5	Senior Engineer*	Senior Engineer**	Senior Engineer**	Senior T&C Engineer*	Senior Engineer*
LEVEL 4	Engineer**	Engineer*	Engineer*	T&C Engineer*	Engineer*
LEVEL 3	Technician / Welder / Painter**	Technician*	Technician*	Technician*	Technician*
LEVEL 2	Fitter	Fitter	Fitter	NJT	Fitter
LEVEL 1	NJT	NJT	NJT	NJT	NJT

NJT – No Job Title | Jobs relevant to technology and industrial revolution |** Critical Jobs and jobs relevant to technology and industrial revolution*

Table 4.8: Summary of Job Titles in C302

JOB AREA	JOB LEVEL							
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
DESIGN PREPARATION / DESIGN AND DEVELOPMENT	NJT	NJT	NJT	1	1	1	NJT	NJT
ARCHITECTURE DESIGN	NJT	NJT	NJT	1	1	1	NJT	NJT
ROLLING STOCKS QUALITY, SAFETY, HEALTH & ENVIRONMENT CONTROL	NJT	NJT	NJT	1	1	1	NJT	NJT
ROLLING STOCKS MECHANICAL ENGINEERING	NJT	1	1	1	1	1	NJT	NJT
ROLLING STOCKS ELECTRICAL & ELECTRONIC ENGINEERING	NJT	1	1	1	1	1	NJT	NJT
ROLLING STOCKS COMMUNICATION & SIGNALLING ENGINEERING	NJT	1	1	1	1	1	NJT	NJT
ROLLING STOCKS TESTING & COMMISSIONING	NJT	NJT	1	1	1	1	NJT	NJT
PRODUCTION ENGINEERING	NJT	1	1	1	1	1	NJT	NJT

DETAILS	LEVEL							
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
IDENTIFIED JOB TITLES (PER LEVEL)	0	4	5	8	8	8	0	0
TOTAL IDENTIFIED JOB TITLE	33							
CRITICAL JOB TITLES (PER LEVEL)	0	0	1	1	2	3	0	0
TOTAL CRITICAL JOB TITLES	9							
JOB TITLES RELEVANT TO TECHNOLOGY & INDUSTRIAL REVOLUTION (PER LEVEL)	0	0	5	8	8	8	0	0
JOB TITLES RELEVANT TO TECHNOLOGY & INDUSTRIAL REVOLUTION	29							

Tables 4.9 and 4.10 present the Occupational Structure (OS) for C302, and Table 4.8 is the summary of job areas and job titles for each level. The data presented showed that there are eleven (11) job areas and fifty-four (54) job titles for C303.

Table 4.9: Occupational Structure – C303 (1 / 2)

SECTION	**(C) MANUFACTURING**					
DIVISION	**(30) MANUFACTURE OF OTHER TRANSPORT EQUIPMENT**					
GROUP	**(303) MANUFACTURE OF AIR AND SPACECRAFT AND RELATED MACHINERY**					
AREA	**AIRCRAFT PART ENGINEERING DESIGN**	**AIRCRAFT PART TOOLING ENGINEER**	**AIRCRAFT PART INDUSTRIAL ENGINEERING**	**AIRCRAFT PART SHEET METAL ENGINEERING**	**AIRCRAFT COMPOSITES PART LAMINATING**	**AIRCRAFT PART MACHINING**
LEVEL 8	NJT	NJT	NJT	NJT	NJT	NJT
LEVEL 7	Principal Design Technologist*	Principal Tool Design Specialist*	Head of Industrial Engineer*	Head of Sheet Metal*	Head of Laminating*	Head of Machining*
LEVEL 6	Senior Design Technologist*	Tool Design Specialist*	Senior Industrial Engineer*	Sheet Metal Specialist*	Laminating Specialist*	Machining Specialist*
LEVEL 5	Design Technologist*	Tool Design Engineer*	Industrial Engineer*	Sheet Metal Engineer*	Laminating Engineer*	Machining Engineer*
LEVEL 4	Drafter*	Senior Tooling Technician*	NJT	Senior Sheet Metal Technician*	Senior Laminating Technician*	Senior Machinist*
LEVEL 3	NJT	Tooling Technician*	NJT	Sheet Metal Technician*	Laminating Technician*	Machinist*
LEVEL 2	NJT	NJT	NJT	NJT	NJT	NJT
LEVEL 1	NJT	NJT	NJT	NJT	NJT	NJT

NJT – No Job Title | Jobs relevant to technology and industrial revolution |** Critical Jobs and jobs relevant to technology and industrial revolution*

Table 4.10: Occupational Structure – C303 (2 / 2)

SECTION	(C) MANUFACTURING				
DIVISION	(30) MANUFACTURE OF OTHER TRANSPORT EQUIPMENT				
GROUP	(303) MANUFACTURE OF AIR AND SPACECRAFT AND RELATED MACHINERY				
AREA	AIRCRAFT PART MECHANICAL ASSEMBLY / FINAL ASSEMBLY	AIRCRAFT PART SURFACE TREATMENT	AIRCRAFT PART TESTING (NON-DESTRUCTIVE TEST (NDT))	AIRCRAFT PART PAINTING	AIRCRAFT PART QUALITY INSPECTION
LEVEL 8	NJT	NJT	NJT	NJT	NJT
LEVEL 7	Head of Production*	Head of Plant*	Head of Quality*	Head of Painting**	Head of Quality**
LEVEL 6	Senior Production Engineer*	Senior Surface Treatment Specialist*	Senior NDT Engineer*	Painting Specialist**	Senior Quality Inspection Engineer**
LEVEL 5	Production Engineer*	Surface Treatment Specialist*	NDT Engineer*	Painting Engineer**	Quality Inspection Engineer**
LEVEL 4	Production Supervisor*	Senior Surface Treatment Technician*	Senior NDT Technician*	Painter Supervisor**	Supervisor**
LEVEL 3	Senior Production Technician*	Surface Treatment Technician*	NDT Technician*	Senior Painter**	Quality Inspector**
LEVEL 2	Production Technician*	NJT	NJT	Painter**	NJT
LEVEL 1	NJT	NJT	NJT	NJT	NJT

NJT – No Job Title | Jobs relevant to technology and industrial revolution |** Critical Jobs and jobs relevant to technology and industrial revolution*

Production supervisors are at Level 4 for C303 hold a bachelor's degree in technology, engineering, business administration, or related fields. At Level 4, the supervisors are commonly the people who have been promoted from the senior technical position, which demonstrated a high level of skill either in the technical field or in people management. The summary table shows there's no job title for Level 1, and the highest job title is at Level 7.

Table 4.11: Summary of Job Titles in C303

JOB AREA	JOB LEVEL							
	1	2	3	4	5	6	7	8
AIRCRAFT PART ENGINEERING DESIGN	NJT	NJT	NJT	1	1	1	1	NJT
AIRCRAFT PART TOOLING ENGINEER	NJT	NJT	1	1	1	1	1	NJT
AIRCRAFT PART INDUSTRIAL ENGINEERING	NJT	NJT	NJT	NJT	1	1	1	NJT
AIRCRAFT PART SHEET METAL ENGINEERING	NJT	NJT	1	1	1	1	1	NJT
AIRCRAFT COMPOSITES PART LAMINATING	NJT	NJT	1	1	1	1	1	NJT
AIRCRAFT PART MACHINING	NJT	NJT	1	1	1	1	1	NJT
AIRCRAFT PART MECHANICAL ASSEMBLY/FINAL ASSY	NJT	1	1	1	1	1	1	NJT
AIRCRAFT PART SURFACE TREATMENT	NJT	NJT	1	1	1	1	1	NJT
AIRCRAFT PART TESTING (NON-DESTRUCTIVE TEST (NDT))	NJT	NJT	1	1	1	1	1	NJT
AIRCRAFT PART PAINTING	NJT	1	1	1	1	1	1	NJT
AIRCRAFT PART QUALITY INSPECTION	NJT	NJT	1	1	1	1	1	NJT

DETAILS	LEVEL							
	1	2	3	4	5	6	7	8
IDENTIFIED JOB TITLES (PER LEVEL)	0	2	9	10	11	11	11	0
TOTAL IDENTIFIED JOB TITLE	54							
CRITICAL JOB TITLES (PER LEVEL)	0	2	4	5	5	8	2	0
TOTAL CRITICAL JOB TITLES	26							
JOB TITLES RELEVANT TO TECHNOLOGY & INDUSTRIAL REVOLUTION (PER LEVEL)	0	2	9	10	11	11	11	0
JOB TITLES RELEVANT TO TECHNOLOGY & INDUSTRIAL REVOLUTION	54							

Tables 4.12 and 4.11 present the Occupational Structure (OS) for C304, and Table 4.14 is the summary of job areas and job titles for each level. The data presented showed that there are ten (10) job areas and forty-seven (47) job titles identified for C304. The summary table shows there's no job title for Level 1, and the highest job title is at Level 6.

Table 4.12: Occupational Structure – C304 (1 / 2)

SECTION	**(C) MANUFACTURING**			
DIVISION	**(30) MANUFACTURE OF OTHER TRANSPORT EQUIPMENT**			
GROUP	**(304) MANUFACTURE OF MILITARY FIGHTING VEHICLES**			
AREA	**PLATFORM / HULL DESIGN, DEVELOPMENT AND PROTOTYPING FIRST UNIT VEHICLE (FUV)**	**WEAPON AND TURRET DESIGN, DEVELOPMENT AND PROTOTYPING FUV**	**ELECTRICAL, ELECTRONIC AND COMMUNICATION DESIGN DEVELOPMENT & PROTOTYPING FUV**	**INDUSTRIAL ENGINEERING**
LEVEL 8	NJT	NJT	NJT	NJT
LEVEL 7	NJT	NJT	NJT	NJT
LEVEL 6	Head of Engineering*	Head of Engineering*	Head of Engineering*	Head of Engineering*
LEVEL 5	Specialist Engineer**	Specialist Engineer**	Specialist Engineer**	Senior Engineer*
LEVEL 4	Design Engineer**	Design Engineer**	Design Engineer**	Engineer*
LEVEL 3	Drafter*	Technician*	Technician*	Supervisor*
LEVEL 2	NJT	NJT	NJT	Technician*
LEVEL 1	NJT	NJT	NJT	NJT

NJT – No Job Title | Jobs relevant to technology and industrial revolution |** Critical Jobs and jobs relevant to technology and industrial revolution*

Table 4.13: Occupational Structure – C304 (2 / 2)

SECTION	**(C) MANUFACTURING**					
DIVISION	**(30) MANUFACTURE OF OTHER TRANSPORT EQUIPMENT**					
GROUP	**(304) MANUFACTURE OF MILITARY FIGHTING VEHICLES**					
AREA	**PRODUCTION PLANNING & CONTROL**	**BODYWORK WELDING**	**ASSEMBLY PROCESS**	**BODYWORK PAINTING**	**MANUFACTURING QUALITY CONTROL**	**PRE-DELIVERY INSPECTION (PDI) & FINAL ACCEPTANCE TEST (FAT)**
LEVEL 8	NJT	NJT	NJT	NJT	NJT	NJT
LEVEL 7	NJT	NJT	NJT	NJT	NJT	NJT
LEVEL 6	Head of Manufacturing*	Head of Manufacturing*	Head of Manufacturing*	Head of Manufacturing*	Head of Quality*	Head of Quality*
LEVEL 5	Senior Engineer*	Senior Welding Engineer*	Senior Engineer*	Senior Engineer*	Senior Engineer*	Senior Engineer*
LEVEL 4	Engineer*	Welding Engineer*	Engineer*	Engineer*	Engineer*	Engineer*
LEVEL 3	Supervisor/ Technician*	Welding Supervisor*	Supervisor/ Technician*	Supervisor/ Technician *	Supervisor/ Technician*	Supervisor/ Technician*
LEVEL 2	Asst Technician*	Welder*	Asst Technician*	Painter*	Asst Technician*	Asst Technician*
LEVEL 1	NJT	NJT	NJT	NJT	NJT	NJT

NJT – No Job Title | Jobs relevant to technology and industrial revolution |** Critical Jobs and jobs relevant to technology and industrial revolution*

Table 4.14: Summary of Job Titles in C304

JOB AREA	JOB LEVEL							
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
PLATFORM/HULL DESIGN, DEVELOPMENT AND PROTOTYPING FIRST UNIT VEHICLE (FUV)	NJT	NJT	1	1	1	1	NJT	NJT
WEAPON AND TURRET DESIGN, DEVELOPMENT AND PROTOTYPING FUV	NJT	NJT	1	1	1	1	NJT	NJT
ELECTRICAL, ELECTRONIC AND COMMUNICATION DESIGN AND DEVELOPMENT	NJT	NJT	1	1	1	1	NJT	NJT
INDUSTRIAL ENGINEERING	NJT	1	1	1	1	1	NJT	NJT
PRODUCTION PLANNING & CONTROL	NJT	1	1	1	1	1	NJT	NJT
BODYWORK WELDING	NJT	1	1	1	1	1	NJT	NJT
ASSEMBLY PROCESS	NJT	1	1	1	1	1	NJT	NJT
BODYWORK PAINTING	NJT	1	1	1	1	1	NJT	NJT
MANUFACTURING QUALITY CONTROL	NJT	1	1	1	1	1	NJT	NJT
PRE-DELIVERY INSPECTION (PDI) & FINAL ACCEPTANCE TEST (FAT)	NJT	1	1	1	1	1	NJT	NJT

DETAILS	LEVEL							
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
IDENTIFIED JOB TITLES (PER LEVEL)	0	7	10	10	10	10	0	0
TOTAL IDENTIFIED JOB TITLE	47							
CRITICAL JOB TITLES (PER LEVEL)	0	0	0	3	3	0	0	0
TOTAL CRITICAL JOB TITLES	6							
JOB TITLES RELEVANT TO TECHNOLOGY & INDUSTRIAL REVOLUTION (PER LEVEL)	0	7	10	10	10	10	0	0
JOB TITLES RELEVANT TO TECHNOLOGY & INDUSTRIAL REVOLUTION	47							

Tables 4.15 present the Occupational Structure (OS) for C309, and Table 4.16 is the summary of job areas and job titles for each level. The data presented showed that there are four (4) job areas and twenty (20) job titles identified for C309. The summary table shows there's two (2) job titles for Level 1, and the highest job title is at Level 6.

Table 4.15: Occupational Structure – C309

SECTION	**(C) MANUFACTURING**			
DIVISION	**(30) MANUFACTURE OF OTHER TRANSPORT EQUIPMENT**			
GROUP	**(309) MANUFACTURE OF TRANSPORT EQUIPMENT N.E.C.**			
AREA	**DESIGN AND DEVELOPMENT**	**PROCESS ENGINEERING**	**PRODUCT VALIDATION**	**TRANSPORT EQUIPMENT PRODUCTION & ASSEMBLY**
LEVEL 8	NJT	NJT	NJT	NJT
LEVEL 7	NJT	NJT	NJT	NJT
LEVEL 6	Head of Design & Development *	Head of Process Engineering**	Head of Product Validation*	Head of Transport Equipment Production & Assembly *
LEVEL 5	Electrical / Mechanical Engineer**	Electrical / Mechanical Engineer**	Electrical / Mechanical Engineer**	Electrical / Mechanical Engineer**
LEVEL 4	Technical Assistant*	Supervisor*	Supervisor*	Supervisor*
LEVEL 3	Drafter**	Line Leader**	Inspector*	Line Leader**
LEVEL 2	NJT	Zone Leader*	NJT	Zone Leader*
LEVEL 1	NJT	Operator*	NJT	Operator*

NJT – No Job Title | Jobs relevant to technology and industrial revolution |** Critical Jobs and jobs relevant to technology and industrial revolution*

Table 4.16: Summary of Job Titles in C309

JOB AREA	JOB LEVEL							
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
DESIGN AND DEVELOPMENT	NJT	NJT	1	1	1	1	0	0
PROCESS ENGINEERING	1	1	1	1	1	1	0	0
PRODUCT VALIDATION	NJT	NJT	1	1	1	1	0	0
TRANSPORT EQUIPMENT PRODUCTION & ASSEMBLY	1	1	1	1	1	1	0	0

DETAILS	LEVEL							
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
IDENTIFIED JOB TITLES (PER LEVEL)	2	2	4	4	4	4	0	0
TOTAL IDENTIFIED JOB TITLE	20							
CRITICAL JOB TITLES (PER LEVEL)	0	0	3	0	4	1	0	0
TOTAL CRITICAL JOB TITLES	8							
JOB TITLES RELEVANT TO TECHNOLOGY & INDUSTRIAL REVOLUTION (PER LEVEL)	2	2	4	4	4	4	0	0
JOB TITLES RELEVANT TO TECHNOLOGY & INDUSTRIAL REVOLUTION	20							

4.4 Occupational Responsibilities (OR)

Occupational responsibility (OR) is a duty or obligation to satisfactorily perform or complete a task (assigned by someone or created by one's own promise or circumstances) that one must achieve and for which failure has a penalty. In a nutshell, OR describes the primary scope of work for the job titles listed in the Occupational Structure (OS). It establishes an employee's accountability and responsibility. Employee accountability is the responsibility of employees to complete the tasks assigned to them, to perform the duties required by the job, and to be present at work in order to achieve the organization's goals.

In this section, the operational responsibilities (OR) for all job titles in the C30 industries will be described and discussed according to their respective job areas and levels. The job titles that are primarily responsible for the main functions within these industries will be explained in further detail.

The OR will serve as the future reference for the development of the National Occupational Skills Standard (NOSS) for the Manufacture of Other Transport Equipment occupation under the MSIC 2008, Division C30. (Group: C301, C302, C303, C304 and C309). The OR for the job titles in this study are tabulated from Table 4.17 until Table 4.32.

Table 4.17: Occupational Responsibility (OR) C301 (1/ 4)

SECTION	(C) MANUFACTURING		
DIVISION	(30) MANUFACTURE OF OTHER TRANSPORT EQUIPMENT		
GROUP	(301) BUILDING OF SHIPS AND BOATS		
AREA	SHIPBUILDING DESIGN	SHIPBUILDING PRODUCTION PLANNING	SHIPBUILDING HULL & OUTFITTING PRODUCTION
LEVEL 8	No Job Title	No Job Title	No Job Title
LEVEL 7	No Job Title	No Job Title	No Job Title
LEVEL 6	**Head of Shipbuilding Design** 1. Lead the design team in the development of new ship designs. 2. Manage and mentor a team of engineers and designers. 3. Provide technical guidance and support to the shipbuilding team. 4. Develop and maintain design schedules and budgets. 5. Review and approve design drawings and calculations.	**Head of Shipbuilding Planning** 1. Develop and maintain detailed project schedules, including resource allocation, critical path analysis, and progress reporting. 2. Manage and mentor a team of planners and schedulers. 3. Provide technical guidance and support to the shipbuilding team.	**Head of Shipbuilding Hull & Outfitting** 1. Lead a team of engineers and designers and are responsible for ensuring that the hull and outfitting of the ship meet the customer's requirements and industry standards. 2. Lead the design team in the development of new ship designs and modifications. 3. Provide technical guidance and support to the shipbuilding team.
LEVEL 5	**Shipbuilding Naval Architect** 1. Design ship to meet Classification Rules and Regulation, and Statutory requirement. 2. Provide all drawing related to the construction of the vessel (Hull, Machinery system, Stability and Safety). 3. Calculate the design, and performance of the vessel.	**Shipbuilding Project Planner** 1. Plan and schedule various project workloads. 2. Gather and analyse information to prepare status reports. 3. Evaluate current procedures and recommends change to improve the efficiency of planning and scheduling of projects.	**Shipbuilding Hull & Outfitting Engineer** 1. Plan and execute the hull and outfitting construction. 2. Check and verify the materials used during construction. 3. Detect the engineering problems and work to solve them.

SECTION	(C) MANUFACTURING		
DIVISION	(30) MANUFACTURE OF OTHER TRANSPORT EQUIPMENT		
GROUP	(301) BUILDING OF SHIPS AND BOATS		
AREA	**SHIPBUILDING DESIGN**	**SHIPBUILDING PRODUCTION PLANNING**	**SHIPBUILDING HULL & OUTFITTING PRODUCTION**
LEVEL 4	**Shipbuilding Senior Draughtman** 1. Monitor and modify technical drawings. using computer-aided design (CAD) software. 2. Supervise and monitor the preparation of technical drawing. 3. Review and advise any changes in the existing drawings in ensuring that they are accurate and up-to-date.	**No Job Title**	**Shipbuilding Hull & Outfitting Supervisor** 1. Supervise the works of the hull and outfitting technician and OEM representative, ensuring that the items are install in according with the ship yard quality standard and project schedule. 2. Review and approve the work of subcontractors and vendors to ensure compliant with project specification. 3. Prepare and report to shipbuilding Hull & Outfitting engineer of work progress and completion.
LEVEL 3	**Shipbuilding Draughtman** 1. Prepare draft of technical drawings using computer-aided design (CAD) software. 2. Collaborate with other departments, such as engineering and production, to ensure that the design meets the customer's requirements. 3. Assist in the preparation of technical drawing.	**No Job Title**	**Shipbuilding Hull & Outfitting Welder** 1. Conduct welding and fabricating structural components of ships, such as hulls, decks, and bulkheads. 2. Install and repair outfitting components such as stairways, railings, and other metal fixtures. 3. Read and interpret blueprints, schematics, and technical drawings to determine the specific welding and fabrication requirements for each project.

SECTION	(C) MANUFACTURING		
DIVISION	(30) MANUFACTURE OF OTHER TRANSPORT EQUIPMENT		
GROUP	(301) BUILDING OF SHIPS AND BOATS		
AREA	**SHIPBUILDING DESIGN**	**SHIPBUILDING PRODUCTION PLANNING**	**SHIPBUILDING HULL & OUTFITTING PRODUCTION**
LEVEL 2	**No Job Title**	**No Job Title**	**Shipbuilding Hull & Outfitting Fitter** 1. Conduct welding and fabricating structural components of ships and boats, such as hulls and decks. 2. Conduct fabricating and installing outfitting components, such as stairways, railings, and bulkheads. 3. Prepare and set up equipment and materials required for welding and fabrication.
LEVEL 1	**No Job Title**	**No Job Title**	**Shipbuilding Hull & Outfitting Helper** 1. Prepare materials and equipment for welding and fabrication, such as cutting and measuring metal sheets and pipes. 2. Clean the work area and equipment, such as removing debris and ensuring that tools are in good working order. 3. Assist the welder with various tasks, such as holding and positioning materials during welding, and helping to move and position equipment.

Table 4.18: Occupational Responsibility (OR) C301 (2/ 4)

SECTION	(C) MANUFACTURING		
DIVISION	(30) MANUFACTURE OF OTHER TRANSPORT EQUIPMENT		
GROUP	(301) BUILDING OF SHIPS AND BOATS		
AREA	SHIPBUILDING MECHANICAL INSTALLATION	SHIPBUILDING PIPING FABRICATION	SHIPBUILDING ELECTRICAL & INSTRUMENTATION (E & I) INSTALLATION
LEVEL 8	No Job Title	No Job Title	No Job Title
LEVEL 7	No Job Title	No Job Title	No Job Title
LEVEL 6	**Head of Shipbuilding Mechanical** 1. Lead a team of mechanical engineers and are responsible for ensuring that the mechanical systems meet the customer's requirements and industry standards. 2. Coordinate with other departments and stakeholders to ensure that the mechanical systems of the ship meet the customer's requirements and industry standards. 3. Provide technical guidance and support to the shipbuilding team	**Head of Shipbuilding Piping** 1. Lead a team of piping engineers and are responsible for ensuring that the piping systems meet the customer's requirements and industry standards. 2. Lead the design team in the development of new ship designs and modifications for piping systems such as fuel, lubrication, fresh water, fire-fighting, and ballast systems. 3. Review and approve design drawings and calculations for piping systems.	**Head of Shipbuilding E & I** 1. Lead a team of E&I engineers and are responsible for ensuring that the E&I systems meet the customer's requirements and industry standards. 2. Lead the design team in the development of new ship designs and modifications for E&I systems such as power generation, distribution, navigation, and communication systems. 3. Review and approve design drawings and calculations for E&I systems.

SECTION	(C) MANUFACTURING		
DIVISION	(30) MANUFACTURE OF OTHER TRANSPORT EQUIPMENT		
GROUP	(301) BUILDING OF SHIPS AND BOATS		
AREA	SHIPBUILDING MECHANICAL INSTALLATION	SHIPBUILDING PIPING FABRICATION	SHIPBUILDING ELECTRICAL & INSTRUMENTATION (E & I) INSTALLATION
LEVEL 5	**Shipbuilding Mechanical Engineer** 1. Install, alignment and testing for all mechanical equipment on board 2. Discuss and solve complex problems with all department, OEMs, and Client. 3. Integrate all ship systems in a trustworthy manner.	**Shipbuilding Piping Technical Executive** 1. Determine suitable piping materials for each ship system. 2. Conduct pipe stress analysis to ensure the structural integrity of the piping systems. 3. Oversee the construction and installation of piping systems to ensure compliance with industry standards and regulations.	**Shipbuilding E & I Engineer** 1. Develop and review engineering documents such as electrical schematics, instrument loop diagrams, and material specifications. 2. Work with other shipbuilding engineers to ensure that the electrical and instrumentation systems are properly integrated with other ship systems such as propulsion, navigation, and communication. 3. Oversee the construction and installation of electrical and instrumentation systems to ensure compliance with industry standards and regulations.
LEVEL 4	**Shipbuilding Mechanical Supervisor** 1. Supervise the works of the mechanical technician and OEM representative, ensuring that the system are install in according with the ship yard quality standard and project schedule	**Shipbuilding Piping Supervisor** 1. Supervise the works of the piping technician and OEM representative, ensuring that the system are install in according with the ship yard quality standard and project schedule.	**Shipbuilding E & I Supervisor** 1. Supervise the works of the electrical and instrumentation technician and OEM representative, ensuring that the system are install in according with the ship yard quality standard and project schedule.

SECTION	(C) MANUFACTURING		
DIVISION	(30) MANUFACTURE OF OTHER TRANSPORT EQUIPMENT		
GROUP	(301) BUILDING OF SHIPS AND BOATS		
AREA	SHIPBUILDING MECHANICAL INSTALLATION	SHIPBUILDING PIPING FABRICATION	SHIPBUILDING ELECTRICAL & INSTRUMENTATION (E & I) INSTALLATION
	2. Review and approve the work of subcontractors and vendors to ensure compliant with project specification. 3. Report to shipbuilding mechanical engineer of work progress and completion.	2. Review and approve the work of subcontractors and vendors to ensure compliant with project specification. 3. Report to shipbuilding piping engineer of work progress and completion.	2. Review and approve the work of subcontractors and vendors to ensure compliant with project specification. 3. Report to shipbuilding E & I engineer of work progress and completion.
LEVEL 3	**Shipbuilding Mechanical Technician** 1. Install, and repair of mechanical systems and components on ships and boats. 2. Troubleshoot and diagnose mechanical problems and making repairs as needed. 3. Read and interpret blueprints and schematics to understand the design and layout of mechanical systems.	**Shipbuilding Piping Technician** 1. Install, and repair piping systems on ships and boats, such as water, fuel, and air systems. 2. Ensure that all work is done to the highest quality standards and meets safety requirements. 3. Report to piping supervisor on construction work progress	**Shipbuilding E & I Technician** 1. Install electrical and instrumentation systems such as power distribution systems, lighting systems, control systems, and instrumentation systems. 2. Read and interpret blueprints and schematics to understand the design and layout of the electrical and instrumentation systems. 3. Supporting commissioning and start-up of the systems
LEVEL 2	**No Job Title**	**Shipbuilding Piping Fitter** 1. Perform fabricating and installing structural components of ships and	**Shipbuilding E & I Installer** 1. Install and connect various electrical and instrumentation systems such as power distribution systems, lighting systems,

SECTION	(C) MANUFACTURING		
DIVISION	(30) MANUFACTURE OF OTHER TRANSPORT EQUIPMENT		
GROUP	(301) BUILDING OF SHIPS AND BOATS		
AREA	**SHIPBUILDING MECHANICAL INSTALLATION**	**SHIPBUILDING PIPING FABRICATION**	**SHIPBUILDING ELECTRICAL & INSTRUMENTATION (E & I) INSTALLATION**
		boats, such as the hull, decks, and superstructure. 2. Conduct cutting, shaping, and fitting metal components to create the structure of the ship. 3. Read and interpret blueprints and schematics to understand the design and layout of the ship.	control systems, and instrumentation systems. 2. Read and interpret blueprints, schematics, and technical drawings to understand the design and layout of the electrical and instrumentation systems. 3. Conduct pulling and routing wires and cables, and installing conduit and other wiring systems.
LEVEL 1	**No Job Title**	**Piping Helper** 1. Assist with the fabrication, and installation of ships and boats, such as the piping systems. 2. Help to prepare materials and tools for use by skilled tradespeople. 3. Clean and maintain tools and equipment.	**No Job Title**

Table 4.19: Occupational Responsibility (OR) C301 (3/ 4)

SECTION	(C) MANUFACTURING		
DIVISION	(30) MANUFACTURE OF OTHER TRANSPORT EQUIPMENT		
GROUP	(301) BUILDING OF SHIPS AND BOATS		
AREA	SHIPBUILDING HEATING, VENTILATION, AIR CONDITIONING (HVAC) INSTALLATION	SHIPBUILDING CARPENTRY FABRICATION	SHIPBUILDING PAINTING
LEVEL 8	No Job Title	No Job Title	No Job Title
LEVEL 7	No Job Title	No Job Title	No Job Title
LEVEL 6	**Head of Shipbuilding HVAC** 1. Lead a team of HVAC engineers and are responsible for ensuring that the HVAC systems meet the customer's requirements and industry standards. 2. Lead the design team in the development of new ship designs and modifications for HVAC systems such as heating, cooling, ventilation, and air conditioning systems. 3. Review and approve design drawings and calculations for HVAC systems.	**Head of Shipbuilding Carpentry** 1. Lead a team of carpentry and woodworking specialists and are responsible for ensuring that the carpentry and woodwork meet the customer's requirements and industry standards. 2. Lead the design team in the development of new ship designs and modifications for carpentry and woodwork such as decks, cabins, and other wooden structures. 3. Review and approve design drawings and calculations for carpentry and woodwork.	No Job Title

SECTION	(C) MANUFACTURING		
DIVISION	(30) MANUFACTURE OF OTHER TRANSPORT EQUIPMENT		
GROUP	(301) BUILDING OF SHIPS AND BOATS		
AREA	SHIPBUILDING HEATING, VENTILATION, AIR CONDITIONING (HVAC) INSTALLATION	SHIPBUILDING CARPENTRY FABRICATION	SHIPBUILDING PAINTING
LEVEL 5	**Shipbuilding HVAC Engineer** 1. Design and specify HVAC systems for new ships and other marine vessels. 2. Develop and review engineering documents such as HVAC schematics, ductwork layouts, and material specifications. 3. Work with other shipbuilding engineers to ensure that the HVAC systems are properly integrated with other ship systems such as propulsion, navigation, and communication.	**Shipbuilding Carpentry Engineer** 1. Design and specify wooden structures and systems for new ships and other marine vessels, including decks, bulkheads, cabins, and other interior and exterior components. 2. Develop detailed engineering drawings and specifications for wooden structures, including plans, elevations, and sections. 3. Oversee the procurement of materials and equipment necessary for the construction and maintenance of wooden structures and systems.	**Head of Shipbuilding Painting** 1. Oversee the planning and execution of painting projects. 2. Identify and implement best practices and new technologies to improve efficiency and reduce costs. 3. Ensure compliance with environmental regulations and permits
LEVEL 4	**Shipbuilding HVAC Supervisor** 1. Supervise the construction and installation of HVAC systems to ensure compliance with industry standards and regulations.	**Shipbuilding Carpentry Supervisor** 1. Oversee the construction and installation of wooden structures and systems to ensure compliance with industry standards and regulations, such as fire safety and stability requirements.	**Shipbuilding Painting Inspector** 1. Verify the paint's accuracy in application and compliance with marine environments' industry standards and specification. 2. Inspect for any defects or issues with the paint, such as cracking, peeling, or fading,

SECTION	(C) MANUFACTURING		
DIVISION	(30) MANUFACTURE OF OTHER TRANSPORT EQUIPMENT		
GROUP	(301) BUILDING OF SHIPS AND BOATS		
AREA	SHIPBUILDING HEATING, VENTILATION, AIR CONDITIONING (HVAC) INSTALLATION	SHIPBUILDING CARPENTRY FABRICATION	SHIPBUILDING PAINTING
	2. Review and approve the work of subcontractors and vendors to ensure compliant with project specification. 3. Report work progress and completion to shipbuilding HVAC engineer.	2. Review and approve the work of subcontractors and vendors to ensure compliant with project specification. 3. Report to shipbuilding Carpentry engineer of work progress and completion.	and make recommendations for repairs or repainting. 3. Inspect the surface quality of the paint, they also ensure that the painting is done according to safety regulations, environmental regulations and compliance with the shipbuilding standards. 4. Prepare painting inspection report to shipyard and ship owner.
LEVEL 3	**Shipbuilding HVAC Technician** 1. Install, test, and maintain various HVAC systems such as heating systems, ventilation systems, and air conditioning systems. 2. Read and interprete blueprints and schematics to understand the design and layout of the HVAC systems. 3. Support commissioning and start-up of the systems	**Shipbuilding Carpenter** 1. Cut and shape wood to fit specific measurements and designs 2. Assemble and install various wooden structures such as decks, bulkheads, and cabins. c)Reading and interpreting blueprints and schematics. 3. Perform sanding and finishing surfaces	**Shipbuilding Painting Supervisor** 1. Monitor the painting process, inspecting the surface preparation, and providing quality assurance during the painting process. 2. Review and approve the work of subcontractors and vendors to ensure compliant with project specification. 3. Report work progress and completion to shipbuilding Painting inspector.
LEVEL 2	**No Job Title**	**Shipbuilding Carpenter Helper** 1. Assist carpenters with various carpentry tasks such as cutting and	**Shipbuilding Painter and Blaster**

SECTION	(C) MANUFACTURING		
DIVISION	(30) MANUFACTURE OF OTHER TRANSPORT EQUIPMENT		
GROUP	(301) BUILDING OF SHIPS AND BOATS		
AREA	SHIPBUILDING HEATING, VENTILATION, AIR CONDITIONING (HVAC) INSTALLATION	SHIPBUILDING CARPENTRY FABRICATION	SHIPBUILDING PAINTING
		measuring materials, preparing surfaces, and installing structures. 2. Prepare materials and tools for carpenters before the job starts. 3. Help carpenters with heavy lifting and moving of materials. 4. Clean up job sites and dispose of waste materials.	1. Prepare surfaces by cleaning, scraping, sanding, and otherwise prepping the surface for painting. 2. Apply paint and coatings using a variety of tools such as brushes, rollers, and spray guns. 3. Perform blasting work such as sand blasting, water blasting, and grit blasting to remove old paint and rust from surfaces.
LEVEL 1	No Job Title	No Job Title	No Job Title

Table 4.20: Occupational Responsibility (OR) C301 (4/ 4)

SECTION	(C) MANUFACTURING	
DIVISION	(30) MANUFACTURE OF OTHER TRANSPORT EQUIPMENT	
GROUP	(301) BUILDING OF SHIPS AND BOATS	
AREA	QUALITY ASSURANCE & QUALITY CONTROL (QAQC)	TESTING & COMMISSIONING HARBOUR ACCEPTANCE TRIAL & SEA TRIAL (HAT & SAT)
LEVEL 8	No Job Title	No Job Title
LEVEL 7	No Job Title	No Job Title
LEVEL 6	**Head of Shipbuilding QAQC** 1. Lead a team of QA/QC engineers and are responsible for ensuring that the shipbuilding process meets the customer's requirements and industry standards. 2. Develop and implement quality assurance and quality control procedures for the shipbuilding process. 3. Review and approve design drawings, calculations and other technical documents to ensure compliance with customer requirements and industry standards	**Head of Shipbuilding Testing & Commissioning** 1. Lead a team of testing and commissioning engineers and are responsible for ensuring that the shipbuilding process meets the customer's requirements and industry standards. 2. Develop and implement testing and commissioning procedures for the shipbuilding process. 3. Coordinate with other departments and stakeholders to ensure that the shipbuilding process meets the customer's requirements. 4. Manage and mentor a team of testing and commissioning engineers
LEVEL 5	**Shipbuilding QAQC Engineer** 1. Implement and maintain quality control systems to ensure that all work is done according to the plans, drawings, and specifications. 2. Conduct inspections of the shipbuilding process to ensure compliance with quality standards.	**Shipbuilding Testing & Commissioning Engineer** 1. Develop and implement testing and commissioning procedures. 2. Coordinate and supervise the testing and commissioning of mechanical, electrical, and electronic systems and equipment. 3. Inspect and evaluate the performance of systems and equipment during testing

SECTION	(C) MANUFACTURING	
DIVISION	(30) MANUFACTURE OF OTHER TRANSPORT EQUIPMENT	
GROUP	(301) BUILDING OF SHIPS AND BOATS	
AREA	QUALITY ASSURANCE & QUALITY CONTROL (QAQC)	TESTING & COMMISSIONING HARBOUR ACCEPTANCE TRIAL & SEA TRIAL (HAT & SAT)
	3. Coordinate with other departments and contractors to ensure that quality standards are met	
LEVEL 4	**Shipbuilding QAQC Supervisor** 1. Supervise the works of the QAQC technician, ensuring that the system are install in according with the ship yard quality standard and project schedule. 2. Review and approve the work of subcontractors and vendors to ensure compliant with project specification. 3. Report to shipbuilding QAQC engineer of work progress and completion.	**No Job Title**
LEVEL 3	**Shipbuilding QAQC Technician** 1. Inspect materials and workmanship to ensure compliance with specifications and industry standards. 2. Identify and document any quality issues, defects or non-conformances and coordinating the implementation of corrective action. 3. Support commissioning and start-up of the systems	**No Job Title**
LEVEL 2	**No Job Title**	**No Job Title**
LEVEL 1	**No Job Title**	**No Job Title**

Table 4.21: Occupational Responsibility (OR) C302 (1 / 3)

SECTION	(C) MANUFACTURING	
DIVISION	(30) MANUFACTURE OF OTHER TRANSPORT EQUIPMENT	
GROUP	(302) MANUFACTURE OF RAILWAY AND ROLLING STOCK	
AREA	DESIGN PREPARATION / DESIGN AND DEVELOPMENT	ARCITECTURE DESIGN
LEVEL 8	No Job Title	No Job Title
LEVEL 7	No Job Title	No Job Title
LEVEL 6	**Head of Design** 1. Manage and mentor Design Engineers 2. Ensure that designs are user-centred and meet user needs and requirements 3. Conduct research to evaluate new materials and technologies of railway	**Head of Architecture Design** 1. Manage and mentor the architecture design team 2. Develop architectural designs and plans for Rolling stock 3. Keep up-to-date with industry trends, materials and technologies to ensure that the designs are innovative and cost-effective.
LEVEL 5	**Senior Engineer** 1. Develop detailed engineering plans and ensuring that a design is functional and meets safety and performance requirements. 2. Participate in the design review process and providing feedback to the team 3. Test and evaluate prototypes to ensure that designs meet performance and quality standards	**Senior Engineer** 1. Develop detailed architecture engineering plans and ensuring that a design is functional and meets safety and performance requirements. 2. Participate in the design review process and providing feedback to the team 3. Test and evaluate prototypes to ensure that designs meet performance and quality standards
LEVEL 4	**Engineer** 1. Create 3D models and technical drawings 2. Focus on the detailed engineering design of the structure and its systems. 3. Prepare technical/Design reports and documentation	**Engineer** 1. Establish the knowledge of architecture and engineering 2. Design and plan of a rolling stock, including site selection, architectural design, and manufacturing management. 3. Focus on the overall design and construction of the rolling stock
LEVEL 3	No Job Title	No Job Title
LEVEL 2	No Job Title	No Job Title

SECTION	(C) MANUFACTURING	
DIVISION	(30) MANUFACTURE OF OTHER TRANSPORT EQUIPMENT	
GROUP	(302) MANUFACTURE OF RAILWAY AND ROLLING STOCK	
AREA	DESIGN PREPARATION / DESIGN AND DEVELOPMENT	ARCITECTURE DESIGN
LEVEL 1	No Job Title	No Job Title

Table 4.22: Occupational Responsibility (OR) C302 (2 / 3)

SECTION	(C) MANUFACTURING		
DIVISION	(30) MANUFACTURE OF OTHER TRANSPORT EQUIPMENT		
GROUP	(302) MANUFACTURE OF RAILWAY AND ROLLING STOCK		
AREA	ROLLING STOCKS MECHANICAL ENGINEERING	ROLLING STOCKS ELECTRICAL & ELECTRONIC ENGINEERING	ROLLING STOCKS COMMUNICATION & SIGNALLING ENGINEERING
LEVEL 8	No Job Title	No Job Title	No Job Title
LEVEL 7	No Job Title	No Job Title	No Job Title
LEVEL 6	**Head of Technical** 1. Manage all activities relating to Mechanical Engineering manufacturing of systems and subsystems for the rolling stock. 2. Plan and schedule all activities in relation to Mechanical Production. 3. Manage and monitor manufacturing progress	**Head of Technical** 1. Manage all activities relating to Electrical Engineering manufacturing of systems and subsystems for the rolling stock. 2. Plan and schedule all activities in relation to Electrical Production 3. Manage and monitor manufacturing progress 4. Design and develop the railway interfaces between different systems, devices or software applications	**Head of Technical** 1. Manage all activities relating to Signal & Comm Engineering manufacturing of systems and subsystems for the rolling stock. 2. Plan and schedule all activities in relation to Signal and Communication. 3. Manage manufacturing progress of Signal and Communication.

SECTION	(C) MANUFACTURING		
DIVISION	(30) MANUFACTURE OF OTHER TRANSPORT EQUIPMENT		
GROUP	(302) MANUFACTURE OF RAILWAY AND ROLLING STOCK		
AREA	ROLLING STOCKS MECHANICAL ENGINEERING	ROLLING STOCKS ELECTRICAL & ELECTRONIC ENGINEERING	ROLLING STOCKS COMMUNICATION & SIGNALLING ENGINEERING
LEVEL 5	**Senior Engineer** 1. Lead and mentor a team of mechanical engineers 2. Conduct analysis and simulations to evaluate the performance and reliability of mechanical systems and components. 3. Participate in the testing and validation of mechanical systems and components.	**Senior Engineer** 1. Lead and mentor a team of Electrical engineers 2. Conduct analysis and simulations to evaluate the performance and reliability of Electrical systems and components. 3. Participate in the testing and validation of Electrical systems and components. 4. Perform the railway interfaces activities between different systems, devices or software applications	**Senior Engineer** 1. Lead and mentor a team of Signal and Communication engineers. 2. Conduct analysis and simulations to evaluate the performance and reliability of Signal and Communication systems and components. 3. Participate in the testing and validation of Signal & Comm systems and components.
LEVEL 4	**Engineer** 1. Identify and troubleshooting problems with existing mechanical systems and products, and developing solutions 2. Supervise the production and assembly of mechanical products. 3. Lead installation, maintenance, and repair of mechanical systems and products. 4. Create and maintain a 3D BIM model of a rolling stock & depot Equipment.	**Engineer** 1. Identify and troubleshoot problems with existing Electrical systems and products, and developing solutions 2. Supervise the production and assembly of Electrical products. 3. Lead installation, maintenance, and repair of Electrical systems and products.	**Engineer** 1. Identify and troubleshoot problems with existing Signal & Comm systems and products, and developing solutions 2. Supervising the production and assembly of Signal & Comm products. 3. Lead installation, maintenance, and repair of Signal & Comm systems and products.
LEVEL 3	**Technician / Welder / Painter** 1. Assemble mechanical components and systems 2. Troubleshoot and repair mechanical problems with equipment and systems. 3. Keep accurate records of the activities.	**Technician** 1. Assemble Electrical components and systems 2. Troubleshoot and repair Electrical problems with equipment and systems. 3. Keep accurate records of the activities.	**Technician** 1. Assemble Signal & Comm components and systems 2. Troubleshoot and repair Signal & Comm problems with equipment and systems. 3. Keeping accurate records of the activities.

SECTION	(C) MANUFACTURING		
DIVISION	(30) MANUFACTURE OF OTHER TRANSPORT EQUIPMENT		
GROUP	(302) MANUFACTURE OF RAILWAY AND ROLLING STOCK		
AREA	ROLLING STOCKS MECHANICAL ENGINEERING	ROLLING STOCKS ELECTRICAL & ELECTRONIC ENGINEERING	ROLLING STOCKS COMMUNICATION & SIGNALLING ENGINEERING
	4. Prepare surfaces for painting, including cleaning, sanding, and masking as needed. (Aluminium structure) 5. Perform welding variety of materials for rolling stock) such as steel, aluminium, and stainless steel using various welding techniques such as MIG, TIG, and stick welding.		
LEVEL 2	**Fitter** 1. Supports the project team. 2. Prepare tools, equipment, and component for assembly work. 3. Carry out assembly works.	**Fitter** 1. Supports the project team 2. Prepare tools, equipment, and component for assembly work. 3. Carry out assembly works.	**Fitter** 1. Supports the project team 2. Prepare tools, equipment, and component for assembly work. 3. Carry out assembly works.
LEVEL 1	No Job Title	No Job Title	No Job Title

Table 4.23: Occupational Responsibility (OR) C302 (3 / 3)

SECTION	(C) MANUFACTURING		
DIVISION	(30) MANUFACTURE OF OTHER TRANSPORT EQUIPMENT		
GROUP	(302) MANUFACTURE OF RAILWAY AND ROLLING STOCK		
AREA	ROLLING STOCKS TESTING & COMMISSIONING	PRODUCTION ENGINEERING	ROLLING STOCKS QUALITY, SAFETY, HEALTH & ENVIRONMENT CONTROL
LEVEL 8	No Job Title	No Job Title	No Job Title
LEVEL 7	No Job Title	No Job Title	No Job Title

SECTION	(C) MANUFACTURING		
DIVISION	(30) MANUFACTURE OF OTHER TRANSPORT EQUIPMENT		
GROUP	(302) MANUFACTURE OF RAILWAY AND ROLLING STOCK		
AREA	ROLLING STOCKS TESTING & COMMISSIONING	PRODUCTION ENGINEERING	ROLLING STOCKS QUALITY, SAFETY, HEALTH & ENVIRONMENT CONTROL
LEVEL 6	**Head of Technical** 1. Ensure the safe testing and commissioning of Rolling Stock. 2. Ensure that through the developed processes the components of and the completed system meet the requirements of the specifications and correct functionality of the design. 3. Manage progress of test & Commissioning.	**Head of Production** 1. Ensure the availability of supplier technical information for design reviews 2. Ensure transmittals of design decisions to suppliers enabling subcontractor material to be approved in a timely manner. 4. Establish routine schedule for meetings and lead discussion between project staff. 5. Plan and coordinate the production process for railway equipment, including scheduling, procurement, and logistics.	**Head QHSE** 1. Preparation and control of Project QHSE Plan documentation specific for rolling stock activities. 2. Monitor the progress and effectiveness of the Project QHSE Plan. 3. Monitor all achieve quality related documentation upon the completion of the project including vendor. 4. Review report audit findings and recommendations.
LEVEL 5	**Senior T&C Engineer** 1. Lead and mentor a team of T&C engineers. 2. Conduct analysis and simulations to evaluate the performance and reliability of T&C systems and components. 3. Participate in the testing and validation of T&C systems and components.	**Senior Engineer** 1. Design and develop production processes and systems. 2. Analyse and optimise existing production processes to improve efficiency, reduce costs, and increase output. 3. Collaborate with other departments such as engineering, quality control, and supply chain management to ensure that the production processes are integrated.	**Senior QHSE** 1. Deploy QHSE Organization structure. 2. Assess customer requirements and ensuring that these are meet (Inspection test Plan). 3. Investigate and set standards for Inspection and Test Plan at Manufacturing Plant.
LEVEL 4	**Engineer** 1. Identify and troubleshoot problems with existing Testing and Communication systems and products, and developing solutions.	**Engineer** 1. Conduct the process of functional inspection and test. 2. Carry out the function tests with the design team.	**QHSE Engineer** 1. Ensure inspection QHSE Control implemented. 2. Coordinate quality control teams engaged in inspection and testing activities.

SECTION	(C) MANUFACTURING		
DIVISION	(30) MANUFACTURE OF OTHER TRANSPORT EQUIPMENT		
GROUP	(302) MANUFACTURE OF RAILWAY AND ROLLING STOCK		
AREA	ROLLING STOCKS TESTING & COMMISSIONING	PRODUCTION ENGINEERING	ROLLING STOCKS QUALITY, SAFETY, HEALTH & ENVIRONMENT CONTROL
	2. Supervise the production and assembly of Test & Comm products. 3. Lead installation, maintenance, and repair of Test & Comm systems and products.	3. Report, analyse and record fault conditions.	3. Create & record NCR in process & approved finished products.
LEVEL 3	**Technician** 1. Assemble Testing and Communication components and systems. 2. Troubleshoot and repair Test and Communication problems with equipment and systems. 3. Keep accurate records of the activities.	**Technician** 1. Assemble components and systems. 2. Troubleshoot and repair problems with equipment and systems. 3. Keep accurate records of the activities.	**No Job Title**
LEVEL 2	**No Job Title**	**Fitter** 1. Supports the project team 2. Prepare tools, equipment, and component for assembly work. 3. Carry out assembly works.	**No Job Title**
LEVEL 1	**No Job Title**	**No Job Title**	**No Job Title**

Table 4.24: Occupational Responsibility (OR) C303 (1 / 4)

SECTION	(C) MANUFACTURING		
DIVISION	(30) MANUFACTURE OF OTHER TRANSPORT EQUIPMENT		
GROUP	(303) MANUFACTURE OF AIR AND SPACECRAFT AND RELATED MACHINERY		
AREA	AIRCRAFT PART ENGINEERING DESIGN	AIRCRAFT PART TOOLING ENGINEER	AIRCRAFT PART INDUSTRIAL ENGINEERING
LEVEL 8	No Job Title	No Job Title	No Job Title
LEVEL 7	**Principal Design Technologist** 1. Lead and manage the technical design and development of aircraft systems and components. 2. Supervise and mentor a team of engineers and technicians. 3. Select and integrate new technologies and materials into aircraft designs. 4. Test and evaluate aircraft systems and components. 5. Provide technical support to other departments within the company. 6. Select and integrate new technologies and materials into aircraft designs.	**Principal Tool Design Specialist** 1. Lead and manage the technical tools design and development of aircraft systems and components. 2. Design and develop tools and equipment, such as jigs, fixtures, and specialized machinery, using CAD software such as CATIA and SolidWorks. 3. Collaborate with engineers, production and maintenance personnel to understand their needs and develop tools that meet their requirements. 4. Develop and maintain detailed technical drawings and documentation for tools and equipment, including parts lists and assembly instructions. 5. Coordinate and oversee the manufacture and assembly of tools and equipment. 6. Troubleshoot and resolve issues related to tool and equipment design and performance.	**Head of Industrial Engineer** 1. Lead and manage a team of industrial engineers to design, develop, and implement manufacturing processes and systems for aircraft production. 2. Develop and maintain production schedules and budgets to ensure efficient use of resources and timely delivery of aircraft. 3. Coordinate with other departments, such as engineering, procurement, and quality control, to ensure that all aspects of the manufacturing process are integrated and working efficiently. 4. Identify and implement process improvements to increase efficiency, reduce costs, and improve product quality.

SECTION	(C) MANUFACTURING		
DIVISION	(30) MANUFACTURE OF OTHER TRANSPORT EQUIPMENT		
GROUP	(303) MANUFACTURE OF AIR AND SPACECRAFT AND RELATED MACHINERY		
AREA	AIRCRAFT PART ENGINEERING DESIGN	AIRCRAFT PART TOOLING ENGINEER	AIRCRAFT PART INDUSTRIAL ENGINEERING
LEVEL 6	**Senior Design Technologist** 1. Lead the design and development of aircraft and aerospace systems, including aerodynamics, propulsion, structures, and systems. 2. Manage and mentor junior design technologists and engineers, providing guidance and support to ensure they meet project objectives. 3. Develop and maintain technical documentation and drawings for aircraft and aerospace systems.	**Tool Design Specialist** 1. Design, develop, and test aircraft tools and equipment using CAD software in accordance with engineering specifications and industry standards. 2. Create detailed engineering drawings, schematics, and 3D models of aircraft tools and equipment. 3. Collaborate with other members of the engineering team to ensure that designs meet project requirements and are feasible to manufacture. 4. Program CNC machines to cut and shape components of the tools and equipment. 5. Communicate with suppliers to ensure that purchased components meet design specifications and are delivered on time.	**Senior Industrial Engineer** 1. Design, develop, and implement manufacturing processes and systems for aircraft production. 2. Develop and maintain production schedules and budgets to ensure efficient use of resources and timely delivery of aircraft. 3. Coordinate with other departments, such as engineering, procurement, and quality control, to ensure that all aspects of the manufacturing process are integrated and working efficiently. 4. Identify and implement process improvements to increase efficiency, reduce costs, and improve product quality.
LEVEL 5	**Design Technologist** 1. Support the design and development of aircraft and aerospace systems. 2. Create and maintain technical drawings, models, and simulations using CAD and other software tools. 3. Participate in design reviews, providing feedback and making	**Tool Design Engineer** 1. Design and develop tools, jigs, fixtures, and equipment using CAD software such as SolidWorks or CATIA. 2. Create detailed engineering drawings, schematics, and 3D models of aircraft tools and equipment. 3. Program CNC machines to cut and shape components of the tools and equipment.	**Industrial Engineer** 1. Design, develop, and implement manufacturing processes and systems for aircraft production. 2. Participate in the design and development of new aircraft models. 3. Develop and maintain production schedules and budgets to ensure

SECTION	(C) MANUFACTURING		
DIVISION	(30) MANUFACTURE OF OTHER TRANSPORT EQUIPMENT		
GROUP	(303) MANUFACTURE OF AIR AND SPACECRAFT AND RELATED MACHINERY		
AREA	AIRCRAFT PART ENGINEERING DESIGN	AIRCRAFT PART TOOLING ENGINEER	AIRCRAFT PART INDUSTRIAL ENGINEERING
	recommendations for design improvements. 4. Collaborate with engineers and other professionals to develop and implement design solutions.	4. Design and create moulds for manufacturing processes, such as injection moulding, blow moulding, and compression moulding. 5. Ensure that designs meet engineering specifications and industry standards, and that all components are manufactured to precise tolerances.	efficient use of resources and timely delivery of aircraft. 4. Coordinate with other departments, such as engineering, procurement, and quality control, to ensure that all aspects of the manufacturing process are integrated and working efficiently. 5. Identify and implement process improvements to increase efficiency, reduce costs, and improve product quality.
LEVEL 4	**Drafter** 1. Create detailed technical drawings and blueprints for aerospace designs and components. 2. Create detailed technical drawings using CAD software, such as CATIA, SolidWorks, and AutoCAD. 3. Create and maintain Bill of Materials (BOMs) and parts lists. 4. Collaborate with engineers and other professionals to develop design solutions and ensure that designs meet customer requirements and industry regulations and standards.	**Senior Tooling Technician** 1. Maintain, repair and overhaul aircraft tools and equipment, such as jigs, fixtures, and special tooling. 2. Operate and program CNC machines to cut and shape components of the tools and equipment. 3. Inspect and test tools and equipment to ensure they meet engineering specifications and industry standards. 4. Troubleshoot and repair equipment malfunctions and making necessary adjustments. 5. Keep accurate records of maintenance and repairs performed on tools and equipment.	**No Job Title**

SECTION	(C) MANUFACTURING		
DIVISION	(30) MANUFACTURE OF OTHER TRANSPORT EQUIPMENT		
GROUP	(303) MANUFACTURE OF AIR AND SPACECRAFT AND RELATED MACHINERY		
AREA	AIRCRAFT PART ENGINEERING DESIGN	AIRCRAFT PART TOOLING ENGINEER	AIRCRAFT PART INDUSTRIAL ENGINEERING
	5. Review and interpret engineering drawings and specifications to ensure accuracy and completeness.	6. Train and mentor junior technicians on tool and equipment maintenance and repair.	
LEVEL 3	**No Job Title**	**Tooling Technician** 1. Design, fabricate, and maintain aircraft tooling and fixtures. 2. Follow engineering drawings and technical specifications to ensure tooling meets design requirements. 3. Use CAD/CAM software to create and modify tooling designs. 4. Operate CNC machines to fabricate tooling and fixtures. 5. Perform preventative maintenance on tooling and fixtures. 6. Inspect tooling and fixtures to ensure they meet quality standards.	**No Job Title**
LEVEL 2	**No Job Title**	**No Job Title**	**No Job Title**
LEVEL 1	**No Job Title**	**No Job Title**	**No Job Title**

Table 4.25: Occupational Responsibility (OR) C303 (2 / 4)

SECTION	(C) MANUFACTURING		
DIVISION	(30) MANUFACTURE OF OTHER TRANSPORT EQUIPMENT		
GROUP	(303) MANUFACTURE OF AIR AND SPACECRAFT AND RELATED MACHINERY		
AREA	AIRCRAFT PART SHEET METAL ENGINEERING	AIRCRAFT COMPOSITES PART LAMINATING	AIRCRAFT PART MACHINING
LEVEL 8	No Job Title	No Job Title	No Job Title
LEVEL 7	**Head of Sheet Metal** 1. Lead and manage a team of sheet metal workers, engineers and other staff to design, develop, and implement manufacturing processes and systems for aircraft sheet metal production. 2. Develop and maintain production schedules and budgets to ensure efficient use of resources and timely delivery of aircraft sheet metal parts. 3. Coordinate with other departments, such as engineering, procurement, and quality control, to ensure that all aspects of the sheet metal manufacturing process are integrated and working efficiently. 4. Identify and implement process improvements to increase efficiency, reduce costs, and improve product quality.	**Head of Laminating** 1. Ensure that the laminating process is carried out correctly and efficiently, and that the final product meets the required standards. 2. Manage and lead the laminating team, and ensuring that the team members are properly trained and motivated. 3. Ensure that the laminating process adheres to the company's quality standards and industry regulations. 4. Develop and implement procedures and protocols to ensure the safety and efficiency of the laminating process. 5. Manage the budget of the laminating department and ensuring that all costs are controlled and minimized.	**Head of Machining** 1. Lead and manage a team of machining supervisors, engineers, and technicians. 2. Collaborate with other departments such as design, quality, procurement, and maintenance to ensure that machining processes are aligned with overall business objectives. 3. Develop and implement machining processes, systems, and equipment. 4. Analyse machining data to identify areas for improvement and implementing changes

SECTION	(C) MANUFACTURING		
DIVISION	(30) MANUFACTURE OF OTHER TRANSPORT EQUIPMENT		
GROUP	(303) MANUFACTURE OF AIR AND SPACECRAFT AND RELATED MACHINERY		
AREA	AIRCRAFT PART SHEET METAL ENGINEERING	AIRCRAFT COMPOSITES PART LAMINATING	AIRCRAFT PART MACHINING
LEVEL 6	**Sheet Metal Specialist** 1. Perform fabricating, repairing, and installing sheet metal parts and structures on aircraft, such as fuselage, wing and tail assemblies, and other aircraft components. 2. Read and interpret blueprints, schematics, and technical drawings to determine the proper procedures for fabricating and installing sheet metal parts. 3. Use hand and power tools to cut, bend, shape, and form sheet metal into specific shapes and sizes to match the specifications on the blueprints. 4. Inspect and test completed work to ensure that it meets quality standards and specifications. 5. Interpret engineering data and specifications to determine the proper dimensions, tolerances, and materials for sheet metal parts.	**Laminating Specialist** 1. Perform fabrication and repairing composite materials used in aircraft construction, such as layering, bonding, and curing the materials. 2. Use tools and equipment to shape and form composite materials to the required specifications. 3. Read and interpret engineering and technical drawings to ensure that the composite materials are fabricated and repaired correctly. 4. Communicate effectively with other members of the team and providing clear instructions for the repair or maintenance of composite materials. 5. Maintain accurate records of work completed and materials used. 6. Participate in quality control inspections and performing final inspections of composite materials.	**Machining Specialist** 1. Operate and maintain a variety of machining equipment including CNC (Computer Numerical Control) machines, lathes, mills, and grinders. 2. Read and interpret engineering drawings, blueprints, and specifications to determine the correct machining procedures. 3. Set up and adjust machining equipment, tools, and fixtures. 4. Program CNC machines using CAM (Computer-Aided Manufacturing) software. 5. Conduct first piece and in-process inspections to ensure that parts meet specifications. 6. Troubleshoot and resolve any issues that may arise during the machining process
LEVEL 5	**Sheet Metal Engineer**	**Laminating Engineer**	**Machining Engineer**

SECTION	(C) MANUFACTURING		
DIVISION	(30) MANUFACTURE OF OTHER TRANSPORT EQUIPMENT		
GROUP	(303) MANUFACTURE OF AIR AND SPACECRAFT AND RELATED MACHINERY		
AREA	AIRCRAFT PART SHEET METAL ENGINEERING	AIRCRAFT COMPOSITES PART LAMINATING	AIRCRAFT PART MACHINING
	1. Design, develop, and implement manufacturing processes and systems for aircraft sheet metal production. 2. Develop detailed engineering drawings and specifications for aircraft sheet metal parts, assemblies and components. 3. Participate in the design and development of new aircraft models. 4. Coordinate with other departments, such as engineering, procurement, and quality control, to ensure that all aspects of the sheet metal manufacturing process are integrated and working efficiently. 5. Identify and implement process improvements to increase efficiency, reduce costs, and improve product quality.	1. Operate and maintain the equipment used in the laminating process and ensuring that the final product meets the required standards. 2. Inspect and test the laminates and materials used in the process to ensure that they meet the specified requirements. 3. Develop and implement procedures and protocols to ensure the safety and efficiency of the laminating process. 4. Identify and solve problems that arise during the laminating process and implementing corrective actions to prevent them from recurring.	1. Design and develop new machining processes, systems, and equipment for aircraft and aircraft components. 2. Analyse machining data to identify areas for improvement and implementing changes. 3. Develop and maintain machining documentation, such as process flows and work instructions.
LEVEL 4	**Senior Sheet Metal Technician** 1. Fabricate, assemble, and install aircraft sheet metal parts, assemblies and components according to engineering drawings and specifications.	**Senior Laminating Technician** 1. Operate and maintain the equipment used in the laminating process and ensuring that the final product meets the required standards. 2. Inspect and test the laminates and materials used in the process to ensure that they meet the specified requirements.	**Senior Machinist** 1. Oversee the machining operations in a manufacturing facility, ensuring that all parts and assemblies are produced efficiently and on time. 2. Develop and implement quality control procedures to ensure that all

SECTION	(C) MANUFACTURING		
DIVISION	(30) MANUFACTURE OF OTHER TRANSPORT EQUIPMENT		
GROUP	(303) MANUFACTURE OF AIR AND SPACECRAFT AND RELATED MACHINERY		
AREA	AIRCRAFT PART SHEET METAL ENGINEERING	AIRCRAFT COMPOSITES PART LAMINATING	AIRCRAFT PART MACHINING
	2. Interpret engineering drawings and specifications to determine the appropriate materials, tools, and equipment required for the job. 3. Perform complex sheet metal fabrication tasks, such as cutting, shaping, forming, and welding sheet metal parts. 4. Inspect and test completed sheet metal parts and assemblies to ensure compliance with engineering specifications and industry standards. 5. Repair and maintain aircraft sheet metal structures, including troubleshooting and diagnosing problems. 6. Provide guidance and mentoring to junior sheet metal technicians.	3. Train and supervise junior technicians in the laminating process and in the use of equipment. 4. Identify and solve problems that arise during the laminating process and implementing corrective actions to prevent them from recurring. 5. Suggest ways to improve the laminating process and increase efficiency. 6. Ensure that all equipment used in the laminating process is properly maintained and in good working condition.	parts and assemblies meet specifications. 3. Develop and implement safety procedures to ensure a safe working environment for machinists and other employees. 4. Schedule, plan and supervise the maintenance of machine tools, equipment and facilities to ensure they are in good working order. 5. Lead, train and supervise a team of machinists, providing guidance and feedback to improve their skills and performance.
LEVEL 3	**Sheet Metal Technician** 1. Fabricate, assemble, and install aircraft sheet metal parts, assemblies and components according to engineering drawings and specifications. 2. Interpret engineering drawings and specifications to determine the	**Laminating Technician** 1. Operate and maintain the equipment used in the laminating process and ensuring that the final product meets the required standards. 2. Inspect and test the laminates and materials used in the process to ensure that they meet the specified requirements.	**Machinist** 1. Read and interpret engineering drawings, blueprints, and specifications to determine the precise dimensions and tolerances of parts to be machined. 2. Set up and adjust machine tools and equipment, including lathes, milling

SECTION	(C) MANUFACTURING		
DIVISION	(30) MANUFACTURE OF OTHER TRANSPORT EQUIPMENT		
GROUP	(303) MANUFACTURE OF AIR AND SPACECRAFT AND RELATED MACHINERY		
AREA	AIRCRAFT PART SHEET METAL ENGINEERING	AIRCRAFT COMPOSITES PART LAMINATING	AIRCRAFT PART MACHINING
	appropriate materials, tools, and equipment required for the job. 3. Perform sheet metal fabrication tasks, such as cutting, shaping, forming, and welding sheet metal parts. 4. Inspect and test completed sheet metal parts and assemblies to ensure compliance with engineering specifications and industry standards. 5. Repair and maintain aircraft sheet metal structures, including troubleshooting and diagnosing problems. 6. Follow safety procedures and guidelines to ensure a safe work environment.	3. Participate in training programs to improve their knowledge and skills in the laminating process and in the use of equipment. 4. Identify and solve problems that arise during the laminating process and implementing corrective actions to prevent them from recurring. 5. Follow regulations, procedures, and policies to ensure compliance with industry standards.	machines, grinders, and other precision machines. 3. Select and install cutting tools, such as drill bits, taps, and end mills, and making necessary adjustments to ensure precise cuts and finishes. 4. Operate machine tools and equipment to fabricate or repair aircraft components, such as landing gear, engines, and fuselage sections. 5. Inspect machine parts to ensure they meet specifications and tolerances, and making any necessary adjustments or repairs. 6. Perform routine maintenance and cleaning on machine tools and equipment to ensure proper functioning and longevity.
LEVEL 2	No Job Title	No Job Title	No Job Title
LEVEL 1	No Job Title	No Job Title	No Job Title

Table 4.26: Occupational Responsibility (OR) C303 (3 / 4)

SECTION	(C) MANUFACTURING		
DIVISION	(30) MANUFACTURE OF OTHER TRANSPORT EQUIPMENT		
GROUP	(303) MANUFACTURE OF AIR AND SPACECRAFT AND RELATED MACHINERY		
AREA	AIRCRAFT PART MECHANICAL ASSEMBLY / FINAL ASSEMBLY	AIRCRAFT PART SURFACE TREATMENT	AIRCRAFT PART TESTING (NDT)
LEVEL 8	No Job Title	No Job Title	No Job Title
LEVEL 7	**Head of Production** 1. Oversee the entire production process for an aircraft manufacturing facility, ensuring that all components and assemblies are manufactured on time, within budget, and to the required quality standards. 2. Develop and implement production processes, procedures, and systems to improve efficiency, reduce costs, and improve product quality. 3. Coordinate with other departments, such as engineering, procurement, and quality control, to ensure that all aspects of the production process are integrated and working efficiently. 4. Identify and implement process improvements to increase efficiency, reduce costs, and improve product quality.	**Head of Plant** 1. Oversee and manage all aspects of the surface treatment processes for aircraft components. 2. Ensure compliance with industry standards and regulations. 3. Oversee the application of coatings and finishes to aircraft components, managing the performance of the surface treatment team, and maintaining the equipment and facilities used in surface treatment. 4. Ensure the safety of workers involved in these processes. 5. Meet production schedule and target 6. Maintain the quality of the surface treatment.	**Head of Quality Section** 1. Lead the NDT team. 2. Mentor, train, and manage the work of NDT engineers and technicians. 3. Develop and implement NDT strategies. 4. Identify and implement new NDT methods and techniques for aircraft components and systems. 5. Plan, organise, and manage the resources necessary to complete NDT projects, such as equipment and personnel. 6. Ensure compliance with regulations and standards: American Society for Non-destructive Testing (ASNT) and the Federal Aviation Administration (FAA), NADCAP (National Aerospace and Defense Contractors Accreditation Program) and AS9100 (Quality management system (QMS)

SECTION	(C) MANUFACTURING		
DIVISION	(30) MANUFACTURE OF OTHER TRANSPORT EQUIPMENT		
GROUP	(303) MANUFACTURE OF AIR AND SPACECRAFT AND RELATED MACHINERY		
AREA	AIRCRAFT PART MECHANICAL ASSEMBLY / FINAL ASSEMBLY	AIRCRAFT PART SURFACE TREATMENT	AIRCRAFT PART TESTING (NDT)
			standard that is specific to the aerospace industry).
LEVEL 6	**Senior Production Engineer** 1. Oversee the production of aircraft components and assemblies, ensuring that they are manufactured on time, within budget, and to the required quality standards. 2. Develop and implement production processes, procedures, and systems to improve efficiency, reduce costs, and improve product quality. 3. Coordinate with other departments, such as engineering, procurement, and quality control, to ensure that all aspects of the production process are integrated and working efficiently. 4. Identify and implement process improvements to increase efficiency, reduce costs, and improve product quality.	**Senior Surface Treatment Specialist** 1. Develop and implement surface treatment processes and procedures includes researching new surface treatment technologies and recommending the most appropriate methods for specific applications. 2. Oversee surface treatment operations includes supervising the surface treatment process, ensuring that it is carried out in accordance with established procedures, and making adjustments as necessary to optimize the process. 3. Maintain surface treatment equipment and facilities includes performing regular maintenance and repairs on equipment and facilities, and ensuring that they meet safety and environmental regulations. 4. Develop and implement quality control procedures includes developing and implementing procedures for monitoring and evaluating the quality of surface treatment operations, and taking corrective action as necessary.	**Senior NDT Engineer** 1. Lead, mentor and train a team of 2. Manage NDT technicians and engineers work and ensure that they have the necessary resources to conduct inspections. 3. Oversee NDT inspections includes monitoring the inspection process, interpreting results, and making decisions about whether an item meets the established acceptance criteria. 4. Manage NDT projects includes planning, organizing, and managing the resources necessary to complete NDT projects, such as equipment and personnel. 5. Prepare reports on the results of NDT inspections, including any defects or issues that were identified, and presenting them to management.

SECTION	(C) MANUFACTURING		
DIVISION	(30) MANUFACTURE OF OTHER TRANSPORT EQUIPMENT		
GROUP	(303) MANUFACTURE OF AIR AND SPACECRAFT AND RELATED MACHINERY		
AREA	AIRCRAFT PART MECHANICAL ASSEMBLY / FINAL ASSEMBLY	AIRCRAFT PART SURFACE TREATMENT	AIRCRAFT PART TESTING (NDT)
LEVEL 5	**Production Engineer** 1. Design, develop, and implement production processes, systems, and equipment. 2. Collaborate with other departments such as design, quality, and procurement to ensure that production processes are aligned with overall business objectives. 3. Analyse production data to identify areas for improvement and implementing changes. 4. Develop and maintain production documentation, such as process flows and work instructions. 5. Oversee the production process to ensure that it runs efficiently and effectively. 6. Troubleshoot and resolve production-related problems	**Surface Treatment Specialist** 1. Apply surface treatment processes: Applying surface treatment processes such as chemical conversion coatings, anodizing, painting, and electroplating to various materials in accordance with established procedures and industry standards. 2. Measure and analyse data to evaluate the effectiveness of surface treatment processes, identify trends and patterns, and make adjustments to optimize operations. 3. Maintain and repair surface treatment equipment, troubleshoot and resolve equipment issues. 4. Ensure that equipment is properly calibrated and in good working order.	**NDT Engineer** 1. Design and develop NDT methods for aircraft components and systems includes researching and testing new NDT techniques that can be used for specific aircraft components and systems, such as wing structures, fuselage, landing gear, and engines. 2. Implement NDT methods includes ensure that the proper NDT methods are used for a given application, and that the necessary equipment and resources are available for conducting inspections. 3. Analyse the results of NDT inspections and determine whether the inspected items meet the established acceptance criteria.
LEVEL 4	**Production Supervisor** 1. Managing and supervising the production team, which may include machinists, assemblers, and other production workers. 2. Planning and scheduling production to ensure that aircraft components	**Senior Surface Treatment Technician** 1. Applying advanced surface treatment processes such as painting, plating, and coating to aircraft components in accordance with established procedures and industry standards.	**Senior NDT Technician** 1. Leading and mentoring junior NDT technicians includes providing guidance and training, and ensuring that team members have the resources they need to do their jobs effectively.

SECTION	(C) MANUFACTURING		
DIVISION	(30) MANUFACTURE OF OTHER TRANSPORT EQUIPMENT		
GROUP	(303) MANUFACTURE OF AIR AND SPACECRAFT AND RELATED MACHINERY		
AREA	AIRCRAFT PART MECHANICAL ASSEMBLY / FINAL ASSEMBLY	AIRCRAFT PART SURFACE TREATMENT	AIRCRAFT PART TESTING (NDT)
	and assemblies are produced to meet quality, safety, and schedule requirements. 3. Ensure that their department follows all relevant Federal Aviation Administration (FAA) regulations and guidelines. 4. Manage inventory, ensure that materials and supplies are available when needed, and that inventory is managed in an efficient manner.	2. Inspecting surface treatments to ensure compliance with specifications, and identifying and addressing any issues that may arise. 3. Maintain and troubleshoot surface treatment equipment and tools, and making repairs as needed. 4. Provide training, guidance, and mentor to junior technicians, and ensuring that their work meets established standards. and procedures.	2. Conducting NDT inspections includes performing a specific range of NDT methods, such as visual inspection, liquid penetrant inspection, and magnetic particle inspection. 3. Analyse the results of NDT inspections and determining whether the inspected items meet the established acceptance criteria.
LEVEL 3	**Senior Production Technician** 1. Supervise and lead a team of production technicians. 2. Oversee the fabrication, assembly, and installation of aircraft components and systems. 3. Conduct quality checks and testing on completed components and systems. 4. Troubleshoot and resolves problems with aircraft components and systems. 5. Maintain production equipment and tools. 6. Ensure that safety procedures and regulations are followed	**Surface Treatment Technician** 1. Responsible for performing surface treatments on various aircraft components such as landing gear, engine parts, and airframe structures to improve their properties and performance. 2. Use techniques such as plating, coating, anodizing, and heat-treating to alter the surface properties of the materials. 3. Prepare the surfaces to be treated. 4. Select and mix the appropriate chemicals, and monitorthe treatment process to ensure the quality of the finished product	**NDT Technician** 1. Conduct NDT inspections: This includes performing a specific range of NDT methods, such as visual inspection, liquid penetrant inspection, and magnetic particle inspection. 2. Interpret results: Analyzing the results of NDT inspections and determining whether the inspected items meet the established acceptance criteria.

SECTION	(C) MANUFACTURING		
DIVISION	(30) MANUFACTURE OF OTHER TRANSPORT EQUIPMENT		
GROUP	(303) MANUFACTURE OF AIR AND SPACECRAFT AND RELATED MACHINERY		
AREA	AIRCRAFT PART MECHANICAL ASSEMBLY / FINAL ASSEMBLY	AIRCRAFT PART SURFACE TREATMENT	AIRCRAFT PART TESTING (NDT)
LEVEL 2	**Production Technician** 1. Fabricating and assembling aircraft components and systems. 2. Install and testi aircraft components and systems. 3. Perform quality checks and test on completed components and systems. 4. Troubleshoot and resolve problems with aircraft components and systems. 5. Maintain production equipment and tools. 6. Follow safety procedures and regulations	**No Job Title**	**No Job Title**
LEVEL 1	**No Job Title**	**No Job Title**	**No Job Title**

Table 4.27: Occupational Responsibility (OR) C303 (4 / 4)

SECTION	(C) MANUFACTURING	
DIVISION	(30) MANUFACTURE OF OTHER TRANSPORT EQUIPMENT	
GROUP	(303) MANUFACTURE OF AIR AND SPACECRAFT AND RELATED MACHINERY	
AREA	AIRCRAFT PART PAINTING	AIRCRAFT PART QUALITY INSPECTION
LEVEL 8	No Job Title	No Job Title
LEVEL 7	**Head of Painting Section** 1. Lead and manage a team of aircraft painting specialists includes setting goals and targets, providing guidance and training, and ensuring that team members have the resources they need to do their jobs effectively. 2. Ensure the team compliance with regulations and standards. 3. Manage projects and budgets, including scheduling, cost control, and resource allocation. 4. Ensure that the aircraft painting process meets quality standards and customer expectations. 5. Coordinate with other departments and able to work effectively with other departments, including engineering, maintenance, and quality control, to ensure that the painting process runs smoothly.	**Head of Quality** 1. Develop and implement quality control procedures to ensure that all aircraft components and assemblies meet industry standards and regulations. 2. Coordinate with other departments, such as engineering, procurement, and production, to ensure that all aspects of the quality inspection process are integrated and working efficiently. 3. Identify and implement process improvements to increase efficiency, reduce costs, and improve product quality.
LEVEL 6	**Painting Specialist** 1. Expertise in painting process with multi-tasking and multi product. 2. Perform as trainer, supporting Painting Engineer for new product development trial and testing. 3. Monitor and buy off paint mixing process according to the manufacturer's specifications to ensure proper colour and consistency.	**Senior Quality Inspection Engineer** 1. Conduct inspections and testing of aircraft components and assemblies to ensure that they meet industry standards and regulations. 2. Participate in the design and development of new aircraft models to ensure that quality standards are built into the design process.

SECTION	(C) MANUFACTURING	
DIVISION	(30) MANUFACTURE OF OTHER TRANSPORT EQUIPMENT	
GROUP	(303) MANUFACTURE OF AIR AND SPACECRAFT AND RELATED MACHINERY	
AREA	AIRCRAFT PART PAINTING	AIRCRAFT PART QUALITY INSPECTION
	4. Monitor and buy off spraying process by painter to aircraft parts and inspecting the painted part surfaces to ensure that they meet quality standards and advise for any touch up process require. 5. Follow all safety procedures to ensure a safe work environment. 6. Maintain and clean painting equipment to ensure proper function and longevity. 7. Keep accurate records of paint used, surface preparation, and other details related to the painting process.	3. Collaborate with other departments, such as engineering, procurement, and production, to ensure that all aspects of the quality inspection process are integrated and working efficiently.
LEVEL 5	**Painting Engineer** 1. Compare and evaluate the different types of coatings and paint systems, including the advantages and disadvantages of each, as well as the proper techniques for applying them. 2. Compare and evaluate the methods and techniques used to prepare surfaces for painting, including cleaning, sanding, and etching. 3. Compare and evaluate the inspection methods and quality standards used to ensure that paint and coating systems meet the required specifications.	**Quality Inspection Engineer** 1. Develop and implement inspection plans and procedures to ensure compliance with industry standards, regulations, and customer requirements during the manufacturing process. 2. Conduct inspections and test aircraft components and systems at different stages of manufacturing process, including in-process, final, and acceptance inspections. 3. Identify and troubleshoot quality issues during the manufacturing process and implementing corrective actions to address them. 4. Participate in design reviews and provide feedback on design issues that may affect quality during the manufacturing process.
LEVEL 4	**Painter Supervisor** 1. Oversee and supervise aircraft painting operations. 2. Ensure work is completed in accordance with quality standards.	**Supervisor** 1. Oversee the work of Aircraft Manufacturing Quality Inspectors to ensure that inspections and quality control

SECTION	(C) MANUFACTURING	
DIVISION	(30) MANUFACTURE OF OTHER TRANSPORT EQUIPMENT	
GROUP	(303) MANUFACTURE OF AIR AND SPACECRAFT AND RELATED MACHINERY	
AREA	AIRCRAFT PART PAINTING	AIRCRAFT PART QUALITY INSPECTION
	3. Maintain painting equipment and materials. 4. Train and manage a team of aircraft painters. 5. Inspect completed work and address any defects. 6. Develop schedules and budgets for painting projects.	processes are carried out correctly and in compliance with industry standards. 2. Provide training and guidance to new and existing Aircraft Manufacturing Quality Inspectors to ensure that they have the knowledge and skills to perform their duties effectively. 3. Conduct internal and external audits to ensure compliance with quality standards and regulations.
LEVEL 3	**Senior Painter** 1. Leading and mentoring junior aircraft painters includes providing guidance and training, and ensuring that team members have the resources they need to do their jobs effectively. 2. Surface preparation includes cleaning, sanding, and etching the surface of the aircraft to ensure that it is ready for painting. 3. Apply paint and coatings to the aircraft using a variety of tools and techniques, such as brushes, rollers, and sprayers. 4. Inspect the finished product to ensure that it meets quality standards and customer expectations.	**Quality Inspector** 1. Inspect aircraft components and assemblies during the manufacturing process to ensure compliance with specifications and industry standards. 2. Monitor and evaluate the quality of the manufacturing process and identify areas for improvement. 3. Keep accurate records of inspection results and maintaining compliance with regulatory requirements. 4. Conduct internal and external audits to ensure compliance with quality standards and regulations. 5. Investigate and analyse the root causes of quality issues and implementing corrective actions to prevent them from recurring.
LEVEL 2	**Painter** 1. Prepare surface cleaning, sanding, and etching the surface of the aircraft to ensure that it is ready for painting. 2. Apply paint and coatings to the aircraft using a variety of tools and techniques, such as brushes, rollers, and sprayers.	**No Job Title**

SECTION	(C) MANUFACTURING	
DIVISION	(30) MANUFACTURE OF OTHER TRANSPORT EQUIPMENT	
GROUP	(303) MANUFACTURE OF AIR AND SPACECRAFT AND RELATED MACHINERY	
AREA	AIRCRAFT PART PAINTING	AIRCRAFT PART QUALITY INSPECTION
	3. Inspect the finished product to ensure that it meets quality standards and customer expectations.	
LEVEL 1	No Job Title	No Job Title

Table 4.28: Occupational Responsibility (OR) C304 (1 / 4)

SECTION	(C) MANUFACTURING		
DIVISION	(30) MANUFACTURE OF OTHER TRANSPORT EQUIPMENT		
GROUP	(304) MANUFACTURE OF MILITARY FIGHTING VEHICLES		
AREA	PLATFORM/HULL DESIGN, DEVELOPMENT AND PROTOTYPING FIRST UNIT VEHICLE (FUV)	WEAPON AND TURRET DESIGN, DEVELOPMENT AND PROTOTYPING FUV	ELECTRICAL, ELECTRONIC AND COMMUNICATION DESIGN AND DEVELOPMENT
LEVEL 8	No Job Title	No Job Title	No Job Title
LEVEL 7	No Job Title	No Job Title	No Job Title
LEVEL 6	**Head of Engineering** 1. Analyse user requirements. 2. Manage system design & integration. 3. Endorse systems architecture. 4. Manage test and acceptance of First Unit Vehicle. 5. Endorse test procedures. 6. Control development timeline and cost. 7. Ensure compliance to MIL-STD. 8. Overall responsibility for Engineering activities across the business. 9. Ensure that Environmental, Health and Safety, engineering and quality standards and procedures are adhered to. 10. Input and hold responsibility for engineering budgets.	**Head of Engineering** 1. Analyse user requirements. 2. Manage system design & integration. 3. Endorse systems architecture. 4. Manage test and acceptance of First Unit Vehicle. 5. Endorse test procedures. 6. Control development timeline and cost. 7. Ensure compliance to MIL-STD. 8. Overall responsibility for Engineering activities across the business. 9. Ensure that Environmental, Health and Safety, engineering and quality standards and procedures are adhered to. 10. Give input and hold responsibility for engineering budgets.	**Head of Engineering** 1. Analyse user requirements. 2. Manage system design & integration. 3. Endorse systems architecture. 4. Manage test and acceptance of First Unit Vehicle. 5. Endorse test procedures. 6. Control development timeline and cost. 7. Ensure compliance to MIL-STD. 8. Overall responsibility for Engineering activities across the business. 9. Ensure that Environmental, Health and Safety, engineering and quality standards and procedures are adhered to. 10. Input and hold responsibility for engineering budgets.
LEVEL 5	**Specialist Engineer**	**Specialist Engineer**	**Senior Engineer** 1. Produce technical specifications.

SECTION	(C) MANUFACTURING		
DIVISION	(30) MANUFACTURE OF OTHER TRANSPORT EQUIPMENT		
GROUP	(304) MANUFACTURE OF MILITARY FIGHTING VEHICLES		
AREA	PLATFORM/HULL DESIGN, DEVELOPMENT AND PROTOTYPING FIRST UNIT VEHICLE (FUV)	WEAPON AND TURRET DESIGN, DEVELOPMENT AND PROTOTYPING FUV	ELECTRICAL, ELECTRONIC AND COMMUNICATION DESIGN AND DEVELOPMENT
	1. Produce platform technical specifications. 2. Produce platform test procedures. 3. Analyse user requirements & implementation. 4. Propose system platform architecture. 5. Verify technical document. 6. Endorsement of Technical Drawings.	1. Produce weaponry &turret technical specifications. 2. Produce weaponry & turret test procedures. 3. Analyse user requirements & implementation. 4. Propose weaponry systems functionality. 5. Verify technical documents. 6. Endorsement of Technical Drawings.	2. Produce test procedures. 3. Analyse user requirements. 4. Propose system architecture and integration. 5. Implement acceptance test. 6. Verify technical documents.
LEVEL 4	**Engineer** 1. Execute system engineering process. 2. Propose suitable platform or chassis etc. to suit user requirements. 3. Integrate sub-systems with vehicle platforms. 4. Work with other Departments on technical issues. 5. Perform engineering work and applied research, development and design. 6. Produce technical documents.	**Engineer** 1. Execute system engineering process. 2. Proposing suitable weapon systems, etc. to suit user requirements. 3. Integrate of sub-systems with vehicle platforms. 4. Work with other Departments on technical issues. 5. Perform engineering work and applied research, development and design. 6. Produce technical documents.	**Engineer** 1. Execute system engineering process. 2. Proposing suitable electrical & electronics etc. to suit user requirements. 3. Integrate of sub-systems with vehicle platforms. 4. Work with other Departments on technical issues. 5. Perform engineering work and applied research, development and design. 6. Produce technical documents.
LEVEL 3	**Draughtman**	**No Job Title**	**No Job Title**

SECTION	(C) MANUFACTURING		
DIVISION	(30) MANUFACTURE OF OTHER TRANSPORT EQUIPMENT		
GROUP	(304) MANUFACTURE OF MILITARY FIGHTING VEHICLES		
AREA	PLATFORM/HULL DESIGN, DEVELOPMENT AND PROTOTYPING FIRST UNIT VEHICLE (FUV)	WEAPON AND TURRET DESIGN, DEVELOPMENT AND PROTOTYPING FUV	ELECTRICAL, ELECTRONIC AND COMMUNICATION DESIGN AND DEVELOPMENT
	1. Prepare 2D and 3D drawings using CAD systems. 2. Control and manage all drawings as a document control. 3. Support to establish of Engineering Change Notice and Engineering Change Request. 4. Ensuring product designs meet required safety and structural standards.		
LEVEL 2	No Job Title	No Job Title	No Job Title
LEVEL 1	No Job Title	No Job Title	No Job Title

Table 4.29: Occupational Responsibility (OR) C304 (2 / 4)

SECTION	(C) MANUFACTURING	
DIVISION	(30) MANUFACTURE OF OTHER TRANSPORT EQUIPMENT	
GROUP	(304) MANUFACTURE OF MILITARY FIGHTING VEHICLES	
AREA	INDUSTRIAL ENGINEERING	PRODUCTION PLANNING & CONTROL
LEVEL 8	No Job Title	No Job Title
LEVEL 7	No Job Title	No Job Title
LEVEL 6	**Head of Engineering** 1. Analyse user requirements. 2. Manage system design & integration. 3. Endorse systems architecture. 4. Manage test and acceptance of First Unit Vehicle. 5. Endorse test procedures. 6. Control development timeline and cost. 7. Ensure compliance to MIL-STD. 8. Overall responsibility for Engineering activities across the business. 9. Ensure that Environmental, Health and Safety, engineering and quality standards and procedures are adhered to. 10. Input and hold responsibility for engineering budgets.	**Head of Manufacturing** 1. Manage workflow 2. Establish goals for all section in manufacturing department, and coordinate a plan to meet those goals. 3. Ensure production stays on schedule. 4. Assure products meet quality standards. 5. Prepare monthly manufacturing reports. 6. Ensure workers and equipment meet performance and safety requirements. 7. Prepare and control departmental annual budget. 8. Prepare mitigation plan if any delay. 9. Hire, train, and assess the performance of workers.
LEVEL 5	**Senior Engineer** 1. Study and analyse manufacturing capability through feasibility studies. 2. Identify current assets and capability to meet project's target output and dateline.	**Senior Engineer** 1. Prepare Production Planning and Material Planning. 2. Prepares and controls annual departmental budget. 3. Manage inventory management systems.

SECTION	(C) MANUFACTURING	
DIVISION	(30) MANUFACTURE OF OTHER TRANSPORT EQUIPMENT	
GROUP	(304) MANUFACTURE OF MILITARY FIGHTING VEHICLES	
AREA	INDUSTRIAL ENGINEERING	PRODUCTION PLANNING & CONTROL
	3. Identify strengths, weaknesses, opportunities and threats with SWOT and 4M analysis. 4. Reduce on production cost to the optimum level to obtain a better profit return. 5. Establish cost estimates of production processes and tooling costs and review alternatives or put forward recommendations for improvement. 6. Propose manufacturing concepts at the most cost effective.	4. Establishes project bill of material based on the project plan and works with the related departments to ensure that project related material tasks are updated in a timely manner. 5. Work closely with other Department on the availability of items for production, assembly, fabrication and delivery use so as to avoid delays. 6. Ensure proper documentation process is followed in accordance with current policies and procedures. 7. Prepare weekly progress report based on production progress status, and parts readiness.
LEVEL 4	**Engineer** 1. Suggest Production Process Flow and Process Layout. 2. Manpower Analysis. 3. Assembly process cycle time analysis. 4. Study on consumable items, machines and tools required. 5. Develop Jig and Fixture based on product design and fabrication method involves. 6. Prepare MBOM, Work Instruction (WI) and Special Operation Process (SOP). 7. Improve production process by applying analysis method such as 4M Analysis, Process capability index, and Production Line Balancing. 8. Prepare Engineering Change Request and Manufacturing Change Notice	**Engineer** 1. Ordering Parts based on MBOM. 2. Identify and prepare work order, rework order, picklist, and material list based on variant and batch. 3. Responsible in monitoring, planning and controlling the inventory stock readiness to align with production schedule. 4. Analyse material list with inventory and shipment list for the shortage list preparation. 5. Monitor and report parts issuance status to superior on weekly basis. 6. Ensure production receive replacement for rejected part on time. 7. Work closely with other department on the availability of items for production to avoid delays.

SECTION	(C) MANUFACTURING	
DIVISION	(30) MANUFACTURE OF OTHER TRANSPORT EQUIPMENT	
GROUP	(304) MANUFACTURE OF MILITARY FIGHTING VEHICLES	
AREA	INDUSTRIAL ENGINEERING	PRODUCTION PLANNING & CONTROL
LEVEL 3	**Senior Technician** 1. Assist engineer to perform study and finalize on consumables, machine and tools requirement. 2. Assist engineer in Work Instruction preparation. 3. Assist engineer in 4M analysis. 4. Assist engineer in preparing Engineering Change Request and Manufacturing Change Notice.	**Supervisor/Technician** 1. Manpower Arrangement. 2. Assist engineer to create work order, rework order, picklist. 3. Ensure all documents to be kept properly and manageable. 4. Assist engineer in preparing weekly report on closed or open work orders. 5. Prepare material shortage list. 6. Assist engineer to identify alternative parts for any shortages.
LEVEL 2	**Technician** 1. Assist engineer to setup line production. 2. Assist engineer in line balancing and process cycle time. 3. Assist engineer to identify consumables usage. 4. Assis engineer in Work Instruction preparation. 5. Assist engineer in 4M analysis.	**Assistant Technician** 1. Prepare work order, rework order and picklist. 2. Ensure all documents to be kept properly and manageable. 3. Assist engineer in preparing weekly report on closed or open work orders. 4. Prepare material shortage list. 5. Assist engineer to identify alternative parts for any shortages.
LEVEL 1	No Job Title	No Job Title

Table 4.30: Occupational Responsibility (OR) C304 (3 / 4)

SECTION	(C) MANUFACTURING		
DIVISION	(30) MANUFACTURE OF OTHER TRANSPORT EQUIPMENT		
GROUP	(304) MANUFACTURE OF MILITARY FIGHTING VEHICLES		
AREA	BODYWORK WELDING	ASSEMBLY PROCESS	BODYWORK PAINTING
LEVEL 8	No Job Title	No Job Title	No Job Title
LEVEL 7	No Job Title	No Job Title	No Job Title
LEVEL 6	**Head of Manufacturing** 1. Manage workflow 2. Establish goals for all section in manufacturing department, and coordinate a plan to meet those goals. 3. Ensure production stays on schedule. 4. Assure products meet quality standards. 5. Prepare monthly manufacturing reports. 6. Ensure workers and equipment meet performance and safety requirements. 7. Prepare and control departmental annual budget. 8. Mitigation plan if any delay. 9. Hire, train, and assess the performance of workers.	**Head of Manufacturing** 1. Manage workflow 2. Establish goals for all section in manufacturing department, and coordinate a plan to meet those goals. 3. Ensure production stays on schedule. 4. Assure products meet quality standards. 5. Prepare monthly manufacturing reports. 6. Ensure workers and equipment meet performance and safety requirements. 7. Prepare and control departmental annual budget. 8. Prepare Mitigation plan if any delay. 9. Hire, train, and assess the performance of workers.	**Head of Manufacturing** 1. Manage workflow 2. Establish goals for all section in manufacturing department, and coordinate a plan to meet those goals. 3. Ensure production stays on schedule. 4. Assure products meet quality standards. 5. Prepare monthly manufacturing reports. 6. Ensure workers and equipment meet performance and safety requirements. 7. Prepare and control departmental annual budget. 8. Prepare mitigation plan if any delay. 9. Hire, train, and assess the performance of workers.
LEVEL 5	**Senior Welding Engineer**	**Senior Assembly Engineer**	**Senior Painting Engineer**

SECTION	(C) MANUFACTURING		
DIVISION	(30) MANUFACTURE OF OTHER TRANSPORT EQUIPMENT		
GROUP	(304) MANUFACTURE OF MILITARY FIGHTING VEHICLES		
AREA	BODYWORK WELDING	ASSEMBLY PROCESS	BODYWORK PAINTING
	1. Study and analyse facilities and equipment to meet the welding process requirement. 2. Ensure manpower ability and skilled manpower according to the requirement. 3. Review and verify welding procedures, processes, and documentation. 4. Manage welding procedure qualifications and generating welding procedures. 5. Set goals for zero defects on production welding process. 6. Conduct failure mode analyses and cause analyses on welding issues. 7. Prepare mitigation plan if any delay in production progress. 8. Prepare weekly progress reports.	1. Ensure production progress and completion according to the production schedule. 2. Ensure manpower ability and skilled manpower according to the requirement. 3. Set goals for zero defects on production assembly process. 4. Ensure all tools and equipment are well maintained and serviceable. 5. Supervise and improve plant and factory production. 6. Conduct failure mode analyses and cause analyses on assembly issues. 7. Prepare mitigation plan if any delay in production progress. 8. Prepare weekly progress reports.	1. Ensure painting progress and completion according to the production schedule. 2. Ensure manpower ability and skilled manpower according to the requirement. 3. Set goals for zero defects on production assembly process. 4. Ensure all tools and equipment are well maintained and serviceable. 5. Supervise and improves plant and factory production. 6. Conduct failure mode analyses and cause analyses on assembly issues. 7. Prepare mitigation plan if any delay in production progress. 8. Prepare weekly progress reports.
LEVEL 4	**Welding Engineer** 1. Coordinate welding activities and ensure to meet schedules and datelines. 2. Ensure required tools and equipment are available and provided.	**Assembly Engineer** 1. Coordinate assembly activities and ensure to meet schedules and datelines. 2. Ensure required tools and equipment are available and provided.	**Painting Engineer** 1. Coordinate painting activities and ensure to meet schedules and datelines. 2. Ensure required tools and equipment are available and provided.

SECTION	(C) MANUFACTURING		
DIVISION	(30) MANUFACTURE OF OTHER TRANSPORT EQUIPMENT		
GROUP	(304) MANUFACTURE OF MILITARY FIGHTING VEHICLES		
AREA	**BODYWORK WELDING**	**ASSEMBLY PROCESS**	**BODYWORK PAINTING**
	3. Determines consumables and miscellaneous materials for production usage. 4. Keep all manufacturing documents properly and regularly updated. 5. Inspect regularly subordinates work performance and updating staff skilled chart. 6. Ensure maintain welding process specifications (WPS) and process qualification requirements (PQR). 7. Solve all kinds of technical problems occurred. 8. Plan and schedule re-certification to welders. 9. Analyse and apply root cause, troubleshooting, and countermeasure action. 9. Conform with regulations related with Occupational Health and Safety (OHS) and Environmental policy in the company and his/her workspace.	3. Determines consumables and miscellaneous materials for production usage. 4. Control production documents used in manufacturing processes and keeps them up to date. 5. Inspect regularly subordinates work performance and updating staff skilled chart. 6. Solve all kinds of technical problems occurred. 7. Plan and schedule re-certification to welders. 8. Analyse and apply root cause, troubleshoot and countermeasure action. 9. Conform with regulations related with Occupational Health and Safety (OHS) and Environmental policy in the company and his/her workspace.	3. Determine consumables and miscellaneous materials for production usage. 4. Keep manufacturing processes and keeps them up to date. 5. Inspect regularly subordinates work performance and updating staff skilled chart. 6. Solve all kinds of technical problems occurred. 7. Planning and scheduling re-certification to welders. 8. Root cause, troubleshoot and countermeasure action analysis and implementation. 9. Conform with regulations related with Occupational Health and Safety (OHS) and Environmental policy in the company and his/her workspace.
LEVEL 3	**Welding Supervisor** 1. Plan the workforce.	**Supervisor/Technician** 1. Plan the workforce	**Painting Supervisor** 1. Plan the workforce.

SECTION	(C) MANUFACTURING		
DIVISION	(30) MANUFACTURE OF OTHER TRANSPORT EQUIPMENT		
GROUP	(304) MANUFACTURE OF MILITARY FIGHTING VEHICLES		
AREA	BODYWORK WELDING	ASSEMBLY PROCESS	BODYWORK PAINTING
	2. Ensure work progress according to production planning. 3. Ensure welding work procedure applies as per Work Instruction and WPS. 4. Ensure welder certification have been validated. 5. Provide data and information to engineer in order to improve efficiency and quality. 6. Inspect work in order to maintain specified standards and quality. 7. Solve all kinds of technical problems occurred in welding and including related machining process. 8. Ensure that all required equipment, consumable, material and document are being provided on time. 9. Communicate with related departments on any issues occurs during production. 10. Prepare daily progress report to engineer. 11. Ensure work safety regulations applies as per Occupational Health and Safety (OHS) and Environmental policy.	2. Ensure work progress according to production planning. 3. Ensure assembly process follows as per Work Instruction. 4. Provide data and information to engineer in order to improve efficiency and quality. 5. Inspect work in order to maintain specified standards and quality. 6. Solve all kinds of technical problems occurred in assembly process and including related machining process. 7. Ensure that all required equipment, consumable, material and document are being provided on time. 8. Communicate with related departments on any issues occurs during production. 9. Prepare daily progress report to engineer. 10. Ensure work safety regulations applies as per Occupational Health and Safety (OHS) and Environmental policy.	2. Ensure work progress according to production planning. 3. Ensure painting and surface finish process follows as per Work Instruction & painting scheme. 4. Provide data and information to engineer in order to improve efficiency and quality. 5. Inspect work in order to maintain specified standards and quality. 6. Solve all kinds of technical problems occurred in painting process and including related machining process, environmental policy. 7. Ensure that all required equipment, consumable, material and document are being provided on time. 8. Communicate with related departments on any issues occurs during production. 9. Prepare daily progress report to engineer. 10. Ensure work safety regulations applies as per Occupational Health and Safety (OHS) and Environmental policy.

SECTION	(C) MANUFACTURING		
DIVISION	(30) MANUFACTURE OF OTHER TRANSPORT EQUIPMENT		
GROUP	(304) MANUFACTURE OF MILITARY FIGHTING VEHICLES		
AREA	BODYWORK WELDING	ASSEMBLY PROCESS	BODYWORK PAINTING
LEVEL 2	**Welder** 1. Perform welding jobs according to Work Instruction, Drawing and Welding Procedure Specification (WPS). 2. Operate and maintain welding tools and equipment. 3. Operate lifting devices. 4. Ensure conformance to welding quality requirement by inspecting own works. 5. Ensure work safety regulations applies as per Occupational Health and Safety (OHS) and Environmental policy.	**Assistant Technician** 1. Perform welding jobs according to Work Instruction and Special Operation Procedure. 2. Operate and maintain assembly and lifting tools and equipment. 3. Ensure conformance to assembly quality requirement by inspecting own works. 4. Ensure work safety regulations applies as per Occupational Health and Safety (OHS) and Environmental policy.	**Painter** 1. Perform painting and surface finish jobs according to Work Instruction and Special Operation Procedure. 2. Prepare equipment before painting. 3. Prepare and process mixing 4. Apply Undercoat and primer application. 5. Perform final Coating and Surface Finish. 6. Rework activities. 7. Proper control on consumables usage. 8. Self-quality inspection on finish product. 9. Ensure work safety regulations applies as per Occupational Health and Safety (OHS) and Environmental policy.
LEVEL 1	No Job Title	No Job Title	No Job Title

Table 4.31: Occupational Responsibility (OR) C304 (4 / 4)

SECTION	(C) MANUFACTURING	
DIVISION	(30) MANUFACTURE OF OTHER TRANSPORT EQUIPMENT	
GROUP	(304) MANUFACTURE OF MILITARY FIGHTING VEHICLES	
AREA	MANUFACTURING QUALITY CONTROL	PRE-DELIVERY INSPECTION (PDI) & FINAL ACCEPTANCE TEST (FAT)
LEVEL 8	No Job Title	No Job Title
LEVEL 7	No Job Title	No Job Title
LEVEL 6	**Head of Quality** 1. Lead, manage and develop the department to ensure it achieves the highest possible standards of excellence in all its activities. 2. Manage Quality Engineers and Technicians in daily activities. 3. Ensure that the function operates in accordance with any health, safety and environment. 4. Monitor throughout the Pre-Delivery Inspection (PDI) and Final Acceptance Test (FAT) process.	**Head of Quality** 1. Lead, manage and develop the department to ensure it achieves the highest possible standards of excellence in all its activities. 2. Manage the Quality Engineers and Technicians in daily activities. 3. Ensure that the function operates in accordance with any health, safety and environment. 4. Monitor throughout the Pre-Delivery Inspection (PDI) and Final Acceptance Test (FAT) process.
LEVEL 5	**Senior Engineer** 1. Lead, manage and develop the department to ensure it achieves the highest possible standards of excellence in all its activities. 2. Management of the Quality Engineers and Technicians in daily activities. 3. Develop, establish and maintain documentation in compliance with Quality Management System (QMS), any regulatory authority and customer requirements; detailing company standards which employees are expected to adhere to.	**Senior Engineer** 1. Provide quality engineering know-how for Quality Operation team in executing proper quality inspections, product or system validation test and quality conformance activities. 2. Conduct research, development or manufacturing engineering assignment for projects and recommends revision of specification and rules. 3. Come out with Inspection Standard as per Schedule of Compliance (SOC).

SECTION	(C) MANUFACTURING	
DIVISION	(30) MANUFACTURE OF OTHER TRANSPORT EQUIPMENT	
GROUP	(304) MANUFACTURE OF MILITARY FIGHTING VEHICLES	
AREA	MANUFACTURING QUALITY CONTROL	PRE-DELIVERY INSPECTION (PDI) & FINAL ACCEPTANCE TEST (FAT)
	4. Provide quality engineering for the assembly of products and related test. 5. Ensure all related documents for the inspection ready before production start. 6. Liaise with related department or personnel in solving any rising issue. 7. Ensure effective records keeping for reference. 8. Implement 7 QC Tools.	4. Prepare Inspection Test Protocol according to User requirements. 5. Liaise with Users for any dispute during PDI/FAT inspection.
LEVEL 4	**Engineer** 1. Provide quality engineering for the assembly of products and related test. 2. Liaise with related department or personnel in solving any rising issue. 3. Prepare inspection check sheet to be used during stage inspection. 4. Set the BUY-OFF procedure for each level/stage. 5. Ensure effective records keeping for reference. 6. Coordinate and monitor activities of workers engaged in inspections and testing. 7. Interpret standards and procedures, and assists workers in resolving technical problems. 8. Implement 7 QC Tools.	**Engineer** 1. Coordinate Pre-Delivery Inspection (PDI) / Final Acceptance Test (FAT). 2. Provide timely response to any issues leading to acceptance of product by customer. 3. Provide technical guidance on quality inspection activities. 4. Coordinate and monitor activities of workers engaged in inspections and testing. 5. To ensure end product delivered the best quality of product is achieved. 6. Acknowledge user's complaints and act to solve any issues arise. 7. Ensuring the final product produced meets the specifications set by the user.
LEVEL 3	**Supervisor/ Technician** 1. Plan the workforce.	**Supervisor/ Technician** 1. Arrange the manpower.

SECTION	(C) MANUFACTURING	
DIVISION	(30) MANUFACTURE OF OTHER TRANSPORT EQUIPMENT	
GROUP	(304) MANUFACTURE OF MILITARY FIGHTING VEHICLES	
AREA	MANUFACTURING QUALITY CONTROL	PRE-DELIVERY INSPECTION (PDI) & FINAL ACCEPTANCE TEST (FAT)
	2. Ensure BUY-OFF stage process conducted according to the procedure. 3. Ensure inspection check sheet, test protocol is well implemented by the subordinates. 4. Ensure all inspection records are kept properly. 5. Prepare daily progress report for superior review. 6. Supervise the production process. 7. Liaise with production line leader on defective parts or quality issues. 8. Maintain all inspection records in accordance to procedures.	2. Provide data and information to engineer in order to improve efficiency and quality. 3. Record all the findings during Pre-Delivery Inspection (PDI) / Final Acceptance Test (FAT). 4. Liaise with Production team in solving any issues found during Pre-Delivery Inspection (PDI) / Final Acceptance Test (FAT). 5. Conduct inspection to certify goods and products that meet specifications and requirements. 6. Conduct the PDI/FAT inspection according to test protocol.
LEVEL 2	**Assistant Technician** 1. Perform in-coming inspection and in-line inspection. 2. Perform BUY-OFF process each stage. 3. Issue Reject Tag for any defective parts. 4. Prepare Discrepancy Report if any rejects parts/process rejected. 5. Ensure assembly process follow Work Instruction. 6. Maintain all inspection records in accordance to procedures. 7. Keep all inspection check sheet properly according to filling standard. 8. Assist supervisor/engineer to investigate defective parts to and come out with counter measure action.	**Assistant Technician** 1. Inspect and confirm all the process as per specifications and standard required. 2. Report to the supervisor if any defects/rejects to the parts/process and do the initial investigation. 3. Conduct inspection to certify goods and products that meet specifications and requirements. 4. Conduct the PDI/FAT inspection according to test protocol.
LEVEL 1	No Job Title	No Job Title

Table 4.32: Occupational Responsibility (OR) C309

SECTION	(C) MANUFACTURING			
DIVISION	(30) MANUFACTURE OF OTHER TRANSPORT EQUIPMENT			
GROUP	(309) MANUFACTURE OF TRANSPORT EQUIPMENT N.E.C.			
AREA	DESIGN AND DEVELOPMENT	PROCESS ENGINEERING	PRODUCT VALIDATION	PRODUCTION & ASSEMBLY
LEVEL 8	No Job Title	No Job Title	No Job Title	No Job Title
LEVEL 7	No Job Title	No Job Title	No Job Title	No Job Title
LEVEL 6	**Head of Design and Development** 1. Oversee the design process within an organization. 2. Prepare budget, financial management, and communication with other departments and stakeholders. 3. Maintain design standards and ensure that projects are completed on time and within budget.	**Head of Process Engineering** 1. Implement design, and ongoing management of business processes within an organisation. 2. Ensure that processes are aligned with the overall goals and objectives of the organization and that they meet industry standards and regulations. 3. Maintain safety standards, manage inventory, and ensure compliance with regulations and industry standards.	**Head of Product Validation** 1. Oversee the testing process within an organization. This includes managing a team of testers, developing and implementing testing strategies and plans 2. Ensure that an organization's products and services meet a certain level of quality. 3. Maintain safety standards, manage inventory, and ensure compliance with regulations and industry standards.	**Head of Production and Assembly** 1. To responsible for overseeing the production process within a manufacturing or industrial organization. 2. Plan and manage budgeting, financial management, and communication with other departments and stakeholders. 3. Maintain safety standards, managing inventory, and ensuring compliance with regulations and industry standards.
LEVEL 5	**Electrical / Mechanical Engineer** 1. Conducts analysis, research, develops concepts, theories and methods of operation.	**Electrical / Mechanical Engineer** 1. Designs, develops, and optimizes industrial processes in order to improve efficiency, reduce	**Quality Engineer** 1. Ensure that an organization's products and services meet the highest standards of quality.	**Electrical / Mechanical Engineer** 1. Conducts analysis, research, develops concepts, theories and methods of operation.

SECTION	(C) MANUFACTURING			
DIVISION	(30) MANUFACTURE OF OTHER TRANSPORT EQUIPMENT			
GROUP	(309) MANUFACTURE OF TRANSPORT EQUIPMENT N.E.C.			
AREA	**DESIGN AND DEVELOPMENT**	**PROCESS ENGINEERING**	**PRODUCT VALIDATION**	**PRODUCTION & ASSEMBLY**
	2. Design and develop products and systems that meet specific needs and requirements. 3. Work with other engineers and professionals to create integrated systems	costs, and increase productivity. 2. Design, test and improve manufacturing processes, as well as troubleshooting issues that arise during production. 3. Work with other engineers and professionals to create integrated systems	2. Enhance existing knowledge and method of testing and systems that meet specific needs and requirements. 3. Define the quality standards, implement and maintain the quality systems, and conduct audits to ensure adherence to the set standards.	2. Analyse production data to identify areas for improvement and implement changes to increase productivity and reduce costs. 3. Work with other engineers and professionals to create integrated systems.
LEVEL 4	**Technical Assistant** 1. Support the design process by providing technical assistance to designers, engineers, and other members of the design team. 2. Keep track of project schedules and deliverables, and ensuring that projects are completed on time and within budget. 3. Collaborate with cross-functional teams to ensure that designs meet specifications and industry standards.	**Supervisor** 1.Supervise a team of production staff, including setting goals, evaluating performance, and providing feedback and coaching. 2. Manage production schedules to ensure that deadlines are met and that production runs smoothly. 3.Manage inventory levels to ensure that production runs smoothly and that there are no delays due to lack of materials.	**Supervisor** 1. Conduct regular quality audits to ensure that the company is in compliance with industry regulations and standards. 2. Create and maintain standard operating procedures, inspection plans, and testing protocols. 3. Manage and train a team of quality control technicians, who are responsible for inspecting and testing products.	**Foreman / Supervisor** 1. Oversee the work of a production and assembly team. 2. Set goals and objectives, developing and implementing strategies. 3. Troubleshoot production problems and implement solutions to resolve them. 4. Implement quality control procedures to ensure that products are of the highest quality.

SECTION	(C) MANUFACTURING			
DIVISION	(30) MANUFACTURE OF OTHER TRANSPORT EQUIPMENT			
GROUP	(309) MANUFACTURE OF TRANSPORT EQUIPMENT N.E.C.			
AREA	**DESIGN AND DEVELOPMENT**	**PROCESS ENGINEERING**	**PRODUCT VALIDATION**	**PRODUCTION & ASSEMBLY**
		4.Implement quality control procedures to ensure that products are of the highest quality.		
LEVEL 3	**Drafter** 1. Creates technical drawings and plans used in the construction, manufacturing, and engineering industries. 2. Create drawings and plans to scale, using correct symbols and dimensioning techniques, 3. Update and revise existing drawings, creating 3D models, visualizations and simulations.	**Line Leader** 1. Supervise a team of production or assembly workers. 2. Set production goals and monitoring progress. 3. Communicate with other managers and supervisors to coordinate production efforts and resolve issues	**Inspector** 1. Evaluate the performance and functionality of a product, system, or service. 2. Design, develop, and execute test plans and test cases to ensure that a product meets its requirements and is free of defects. 3. Keep records of testing activities and results.	**Line Leader** 1. Supervise a team of production or assembly workers. 2. Set production goals and monitoring progress. 3. Communicate with other managers and supervisors to coordinate production efforts and resolve issues
LEVEL 2	**No Job Title**	**Zone Leader** 1. Oversee the operations and performance of a specific area or "zone" within an organization as to ensure daily that goals and objectives are met. 2. Ensure compliance with safety and quality standards, and managing	**No Job Title**	**Zone Leader** 1. Oversee the operations and performance of a specific area or "zone" within an organization as to ensure daily that goals and objectives are met. 2. Ensure compliance with safety and quality standards, and managing logistics and supply chain operation

SECTION	(C) MANUFACTURING			
DIVISION	(30) MANUFACTURE OF OTHER TRANSPORT EQUIPMENT			
GROUP	(309) MANUFACTURE OF TRANSPORT EQUIPMENT N.E.C.			
AREA	**DESIGN AND DEVELOPMENT**	**PROCESS ENGINEERING**	**PRODUCT VALIDATION**	**PRODUCTION & ASSEMBLY**
		logistics and supply chain operation 3. Organise training programs for employees. 4. Motivate and mentor employees to improve their performance and reach their goals.		3. Implement training programs for employees. 4. Motivate and mentor employees to improve their performance and reach their goals.
LEVEL 1	**No Job Title**	**Operator** 1. Assemble activity and their components in a manufacturing setting. 2. Perform routine maintenance on at production line and equipment. 3. Ensure safety, health, environment and quality at workplaces	**No Job Title**	**Operator** 1. Perform assembling activity and their components in a manufacturing setting. 2. Perform routine maintenance on at production line and equipment. 3. Ensure safety, health, environment and quality at workplaces

4.5 Occupational Description (OD)

Occupational Description (OD) is a broad, general, and written statement of a specific job, based on the findings of the job analysis.

The OD within this context refers to the job titles in demand that have been identified as important for the operations of the sector. The OD describes the summary of responsibilities, job level, and competency set such as knowledge, skills and attributes particular to the job. In total, there are C301 – 22 job titles, C302 – 22 job titles, C303 – 33 job titles, C304 – 22 job titles and C309 – 18 job titles. The developed OD of this OF is explained in Annex 4.

4.6 Competencies in Demand

"Competencies in demand" refers to the skills, knowledge, and abilities that are highly sought after in the job market. These are the qualities that employers are looking for in candidates and are necessary to perform the tasks required in a particular job. The competencies in demand vary depending on industry, location, and the current state of the job market. The job skills in demand are ever-changing to reflect the rapid shifts in the way the world works. As new skills become more relevant, others become obsolete.

This section discussed the competency that is currently high in demand in the Manufacture of Other Transport Equipment industries. Competency in demand is the required or additional ability of a person to perform their job requirement and responsibilities accordingly with the industry requirement. This includes the knowledge, skills and attribute that is required to perform the job.

Knowledge is defined as the understanding of an information that acquired through education or experience that could be benefited to perform a task. The ability to perform specific tasks or activities in and efficient and competent manner is referred to skills. While for attribute, it is related to the quality or characteristic of that is important to the task.

The competencies in demand under the C30 industries were discussed and identified during the FGD and are elaborated as in the Table 4.33.

Table 4.33: Competency in demand and description under the C30 industries.

COMPETENCY IN DEMAND	DESCRIPTION
KNOWLEDGE	
Project Management	Understand and practise the process of organizing, planning, executing and controlling resources, procedures and protocols to achieve specific goals and objectives within a specified time frame.
Engineering Design	Understand and practise the process of conceptualizing, planning, and developing a solution to a technical problem.
Production, Fabrication, Assembly and Repair	Understand and practise the process of making a product from creating individual parts, putting or assembling all the individual parts and combined with the whole process until the final product produce.
Machining & Special Tooling	Understand and practise the process of handling machines and tools including the high technology machineries as well as the special tooling that required in manufacturing industries especially in the production of high-precision and complex products.
Quality & Safety Management	Understand and practise the process of ensuring the products and procedures of making the products are safe, high quality and meet customer expectation.
Industrial Automation Engineering	Understand and able to use various technologies, such as programmable logic controllers (PLCs), robotic systems, and computer-integrated manufacturing (CIM) systems in a wide range of activities, including process analysis and optimization, control system design, software development, and commissioning and testing of automated systems.
SKILLS	
Interpersonal Communication	Able to communicate well and express oneself clearly and to understand the meaning behind the words and actions of others. For example, is being an active listener, effective speaker, nonverbal communication, and empathy.
Written Communication	Able to communicate and understand the process of exchanging information, ideas, and feelings through written text such as emails, letters, reports, memos, and instructional materials.
Critical Thinking	Able to practice critical thinking through careful and systematic evaluation of information, arguments, and evidence in order to make informed decisions and solve problems.
Problem Solving	Ability to define a problem, gathering information, generating potential solutions, evaluating the solutions, and implementing the chosen solution.
Agile Mindset	Ability to practice a thought process that involves understanding, collaborating, learning, and staying flexible to achieves high performing results.
Leadership	Ability to influence and motivate others to achieve common goals by setting a direction, inspiring and motivating others to follow, and creating an environment that supports and encourages success.

COMPETENCY IN DEMAND	DESCRIPTION
Time management	Able to plan and organize the time allocation efficiently and effectively towards the accomplishment of specific tasks, goals and objectives.
Aptitude for Technology and Equipment	Able to understand how technologies and equipment operate, while easily learn and adapt to a new or future technology and equipment.
Intrapreneurship	Creative, innovative and able to create new opportunities for innovation, new products or services, and bringing them to market.
ATTRIBUTE / ATTITUTE	
Attention to detail	Able to focus on the smaller, finer points of a task or project, and to ensure that every aspect has been considered and executed correctly to a high standard.
Teamwork	Able and willing to collaborate and cooperate between individuals in working together towards completing a goal.
Multi-tasking / Flexibility	Able to handle multiple tasks, responsibilities, or projects simultaneously.
Dependability	Dependable, reliable and consistent in completing the task and responsibilities.
Work Ethic	Able to commit to working hard, being productive, and striving for excellence in completing a goal.
Professionalism	A competent, knowledgeable, and skilled in their work in completing a task.
Self-management / Independent	Able to manage emotions, thoughts, behaviours, and time in order to achieve their personal and professional goals.
Self-learning	Ability to acquire knowledge, skills, and abilities through their own efforts, without relying on formal education or training.
Agility	Flexible, adaptable, and responsive in the face of changing circumstances, requirements, or conditions.
Ego-management	Able to regulate one's ego or self-esteem in order to achieve personal and professional success.
Career management	Able to set career goals, explore and identify opportunities for growth and advancement, and continuously working to improve skills, knowledge, and abilities.

The listed competencies are very important to all the job titles under the Manufacturing of Other Transport Equipment industries and are essential for a graduate or candidate to have in order to be able to perform the job requirement and responsibilities under these industries. However, the level of importance may be differ depending on the job level and requirements.

The list of competencies was then asked in the survey to determine which competencies are important to respective industries under the Manufacture of Other

Transport Equipment. The result from the survey was analysed and shown as in Figure 4.1 until Figure 4.5. All the competencies presented in the figures were selected as “very important” by the respondents to their respective industry.

From the figures, it shows that different industries have different requirement on competencies. Nevertheless, there are similarities in which are very important to every manufacturing industry such as production, fabrication, assembly and repair knowledge, quality management, problem solving, critical thinking, teamwork, work ethic and many others.

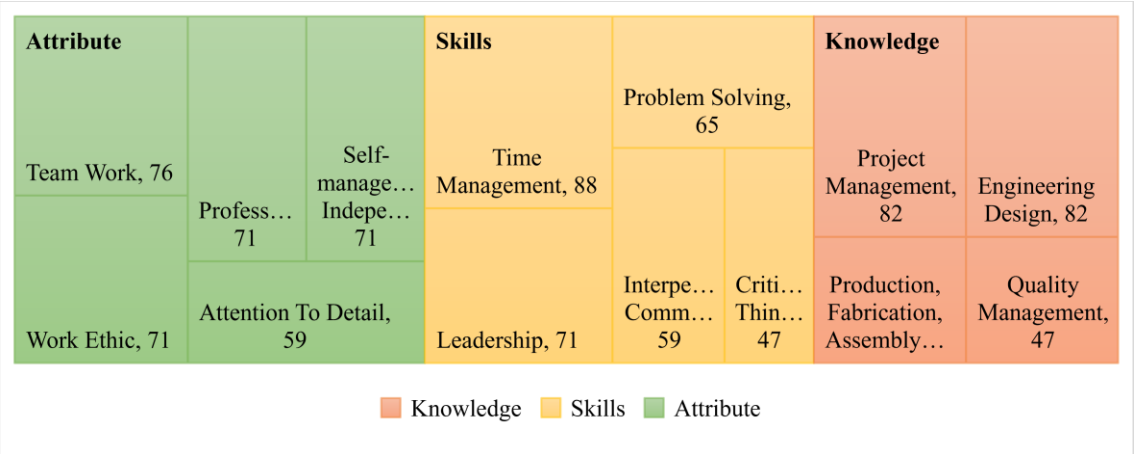

Figure 4.1: Competencies in demand that are very important for C301 industry.

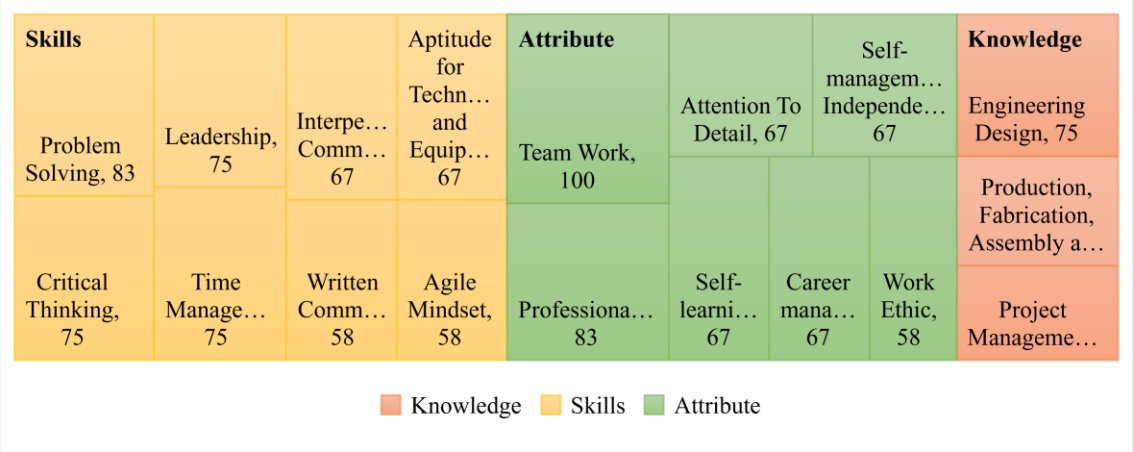

Figure 4.2: Competencies in demand that are very important for C302 industry.

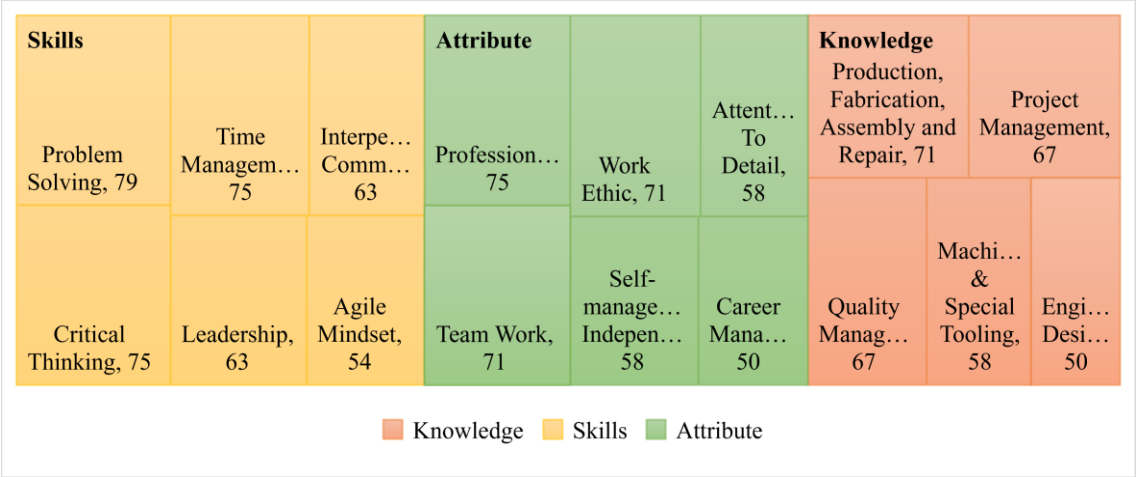

Figure 4.3: Competencies in demand that are very important for C303 industry.

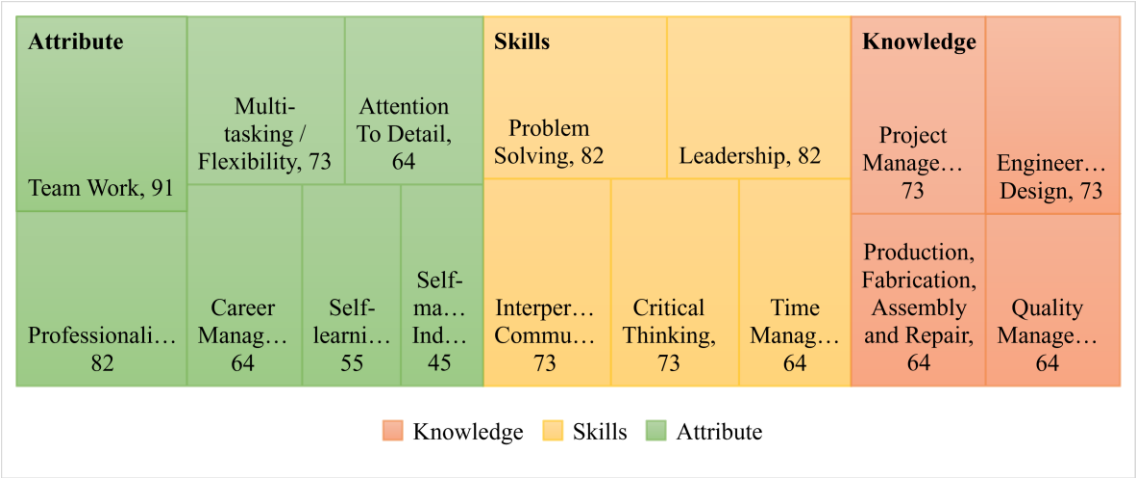

Figure 4.4: Competencies in demand that are very important for C304 industry.

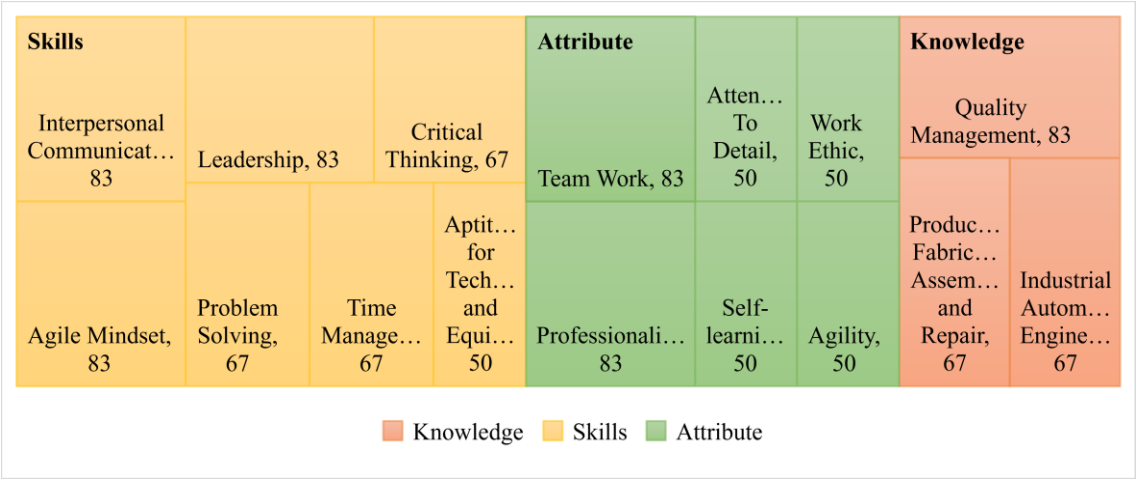

Figure 4.5: Competencies in demand that are very important for C309 industry.

On the other hand, the survey also captured the data related to the skills gap among graduates or new recruits and the factors contribute to the skills gap and the result shows in Figure 4.6. Based on the response from the survey, it shows that out of 166 respondents, 59% of them agreed that current graduate or workers does possess the skills required by the industries to perform their tasks while the remaining 41% disagreed.

The persistent skills gap among graduates and workers can be attributed to a number of factors, including a poor work ethic, a mismatch between education or training and job requirements, and the need for workers to acquire new skills as technology continues to advance.

According to some respondents, other factors contributing to the skills gap include misalignment in the way job seekers present their skills on their resumes, employers not clearly specifying the required skills in job advertisements, and differences in values and thinking among different generations. However, experts during focus group discussions have suggested that these gaps can be reduced through on-the-job training and experience.

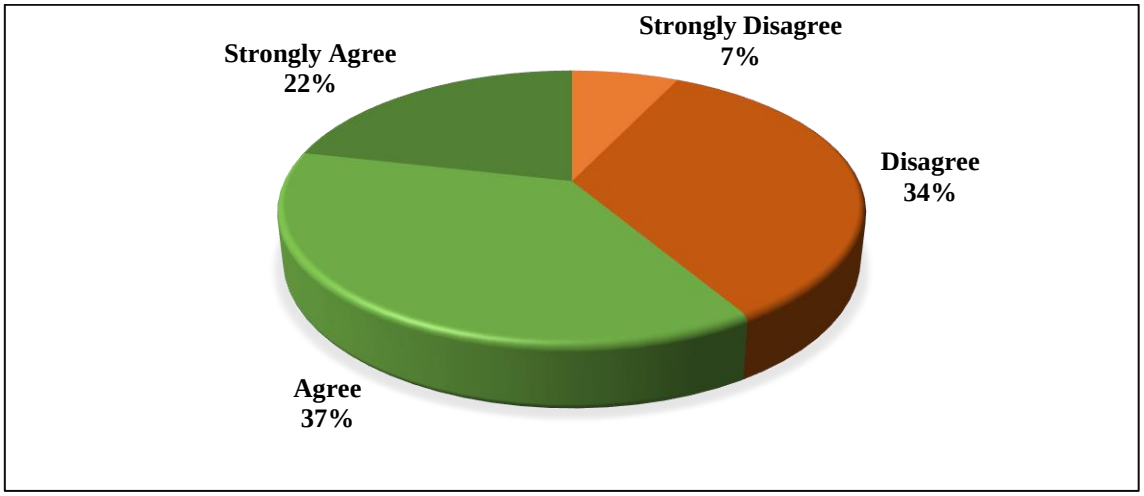

Figure 4.6: Skill gap among graduates or workers to perform tasks in their industries

4.7 Jobs in Demand and Critical Jobs

Occupation is considered critical if they are skilled, sought-after, and strategic (TalentCorp, 2022). According to TalentCorp (2022), sought-after means that demand for an occupation or job title exceeds the supply of appropriately qualified workers despite efforts on the part of employers to satisfy their demand and for reasons not easily

addressed through changes in employer hiring practices. Strategic means that an occupation is central to Malaysia's economic development objectives. A strategic occupation is one that is closely linked to Malaysia's economic growth and the development of its knowledge-based economy.

The critical job and job in demand were identified through the FGD session and brainstorming session where the experts list out the critical job and job in demand for their respective industries.

On the other hand, one of the sections in the survey is to identify the jobs in demand and critical jobs in the respondents' respective industry. The list of jobs in deman1d and critical jobs for respective group under the Manufacture of Other Transport Equipment are explained in the Table 4.34 until Table 4.38.

Table 4.34: Jobs in demand and critical jobs under the C301 group.

JOB AREA	JOBS IN DEMAND	CRITICAL JOBS
Shipbuilding Design	1. Naval Architect	1. Naval Architect
Production Planning	1. Head of Planning	*No Job Title*
Hull & Outfitting Production	1. Head of Hull & Outfitting 2. Hull & Outfitting Engineer	1. Hull & Outfitting Welder 2. Hull & Outfitting Fitter
Shipbuilding Mechanical Installation	1. Head of Mechanical 2. Mechanical Engineer 3. Mechanical Technician	*No Job Title*
Shipbuilding Piping Fabrication	1. Head of Piping 2. Piping Technician	1. Piping Fitter
Shipbuilding Electrical & Instrumentation (E & I) Installation	1. Head of Shipbuilding E & I 2. Shipbuilding E & I Engineer 3. Shipbuilding E & I Technician	*No Job Title*
Shipbuilding Heating, Ventilation, Air Conditioning (HVAC) Installation	1. Head of Shipbuilding HVAC 2. Shipbuilding HVAC Engineer 3. Shipbuilding HVAC Technician	*No Job Title*
Shipbuilding Carpentry Fabrication	1. Head of Shipbuilding Carpentry	1. Shipbuilding Carpenter

JOB AREA	JOBS IN DEMAND	CRITICAL JOBS
	2. Shipbuilding Carpentry Engineer 3. Shipbuilding Carpenter	
Shipbuilding Painting	1. Head of Painting 2. Painter and Blaster	*No Job Title*
Quality Assurance & Quality Control	1. Head of shipbuilding QAQC 2. Shipbuilding QAQC Technician	*No Job Title*
Testing & Commissioning Harbour Acceptance Trial & Sea Trial (HAT & SAT)	1. Shipbuilding Testing & Commissioning Engineer	1. Shipbuilding Testing & Commissioning Engineer

Table 4.35: Jobs in demand and critical jobs under the C302 group.

JOB AREA	JOBS IN DEMAND	CRITICAL JOBS
Design Preparation / Design and Development	1. Technical Design Director 2. Head of Technical 3. Senior Engineer	*No Job Title*
Architecture Design	1. Senior Engineer	*No Job Title*
Rolling Stocks Quality, Safety, Health & Environment Control (QSHE)	1. Technical Engineering Director 2. Senior QSHE 3. Engineer	1. Head of QSHE 2. Senior QSHE
Rolling Stocks Mechanical Engineering	1. Head of Technical 2. Engineer 3. Technician	1. Engineer
Rolling Stocks Electrical & Electronic Engineering	1. Head of Technical 2. Engineer 3. Technician	1. Head of Technical 2. Senior Engineer
Rolling Stocks Communication & Signalling Engineering	1. Head of Technical 2. Engineer 3. Technician	1. Head of Technical 2. Senior Engineer
Rolling Stocks Testing & Commissioning	1. Head of Technical 2. Engineer 3. Technician	*No Job Title*
Production Engineering	1. Head of Production 2. Engineer 3. Technician / Welder / Painter	1. Head of Production

Table 4.36: Jobs in demand and critical jobs under the C303 group.

JOB AREA	JOBS IN DEMAND	CRITICAL JOBS
Aircraft Part Engineering Design	1. Principal Design Technologist 2. Senior Design Technologist 3. Design Technologist	1. Principal Design Technologist 2. Senior Design Technologist 3. Design Technologist
Aircraft Part Tooling Engineer	1. Principal Tool Design Specialist 2. Tool Design Specialist 3. Tool Design Engineer 4. Senior Tooling Technician	1. Tool Design Specialist 2. Tool Design Engineer 3. Senior Tooling Technician
Aircraft Part Industrial Engineering	1. Senior Industrial Engineer 2. Industrial Engineer	1. Senior Industrial Engineer *2.* Industrial Engineer
Aircraft Part Sheet Metal Engineering	1. Sheet Metal Specialist 2. Sheet Metal Technician	1. Sheet Metal Specialist
Aircraft Composites Part Laminating	1. Laminating Specialist	1. Laminating Specialist
Aircraft Part Machining	1. Senior Machinist 2. Machinist	1. Machinist
Aircraft Part Mechanical Assembly/Final Assy	1. Senior Production Engineer 2. Production Engineer 3. Production Supervisor 4. Senior Production Technician 5. Production Technician	1. Senior Production Engineer 2. Production Engineer 3. Production Supervisor 4. Senior Production Technician *5.* Production Technician
Aircraft Part Surface Treatment	1. Senior Surface Treatment Specialist 2. Surface Treatment Specialist 3. Senior Surface Treatment Technician	1. Senior Surface Treatment Specialist 2. Senior Surface Treatment Technician
Aircraft Part Testing (NDT)	1. Head of Quality 2. NDT Engineer 3. NDT Technician	*No Job Title*
Aircraft Part Painting	1. Painting Specialist 2. Painting Engineer 3. Painter Supervisor 4. Senior Painter 5. Painter	1. Painting Specialist 2. Painting Engineer 3. Painter Supervisor 4. Senior Painter 5. Painter
Aircraft Part Quality Inspection	1. Senior Quality Inspection Engineer 2. Supervisor 3. Quality Inspector	1. Head of Quality 2. Supervisor 3. Quality Inspector

Table 4.37: Jobs in demand and critical jobs under the C304 group.

JOB AREA	JOBS IN DEMAND	CRITICAL JOBS
Platform/Hull Design, Development and Prototyping First Unit Vehicle (FUV)	1. Head of Engineering 2. Specialist Engineer 3. Design Engineer	1. Specialist Engineer 2. Design Engineer
Weapon And Turret Design, Development and Prototyping FUV	1. Specialist Engineer 2. Design Engineer	1. Specialist Engineer 2. Design Engineer
Electrical, Electronic and Communication Design and Development	1. Specialist Engineer 2. Design Engineer	1. Specialist Engineer 2. Design Engineer
Industrial Engineering	1. Senior Engineer 2. Engineer	*No Job Title*
Production Planning & Control	1. Senior Engineer 2. Engineer	*No Job Title*
Bodywork Welding	1. Senior Welding Engineer 2. Welding Engineer	*No Job Title*
Assembly Process	1. Engineer	*No Job Title*
Bodywork Painting	1. Senior Engineer 2. Engineer	*No Job Title*
Manufacturing Quality Control	1. Senior Engineer 2. Engineer	*No Job Title*
Pre-Delivery Inspection (PDI) & Final Acceptance Test (FAT)	1. Senior Engineer 2. Engineer	*No Job Title*

Table 4.38: Jobs in demand and critical jobs under the C309 group.

JOB AREA	JOBS IN DEMAND	CRITICAL JOBS
Design And Development	1. Manager 2. Electrical / Mechanical Engineer 3. Technical Assistant 4. Drafter	1. Electrical / Mechanical Engineer 2. Drafter
Process Engineering	1. Senior Manager 2. Manager 3. Electrical / Mechanical Engineer 4. Supervisor 5. Line leader	1. Manager 2. Electrical / Mechanical Engineer 3. Line Leader
Product Validation	1. Manager 2. Electrical / Mechanical Engineer 3. Supervisor	1. Electrical / Mechanical Engineer
Transport Equipment Production & Assembly	1. Senior Manager 2. Manager 3. Electrical / Mechanical Engineer	1. Electrical / Mechanical Engineer 2. Line Leader

JOB AREA	JOBS IN DEMAND	CRITICAL JOBS
	4. Supervisor 5. Line leader 6. Operator	

The jobs in demand in the tabulated tables are listed based on the job titles and areas derived in the developed OS from the industries' experts. There are a total of 116 overall jobs in demand under the Manufacture of Other Transport Equipment industries managed to be listed based on the survey result (C301 – 23 jobs in demand, C302 – 22 jobs in demand, C303 – 33 jobs in demand, C304 – 20 jobs in demand and C309 – 18 jobs in demand). Out of these 116 jobs in demand, 57 is the critical jobs which according to the experts, currently experienced shortage in supply and some jobs require completion in foreign countries.

In addition, data from the experts from FGD and data from respondents from survey have identified the contributing factors to the shortage of jobs in demand in the industries. The explanations are as follow:

a) Lack of experience to execute the job requirement and responsibility.
b) High salary expectation or salary offered did not compensate well to the job requirement especially among graduates.
c) Lack of knowledge, skills, and competency among candidates.
d) High turnover due to salary and benefits offered by competitors are more attractive.
e) Lack of local resources especially on certified and competent candidates.
f) Mismatch of qualification and education to perform the job requirement.
g) Rapid advancement of new technologies that requires higher knowledge, skills and unique scope of work.
h) Poor career growth in the industry.
i) Contract-based job has caused less attractive to the graduates who look for more stable career.
j) Post-pandemic effect whereby manpower was reduced to minimum during pandemic as well as their salary which in turn, lead to high turnover or resignation.

4.8 Emerging Skills

In today's rapidly changing job market, it is crucial to keep pace with the emerging skills and trends in order to remain competitive and relevant. This section presents the research findings on emerging skills, providing a comprehensive analysis of the most in-demand skills for various job titles. The findings will help to shed light on the skills that are becoming increasingly important in the job market and provide valuable insights for job seekers, employers, and policy makers. This section will also contribute to the ongoing discourse on the future of work and skill development and help inform training and professional development programs aimed at promoting the growth and competitiveness of the workforce. Emerging skills refer to the new and rapidly developing abilities and knowledge areas that are becoming increasingly important in various fields and industries. In the manufacturing of other transport equipment industries, workers may need to develop and adapt to the following emerging skills:

Emerging skills refer to new or rapidly evolving abilities and competencies that are in high demand in the job market due to technological advancements, changes in the global economy, and other factors. These skills are typically related to new technologies or digital transformation, data analysis, design thinking, and cross-cultural collaboration, among others. Emerging skills are seen as key drivers of innovation and competitiveness, and individuals and organizations who have them are better equipped to adapt to the changing demands of the workplace.

In the survey, type of emerging skills that is essential and could have a significant impact to the future of the Manufacturing of Other Transport Equipment industries were asked to the respondents and the result is explained as in Table 4.39. While Figure 4.7 shows the emerging skills suggested by the respondents that are essential and related to their respective industries. In general, more than 80% respondents provide their opinion on the future emerging skills. Since most of them are proposing the similar emerging skills, their opinions are merged and explained as shown in the table.

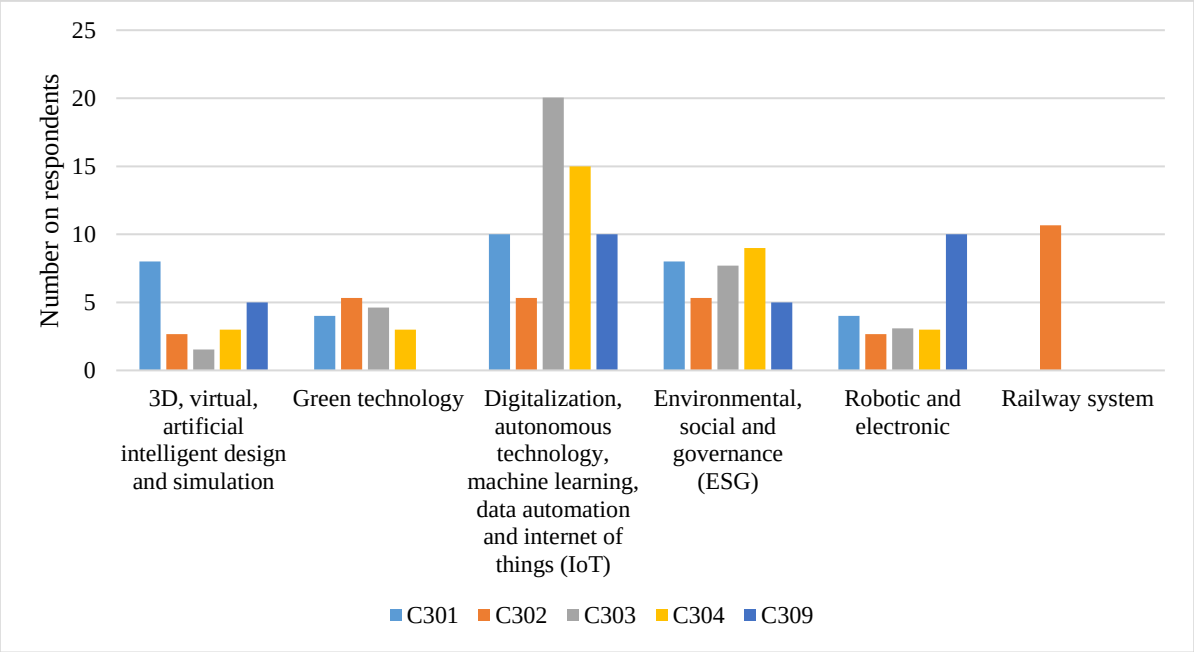

Figure 4.7: Emerging skills related to C30 industries.

Data from Figure 4.7 showed that there are six (6) important emerging skills for C30. Digitalization, autonomous technology, machine learning, data automation, and the Internet of Things (IoT) are some of the most important new skills. These emerging skills are essential to improve manufacturing industries in terms of quality, time consumption, effectiveness, communication, and human error. These enable humans to control and monitor the manufacturing process anywhere through an application or software, as well as improve the decision-making process, time management, and maintenance work.

Table 4.39: Future emerging skills that were suggested by the respondents

EMERGING SKILLS	REASONS ON THE REQUIRED SKILLS
3D, virtual, artificial intelligent design and simulation	Future application requires technological advancement as mentioned in industrial revolution. It is essential for future graduates and talent to be exposed with these advance technologies since future manufacturing are looking to practice more digitalization.
Green technology	Technologies advancement in the future are looking more at green and renewable energy. Thus, future graduates and new talent are recommended to be exposed with any green technology and system.
Digitalization,	These emerging skills are essential to improve

EMERGING SKILLS	REASONS ON THE REQUIRED SKILLS
autonomous technology, machine learning, data automation and internet of things (IoT)	manufacturing industries in terms of quality, time consumption, effectiveness, communication and human error. These enable human to control and monitor the manufacturing process anywhere through application or software as well as improve decision making process, time and maintenance work.
Environmental, social and governance (ESG)	A new knowledge and skills that could benefits the organization in terms of profitability, productivity, efficiencies and reduce waste. ESG is a demand in current industries, thus, will be essential to the future generation.
Robotic and electronic	As future technologies advancement is looking at more autonomous process that involve more on robots and electronic, future talent can benefit through it by familiarizing with the operation of robotic and electronic.
Railway system	A high demand from railway industries as this skill is currently dominated by foreign workers.

4.9 Job Relevant to Industrial Revolution 4.0 (IR 4.0)

The integration of technology in industrial relations is driving significant changes in the job market and creating new job opportunities. The research findings showed there are 193 job titles relevant to IR 4.0 within the Manufacturing of Other Transport Equipment industries.

As the technology grows rapidly, it is likely to foresee the future occupation will be more automated especially with the introduction of artificial intelligent, robotics and what not. Industrial revolution has significantly improved manufacturing industries especially on production volume, lead time, accuracy and efficiencies. However, it does affect towards reducing manpower and high maintenance.

This issue is discussed in the FGD and were agreed among the experts that the technologies and industrial revolution impact directly towards the Manufacturing of Other Transport Equipment industries, however, not all job level are affected by it. Following to the FGD discussion, the issue was brought to the survey and the result is discussed as in Figure 4.8 and Figure 4.9.

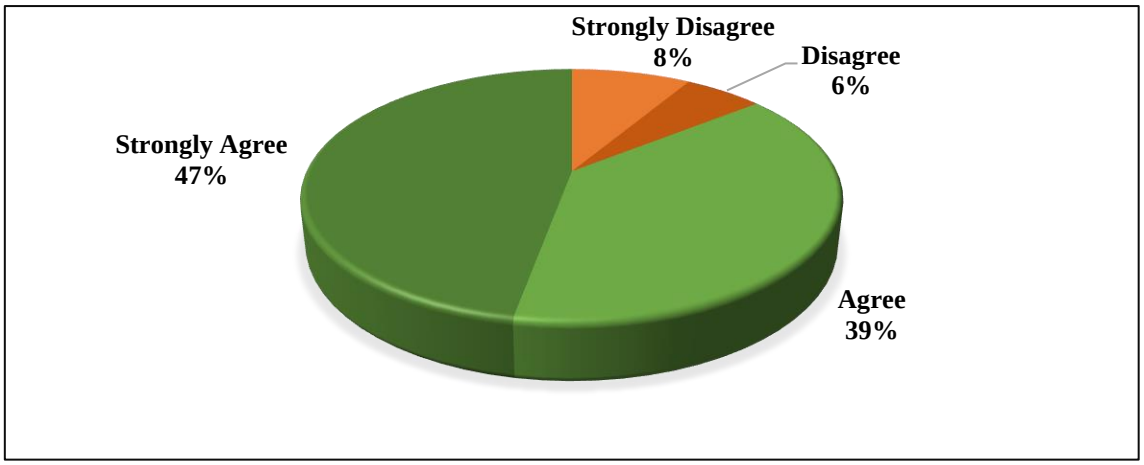

Figure 4.8: The industrial revolution impact to the industries

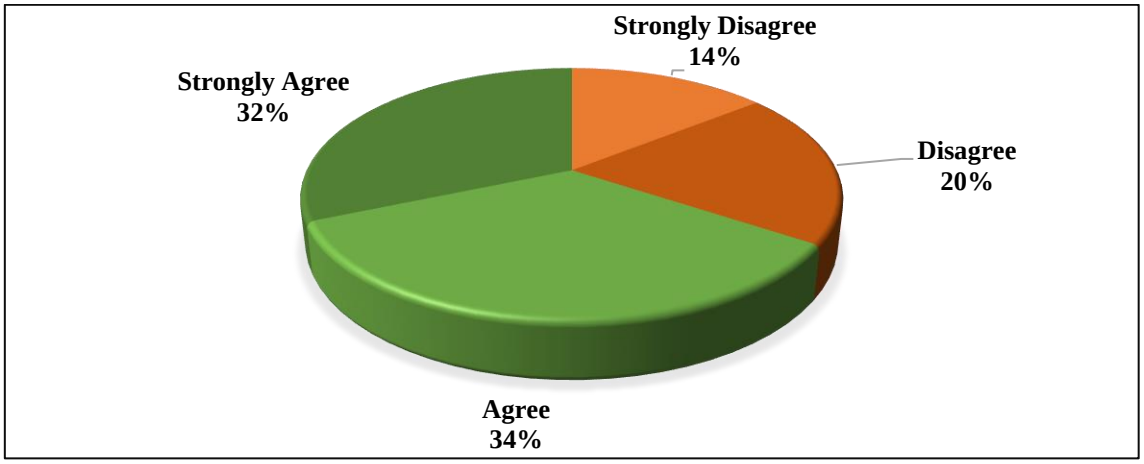

Figure 4.9: Technology advancement affect to the job in industries

Similar to the discussion in the FGD, the result from the survey shows that out of 166 respondents, majority of the respondents (86%) agreed that the industrial revolution will impact directly to the industries as they are very related to manufacturing. Industrial revolution provides better lead time with lower cost, while improve efficiencies, less manpower needed, less human error, improve product quality, simulation made easier, prototype more accurate, and improve productivity.

However, majority of them also agreed that the technology advancement may affect their job in the industries in future (66%). This may be due to several reasons such as replacing or reducing manpower with robotics, cost savings, difficulties to find a

skilled and competent worker, and difficulties in coping with new technologies.

Nevertheless, the response by experts from FGD explained that not all industries under the Manufacture of Other Transport Equipment are capable and ready to optimise their technologies and manufacturing machineries due to its high cost and maintenance. Thus, physical labour remains relevant and reliable in manufacturing industries.

Nine (9) crucial pillars of technologies advancement were discussed in the Chapter 2 of this research, with all of them are directly relevant to the Manufacture of Other Transport Equipment industries. Table 4.40 elaborate further on the relevant technologies under the industrial revolution and the systems or programs that were used in the industries according to the result from the FGD 1.

Table 4.40: Technology pillars under the IR 4.0 that are relevant to Manufacture of Other Transport Equipment industries.

TECHNOLOGY PILLARS	DESCRIPTION OF THE PILLARS	SYSTEMS OR PROGRAMS USED IN THE INDUSTRIES
Autonomous Robots	Coordinated and automated actions of robots to complete tasks intelligently, with minimal human input	Autonomous robot machines in assembly factories, autonomous or self-driving vehicle such as safety technologies in recent vehicle.
Big Data Analytics	The analysis of ever larger volumes of data. Circulation, collection, and analysis of information is a necessity because it supports productivity growth based on a real-time decision-making process	Machine learning, data collecting and analyzing sensors, equipment, robotics and some others for maintenance purposes in factories and industries.
Cloud Computing	Storing and accessing data and programs over the Internet instead of your computer's hard drive	Cloud based storage, storing data for maintenance purposes, data sharing, remote monitoring and reporting of a process.
Internet of Things (IoT)	All machines and systems connected to the production plant (as well as other systems) must be able to collect, exchange and save these massive volumes of information, in a completely autonomous way and without the need of	Real-time data, storing and sending through cloud for maintenance purposes, quality control, remote monitoring and efficiency reporting.

TECHNOLOGY PILLARS	DESCRIPTION OF THE PILLARS	SYSTEMS OR PROGRAMS USED IN THE INDUSTRIES
	human intervention	
Additive Manufacturing	Use in prototyping, design iteration and small-scale production and often described as "rapid prototyping" - produce the desired components faster, more flexibly and more precisely than ever before.	3D printing, Prototyping, 1 to 1 prototyping, details printing.
System Integration	The process of linking together different computing systems and software applications physically or functionally to act as a coordinated whole via Internet of Things-IoT	Factory automation system, Machine-to-machine communication, quality management, maintenance system
Cybersecurity	With the increased connectivity and use of standard communications protocols, the need to protect critical industrial systems and manufacturing lines from cybersecurity threats is increasing	Automation system security, network security, access control, encryption, software security, physical security
Augmented Reality	Augmented-reality-based systems support a variety of services, such as selecting parts in a warehouse and sending repair instructions over mobile devices - provide workers with real-time information to improve decision making and work procedures	Real-time data for training, maintenance, quality management, product design, product assembly and production
Simulation	Simulations will leverage real-time data to mirror the physical world in a virtual model, which can include machines, products, and humans. This allows operators to test and optimize the machine settings for the next product in line in the virtual world before the physical changeover, thereby driving down machine setup times and increasing quality	Pre-process / production analysis such as parts produce per time, lead time for a product, machines and robots work rate, design and balancing, programming robot.

On the other hand, Figure 4.10 shows the IR 4.0 pillars that are relevant to the industries under the Manufacture of Other Transport Equipment based on the responses of the survey. The result shows that all IR 4.0 pillars are essential, important and will give an impact to all industries now and in the future. Furthermore, the IR 4.0 is meant for manufacturing industries, which makes it relevant to industries under C30.

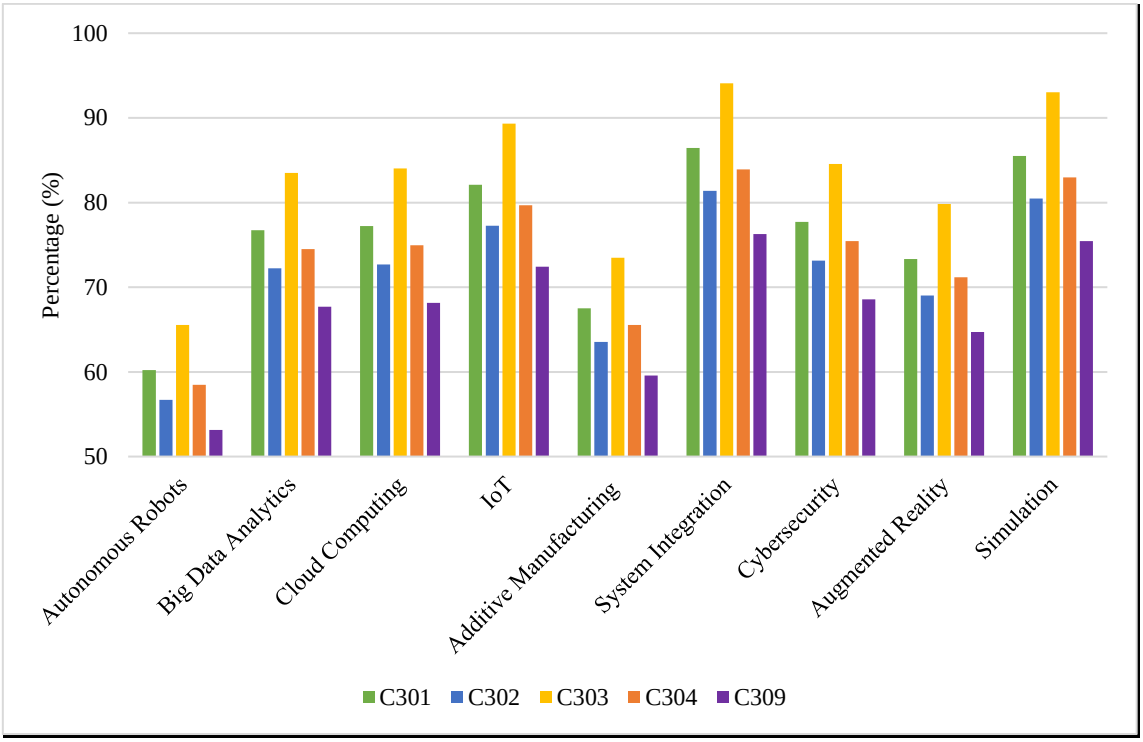

Figure 4.10: IR 4.0 pillar that are relevant to the industries under the Manufacture of Other Transport Equipment.

From the graph, it shows that the IoT, system integration and simulation are the pillars that are very important to all C30 industries. However, data also showed that Autonomous Robots are the least important to C30 group. Group C303 showed a higher score for all nine pillars of IR 4.0 especially for System Integration, Simulation, IOT, Cloud computing, Big Data Analysis and Cybersecurity are relevant to their job.

4.10 Issues related to Manufacture of Other Transport Equipment Industries

The manufacture of other transport equipment is an important sector of the economy, contributing to the development and growth of various industries. However, this sector faces various challenges and issues that need to be addressed to ensure its sustainability and competitiveness. This section aims to shed light on the key issues related to the manufacture of other transport equipment and identify possible solutions to overcome them. This analysis will provide valuable insights into the challenges faced by this sector and help inform policy decisions aimed at promoting its growth and development. Ultimately, this will contribute to the improvement of the overall economic performance

and competitiveness of the country.

Issues related to Manufacture of Other Transport Equipment industries were discussed during the FGD and further verified through survey questions. Figure 4.11 shows the issues related to respective industries under the Manufacture of Other Transport Equipment based on the responses of the survey. All industries show a consistent result in which the issues are more to insufficient number of skilled, certified and competence workers, underpayment of wages, talent gap, adaptation to technological changes and poor facilities and amenities. In addition, all areas of expertise reported that foreign labour dependencies are not the major issues.

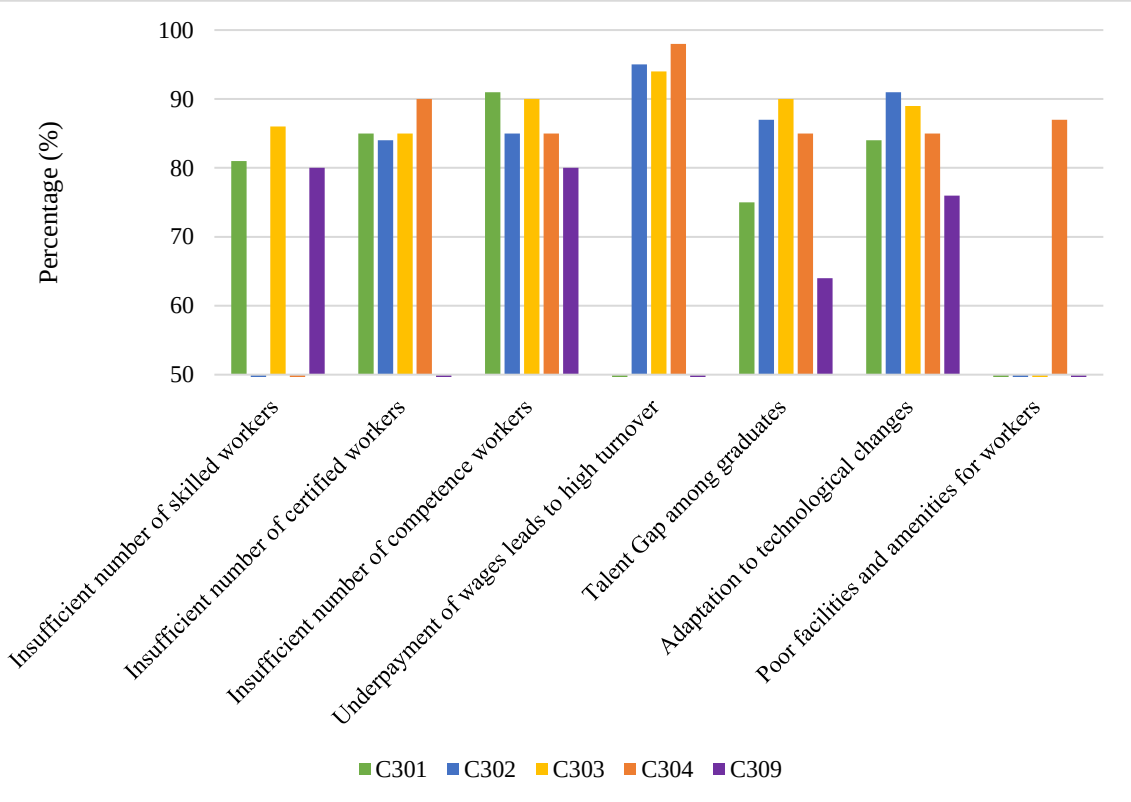

Figure 4.11: Issues related to C30 industries.

According to the findings presented in Figure 4.11, there are several issues related to the Manufacture of Other Transport Equipment industry in Division C30, as per MSIC 2008. These issues vary across different groups within the industry. The Manufacture of Other Transport Equipment industry in Division C30 faces several challenges, including a talent gap among graduates, a lack of adaptation to technological changes, and a

shortage of competent workers. These issues affect all groups within the industry and can limit the overall productivity and sustainability of the industry.

In addition, there is a shortage of skilled workers in industries C301, C303, and C309. This can hinder the production process and limit the overall productivity of these industries. Another issue that affects multiple groups within Division C30 is the problem of underpayment of wages, which can lead to high turnover rates. This issue is particularly relevant to industries C302, C303, and C304. Furthermore, the facilities and amenities provided for workers in industry C304 are reported to be poor. This can negatively impact the health and well-being of workers, as well as their overall job satisfaction.

In conclusion, the findings from Figure 4.11 highlight several challenges faced by the Manufacture of Other Transport Equipment industry in Division C30. These challenges include a shortage of competent and skilled workers, issues with wages and turnover rates, and inadequate facilities and amenities for workers. Addressing these issues could help to improve the overall productivity and sustainability of the industry.

Further to the survey, other related issues were also asked to the respondents and their responses were gathered, analysed, summarised and discussed in Table 4.41.

Table 4.41: Other issues related to Manufacture of Other Transport Equipment industries.

ISSUES	DETAILS
Career advance opportunities	No clear direction on career advancement.
Competency development	Employee development in terms of competency or specific skills are lacking.
Poor leadership	Poor or improper leadership from superior and management.
Employee benefits	Lack of employee benefits in terms of medical, protection and salary benefits.
Attitude management	Employees poor or improper attitude.
Unqualified employee	Superior or management position are filled with unqualified personnel.
Management support	Lack of management support in some critical activities.
High turnover	Post pandemic issues and offers from industries' competitors are better.

4.11 Mapping OS to Available NOSS

In today's rapidly changing job market, it is crucial to align occupational structures with the current National Occupational Skills Standards (NOSS). This section aims to map the occupational structure identified in the research findings with the NOSS to provide a comprehensive understanding of the skills and competencies required for each job title. The mapping of the occupational structure with the NOSS will provide valuable insights into the current job market and help identify the skills gap that needs to be addressed through skill development and training programs. This will ultimately contribute to the growth and competitiveness of the workforce and the economy as a whole.

Table 4.42 until Table 4.48 shows the mapping of the developed OS to the current existing NOSS.

Table 4.42: Existing NOSS mapped with C301 OS (1/2)

SECTION	**(C) MANUFACTURING**		
DIVISION	**(30) MANUFACTURE OF OTHER TRANSPORT EQUIPMENT**		
GROUP	**(301) BUILDING OF SHIPS AND BOATS**		
AREA	**SHIPBUILDING DESIGN**	**PRODUCTION PLANNING**	**HULL & OUTFITTING PRODUCTION**
LEVEL 8	NJT	NJT	NJT
LEVEL 7	NJT	NJT	NJT
LEVEL 6	Head of Shipbuilding Design	Head of Planning	Head of Hull & Outfitting
LEVEL 5	Naval Architect	Project Planner	Hull & Outfitting Engineer **Ship Hull Construction Management (TP-024-5:2012) (18-12-2012)** **Ship Hull Construction and Maintenance Management (Metal) (C301-001-5:2018) (06-02-2018)** **Fiberglass Boat Manufacturing Management (TP-022-5:2016)**

			(24-05-2016)
LEVEL 4	Senior Draughtsman	NJT	Hull & Outfitting Supervisor **Ship Hull Construction Coordination (TP-024-4:2012) (18-12-2012)** **Ship Hull Construction and Maintenance Coordination (Metal) (C301-001-4:2018) (06-02-2018)** **Fiberglass Hull and Superstructure Manufacturing Coordination & Administration (TP-022-4:2016) (24-05-2016)**
LEVEL 3	Draughtman	NJT	Hull & Outfitting Welder **Marine Hull Senior Technician (TP-024-3) (01-10-09)** **Ship Hull & Super Structure Construction (TP-026-3:2013) (24-04-2013)** **Fiberglass Hull and Superstructure Manufacturing (TP-022-3:2014) (25-09-2014)**
LEVEL 2	NJT	NJT	Hull & Outfitting Fitter **Marine Hull Fabrication, Installation and Maintenance (Steel) (TP-028-2:2014) (25-09-2014)** **Marine Hull Technician (TP-024-2) (01-10-09)**

			Senior Duyung Traditional Boat Maker (TP-080-2) (25-10-10)
LEVEL 1	NJT	NJT	Hull & Outfitting Helper **Marine Mechanic (R-010-1) (19-07-96)** **Duyung Traditional Boat Maker (TP-080-1) (25-10-10)**

Table 4.43: Existing NOSS map with C301 OS (2/2)

SECTION	**(C) MANUFACTURING**		
DIVISION	**(30) MANUFACTURE OF OTHER TRANSPORT EQUIPMENT**		
GROUP	**(301) BUILDING OF SHIPS AND BOATS**		
AREA	**SHIPBUILDING MECHANICAL INSTALLATION**	**SHIPBUILDING PIPING FABRICATION**	**SHIPBUILDING ELECTRICAL & INSTRUMENTATION (E & I) INSTALLATION**
LEVEL 8	NJT	NJT	NJT
LEVEL 7	NJT	NJT	NJT
LEVEL 6	Head of Mechanical	Head of Piping	Head of Shipbuilding E & I
LEVEL 5	Mechanical Engineer	Piping Technical Executive **Ship Piping System Construction & Maintenance Management (C301-002-5:2018) (06-02-2018)**	Shipbuilding E & I Engineer
LEVEL 4	Mechanical Supervisor	Piping Supervisor **Ship Piping System Construction & Maintenance Coordination**	Shipbuilding E & I Supervisor

		(C301-002-4:2018) (06-02-2018)	
LEVEL 3	Mechanical Technician	Piping Technician **Piping Fabrication, Installation and Testing Supervision (TP-029-3:2014) (25-09-2014)**	Shipbuilding E & I Technician
LEVEL 2	NJT	Piping Fitter **Piping Fabrication, Installation and Testing TP-029-2:2014 (25-09-2014)**	Shipbuilding E & I Installer **Marine Electrical Installation, Operation and Maintenance (TP-035-2:2014) (16-12-2014)**
LEVEL 1	NJT	NJT	Hull & Outfitting Helper

Table 4.44: Existing NOSS map with C303 OS (1/3)

SECTION	**(C) MANUFACTURING**		
DIVISION	**(30) MANUFACTURE OF OTHER TRANSPORT EQUIPMENT**		
GROUP	**(303) MANUFACTURE OF AIR AND SPACECRAFT AND RELATED MACHINERY**		
AREA	**AIRCRAFT PART SHEET METAL ENGINEERING**	**AIRCRAFT COMPOSITES PART LAMINATING**	**AIRCRAFT PART MACHINING**
LEVEL 8	NJT	NJT	NJT
LEVEL 7	Head of Sheet Metal	Head of Laminating	Head of Machining
LEVEL 6	Sheet Metal Specialist	Laminating Specialist	Machining Specialist
LEVEL 5	Sheet Metal Engineer	Laminating Engineer **Composite Manufacturing Management (MT-010-5:2013) (30-12-2013)**	Machining Engineer
LEVEL 4	Senior Sheet Metal Technician	Senior Laminating Technician **Composite Manufacturing**	Senior Machinist

SECTION	(C) MANUFACTURING		
DIVISION	(30) MANUFACTURE OF OTHER TRANSPORT EQUIPMENT		
GROUP	(303) MANUFACTURE OF AIR AND SPACECRAFT AND RELATED MACHINERY		
AREA	AIRCRAFT PART SHEET METAL ENGINEERING	AIRCRAFT COMPOSITES PART LAMINATING	AIRCRAFT PART MACHINING
		Administration (MT-010-4:2013) (30-12-2013)	
LEVEL 3	Sheet Metal Technician	Laminating Technician **Composite Manufacturing Operation (Aerospace) (MT-010-3:2013) (30-12-2013)**	Machinist
LEVEL 2	NJT	NJT	NJT
LEVEL 1	NJT	NJT	NJT

Table 4.45: Existing NOSS map with C303 OS (2/3)

SECTION	(C) MANUFACTURING		
DIVISION	(30) MANUFACTURE OF OTHER TRANSPORT EQUIPMENT		
GROUP	(303) MANUFACTURE OF AIR AND SPACECRAFT AND RELATED MACHINERY		
AREA	AIRCRAFT PART MECHANICAL ASSEMBLY / FINAL ASSEMBLY	AIRCRAFT PART SURFACE TREATMENT	AIRCRAFT PART TESTING (NDT)
LEVEL 8	NJT	NJT	NJT
LEVEL 7	Head of Production	Head of Plant	Head of Quality
LEVEL 6	Senior Production Engineer	Senior Surface Treatment Specialist	Senior NDT Engineer
LEVEL 5	Production Engineer	Surface Treatment Specialist	NDT Engineer
LEVEL 4	Production Supervisor	Senior Surface Treatment Technician	Senior NDT Technician
LEVEL 3	Senior Production Technician **Aircraft Component**	Surface Treatment Technician	NDT Technician **Aerospace Ultrasonic Tester (UT)**

SECTION	(C) MANUFACTURING		
DIVISION	(30) MANUFACTURE OF OTHER TRANSPORT EQUIPMENT		
GROUP	(303) MANUFACTURE OF AIR AND SPACECRAFT AND RELATED MACHINERY		
AREA	AIRCRAFT PART MECHANICAL ASSEMBLY / FINAL ASSEMBLY	AIRCRAFT PART SURFACE TREATMENT	AIRCRAFT PART TESTING (NDT)
	and Structure Assembly (C282-002-3:2019) (30-01-2019)		**(MC-062-3) (25-10-10)**
LEVEL 2	Production Technician **Aircraft Component Assembly (C282-002-2:2019) (30-01-2019)**	NJT	NJT
LEVEL 1	NJT	NJT	NJT

Table 4.46: Existing NOSS map with C303 OS (3/3)

SECTION	(C) MANUFACTURING	
DIVISION	(30) MANUFACTURE OF OTHER TRANSPORT EQUIPMENT	
GROUP	(303) MANUFACTURE OF AIR AND SPACECRAFT AND RELATED MACHINERY	
AREA	AIRCRAFT PART PAINTING	AIRCRAFT PART QUALITY INSPECTION
LEVEL 8	NJT	NJT
LEVEL 7	Head of Painting	Head of Quality
LEVEL 6	Painting Specialist	Senior Quality Inspection Engineer
LEVEL 5	Painting Engineer	Quality Inspection Engineer **Aerospace Manufacturing Quality Assurance (QA) Administration (C282-003-5:2020) (13-11-2020)**
LEVEL 4	Painter Supervisor	Supervisor **Aerospace Manufacturing Quality Assurance (QA) Management (C282-003-4:2020) (13-11-2020)**

SECTION	(C) MANUFACTURING	
DIVISION	(30) MANUFACTURE OF OTHER TRANSPORT EQUIPMENT	
GROUP	(303) MANUFACTURE OF AIR AND SPACECRAFT AND RELATED MACHINERY	
AREA	AIRCRAFT PART PAINTING	AIRCRAFT PART QUALITY INSPECTION
LEVEL 3	Senior Painter	Quality Inspector
LEVEL 2	Painter	NJT
LEVEL 1	NJT	NJT

Table 4.47: Existing NOSS map with C309 OS (1/2)

SECTION	(C) MANUFACTURING	
DIVISION	(30) MANUFACTURE OF OTHER TRANSPORT EQUIPMENT	
GROUP	(309) MANUFACTURE OF TRANSPORT EQUIPMENT N.E.C.	
AREA	DESIGN AND DEVELOPMENT	PROCESS ENGINEERING
LEVEL 8	NJT	NJT
LEVEL 7	NJT	NJT
LEVEL 6	Head of Design & Development *	Head of Process Engineering
LEVEL 5	Electrical / Mechanical Engineer** **Remotely Operated Vehicle (ROV) Design and Construction Management (C309-001-5:2019) (30-01-2019)**	Electrical / Mechanical Engineer
LEVEL 4	Technical Assistant* **Remotely Operated Vehicle (ROV) Design and Construction (C309-001-4:2019) (30-01-2019)**	Supervisor
LEVEL 3	Drafter**	Line Leader **Motorcycle Painting Operation (TP-010-3:2013) (30-12-2013)** **Motorcycle Fabrication (TP-500-3:2013) (30-12-2013)**
LEVEL 2	NJT	Zone Leader

SECTION	(C) MANUFACTURING	
DIVISION	(30) MANUFACTURE OF OTHER TRANSPORT EQUIPMENT	
GROUP	(309) MANUFACTURE OF TRANSPORT EQUIPMENT N.E.C.	
AREA	DESIGN AND DEVELOPMENT	PROCESS ENGINEERING
		Senior Motorcycle Plating Operator (TP-511-2) (25-10-10)
LEVEL 1	NJT	Operator **Motorcycle Plating Operator (TP-511-1) (25-10-10)**

Table 4.48: Existing NOSS map with C309 OS (2/2)

SECTION	(C) MANUFACTURING	
DIVISION	(30) MANUFACTURE OF OTHER TRANSPORT EQUIPMENT	
GROUP	(309) MANUFACTURE OF TRANSPORT EQUIPMENT N.E.C.	
AREA	PRODUCT VALIDATION	TRANSPORT EQUIPMENT PRODUCTION & ASSEMBLY
LEVEL 8	NJT	NJT
LEVEL 7	NJT	NJT
LEVEL 6	Head of Product Validation	Head of Transport Equipment Production & Assembly
LEVEL 5	Electrical / Mechanical Engineer	Electrical / Mechanical Engineer **Automotive Production Management (TP-410-5:2016) (04-02-2016)**
LEVEL 4	Supervisor	Supervisor **Automotive Assembly Control (TP-410-4:2016) (04-02-2016)**
LEVEL 3	Inspector	Line Leader **Motorcycle Assembly Operation (TP-510- 3:2013) (30-12-2013)** **Motorcycle Painting Operation (TP-010-3:2013)**

SECTION	(C) MANUFACTURING	
DIVISION	(30) MANUFACTURE OF OTHER TRANSPORT EQUIPMENT	
GROUP	(309) MANUFACTURE OF TRANSPORT EQUIPMENT N.E.C.	
AREA	PRODUCT VALIDATION	TRANSPORT EQUIPMENT PRODUCTION & ASSEMBLY
		(30-12-2013) **Motorcycle Fabrication** **(TP-500- 3:2013)** **(30-12-2013)**
LEVEL 2	No Job Title	Zone Leader **Motorcycle Engine Assembling Senior Operator** **(TP-512-2)** **(25-10-10)**
LEVEL 1	No Job Title	Operator **Motorcycle Engine Assembling Operator** **(TP-512-1)** **(25-10-10)**

Currently, there are 31 NOSS that has been developed that are categorized under C30 group, while 9 NOSS that has been developed that are not categorized under the C30 group but relevant to C30 group, related to C303 as shown in Table 4.45 and 4.46. According to the industry experts, these 9 developed NOSS are best categorized under the C30 group.

There are also multiple NOSS that are related to a single job title as shown in the Table 4.42 and Table 4.48. This is due to the developed NOSS is focus to a specific product whereas the job title under the OS is covering the production of all products under the C30 groups. Nevertheless, there is a need to develop the NOSS document for the critical job titles listed in the OS.

4.12 Conclusion

In conclusion, Chapter 4 provides a comprehensive analysis of the occupational structure, responsibilities, and descriptions of various job titles. The findings from the focus group

discussions and survey provide a detailed understanding of the job market and the skills that are in demand. The critical competencies and skills related to IR and technology were also identified, highlighting the importance of digital literacy in today's job market. The presentation of emerging skills highlights the need for continuous professional development to stay ahead in the ever-evolving job market. Overall, the research findings in Chapter 4 provide valuable insights for job seekers, employers, and policy makers, and contribute to the ongoing discourse on the future of work and skill development.

CHAPTER V

DISCUSSION, RECOMMENDATIONS AND CONCLUSION

5.1 Introduction

The objective of this chapter is to provide a comprehensive discussion, recommendations, and conclusion based on the findings of the study on the Occupational Structure (OS) for the Manufacture of Other Transport Equipment sector. This study aimed to establish the OS based on MSIC 2008, by examining job areas, job titles, and relevant competency level, determining Occupational Responsibilities (OR) that outline the main work activities and tasks for each job title, determining Occupational Descriptions (OD) for each job title in demand based on the proposed OS, identifying critical job titles in the Manufacture of Other Transport Equipment section, and proposing job titles related to the current national technology and industrial revolution for the Manufacture of Other Transport Equipment section.

To achieve these objectives, a mixed-methods research approach was employed, using multiple data collection techniques, including document review, focus group discussion, brainstorming, and survey methods. The findings of this study will provide insights into the occupational structure, responsibilities, and descriptions for the Manufacture of Other Transport Equipment sector, which can be used to guide workforce planning, training and development, recruitment and retention, and other human resource management practices.

This chapter will present a discussion of the study's key findings, including the establishment of the occupational structure, responsibilities, and descriptions for each

group in the Manufacture of Other Transport Equipment sector. The chapter will also provide recommendations based on the study's findings, including the identification of critical job titles and proposed job titles related to the current national technology and industrial revolution. Finally, this chapter will present conclusions and contributions of the study to the field of workforce development in the Manufacture of Other Transport Equipment sector.

5.2 Discussion

The discussion in this section will be organized according to the research questions, with each question being addressed separately.

5.2.1 Objective 1: To establish Occupational Structure (OS) for the Manufacture of Other Transport Equipment sector based on MSIC 2008 by examine job areas, job titles and relevant competency level

The occupation structure of an industry is a critical aspect that determines the efficiency and competitiveness of the industry. Understanding the various job areas, titles, and levels within an industry provides valuable insight into the skills and competencies required to perform these jobs, and the level of expertise required for different roles. Occupational Structure (OS) for each group of C301, C302, C303, C304, and C309 has been successfully developed through Focus Group Discussions (FGD) with industry experts representative from every industry related to C30 group. The study has identified a total of 44 total job areas and 200 job titles in the Manufacture of Other Transport Equipment sector across all five groups (as shown in Figure 5.1): C301 (11 job areas;46 job titles), C302 (8 job areas; 33 job titles), C303 (11 job areas; 54 job titles), C304 (10 job areas; 47 job titles), and C309 (4 job areas; 20 job titles).

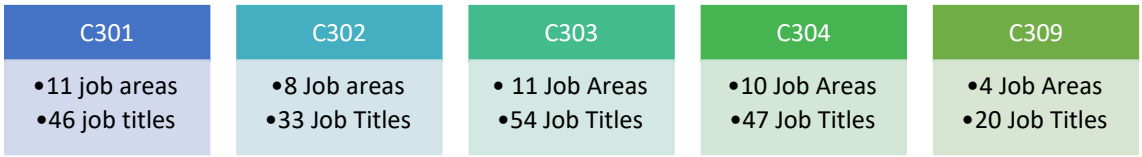

Figure 5.1: Number of Job Areas and Job Titles for C30 Group

The number of job areas and titles identified for each group reflects the unique nature of the Manufacturing of Other Transport Equipment sector and the specific skill sets required for each job area. The primary job areas within this sector include design and development, process engineering, product validation, and transport equipment production and assembly. In summary, there is a wide range of job opportunities in the manufacturing of other transport equipment, with various job levels and areas of expertise to explore.

The understanding of occupational structure is important policy makers as it provides insights and helps to understand composition of the workforce and for formulating future plans (Godora,2021). This information is also valuable for industry players and decision makers who are looking to improve their competitiveness and meet the changing demands of the market.

5.2.2 Objective 2: To determine Occupational Responsibilities (OR) that outline the main work activities and tasks for each job titles

The responsibilities of a job within an industry play a crucial role in determining the efficiency and competitiveness of the industry. Understanding the tasks, duties, and responsibilities associated with different jobs provides valuable insights into the skills and competencies required for these jobs.

The OR developed for 200 job titles described in Table 4.19 until Table 4.34 will serve as the future reference for the development of the National Occupational Skills Standard (NOSS) for C30 Manufacture of Other Transport Equipment occupation under the MSIC 2008, The results of this analysis provide a comprehensive overview of the occupational responsibilities of the industry and provide insights into the skills and competencies required for different roles. This information is valuable for industry players and decision makers who are looking to improve their competitiveness and meet the changing demands of the market, as well as for job seekers who want to understand the requirements for different positions within the industry (Talent Corp, 2022).

5.2.3 Objective 3: To determine Occupational Descriptions (OD) for each job title in demand based on the proposed OS

The occupational description section provides a detailed overview of the responsibilities, knowledge, skills, and attributes required for a job in demand in the manufacturing of other transport equipment. The aim of OD is to give individuals and organizations a clear understanding of the role and its requirements, which will aid in evaluating the suitability of potential candidates. It is also helpful for individuals seeking to enter this field, as it highlights the necessary knowledge, experience, and competencies for success. With a comprehensive understanding of the job, the occupational description will ensure that the right person is matched with the right position, leading to improved job satisfaction, performance, and success for both the individual and the organization.

There are a total of 116 overall jobs in demand under the Manufacture of Other Transport Equipment industries managed to be listed based on the survey result (C301 – 23 jobs in demand, C302 – 22 jobs in demand, C303 – 33 jobs in demand, C304 – 20 jobs in demand and C309 – 18 jobs in demand). Jobs in demand data showed that there is a relatively high demand for skilled workers in the manufacturing of other transport equipment industry. This finding indicates that there may be a shortage of qualified candidates to fill these roles, which could lead to increased competition among employers for top talent. Additionally, it may suggest that there are opportunities for individuals interested in pursuing a career in this field, as there are a significant number of jobs currently available. Overall, this information could be useful for both employers and job seekers to understand the current state of the job market in this industry and make informed decisions based on the demand for specific job roles.

The shortage of jobs in demand in the industries is due to several factors, including the lack of experience among candidates, high salary expectations, a lack of knowledge, skills, and competency, high turnover, a lack of local resources, a mismatch of qualification and education, rapid technological advancements, poor career growth, and the post-pandemic effect (Talent Corp, 2022; Ibrahim and Nashir, 2022). To address these challenges, companies and academic institutions need to work together to provide practical experience, competitive compensation, relevant skills training, employee retention strategies, and career growth opportunities (Valiente, Zancajo, and Jacokis,

2020). The competencies in demand for knowledge, such as project management, engineering design, production, fabrication, assembly, repair, machining, quality and safety management, and industrial automation engineering, highlight the skills required for candidates seeking to enter the industry.

Knowing what competency are important in an industry can help with planning and improving the industry. Understanding the skills, knowledge and abilities that are in high demand within the industry provides valuable insights into the talent needs of the industry.

5.2.4 Objective 4: To identify the critical jobs titles in the Manufacture of Other Transport Equipment section

Identifying critical job titles within an industry is important as these positions play a crucial role in determining the success and competitiveness of the industry. Understanding the skills and competencies required for critical jobs can provide valuable insights into the industry's talent needs and help to inform workforce development initiatives. Out of the 121 jobs in demand identified, 55 are identified as critical jobs that are currently experiencing a shortage of supply. Some of these critical jobs require completion in foreign countries.

To address the talent shortage in the C30 industry, companies need to focus on providing practical experience, competitive compensation, relevant skills training, and career growth opportunities for their employees. This will help to improve employee retention and attract new talent. In terms of specific competencies, project management skills are essential for production managers, while engineering design skills are critical for engineers. Skilled workers such as machinists and technicians require specialized skills in machining and special tooling, as well as knowledge of quality and safety management.

The rapid advancement of new technologies in the C30 industry requires a focus on developing skills in industrial automation engineering, such as knowledge of robotics, artificial intelligence, and other advanced technologies.

Overall, to address the talent shortage in the C30 industry, companies need to

focus on providing competitive compensation, relevant skills training, and career growth opportunities for employees, while also developing specific competencies in areas such as project management, engineering design, industrial automation engineering, and quality and safety management.

The research findings list nine important skills that are in demand for individuals working in the manufacturing of other transport equipment industries. These skills include communication (both interpersonal and written), critical thinking, problem-solving, an agile mindset, leadership, time management, aptitude for technology and equipment, and intrapreneurship. These skills are essential for success in the manufacturing of other transport equipment industries and are highly valued by employers. Individuals who possess these skills are more likely to excel in their roles and contribute to the success of their organizations.

The attributes or attitudes that are important in the industry of other transport equipment manufacturing include teamwork, multi-tasking or flexibility, dependability, work ethic, professionalism, self-management or independence, self-learning, agility, ego-management, and career management. These attributes are important for performing the job in the industry of manufacturing other transport equipment.

This above information will give us a better understanding of the talent the industry needs. This is useful for people who work in the industry and want to be more competitive, and for people looking for jobs in the industry to know what knowledge, skills and attributes that they should have. This information is valuable for industry players and decision makers who are looking to improve their competitiveness (UNIDO, 2022) and meet the changing demands of the market, as well as for job seekers who want to understand the requirements for critical positions within the industry.

5.2.5 Objective 5: To propose job titles related to the industrial revolution technology for the Manufacture of Other Transport Equipment section

The manufacturing of other transport equipment is an important sector of the economy that is undergoing significant changes due to advancements in industrial revolution technology. From the research findings, 193 job titles are identified related to industrial

revolution technology. The result from the survey also showed that majority of the respondents (86%) agreed that the industrial revolution will impact directly to the industries as they are very related to manufacturing. Industrial revolution provides better lead time with lower cost, while improve efficiencies, less manpower needed, less human error, improve product quality, simulation made easier, prototype more accurate, and improve productivity.

However, majority of them also agreed that the technology advancement may affect their job in the industries in future (66%). This may be due to several reasons such as replacing or reducing manpower with robotics, cost savings, difficulties to find a skilled and competent worker, and difficulties in coping with new technologies.

Based on FGD and survey findings analysis it could be clearly noted that digitalisation, and the impact on production processes, is acknowledged as a key issue for manufacturing companies. However, the actual progress in this area seems to vary a lot between companies. While some respondent explained significant progress related to digitalisation in their companies, such as automation of activities and digital monitoring of production, other companies have not yet been able to upgrade their production environments.

These findings shed light on the importance of digital literacy and the impact of technology on industrial revolutions, and provide valuable insights for job seekers, employers, and policy makers. This section also contributes to the ongoing discourse on the future of work and the role of technology in industrial relations and help inform training and professional development programs aimed at promoting the growth and competitiveness of the workforce., exploring the implications of these findings for the job market and the workforce.

The discussion on emerging skills is critical in understanding the rapidly evolving landscape of the manufacturing of other transport equipment. With technology playing an increasingly larger role in manufacturing (UNIDO,2022), it's important for individuals and organizations to stay ahead of the curve by continuously acquiring and refining these emerging skills. The findings related to emerging skills will be valuable for individuals seeking to enter the manufacturing of other transport equipment, as well as for

organizations looking to upskill their workforce and remain competitive in the market. By highlighting the key skills in demand, this section will help to ensure that individuals and organizations have the necessary knowledge and competencies to succeed in this rapidly changing industry. Staying up-to-date with these emerging skills will help individuals and organizations remain competitive in the rapidly evolving landscape of the manufacturing of other transport equipment.

5.3 Recommendations

The Occupational Framework (OF) is a comprehensive report designed to inform the industry about the necessary human capital development requirements for a specific sector. The ultimate goal of the OF is to serve as a reference for the industry's future plans to develop skilled workers and certify Malaysians in sector C30, with the aim of enhancing the quality of the local sector and ultimately boosting Malaysia's global competitiveness.

The Occupational Structure (OS) was created by incorporating feedback from focus group discussions and it highlights the various job areas, job titles, and career paths based on competency levels. During the development of the OS, a number of challenges were identified for C30 industries in Malaysia. Taking these findings into consideration, recommendations have been proposed for C30 industries.

a) Develop National Occupational Skills Standards (NOSS): Based on the research findings, it is recommended that the existing 40 NOSS for the 28 job titles in the C30 sector be reviewed and updated, and that new NOSS be developed for the remaining 172 job titles that currently have no NOSS. This will not only ensure a standardized set of skills, knowledge and competencies required for each occupation within the sector but will also be helpful for universities and TVET training institutions to review their existing curriculum and align it with industry needs.
b) Add qualification requirements to Job Descriptions: Given the unique nature of the C30 manufacturing of other transport industry, it is recommended that qualification requirements be added to job descriptions where appropriate. This will help to ensure that employers have a clear understanding of the

qualifications and skills required for each role, and that job seekers are aware of the qualifications and skills they need to possess to be considered for these roles.

c) Timeframes for future research on the creation of an Organisational Framework (OF) for the C30 sector should be extended to ensure that current data is reported. This will help to ensure that the OF remains relevant and up-to-date, and that the skills and competencies required for each occupation within the sector are reflective of current industry needs. A time frame of one year may be appropriate for future research. This duration may allow sufficient time to gather and analyse relevant literature and data sources, conduct surveys or interviews with industry experts, and validate the findings.

5.4 Limitation

One of the primary limitations of this research is the short time frame for conducting a thorough literature review and data collection on the C30 Occupational Framework. The framework covers five distinct groups, including shipbuilding, manufacture of railway and rolling stock, manufacture of air and spacecraft, manufacture of military vehicles, and manufacture of other transport n.e.c. Each group has its own set of competencies and skills, making it challenging to conduct a comprehensive analysis in a limited amount of time.

Furthermore, obtaining up-to-date data on industry growth, employment trends, and other relevant factors can also be challenging, particularly given the constantly evolving nature of the industry. As a result, this data for this research needs to be updated a few times in order to provide a complete and accurate picture of the current state of each group within the C30 division.

In summary, while this research provides valuable insights into the potential benefits of the C30 Occupational Framework, its limitations include the short time frame for literature review and data collection, the complexity of the framework's five distinct groups, and the rapidly evolving nature of the industry. Future research with a more extended time frame and more extensive data collection may be necessary to provide a more complete and accurate understanding of the competencies and skills required for

each group within the C30 division.

5.5 Conclusion

The research findings indicate that the objectives of this study have been accomplished. The OS for C30 Manufacture of Other Equipment industry has identified 44 job areas and 200 job titles that possess distinct occupational structures, duties, and descriptions. These job titles are significant for the industry's transformation and essential job areas. The study also identifies the emerging skills and competencies required to support the growth of the industry. These findings will serve as a foundation for the development of the National Occupational Skills Standard (NOSS) document. The existing NOSS should be reviewed and the NOSS for critical job and job in demand to be develop.

The C30 Occupational Framework can also provide valuable insights for stakeholders on the current and future trends in the C30 industries. This includes information on emerging technologies, new business models, and changing customer needs. This information can help stakeholders to stay ahead of the curve and to anticipate and respond to changes in the industry.

Furthermore, the C30 Occupational Framework can help stakeholders to identify and address gaps and inefficiencies in the industry. For example, it can highlight areas where there is a shortage of skilled workers or where there are barriers to entry for new workers. This information can be used to develop targeted initiatives and policies to address these issues.

Additionally, the C30 Occupational Framework can be used to support workforce planning and development. It can provide insights on the supply and demand for various occupations within the C30 industries, which can inform decisions around hiring, training, and succession planning.

Finally, the C30 Occupational Framework can provide a common language and understanding among stakeholders, which can facilitate collaboration and innovation within the industry. In addition, the framework can provide valuable insights on industry trends and help identify gaps and inefficiencies. It can also support workforce planning and development, and facilitate collaboration and innovation among stakeholders.

Overall, the C30 Occupational Framework has the potential to bring numerous benefits to the industry and its stakeholders.

REFERENCES

Aerospace Malaysia Innovation Centre (AMIC). (November 25, 2022). Retrieved from https://amic.my/about-us/

Army Technology. (2021). Deftech AV8 Gempita 8x8 armoured wheeled vehicle. Retrieved from https://www.army-technology.com/projects/deftech-av8-multi-role-wheeled-armoured-vehicle/

ASEAN Statistical Yearbook (2022). Vol. 18/December 2022 Retrieved from https://www.aseanstats.org/wp-content/uploads/2023/02/ASYB-2022_0223.pdf

Association of Marine Industries of Malaysia (AMIM). (November 25, 2022). Retrieved from https://www.amim.org.my/about-us/

Bernama. (2021, March 20). ECRL project 24% completed, on track for full completion in 2027 - MRL. Malay Mail. Retrieved from https://www.malaymail.com/news/malaysia/2021/03/20/ecrl-project-24-completed-on-track-for-full-completion-in-2027-mrl/1952018

Board of Engineers Malaysia (BEM). (November 25, 2022). Retrieved from http://bem.org.my/web/guest/history

Centers For Disease Control And Prevention (CDC). (2018). Data Collection Methods for Evaluation: Document Review. Retrieved from https://www.cdc.gov/healthyyouth/evaluation/pdf/brief18.pdf

Centre for Instructor and Advanced Skill Training (CIAST). (2021b). Taklimat Pembangunan Soalan Latihan Kemahiran. Retrieved from https://www.ciast.gov.my/wp-content/uploads/2021/PPL/soalan/NOTA%20SLAID%20SOlALAN%20LATIHAN%20KEMAHIRAN%20JUN%202021%20(LAMAN%20WEB).pdf

China Daily. (2018, September 11). CRRC, Eversendai set up train plant in Malaysia. Retrieved from http://www.chinadaily.com.cn/a/201809/11/WS5b97c8e7a31033b4f4657d10.html

Creswell, J. W., & Creswell, J. D. (2017). Research design: Qualitative, quantitative, and mixed methods approaches. Sage publications.

Department of Skill Development (DSD) (2023). Pertauliahan dan Verifikasi. Retrieve from https://www.dsd.gov.my/index.php/perkhidmatan/sistem-latihan-pusat-bertauliah-slapb/pentauliahan-verifikasi

Department of Skill Development (DSD). (November 25, 2022). retrieved from https://www.dsd.gov.my/index.php/perkhidmatan/artikulasi/123-perkhidmatan/452-core-abilities

Department of Skills Development (DSD). (2020). National Occupational Skills Standards (NOSS). Retrieved from https://www.dsd.gov.my/index.php/en/service/accredited-centre-training-system/registration-certification/9-explore/1720-noss-eng-new

Department of Statistic Malaysia (DoSM). (February 7, 2023). Monthly Manufacturing Statistics. December 2022 Retrieved at https://newss.statistics.gov.my/newss-portalx/ep/epDownloadContentSearch.seam?cid=92714

Employment Statistics Third Quarter (2022). Retrieved from https://www.dosm.gov.my/v1/index.php?r=column/cthemeByCat&cat=439&bul_id=RXNQSUZkQTAyZXFIemhON3F3V0pzUT09&menu_id=Tm8zcnRjdVRNWWlpWjRlbmtlaDk1UT09

Department of Statistic Malaysia (DoSM). (November 9, 2022a). Employment Statistics Third Quarter 2022. Retrieved from https://www.dosm.gov.my/v1/index.php?r=column/cthemeByCat&cat=439&bul_id=RXNQSUZkQTAyZXFIemhON3F3V0pzUT09&menu_id=Tm8zcnRjdVRNWWlpWjRlbmtlaDk1UT09

Department of Statistics Malaysia (DoSM) (2022b). Monthly Manufacturing Statistics Malaysia: December 2022. Retrieved from https://newss.statistics.gov.my/newss-portalx/ep/epFreeDownloadContentSearch.seam?cid=125519

Department of Statistics Malaysia (DoSM) (2022c). Index Of Industrial Production (IPI):

December 2022. Retrieved from https://newss.statistics.gov.my/newss-portalx/ep/epFreeDownloadContentSearch.seam?cid=125555

Ferber, R., & Verdoorn, P. J. (1962). Research Methods in Economics and Business. New York: The Macmillan Company.

Godora, R. (2021). An Analysis of Occupational Structure: A Case Study of Panchkula District. Retrieved from https://www.researchgate.net/publication/353377986_An_Analysis_of_Occupational_Structure_A_Case_Study_of_Panchkula_District

Ibrahim, A., & Nashir, I. M. (2022). Demand-supply Mismatch in TVET Academic Programmes: What Is It and What Should It Be? Journal of Technical Education and Training, 14(2), 177-189.

Institut Latihan Perindustrian (ILP) Kuala Lumpur. (November 25, 2022). Retrieved from https://www.ilpkl.gov.my/2015/jabatan-mekanikal

Institute of Labour Market Information and Analysis (ILMIA) (2019). Critical Occupation List (COL); Signaling Jobs That Are In Demand. Retrieved from https://www.ilmia.gov.my/index.php/en/research-publication/publication

International Railway Journal. (2018). Malaysia's rail industry gains momentum. Retrieved from https://www.railjournal.com/regions/asia/malaysias-rail-industry-gains-momentum/

INTRAC. (2017). Focus Group Discussion (FGD). Retrieved from https://www.intrac.org/wpcms/wp-content/uploads/2017/01/Focus-group-discussions.pdf

Malaysia Board of Technologists (MBOT). (November 25, 2022). Retrieved from https://www.mbot.org.my/about-us/mbot/

Malaysia External Trade Development Corporation (MATRADE). (2021). Aerospace. Retrieved from https://www.matrade.gov.my/en/malaysian-exporters/success-stories/aerospace

Malaysia Productivity Corporation (MPC) (November 25, 2022). Retrieved from https://www.mpc.gov.my/background

Malaysian Industrial Development Authority (MIDA). (2020). Bicycle Industry. Retrieved from https://www.mida.gov.my/home/bicycle-industry/posts/

Malaysian Industry-Government Group for High Technology (MIGHT). (2015). Malaysian Aerospace Industry Blueprint 2030 (MAIB2030). Retrieved from https://www.researchgate.net/publication/277013834_Malaysian_Aerospace_Industry_Blueprint_2030

Malaysian Industry-Government Group for High Technology (MIGHT). (2014). Malaysian Rail Supporting Industry Roadmap 2030. Retrieve from https://www.mida.gov.my/wp-content/uploads/2020/07/Malaysian%20Rail%20Supporting%20Industry%20Roadmap%202030.pdf

Malaysian Investment Development Authority (MIDA). (2021). 12 Oct 2021 Manufacturing most affected industrial sector hit by Covid-19: MITI. Retrieved from https://www.mida.gov.my/mida-news/manufacturing-most-affected-industrial-sector-hit-by-covid-19-miti/

Miller, K. W., Wilder, L. B., Stillman, F. A., & Becker, D. M. (1997). The feasibility of a street-intercept survey method in an African-American community. American journal of public health, 87(4), 655-658.

MIDA. 2021. Powering Resilience. Malaysia Investment Performance Report. 2022. Retrieved from https://www.mida.gov.my/wp-content/uploads/2022/03/MIDA-IPR-2021-1.pdf

Malaysian Investment Development Authority (MIDA) (2022). Malaysia Investment Performance Report 2021. Retrieve from https://www.mida.gov.my/wp-content/uploads/2022/03/MIDA-IPR-2021-1.pdf

Malaysian Investment Development Authority (MIDA). (2020a). Guideline On Application for Manufacturing Licence. January 28, 2019. Retrieved from

https://www.mida.gov.my/wp-content/uploads/2020/07/20190218151715_GD_ML.pdf

Malaysian Investment Development Authority (MIDA). (2020b). Malaysian Industrial Statistics 2019. Retrieved from https://www.mida.gov.my/home/9097/news/malaysian-industrial-statistics-2019/

Malik, M. A., & Said, S. M. (2018). Transport equipment: A key contributor to Malaysia's manufacturing industry. Journal of Advanced Manufacturing Technology, 12(2), 63-75. doi: 10.18517/jamt/2018/12.2.010.

MARA Skills Institutes and GIATMARA Centres (November 25, 2022). Retrieved from https://giatmara.edu.my/senarai-kursus/

Marine Digital (2023a). 5 Benefits Of Digital Twin In The Shipping Industry. Retrieved from https://marine-digital.com/article_5benefits_of_digital_twin

Marine Digital (2023b). Technologies in the Shipping Industry: main technological trends in Shipbuilding. Retrieved from https://marine-digital.com/article_technologies_in_shipbuilding

Mazali, T. (2018). From industry 4.0 to society 4.0, there and back. Ai & Society, 33(3), 405-411.

Mazlan, N. H., Hanafi, N. F., Mustafa, N. I., & A. Jalil, M. E. (2020). Industry 4.0 technologies adoption in Malaysian automotive industry: A review. Journal of Advanced Manufacturing Technology, 14(2), 1-11.

Menhat, M., Zaideen, I. M. M., Yusuf, Y., Salleh, N. H. M., Zamri, M. A., & Jeevan, J. (2021). The impact of Covid-19 pandemic: A review on maritime sectors in Malaysia. Ocean & coastal management, 209, 105638.

Ministry of International Trade and Industry (MITI) (2018a). Industry 4WRD: National Policy On Industry 4.0. Retrieved from https://www.miti.gov.my/miti/resources/National%20Policy%20on%20Industry%204.0/Industry4WRD_Final.pdf

Ministry of International Trade and Industry (MITI) (2018b). Seminar On Understanding The Impact Of Smart Manufacturing In Policy And Regulatory Approaches 25 & 26 September 2018, Pulau Pinang, Malaysia. https://www.miti.gov.my/index.php/pages/view/industry4.0

Ministry of International Trade and Industry (MITI). (2015). Overview Of The Malaysian SBSR Industry. Retrieve from https://www.oecd.org/sti/ind/Item%203.6a%20Aida%20-%20Malaysia%20OVERVIEW%20OF%20THE%20MALAYSIAN%20SBSR%20INDUSTRY.pdf

Ministry of International Trade and Industry (MITI). (2016). Aerospace Industry Blueprint 2030. Retrieved from https://www.miti.gov.my/miti/resources/Aerospace%20Industry%20Blueprint%202030%20(Eng).pdf

Ministry of International Trade and Industry (MITI). (2019). Malaysia Automotive Policy 2019-2030. Retrieved from https://www.miti.gov.my/miti/resources/Automotive%20Policy%202019-2030%20(English).pdf

Ministry of International Trade and Industry (MITI). (2020). National Automotive Policy 2020. Retrieved from https://www.miti.gov.my/miti/resources/National%20Automotive%20Policy%202020%20(English).pdf

Ministry of International Trade and Industry (MITI). (2021). Shipbuilding and Ship Repair Industry in Malaysia. Retrieved from https://www.miti.gov.my/miti/resources/SABAH%20WORKSHOP-Shipbuilding.pdf

Ministry of International Trade and Industry (MITI). (2022). MITI Report 2021. Retrieved from https://www.miti.gov.my/miti/resources/MITI%20Report/MITI_Report_2021_EN.pdf

Motorcycle and Scooter Assemblers and Distributors Association of Malaysia (MASAAM). (November 25, 2022). Retrieved from https://www.masaam.com/organization/

Mumtaz, A. M., Ting, H., Ramayah, T., Chuah, F., & Cheah, J. H. (2017). Editorial,'a review of the methodological misconceptions and guidelines related to the application of structural equation modelling: a Malaysian scenario'. Journal of applied structural equation modeling, 1(1), 1-13.

Narayanasamy S. (2021). Realising the 12th Malaysia Plan: Moving Malaysia up the Manufacturing Ecosystem. Retrieved from https://www.linkedin.com/in/sakthivel-narayanasamy-2b1900118/recent-activity/posts/

National Occupational Skills Standard (NOSS). (November 25, 2022). Retrieved from https://www.skillsmalaysia.gov.my/index.php/en/service/noss

National Skills Development Act 652 (November 25, 2022). retrieved from https://www.ilo.org/dyn/natlex/docs/ELECTRONIC/95630/112654/F-998717512/MYS95630.pdf

Nazery, K. (2017). Upskilling the shipbuilding industry. Retrieve from https://themalaysianreserve.com/2017/04/03/upskilling-the-shipbuilding-industry/

Ng, S. Y. (2020). Digital transformation of manufacturing SMEs in Malaysia. Journal of Industrial Engineering and Management Science, 3(1), 9-16.

Noury, P., Hayman, B., McGeorge, D., & Weitzenbock, J. (2002). Lightweight construction for advanced shipbuilding-recent development. Proceedings of the 37th WEGEMT summer school, 11-15.

O. Nyumba, T., Wilson, K., Derrick, C. J., & Mukherjee, N. (2018). The use of focus group discussion methodology: Insights from two decades of application in conservation. Methods in Ecology and evolution, 9(1), 20-32.

Rodrigue, J. P. (2020). The Geography of Transport Systems (5th ed.). Routledge. https://doi.org/10.4324/9780429346323

Roscoe, J. T. (1975). Fundamental Research Statistics for The Behavioural Sciences (Second ed.). New York: Holt Rinehart and Winston.

Rungskunroch, P., Kaewunruen, S., & Shen, Z. J. (2019). An improvement on the end-of-life of high-speed rail rolling stocks considering CFRP composite material replacement. Frontiers in Built Environment, 5, 89.

Schimek, R. S. (2016). IoT case studies: companies leading the connected economy. American International Group, 1-16.

Science & Technology Research Institute for Defence (STRIDE). (November 25, 2022). Retrieved from https://www.stride.gov.my/v3/en/frequently-asked-question-faq

SIRIM Berhad (November 25, 2022). Retrieved from https://www.sirim.my/about-us/innovate-as-partner

Statista. (January 20, 2023). Retrieved from https://www.statista.com/outlook/io/manufacturing/manufacture-of-other-transport-equipment/

Talent Corp Group of Companies (TalentCorp) (2022). Critical Occupation List retrieved at https://www.talentcorp.com.my/clients/TalentCorp_2016_7A6571AE-D9D0-4175-B35D-99EC514F2D24/contentms/img/Documents/COL%202020-2021_Technical%20Report_FINAL.pdf

Tan, K. H. (2019). The Future of Manufacturing in Malaysia. In The Future of Manufacturing in ASEAN (pp. 39-61). Springer, Cham.

Technical and Vocational Education and Training (TVET) MARA. (November 25, 2022). Retrieved from https://www.tvetmara.edu.my/index.php

Technological Association Malaysia (TAM). (November 25, 2022). Retrieved from https://www.tam.org.my/about-us/

The Edge Malaysia. (2022). Cover Story: Weathering the perfect storm of supply chain disruptions. January 10, 2022. Retrieved from

https://www.theedgemarkets.com/article/cover-story-weathering-perfect-storm-supply-chain-disruptions

The Institution of Engineers Malaysia (IEM). (November 25, 2022). Retrieved from https://www.myiem.org.my/content/introduction-261.aspx

The Maritime Institute of Malaysia (MIMA). (November 25, 2022). Retrieved from https://www.mima.gov.my/introduction

United Nations Industrial Development Organization (UNIDO). (2022). International Yearbook of Industrial Statistics Edition 2022. Retrieved from https://stat.unido.org/content/publications/-international-yearbook-of-industrial-statistics-2022;jsessionid=6115678B9C48E2B7F35665E82FD74101

United Nations Industrial Development Organization (UNIDO). (2023) Statistic Data Portal. Latest Trends. Retrieved from https://stat.unido.org/latest_trends

Universiti Tun Hussein Onn Malaysia (UTHM). (November 25, 2022). Retrieved from https://fkmp.uthm.edu.my/index.php/home/dean-office

Valiente, O., Zancajo, A., & Jacovkis, J. (2020). The coordination of skill supply and demand in the market model of skill formation: testing the assumptions for the case of Chile. International J. of Lifelong Education, 39(1), 90-103.

Yuan, M., Zhang, H., Long, Y., Shen, R., Wang, B., & Liang, Y. (2019). Economic, energy-saving and carbon-abatement potential forecast of multiproduct pipelines: A case study in China. Journal of Cleaner Production, 211, 1209-1227.

Yap, W. Y. (2021). Factors influencing industry 4.0 adoption in the Malaysian manufacturing sector: A review. Journal of Technology and Operations Management, 16(1), 44-52.

ANNEX 1: QUESTIONNAIRE

OCCUPATIONAL FRAMEWORK SURVEY
C30 MANUFACTURE OF OTHER TRANSPORT EQUIPMENT
DEPARTMENT OF SKILLS DEVELOPMENT
MINISTRY OF HUMAN RESOURCES

Dear Sir / Madam,

I am Dr. Hapidah, currently conducting a study on the occupational framework for the C30 Manufacture of Other Transport Equipment Industry in collaboration with the Department of Skills Development (DSD), Ministry of Human Resources. The research aims to establish the occupational structure for the other transport equipment manufacturing industry by examining job areas, job titles, and levels; determine the occupational description and responsibilities for each job; examine the jobs and competencies in demand; identify critical job titles; and propose emerging job titles related to national technology and industry revolutions.

Please fill in where necessary in the form provided. Any recommendation is deeply appreciated. There is no right or wrong answer in this questionnaire. All information provided will be stored confidentially, and as such your identity if not required. We would like to express our heartfelt appreciation for your assistance in completing the survey. Thank you for your time and cooperation.

Yours sincerely,

Dr. Hapidah Mohamed
Researcher for ADIMEGA Sdn Bhd.

Email: hapidah127@gmail.com

This survey contains **six (6) sections**.

Please attempt all sections and select or fill in where applicable.

A. SURVEY RESPONDENT DETAIL

Type of Manufacture of Other Transport Equipment industries you represent.

Please TICK (/) where appropriate

- ○ Building of Ships and Boat
- ○ Manufacture of Railway and Rolling Stock
- ○ Manufacture of Air and Spacecraft and Related Machinery
- ○ Manufacture of Military Fighting Vehicles
- ○ Manufacture of Transport Equipment n.e.c. *(motorcycle, bicycle, invalid carriage, hand-propelled vehicle, vehicle drawn by animals)*

SECTION 1: DEMOGRAPHY

1. Age:
   Mark only one circle.

   - ○ Below 20 years old
   - ○ 20 – 29 years old
   - ○ 30 – 39 years old
   - ○ 40 – 49 years old
   - ○ Above 50 years old

2. Gender:
   Mark only one circle.

   - ○ Male
   - ○ Female

3. Overall numbers of years in the manufacturing industry:

   Mark only one circle.

   ○ Below 5 years

   ○ 6 – 10 years

   ○ 11 – 20 years

   ○ 21 – 30 years

   ○ Above 30 years

4. Position in the organization:
   Mark only one circle.

   ○ Specialist/Managing Director/General Manager

   ○ Production Engineer/Engineer

   ○ Assistant Engineer/Field Engineer/Assistant Manage

   ○ Others *(please specify)*: _____

5. Location of your organization in Malaysia

   (*Please specify the state only*): _____

SECTION 2: COMPETENCY IN DEMAND

1. What is your area of expertise?

   Mark only one circle.

   ○ Project Management
   ○ Engineering Design & Development
   ○ Production, Fabrication, Installation & Assembly
   ○ Quality & Safety Management
   ○ Testing & Commissioning
   ○ Others (Please specify): _____

2. Provide a demand rating for the job area under Manufacturing of Other Transport Equipment industry. Please TICK (/) where appropriate.

Area of Expertise	**High in Demand**	**In Demand**	**Low in Demand**
Project Management	○	○	○
Engineering Design & Development	○	○	○
Production, Fabrication, Installation & Assembly	○	○	○
Quality & Safety Management	○	○	○
Testing & Commissioning	○	○	○
Others (please specify): _____ _____ _____	○	○	○

_____			

3. Based on the experience of your organisation, please indicate how much you consider the following competencies important to perform your job. Please TICK (/) where appropriate in the box.

i. Knowledge

Knowledge	**Very Important**	**Important**	**Moderately Important**	**Low Importance**	**Not Relevant**
Project Management					
Engineering Design					
Production, Fabrication, Assembly and Repair					
Machining & Special Tooling					
Quality & Safety Management					
Industrial Automation Engineering					
Others (please specify):					

ii. Skills

Skills	**Very Important**	**Important**	**Moderately Important**	**Low Importance**	**Not Relevant**
Interpersonal Communication					
Written Communication					
Critical Thinking					
Problem Solving					
Agile Mindset *(A thought process that involves understanding, collaborating, learning, and staying flexible to achieves high performing results)*					
Leadership					
Time management					
Aptitude for Technology and Equipment					
Intrapreneurship *(Refers to employee initiatives in organisations to take something new, without being asked to do so)*					

Skills	Very Important	Important	Moderately Important	Low Importance	Not Relevant
Others (please specify):					

iii. Attribute / Attitude

Attribute / Attitude	Very Important	Important	Moderately Important	Low Importance	Not Relevant
Attention to detail					
Teamwork					
Multi-tasking / Flexibility					
Dependability *(Trustworthy & reliable)*					
Work Ethic					
Professionalism					
Self-management / Independent					
Self-learning					
Agility *(ability to think and understand quickly)*					
Ego-management *(An exaggerated sense of self-worth based on one's extrinsic achievements)*					

Career management *(Career path and individual development, succession planning)*					
Others (please specify):					

iv. The current graduates, trainees, apprentices, and current workers possess the skills required by the industry. Please TICK (/) where appropriate in the box below.

Strongly Disagree	**Disagree**	**Agree**	**Strongly Agree**

v. What are the reasons for the skills gap (skills possessed by employees that do not match the competencies in demand by the industry)? You may TICK (/) more than one whereapplicable.

- ○ Education or training mismatch
- ○ Major changes in traditional training and new skills requirements
- ○ Attitude (for example, lack of desire to work)

- ○ Misalignment between how job seekers are communicating their skills in their CV
- ○ Employers do not clarify the skills they require in the job specifications in the jobadvertisement
- ○ Other *(please specify)*:

  _____

  _____

  _____

  _____

SECTION 3: JOBS IN DEMAND

In this section, respondents are required to answer based on their industry under the Manufacture of Other Transport Equipment. Please proceed to the question at the page number given below:

1. BUILDING OF SHIPS AND BOAT

Based on the experience of your organisation, please rate the level of manpower shortage for all the jobs listed. Please TICK (/) where appropriate in the box below.

a. Project Management

Job Title	High Shortage	Moderate Shortage	Low Shortage
Project Director			
Senior Project Manager			
Project Manager			

b. Engineering Design & Development

Job Title	High Shortage	Moderate Shortage	Low Shortage
Technician / Draughtman			
Junior Naval Architect/Senior Draughtman			
Naval Architect			
Senior Naval Architect			
Head of Naval Architect			

c. Production, Fabrication, Installation & Assembly

Job Title	High Shortage	Moderate Shortage	Low Shortage
Mechanical Technician			
Junior Planning Engineer			
Planning Engineer			
Senior Planning Engineer			
Head of Planning			
HVAC Technician			
Hull & Outfitting Technician			
Hull & Outfitting Supervisor			
Hull & Outfitting Technical Executive			
Hull & Outfitting Manager			
Carpenter			
Mechanical Supervisor			
Mechanical Engineer			
Senior Mechanical Engineer			
Head of Mechanical			
Painter			
Senior Piping Technician			
Piping Technical Leader			
Piping Technical Executive			
Head of Piping			
QAQC Technician			
Senior Electrical Technician			
Electrical Engineer			
Senior Electrical Engineer			
Head of Electrical			
Technician Testing & Commissioning			
HVAC Supervisor			
HVAC Engineer			
Senior HVAC Engineer			
Head of HVAC			
Carpentry Supervisor			
Carpentry Engineer			
Senior Carpentry Engineer			
Head of Carpentry			
Painting Supervisor			
Painting Engineer			

Job Title	High Shortage	Moderate Shortage	Low Shortage
Senior Painting Engineer			
Head of Painting			

d. Quality & Safety Management

Job Title	High Shortage	Moderate Shortage	Low Shortage
Senior QAQC Technician/Junior QAQC Engineer			
QAQC Engineer			
Senior QAQC Engineer			
Head of QAQC			

e. Testing & Commissioning

Job Title	High Shortage	Moderate Shortage	Low Shortage
Testing & Commissioning Supervisor			
Testing & Commissioning Engineer			
Senior Testing & Commissioning Engineer			
Head of Testing & Commissioning			

1. State the reason for **HIGH SHORTAGE** in Job in Demand.

_____

_____

_____

2. Please state any other job in demand that have not been mentioned above, yet relevant to your current job, and state the reason behind.

_____

_____

_____

2. MANUFACTURE OF RAILWAY AND ROLLING STOCK

Based on the experience of your organisation, please rate the level of manpower shortage for all the jobs listed. Please TICK (/) where appropriate in the box below.

a. Project Management

Job Title	High Shortage	Moderate Shortage	Low Shortage
Head of Technical			
Head of Production			

b. Engineering Design & Development

Job Title	High Shortage	Moderate Shortage	Low Shortage
Head of Technical			
Senior Engineer			
Engineer			
Assistant Engineer			

c. Production, Fabrication, Installation & Assembly

Job Title	High Shortage	Moderate Shortage	Low Shortage
Head of Technical			
Head of Production			
Senior Engineer			
Engineer / Supervisor			
Assistant Engineer / Supervisor			
Technician			
Assistant Technician			
Fitter			

d. Quality & Safety Management

Job Title	High Shortage	Moderate Shortage	Low Shortage
Senior QHSE			
QHSE Engineer			
Assistant QHSE Engineer			

e. Testing & Commissioning

Job Title	High Shortage	Moderate Shortage	Low Shortage
Senior T&C Engineer			
T&C Engineer			
Assistant T&C Engineer			
Technician			

1. State the reason for **HIGH SHORTAGE** in Job in Demand.

_____

_____

_____

2. Please state any other job in demand that have not been mentioned above, yet relevant to your current job, and state the reason behind.

_____

_____

_____

3. MANUFACTURE OF AIR AND SPACECRAFT AND RELATED MACHINERY

Based on the experience of your organisation, please rate the level of manpower shortage for all the jobs listed. Please TICK (/) where appropriate in the box below.

a. Project Management

Job Title	High Shortage	Moderate Shortage	Low Shortage
Head of Sheet Metal Section			
Head of Laminating Section			
Head of Machining Section			
Head of Production Section			
Head of Plant Section			
Head of Quality Section			
Head of Industrial Engineer Section			
Head of NDT Section			
Head of Painting Section			
Assistant Head of Sheet Metal Section			
Assistant Head of Laminating Section			
Assistant Head of Machining Section			
Assistant Head of Production Section			
Assistant Head of Plant Section			
Assistant Head of Quality Section			

b. Engineering Design & Development

Job Title	High Shortage	Moderate Shortage	Low Shortage
Principal Design Technologist			
Senior Design Technologist			
Design Technologist			
Drafter			

c. Production, Fabrication, Installation & Assembly

Job Title	High Shortage	Moderate Shortage	Low Shortage
Tool & Design Specialist			
Assistant Tool & Design Specialist			
Sheet Metal Specialist			
Laminating Specialist			
Machining Specialist			

Job Title	High Shortage	Moderate Shortage	Low Shortage
Senior Surface Treatment Specialist			
Surface Treatment Specialist			
Painting Specialist			
Senior Industrial Engineer Section			
Senior Production Engineer			
Tool & Design Engineer			
Industrial Engineer			
Sheet Metal Engineer			
Laminating Engineer			
Machining Engineer			
Production Engineer			
Painting Engineer			
Assistant Tool & Design Technologist			
Assisting Sheet Metal Engineer			
Assistant Laminating Engineer			
Assisting Machining Engineer			
Assistant Surface Treatment Engineer			
Assistant Painting Engineer			
Senior Tooling Technician			
Senior Sheet Metal Technician			
Senior Laminating Technician			
Senior Machinist			
Senior Production Technician			
Senior Surface Treatment Technician			
Production Supervisor			
Surface Treatment Technician			
Tooling Technician			
Sheet Metal Technician			
Laminating Technician			
Machinist			
Production Technician			
Production Assistant			
Production Machinist			
Senior Painter			
Painter			

d. Quality & Safety Management

Job Title	High Shortage	Moderate Shortage	Low Shortage
Head of Quality Section			
Assistant Head of Quality Section			
Senior Quality Inspection Engineer			
Quality Inspection Engineer			
Assistant Quality Inspection Engineer			
Senior Quality Inspector			
Quality Inspector			

e. Testing & Commissioning

Job Title	High Shortage	Moderate Shortage	Low Shortage
Head of NDT Section			
Assistant Head of NDT Section			
Senior NDT Engineer			
NDT Engineer			
Assistant NDT Engineer			
Senior NDT Technician			
NDT Technician			

1. State the reason for **HIGH SHORTAGE** in Job in Demand.

_____

_____

_____

2. Please state any other job in demand that have not been mentioned above, yet relevant to your current job, and state the reason behind.

_____

_____

_____

4. MANUFACTURE OF MILITARY FIGHTING VEHICLES (*We have not yet gather the information in this group as the arrangement to meet the expert is schedule to be in January 2023.)*

Based on the experience of your organisation, please rate the level of manpower shortage for all the jobs listed. Please TICK (/) where appropriate in the box below.

a. Project Management

Job Title	High Shortage	Moderate Shortage	Low Shortage

b. Engineering Design & Development

Job Title	High Shortage	Moderate Shortage	Low Shortage

c. Production, Fabrication, Installation & Assembly

Job Title	High Shortage	Moderate Shortage	Low Shortage

d. Quality & Safety Management

Job Title	High Shortage	Moderate Shortage	Low Shortage

e. Testing & Commissioning

Job Title	High Shortage	Moderate Shortage	Low Shortage

1. State the reason for **HIGH SHORTAGE** in Job in Demand.

2. Please state any other job in demand that have not been mentioned above, yet relevant to your current job, and state the reason behind.

5. MANUFACTURE OF TRANSPORT EQUIPMENT N.E.C

Based on the experience of your organisation, please rate the level of manpower shortage for all the jobs listed. Please TICK (/) where appropriate in the box below.

a. Project Management

Job Title	High Shortage	Moderate Shortage	Low Shortage
Project Director			
Senior Project Manager			
Project Manager			
Head of Planning			

b. Engineering Design & Development

Job Title	High Shortage	Moderate Shortage	Low Shortage
Technical Specialist			
Technical Head			
Senior Electrical Engineer			
Senior Mechanical Engineer			
Electrical Engineer			
Mechanical Engineer			
Assistant Electrical			
Assistant Mechanical			

c. Production, Fabrication, Installation & Assembly

Job Title	High Shortage	Moderate Shortage	Low Shortage
Technical Specialist			
Head of Production			
Senior Electrical Engineer			
Senior Mechanical Engineer			
Electrical Engineer			
Mechanical Engineer			
Supervisor			
Line Leader			
Operator			

d. Quality & Safety Management

Job Title	High Shortage	Moderate Shortage	Low Shortage
Technical Specialist			
Head of Quality Assurance			
Senior Electrical Engineer			
Senior Mechanical Engineer			
Electrical Engineer			
Mechanical Engineer			
Assistant Electrical			
Assistant Mechanical			

e. Testing & Commissioning

Job Title	High Shortage	Moderate Shortage	Low Shortage
Technical Specialist			
Head of Quality Assurance			
Senior Electrical Engineer			
Senior Mechanical Engineer			
Electrical Engineer			
Mechanical Engineer			
Assistant Electrical			
Assistant Mechanical			

1. State the reason for **HIGH SHORTAGE** in Job in Demand.

_____

_____

_____

2. Please state any other job in demand that have not been mentioned above, yet relevant to your current job, and state the reason behind.

_____

_____

_____

SECTION 4: EMERGING SKILLS

Emerging skills are skills that are expected to be important to the industry in the near future based on recent events, trends, government policies, or research. For example, the technology revolution, issues of sustainability, and many other things are examples of emerging skills.

1. Identify future emerging skills that affect the productivity of your current job.

2. Provide reasons for the requirement of Emerging Skills that you mentioned on your previous answer.

3. Please add any other comment, recommendation, or suggestion.

SECTION 5: OCCUPATION RELATED TO TECHNOLOGY

	Strongly Disagree	Disagree	Agree	Strongly Agree
1. The Industrial Revolution would have an impact on the manufacturing of other transport equipment industries. Please **TICK (/)** where appropriate.				
a. Please specify why.				

	Strongly Disagree	Disagree	Agree	Strongly Agree
2. Technology advancements directly affect my current job. Please **TICK (/)** where appropriate.				
a. Please specify why.				

3. Listed below are the nine (9) technology drives that may relate to your area of expertise. Please **TICK (/)** where appropriate, you may tick more than once.

Technology Pillars	Project Management	Engineering Design & Development	Production, Fabrication, Installation & Assembly	Quality Management	Testing & Commissioning
Autonomous Robots (Coordinated and automated actions of robots to complete tasks intelligently, with minimal human input)					
Big Data Analytics (The analysis of ever larger volumes of data. Circulation, collection, and analysis of information is a necessity because it supports productivity growth based on a real-time decision-making process)					
Cloud Computing (Storing and accessing data and programs over the Internet instead of your computer's hard drive)					
Internet of Things (IoT) (All machines and systems connected to the production plant (as well as other systems) must be able to collect, exchange and save these massive volumes of information, in a completely autonomous way and without the need of human intervention)					
Additive Manufacturing (3D Printing) (Use in prototyping, design iteration and small scale production and often described as "rapid prototyping" - produce the desired components faster, more flexibly and more precisely than ever before)					
System Integration (The process of linking together different computing systems and software applications physically or functionally to act as a coordinated whole via					

Technology Pillars	Project Management	Engineering Design & Development	Production, Fabrication, Installation & Assembly	Quality Management	Testing & Commissioning
Internet of Things-IoT)					
Cybersecurity (With the increased connectivity and use of standard communications protocols, the need to protect critical industrial systems and manufacturing lines from cybersecurity threats is increasing)					
Augmented Reality (Augmented-reality-based systems support a variety of services, such as selecting parts in a warehouse and sending repair instructions over mobile devices - provide workers with real-time information to improve decision making and work procedures)					
Simulation (Simulations will leverage real-time data to mirror the physical world in a virtual model, which can include machines, products, and humans. This allows operators to test and optimize the machine settings for the next product in line in the virtual world before the physical changeover, thereby driving down machine setup times and increasing quality)					

4. Please add any comment, recommendation, or suggestion.

_____

_____

_____

SECTION 6: RELATED ISSUES

Below are the current issues that need to be addressed for the betterment of the workforce in the manufacturing of other transport equipment industry. Please rate **ALL** the key issues by using the scale below.

1	2	3	4
Strongly Disagree	**Disagree**	**Agree**	**Strongly Agree**

Issues	**Project Management**	**Engineering Design & Development**	**Production, Fabrication, Installation & Assembly**	**Quality Management**	**Testing & Commissioning**
Insufficient number of skilled workers					
Insufficient number of certified workers					
Insufficient number of competence workers					
High dependence on foreign labor					
Underpayment of wages leads to high turnover					
Talent Gap among graduates					
Adaptation to technological changes					
Poor facilities and amenitiesfor workers					
Others (please specify):					

On behalf of the development team, we would like to thank you for your time and willingness to participate in this survey!

ANNEX 2: OCCUPATIONAL DESCRIPTION (OD)

TITLE	**:**	**OCCUPATIONAL DESCRIPTION**
SECTION	**:**	**(C) MANUFACTURING**
DIVISION	**:**	**(30) MANUFACTURE OF OTHER TRANSPORT EQUIPMENT**
GROUP	**:**	**(301) BUILDING OF SHIPS AND BOAT**

MSIC DIVISION : C30 - Manufacture Of Other Transport Equipment
MSIC GROUP : C301 - Building Of Ships And Boat
AREA : Shipbuilding Production Planning
JOB TITLE : Head of Planning
LEVEL : 6

Job Responsibilities:

- Developing and maintaining detailed project schedules, including resource allocation, critical path analysis, and progress reporting.
- Managing and mentoring a team of planners and schedulers.
- Providing technical guidance and support to the shipbuilding team.

Knowledge:

- Project management
- Project Schedule Planning.
- Shipbuilding processes and procedures.
- Resource management.
- Communication and leadership.
- Risk management.
- Continuous improvement.
- Quality management.
- Legal and regulatory compliance.

Skills:

- Project management
- Shipbuilding materials and equipment.
- Problem-solving
- Communication
- Leadership
- Negotiation and budget management
- Subject Matter Expert
- Safety and quality procedures
- Shipbuilding industry regulations and standards

Attributes (Attitude):

- Accountability
- Inter team cooperation
- Interdepartmental Liaison
- Proactive reporting
- Inter team communication
- Occupational Safety and Health Compliance

MSIC DIVISION	**:**	**C30 - Manufacture of Other Transport Equipment**
MSIC GROUP	**:**	**C301 - Building of Ships And Boat**
AREA	**:**	**Shipbuilding Hull & Outfitting Production**
JOB TITLE	**:**	**Head of Hull & Outfitting**
LEVEL	**:**	**6**

Job Responsibilities:

- Lead a team of engineers and designers and are responsible for ensuring that the hull and outfitting of the ship meet the customer's requirements and industry standards.
- Leading the design team in the development of new ship designs and modifications.
- Providing technical guidance and support to the shipbuilding team

Knowledge:

- Project management
- Project Schedule Planning
- Shipbuilding processes and procedures
- Resource management.
- Communication and leadership
- Risk management.
- Continuous improvement.
- Quality management.
- Legal and regulatory compliance.

Skills:

- Project management
- Ship design and construction techniques
- Shipbuilding materials and equipment
- Problem solving
- Communication
- Leadership
- Industry experts
- Safety and quality procedures
- Regulations and standards

Attributes (Attitude):

- Accountability
- Team Work
- Interdepartmental Liaison
- Proactive Reporting
- Inter-Team Communication
- Occupational Safety and Health (OSHA) Compliance

MSIC DIVISION : C30 - Manufacture of Other Transport Equipment
MSIC GROUP : C301 - Building of Ships And Boat
AREA : Shipbuilding Hull & Outfitting Production
JOB TITLE : Hull & Outfitting Engineer
LEVEL : 5

Job Responsibilities:

- Plan and execute the hull and outfitting construction.
- Check and verify the materials used during construction.
- Detect the engineering problems and work to solve them.

Knowledge:

- Ship design and construction techniques.
- Marine engineering principles.
- Shipbuilding regulations and standards.
- Shipbuilding Safety and quality procedures
- Computer-aided design (CAD) and engineering software
- Fabrication and welding methods
- Technical documentation
- Project management skills
- Technical communication
- Problem-solving

Skills:

- Technical drawing
- Ships construction planning
- Effective communication
- Problem-solving
- Task prioritization
- 3D CAD modelling systems

Attributes (Attitude):

- Individual and branch responsibilities
- Organizational goals and operational tasks
- Occupational Safety and Health Compliance
- Ensure Quality outcomes
- Adherence to procedures
- Team Performance management
- Technical Documentation and Reporting
- Technical Problem-solving

MSIC DIVISION : C30 - Manufacture of Other Transport Equipment
MSIC GROUP : C301 - Building of Ships And Boat
AREA : Shipbuilding Hull & Outfitting Production
JOB TITLE : Hull & Outfitting Supervisor
LEVEL : 4

Job Responsibilities:

- Plan and execute the hull and outfitting construction.
- Check and verify the materials used during construction.
- Detect the engineering problems and work to solve them.

Knowledge:

- Ship Design and Construction
- Regulations and Standards.
- Safety And Quality Procedures
- Fabrication and Welding Methods
- Technical Documentation
- Project Management Skills
- Problem-Solving Skills.
- Shipyard's Organization
- Hull & Outfitting Department Specific Tasks
- Hull & Outfitting Department Tools and Equipment
- Hull & Outfitting Department Processes and Procedures

Skills:

- Technical Drawings Interpretation
- Ships Construction Planning and Coordination
- Effective Problem-solving
- Team Leaders Management
- Interpersonal Communication.
- Technical Drawings Interpretation
- Effective Time and Resources Management
- Team Motivation
- Safety and Quality Standards Compliance
- Attention to Detail

Attributes (Attitude):

- Effective Interpersonal Communication.
- Creative Problems Solving
- Interdepartmental Teamwork
- Occupational Safety and Health (OSHA) adherence

MSIC DIVISION	**:**	**C30 - Manufacture of Other Transport Equipment**
MSIC GROUP	**:**	**C301 - Building of Ships And Boat**
AREA	**:**	**Shipbuilding Mechanical Installation**
JOB TITLE	**:**	**Head of Mechanical**
LEVEL	**:**	**6**

Job Responsibilities:

- Lead a team of mechanical engineers and are responsible for ensuring that the mechanical systems meet the customer's requirements and industry standards.
- Coordinate with other departments and stakeholders to ensure that the mechanical systems of the ship meet the customer's requirements and industry standards.
- Provide technical guidance and support to the shipbuilding team.

Knowledge:

- Project Management
- Planning And Scheduling
- Shipbuilding Processes and Procedures
- Resource Management
- Communication And Leadership
- Risk Management.
- Continuous Improvement
- Quality Management
- Legal And Regulatory Compliance

Skills:

- Project Management
- Ship Design and Construction Techniques
- Shipbuilding Materials and Equipment
- Problem-Solving and decision making
- Interpersonal Communication Skills
- Leadership Skills.
- Subject Matter Expert
- Safety And Quality Procedures
- Regulations and Standards

Attributes (Attitude):

- Individual Task Responsibilities
- Inter-team Cooperation
- Interdepartmental Liaison
- Proactive in updating report.
- Team Communication
- Occupational Safety and Health Compliance

MSIC DIVISION : C30 - Manufacture of Other Transport Equipment
MSIC GROUP : C301 - Building of Ships And Boat
AREA : Shipbuilding Mechanical Installation
JOB TITLE : Mechanical Engineer
LEVEL : 5

Job Responsibilities:

- Responsible for the installation, alignment and testing for all mechanical equipment on board.
- Discuss and solve complex problems with all department, OEMs, and Client.
- Ensure reliable integration of all ship systems

Knowledge:

- Mechanical Engineering.
- Manufacturing Processes
- Marine Engineering Principles
- Shipbuilding Regulations and Standards
- Safety and Quality Procedures
- Technical Documentation
- Project Management Skills
- Technical Communication Skills
- Problem-Solving Skills

Skills:

- Technical Drawings and Interpretation
- Installation Of Equipment Onboard Ships
- Interpersonal Communication
- Problem-Solving
- Prioritization And Task Completion

Attributes (Attitude):

- Individual And Branch Contribution
- Organizational Goals and Operational Tasks Relationship
- Occupational Safety and Health Compliance
- Quality Outcomes and Procedures Adherence
- Team Performance Management
- Documentation And Reporting
- Technical Problem-Solving

MSIC DIVISION : C30 - Manufacture of Other Transport Equipment
MSIC GROUP : C301 - Building of Ships And Boat
AREA : Shipbuilding Mechanical Installation
JOB TITLE : Mechanical Supervisor
LEVEL : 4

Job Responsibilities:

- Supervise the works of the mechanical technician and OEM representative, ensuring that the system is install in according with the shipyard quality standard and project schedule.
- Review and approve the work of subcontractors and vendors to ensure compliant with project specification.
- Report to shipbuilding mechanical engineer of work progress and completion.

Knowledge:

- Ship Design and Construction Techniques
- Regulations and Standards
- Safety and Quality Procedures
- Technical Documentation
- Project Management
- Problem-Solving
- Mechanical Department Organization and Specific Tasks
- Mechanical Department Tools and Equipment
- Mechanical Department Processes and Procedures

Skills:

- Technical Drawings and Interpretation
- Equipment Installation and Alignment
- Problem-Solving.
- Team Management
- Interpersonal Communicate
  Resources and Time Management
- Team Motivation
- Safety and Quality Standards Compliance
- Attention to Detail

Attributes (Attitude):

- Interpersonal Communication
- Creative Problem Solving
- Interdepartmental Teamwork
- Occupational Safety and Health (OSHA) Compliance

MSIC DIVISION : C30 - Manufacture of Other Transport Equipment
MSIC GROUP : C301 - Building of Ships And Boat
AREA : Shipbuilding Mechanical Installation
JOB TITLE : Mechanical Technician
LEVEL : 3

Job Responsibilities:

- Install, and repair of mechanical systems and components on ships and boats.
- Troubleshoot and diagnose mechanical problems and making repairs as needed.
- Read and interpret blueprints and schematics to understand the design and layout of mechanical systems.

Knowledge:

- Marine engineering principles and systems
- Shipbuilding and repair techniques
- Safety and quality procedures in shipbuilding
- Technical documentation
- tools and equipment
- the shipyard's organization and the Mechanical department specific tasks
- Mechanical department processes and procedures
- the industry standards and regulations
- materials in shipbuilding.
- computer-aided design (CAD) software
- computer-aided manufacturing (CAM) software
- hand tools, power tools, and machine tools.

Skills:

- equipment and operating systems.
- mechanical operations, standards and controls
- motor, pump, conveyor and hydraulic problems.
- Repair and perform preventive maintenance as per established standards.
- Handle personal tools for job including up-to-date documented personal tool lists.
- Handle time accounting ad complete work order.

Attributes (Attitude):

- work progress report.
- Interpersonal Communicate
- Creative problems solving
- Interdepartmental Team Work
- Occupational Safety and Health (OSHA) compliance

MSIC DIVISION : C30 - Manufacture of Other Transport Equipment
MSIC GROUP : C301 - Building of Ships And Boat
AREA : Shipbuilding Piping Fabrication
JOB TITLE : Head of Piping
LEVEL : 6

Job Responsibilities:

- Lead a team of piping engineers and are responsible for ensuring that the piping systems meet the customer's requirements and industry standards.
- Lead the design team in the development of new ship designs and modifications for piping systems such as fuel, lubrication, fresh water, fire-fighting, and ballast systems.
- Review and approve design drawings and calculations for piping systems.

Knowledge:

- Project Management
- Planning And Scheduling
- Shipbuilding Processes and Procedures.
- Resource Management.
- Communication and Leadership.
- Risk Management.
- Continuous Improvement.
- Quality Management.
- Legal And Regulatory Compliance.

Skills:

- Project Management
- Ship Piping Systems.
- Shipbuilding Piping Materials and Equipment.
- Problem-Solving
- Interpersonal Communication
- Leadership Skills
- Subject Matter Expert
- Safety And Quality Procedures
- Regulations And Standards Compliance

Attributes (Attitude):

- Tasks Responsibility
- Inter team Cooperation
- Interdepartmental Liaison
- Report Timely
- Team Communication
- Occupational Safety and Health Compliance

MSIC DIVISION	**:**	**C30 - Manufacture of Other Transport Equipment**
MSIC GROUP	**:**	**C301 - Building of Ships And Boat**
AREA	**:**	**Shipbuilding Piping Fabrication**
JOB TITLE	**:**	**Piping Supervisor**
LEVEL	**:**	**4**

Job Responsibilities:

- Supervise the works of the piping technician and OEM representative, ensuring that the system is install in according with the shipyard quality standard and project schedule.
- Review and approve the work of subcontractors and vendors to ensure compliant with project specification.
- Report to shipbuilding piping engineer of work progress and completion.

Knowledge:

- Ship Design and Construction Techniques
- Regulations And Standards
- Safety And Quality Procedures in Shipbuilding
- Technical Documentation
- Project Management
- Problem-Solving.
- The Shipyard's Organization and The Piping Department Specific Tasks
- Piping Department Tools and Equipment
- Piping Department Processes and Procedures

Skills:

- Technical Drawings and Interpretation
- Installation Of Piping Systems.
- Problem-Solving
- Team Management.
- Interpersonal Communication
- Resource and Time Management
- Team Motivation
- Safety And Quality Standards Compliance
- Attention To Detail

Attributes (Attitude):

- Inter Team Communication
- Creative Problems. Solving
- Interdepartmental Teamwork
- Adherence to Occupational Safety and Health (OSHA) Compliance Requirement

MSIC DIVISION : C30 - Manufacture of Other Transport Equipment
MSIC GROUP : C301 - Building of Ships And Boat
AREA : Shipbuilding Piping Fabrication
JOB TITLE : Piping Technician
LEVEL : 3

Job Responsibilities:

- Install and repair piping systems on ships and boats, such as water, fuel, and air systems.
- Ensure that all work is done to the highest quality standards and meets safety requirements.
- Reportto piping supervisor on construction work progress.

Knowledge:

- Marine Engineering Principles and Systems Onboard Ship.
- Shipbuilding And Repair Techniques.
- Safety And Quality Procedures in Shipbuilding.
- Technical Documentation.
- Tools And Equipment Used in Shipbuilding.
- The Shipyard's Organization and The Piping Department Specific Tasks
- Piping Department Processes and Procedures
- Industry Standards and Regulations
- Materials Used in Shipbuilding.
- Computer-Aided Design (CAD)
- Computer-Aided Manufacturing (CAM) Software.
- Hand Tools, Power Tools, And Machine Tools.

Skills:

- Technical Drawings Interpretation
- Interdepartmental Communication
- Interpret Piping Isometric Drawings Interpretation
- Piping Layout Drawings.
- Cutting, Bending, And Joining Pipe Materials.
- Fabrication And Welding Of Piping

Attributes (Attitude):

- Timely Report Documentation
- Team Communication
- Interpersonal Communication
- Creative Problem Solving
- Interdepartmental Collaboration
- Adherence to Occupational Safety and Health (OSHA) Compliance Requirement

MSIC DIVISION	**:**	**C30 - Manufacture of Other Transport Equipment**
MSIC GROUP	**:**	**C301 - Building of Ships And Boat**
AREA	**:**	**Shipbuilding Electrical & Instrumentation Installation (E & I)**
JOB TITLE	**:**	**Head of Shipbuilding E & I**
LEVEL	**:**	**6**

Job Responsibilities:

- Lead a team of E&I engineers and are responsible for ensuring that the E&I systems meet the customer's requirements and industry standards.
- Lead the design team in the development of new ship designs and modifications for E&I systems such as power generation, distribution, navigation, and communication systems.
- Review and approve design drawings and calculations for E&I systems.

Knowledge:

- Project Management
- Planning and Scheduling
- Shipbuilding Processes and Procedures.
- Resource Management.
- Communication and Leadership.
- Risk Management.
- Continuous Improvement.
- Quality Management.
- Legal And Regulatory Compliance.

Skills:

- Project Management
- Ship Piping Systems
- Shipbuilding E & I Material and Equipment.
- Problem-Solving
- Interpersonal Communication
- Leadership Skills
- Team Motivation
- Subject Matter Expert
- Safety And Quality Procedures
- Regulations and Standards

Attributes (Attitude):

- Individual Responsibility
- Team Cooperation
- Interdepartmental Liaison
- Timely Progress Reporting
- Teams Communication
- Occupational Safety and Health Compliance

MSIC DIVISION	**:**	**C30 - Manufacture of Other Transport Equipment**
MSIC GROUP	**:**	**C301 - Building of Ships And Boat**
AREA	**:**	**Shipbuilding Electrical & Instrumentation Installation (E & I)**
JOB TITLE	**:**	**Shipbuilding E & I Engineer**
LEVEL	**:**	**5**

Job Responsibilities:

- Develop and review engineering documents such as electrical schematics, instrument loop diagrams, and material specifications.
- Work with other shipbuilding engineers to ensure that the electrical and instrumentation systems are properly integrated with other ship systems such as propulsion, navigation, and communication.
- Oversee the construction and installation of electrical and instrumentation systems to ensure compliance with industry standards and regulations.

Knowledge:

- Lean Manufacturing
- Power Management
- Ingress Protection (IP) Rating
- Electrical Load Calculation and Component Selection
- Standard and Power Consumption Compliance
- Power Protection System and Grounding

Skills:

- Electrical System Design Verification
- Electrical System Testing and Commissioning Verification
- Electrical Documentation Management
- Electrical System Documentation and Information Dissemination
- Resources Management
- Project Management.
- 3D Cad Modelling Systems

Attributes (Attitude):

- Individual and Branch Responsibilities
- Organizational Goals and Operational Tasks.
- Occupational Safety and Health Compliance
- Quality Outcomes and Adherence to Procedures.
- Team Performance Management
- Documentation and Reporting
- Technical Problem-Solving

MSIC DIVISION	**:**	**C30 - Manufacture of Other Transport Equipment**
MSIC GROUP	**:**	**C301 - Building of Ships And Boat**
AREA	**:**	**Shipbuilding Electrical & Instrumentation Installation (E & I)**
JOB TITLE	**:**	**Shipbuilding E & I Supervisor**
LEVEL	**:**	**4**

Job Responsibilities:

- Supervise the works of the electrical and instrumentation technician and OEM representative, ensuring that the system is installed according with the shipyard quality standard and project schedule.
- Review and approve the work of subcontractors and vendors to ensure compliant with project specification.
- Report to shipbuilding E & I engineer of work progress and completion.

Knowledge:

- Wiring Circuit Diagram Interpretation
- Electrical Measuring Instrument.
- Machining Process.
- Electrical Power.
- Electrical Wiring.

Skills:

- Team Management
- Operation Scheduling.
- Accurate Work Data Collection
- Tools and Equipment Preparation.
- Electrical Component Assembly.
- Electrical System Test Result
- Machine And Equipment Preventive and Correction Measures
- Machine Parameter Setting

Attributes (Attitude):

- Task Responsibility
- Interdepartmental Liaison
- Work Progress Reporting
- Interpersonal Communication
- Occupational Safety and Health Compliance

MSIC DIVISION	**:**	**C30 - Manufacture of Other Transport Equipment**
MSIC GROUP	**:**	**C301 - Building of Ships And Boat**
AREA	**:**	**Shipbuilding Electrical & Instrumentation Installation (E & I)**
JOB TITLE	**:**	**Shipbuilding E & I Technician**
LEVEL	**:**	**3**

Job Responsibilities:

- Install electrical and instrumentation systems such as power distribution systems, lighting systems, control systems, and instrumentation systems.
- Read and interpret blueprints and schematics to understand the design and layout of the electrical and instrumentation systems.
- Support commissioning and start-up of the systems

Knowledge:

- Marine Engineering Principles and Systems
- Shipbuilding And Repair Techniques
- Safety And Quality Procedures
- Technical Documentation
- Tools And Equipment
- The Shipyard's Organization and E & I Department Specific Tasks
- E & I Department Processes and Procedures
- Industry Standards and Regulations
- Shipbuilding Materials
- Computer-Aided Design (CAD) Software
- Computer-Aided Manufacturing (CAM) Software
- Hand Tools, Power Tools, and Machine Tools.

Skills:

- Equipment And Operating Systems.
- Mechanical Operations, Standards and Controls
- Motor and Pump Systems
- Preventive Maintenance as Per Established Standards.
- Personal Tools Handling and Documentation
- Time Accounting and Work Order

Attributes (Attitude):

- Timely Progress Report
- Interpersonal Communication
- Creative Problem Solving
- Interdepartmental Team Work
- Occupational Safety and Health (OSHA) Compliance

MSIC DIVISION	**:**	**C30 - Manufacture of Other Transport Equipment**
MSIC GROUP	**:**	**C301 - Building of Ships And Boat**
AREA	**:**	**Shipbuilding Heating, Ventilation, Air Conditioning (HVAC) Installation**
JOB TITLE	**:**	**Head of Shipbuilding HVAC**
LEVEL	**:**	**6**

Job Responsibilities:

- Lead a team of HVAC engineers and are responsible for ensuring that the HVAC systems meet the customer's requirements and industry standards.
- Lead the design team in the development of new ship designs and modifications for HVAC systems such as heating, cooling, ventilation, and air conditioning systems.
- Review and approve design drawings and calculations for HVAC systems.

Knowledge:

- Project Management
- Planning And Scheduling
- Shipbuilding Processes and Procedures
- Resource Management
- Communication and Leadership
- Risk Management
- Continuous Improvement
- Quality Management
- Legal And Regulatory Compliance

Skills:

- Project Management
- Ship HVAC Systems
- Problem-Solving
- Interpersonal Communication
- Leadership
- Subject Matter Expert
- Safety And Quality Procedures
- Industry Regulations and Standards

Attributes (Attitude):

- Responsible in carrying construction progress.
- Cooperate with another team in carrying out.
- Liaise with another department.
- Proactive in updating report.
- Actively in communicating with teams.
- Adhere to Occupational Safety and Health Compliance Requirement.

MSIC DIVISION	**:**	**C30 - Manufacture of Other Transport Equipment**
MSIC GROUP	**:**	**C301 - Building of Ships And Boat**
AREA	**:**	**Shipbuilding Heating, Ventilation, Air Conditioning (HVAC) Installation**
JOB TITLE	**:**	**Shipbuilding HVAC Engineer**
LEVEL	**:**	**5**

Job Responsibilities:

- Responsible for implementing and maintaining quality control systems to ensure that all work is done according to the plans, drawings, and specifications.
- Conduct inspections of the shipbuilding process to ensure compliance with quality standards.
- Coordinate with other departments and contractors to ensure that quality standards are met.

Knowledge:

- Heating, Ventilation, And Air Conditioning (HVAC) Systems on Ships
- Mechanical And Electrical Systems
- Marine Environments and The Specific Requirements for Shipbuilding
- Industry Regulations and Standards
- Problem-Solving
- Interpersonal Communication Skills

Skills:

- Design and Install HVAC Systems
- Troubleshoot HVAC Systems
- Industry Regulations and Standards.
- Project Management
- Verbal and Written Communication Skills.
- Analytical and Problem-Solving Skills.
- Adapt to New Technologies.
- Time Management Skills.
- 3D CAD Modelling Systems

Attributes (Attitude):

- Understanding of Role and Branch Contributes to The Organization.
- Organisational Goals and Operational Tasks
- Occupational Safety and Health Compliance
- Quality Outcomes and Adherence to Procedures.
- Team Performance Management
- Timely Documentation and Reporting
- Technical Problem-Solving

MSIC DIVISION	**:**	**C30 - Manufacture of Other Transport Equipment**
MSIC GROUP	**:**	**C301 - Building of Ships And Boat**
AREA	**:**	**Shipbuilding Heating, Ventilation, Air Conditioning (HVAC) Installation**
JOB TITLE	**:**	**Shipbuilding HVAC Supervisor**
LEVEL	**:**	**4**

Job Responsibilities:

- Supervise the construction and installation of HVAC systems to ensure compliance with industry standards and regulations.
- Review and approve the work of subcontractors and vendors to ensure compliant with project specification.
- Report to shipbuilding HVAC engineer of work progress and completion.

Knowledge:

- HVAC Installation
- Mechanical and electrical systems
- marine environments and requirements
- industry regulations and standards
- HVAC systems codes, standards, and regulations

Skills:

- Attention to detail.
- Problem-solving.
- Communication.
- Analytical and critical thinking.
- technical drawings and schematics.
- safety regulations and best practices
- Computer programs and software
- train, mentor and direct team members.

Attributes (Attitude):

- Task orientation
- Inter departmental Liaison
- Timely report
- Team communication
- Occupational Safety and Health Compliance

MSIC DIVISION	**:**	**C30 - Manufacture of Other Transport Equipment**
MSIC GROUP	**:**	**C301 - Building of Ships And Boat**
AREA	**:**	**Shipbuilding Heating, Ventilation, Air Conditioning (HVAC) Installation**
JOB TITLE	**:**	**Shipbuilding HVAC Technician**
LEVEL	**:**	**3**

Job Responsibilities:

- Install, test, and maintain various HVAC systems such as heating systems, ventilation systems, and air conditioning systems.
- Read and interpret blueprints and schematics to understand the design and layout of the HVAC systems.
- Support commissioning and start-up of the systems.

Knowledge:

- HVAC Installation
- Mechanical and Electrical Systems
- Marine Environments and Requirements for Shipbuilding
- Industry Regulations and Standards
- Technical Drawings and Schematics
- Safety Regulations and Best Practices
- HVAC Systems Tools and Equipment

Skills:

- Problem-Solving and Communication Skills
- Equipment and Operating Systems.
- HVAC Operations, Standards and Controls
- Resolve HVAC Systems
- Personal Tools Handling and documentation
- Time accounting and work order

Attributes (Attitude):

- Detailed work report
- Team Communication
- Creative problem solving
- Inter department teamwork
- Occupational Safety and Health (OSHA) compliance

MSIC DIVISION : C30 - Manufacture of Other Transport Equipment
MSIC GROUP : C301 - Building of Ships And Boat
AREA : Shipbuilding Carpentry Fabrication
JOB TITLE : Head of Shipbuilding Carpentry
LEVEL : 6

Job Responsibilities:

- Lead a team of carpentry and woodworking specialists and are responsible for ensuring that the carpentry and woodwork meet the customer's requirements and industry standards.
- Leading the design team in the development of new ship designs and modifications for carpentry and woodwork such as decks, cabins, and other wooden structures.
- Reviewing and approving design drawings and calculations for carpentry and woodwork.

Knowledge:

- Shipbuilding Carpentry
- Industry Regulations and Standards.
- Plan, Schedule, And Coordinate the Work
- Safety And Quality Standards
- Project Management.
- Interpret Technical Drawings, Blueprints and Schematics.

Skills:

- Leadership and Management Skills.
- Project Management Skills.
- Knowledge Of Ship Carpentry Works.
- Problem-Solving.
- Interpersonal Communication
- Leadership and Motivation
- Safety and Quality Procedures In Shipbuilding.
- Regulations and Standards in The Shipbuilding Industry.

Attributes (Attitude):

- Responsible In Carrying Construction Progress
- Inter Team Cooperation
- Inter Department Liaison
- Timely Reporting
- Team Interpersonal Communication
- Occupational Safety and Health Compliance

MSIC DIVISION	**:**	**C30 - Manufacture of Other Transport Equipment**
MSIC GROUP	**:**	**C301 - Building of Ships And Boat**
AREA	**:**	**Shipbuilding Carpentry Fabrication**
JOB TITLE	**:**	**Shipbuilding Carpentry Engineer**
LEVEL	**:**	**5**

Job Responsibilities:

- Design and specify wooden structures and systems for new ships and other marine vessels, including decks, bulkheads, cabins, and other interior and exterior components.
- Develop detailed engineering drawings and specifications for wooden structures, including plans, elevations, and sections.
- Oversee the procurement of materials and equipment necessary for the construction and maintenance of wooden structures and systems.

Knowledge:

- Carpentry Work on Ships Under Construction.
- Materials, Techniques, and Equipment Used in The Construction Of Ships.
- Industry Regulations and Standards.
- Marine Engineering Principles.
- Technical Drawings and Schematics
- Safety Regulations and Best Practices.
- Specialized Tools and Equipment.
- Cost, Safety and Performance of Different Systems and Make Decisions Accordingly.
- Computer Programs and Software.

Skills:

- Project Management Skills.
- Attention to Detail.
- Communication Skills.
- Analytical and Critical Thinking Skills.
- Read and Understand Technical Drawings and Schematics.
- Train, Mentor and Direct Team Members,
- Tasks Delegation and Responsibilities.

Attributes (Attitude):

- Organizational Goals and Operational Tasks
- Occupational Safety and Health Compliance
- Quality Outcomes
- Adherence to Procedures.
- Team Performance Management
- Timely Document and Report
- 3d CAD Modelling Systems
- Draft Engineering Drawings
- Technical Problem-Solving

MSIC DIVISION	**:**	**C30 - Manufacture of Other Transport Equipment**
MSIC GROUP	**:**	**C301 - Building of Ships And Boat**
AREA	**:**	**Shipbuilding Carpentry Fabrication**
JOB TITLE	**:**	**Shipbuilding Carpentry Supervisor**
LEVEL	**:**	**4**

Job Responsibilities:

- Overseeing the construction and installation of wooden structures and systems to ensure compliance with industry standards and regulations, such as fire safety and stability requirements.
- Review and approve the work of subcontractors and vendors to ensure compliant with project specification.
- Report to shipbuilding Carpentry engineer of work progress and completion.

Knowledge:

- Understanding of shipbuilding carpentry, including materials, techniques, and equipment used in the construction of ships.
- industry regulations and standards.
- project management.
- computer programs and software.
- cost estimation, budgeting and project scheduling.

Skills:

- Leadership and management skills.
- Project management
- Attention to detail.
- Problem-solving.
- Communication to work.
- Analytical and critical thinking.
- technical drawings and schematics.
- Team management

Attributes (Attitude):

- Task Oriented
- Inter department Liaison
- Timely reporting
- Team Communication
- Occupational Safety and Health Compliance

MSIC DIVISION : C30 - Manufacture of Other Transport Equipment
MSIC GROUP : C301 - Building of Ships And Boat
AREA : Shipbuilding Carpentry Fabrication
JOB TITLE : Shipbuilding Carpenter
LEVEL : 3

Job Responsibilities:

- Cutting and shaping wood to fit specific measurements and designs.
- Assembling and installing various wooden structures such as decks, bulkheads, and cabins.
- Reading and interpreting blueprints and schematics.
- Sanding and finishing surfaces to ensure a smooth finish

Knowledge:

- Installing various type of carpentry material.
- Understanding of mechanical, HVAC, piping and electrical systems, as well as knowledge of marine environments and the specific requirements for shipbuilding.
- Familiar with industry regulations and standards.
- Understand technical drawings and schematics, be familiar with safety regulations and best practices,
- Ability to use specialized tools and equipment to diagnose, carpentry works.

Skills:

- Problem-solving and communication skills.
- Check equipment and type of material.
- Ability to fabricate custom made items
- Handle personal tools for job including up-to-date documented personal tool lists.
- Handle time accounting ad complete work order.

Attributes (Attitude):

- Meticulous in preparing work report.
- Communicate effectively with teamwork
- Creative in solving problems.
- Work closely with another department.
- Adhere to Occupational Safety and Health (OSHA) / Factory and Machinery Act 1967.

MSIC DIVISION : C30 - Manufacture of Other Transport Equipment
MSIC GROUP : C301 - Building of Ships And Boat
AREA : Shipbuilding Painting
JOB TITLE : Head of Painting
LEVEL : 5

Job Responsibilities:

- Overseeing the planning and execution of painting projects.
- Identifying and implementing best practices and new technologies to improve efficiency and reduce costs.
- Ensuring compliance with environmental regulations and permits

Knowledge:

- shipbuilding painting and coating techniques.
- industry regulations and standards.
- Planning, scheduling, and coordinating,
- Project management
- computer programs and software
- cost estimation, budgeting, and project scheduling.
- types of coatings and paints used in shipbuilding.
- application methods and the proper equipment and safety precautions
- surface preparation techniques
- troubleshoot and solve problems with coating systems
- environmental and safety regulations

Skills:

- train, mentor and task delegation to team members
- read and interpret technical drawings, blueprints and schematics.
- Leadership and management skills
- project management skills
- ship carpentry works including pre-fab units
- Problem-solving
- Interpersonal communication
- safety and quality procedures in shipbuilding.

Attributes (Attitude):

- Task oriented
- Team Cooperation
- Inter department liaison
- Proactive in updating report.
- Team communicating with teams.
- Adhere to Occupational Safety and Health Compliance Requirement

MSIC DIVISION : C30 - Manufacture of Other Transport Equipment
MSIC GROUP : C301 - Building of Ships And Boat
AREA : Shipbuilding Painting
JOB TITLE : Painting Inspector
LEVEL : 4

Job Responsibilities:

- To ensure that the paint has been applied correctly and meets industry standards and specifications for marine environments.
- To inspect for any defects or issues with the paint, such as cracking, peeling, or fading, and make recommendations for repairs or repainting.
- Inspecting the surface quality of the paint, they also ensure that the painting is done according to safety regulations, environmental regulations and compliance with the shipbuilding standards.
- To prepare painting inspection report including any non-conformities and recommendations for corrective action to shipyard and ship owner.

Knowledge:

- shipbuilding painting and coating techniques including
- materials, equipment, and safety regulations
- industry regulations and standards
- project management
- Knowledge of computer programs and software.
- application methods and surface preparation techniques
- troubleshoot and solve problems with coating systems.
- environmental regulations and safety regulations.
- Interpret and evaluate technical drawings, blueprints, and schematics
- quality control and quality assurance methods.

Skills:

- train, mentor and direct team members
- read and interpret technical drawings, blueprints and schematics
- Leadership and management skills to oversee the work of a team of carpenters
- Strong project management skills to oversee the entire shipbuilding process.
- Knowledge of ship carpentry works including pre-fab units
- Problem-solving
- Interpersonal communication
- safety and quality procedures in shipbuilding.

Attributes (Attitude):

- Task oriented
- Team Cooperation and communication
- Liaise with another department.
- Proactive in updating report.
- Adhere to Occupational Safety and Health Compliance Requirement.

MSIC DIVISION	**:**	**C30 - Manufacture of Other Transport Equipment**
MSIC GROUP	**:**	**C301 - Building of Ships And Boat**
AREA	**:**	**Shipbuilding Painting**
JOB TITLE	**:**	**Painter and Blaster**
LEVEL	**:**	**2**

Job Responsibilities:

- Preparing surfaces by cleaning, scraping, sanding, and otherwise prepping the surface for painting.
- Applying paint and coatings using a variety of tools such as brushes, rollers, and spray guns.
- Performing blasting work such as sand blasting, water blasting, and grit blasting to remove old paint and rust from surfaces.

Knowledge:

- shipbuilding painting, coating techniques including
- materials, equipment, and safety regulations.
- industry regulations and standards.
- types of coatings and paints used in shipbuilding.
- Paint application methods.
- Familiar with various surface preparation techniques
- equipment used for sandblasting
- types of abrasives used for blasting
- safety and environmental regulations
- correct procedures for handling hazardous materials.

Skills:

- prepare surfaces for painting
- troubleshoot and solve problems.
- Team management
- Problem-solving
- safety and quality procedures in shipbuilding.

Attributes (Attitude):

- Responsible in carrying blasting and painting process work effectively
- Cooperate with another team in carrying out.
- Liaise with another department.
- Proactive and timely reporting
- Team communicating
- Adhere to Occupational Safety and Health Compliance Requirement.

MSIC DIVISION	**:**	**C30 - Manufacture of Other Transport Equipment**
MSIC GROUP	**:**	**C301 - Building of Ships And Boat**
AREA	**:**	**Shipbuilding Quality Assurance & Quality Control (QA/QC)**
JOB TITLE	**:**	**Head of Shipbuilding QA/QC**
LEVEL	**:**	**6**

Job Responsibilities:

- Lead a team of QA/QC engineers and are responsible for ensuring that the shipbuilding process meets the customer's requirements and industry standards.
- Developing and implementing quality assurance and quality control procedures for the shipbuilding process.
- Reviewing and approving design drawings, calculations and other technical documents to ensure compliance with customer requirements and industry standards

Knowledge:

- shipbuilding techniques, including materials, equipment, and safety regulations.
- industry regulations and standards.
- quality management systems.
- quality control and quality assurance methods.
- safety regulations.
- environmental and safety regulations for the disposal of materials.
- Also be able to develop and implement procedures for ensuring that the work is being done according to the specified standards and regulations.
- Able to communicate effectively.

Skills:

- Strong project management skills.
- Understanding QAQC engineer report and corrective action proposal
- ship design and construction techniques.
- shipbuilding materials and equipment.
- analytical thinking and problem-solving skills.
- Interpersonal communication.
- leadership skills.
- negotiation and budget management skills.
- Expert in shipbuilding and/or maritime industry.
- safety and quality procedures in shipbuilding.

Attributes (Attitude):

- Responsible and task oriented
- Team Cooperation
- Interdepartmental liaison
- timely reporting
- Active team communication
- Adhere to Occupational Safety and Health Compliance Requirement.

MSIC DIVISION	**:**	**C30 - Manufacture of Other Transport Equipment**
MSIC GROUP	**:**	**C301 - Building of Ships And Boat**
AREA	**:**	**Shipbuilding Quality Assurance & Quality Control (QA/QC)**
JOB TITLE	**:**	**Shipbuilding QA/QC Supervisor**
LEVEL	**:**	**4**

Job Responsibilities:

- Supervising the works of the QAQC technician, ensuring that the system is install in according with the ship yard quality standard and project schedule.
- Review and approve the work of subcontractors and vendors to ensure compliant with project specification.
- Report to shipbuilding QAQC engineer of work progress and completion.

Knowledge:

- shipbuilding processes and standards.
- quality control techniques and tools, including inspections, testing and auditing.
- welding and metal fabrication techniques.
- health and safety regulations and procedures.
- project management, scheduling and budgeting.
- relevant codes and regulations.
- leadership and interpersonal communication skills.
- quality control issues
- data analysis and reporting.

Skills:

- Strong leadership and management skills.
- Excellent communication skills.
- Attention to detail and ability.
- Ability to analyze and interpret data.
- Strong problem-solving skills.
- Knowledge of project management.
- Strong organizational and time management skills.
- Ability to adapt to changing requirements and processes.
- Familiarity with relevant software and technology.

Attributes (Attitude):

- Responsible in carrying out tasking.
- Liaise with another department.
- Proactive in updating report.
- Actively in communicating with teams.
- Adhere to Occupational Safety and Health Compliance Requirement.

MSIC DIVISION	**:**	**C30 - Manufacture of Other Transport Equipment**
MSIC GROUP	**:**	**C301 - Building of Ships And Boat**
AREA	**:**	**Shipbuilding Quality Assurance & Quality Control (QA/QC)**
JOB TITLE	**:**	**Shipbuilding QA/QC Technician**
LEVEL	**:**	**3**

Job Responsibilities:

- Inspecting materials and workmanship to ensure compliance with specifications and industry standards.
- Identifying and documenting any quality issues, defects or non-conformances and coordinating the implementation of corrective action.
- Supporting commissioning and start-up of the systems

Knowledge:

- shipbuilding processes and standards.
- quality control techniques and tools, including inspections, testing and auditing.
- welding and metal fabrication techniques.
- health and safety regulations and procedures.
- relevant codes and regulations
- measuring and testing equipment
- non-destructive testing techniques
- Strong attention to detail and ability to identify and resolve quality control issues.

Skills:

- perform inspections, tests and record results.
- Creative problem-solving
- procedures and standards.
- non-destructive testing techniques.
- organizational and time management
- change requirements and processes.
- Interpersonal communication
- Ability to work in a fast-paced and dynamic environment.
- software and technology.

Attributes (Attitude):

- Attention to detail
- Report and documentation
- Team Communication
- Interdepartmental Teamwork
- Adhere to Occupational Safety and Health (OSHA) / Factory and Machinery Act 1967.

MSIC DIVISION	**:**	**C30 - Manufacture of Other Transport Equipment**
MSIC GROUP	**:**	**C301 - Building of Ships And Boat**
AREA	**:**	**Shipbuilding Testing & Commissioning (HAT & SAT)**
JOB TITLE	**:**	**Shipbuilding Testing & Commissioning Engineer**
LEVEL	**:**	**5**

Job Responsibilities:

- Developing and implementing testing and commissioning procedures.
- Coordinating and supervising the testing and commissioning of mechanical, electrical, and electronic systems and equipment
- Inspecting and evaluating the performance of systems and equipment during testing

Knowledge:

- shipbuilding systems and equipment, including electrical, mechanical, hydraulic, and pneumatic systems.
- relevant codes and regulations.
- testing and commissioning procedures and standards.
- electrical and instrumentation systems and testing techniques.
- health and safety regulations and procedures.
- problem-solving skills.
- interpret technical drawings and schematics.
- project management, scheduling and budgeting skills.

Skills:

- testing and commissioning of shipbuilding
- problem-solving skills.
- Interpersonal communication
- project management.
- interpret technical drawings and schematics.
- relevant codes and regulations.
- analytical and organizational skills.

Attributes (Attitude):

- Task oriented
- work under pressure and meet deadlines
- Team work and Cooperation
- Interdepartmental liaison
- Timely reporting.
- Adhere to Occupational Safety and Health Compliance Requirement.

SECTION : (C) MANUFACTURING

DIVISION : (30) MANUFACTURE OF OTHER TRANSPORT EQUIPMENT

GROUP : (302) MANUFACTURE OF RAILWAY AND ROLLING STOCK

MSIC DIVISION	**:**	**C30 - Manufacture of Other Transport Equipment**
MSIC GROUP	**:**	**C302 - Manufacture of Railway And Rolling Stock**
AREA	**:**	**Rolling Stock Design Preparation / Design And Development & Architecture Design**
JOB TITLE	**:**	**Technical Design Director**
LEVEL	**:**	**7**

Job Responsibilities:

A Technical Design Director is responsible for leading the technical design and development of products, systems, or projects within an organization.

Knowledge:

- Railway and rolling stock
- railway and rolling stock design principles
- Team leadership
- railway industry standards, regulations, and best practices.
- Design tools technology
- Budgeting and financial management principles.
- Quality control and quality assurance procedures.

Skills:

- Execution of technical aspects of a production.
- Communication skills.
- Leadership.
- Problem-solving.
- Flexibility.
- Technical expertise.
- Budgeting and cost control.
- 3D CAD modelling systems

Attributes (Attitude):

- Occupational Safety and Health Compliance
- quality outcomes and adherence to procedures
- Team management
- Documentation and presentation
- Technical problem-solving
- Systematic methods, technical documentation

MSIC DIVISION	**:**	**C30 - Manufacture of Other Transport Equipment**
MSIC GROUP	**:**	**C302 - Manufacture of Railway And Rolling Stock**
AREA	**:**	**Rolling Stock Design Preparation / Design And Development & Architecture Design**
JOB TITLE	**:**	**Head of Technical**
LEVEL	**:**	**6**

Job Responsibilities:

The Technical Head is responsible for creating and executing technical strategies that align with the organization's overall goals and objectives. Responsible for managing and leading technical teams, including assigning tasks and ensuring that team members have the necessary resources and support to complete them

Knowledge:

- Rolling stock design
- project management principles.
- diagnose and troubleshoot technical issues
- aligning vendor's technology
- Budget management and control

Skills:

- technical problem solving
- leadership skills.
- project management skills.
- verbal and written communication
- The ability to think strategically
- Budget management
- decision-making

Attributes (Attitude):

- Work ethic
- attention to detail.
- Flexibility.
- Results-oriented.
- collaboration

MSIC DIVISION	**:**	**C30 - Manufacture of Other Transport Equipment**
MSIC GROUP	**:**	**C302 - Manufacture of Railway And Rolling Stock**
AREA	**:**	**Rolling Stock Design Preparation / Design And Development & Architecture Design**
JOB TITLE	**:**	**Senior Engineer**
LEVEL	**:**	**5**

Job Responsibilities:

R&D Senior Engineer is responsible to review and design, manufacture and maintain everything from small parts like miniature connectors to large machine tools like drill presses. They take a product from start to finish, and design for aesthetics, functionality, and durability.

Knowledge:

- Engineering principles.
- Design software, CAD (computer-aided design) and CAE (computer-aided engineering) programs
- manufacturing processes.
- Geometric Dimensioning and Tolerance (GD&T)
- Prototyping techniques.

Skills:

- quality management requirement.
- product conceptual design modelling
- Carry out design engineering analysis
- Prepare design specification.
- Produce BOM list.

Attributes (Attitude):

- Department roles
- organisational goals and operational tasks relationship
- Knowledge sharing
- Change management
- Documentation and reporting
- Team development program

MSIC DIVISION	**:**	**C30 - Manufacture of Other Transport Equipment**
MSIC GROUP	**:**	**C302 - Manufacture of Railway And Rolling Stock**
AREA	**:**	**Rolling Stock Architecture Design**
JOB TITLE	**:**	**Head of Technical**
LEVEL	**:**	**6**

Job Responsibilities:

An Architecture Design Head is responsible for leading and managing the design process for architecture projects, managing and mentoring a team of architects and designers, and leading the design process for multiple projects simultaneously.

Knowledge:

- Analysing the site and the surrounding area.
- Developing conceptual design.
- Developing detailed design drawings.
- Preparing construction documentation.
- environmental and social impact

Skills:

- Technical problem solving
- leadership
- verbal and written communication
- Strategic thinking
- decision-making

Attributes (Attitude):

- work ethic.
- attention to detail.
- new technologies adaptation
- high-quality technical solutions
- Multi-tasking team work

MSIC DIVISION	**:**	**C30 - Manufacture of Other Transport Equipment**
MSIC GROUP	**:**	**C302 - Manufacture of Railway And Rolling Stock**
AREA	**:**	**Rolling Stock Architecture Design**
JOB TITLE	**:**	**Senior Engineer**
LEVEL	**:**	**5**

Job Responsibilities:

An Architecture Engineer responsible to apply engineering principles to the design, construction, and maintenance of railway rolling stock.

Knowledge:

- Principles of structural engineering.
- Design and analyse structures
- Design and function of mechanical, electrical, and plumbing systems
- HVAC, lighting and power systems.
- Sustainable design principles.

Skills:

- Structural engineering, MEP systems, construction materials and methods.
- Ability to create detailed, accurate and visually pleasing designs.
- AutoCAD software

Attributes (Attitude):

- Information sharing
- Adaptation to new environment.
- Documentation and records
- Team learning opportunities
- Team management
- Documentation and reporting

MSIC DIVISION	**:**	**C30 - Manufacture of Other Transport Equipment**
MSIC GROUP	**:**	**C302 - Manufacture of Railway And Rolling Stock**
AREA	**:**	**Rolling Stocks Mechanical Engineering**
JOB TITLE	**:**	**Head of Technical**
LEVEL	**:**	**6**

Job Responsibilities:

Mechanical Engineering head is responsible for ensuring that the mechanical systems and components are designed, developed, tested, and manufactured to meet the requirements of the project or product and that they meet the safety, quality, and performance standards. Additionally, they are responsible for ensuring that the project is completed on time, within budget and that the client's requirements are met.

Knowledge:

- Railway Manufacturing (Bogie, Roof, Side, Underframe, Brake system)
- Team Management
- technical documentation.
- project timelines and budgets management
- process improvements.
- mechanical systems analysis

Skills:

- problem solving and solutions.
- Strong foundation in
- Proficient in computer-aided design (CAD) software.
- Interpersonal communication
- technical reports and documentation
- data analysis and decision making
- simulation and modelling techniques
- Mentoring and training junior engineers

Attributes (Attitude):

- work ethic and quality work
- project management and time management
- analytical thinking and problem-solving
- teamwork
- customer-focused
- Flexibility and adaptability
- adherence to industry regulations and standards

MSIC DIVISION	**:**	**C30 - Manufacture of Other Transport Equipment**
MSIC GROUP	**:**	**C302 - Manufacture of Railway And Rolling Stock**
AREA	**:**	**Rolling Stocks Mechanical Engineering**
JOB TITLE	**:**	**Engineer**
LEVEL	**:**	**4**

Job Responsibilities:

Mechanical engineer role in the planning, design, construction, and operations of a building/rolling stock by providing a digital representation of the building/rolling stock that can be used to support all phases of the project. To ensuring that the Building Information Modelling (BIM) is accurate, up-to-date, and accessible to all project stakeholders, and that it is used to support the project's goals and objectives.

Knowledge:

- BIM software and technology
- design and construction process
- building / rolling stock systems and components
- industry standards and regulations
- computer-aided design (CAD) software

Skills:

- BIM software such as Revit, ArchiCAD, Navisworks, and Solibri.
- fabrication, assembly, installation, and commissioning process

Attributes (Attitude):

- information sharing
- environment change adaptation
- Document and record keeping system.
- Team learning opportunities
- Task delegation
- Documentation and reporting

MSIC DIVISION	**:**	**C30 - Manufacture of Other Transport Equipment**
MSIC GROUP	**:**	**C302 - Manufacture of Railway And Rolling Stock**
AREA	**:**	**Rolling Stocks Mechanical Engineering**
JOB TITLE	**:**	**Technician / Welder / Painter**
LEVEL	**:**	**3**

Job Responsibilities:

Welders are responsible for welding in railway rolling stock. They are specialize in welding, such as TIG welding for precision work or MIG welding for speed and efficiency. Painter is responsible to apply paint, coating, and finishes to a rolling stock surface, work on both interior and exterior surfaces.

Knowledge:

- paint characteristics and application methods.
- different types of paint, finishes and application methodologies.
- paint's properties, coverage, and drying time.
- welding techniques
- properties of different metals
- finished product inspection

Skills:

- read and interpret blueprints and technical drawings
- Flexibility and adaptability
- colour, composition and design
- creating visually appealing and attractive finished products

Attributes (Attitude):

- Preparing work report.
- Communicate effectively with team work and client.
- Creative in solving problems.
- Work closely with another department.
- Adhere to Occupational Safety and Health

MSIC DIVISION	**:**	**C30 - Manufacture of Other Transport Equipment**
MSIC GROUP	**:**	**C302 - Manufacture of Railway And Rolling Stock**
AREA	**:**	**Rolling Stocks Electrical & Electronic Engineering**
JOB TITLE	**:**	**Head of Technical**
LEVEL	**:**	**6**

Job Responsibilities:

Rolling Stocks Electrical and Electronic Engineering head is responsible for ensuring that the Electrical systems and components are designed, developed, tested, and manufactured to meet the requirements of the project or product and that they meet the safety, quality, and performance standards. Additionally, they are responsible for ensuring that the project is completed on time, within budget and that the client's requirements are met.

Knowledge:

- Railway Manufacturing (Power, Auxiliary, VAC, Transformer)
- Leadership and project management
- testing and validation of Electrical systems
- technical documentation
- project timelines and budget management
- Interpersonal Communication
- process improvements
- Mentoring and training

Skills:

- Technical problem solving
- Electrical systems.
- communication and teamwork
- technical reports, documentation and presentation
- Data analysis and decision making
- simulation and modelling techniques
- project management and time management

Attributes (Attitude):

- work ethic and quality work
- analytical and problem-solving
- interpersonal communication
- customer-focused
- Flexibility and adaptability
- safety, industry regulations and standards.

MSIC DIVISION	**:**	**C30 - Manufacture of Other Transport Equipment**
MSIC GROUP	**:**	**C302 - Manufacture of Railway And Rolling Stock**
AREA	**:**	**Rolling Stocks Electrical & Electronic Engineering**
JOB TITLE	**:**	**Engineer**
LEVEL	**:**	**4**

Job Responsibilities:

An interface railway engineer implement the designs, develops, and perform interfaces between different systems, include designing and implementing user interfaces, as well as creating and maintaining APIs (Application Programming Interfaces). Responsible for final verification and validation of interface requirements for respective scope.

Knowledge:

- internal and external interfaces
- interface database.
- industry standards and regulations
- fabrication, assembly, installation, and commissioning process
- building codes, energy efficiency, and accessibility

Skills:

- Interface meeting
- Problem solving for Interface issues
- Verification and validation process

Attributes (Attitude):

- adapt to change
- Documentation and record keeping system
- Team learning opportunities
- Team task delegation
- Documentation and reporting

MSIC DIVISION	**:**	**C30 - Manufacture of Other Transport Equipment**
MSIC GROUP	**:**	**C302 - Manufacture of Railway And Rolling Stock**
AREA	**:**	**Rolling Stocks Electrical & Electronic Engineering**
JOB TITLE	**:**	**Technician**
LEVEL	**:**	**3**

Job Responsibilities:

An electrical technician responsibilities is to implement the designs, develops, and perform interfaces between different systems.

Knowledge:

- wiring methods and materials
- test equipment
- alternating current (AC) and direct current (DC) electrical systems
- circuit design and layout, including schematics, wiring diagrams, and blueprints.

Skills:

- diagnose and troubleshoot electrical problems
- use of test equipment and diagnostic techniques
- Interpersonal communication
- analyse and solve problems related to electrical equipment and systems.
- install, maintain, and repair electrical systems
- read and understand technical documentation

Attributes (Attitude):

- Preparing work report.
- Communicate effectively with team work and client.
- Creative in solving problems.
- Work closely with another department.
- Adhere to Occupational Safety and Health.

MSIC DIVISION	**:**	**C30 - Manufacture of Other Transport Equipment**
MSIC GROUP	**:**	**C302 - Manufacture of Railway And Rolling Stock**
AREA	**:**	**Rolling Stocks Communication & Signalling Engineering**
JOB TITLE	**:**	**Head of Technical**
LEVEL	**:**	**6**

Job Responsibilities:

Signal & Communication Engineering head is responsible for ensuring that the Signal & Communication systems and components are designed, developed, tested, and manufactured to meet the requirements of the project or product and that they meet the safety, quality, and performance standards. Additionally, they are responsible for ensuring that the project is completed on time, within budget and that the client's requirements are met.

Knowledge:

- Railway manufacturing (CCTV, PIS, antenna).
- Rolling stock signal & communication engineering
- Testing and validation of signal & communication systems.
- Technical documentation
- Project timelines and budget management
- Interpersonal communication
- Process improvements.
- Mentoring and training

Skills:

- Analyse complex problems and develop effective solutions
- Signal and communication systems
- Team management
- Project management and time management
- Communication and interpersonal skills
- Technical reports, design documents, and other technical communication

Attributes (Attitude):

- work ethic
- quality work
- analytical and problem-solving
- customer-focused attitude
- Flexibility and adaptability
- safety and adherence to industry regulations and standards.

MSIC DIVISION	**:**	**C30 - Manufacture of Other Transport Equipment**
MSIC GROUP	**:**	**C302 - Manufacture of Railway And Rolling Stock**
AREA	**:**	**Rolling Stocks Communication & Signalling Engineering**
JOB TITLE	**:**	**Engineer**
LEVEL	**:**	**4**

Job Responsibilities:

Signalling & Communication Engineer is responsible for execute the rolling stock testing of new systems , equipment, and facilities.

Knowledge:

- electrical systems, including power distribution, control systems, and instrumentation
- testing procedures and techniques
- troubleshooting techniques

Skills:

- Understanding of electrical, mechanical, and control systems
- industry standards and regulations
- ability to troubleshoot and resolve issues
- Interpersonal communication skills
- Team management
- safety regulations and guidelines.
- Documentation and recording system

Attributes (Attitude):

- information sharing
- assist others to adapt changing environment.
- Workers learning opportunities
- Effective task delegation
- Prepare documents clearly and report concisely.

MSIC DIVISION	**:**	**C30 - Manufacture of Other Transport Equipment**
MSIC GROUP	**:**	**C302 - Manufacture of Railway And Rolling Stock**
AREA	**:**	**Rolling Stocks Communication & Signalling Engineering**
JOB TITLE	**:**	**Technician**
LEVEL	**:**	**3**

Job Responsibilities:

Technician is responsible to implement the designs, develops, and perform signalling and communication.

Knowledge:

- wiring methods and materials
- test equipment, and other diagnostic tools
- alternating current (AC) and direct current (DC) electrical systems and their components.
- circuit design and layout
- diagnose and troubleshoot electrical problems

Skills:

- troubleshooting, repair, and maintenance
- Interpersonal communication
- technical documentation
- work progress report.
- Interpersonal Communicate
- Creative problems solving
- Interdepartmental Team work
- Adhere to Occupational Safety and Health

Attributes (Attitude):

- Adhere to Occupational Safety and Health
- information sharing
- assist others to adapt changing environment.
- Workers learning opportunities
- Effective task delegation
- Prepare documents clearly and report concisely.

MSIC DIVISION	**:**	**C30 - Manufacture of Other Transport Equipment**
MSIC GROUP	**:**	**C302 - Manufacture of Railway And Rolling Stock**
AREA	**:**	**Rolling Stocks Testing & Commissioning (T & C)**
JOB TITLE	**:**	**Head of Technical**
LEVEL	**:**	**6**

Job Responsibilities:

Test & Commissioning Engineering head is responsible for ensuring that the Test & Commissioning systems and components are designed, developed, tested, and manufactured to meet the requirements of the project or product and that they meet the safety, quality, and performance standards. Additionally, they are responsible for ensuring that the project is completed on time, within budget and that the client's requirements are met.

Knowledge:

- railway rolling stock and Railway Testing (Event, HMI, Light, Comm, Smoke, VAC, IF S&TCS, IF COM, Aux Power, MVB, Aux Con, Door, Brake, SW).
- Leadership and Project Management
- testing and validation of Test & Commissioning systems.
- Technical documentation

Skills:

- process improvements.
- analyse complex problems during rolling stock test & inspection
- Test & Commissioning systems.
- Team interpersonal communication
- technical reports, design documents, and other technical communication.
- analyse data and effective decision making
- Mentoring and training
- simulation and modelling techniques
- Managing project timelines and budgets.
- Reviewing and approving technical documentation

Attributes (Attitude):

- work ethic and commitment to quality work
- project management and time management
- analytical thinking and problem-solving
- interpersonal communication
- A customer-focused attitude
- Flexibility and adaptability to changing requirements or conditions
- adherence to industry regulations and standards.

MSIC DIVISION	**:**	**C30 - Manufacture of Other Transport Equipment**
MSIC GROUP	**:**	**C302 - Manufacture of Railway And Rolling Stock**
AREA	**:**	**Rolling Stocks Testing & Commissioning (T & C)**
JOB TITLE	**:**	**T & C Engineer**
LEVEL	**:**	**4**

Job Responsibilities:

- Test and Commissioning Engineer is responsible for execute the rolling stock testing and commissioning of new systems , equipment, and facilities.

Knowledge:

- electrical systems, including power distribution, control systems, and instrumentation
- mechanical systems, including HVAC, plumbing, and fire protection systems
- testing procedures and techniques
- troubleshooting techniques
- Interpersonal communication
- electrical, mechanical, and control systems
- industry standards and regulations
- safety regulations and guidelines

Skills:

- troubleshoot and resolve
- Interpersonal Communication
- Progress Report presentation
- Documentation and record keeping
- Team task delegation

Attributes (Attitude):

- Information sharing
- Helpful and assist team to adapt changing environment
- Team learning opportunities

MSIC DIVISION	**:**	**C30 - Manufacture of Other Transport Equipment**
MSIC GROUP	**:**	**C302 - Manufacture of Railway And Rolling Stock**
AREA	**:**	**Rolling Stocks Testing & Commissioning (T & C)**
JOB TITLE	**:**	**T & C Technician**
LEVEL	**:**	**3**

Job Responsibilities:

- Test and Commissioning technician is responsible to perform the rolling stock testing and commissioning of systems , equipment, and facilities according to the Inspection & Test Plan.

Knowledge:

- wiring methods and materials
- test equipment and diagnostic techniques for railway rolling stock system.
- alternating current (AC) and direct current (DC) electrical systems and their components.
- circuit design and layout, including schematics, wiring diagrams, and blueprints.

Skills:

- diagnose and troubleshoot electrical problems
- Interpersonal communication
- Problem solving related to electrical equipment and systems.
- install, maintain, and repair electrical systems, including wiring, switchgear, and other electrical components.
- technical documentation, such as schematics, wiring diagrams, and blueprints.

Attributes (Attitude):

- Preparing work report.
- Communicate effectively with team work and client.
- Creative in solving problems.
- Work closely with another department.
- Adhere to Occupational Safety and Health.

MSIC DIVISION : C30 - Manufacture of Other Transport Equipment
MSIC GROUP : C302 - Manufacture of Railway And Rolling Stock
AREA : Rolling Stocks Production Engineering
JOB TITLE : Head of Production
LEVEL : 6

Job Responsibilities:

Production Manager is responsible for overseeing the production process of a manufacturing rolling stock, ensuring that products are produced efficiently, on time, and within budget.

Knowledge:

- manufacturing processes (assembly, fabrication, and machining for rolling stock)
- railway safety regulations and guideline.
- project management principles and techniques.
- sourcing, procurement, inventory management, and logistics.
- lean manufacturing principles, such as 5S and Kanban.

Skills:

- Project management
- Leadership and team management
- plan and organize production schedules
- Interdepartmental coordination
- resolve production issues and decision making
- Interdepartmental communication
- Team time management

Attributes (Attitude):

- Be mindful
- Openness and able to adapt new situations
- positive attitude, face challenges
- inspire and motivate team to achieve their goals.
- Being proactive and making effective decisions

MSIC DIVISION	**:**	**C30 - Manufacture of Other Transport Equipment**
MSIC GROUP	**:**	**C302 - Manufacture of Railway And Rolling Stock**
AREA	**:**	**Rolling Stocks Quality, Safety, Health & Environment Control (QSHE)**
JOB TITLE	**:**	**Senior QSHE**
LEVEL	**:**	**5**

Job Responsibilities:

Senior QSHE responsible for all Quality Assurance/Quality Control matters within the organization, with the Supplier / Sub Contractors and sub-contractors, and with the Authority.

Knowledge:

- customer service standards.
- standards for Inspection and Test Plan at Manufacturing Plant.
- HAP's Project Quality Plan requirement.
- Engineering Changed Notice implemented in Manufacturing by Quality Inspector.
- manufacturing Book and main components compliance test certificated
- rolling stock Manufacturing and Assembly processes
- contract document requirement

Skills:

- quality management systems
- auditing techniques
- inspection techniques
- Statistical analysis techniques and process improvement
- Problem-solving: issues and decision making

Attributes (Attitude):

- work ethic and commitment to quality work
- analytical thinking and effective problem-solving
- Interpersonal communication
- customer-focused attitude

MSIC DIVISION	**:**	**C30 - Manufacture of Other Transport Equipment**
MSIC GROUP	**:**	**C302 - Manufacture of Railway And Rolling Stock**
AREA	**:**	**Rolling Stocks Quality, Safety, Health & Environment Control (QSHE)**
JOB TITLE	**:**	**QSHE Engineer**
LEVEL	**:**	**4**

Job Responsibilities:

- Quality Engineer has the responsibility and authority for implementing, monitoring and improving of the quality activities and project quality system. The engineer is also responsibility for quality control of fitting (final assembling), quality control of painting and in-process inspection.

Knowledge:

- quality management systems such as ISO 9001
- statistical process control techniques
- inspection techniques to ensure compliance with quality standards.
- manufacturing processes, equipment, and machinery
- troubleshoot and make repairs
- quality control techniques to meet quality standards

Skills:

- analyse data, identify problems, and effective solutions
- plan, organize, and project management
- analyse data, identify trends and patterns, and make decisions.
- conduct internal and external audits
- inspection tools and techniques

Attributes (Attitude):

- Documentation, timely reporting and record keeping
- Team learning opportunities
- Effective task delegation

SECTION : (C) MANUFACTURING

DIVISION : (30) MANUFACTURE OF OTHER TRANSPORT EQUIPMENT

GROUP : (303) MANUFACTURE OF AIR AND SPACECRAFT AND RELATED MACHINERY

MSIC DIVISION	**:**	**C30 - Manufacture of Other Transport Equipment**
MSIC GROUP	**:**	**C303 - Manufacture of Air And Spacecraft And Related Machinery**
AREA	**:**	**Aircraft Part Engineering Design**
JOB TITLE	**:**	**Principal Design Technologist**
LEVEL	**:**	**7**

Job Responsibilities:

The specific responsibilities of a Principal Aircraft Design Technologist can vary depending on the company and the specific project.

Knowledge:

- Aircraft design and development.
- Regulations and safety standards.
- Materials and manufacturing.
- Project management.
- Team management.
- Technical writing and communication.
- Software required.
- industry trends and developments.
- aerospace product and design lifecycle.
- avionics, electrical systems, propulsion, aerodynamics, structures and systems integration
- aircraft certification process and requirements

Skills:

- Technical expertise.
- Leadership and project management.
- Communication and interpersonal skills.
- Problem-solving and analytical skills.
- Technical writing.
- CAD and simulation software.
- Adaptability and flexibility.
- Attention to detail.
- Strategic thinking.
- Strong mentoring and team management skills.

Attributes (Attitude):

- Strong work ethic.
- Leadership and decision-making ability.
- analytical and problem-solving skills.
- Creativity and innovation.
- Attention to detail
- Interpersonal communication
- Strong ability to work under pressure and handle multiple tasks simultaneously.

MSIC DIVISION	**:**	**C30 - Manufacture of Other Transport Equipment**
MSIC GROUP	**:**	**C303 - Manufacture of Air And Spacecraft And Related Machinery**
AREA	**:**	**Aircraft Part Engineering Design**
JOB TITLE	**:**	**Senior Design Technologist**
LEVEL	**:**	**6**

Job Responsibilities:

A Senior Design Technologist is responsible for leading and managing the design and development of aircraft and aerospace systems.

Knowledge:

- Aerospace engineering principles
- Computer-aided design (CAD) and simulation software.
- Industry regulations and standards.
- Product data management (PDM) and bill of materials (BOM).
- Materials and manufacturing processes.
- Project management
- aircraft systems and their interactions,
- certification process and requirements,
- industry regulations and standards,
- materials and manufacturing processes

Skills:

- Technical expertise.
- CAD and simulation software.
- Project management.
- Leadership and decision making
- Interpersonal Communication
- Interpersonal skills
- Problem-solving and Decision-making
- Adaptability.
- Strategic thinking
- Attention to detail
- Time management
- Technical documentation and drawings

Attributes (Attitude):

- work ethic
- Professionalism
- Flexibility
- Creativity.
- Attention to detail
- Self-motivation.

MSIC DIVISION	**:**	**C30 - Manufacture of Other Transport Equipment**
MSIC GROUP	**:**	**C303 - Manufacture of Air and Spacecraft And Related Machinery**
AREA	**:**	**Aircraft Part Engineering Design**
JOB TITLE	**:**	**Design Technologist**
LEVEL	**:**	**5**

Job Responsibilities:

A Design Technologist is responsible for supporting the design and development of aircraft and aerospace systems. They work closely with engineers and other professionals to create technical drawings, models, and simulations to support the design and development of aircraft and aerospace systems.

Knowledge:

- Aerospace engineering principles.
- CAD and simulation software.
- Materials and manufacturing processes.
- Industry regulations and standards.
- Aircraft systems and their interactions.
- Aircraft certification process and requirements.
- Technical documentation.
- Project management.

Skills:

- Analytical and problem-solving skills.
- Project management.
- Communication and interpersonal skills.
- Technical writing and documentation.
- Time management and organisation.
- Attention to detail.
- Teamwork.
- Flexibility and adaptability.
- Technical leadership.

Attributes (Attitude):

- Strong work ethic.
- Continuous learning.
- Creativity.
- Attention to detail.
- Flexibility and adaptability.
- Strong time management and organization.

MSIC DIVISION	**:**	**C30 - Manufacture of Other Transport Equipment**
MSIC GROUP	**:**	**C303 - Manufacture of Air and Spacecraft And Related Machinery**
AREA	**:**	**Aircraft Part Tooling Engineer**
JOB TITLE	**:**	**Principal Tool Design Specialist**
LEVEL	**:**	**7**

Job Responsibilities:

- A Principal Tool Design Specialist is responsible for designing, developing and maintaining the tools and equipment used in the manufacture, assembly and maintenance of aircraft and aerospace systems.

Knowledge:

- Aerospace industry standards and regulations.
- Materials science.
- Manufacturing processes.
- Quality control and inspection.
- Design principles.
- Project management.
- Technical writing and documentation.
- Safety.
- Computer-Aided Design (CAD.
- Computer Numerical Control (CNC).
- Metal cutting.
- Mold Designing.

Skills:

- Problem-solving and critical thinking skills
- Communication.
- Attention to detail.
- Interpersonal skills.
- Time management.
- Technical expertise.
- leadership and management skills

Attributes (Attitude):

- attention to detail
- identify and resolve design errors
- Flexibility
- Teamwork

MSIC DIVISION	**:**	**C30 - Manufacture of Other Transport Equipment**
MSIC GROUP	**:**	**C303 - Manufacture of Air and Spacecraft And Related Machinery**
AREA	**:**	**Aircraft Part Tooling Engineer**
JOB TITLE	**:**	**Tool Design Specialist**
LEVEL	**:**	**6**

Job Responsibilities:

- Designing, developing, and testing aircraft tools and equipment using CAD software in accordance with engineering specifications and industry standards.
- Creating detailed engineering drawings, schematics, and 3D models of aircraft tools and equipment.

Knowledge:

- Aircraft tool design and manufacturing processes.
- Engineering drawings and specifications.
- Computer-aided design (CAD).
- CNC machining.
- Industry standards and regulations.

Skills:

- analytical and problem-solving
- Metal cutting skills.
- Mould design skills.
- communication and collaboration .
- leadership and management skills.
- Strong time management and organizational skills.

Attributes (Attitude):

- Creativity.
- Technical expertise.
- Attention to detail.
- Flexibility and adaptability.
- Passion for the industry.
- Continuous learning.

MSIC DIVISION	**:**	**C30 - Manufacture of Other Transport Equipment**
MSIC GROUP	**:**	**C303 - Manufacture of Air and Spacecraft And Related Machinery**
AREA	**:**	**Aircraft Part Tooling Engineer**
JOB TITLE	**:**	**Tool Design Engineer**
LEVEL	**:**	**5**

Job Responsibilities:

- Designing and developing tools, jigs, fixtures, and equipment using CAD software such as SolidWorks or CATIA.
- Creating detailed engineering drawings, schematics, and 3D models of aircraft tools and equipment.

Knowledge:

- Aerospace engineering principles.
- CAD software.
- CNC machining.
- Mold design.
- Engineering materials and their properties.
- Manufacturing processes and their limitation.
- Industry standards and regulations.
- Project management.
- Aerospace industry trends and advancements.

Skills:

- problem-solving skills.
- CAD skills.
- CNC programming skills.
- attention to detail.
- communication and collaboration skills.
- analytical and creative thinking skills.
- learning and adapting skills.

Attributes (Attitude):

- technical aptitude.
- attention to detail.
- analytical and creative thinking.
- work ethic.
- safety
- quality
- adaptability
- responsibility

MSIC DIVISION	**:**	**C30 - Manufacture of Other Transport Equipment**
MSIC GROUP	**:**	**C303 - Manufacture of Air and Spacecraft And Related Machinery**
AREA	**:**	**Aircraft Part Tooling Engineer**
JOB TITLE	**:**	**Senior Tooling Technician**
LEVEL	**:**	**4**

Job Responsibilities:

- Maintaining, repairing, and overhauling aircraft tools and equipment, such as jigs, fixtures, and special tooling.
- Operating and programming CNC machines to cut and shape components of the tools and equipment.
- Inspecting and testing tools and equipment to ensure they meet engineering specifications and industry standards.
- Troubleshooting and repairing equipment malfunctions and making necessary adjustments.

Knowledge:

- Aerospace industry standards and regulations.
- CAD/CAM software and programming languages.
- Manufacturing processes.
- CNC machining principles.
- Quality control and inspection techniques.
- Safety procedures and regulations.
- Maintenance and repair techniques for aircraft tools and equipment.
- Technical documentation and record keeping.
- The principles of Lean, Six Sigma, and total quality management (TQM).
- The latest trends and advancements in the aerospace industry and tooling technology.
- Familiarity with the use of precision measuring instruments.

Skills:

- technical skills.
- operation and programming of CNC machines.
- problem-solving and troubleshooting abilities.
- organizational and time management
- verbal and written communication
- analytical and creative thinking
- project management
- problem-solving

Attributes (Attitude):

- technical aptitude.
- attention to detail.
- Strong work ethic.
- Commitment to safety.

- commitment to quality.
- adaptability.

MSIC DIVISION	**:**	**C30 - Manufacture of Other Transport Equipment**
MSIC GROUP	**:**	**C303 - Manufacture of Air and Spacecraft And Related Machinery**
AREA	**:**	**Aircraft Part Industrial Engineering**
JOB TITLE	**:**	**Senior Industrial Engineer**
LEVEL	**:**	**6**

Job Responsibilities:

- Project management: The engineer is responsible for managing projects from concept to completion, including setting timelines, budgets, and resource allocation.
- Manufacturing processes and techniques: The engineer is responsible for developing, implementing, and maintaining the various manufacturing processes and techniques used in aircraft production, such as assembly, welding, and inspection.
- Lean manufacturing: The engineer is responsible for identifying and implementing improvements in the manufacturing process to increase efficiency and reduce waste.
- Engineering and design: The engineer is responsible for developing and designing new manufacturing processes and equipment to improve productivity and quality.
- Quality control and assurance: The engineer is responsible for implementing and maintaining quality control and assurance procedures to ensure that the manufactured products meet the required specifications.

Knowledge:

- Project management.
- Manufacturing processes and techniques.
- Lean manufacturing.
- Engineering and design principles.
- Quality control and assurance.
- Safety regulations.
- Supply chain management.
- Cost analysis and budgeting.
- Technical writing.
- Knowledge of aerospace industry and regulations.

Skills:

- analytical thinking
- Interpersonal communication
- leadership and mentorship
- computer skills
- problem-solving

Attributes (Attitude):

- Attention to detail.
- work independently and in a team.
- adapt to changes

- work ethic
- work under pressure.
- ability to manage risks.

MSIC DIVISION	**:**	**C30 - Manufacture of Other Transport Equipment**
MSIC GROUP	**:**	**C303 - Manufacture of Air and Spacecraft And Related Machinery**
AREA	**:**	**Aircraft Part Industrial Engineering**
JOB TITLE	**:**	**Industrial Engineer**
LEVEL	**:**	**5**

Job Responsibilities:

- The industrial engineer is responsible for designing and implementing manufacturing processes that are efficient, safe, and cost-effective.
- Developing and maintaining production schedules that meet customer demand and ensure that products are delivered on time.
- Managing projects, including developing project plans, budgets, and timelines, and ensuring that projects are completed on time and within budget.
- Managing resources, including personnel, equipment, and materials, and ensuring that resources are used efficiently and effectively.

Knowledge:

- Manufacturing processes.
- Engineering principles.
- Quality control.
- Project management.
- Resource management.
- Data analysis.
- Safety regulations.
- Industry trends and developments.
- Cost management.
- Lean Manufacturing.
- Computer-aided design (CAD) and computer-aided manufacturing (CAM).

Skills:

- Technical
- Communication
- Problem-solving
- Leadership
- Technical writing
- Time management
- interpersonal skills and ability to work well with others.
- analytical and critical thinking skills.

Attributes (Attitude):

- Strong work ethic.
- Attention to detail.
- Adaptability.
- Creativity.
- continuous improvement.

MSIC DIVISION	**:**	**C30 - Manufacture of Other Transport Equipment**
MSIC GROUP	**:**	**C303 - Manufacture of Air and Spacecraft And Related Machinery**
AREA	**:**	**Aircraft Part Sheet Metal Engineering**
JOB TITLE	**:**	**Sheet Metal Specialist**
LEVEL	**:**	**6**

Job Responsibilities:

- Fabricating, repairing, and installing sheet metal parts and structures on aircraft, such as fuselage, wing and tail assemblies, and other aircraft components.
- Reading and interpreting blueprints, schematics, and technical drawings to determine the proper procedures for fabricating and installing sheet metal parts.
- Using hand and power tools to cut, bend, shape, and form sheet metal into specific shapes and sizes to match the specifications on the blueprints.

Knowledge:

- Techniques and procedures for fabricating, repairing, and installing sheet metal parts and structures on aircraft.
- Reading and interpreting blueprints, schematics, and technical drawings
- Material properties of sheet metal and effects of fabrication processes
- The principles of aerodynamics.
- The principles of metalworking.
- Safety regulations and procedures for working with sheet metal.
- Quality control procedures and inspection techniques
- computer-aided design (CAD) software.
- aeronautical engineering.
- tools, equipment, and materials.
- cost control and budgeting principles.
- Project management

Skills:

- Technical
- Communication
- Problem-solving
- Leadership skills.
- Technical writing skills.
- Time management skills.
- interpersonal skills and team work
- analytical and critical thinking skills.

Attributes (Attitude):

- work ethic and high-quality work
- attention to detail and work with precision and accuracy
- work independently
- learn new technologies and processes quickly
- ability to adapt to change

MSIC DIVISION	**:**	**C30 - Manufacture of Other Transport Equipment**
MSIC GROUP	**:**	**C303 - Manufacture of Air and Spacecraft And Related Machinery**
AREA	**:**	**Aircraft Part Sheet Metal Engineering**
JOB TITLE	**:**	**Sheet Metal Technician**
LEVEL	**:**	**3**

Job Responsibilities:

- Fabricating and assembling sheet metal parts, components, and assemblies for aircraft.
- Reading and interpreting blueprints, engineering drawings, and specifications to determine the appropriate materials, tools, and equipment needed for the job.

Knowledge:

- Sheet metal fabrication techniques.
- Blueprints and engineering drawings.
- Aircraft structures.
- Aerospace materials.
- Safety regulations and procedures.
- Quality assurance and inspection.
- Computer-aided design (CAD) and computer-aided manufacturing (CAM) software.
- Standard operating procedures and quality management systems.
- Maintenance and troubleshooting.
- Industry regulations and standards.
- Aerospace industry trends.

Skills:

- Fabrication skills.
- Mechanical aptitude
- Blueprint reading and interpretation.
- Communication skills.
- Problem-solving skills.
- Time management skills.
- Teamwork skills.
- Adaptability.
- Technical skills.
- Continuous Learning.

Attributes (Attitude):

- Attention to detail
- Dependability
- Adaptability and flexibility
- Technical proficiency.
- work ethic
- Positive attitude

MSIC DIVISION	**:**	**C30 - Manufacture of Other Transport Equipment**
MSIC GROUP	**:**	**C303 - Manufacture of Air and Spacecraft And Related Machinery**
AREA	**:**	**Aircraft Composites Part Laminating**
JOB TITLE	**:**	**Laminating Specialist**
LEVEL	**:**	**6**

Job Responsibilities:

- Fabricating and repairing composite materials used in aircraft construction, such as layering, bonding, and curing the materials.
- Using tools and equipment to shape and form composite materials to the required specifications.
- Reading and interpreting engineering and technical drawings to ensure that the composite materials are fabricated and repaired correctly.

Knowledge:

- Composite materials.
- Fabrication and repair techniques.
- Engineering and technical drawings.
- Computer-aided design (CAD) and computer-aided manufacturing (CAM) software.
- Aerospace industry and manufacturing process
- OSHA regulations and safety guidelines.
- Resins and curing processes.
- Autoclaves and other composite manufacturing equipment.
- Quality control and assurance principles.
- Hand and power tools.
- Knowledge of different types of adhesives and sealants used in composite materials fabrication and repair.
- Familiarity with aircraft design, engineering, and materials science.

Skills:

- Fabrication and repair
- Interpersonal communication
- Problem-solving
- Tools and equipment

Attributes (Attitude):

- Attention to detail.
- work ethic.
- Teamwork.
- Adaptability.
- Flexibility.
- Detail oriented.
- Positive attitude.
- Willingness to continuously learn and improve skills.

MSIC DIVISION	**:**	**C30 - Manufacture of Other Transport Equipment**
MSIC GROUP	**:**	**C303 - Manufacture of Air and Spacecraft And Related Machinery**
AREA	**:**	**Aircraft Part Machining**
JOB TITLE	**:**	**Senior Machinist**
LEVEL	**:**	**4**

Job Responsibilities:

- Overseeing the machining operations in a manufacturing facility, ensuring that all parts and assemblies are produced efficiently and on time.
- Developing and implementing quality control procedures to ensure that all parts and assemblies meet specifications.
- Developing and implementing safety procedures to ensure a safe working environment for machinists and other employees.
- Scheduling, planning and supervising the maintenance of machine tools, equipment and facilities to ensure they are in good working order.
- Leading, training and supervising a team of machinists, providing guidance and feedback to improve their skills and performance.

Knowledge:

- Production management.
- Quality control.
- Safety.
- Maintenance.
- Employee supervision.
- Cost control.
- Technical knowledge.
- Aerospace industry standards and regulations.

Skills:

- Advanced machining techniques.
- Advanced Quality control
- Advanced problem-solving
- leadership and management
- Interpersonal communication
- organizational skills.

Attributes (Attitude):

- work ethic.
- attention to detail.
- adaptability to changing circumstances and technologies.
- self-motivated, proactive, and take initiative.
- dependable and reliable.
- creative and innovative problem solution
- patient, persistent and detail-oriented.

MSIC DIVISION	**:**	**C30 - Manufacture of Other Transport Equipment**
MSIC GROUP	**:**	**C303 - Manufacture of Air and Spacecraft And Related Machinery**
AREA	**:**	**Aircraft Part Machining**
JOB TITLE	**:**	**Machinist**
LEVEL	**:**	**3**

Job Responsibilities:

- Reading and interpreting engineering drawings, blueprints, and specifications to determine the precise dimensions and tolerances of parts to be machined.
- Setting up and adjusting machine tools and equipment, including lathes, milling machines, grinders, and other precision machines.
- Selecting and installing cutting tools, such as drill bits, taps, and end mills, and making necessary adjustments to ensure precise cuts and finishes.
- Operating machine tools and equipment to fabricate or repair aircraft components, such as landing gear, engines, and fuselage sections.

Knowledge:

- Machining principles.
- materials used in aerospace manufacturing.
- CNC programming and operation.
- Quality control procedures and inspection techniques.
- Safety regulations and procedures
- Cost control and budgeting principles.
- measuring instruments and equipment.
- Computer-aided design (CAD) software,
- computer-aided manufacturing (CAM) software.
- Aerospace industry standards and regulations.
- Manufacturing processes.
- Quality Control.

Skills:

- Precision machining.
- Problem-solving.
- Interpersonal Communication

Attributes (Attitude):

- Attention to detail.
- Patience.
- Physical dexterity.
- Flexibility.
- Strong work ethic.
- continuous learning.

MSIC DIVISION	**:**	**C30 - Manufacture of Other Transport Equipment**
MSIC GROUP	**:**	**C303 - Manufacture of Air and Spacecraft And Related Machinery**
AREA	**:**	**Aircraft Part Mechanical Assembly / Final Assembly**
JOB TITLE	**:**	**Senior Production Engineer**
LEVEL	**:**	**6**

Job Responsibilities:

- A Senior Production Engineer is an experienced professional who is responsible for leading, designing, developing, and implementing the processes, systems, and equipment used in the production of aircraft components and systems. They work closely with the production team and other departments such as design, quality and procurement to ensure that the production process is efficient, effective, and meets quality standards and regulatory requirements.

Knowledge:

- Industry standards and regulations
- Complex production processes
- Data analysis and identify areas for improvement
- Technical knowledge

Skills:

- problem-solving skills.
- leadership and team management skills.
- project management skills.
- analytical skills.
- Interpersonal communication skills.

Attributes (Attitude):

- Positive
- Flexible
- Proactive
- Quality-focused
- Safety-focused
- Open-minded
- Team-oriented
- Leadership
- Sense of responsibility
- Continuous learning and improvement

MSIC DIVISION	**:**	**C30 - Manufacture of Other Transport Equipment**
MSIC GROUP	**:**	**C303 - Manufacture of Air and Spacecraft And Related Machinery**
AREA	**:**	**Aircraft Part Mechanical Assembly / Final Assembly**
JOB TITLE	**:**	**Production Engineer**
LEVEL	**:**	**5**

Job Responsibilities:
A Production Engineer is a professional responsible for designing, developing, and implementing the processes, systems, and equipment used in the production of aircraft components and systems. They work closely with the production team and other departments such as design, quality, and procurement to ensure that the production process is efficient, effective, and meets quality standards and regulatory requirements.

Knowledge:
- Industry standards and regulations
- Complex production processes
- Data analysis data and identify areas for improvement
- Ability to effectively.
- Technical
- Manufacturing and production process

Skills:
- Technical drawing and design
- Project management
- Problem-solving
- Interpersonal Communication
- Leadership and team management
- Quality control and inspection
- Technical writing
- Time management

Attributes (Attitude):

- Attention to detail.
- Flexibility.
- Creativity.
- Positive attitude.
- Strong work ethic.
- Willingness to learn.
- Self-motivation.
- Sense of responsibility.
- Continuous improvement mindset.

MSIC DIVISION	**:**	**C30 - Manufacture of Other Transport Equipment**
MSIC GROUP	**:**	**C303 - Manufacture of Air and Spacecraft And Related Machinery**
AREA	**:**	**Aircraft Part Mechanical Assembly / Final Assembly**
JOB TITLE	**:**	**Production Supervisor**
LEVEL	**:**	**4**

Job Responsibilities:

- The Production Supervisor is responsible for managing and supervising the production team, which may include machinists, assemblers, and other production workers.
- Planning and scheduling production to ensure that aircraft components and assemblies are produced to meet quality, safety, and schedule requirements.

Knowledge:

- Aircraft manufacturing processes.
- Quality control.
- Safety.
- Project management.
- Enterprise resource planning (ERP) and manufacturing resource planning (MRP).
- Aerospace materials.
- Technical Writing.
- Computer Software

Skills:

- Leadership.
- Planning and organization.
- Problem-solving.
- Communication.
- Time management.
- Technical Writing.
- Computer

Attributes (Attitude):

- Attention to detail.
- Flexibility.
- Strong work ethic.
- Continuous improvement.
- Teamwork.
- Positive attitude.

MSIC DIVISION	**:**	**C30 - Manufacture of Other Transport Equipment**
MSIC GROUP	**:**	**C303 - Manufacture of Air and Spacecraft And Related Machinery**
AREA	**:**	**Aircraft Part Mechanical Assembly / Final Assembly**
JOB TITLE	**:**	**Senior Production Technician**
LEVEL	**:**	**3**

Job Responsibilities:

A Senior Production Technician is an experienced professional who is responsible for leading and overseeing the production of aircraft components and systems in a manufacturing or assembly environment. They are skilled in the fabrication, assembly, and installation of various aircraft components and systems, and are responsible for ensuring that the work is done correctly and on time.

Knowledge:

- Aerospace materials.
- Manufacturing processes.
- Machine operation.
- Quality control.
- Safety regulations.
- Engineering drawings and schematics.
- Computer-aided design and manufacturing (CAD/CAM) software.
- Troubleshooting.
- Lean manufacturing.
- Technical documentation.

Skills:

- Technical
- Problem-solving
- Interpersonal Communication
- Leadership
- Time management

Attributes (Attitude):

- Positive mind
- Professionalism
- Teamwork
- work ethic
- Safety-mindedness
- Flexibility
- Continuous improvement
- Attention to detail

MSIC DIVISION	**:**	**C30 - Manufacture of Other Transport Equipment**
MSIC GROUP	**:**	**C303 - Manufacture of Air and Spacecraft And Related Machinery**
AREA	**:**	**Aircraft Part Mechanical Assembly / Final Assembly**
JOB TITLE	**:**	**Production Technician**
LEVEL	**:**	**2**

Job Responsibilities:

A Production Technician is a skilled professional who is responsible for performing a variety of tasks involved in the production of aircraft components and systems. They work in a manufacturing or assembly environment, using tools and equipment to fabricate, assemble, and install various aircraft components and systems. They may also be responsible for performing quality checks, testing and troubleshooting of the aircraft components and systems.

Knowledge:

- Technical knowledge.
- Manufacturing processes.
- Quality control.
- Aerospace industry.
- Safety.
- Maintenance and Repair.
- Technical documents.
- Computer-aided design (CAD) and computer-aided manufacturing (CAM) software.

Skills:

- Technical skills.
- Mechanical skills.
- Problem-solving.
- Time management.
- Teamwork.

Attributes (Attitude):

- Professionalism.
- Positive attitude.
- Reliability.
- Accountability.
- Continuous learning.
- Safety-mindedness.
- Flexibility.
- Positive attitude and willingness to learn.

MSIC DIVISION	**:**	**C30 - Manufacture of Other Transport Equipment**
MSIC GROUP	**:**	**C303 - Manufacture of Air and Spacecraft And Related Machinery**
AREA	**:**	**Aircraft Part Surface Treatment**
JOB TITLE	**:**	**Senior Surface Treatment Specialist**
LEVEL	**:**	**6**

Job Responsibilities:

- Developing and implementing surface treatment processes and procedures.
- Overseeing surface treatment operations.
- Maintaining surface treatment equipment and facilities.
- Developing and implementing quality control procedures.
- Training and mentoring junior staff.

Knowledge:

- Surface treatment processes.
- Materials science.
- Quality control.
- Safety and environmental regulations.
- Manufacturing processes.
- Equipment maintenance.
- Technical documentation.

Skills:

- Technical expertise.
- Problem-solving.
- Leadership.
- Communication.
- Project management.
- Data analysis.
- Technical writing.
- Creativity.

Attributes (Attitude):

- Strong work ethic.
- Detail-oriented.
- Team-oriented.
- Safety-conscious.
- Continuous improvement.
- Flexibility.
- Positive attitude.
- Sense of responsibility.
- Proactivity.

MSIC DIVISION	**:**	**C30 - Manufacture of Other Transport Equipment**
MSIC GROUP	**:**	**C303 - Manufacture of Air and Spacecraft And Related Machinery**
AREA	**:**	**Aircraft Part Surface Treatment**
JOB TITLE	**:**	**Surface Treatment Specialist**
LEVEL	**:**	**5**

Job Responsibilities:

- Applying surface treatment processes.
- Measuring and analysing data.
- Maintaining equipment.
- Ensuring compliance.
- Writing procedures and work instructions.

Knowledge:

- Surface treatment processes.
- Equipment.
- Safety and environmental regulations.
- Industry standards.
- Quality control.
- Materials science.
- Technical documentation.
- Project management.
- Technical communication.
- Aerospace industry

Skills:

- Technical
- Safety
- Problem-solving
- Interpersonal Communication
- Leadership
- Time management
- Teamwork

Attributes (Attitude):

- Positive attitude.
- Attention to detail.
- Safety-conscious.
- Responsible attitude.
- Team player.
- Flexible attitude.
- Pro-active attitude.

MSIC DIVISION	**:**	**C30 - Manufacture of Other Transport Equipment**
MSIC GROUP	**:**	**C303 - Manufacture of Air and Spacecraft And Related Machinery**
AREA	**:**	**Aircraft Part Surface Treatment**
JOB TITLE	**:**	**Senior Surface Treatment Technician**
LEVEL	**:**	**4**

Job Responsibilities:

- Applying advanced surface treatment processes such as painting, plating, and coating to aircraft components in accordance with established procedures and industry standards.
- Inspecting surface treatments to ensure compliance with specifications, and identifying and addressing any issues that may arise.
- Maintaining and troubleshooting surface treatment equipment and tools, and making repairs as needed.
- Providing training, guidance, and mentoring to junior technicians, and ensuring that their work meets established standards and procedures.

Knowledge:

- Advanced surface treatment processes.
- Aerospace industry standards and regulations.
- Quality control procedures and inspection techniques.
- Occupational safety and health regulations.
- Technical documentation and drawings.
- Troubleshooting and maintenance of surface treatment equipment and tools.
- Strong understanding of aerospace materials.
- Aerospace corrosion and corrosion prevention
- Chemical and physical properties of surface.

Skills:

- Advanced technical skills
- Problem-solving and critical thinking
- Organizational and time management
- Communication and interpersonal
- Leadership
- Computer
- Root Cause Analysis and corrective actions

Attributes (Attitude):

- Quality and attention to detail.
- Strong commitment to safety.
- Teamwork.
- Sense of responsibility and ownership.
- Flexibility and adaptability.
- Continuous learning and professional development.
- Work ethic

MSIC DIVISION	**:**	**C30 - Manufacture of Other Transport Equipment**
MSIC GROUP	**:**	**C303 - Manufacture of Air and Spacecraft And Related Machinery**
AREA	**:**	**Aircraft Part Quality Inspection**
JOB TITLE	**:**	**Head of Quality**
LEVEL	**:**	**7**

Job Responsibilities:

- Developing and implementing quality policies, procedures, and standards to ensure that manufactured parts and assemblies meet the specified quality requirements.
- Overseeing the quality inspection process to ensure that all manufactured parts and assemblies meet the specified quality standards and requirements.
- Identifying, reporting, and correcting quality issues or defects.

Knowledge:

- Aviation regulations and industry standards.
- Quality management system.
- Statistical process control.
- Root cause analysis and corrective action
- aerospace engineering

Skills:

- Leadership.
- Communication.
- Problem-solving.
- Auditing and inspection.
- Planning and organization.
- Adaptability.
- Interpersonal skills.
- Strong analytical skills

Attributes (Attitude):

- Strong commitment to quality.
- Customer focus.
- Continuous improvement.
- Professionalism.
- Openness to feedback.
- Sense of responsibility.
- Strong decision-making skills.
- Willingness to take calculated risks.
- proactive mindset

MSIC DIVISION	**:**	**C30 - Manufacture of Other Transport Equipment**
MSIC GROUP	**:**	**C303 - Manufacture of Air and Spacecraft And Related Machinery**
AREA	**:**	**Aircraft Part Testing (NDT)**
JOB TITLE	**:**	**NDT Engineer**
LEVEL	**:**	**5**

Job Responsibilities:

- Designing, developing and implement NDT methods for aircraft components and systems includes researching and testing new NDT techniques that can be used for specific aircraft components and systems, such as wing structures, fuselage, landing gear, and engines.

Knowledge:

- NDT techniques and methods
- Computer-aided design (CAD)
- Specific requirements of the aerospace industry
- Aviation regulations and industry standards.
- Quality management system.
- Technical knowledge
- Aerospace industry standards
- Calibration and maintenance of equipment.

Skills:

- Inspection planning and execution.
- Strong communication
- Problem-solving
- Critical thinking

Attributes (Attitude):

- Safety-conscious.
- Attention to detail.
- Quality-focused.
- Responsible and accountable.
- Flexible.
- Team player.
- Continuous learning

MSIC DIVISION	**:**	**C30 - Manufacture of Other Transport Equipment**
MSIC GROUP	**:**	**C303 - Manufacture of Air and Spacecraft And Related Machinery**
AREA	**:**	**Aircraft Part Testing (NDT)**
JOB TITLE	**:**	**NDT Technician**
LEVEL	**:**	**3**

Job Responsibilities:

- Conducting NDT inspections: This includes performing a specific range of NDT methods, such as visual inspection, liquid penetrant inspection, and magnetic particle inspection.
- Interpreting results: Analyzing the results of NDT inspections and determining whether the inspected items meet the established acceptance criteria.
- Reporting: Preparing reports on the results of NDT inspections, including any defects or issues that were identified.

Knowledge:

- NDT techniques and methods
- Read and understand technical drawings
- Aviation regulations and industry standards.
- Technical knowledge.
- Inspection planning and execution

Skills:

- NDT inspections
- Equipment handling and maintenance.
- Reporting and documentation.
- Strong communication skills
- Problem-solving skills.

Attributes (Attitude):

- Safety-conscious.
- Attention to detail.
- Quality-focused.
- Responsible and accountable.
- Flexible.
- Team player.
- Continuous learning
- Willing to follow instruction.

MSIC DIVISION	**:**	**C30 - Manufacture of Other Transport Equipment**
MSIC GROUP	**:**	**C303 - Manufacture of Air and Spacecraft And Related Machinery**
AREA	**:**	**Aircraft Part Painting**
JOB TITLE	**:**	**Painting Specialist**
LEVEL	**:**	**6**

Job Responsibilities:

- Aircraft painting specialist is a skilled tradesperson who is responsible for preparing, painting and finishing the surface of aircrafts, ensuring that the process meet safety, regulations and quality standards.

Knowledge:

- Technical knowledge.
- Painting equipment
- Hazardous waste management
- Health and safety procedures
- Inspect paintwork
- Prepare surface for painting
- Work safely with chemicals

Skills:

- Strong communication.
- Critical thinking.
- Leadership.
- Problem-solving.

Attributes (Attitude):

- Strong work ethic.
- Attention to details.
- Flexibility.
- Good judgement.
- Good Teamwork.
- Safety-conscious.
- Continuous learning.
- Positive attitude.
- Strong physical stamina.
- Time management.

MSIC DIVISION	**:**	**C30 - Manufacture of Other Transport Equipment**
MSIC GROUP	**:**	**C303 - Manufacture of Air and Spacecraft And Related Machinery**
AREA	**:**	**Aircraft Part Painting**
JOB TITLE	**:**	**Painting Engineer**
LEVEL	**:**	**5**

Job Responsibilities:

- An aircraft painting engineer is a responsible for the selection and application of coatings, surface preparation, and quality control. They work according to aerospace manufacturers and process to ensure that the paint and coatings used on aircrafts meet safety and regulatory standards and also to improve durability of the paint. Additionally, they may be involved in the development and testing of new coating materials that are specifically designed for use on aircrafts and parts.

Knowledge:

- Coating materials and application techniques.
- Surface preparation.
- Quality control.
- Regulations and standards.
- Project management.
- Aerospace industry.
- Health and Safety.
- Advanced technologies.
- Understanding of the principles of physics, chemistry and materials science.
- Material science

Skills:

- Problem-solving skills.
- Strong communication skills.
- Critical thinking.
- Leadership.

Attributes (Attitude):

- Attention to detail.
- Strong work ethic.
- Team-oriented.
- Positive attitude.
- Safety-conscious.
- Flexibility.
- Continuous learning.
- Strong physical stamina.
- Good judgement.

MSIC DIVISION	**:**	**C30 - Manufacture of Other Transport Equipment**
MSIC GROUP	**:**	**C303 - Manufacture of Air and Spacecraft And Related Machinery**
AREA	**:**	**Aircraft Part Painting**
JOB TITLE	**:**	**Painter Supervisor**
LEVEL	**:**	**4**

Job Responsibilities:

- Supervising and coordinating the activities of the painting team includes monitoring progress, assigning tasks, and ensuring that work is completed on schedule and to the required quality standards.
- Developing and implementing painting procedures and ensuring that the painting process is safe, efficient, and effective. This may involve developing new procedures or modifying existing ones to improve quality and productivity.

Knowledge:

- Aircraft painting techniques and procedures
- Health and safety regulations
- Quality control standards.
- Cost control and budgeting.
- Computer software
- Relevant industry codes, standards and regulations.
- Aerospace materials and finishes.
- Paint shop equipment and maintenance.

Skills:

- Leadership and management skills.
- Communication skills.
- Technical skills.
- Problem-solving skills.
- Planning and organizational skills.
- Time management skills.
- Decision-making skills
- Interpersonal skills.

Attributes (Attitude):

- Strong work ethic.
- Positive attitude.
- Professionalism.
- Reliability.
- Proactivity.
- Attention to detail.
- Safety-consciousness.
- Flexibility.
- Continuous improvement mindset.

MSIC DIVISION	**:**	**C30 - Manufacture of Other Transport Equipment**
MSIC GROUP	**:**	**C303 - Manufacture of Air and Spacecraft And Related Machinery**
AREA	**:**	**Aircraft Part Painting**
JOB TITLE	**:**	**Senior Painter**
LEVEL	**:**	**3**

Job Responsibilities:

- Leading and mentoring junior aircraft painters includes providing guidance and training, and ensuring that team members have the resources they need to do their jobs effectively.
- Surface preparation includes cleaning, sanding, and etching the surface of the aircraft to ensure that it is ready for painting.
- Applying paint and coatings to the aircraft using a variety of tools and techniques, such as brushes, rollers, and sprayers.
- Inspecting the finished product to ensure that it meets quality standards and customer expectations.

Knowledge:

- Aircraft painting process
- Advanced technologies used in aircraft painting.
- Aircraft painting techniques and procedures
- Health and safety regulations
- Quality control standards.
- Computer software
- Relevant industry codes, standards and regulations.

Skills:

- Paint application techniques.
- Problem-solving skills.
- Critical thinking skills
- Communication skills
- Time management skills

Attributes (Attitude):

- Work ethic and commitment to quality and safety.
- Attention to detail.
- Flexibility and adaptability.
- Strong physical stamina.
- Good hand-eye coordination, dexterity, and fine motor skills.
- A willingness to continuously learn and improve.
- Independent.
- Professional attitude.

MSIC DIVISION	**:**	**C30 - Manufacture of Other Transport Equipment**
MSIC GROUP	**:**	**C303 - Manufacture of Air and Spacecraft And Related Machinery**
AREA	**:**	**Aircraft Part Painting**
JOB TITLE	**:**	**Painter**
LEVEL	**:**	**2**

Job Responsibilities:

- Surface preparation cleaning, sanding, and etching the surface of the aircraft to ensure that it is ready for painting.
- Applying paint and coatings to the aircraft using a variety of tools and techniques, such as brushes, rollers, and sprayers.
- Inspecting the finished product to ensure that it meets quality standards and customer expectations.

Knowledge:

- Painting materials and techniques used in aircraft painting
- Surface preparation
- Paint application
- Quality control.
- Aerospace industry regulations and standards.

Skills:

- Paint application techniques.
- Problem-solving skills.
- Critical thinking skills
- Communication skills
- Time management skills

Attributes (Attitude):

- Work ethic and commitment to quality and safety.
- Attention to detail.
- Flexibility and adaptability.
- Strong physical stamina.
- Good hand-eye coordination, dexterity, and fine motor skills.
- A willingness to continuously learn and improve.
- Independent.
- Professional attitude.

MSIC DIVISION	**:**	**C30 - Manufacture of Other Transport Equipment**
MSIC GROUP	**:**	**C303 - Manufacture of Air and Spacecraft And Related Machinery**
AREA	**:**	**Aircraft Part Quality Inspection**
JOB TITLE	**:**	**Senior Quality Inspection Engineer**
LEVEL	**:**	**6**

Job Responsibilities:

- Developing, implementing and maintaining quality systems and processes to ensure that all manufactured parts and assemblies meet the specified quality standards and requirements.
- Identifying, reporting and correcting quality issues or defects.
- Conducting inspection and testing of materials, parts and assemblies to ensure compliance with specifications and industry standards.

Knowledge:

- Aviation regulations and industry standards.
- Inspection techniques.
- Quality management systems.
- Root cause analysis.
- Technical knowledge.
- Statistical process control.
- Knowledge of industry-specific software.

Skills:

- Inspection.
- Problem-solving.
- Auditing and inspection.
- Critical Thinking
- Planning and organization.
- Leadership.
- Interpersonal Communication.
- Strong Interpersonal skills.
- Strong analytical skills.

Attributes (Attitude):

- Strong commitment to quality.
- Sense of responsibility.
- Attention to detail.
- Continuous improvement mindset.
- Flexibility.
- Proactiveness.
- Sense of ethics.
- Teamwork attitude.
- Learning attitude.

MSIC DIVISION	**:**	**C30 - Manufacture of Other Transport Equipment**
MSIC GROUP	**:**	**C303 - Manufacture of Air and Spacecraft And Related Machinery**
AREA	**:**	**Aircraft Part Quality Inspection**
JOB TITLE	**:**	**Supervisor**
LEVEL	**:**	**4**

Job Responsibilities:

- Overseeing the work of Aircraft Manufacturing Quality Inspectors to ensure that inspections and quality control processes are carried out correctly and in compliance with industry standards.

Knowledge:

- Regulations and standards.
- Aircraft systems and components.
- Maintenance procedures and processes.
- Inspection techniques.
- Maintenance records and documentation.
- Safety management systems.
- Technical knowledge and industry developments.
- Compliance with regulations and standards.

Skills:

- Leadership.
- Interpersonal Communication.
- Problem-solving.
- Planning and organization.
- Time management.
- Auditing.
- Documentation.
- Root cause analysis.

Attributes (Attitude):

- Safety-oriented.
- Professionalism.
- Team-oriented.
- Flexibility.
- Positive attitude.
- Open-minded.
- Strong work ethic.
- Continuous improvement.
- Sense of responsibility.
- Attention to details.

MSIC DIVISION	**:**	**C30 - Manufacture of Other Transport Equipment**
MSIC GROUP	**:**	**C303 - Manufacture of Air and Spacecraft And Related Machinery**
AREA	**:**	**Aircraft Part Quality Inspection**
JOB TITLE	**:**	**Quality Inspector**
LEVEL	**:**	**3**

Job Responsibilities:

- Inspecting aircraft components and assemblies during the manufacturing process to ensure compliance with specifications and industry standards.
- Monitoring and evaluating the quality of the manufacturing process and identifying areas for improvement.
- Keeping accurate records of inspection results and maintaining compliance with regulatory requirements.

Knowledge:

- Regulations and Standards.
- Inspection Techniques.
- Aircraft Systems and Components.
- Quality Control and Assurance.
- Safety Management System
- Technical Documentation
- Industry developments and new technologies.

Skills:

- Inspection.
- Problem-solving.
- Communication.
- Computer skills.
- Time management.
- Interpersonal skills.
- Audit and compliance skills.

Attributes (Attitude):

- Professionalism.
- Positive attitude.
- Attention to detail.
- Continuous improvement.
- Flexibility.
- Safety oriented.
- Integrity.
- Responsiveness.
- Continuous learning.
- Compliance oriented.
- Proactivity.
- Strong work ethic

SECTION	**:**	**(C) MANUFACTURING**
DIVISION	**:**	**(30) MANUFACTURE OF OTHER TRANSPORT EQUIPMENT**
GROUP	**:**	**(304) MANUFACTURE OF MILITARY FIGHTING VEHICLES**

MSIC DIVISION	**:**	**C30 - Manufacture of Other Transport Equipment**
MSIC GROUP	**:**	**C304 - Manufacture of Military Fighting Vehicles**
AREA	**:**	**Platform / Hull Design, Development and Prototyping First Unit Vehicle (FUV)**
JOB TITLE	**:**	**Head of Engineering**
LEVEL	**:**	**6**

Job Responsibilities:

- Head of Engineering is responsible for managing all resources including engineers, development tools and test equipment towards achieving the design of platform.

Knowledge:

- MIL-STD
- STANAG Armoured Protection Levels
- Project Management
- System Development Lifecycle
- Interpretation of system block diagram
- Mechanical and Electronics Integrations
- Mechatronics
- Electromagnetic Compatibilities
- Electronics systems integration

Skills:

- Leadership.
- Interpersonal Communication.
- Problem-solving.
- Critical thinking
- Planning and organization.
- Time management.
- Interpersonal skills.
- Computer skills.

Attributes (Attitude):

- Continuous improvement.
- Professionalism.
- Openness to feedback.
- Sense of responsibility.
- Strong decision-making skills.
- Willingness to take calculated risks.
- Proactive mindset.

MSIC DIVISION	**:**	**C30 - Manufacture of Other Transport Equipment**
MSIC GROUP	**:**	**C304 - Manufacture of Military Fighting Vehicles**
AREA	**:**	**Platform / Hull Design, Development and Prototyping First Unit Vehicle (FUV)**
JOB TITLE	**:**	**Specialist Engineer**
LEVEL	**:**	**5**

Job Responsibilities:

- Senior Engineer is primarily responsible to supervise and execute all design processes and activities required of Product Engineering Team such as providing conceptual design, CAD model, conducting simulation and analysis, detailed design, verifying design drawings and performing design review.

Knowledge:

- MIL-STD
- STANAG Protection Levels
- CAD tool
- Mechanical and electrical integration

Skills:

- Communication.
- Problem-solving.
- Critical thinking.
- Planning and organization.
- Time management.
- Interpersonal skills.
- Computer skills.
- Strong analytical skills.

Attributes (Attitude):

- Attention to detail.
- Strong work ethic.
- Team-oriented.
- Positive attitude.
- Safety-conscious.
- Flexibility.
- Continuous learning.

MSIC DIVISION	**:**	**C30 - Manufacture of Other Transport Equipment**
MSIC GROUP	**:**	**C304 - Manufacture of Military Fighting Vehicles**
AREA	**:**	**Platform / Hull Design, Development and Prototyping First Unit Vehicle (FUV)**
JOB TITLE	**:**	**Design Engineer**
LEVEL	**:**	**4**

Job Responsibilities:

- Reporting to the Head of Engineering, EEC, Electronic Engineer responsible for the Electronic System activities including producing the test procedures, test reports, and for the conduct of the Electrical system test activities either on the actual or test platforms.

Knowledge:

- MIL STD
- STANAG Protection Levels
- CAD tools
- Mechanical and electrical integration
- Test Procedures and activities

Skills:

- Communication.
- Problem-solving.
- Critical thinking.
- Time management.
- Interpersonal skills.
- Computer skills.
- Strong analytical skills.

Attributes (Attitude):

- Attention to detail.
- Strong work ethic.
- Team-oriented.
- Positive attitude.
- Safety-conscious.
- Flexibility.
- Continuous learning.

MSIC DIVISION	**:**	**C30 - Manufacture of Other Transport Equipment**
MSIC GROUP	**:**	**C304 - Manufacture of Military Fighting Vehicles**
AREA	**:**	**Weapon and Turret Design, Development and Prototyping FUV**
JOB TITLE	**:**	**Head of Engineering**
LEVEL	**:**	**6**

Job Responsibilities:

- Head of Engineering is responsible for managing all resources including engineers, development tools and test equipment towards achieving weaponry, turret and systems integration according to user requirements.

Knowledge:

- MIL-STD
- STANAG Armoured Protection Levels
- Project Management
- System Development Lifecycle
- Interpretation of system block diagram
- Mechanical and Electronics Integrations
- Mechatronics
- Electromagnetic Compatibilities
- Electronics systems integration

Skills:

- Leadership.
- Communication.
- Problem-solving.
- Planning and organization.
- Time management.
- Interpersonal skills.
- Computer skills.
- Strong analytical skills

Attributes (Attitude):

- Continuous improvement.
- Professionalism.
- Openness to feedback.
- Sense of responsibility.
- Strong decision-making skills.
- Willingness to take calculated risks.
- Proactive mindset.

MSIC DIVISION	**:**	**C30 - Manufacture of Other Transport Equipment**
MSIC GROUP	**:**	**C304 - Manufacture of Military Fighting Vehicles**
AREA	**:**	**Weapon and Turret Design, Development and Prototyping FUV**
JOB TITLE	**:**	**Specialist Engineer**
LEVEL	**:**	**5**

Job Responsibilities:

- Senior Engineer is primarily responsible to supervise and execute all design processes and activities required of Product Engineering Team such as providing conceptual design, CAD model, conducting simulation and analysis, detailed design, verifying design drawings and performing design review. He is responsible for the overall system engineering life cycle of the Systems from design stage through service and logistic support

Knowledge:

- MIL-STD
- STANAG Protection Levels
- CAD tool
- Mechanical and electrical integration
- System Designs
- Programming
- System Diagnose

Skills:

- Communication.
- Problem-solving.
- Critical thinking.
- Planning and organization.
- Time management.
- Interpersonal skills.
- Computer skills.
- Strong analytical skills.

Attributes (Attitude):

- Attention to detail.
- Strong work ethic.
- Team-oriented.
- Positive attitude.
- Safety-conscious.
- Flexibility.
- Continuous learning.

MSIC DIVISION	**:**	**C30 - Manufacture of Other Transport Equipment**
MSIC GROUP	**:**	**C304 - Manufacture of Military Fighting Vehicles**
AREA	**:**	**Weapon and Turret Design, Development and Prototyping FUV**
JOB TITLE	**:**	**Design Engineer**
LEVEL	**:**	**4**

Job Responsibilities:

- Engineer is responsible for the system installation, configuration, setting-to-works and test activities either standalone or integrated with other systems on the actual or test platforms. Reporting to the Head of Engineering, engineer responsible for the Weapon System activities including producing the test procedures, test reports, and for the conduct of the Electrical system test activities either on the actual or test platforms.

Knowledge:

- System Designs
- Programming
- MIL-STD
- STANAG Protection Levels
- CAD tools
- Mechanical and electrical integration
- Test Procedures and activities

Skills:

- Communication.
- Problem-solving.
- Critical thinking.
- Time management.
- Interpersonal skills.
- Computer skills.
- Strong analytical skills.

Attributes (Attitude):

- Attention to detail.
- Strong work ethic.
- Team-oriented.
- Positive attitude.
- Safety-conscious.
- Flexibility.
- Continuous learning.

MSIC DIVISION	**:**	**C30 - Manufacture of Other Transport Equipment**
MSIC GROUP	**:**	**C304 - Manufacture of Military Fighting Vehicles**
AREA	**:**	**Electrical, Electronic and Communication Design & Development**
JOB TITLE	**:**	**Head of Engineering**
LEVEL	**:**	**6**

Job Responsibilities:

- Head of Engineering is responsible for managing all resources including electrical, electronics, communication systems, and systems integration according to user requirements.

Knowledge:

- MIL-STD
- STANAG Armoured Protection Levels
- Project Management
- System Development Lifecycle
- Interpretation of system block diagram
- Mechanical and Electronics Integrations
- Mechatronics
- Electromagnetic Compatibilities
- Electronics systems integration

Skills:

- Leadership.
- Communication.
- Problem-solving.
- Planning and organization.
- Time management.
- Interpersonal skills.
- Computer skills.
- Strong analytical skills

Attributes (Attitude):

- Continuous improvement.
- Professionalism.
- Openness to feedback.
- Sense of responsibility.
- Strong decision-making skills.
- Willingness to take calculated risks.
- Proactive mindset.

MSIC DIVISION	**:**	**C30 - Manufacture of Other Transport Equipment**
MSIC GROUP	**:**	**C304 - Manufacture of Military Fighting Vehicles**
AREA	**:**	**Electrical, Electronic and Communication Design & Development**
JOB TITLE	**:**	**Specialist Engineer**
LEVEL	**:**	**5**

Job Responsibilities:

- Senior Engineer is responsible to provide competency and knowledge on electronics and radio communications systems engineering for systems such as Battlefield Management System, Laser Detection System, and HF/VHF/UHF radio in order to meet system requirements and specifications. He is responsible for the overall system engineering life cycle of the Systems from design stage through service and logistic support

Knowledge:

- System Designs
- Programming
- System Diagnose
- MIL-STD

Skills:

- Communication.
- Problem-solving.
- Critical thinking.
- Planning and organization.
- Time management.
- Interpersonal skills.
- Computer skills.
- Strong analytical skills.

Attributes (Attitude):

- Attention to detail.
- Strong work ethic.
- Team-oriented.
- Positive attitude.
- Safety-conscious.
- Flexibility.
- Continuous learning.

MSIC DIVISION	**:**	**C30 - Manufacture of Other Transport Equipment**
MSIC GROUP	**:**	**C304 - Manufacture of Military Fighting Vehicles**
AREA	**:**	**Electrical, Electronic and Communication Design & Development**
JOB TITLE	**:**	**Design Engineer**
LEVEL	**:**	**4**

Job Responsibilities:

- Engineer is responsible for the system installation, configuration, setting-to-works and test activities either standalone or integrated with other systems on the actual or test platforms.

Knowledge:

- System Designs
- Programming
- MIL-STD

Skills:

- Communication.
- Problem-solving.
- Critical thinking.
- Time management.
- Interpersonal skills.
- Computer skills.
- Strong analytical skills.

Attributes (Attitude):

- Attention to detail.
- Strong work ethic.
- Team-oriented.
- Positive attitude.
- Safety-conscious.
- Flexibility.
- Continuous learning.

MSIC DIVISION : C30 - Manufacture of Other Transport Equipment
MSIC GROUP : C304 - Manufacture of Military Fighting Vehicles
AREA : Industrial Engineering
JOB TITLE : Senior Engineer
LEVEL : 5

Job Responsibilities:

- Senior Industrial Engineering engineer is responsible to design a vast array of production systems aiming to present efficient and effective solutions. Responsible to integrate a varied number of variables such as workers, technology, ergonomics, production flows, and product specifications for the design and implementation of production systems.

Knowledge:

- Lean Manufacturing
- Manufacturing Process
- Machining Process
- Quality Assurance / Quality Control
- Root Cause Analysis
- 4M Method

Skills:

- Communication.
- Problem-solving.
- Critical thinking.
- Time management.
- Interpersonal skills.
- Computer skills.
- Strong analytical skills.

Attributes (Attitude):

- Attention to detail.
- Strong work ethic.
- Team-oriented.
- Positive attitude.
- Safety-conscious.
- Flexibility.
- Continuous learning.

MSIC DIVISION	**:**	**C30 - Manufacture of Other Transport Equipment**
MSIC GROUP	**:**	**C304 - Manufacture of Military Fighting Vehicles**
AREA	**:**	**Industrial Engineering**
JOB TITLE	**:**	**Engineer**
LEVEL	**:**	**4**

Job Responsibilities:

- Reporting to the Senior IE Engineer will be responsible to effective and efficiently monitor all production activities through the integrated business software as implemented.

Knowledge:

- Lean Manufacturing
- Manufacturing Process
- Machining Process
- Quality Assurance / Quality Control
- Root Cause Analysis
- 4M Method

Skills:

- Communication.
- Problem-solving.
- Critical thinking.
- Time management.
- Interpersonal skills.
- Computer skills.
- Strong analytical skills.

Attributes (Attitude):

- Attention to detail.
- Strong work ethic.
- Teamwork.
- Positive attitude.
- Safety-conscious.
- Flexibility.
- Continuous learning.

MSIC DIVISION : C30 - Manufacture of Other Transport Equipment
MSIC GROUP : C304 - Manufacture of Military Fighting Vehicles
AREA : Production Planning & Control
JOB TITLE : Senior Engineer
LEVEL : 5

Job Responsibilities:

- Reporting to the Head of Manufacturing will be responsible for all the planning parameters of any project in the company.

Knowledge:

- Lean Manufacturing
- Manufacturing Process
- Inventory Systems
- Quality Assurance / Quality Control
- ERP Systems

Skills:

- Problem-solving skills.
- Leadership skills.
- Project management skills.
- Analytical skills.
- Communication skills.

Attributes (Attitude):

- Positive attitude.
- Flexible attitude.
- Proactive attitude.
- Quality-focused attitude.
- Safety-focused attitude.
- Continuous improvement attitude.
- Open-minded attitude.
- Team-oriented attitude.
- Leadership attitude.
- Sense of responsibility attitude.

MSIC DIVISION : C30 - Manufacture of Other Transport Equipment
MSIC GROUP : C304 - Manufacture of Military Fighting Vehicles
AREA : Production Planning & Control
JOB TITLE : Engineer
LEVEL : 4

Job Responsibilities:

- Reporting to the Senior Engineer will be responsible to effective and efficiently monitor all production activities through the integrated business software as implemented for use by the company

Knowledge:

- Lean Manufacturing
- Manufacturing Process
- Inventory Systems
- Quality Assurance / Quality Control
- ERP Systems

Skills:

- Problem-solving skills.
- Leadership skills.
- Project management skills.
- Analytical skills.
- Communication skills.

Attributes (Attitude):

- Positive attitude.
- Flexible attitude.
- Proactive attitude.
- Quality-focused attitude.
- Safety-focused attitude.
- Continuous improvement attitude.
- Open-minded attitude.
- Team-oriented attitude.
- Leadership attitude.
- Sense of responsibility attitude.

MSIC DIVISION	**:**	**C30 - Manufacture of Other Transport Equipment**
MSIC GROUP	**:**	**C304 - Manufacture of Military Fighting Vehicles**
AREA	**:**	**Bodywork Welding**
JOB TITLE	**:**	**Senior Welding Engineer**
LEVEL	**:**	**5**

Job Responsibilities:

- Senior welding engineers create solutions for welding-related problems. This includes the design, maintenance and development of welding systems for use across industry.

Knowledge:

- Knowledge of engineering, materials, metallurgy, physics and welding
- Lean Manufacturing
- Welding Machining Process
- Knowledge in math and science

Skills:

- Welding skills
- Problem-solving skills.
- Leadership skills.
- Communication skills.

Attributes (Attitude):

- Positive attitude.
- Flexible attitude.
- Proactive attitude.
- Quality-focused attitude.
- Safety-focused attitude.
- Continuous improvement attitude.
- Open-minded attitude.
- Team-oriented attitude.
- Leadership attitude.
- Sense of responsibility attitude.

MSIC DIVISION	**:**	**C30 - Manufacture of Other Transport Equipment**
MSIC GROUP	**:**	**C304 - Manufacture of Military Fighting Vehicles**
AREA	**:**	**Bodywork Welding**
JOB TITLE	**:**	**Welding Engineer**
LEVEL	**:**	**4**

Job Responsibilities:

- Report to Senior Welding engineers create solutions for welding-related problems. This includes the design, maintenance and development of welding systems for use across industry.

Knowledge:

- Knowledge of engineering, materials, metallurgy, physics and welding
- Lean Manufacturing
- Welding Machining Process
- Knowledge in math and science

Skills:

- Welding skills
- Problem-solving skills.
- Leadership skills.
- Communication skills.

Attributes (Attitude):

- Positive attitude.
- Flexible attitude.
- Proactive attitude.
- Quality-focused attitude.
- Safety-focused attitude.
- Continuous improvement attitude.
- Open-minded attitude.
- Team-oriented attitude.
- Leadership attitude.
- Sense of responsibility attitude.

MSIC DIVISION	**:**	**C30 - Manufacture of Other Transport Equipment**
MSIC GROUP	**:**	**C304 - Manufacture of Military Fighting Vehicles**
AREA	**:**	**Assembly Process**
JOB TITLE	**:**	**Senior Engineer**
LEVEL	**:**	**5**

Job Responsibilities:

- Reporting to the Head of Manufacturing, the engineer is responsible for all the planning, coordination and execution of all assembly work

Knowledge:

- Lean Manufacturing
- Manufacturing Process
- Quality Assurance / Quality Control

Skills:

- Problem-solving skills.
- Leadership skills.
- Project management skills.
- Analytical skills.
- Communication skills.

Attributes (Attitude):

- Positive attitude.
- Flexible attitude.
- Proactive attitude.
- Quality-focused attitude.
- Safety-focused attitude.
- Continuous improvement attitude.
- Open-minded attitude.
- Team-oriented attitude.
- Leadership attitude.
- Sense of responsibility attitude.

MSIC DIVISION	**:**	**C30 - Manufacture of Other Transport Equipment**
MSIC GROUP	**:**	**C304 - Manufacture of Military Fighting Vehicles**
AREA	**:**	**Assembly Process**
JOB TITLE	**:**	**Engineer**
LEVEL	**:**	**4**

Job Responsibilities:

- Reporting to the Senior Assembly Engineer. The engineer is responsible for all the planning, coordination and execution of all assembly work

Knowledge:

- Lean Manufacturing
- Manufacturing Process
- Quality Assurance / Quality Control

Skills:

- Problem-solving skills.
- Leadership skills.
- Project management skills.
- Analytical skills.
- Communication skills.

Attributes (Attitude):

- Positive attitude.
- Flexible attitude.
- Proactive attitude.
- Quality-focused attitude.
- Safety-focused attitude.
- Continuous improvement attitude.
- Open-minded attitude.
- Team-oriented attitude.
- Leadership attitude.
- Sense of responsibility attitude.

MSIC DIVISION	**:**	**C30 - Manufacture of Other Transport Equipment**
MSIC GROUP	**:**	**C304 - Manufacture of Military Fighting Vehicles**
AREA	**:**	**Bodywork Painting**
JOB TITLE	**:**	**Senior Engineer**
LEVEL	**:**	**5**

Job Responsibilities:

- Reporting to the Head of Manufacturing, the engineer is responsible for all the planning, coordination and execution of all painting work.

Knowledge:

- Lean Manufacturing
- Manufacturing Process
- Quality Assurance / Quality Control
- Painting equipment
- Hazardous waste management
- Health and safety procedures

Skills:

- Strong communication.
- Critical thinking.
- Leadership.
- Problem-solving.

Attributes (Attitude):

- Strong work ethic.
- Attention to details.
- Flexibility.
- Good judgement.
- Good Teamwork.
- Safety-conscious.
- Continuous learning.
- Positive attitude.
- Strong physical stamina.
- Time management.

MSIC DIVISION	**:**	**C30 - Manufacture of Other Transport Equipment**
MSIC GROUP	**:**	**C304 - Manufacture of Military Fighting Vehicles**
AREA	**:**	**Bodywork Painting**
JOB TITLE	**:**	**Engineer**
LEVEL	**:**	**4**

Job Responsibilities:

- Reporting to the Senior Painting Engineer, the engineer is responsible for all the planning, coordination and execution of all painting work.

Knowledge:

- Lean Manufacturing
- Manufacturing Process
- Quality Assurance / Quality Control
- Hazardous waste management
- Health and safety procedures
- Inspect paintwork
- Prepare surface for painting
- Work safely with chemicals

Skills:

- Strong communication.
- Critical thinking.
- Leadership.
- Problem-solving.

Attributes (Attitude):

- Strong work ethic.
- Attention to details.
- Flexibility.
- Good judgement.
- Good Teamwork.
- Safety-conscious.
- Continuous learning.
- Positive attitude.
- Strong physical stamina.
- Time management.

MSIC DIVISION	**:**	**C30 - Manufacture of Other Transport Equipment**
MSIC GROUP	**:**	**C304 - Manufacture of Military Fighting Vehicles**
AREA	**:**	**Manufacturing Quality Control**
JOB TITLE	**:**	**Senior Engineer**
LEVEL	**:**	**5**

Job Responsibilities:

- Senior Quality Engineers define quality standards for the creation of products or services. Ensure products and services are following the quality standards and coordinate quality improvements.

Knowledge:

- Quality Operation
- Lean Manufacturing
- Manufacturing Process
- Machining Process
- Quality Assurance / Quality Control

Skills:

- Problem-solving.
- Critical Thinking
- Leadership.
- Communication.
- Strong Interpersonal skills.
- Strong analytical skills.

Attributes (Attitude):

- Strong commitment to quality.
- Sense of responsibility.
- Attention to detail.
- Continuous improvement mindset.
- Flexibility.
- Proactiveness.
- Sense of ethics.
- Teamwork attitude.
- Learning attitude.

MSIC DIVISION	**:**	**C30 - Manufacture of Other Transport Equipment**
MSIC GROUP	**:**	**C304 - Manufacture of Military Fighting Vehicles**
AREA	**:**	**Manufacturing Quality Control**
JOB TITLE	**:**	**Engineer**
LEVEL	**:**	**4**

Job Responsibilities:

- Quality Engineer is primarily responsible to execute all design processes and activities required of Product Engineering Team such as conducting simulation and analysis, detailed design, verifying design drawings and performing design review.

.

Knowledge:

- Quality Operation
- Lean Manufacturing
- Manufacturing Process
- Machining Process
- Quality Assurance / Quality Control

Skills:

- Problem-solving.
- Critical Thinking
- Leadership.
- Communication.
- Strong Interpersonal skills.
- Strong analytical skills.

Attributes (Attitude):

- Strong commitment to quality.
- Sense of responsibility.
- Attention to detail.
- Continuous improvement mindset.
- Flexibility.
- Proactiveness.
- Sense of ethics.
- Teamwork attitude.
- Learning attitude.

MSIC DIVISION	**:**	**C30 - Manufacture of Other Transport Equipment**
MSIC GROUP	**:**	**C304 - Manufacture of Military Fighting Vehicles**
AREA	**:**	**Pre-Delivery Inspection (PDI) & Final Acceptance Test (FAT)**
JOB TITLE	**:**	**Senior Engineer**
LEVEL	**:**	**5**

Job Responsibilities:

- Manage a team of quality personnel working on continuous improvement of product and process quality through adapting full improving cycle of Plan-Do-Check-Act concept

Knowledge:

- Quality Operation
- Lean Manufacturing
- Autonomous Maintenance
- Machining Process
- Quality Assurance / Quality Control

Skills:

- Inspection.
- Problem-solving.
- Auditing and inspection.
- Critical Thinking
- Planning and organization.
- Leadership.
- Communication.
- Strong Interpersonal skills.
- Strong analytical skills.

Attributes (Attitude):

- Strong commitment to quality.
- Sense of responsibility.
- Attention to detail.
- Continuous improvement mindset.
- Flexibility.
- Proactiveness.
- Sense of ethics.
- Teamwork attitude.
- Learning attitude.

MSIC DIVISION	**:**	**C30 - Manufacture of Other Transport Equipment**
MSIC GROUP	**:**	**C304 - Manufacture of Military Fighting Vehicles**
AREA	**:**	**Pre-Delivery Inspection (PDI) & Final Acceptance Test (FAT)**
JOB TITLE	**:**	**Engineer**
LEVEL	**:**	**4**

Job Responsibilities:

- Manage a quality team in conforming finished product / sub-system manufactured complied to quality requirement agreed by organization

Knowledge:

- Quality Operation
- Lean Manufacturing
- Autonomous Maintenance
- Machining Process
- Quality Assurance / Quality Control

Skills:

- Inspection.
- Problem-solving.
- Auditing and inspection.
- Critical Thinking
- Planning and organization.
- Leadership.
- Communication.
- Strong Interpersonal skills.
- Strong analytical skills.

Attributes (Attitude):

- Strong commitment to quality.
- Sense of responsibility.
- Attention to detail.
- Continuous improvement mindset.
- Flexibility.
- Proactiveness.
- Sense of ethics.
- Teamwork attitude.
- Learning attitude.

SECTION : (C) MANUFACTURING

DIVISION : (30) MANUFACTURE OF OTHER TRANSPORT EQUIPMENT

GROUP : (309) MANUFACTURE OF TRANSPORT EQUIPMENT N.E.C.

MSIC DIVISION	**:**	**C30 - Manufacture of Other Transport Equipment**
MSIC GROUP	**:**	**C309 - Manufacture of Transport Equipment N.E.C.**
AREA	**:**	**Design and Development**
JOB TITLE	**:**	**Head of Design and Development**
LEVEL	**:**	**6**

Job Responsibilities:

- Responsible for overseeing the design process within an organization.
- Responsible for budgeting, financial management, and communication with other departments and stakeholders.
- Responsible for maintaining design standards and ensuring that projects are completed on time and within budget.

Knowledge:

- Design principles and methodologies.
- Computer-aided design (CAD) software.
- Project management.
- Business and market trends.

Skills:

- Leadership.
- Project management.
- Design expertise.
- Creative problem-solving.
- Technical.
- Communication

Attributes (Attitude):

- Attention to detail.
- Adaptability.
- Strong business acumen.
- Professionalism.
- Positive attitude.
- Integrity.
- Responsiveness.
- Teamwork

MSIC DIVISION	**:**	**C30 - Manufacture of Other Transport Equipment**
MSIC GROUP	**:**	**C309 - Manufacture of Transport Equipment N.E.C.**
AREA	**:**	**Design and Development**
JOB TITLE	**:**	**Electrical / Mechanical Engineer**
LEVEL	**:**	**5**

Job Responsibilities:

- Conducts analysis, research, develops concepts, theories and methods of operation.
- Enhance existing knowledge to design and develop products and systems that meet specific needs and requirements.
- To work with other engineers and professionals to create integrated systems.

Knowledge:

- Engineering principles, including physics, mechanics, and materials science.
- Industry-specific design methodologies.
- Computer-aided design (CAD)
- Computer-aided engineering (CAE)
- Manufacturing processes, testing and validation techniques.
- Industry standards and regulations.
- Project management.

Skills:

- Technical skills.
- Problem-solving.
- Analytical skills.
- Communication skills.
- Critical thinking.

Attributes (Attitude):

- Attention to detail.
- Creativity.
- Adaptability.
- Strong business acumen.
- Continuous Learning.
- Professionalism.
- Positive attitude.
- Integrity.
- Teamwork.

MSIC DIVISION	**:**	**C30 - Manufacture of Other Transport Equipment**
MSIC GROUP	**:**	**C309 - Manufacture of Transport Equipment N.E.C.**
AREA	**:**	**Design and Development**
JOB TITLE	**:**	**Technical Assistant Electrical / Mechanical**
LEVEL	**:**	**4**

Job Responsibilities:

- Supporting the design process by providing technical assistance to designers, engineers, and other members of the design team.
- Keeping track of project schedules and deliverables, and ensuring that projects are completed on time and within budget.
- Collaborating with cross-functional teams to ensure that designs meet specifications and industry standards.

Knowledge:

- Engineering principles.
- Computer-aided design (CAD)
- Industry standards and regulations.
- Project management.
- Technical documentation.
- 3D modelling and rendering.
- Materials Science.
- Manufacturing processes.
- Quality control.

Skills:

- Technical skills.
- Communication skills.
- Project management skills.
- Analytical skills.
- Organizational skills.

Attributes (Attitude):

- Attention to detail.
- Work ethic.
- Adaptability.
- Continuous learning.
- Teamwork.

MSIC DIVISION	**:**	**C30 - Manufacture of Other Transport Equipment**
MSIC GROUP	**:**	**C309 - Manufacture of Transport Equipment N.E.C.**
AREA	**:**	**Design and Development**
JOB TITLE	**:**	**Drafter**
LEVEL	**:**	**3**

Job Responsibilities:

- Create technical drawings and plans used in the construction, manufacturing, and engineering industries.
- Responsible for creating drawings and plans to scale, using correct symbols and dimensioning techniques,
- Responsible for updating and revising existing drawings, creating 3D models, visualizations and simulations.

Knowledge:

- CAD software.
- Engineering principles.
- Industry standards and regulations.
- Design documentation.
- Project management.
- Manufacturing processes.
- Technical proposal and presentations.
- Industry trends and best practices.

Skills:

- Computer-aided design (CAD)
- Technical knowledge.
- interpersonal Communication
- Organizational management
- Problem-solving

Attributes (Attitude):

- Attention to detail.
- Strong work ethic.
- Adaptability.
- Continuous learning.
- Teamwork.
- Creativity.
- Patience.

MSIC DIVISION	**:**	**C30 - Manufacture of Other Transport Equipment**
MSIC GROUP	**:**	**C309 - Manufacture of Transport Equipment N.E.C.**
AREA	**:**	**Process Engineering**
JOB TITLE	**:**	**Head of Process Engineering**
LEVEL	**:**	**6**

Job Responsibilities:

- Setting goals and objectives for the section/ department or team they manage and ensuring that they align with the overall goals and objectives of the organization.
- Planning and organizing the activities of the section/ department or team, and allocating resources as needed.
- Leading, managing, and mentoring a team of employees, including setting goals, evaluating performance, and providing feedback and coaching.
- Managing budgets and resources to ensure that the department or team's goals are met.
- Identifying and managing risks to the organization and developing and implementing strategies to mitigate those risks.

Knowledge:

- Production and Processing.
- Lean Manufacturing
- Manufacturing Process
- Quality Assurance / Quality Control

Skills:

- Problem-solving
- Leadership
- Project management
- Analytical
- Communication

Attributes (Attitude):

- Attention to detail.
- Adaptability.
- Strong business acumen.
- Professionalism.
- Positive attitude.
- Integrity.
- Responsiveness.
- Teamwork.

MSIC DIVISION	**:**	**C30 - Manufacture of Other Transport Equipment**
MSIC GROUP	**:**	**C309 - Manufacture of Transport Equipment N.E.C.**
AREA	**:**	**Process Engineering**
JOB TITLE	**:**	**Electrical / Mechanical Engineer**
LEVEL	**:**	**5**

Job Responsibilities:

- Designing and improving production processes.
- Planning and scheduling production.
- Production equipment and machinery.
- Production problem and solutions.
- Quality control procedures.

Knowledge:

- Mechanical.
- Engineering and Technology.
- Production and Processing.
- Lean Manufacturing
- Manufacturing Process
- Quality Assurance / Quality Control

Skills:

- Technical skills.
- Problem-solving.
- Analytical thinking
- Interpersonal Communication
- Critical thinking.

Attributes (Attitude):

- Attention to detail.
- Creativity.
- Adaptability.
- business acumen.
- Continuous Learning.
- Professionalism.
- Positive attitude.
- Integrity.
- Teamwork

MSIC DIVISION	**:**	**C30 - Manufacture of Other Transport Equipment**
MSIC GROUP	**:**	**C309 - Manufacture of Transport Equipment N.E.C.**
AREA	**:**	**Process Engineering**
JOB TITLE	**:**	**Supervisor**
LEVEL	**:**	**4**

Job Responsibilities:

- Supervising a team of production staff, including setting goals, evaluating performance, and providing feedback and coaching.
- Managing production schedules to ensure that deadlines are met and that production runs smoothly.
- Managing inventory levels to ensure that production runs smoothly and that there are no delays due to lack of materials.
- Troubleshooting production problems and implementing solutions to resolve them.
- Implementing quality control procedures to ensure that products are of the highest quality.

Knowledge:

- Mechanical.
- Engineering and Technology.
- Production and Processing.
- Lean Manufacturing
- Manufacturing Process
- Quality Assurance / Quality Control

Skills:

- Technical skills.
- Problem-solving.
- Communication skills.
- Technical expertise.
- Leadership.
- Quality control.

Attributes (Attitude):

- Attention to detail.
- Adaptability.
- Continuous Learning.
- Professionalism.
- Positive attitude.
- Integrity.
- Teamwork

MSIC DIVISION	**:**	**C30 - Manufacture of Other Transport Equipment**
MSIC GROUP	**:**	**C309 - Manufacture of Transport Equipment N.E.C.**
AREA	**:**	**Process Engineering**
JOB TITLE	**:**	**Line Leader**
LEVEL	**:**	**3**

Job Responsibilities:

- Leading a team of production workers, including setting goals, evaluating performance, and providing feedback and coaching.
- Managing production schedules to ensure that deadlines are met and that production runs smoothly.
- Managing inventory levels to ensure that production runs smoothly and that there are no delays due to lack of materials.
- Troubleshooting production problems and implementing solutions to resolve them.
- Implementing quality control procedures to ensure that products are of the highest quality.

Knowledge:

- Engineering and Technology.
- Design.
- English Language.
- Production and Processing.
- Manufacturing Process
- Quality Assurance / Quality Control

Skills:

- Technical expertise.
- Leadership.
- Communication.
- Problem-solving.
- Quality control.

Attributes (Attitude):

- Attention to detail.
- Adaptability.
- Continuous Learning.
- Professionalism.
- Positive attitude.
- Integrity.
- Teamwork

MSIC DIVISION	**:**	**C30 - Manufacture of Other Transport Equipment**
MSIC GROUP	**:**	**C309 - Manufacture of Transport Equipment N.E.C.**
AREA	**:**	**Product Validation**
JOB TITLE	**:**	**Electrical / Mechanical / Quality Engineer**
LEVEL	**:**	**5**

Job Responsibilities:

- Responsible for ensuring that an organization's products and services meet the highest standards of quality.
- Enhance existing knowledge and method of testing and systems that meet specific needs and requirements.
- Responsible for defining the quality standards, implementing and maintaining the quality systems, and conducting audits to ensure adherence to the set standards.

Knowledge:

- Quality management systems.
- Statistical process control (SPC).
- Root cause analysis.
- Quality tools and techniques.
- Quality standards and regulations.
- Auditing.

Skills:

- Analytical skills.
- Problem-solving skills
- Leadership skills.
- Communication skills.
- Technical expertise.
- Project management skills.

Attributes (Attitude):

- Strong ethics and integrity.
- Continuous improvement mindset.
- Proactivity.
- Open-mindedness and flexibility.
- Attention to detail.
- Creativity.
- Integrity.
- Teamwork

MSIC DIVISION	**:**	**C30 - Manufacture of Other Transport Equipment**
MSIC GROUP	**:**	**C309 - Manufacture of Transport Equipment N.E.C.**
AREA	**:**	**Product Validation**
JOB TITLE	**:**	**Supervisor**
LEVEL	**:**	**4**

Job Responsibilities:

- Responsible for conducting regular quality audits to ensure that the company is in compliance with industry regulations and standards.
- Responsible for creating and maintaining standard operating procedures, inspection plans, and testing protocols.
- Responsible for managing and training a team of quality control technicians, who are responsible for inspecting and testing products.

Knowledge:

- Quality management systems.
- Inspection and testing techniques.
- Root cause analysis.
- Documentation and record-keeping.
- Industry-specific regulations and standards.

Skills:

- Technical skills.
- Problem-solving.
- Communication skills.
- Technical expertise.
- Leadership.
- Quality control.

Attributes (Attitude):

- Attention to detail.
- Adaptability.
- Continuous Learning.
- Professionalism.
- Positive attitude.
- Integrity.
- Teamwork.

MSIC DIVISION	**:**	**C30 - Manufacture of Other Transport Equipment**
MSIC GROUP	**:**	**C309 - Manufacture of Transport Equipment N.E.C.**
AREA	**:**	**Transport Equipment Production & Assembly**
JOB TITLE	**:**	**Head of Transport Equipment Production & Assembly**
LEVEL	**:**	**6**

Job Responsibilities:

- Responsible for overseeing the production and assembly process within a manufacturing or industrial organization.
- Responsible for budgeting, financial management, and communication with other departments and stakeholders.
- Responsible for maintaining safety standards, managing inventory, and ensuring compliance with regulations and industry standards.

Knowledge:

- Production processes and systems.
- Industry regulations and standards.
- Quality control.
- Equipment and machinery.
- Project management.
- Safety.
- Lean manufacturing.
- Supply chain management.
- Maintenance management.
- Inventory management.
- Statistical process control (SPC).
- Product design and development.
- Data analysis and interpretation.
- Sustainable manufacturing.

Skills:

- Leadership.
- Planning and organization.
- Problem-solving.
- Technical expertise.
- Project management.
- Communication.
- Time management.
- Interpersonal skills.
- Risk management.
- Decision making.
- Analytical thinking.

Attributes (Attitude):

- Attention to detail.
- Adaptability.

- Strong business acumen.
- Professionalism.
- Positive attitude.
- Integrity.
- Responsiveness.
- Teamwork.

MSIC DIVISION	**:**	**C30 - Manufacture of Other Transport Equipment**
MSIC GROUP	**:**	**C309 - Manufacture of Transport Equipment N.E.C.**
AREA	**:**	**Transport Equipment Production & Assembly**
JOB TITLE	**:**	**Electrical / Mechanical Engineer**
LEVEL	**:**	**5**

Job Responsibilities:

- Conducts analysis, research, develops concepts, theories and methods of operation.
- Responsible for analysing production data to identify areas for improvement and implementing changes to increase productivity and reduce costs.
- To work with other engineers and professionals to create integrated systems.

Knowledge:

- Manufacturing processes.
- Industry-specific equipment and technology.
- Quality control and quality assurance.
- Materials science and engineering principles.
- Health and safety regulations.
- Project management.
- Computer-aided design (CAD) and computer-aided manufacturing (CAM).
- Lean manufacturing and Six Sigma.

Skills:

- Problem-solving skills
- Decision-making skills
- Analytical and quantitative skills
- Communication and interpersonal skills
- Leadership skills
- Organizational and planning skills

Attributes (Attitude):

- Attention to detail.
- Creativity.
- Adaptability.
- Strong business acumen.
- Continuous Learning.
- Professionalism.
- Positive attitude.
- Integrity.
- Teamwork.

MSIC DIVISION	**:**	**C30 - Manufacture of Other Transport Equipment**
MSIC GROUP	**:**	**C309 - Manufacture of Transport Equipment N.E.C.**
AREA	**:**	**Transport Equipment Production & Assembly**
JOB TITLE	**:**	**Supervisor**
LEVEL	**:**	**4**

Job Responsibilities:

- Responsible for overseeing the work of a production and assembly team.
- Responsible for setting goals and objectives, developing and implementing strategies.
- Troubleshooting production problems and implementing solutions to resolve them.
- Implementing quality control procedures to ensure that products are of the highest quality.

Knowledge:

- Production processes and techniques.
- Industry-specific equipment and technology.
- Quality control and quality assurance.
- Health and safety regulations.
- Project management.
- Inventory management.
- Lean manufacturing and Six Sigma.
- Computer-aided design (CAD) and computer-aided manufacturing (CAM).

Skills:

- Technical skills.
- Problem-solving.
- Communication skills.
- Technical expertise.
- Leadership.
- Quality control.

Attributes (Attitude):

- Attention to detail.
- Adaptability.
- Continuous Learning.
- Professionalism.
- Positive attitude.
- Integrity.
- Teamwork

MSIC DIVISION : C30 - Manufacture of Other Transport Equipment
MSIC GROUP : C309 - Manufacture of Transport Equipment N.E.C.
AREA : Transport Equipment Production & Assembly
JOB TITLE : Line Leader
LEVEL : 3

Job Responsibilities:

- Leading a team of production and assembly workers.
- Setting production goals and monitoring progress.
- Communicating with other managers and supervisors to coordinate production efforts and resolve issues.
- Troubleshooting production problems and implementing solutions to resolve them.
- Implementing quality control procedures to ensure that products are of the highest quality.

Knowledge:

- Production processes.
- Industry-specific equipment and technology.
- Safety regulations.
- Lean manufacturing and Six Sigma.
- Inventory management.
- Quality control.
- Scheduling and planning.
- Production line design and layout.
- Data analysis and statistics.
- Team management and supervision.

Skills:

- Technical expertise.
- Leadership.
- Communication.
- Problem-solving.
- Quality control.

Attributes (Attitude):

- Attention to detail.
- Adaptability.
- Continuous Learning.
- Professionalism.
- Positive attitude.
- Integrity.
- Teamwork

MSIC DIVISION : C30 - Manufacture of Other Transport Equipment
MSIC GROUP : C309 - Manufacture of Transport Equipment N.E.C.
AREA : Transport Equipment Production & Assembly
JOB TITLE : Operator
LEVEL : 1

Job Responsibilities:

- Responsible for assembling activity and their components in a manufacturing setting.
- Responsible for performing routine maintenance on at production line and equipment.
- Responsible for ensuring safety, health, environment and quality at workplaces.

Knowledge:

- Equipment and machinery.
- Manufacturing processes.
- Quality control.
- Safety.
- Industry regulations.
- Basic mechanical and electrical skills.
- Inventory management.
- Technical documentation.
- Productivity improvement techniques.
- Troubleshooting techniques.

Skills:

- Technical skills.
- Problem-solving skills.
- Communication skills.
- Time management skills.
- Analytical skills.
- Interpersonal skills.
- Decision-making skills.

Attributes (Attitude):

- Attention to detail.
- Work ethic.
- Flexibility.
- Willingness to learn and improve.
- Team player.
- Positive attitude.
- Good Physical stamina.
- Good hand-eye coordination.
- Safety-minded.
- Self-motivated.
- Good time management.

ANNEX 3: LIST OF CONTRIBUTORS

C30 - MANUFACTURE OF OTHER TRANSPORT EQUIPMENT
OCCUPATIONAL FRAMEWORK DEVELOPMENT COMMITTEE

RESEARCHERS

NO.	NAME	POSITION	ORGANISATION
1	Dr. Hapidah binti Mohamed	Researcher	Adimega Sdn. Bhd.
2	Ts. Muhamad Syukri bin Abdul Khalid	Assistant Researcher	Adimega Sdn. Bhd.

EXPERT PANELISTS

NO.	NAME	POSITION	ORGANISATION
1	Muhammad Amzar Danish Bin Chairil	Executive	Malaysia Automotive Robotics and IOT Institute (MARii).
2	Noor Asha Bin Abdul Rashid	Chairman	Technical Commitee Association of Marine Industries of Malaysia (AMIM)
3	Muhammad Fauzan Bin Mat Yusoff	Head Ship Electrical and Electronic Sector	THHE Fabricator Sdn. Bhd.
4	Ayu Hazwani Binti Ramman	Assistant Manager	National Aerospace Industry Corporation Malaysia (NAICO Malaysia)
5	Noor Rulhuda Binti Hashim	Executive	National Aerospace Industry Corporation Malaysia (NAICO Malaysia)

NO.	NAME	POSITION	ORGANISATION
6	Raja Khairul Iskandar Bin Raja Aman	Senior Operation Manager	Spirit AeroSystems Malaysia Sdn. Bhd.
7	Salehudin Bin Daud	Manager	APM Auto Electrics Sdn. Bhd.
8	Mohd Yusaini Bin Ahmad	Operation Manager	HICOM Diecastings Sdn. Bhd.
9	Mohd Suhaimi Omar	Senior Manager	DRB-HICOM Defence Technologies (DEFTECH)
10	Mohd Nazri Bin Nordin	Manager	DRB-HICOM Defence Technologies (DEFTECH)
11	Muhamad Shahril Bin Zakariah	Technical Manager	Boon Siew Honda
12	Hafidz Bin Mohd Azhar	Senior Manager (Technical Training & Development)	Hong Leong Yamaha Sdn. Bhd.
13	Shairil Izwan Bin Herman	Quality Manager	Hyundai Rotem, Apex Comm, Posco Consortium (HAPC)

OCCUPATIONAL FRAMEWORK ASSESSMENT TECHNICAL COMMITTEE (JTPOF)

NO.	NAME	POSITION	ORGANISATION
1	Dr. Saiful Anuar bin Abu Bakar	Senior Lecturer	Faculty of Mechanical Engineering Universiti Teknologi Malaysia (UTM)
2	Prof. Adj. Ts. Shamsul Kamar bin Abu Samah	Head of National Aerospace Industry Corporation Malaysia (NAICO Malaysia)	National Aerospace Industry Corporation Malaysia (NAICO Malaysia)
3	Soo Je Main	Business Development Manager	Grade One Marine Shipyard Sdn Bhd (GOMS)
4	Mohd Helmi bin Roslan	Senior Manager Business Development	HICOM Diecastings Sdn. Bhd.
5	Azrul Amin bin Ahmad Latifi	Industrial Relations Officer	Jabatan Tenaga Kerja Semenanjung Malaysia (JTKSM)

OCCUPATIONAL FRAMEWORK INTERNAL TECHNICAL COMMITTEE DEPARTMENT OF SKILLS DEVELOPMENT

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1	Dr. Norhuda binti Salim	Head of Programme Skills Instructor Development Programme (PPK)	Centre of Instructors and Advanced Skills Training (CIAST)
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NO.	NAME	POSITION	DIVISION/ CENTRE
6	Dr. Fairus Atida binti Said	Senior Assistant Director (SLDN Assessment)	Competencies Certification Division (BPK)
7	Dr. Nor Salwa binti Hamdan	Senior Assistant Director (SLaPB Accreditation)	Accreditation Division (BPT)
8	Ts. Dr. Norhayati binti Yahaya	Head of Unit (Competencies Advancement and Quality Assurance) Skills Professional Development (SPD) Programme	Centre of Instructors and Advanced Skills Training (CIAST)
9	Ts. Dr. Nurul Amin bin Badrul	Head of Unit (Research and Innovation)	Centre of Instructors and Advanced Skills Training (CIAST)
11	Dr. Saidi bin Zain	Innovation Coordinator Research and Innovation Unit	Centre of Instructors and Advanced Skills Training (CIAST)

OCCUPATIONAL FRAMEWORK MANAGEMENT UNIT

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1	Khadijah binti Isaak	Principal Assistant Director
2	Ahmad Azran bin Ranaai	Senior Assistant Director
3	Nazrul Hilmi bin Mohammad	Senior Assistant Director