

# SIRIM LINK

Volume 3  
2021

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DRIVING THE  
NATION'S ECONOMY



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# CATALYSIS FOR MALAYSIA'S PROGRESS



Malaysia is now 64 years old. Through the years, we have successfully transitioned from an agricultural nation to an industrialised nation. The five-year Malaysia Plans have been instrumental to this journey. We are currently in our 12th chapter, which has revealed numerous high-impact sectors that will pave the way for our continued progress. These have immense potential to exert significant transformations that will reverberate across our myriad industries and make the biggest impact on our economy at large.

In gearing up to set the stage for the debut of Malaysia as a high-income nation, SIRIM has the right expertise, experience and programmes within our arsenal, making us ideally positioned to be the catalyst that speeds up the country's endeavours. We've all heard that "change is the only constant in life". At SIRIM, let us help to make this a positive transformation for the ultimate prosperity of the nation.

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# TWELFTH MALAYSIA PLAN

2021-2025  
PROSPEROUS, INCLUSIVE, SUSTAINABLE MALAYSIA



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VICE PRESIDENT,  
SIRIM GROUP STRATEGIC PLANNING

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*Dr. Zanariah Ujang*

**VICE PRESIDENT,  
SIRIM GROUP STRATEGIC PLANNING**



## CATALYSING MALAYSIA'S GROWTH & PROSPERITY

COVID-19 HAS DISRUPTED GLOBAL ECONOMIC PROGRESS. HOW HAS MALAYSIA FARED, AND HOW WILL WE DO AS WE START OUR JOURNEY DOWN THE ROAD TO RECOVERY? SIRIM IS MORE THAN READY TO DO ITS PART IN FUELLING THE NATION'S DEVELOPMENT.

The battle against COVID-19 continues, but there is hope on the horizon. While Malaysia had a slow start in 2021 with the delayed implementation of the national COVID-19 vaccination programme and the arrival of the more infectious Delta and Omicron variants, things are now starting to look up.

Among others, the negative repercussions of nationwide containment measures are anticipated to be cushioned by several factors, including allowances for essential economic sectors, higher adaptability to remote work, and increased automation and digitalisation, as well as various policy measures aimed at providing cash flow support as the country cautiously reopens.

Herein lies the importance of the country's catalytic industries, which the Ministry of International Trade and Industry (MITI) identified under the 11th Malaysia Plan (2016-2020). These encompass three primary sectors, namely Electrical & Electronics, Machinery & Equipment, and Chemicals, and two sub-sectors, namely Aerospace and Medical Devices. Additionally, MITI is expected to release a new Industrial Master Plan at the end of the year, which will continue to pave the way forward for the country's industries.

"Based on our studies, other high potential sectors such as Energy & Environment, Food & Beverage, Construction, Rail & Transport and Textiles could be included as well," said Dr. Zanariah Ujang, Vice President of Group Strategic Planning at SIRIM.

According to her, the term Catalytic Industries refers to industries that have the greatest potential to exert the biggest change across the widest portions of the country's manufacturing sectors. "It pertains to strategies to revitalise the country's manufacturing sector which, in turn, will make the biggest positive impact on our economy.



*The three main catalytic sectors are envisioned to provide a crucial platform for Malaysia to transition into an advanced economy and inclusive nation, and charged with boosting Malaysia's industrial ecosystems. They have strong linkages to other sectors and products of these sectors are used in many applications across various industries.*



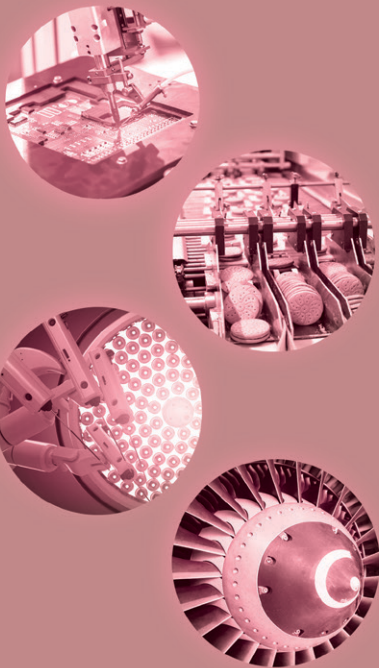
"The three main catalytic sectors are envisioned to provide a crucial platform for Malaysia to transition into an advanced economy and inclusive nation, and charged with boosting Malaysia's industrial ecosystems. They have strong linkages to other sectors and products of these sectors are used in many applications across various industries," she continued.

As the country strives to move ahead on the road to economic recovery, consumer demand will help fuel a fast rebound. "In the long run the catalytic sectors need to build long-term resiliency and sustainability," said Dr. Zanariah. According to her, businesses need to accelerate digitalisation of manufacturing and services to remain globally competitive.



## Significant Disruptions

The past two years have brought about unprecedented trials to Malaysia's economic landscape.



### Electrical & Electronics

The electronics market experienced a modest growth rate initially. Subsequently, however, production facilities of electronics parts were halted due to logistics slowdown and unavailability of workforce across the globe. Additionally, e-commerce companies worldwide discontinued the delivery of non-essential items, including the electronics products, which affected the electronics industry.

### Machinery & Equipment

The manufacturing and supply chain operations of industrial equipment companies were severely disrupted. This caused a chain reaction down the whole supplier network. The pandemic also caused new challenges, such as worker absence, restricted site access and collaboration, travel limitations, fatigue and new work protocols.

### Medical Devices

During this time, the medical technology (medtech) industry became a central focus, with unparalleled demand for diagnostic tests, personal protective equipment (PPE), ventilators and other vital medical supplies. To meet this challenge, medtech leaders had to rapidly ramp up their manufacturing capacity and capabilities while also exploring creative solutions to support the health needs of the public.

### Chemicals & Chemical Products

In early 2020, the effects of the COVID-19-related economic and oil price collapse were felt across the oil & gas and chemicals industries. Compounding this were a growing awareness of sustainability among consumers, which led to a focus on decarbonisation technologies; increased use of digital technologies in the workplace and oversupply in certain market segments.

### Aerospace & Aviation

As travelling became virtually non-existent, there was a huge disruption in commercial aviation, with customers deferring the delivery of new aircrafts and demand for spare parts dwindling. This has hit aircraft manufacturers hard. It is projected that they will continue facing challenges in the longer term that will further weaken the industrial base supporting complex manufacturing. While defence contractors have not been as badly affected, they can still expect a slower demand and flatter growth curve in the long run as governments tighten their belts. The downturn in commercial aviation has also affected the aerospace industry, which has been suffering the highest year-on-year decline in half a century.

### Cushioning COVID-19 Impacts

With laboratories and testing facilities that are ISO 17025 and Good Laboratory Practice (GLP) accredited, SIRIM is well-equipped to conduct various types of biocompatibility and safety tests for medical device products.

"Among others, SIRIM can broaden the role of the healthcare industry by establishing new testing infrastructure and capabilities to support the national vaccine development programme and minimise our reliance on imported vaccines," Dr. Zanariah said.

*Among others, SIRIM can broaden the role of the healthcare industry by establishing new testing infrastructure and capabilities to support the national vaccine development programme and minimise our reliance on imported vaccines.*





# TWELFTH MALAYSIA PLAN

2021-2025

A PROSPEROUS, INCLUSIVE, SUSTAINABLE MALAYSIA

SIRIM also has the potential of playing an important role in the research & development of new products such as COVID-19 test kits, predictive technologies to identify hot spots, digital technology for education and air filtration and purification technologies; testing of medical products including vaccines, PPE and other medical devices; as well as measurement and calibration services for medical devices.

While some segments of the healthcare industry, such as PPE and vaccine manufacturers, have experienced tremendous revenue growth owing to increased demand, other industries have seen the opposite occur due to reduced demand, movement restrictions and supply chain disruptions.

*For one, the Machinery & Equipment industry can benefit from SIRIM's expertise in assisting small and medium enterprises (SMEs) to adopt smart manufacturing technologies such as automation and Internet of Things (IoT) applications to enhance efficiency and productivity.*

*SIRIM's existing industrial innovation and market access ecosystem are well-positioned to facilitate the development of the catalytic sectors in the country.*

Hence, embracing research & design, adapting high technology and creating high value-added products are among the strategies that these sectors could employ to climb up the value chain. Through its years of facilitating industry growth in the country, SIRIM has the proper facilities, expertise and services to enable organisations to meet the requirements of the export market and increase revenue from global market penetration.

"SIRIM's existing industrial innovation and market access ecosystem are well-positioned to facilitate the development of the catalytic sectors in the country," remarked Dr. Zanariah, before going on to cite some examples.

"For one, the Machinery & Equipment industry can benefit from SIRIM's expertise in assisting small and medium enterprises (SMEs) to adopt smart manufacturing technologies such as automation and Internet of Things (IoT) applications to enhance efficiency and productivity," she explained.

To mitigate the adverse impacts of COVID-19 on the aerospace & aviation industry, SIRIM offers AS9000 certification services, which local aerospace organisations can benefit from. In fact, SIRIM QAS

International Sdn Bhd (SIRIM QAS) is currently gearing up to become the local recognised certification body to carry out this scheme. Among others, these will encompass testing, inspection and certification services across the entire manufacturing value chain, including system integration, production, and maintenance, repair and overhaul (MRO).

Besides that, SIRIM QAS also provides testing and certification services to the rail sector across all value chain segments, including civil works, trackwork, electrification and communications. "We offer holistic training courses to support the industry at various stages of the life cycle, from rail infrastructure construction & maintenance, rolling stock and track maintenance to operations and employee training," shared Dr. Zanariah.

### ∴ The Way Forward ∴

With the COVID-19 pandemic being far from over, SIRIM is committed in helping Malaysia to rise from the quagmire. "One of our main roles is in boosting the economic efficiency and development of the country. This is particularly essential as we soldier on in our battle against the pandemic," said Dr. Zanariah.

Unveiled during the latter part of 2021, the 12th Malaysia Plan and 2022 Budget have opened up further opportunities for SIRIM to do its part in extending a helping hand to various industry players and boosting the trajectory of the nation's economic recovery.

For one, SIRIM looks forward to being an instrumental part in driving the growth of the following sectors:

- High Impact Industries
- Digitalisation & Advanced Technologies
- Green Growth & Sustainability
- Bumiputera Micro SMEs
- Healthcare

*We offer holistic training courses to support the industry at various stages of the life cycle, from rail infrastructure construction & maintenance, rolling stock and track maintenance to operations and employee training.*



*SIRIM is also focusing on ongoing competency development for our employees in areas such as Data Analytics and Artificial Intelligence in order to provide high-value services to industry players in the near future. These are frontier technologies that have huge potential for improving people's lives and protecting the planet.*

"Within the High Impact Industries banner, for example, we are involved in the National Electrical & Electronic roadmap, bio-jet fuel and Industry 4.0 for the Manufacturing, Electrical & Electronics and Aerospace sectors.

"Consequently, in encouraging the adoption of technology among local industries, we gauge industry readiness to move into high technology adoption, providing research & development and technology matching services as well as facilitating funding for micro SMEs and startups via our collaboration with Cradle Fund Sdn Bhd," she explained.

Besides that, the SIRIM Industrial Centre of Innovation in Smart Manufacturing (ICI-SM) conducts technology audits and Industry 4.0 readiness assessments to identify gaps in the manufacturing process and provide solutions to address SMEs' manufacturing issues.

"SIRIM is also focusing on ongoing competency development for our employees in areas such as Data Analytics and Artificial Intelligence in order to provide high-value services to industry players in the near future. These are frontier technologies that have huge potential for improving people's lives and protecting the planet," Dr. Zanariah said.

Tasked with rebuilding the nation, the allocations in the 2022 Budget will see SIRIM accelerating its efforts in myriad areas, such as upskilling and reskilling programmes focusing on digital skills; technical and vocational education and training (TVET); Bumiputera development, agropreneur and halal industry entrepreneur programmes; youth leadership training and entrepreneurship programmes; funding for women entrepreneurs affected by COVID-19 and business expansion; skills enhancement in high value-added industries; intensive research & development activities for new innovations; and projects related to food security, tourism and environmental preservation and conservation.

"With the global pandemic still at large, we have a momentous responsibility in spurring the country's recovery. Nevertheless, there is a clearly carved pathway forward, and SIRIM is confident that we will be able to support the government's efforts in bolstering our economic performance to make way for a better and brighter Malaysia," concluded Dr. Zanariah.



*Norfaizah Nasir*

SENIOR CONSULTANT, SIRIM STS SDN BHD

## ACCELERATING INDUSTRY 4.0 ADOPTION

THE FACTORY TRANSFORMATION PROGRAMME WAS ROLLED OUT TO HELP LOCAL BUSINESSES TO EMBRACE MANUFACTURING BEST PRACTICES TOWARDS ADOPTING INDUSTRY 4.0. FIRST TO PARTICIPATE IS THE TIMBER AND FURNITURE INDUSTRY.



Malaysia's timber industry is a robust and growing industry which significantly contributes to the country's economic landscape. For example, export of Malaysian timber and timber products was valued at RM2.3 billion in March 2021, representing a 22% rise. Furthermore, cumulative exports from January to March 2021 climbed 10% to RM6.0 billion compared to the previous corresponding period. Similarly, sawn timber shipments to the EU, West Asia, the UAE, Iraq and Oman increased by 44% to 142%, according to the April 2021 issue of *Maskayu*.

In acknowledging the potential of the timber industry, SIRIM executed its first Factory Transformation Programme (FTP) for the timber and furniture industry, in collaboration with Malaysian Timber Council (MTC), Malaysian Timber Industry Board (MTIB) and ICA 40 Sdn Bhd, an organisation that provides comprehensive consultancy and advisory services as well as lead industry training and implementations for factory transformation and modernisation.

According to the collaboration, MTC provides a list of high-potential organisations while also funding a 20% participation fee for organisations that sign up. MTIB, on the other hand, will share a list of timber organisations that have participated in the GMP 5S Programme and Lean Management Programme.

"The programme is carried out through a series of consultation sessions held at the site of each participating organisation as well as field sessions with MTC and MTIB," explained Norfaizah Nasir, a Senior Consultant at SIRIM STS Sdn Bhd (SIRIM STS).

After an initial assessment of the participating organisation, SIRIM STS prescribes the necessary module based on the main issues faced by the organisation and its degree of readiness. As such, this initial evaluation is a critical step for understanding and analysing the organisation's general operations and management procedures.

"Both MTC and MTIB will subsequently conduct visits and monitor the status of implementation and improvements achieved from time to time," continued Norfaizah, expressing her hope that the timber and furniture industries will realise the benefits of subscribing to the FTP programme, which will ultimately enhance their productivity and efficiency.

### TRANSFORMING INDUSTRY FOR THE BETTER

*SIRIM STS Sdn Bhd, with the involvement of SIRIM Industrial Research through allocation from the SIRIM-Fraunhofer Fund, introduced the Factory Transformation Programme (FTP) to provide training and advisory services to help industry players enhance their performance, sustain their business and become Industry 4.0-ready.*

*"The programme is carried out through a series of consultation sessions held at the site of each participating organisation as well as field sessions with MTC and MTIB."*

### BENEFITING THE TIMBER INDUSTRY

- ⌘ Reduction of cycle time, which ultimately increases productivity and efficiency
- ⌘ Decrease in stocks/inventory and material, which will optimise space utilisation and costs
- ⌘ Minimises energy consumption for lower operating costs
- ⌘ Opportunity to re-skill and up-skill workers
- ⌘ Increase in machines' Overall Equipment Efficiency (OEE) by implementing best maintenance practices
- ⌘ Reduction of occupational hazards and improvement of the workplace environment and safety

### ⌘ Evolving for Excellence ⌘

"The fourth industrial revolution is transforming the production environment, and digitalisation and automation are here to stay. Thus, 'business as usual' is no longer sustainable in the present environment. The FTP aims to assist national manufacturing capabilities in boosting productivity and competitive value in order to improve their worldwide market position," emphasised Norfaizah.

FTP focuses on the implementation of four best practices: Green 5S, Lean Management, QC Tools & Techniques, and Innovation Management, which are important measures for the respective industries to follow in order to properly embrace Industry 4.0 technology.

"Jumping directly into Industry 4.0 adoption may cause organisations to fall into a technology trap, where the acquisition or adoption of technology actually produces additional difficulties in the business operations or management," she explained.

### Factory Transformation Programme Aims

- ⌘ Conduct an evaluation and diagnostic research of the factory shop floor to discover inefficiencies and wastes
- ⌘ Provide training and coaching to manufacturing companies at their sites/premises
- ⌘ Assist in transforming the shop floor with an efficient workflow and provide technical support to meet KPIs
- ⌘ Identify and develop appropriate guidelines for easy adoption by manufacturing companies
- ⌘ Train industry personnel to adopt an innovation culture in their organisation
- ⌘ Guide manufacturing companies to do initial assessments on readiness towards Industry 4.0 at their shop floor



*The fourth industrial revolution is transforming the production environment, and digitalisation and automation are here to stay. Thus, 'business as usual' is no longer sustainable in the present environment. The FTP aims to assist national manufacturing capabilities in boosting productivity and competitive value in order to improve their worldwide market position.*



There are five foundations of excellence in an organisation's operations, according to Norfaizah. "First, we need to obtain the proper management commitment, establish the right working culture and instil innovation culture throughout their organisation. Furthermore, organisations must eliminate waste through the application of lean methods, enhance product quality through quick response quality control, and, lastly, understand their readiness for the adoption of Industry 4.0 technologies," she said.

### 5 Foundations of Excellence



*Jumping directly into Industry 4.0 adoption may cause organisations to fall into a technology trap, where the acquisition or adoption of technology actually produces additional difficulties in the business operations or management.*





**:: Demonstrating Enhanced Productivity ::**

FTP encompasses three Recognition Schemes where organisations will be audited based on Green 5S, Lean Management and Innovation Management. If granted, the organisations may then use the Recognition Scheme logo in their promotional material. With this recognition, businesses can demonstrate to their clients that their operations have been audited and validated for best practices.

Three Recognition Schemes



*Through the implementation of this programme, organisations are able to execute new processes and innovative projects such as an improved kiln drying process, efficient and innovative work system, new data collecting system/software, improved store management, new marketing channel, and creation and production of new innovative goods.*

"Currently, 14 organisations are participating in the programme, four of which are timber product manufacturers and 10 are furniture factories. Each organisation was prescribed with different modules according to their varied needs; as a step forward in the right direction, they have acquired sound understanding on how lean management systems can help them improve in a systematic way," Norfaizah explained.



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Timber Product Manufacturers



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Furniture Factories



FTP also assists businesses in understanding the importance of a data-driven culture to boost their everyday production efficiency. They have also become aware of the impact of incoming raw material quality on their operations and the need to continually enhance it.

"Through the implementation of this programme, organisations are able to execute new processes and innovative projects such as an improved kiln drying process, efficient and innovative work system, new data collecting system/software, improved store management, new marketing channel, and creation and production of new innovative goods," said Norfaizah.



Improved operations and productivity may be obtained by better knowledge of inventory level, waste reduction and cycle time reduction when Green 5S and Lean Management are used. "As a result, these factories have been better structured and are more methodical in order to increase process efficiency," said Norfaizah.

"The organisations' management team was also able to involve all key employees to help them in their quest to create a better workplace," she added.

Most organisations were unable to complete the auditing step for the Recognition Scheme due to the closures of timber and timber-related facilities because of the movement control orders brought about by COVID-19. However, to date, seven firms have finished their auditing and are awaiting certification.

Meanwhile, the partnership between SIRIM, MTC and MTIB will continue to ensure that all the players in the timber and furniture industries are able to benefit from this initiative. "More programmes are planned for the coming years with various categories to support organisations with different levels of understanding and implementation. We are looking at three categories, which are FTP 1.0 for new organisations, FTP 1.5 for those that require additional support upon completion of FTP 1.0 and FTP 2.0 for those that can advance to becoming ready for Industry 4.0 adoption," said Norfaizah.

On a final note, Norfaizah urged for organisations to take advantage of this programme to prepare for Industry 4.0 adoption. The organisations need to embrace these new technologies and implement them according to their means. Industry 4.0 brings a new dimension in intelligence and connectivity to the manufacturing environment, resulting in a significant increase in industrial productivity and decrease in defects and non-value added activities. If not guided correctly, organisations may have issues trying to grasp the idea of the Industry 4.0 concept and determine their state-of-development with regards to Industry 4.0 implementation. SIRIM STS, using the module developed from various SIRIM Standards published, such as Industry 4.0 - Maturity Level, Criteria for Adoption and Use Case, will be able to give insights to organisations on the key shift factors, strategic thrusts and focus areas that could make Industry 4.0 work for them. But prior to that, a good "cleaning up" of the operations is vital.

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*More programmes are planned for the coming years with various categories to support organisations with different levels of understanding and implementation. We are looking at three categories, which are FTP 1.0 for new organisations, FTP 1.5 for those that require additional support upon completion of FTP 1.0 and FTP 2.0 for those that can advance to becoming ready for Industry 4.0 adoption.*



*Mohd Fauzi Ismail*

**DIRECTOR, INDUSTRIAL CENTRE  
OF INNOVATION IN  
ENERGY MANAGEMENT**



## REVOLUTIONISING THE TIMBER INDUSTRY

AS AN EQUATORIAL COUNTRY, MALAYSIA IS BLESSED WITH YEAR-ROUND SUNSHINE. SIRIM HARNESSES THIS RENEWABLE ENERGY TO UNVEIL A FIRST-OF-ITS-KIND SOLAR THERMAL TECHNOLOGY THAT IS SET TO HELP THE TIMBER INDUSTRY SAVE ENERGY AND COST, AS WELL AS MINIMISING ITS ENVIRONMENTAL IMPACT.

Timber, Malaysia's third largest commodity after palm oil and rubber, is a significant contributor to the national economy. Between 2016 and 2020, the export value of timber and timber products was roughly RM20 billion, placing the country among the top 10 in the world. Recently, despite the economic slowdown brought on by the COVID-19 pandemic, Malaysia's wooden furniture exports, including rattan and bamboo furniture, still managed to record a value of more than RM10 billion; while soft timber contributed RM2.4 billion in export value, ranking Malaysia third in the world after Thailand and China.

In an attempt to increase the energy efficiency of the industry, SIRIM, Persatuan Pengusaha Kayu-kayan dan Perabot Bumiputera Malaysia (PEKA) and Malaysian Timber Industry Board (MTIB) have collaborated to pioneer a new project harnessing solar power to dry green timber.

SIRIM will be utilising PEKA's facility in Lanchang, Pahang, under MTIB's sponsorship. PEKA offers saw millers timber drying services and has eight kiln dryer units capable of drying approximately 30 tonnes of soft timber each.

"Timber drying is an energy-intensive process that can take 12 to 16 days of continuous drying in the kiln dryer. SIRIM has designed a more efficient system incorporating renewable energy, which will translate to significant cost savings for the industry," said Mohd Fauzi Ismail, Director of the Industrial Centre of Innovation in Energy Management at SIRIM.

*Timber drying is an energy-intensive process that can take 12 to 16 days of continuous drying in the kiln dryer. SIRIM has designed a more efficient system incorporating renewable energy, which will translate to significant cost savings for the industry.*

### :: Harnessing the Power of the Sun ::

Kiln dryers may use biomass boilers to get steam, and the cost of biomass fuel is around RM200 to RM300 per tonne, or more if it is in pallet form. While the majority of the energy is directed towards the kiln dryers, there is also a significant amount of energy needed for equipment to control the humidity and temperature.

2016 -  
2020  
Export Value of  
Timber and  
Timber Products  
**RM20bil**

among the  
**Top 10**  
in the world

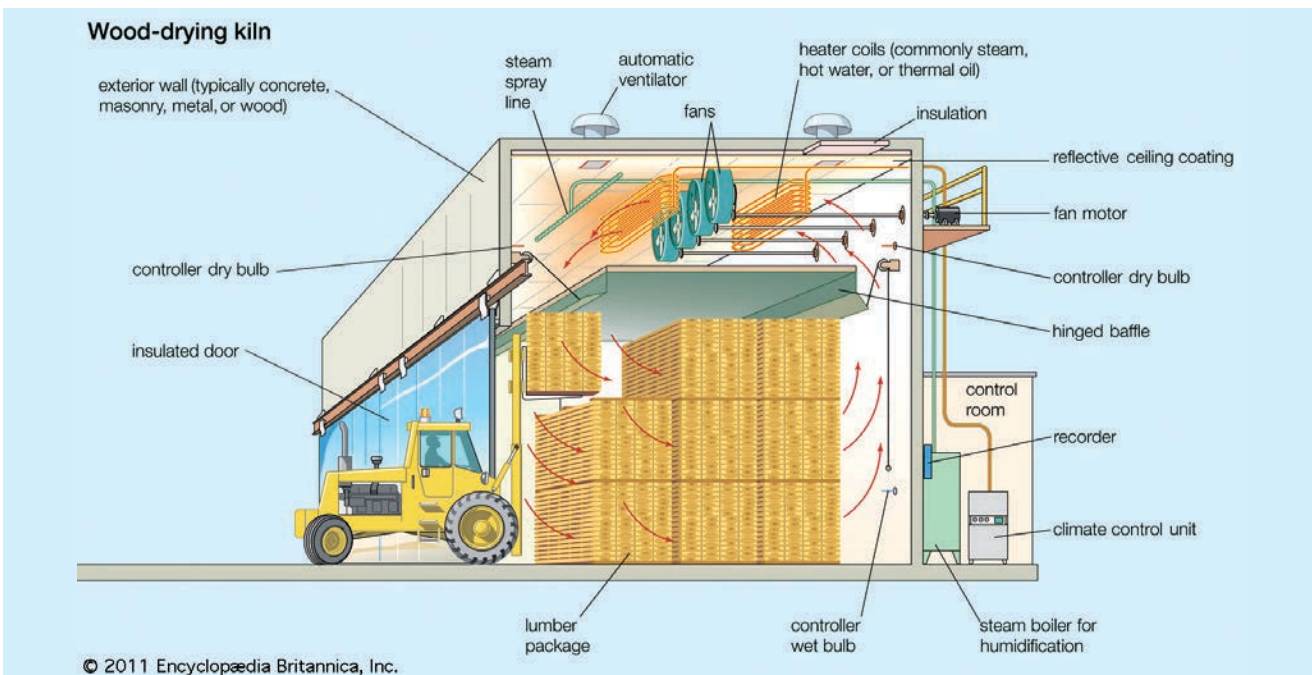
"An energy audit conducted at PEKA revealed that certain processes were not energy efficient. This spurred us to come in to optimise the system and try to eliminate energy losses. Once we get the formula right, the impact will be enormous, as the industry will rely less on biomass fuel and grid electricity," enthused Mohd Fauzi.

*Based on our research, we were able to better understand the drying process in the chamber by monitoring the system. The new technology allows for motor speed control and adjustment. By reducing the speed at a specific time, less energy was used.*

The ventilation motors in the kiln dryers that were connected to the fans were among the energy losses. The fans provide airflow to the kiln dryers to ensure uniform drying. However, they run for 24 hours a day, 12 to 16 days a month; consuming a lot of energy. To address this, SIRIM introduced a new technology called radio frequency drive, which eliminates the need for motors to run continuously at the same speed.

"Based on our research, we were able to better understand the drying process in the chamber by monitoring the system. The new technology allows for motor speed control and adjustment. By reducing the speed at a specific time, less energy was used," he elaborated.

While solar thermal technology has been established in Malaysia for over 40 years, its uses have primarily been centred on domestic applications such as producing hot water for kitchen and bathroom usage, which typically have fairly low temperature requirements of around 40°C. Industrial applications, however, usually require a more complex process that cannot be interrupted and a temperature that has to be consistently just right.



According to Mohd Fauzi, the technology has been successfully implemented in other sub-sectors, beginning with the poultry industry, which resulted in smoother processes, and substantial savings on thermal energy and/or electricity. Eventually, it was introduced to other sub-sectors such as the food & beverage industry.

*Our solar thermal system was designed to be integrated in both the final (drying) processes in the kiln dryer and boiler feedwater system.*

However, this is a first for the timber industry. "As such, the project with PEKA will serve as a demonstration project of how solar thermal energy can be both cost and energy-efficient for the wood drying process," he said.

With the current technology adopted by SIRIM, the temperature can reach 90°C, which is adequate for drying wood. "Our solar thermal system was designed to be integrated in both the final (drying) processes in the kiln dryer and boiler feedwater system," he added.



## :: Enhancing Energy Efficiency ::

The successful implementation of the project is set to benefit the country's kiln drying operators as they utilise the technology for future wood drying processes. "Presently, Malaysia has over 300 operators. We hope to eventually reach all of them and enable them to utilise this technology," shared Mohd Fauzi.

SIRIM worked tirelessly to ensure that the project runs smoothly. The team was responsible for everything from sourcing technology to conducting an energy audit to calculating how many panels design work for a solar photovoltaics (PV) system.

Over 160kW of solar PV systems have already been installed at PEKA's facility in Lanchang, Pahang. While various movement restrictions throughout the year have slowed down the project's progress, Mohd Fauzi is optimistic that they will be able to continue with the project and complete it by December this year.

### SIRIM-PEKA Project Milestones



#### :: Energy audit ::

A detailed energy audit was first performed to better understand the energy consumption patterns of kiln dryer operators.



#### :: Energy saving ::

Priority was given to energy losses or inefficient systems. Low-efficiency motors were replaced with high-efficiency motors, totaling 32 motors in the kiln dryers and two motors related to boiler operations.



#### :: Technology interventions ::

Solar PV and solar thermal systems will be installed; the design, technical specifications and supplier have already been secured.



#### :: Project monitoring ::

Once the on-site installation is complete, the project will be validated and verified.



#### :: Evaluation ::

The results (data collection and savings) will be evaluated and shared with relevant groups and industry.

"We are excited to see this project come to fruition and assist the timber industry in becoming more efficient whilst also contributing to environmental conservation. Nevertheless, our collaboration with PEKA does not end here. For future projects, we will work on other areas such as automation and integrating the fourth industrial revolution," Mohd Fauzi concluded.



*We are excited to see this project come to fruition and assist the timber industry in becoming more efficient whilst also contributing to environmental conservation. Nevertheless, our collaboration with PEKA does not end here. For future projects, we will work on other areas such as automation and integrating the fourth industrial revolution.*



*Dr. Ahmad Hazri Ab Rashid*

**GENERAL MANAGER,  
INDUSTRIAL BIOTECHNOLOGY  
RESEARCH CENTRE**

# FORTIFYING MALAYSIA'S VACCINE DEVELOPMENT ECOSYSTEM



*Dr. Nurul Izza Nordin*

**SENIOR RESEARCHER,  
INDUSTRIAL BIOTECHNOLOGY  
RESEARCH CENTRE**



AS MALAYSIA GETS READY TO TREAT COVID-19 AS AN ENDEMIC DISEASE, THE COVID-19 VACCINES WILL PLAY AN IMPORTANT ROLE IN REINING IN THE VIRUS. CONCURRENTLY, RIGOROUS TESTING OF THE VACCINES AND THE DEVELOPMENT OF NEW VACCINES ARE CRUCIAL.

COVID-19 has raged on for nearly two years. Today, while we are resigned to live alongside the virus, the COVID-19 vaccines have proven to be a formidable weapon in the battle to contain the spread of the virus. As such, the importance of vaccine testing and development is paramount.

According to Dr. Nurul Izza Nordin, Senior Researcher at the Industrial Biotechnology Research Centre (IBRC) at SIRIM, "Vaccine testing is very crucial to make sure that the efficacy of the vaccine is maintained from the moment it is produced right until it is administered to the end-user. The process is very comprehensive. We need to ascertain that the vaccine is safe to use and can do its job effectively in protecting the user."



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The testing is typically conducted based on international standards for new vaccines, which validate aspects like accuracy, robustness of results and the competency of the people conducting the test.

The entire testing process is actually very comprehensive and involves every stage from vaccine development to production to even after it is released to the public. "At present, there is a lot of testing being conducted by internationally renowned research institutes to verify vaccine efficacy. These studies are done on newly developed and current vaccines, and include comparisons between the different types of vaccines," she explained.

## STAGES OF VACCINE DEVELOPMENT

*Vaccine development involves numerous comprehensive steps.*

### Step 1

#### EXPLORATORY STAGE

❖ *Researching, designing & developing the vaccine*

### Step 2

#### PRE-CLINICAL STAGE

❖ *Testing of the vaccine's efficacy using in vitro human cells and animals*

### Step 3

#### CLINICAL STAGE

*(encompasses 4 stages)*

❖ *Testing of the vaccine on human populations*

### Step 4

#### APPROVAL

❖ *Nevertheless, testing and evaluation is continued on the sample populations*



"At IBRC, we have extensive experience and specially developed facilities for testing. Our laboratories were initially developed for medical devices to support the Medical Device Act 2012, which made it compulsory for medical devices to undergo safety and biocompatibility testing," explained Dr. Ahmad Hazri Ab Rashid, General Manager of IBRC.

Through the years, IBRC has developed vast capabilities in biocompatibility testing, and has been accredited with the ISO 17025 and Good Laboratory Practice certifications. This means that all the testing done by IBRC is according to the highest international standards.

"As we progressed, we discovered that the tests are actually applicable for testing pharmaceutical products, including vaccines. We developed our competencies in biocompatibility and safety testing along the way. As such, when COVID-19 struck the nation, we were, in a way, ready to offer our services to ensure the safety of the vaccines," continued Dr. Ahmad Hazri.

In fact, one of the COVID-19 vaccines used in Malaysia goes through a fill-and-finish process in the country, which requires validation, and SIRIM was engaged to conduct some of the testing.

## CUTTING-EDGE CAPABILITIES

*The Industrial Biotechnology Research Centre is part of SIRIM Industrial Research, offering a wide range of product testing services to ensure that they comply with the necessary requirements. The centre focuses on biotechnology-related research and services, which include processes involving microorganisms and plants.*

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## :: Getting on the bandwagon ::

In mid-June this year, then Health Minister Datuk Seri Dr. Adham Baba announced that Malaysia had officially entered the global race to develop COVID-19 vaccines via a joint venture between the Ministry of Health and Institute of Medical Research (IMR).

"Viral pandemics are fast-moving and require fast reactions. Having a proper development programme for our own vaccine is essential so that we are not caught off-guard in the event that another viral pandemic occurs," shared Dr. Ahmad Hazri.

Dr. Nurul Izza concurs. "This is a timely development. Our neighbours like Singapore, Indonesia and Vietnam are already conducting clinical trials locally. Once we have our own vaccine, we won't have to rely on other countries."

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## DEVELOPMENT OF COVID-19 VACCINES

There are a few ways to develop the COVID-19 vaccines. Currently, these are:

1. **Conventional:** Employs inactivated (i.e. dead or extremely weak) viruses. These are injected into the body, which recognises them as a foreign particle, thus eliciting an immune response to it and developing antibodies to fight the disease.
2. **Recombinant:** Produced using recombinant DNA technology or genetic engineering. This involves inserting the DNA encoding the spike protein to stimulate an immune response into a mammalian cell host. The spike protein is then expressed and injected into the body, which will subsequently develop antibodies to fight the spike proteins.
3. **mRNA:** The latest vaccine technology that utilises a copy of a molecule, i.e. the messenger RNA, which is optimised and encoded with the spike protein before being synthesised in the laboratory and encapsulated in a lipid carrier. When injected into the body, the vaccine stimulates an immune response and begins making antibodies.

According to her, Malaysia already has a good ecosystem for vaccine development. For one, the country already has the expertise and experience in isolating and identifying viruses. "We just need to cultivate our competencies further and be vigilant in keeping updated on the emergence of new viruses as well as getting the necessary support in terms of investment and encouraging more research efforts," she added.

"Besides the people from IMR, we also have universities that can take on the development task and organisations for testing, validation and production of the vaccines. Now, we also have local pharmaceutical organisations on board," elaborated Dr. Ahmad Hazri.



*We have to develop the infrastructure and competencies required for a vaccine development programme, in addition to having a timeline for the development of new vaccines. There are 3Ms – Manpower (competencies), Machineries (facilities) and Money (funding) – that are needed to roll out the vaccine in three to five years' time; these will form an integral part of the roadmap.*



There are currently three ways of producing the COVID-19 vaccine. With the possibility of more variants of the virus coming along, it is essential to explore more options. Homegrown vaccines will facilitate the accessibility of these vaccines for the population as well as contributing to the progress of international vaccine development.

### :: Mapping the Future ::

In paving the way forward, the National Vaccine Development Roadmap, which is currently being finalised, will determine the players and their roles, among others.

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IBRC is committed to being a part of the ecosystem for vaccine development in the country, either by validating the research process, during preclinical studies or at the production stage.

“We are preparing ourselves to be a part of the National Vaccine Development Roadmap and contribute to the nation by offering the facilities, competencies and product validation and development services.

“In the mean time, we are looking at new methodologies and look forward to collaborating with other research institutes. We hope to play a part in a few of the vaccine development activities,” said Dr. Ahmad Hazri.

On top of that, with the anticipation of the emergence of other variants and viruses in the future, Dr. Nurul Izza remarked that it might also be imperative to add other types of drugs to the arsenal. “At IBRC, we have a sufficient foundation in the development of drugs, so this is also something we can look into,” she shared.

“We are ready for this new challenge. We are continually upgrading our laboratories and facilities to ensure that we are able to cover the entire vaccine testing and development process when Malaysia is ready to roll out our own vaccines,” commented Dr. Ahmad Hazri.

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*“In the mean time, we are looking at new methodologies and look forward to collaborating with other research institutes. We hope to play a part in a few of the vaccine development activities.*

*We are ready for this new challenge. We are continually upgrading our laboratories and facilities to ensure that we are able to cover the entire vaccine testing and development process when Malaysia is ready to roll out our own vaccines.*

*Dr. Norshidah Baharuddin*

**DIRECTOR OF INDUSTRIAL  
RESEARCH MANAGEMENT  
CENTRE, SIRIM INDUSTRIAL  
RESEARCH**

## DRIVING THE NATION'S ECONOMY



PERHAPS ONE OF THE MOST CHALLENGING HURDLES THAT MALAYSIA'S MANUFACTURING SECTOR FACES IS IN ENHANCING ITS PRODUCTIVITY. SIRIM SHARES HOW IT CAN HELP.

The manufacturing sector is the backbone of Malaysia's economy, and small and medium enterprises (SMEs) play a vital role in advancing this sector. As the country attempts to evolve into a high income nation, the manufacturing sector has to be able to ramp up concurrently. However, a key challenge for the sector is in increasing its productivity.

"Research & development, for one, requires high risks and heavy investments to procure machineries and testing equipment as well as a long gestation period. Many organisations also lack the awareness and know-how to properly comply with global environmental requirements, which limits their ability to penetrate international markets. And, of course, compliance with standards also requires significant investment in testing and certification," explained Dr. Norshidah Baharuddin, Director of the Industrial Research Management Centre at SIRIM Industrial Research.

With SMEs typically lagging behind multinationals in terms of technology, networks and finances, it makes it harder for the former to meet standards or fulfill the demands of multinationals, subsequently hindering their ability to effectively participate in the global supply chain.

Recent times have also seen a shift towards the manufacturing of higher value and more complex products, which requires skilled, creative and innovative personnel with adequate technological knowledge to improve on their products and processes. However, the easy access to low-skilled foreign workers in Malaysia has discouraged manufacturers from innovating and investing in automation and technology upgrades to enable higher productivity.

Some of the hurdles faced by the manufacturing sector include:

- ❖ Lack of innovation and research & development
- ❖ Lack of product diversification to increase competitiveness
- ❖ Difficulty in complying with international requirements
- ❖ Gaps between multinationals and SMEs
- ❖ Labour intensive with high dependency on low-skilled foreign workers
- ❖ Insufficient supporting infrastructure and logistics



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Besides that, there are many industrial estates that do not have sufficient infrastructure and logistics facilities. "There are over 600 industrial estates in Malaysia, many of which do not have enough facilities. Additionally, accessibility to and coverage of broadband is also still inadequate. This has caused inefficiency and high logistics and trade facilitation costs, causing the country to fall behind other ASEAN countries such as Indonesia, Singapore and Thailand," said Dr. Norshidah.



Playing a primary role in nurturing the growth of SMEs in Malaysia, SIRIM is committed to doing its part in helping local players to enhance their productivity and is a key figure in the execution of the High Value-added and Complex Product Development Programme (PDP).

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**:: Promoting Productivity ::**

The High Value-added and Complex Product Development Programme (PDP) is aimed at improving the capabilities and competencies of the manufacturing sector by enabling the development of high value-added and complex products. This is anticipated to increase manufacturing efficiency and revenue whilst also opening up new growth avenues towards attaining the goals of the 12th Malaysia Plan.

Among others, there are awareness programmes, industry intelligence, research, talent and competency development, technology acquisition, standards development, accreditations, certifications and testing via recognised research institutions, institutes of higher learning/research universities and industry players.

The PDP encompasses a Market Development sub-programme (MDP), which provides financial assistance in the form of matching grants to enable organisations to produce high value-added and complex products. The activities that qualify for the MDP include productivity improvement, capacity building, licencing, standards and certification compliance and promotional activities. "There is an allocation of a maximum of RM950,000 per organisation, which will be paid directly to recognised service providers and institutions that are approved by the Ministry of International Trade and Industry (MITI)," elaborated Dr. Norshidah.

Among those that stand to benefit from the PDP are industry players involved in high-impact, commodities, pharmaceutical and medical devices sectors.

**Desired Outcomes of the PDP**



**to contribute towards achieving the Economic Empowerment Agenda under the 12th Malaysia Plan**

**I M P A C T**

- :: Create an efficient and competent supply chain
- :: Increase value-added to manufacturing industry
- :: Create reliable support system for vendor-supply chain development

Source: Malaysian Investment Development Authority

Industries eligible for the PDP



→ Metal → Electrical & Electronics/ICT → Machinery & Equipment → Transport → Chemicals & Petrochemicals  
 → Pharmaceuticals → Medical Devices → Food Processing → Oil Palm-based → Rubber Products → Textiles & Apparel  
 → Wood-based → Remanufacturing

Source: Malaysian Investment Development Authority

Currently, there are five ongoing projects led by SIRIM under the PDP programme. These projects were awarded in stages in 2020 and have a total value of over RM7 million.

| No. | Project Title  | Project Value (RM) | Technical Progress (%)* |
|-----|--|--------------------|-------------------------|
| 1   | Smart Harvesting System for Stingless Bee Farming  | 805,000            | 90% completed           |
| 2   | Product Enhancement of Producing Local (In-House) Production of Carbon Fibre   | 1,175,000          | 55% completed           |
| 3   | Transforming Orthotic and Prosthetic Industry towards Digital Manufacturing using 3D Imaging and Additive Manufacturing Technologies                           | 1,630,000          | 55% completed           |
| 4   | Clinical Trials of Titanium Alloy Metallic Implants for Oral Maxillofacial produces by Metal Injection Molding Technique for Trauma Cases                      | 2,334,680          | 55% completed           |
| 5   | Fabrication of Smart and Lightweight Mobile Storage CNG Composite Cylinders for alternative distribution of Natural Gas (CNG)/Compressed Bio-Natural Gas (CBG) | 1,214,000          | 40% completed           |

\* Progress recorded at time of interview

**RM7,158,680**

Moving forward, SIRIM is looking to focus on medical devices as well, among others, in alignment with one of MITI's key focus areas. Consequently, this year, it is pitching for two projects: the Development of Metallic Implants Fabrication for Boosting Medical Device Industries in Malaysia and Digitalisation of Clear Aligners Production through Direct 3D Printing Technology projects.

According to Dr. Norshidah, the execution of the projects has been challenging, with the COVID-19 pandemic and resultant movement restrictions affecting some of SIRIM's deliverables, but she is optimistic that things will look up as the country reopens. "Due to the various movement control order stages in 2020 and this year, some of our suppliers and fabricators were unable to deliver the raw materials, parts and components needed. As the nation moves closer to endemic status with the number of new COVID-19 cases trending lower, we are confident that the respective project teams will be able to resume their work and move swiftly to complete the deliverables," she said.



*Rafidah Mokhdar*

**CHIEF EXECUTIVE OFFICER,  
PACKAGING AND SECURITY  
DESIGN CENTRE, SIRIM**



# PROTECTION AGAINST COUNTERFEITING AND FORGERY

SIRIM'S PACKAGING AND SECURITY DESIGN CENTRE IS A TOTAL SOLUTIONS PROVIDER OF SECURITY DESIGN AND PRINTING SERVICES, ENABLING BUSINESSES TO SAFEGUARD THEIR BRANDS WHILE ALSO ENSURING LONG-TERM ECONOMIC VIABILITY.

The COVID-19 pandemic has substantially grown the global e-commerce market, which was worth over USD2.41 trillion in 2020. On the flip side, counterfeiting has also been on the rise as global fears over possible shortages of certain products have created additional opportunities for ruthless individuals or organisations to cut corners, particularly for highly demanded products. This has resulted in items like counterfeit facemasks, substandard hand sanitisers and unauthorised antiviral medications flooding the market.

This is a thriving phenomenon in Malaysia, which is a well-known shopping paradise for people looking for counterfeit "branded luxury" products. Fake degrees and certificates are also very common here, and it is estimated that counterfeit items are valued at roughly RM300 billion every year, accounting for around 21% of the country's gross domestic product (GDP).



*Fake, forgery and counterfeit all suggest that an item is not genuine, but forgery and counterfeiting implies intentional illegality.*

| Counterfeiting vs Forgery  |  |
|--|--|
| Counterfeiting   | Forgery  |
| Manufacturing or distribution of goods under someone else's name or brand without permission | Creating a false document or changing an authentic one |

"A Channel News Asia report revealed that COVID-19 might have given this matter a new twist, with facemasks touting false claims, food being labelled with established brand names that did not originate from the said manufacturer and, even more dangerously, the substance of the food being wrongly stated!" exclaimed Rafidah Mokhdar, Chief Executive Officer of the Packaging and Security Design Centre (PSDC) at SIRIM.

Falsified pharmaceuticals are among the most harmful of these items, with fake medications being frequently marketed via unregulated venues, such as roadside vendors and traditional medical stores, throughout Malaysia.

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"These products not only compromise quality and have the potential of causing huge monetary losses but, most importantly, they can be harmful – perhaps even fatal – for consumers. Even the Federation of Malaysian Consumers Associations (FOMCA) has voiced its concern that counterfeit items that can be found here include everyday items like appliances, foodstuff, medicines, cosmetics, automotive parts and aircraft parts," continued Rafidah.

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Hence, it is now more important than ever to safeguard the interests of both legitimate manufacturers and consumers. With a wide range of security design solutions up its sleeve, PSDC is well-equipped to help tackle this issue.



PSDC's security design offerings include:



While there are numerous security printing companies in Malaysia, PSDC's competitive edge stems from 27 years of expertise as well as its track record in security design and printing. For one, PSDC has been a licenced security printer with Malaysia's Ministry of Finance (MOF) under Kod Bidang 221607 Cetak Keselamatan since its founding in 1994. This also means that the centre is subject to monitoring and auditing by the Chief Government Secretary Office (CGSO), under the Prime Minister's Office.

"PSDC now delivers complete and integrated solutions, including a wide range of innovative customised high-performance security printing solutions and services, as well as track and trace solutions for product identification," said Rafidah.

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Through the years, the centre has evolved from servicing in-house clients to expanding its offerings to external customers, namely ministries, government agencies, institutes of higher learning and small and medium enterprises (SMEs).

## :: Stalwart Capabilities ::

The main goal of security design and printing is to protect products and prevent forgery, tampering or counterfeiting. "Businesses or brand owners can protect their products and documents by incorporating anti-counterfeiting technologies to ensure that these products and documents cannot be forged or that alteration of data cannot occur undetected," advised Rafidah.

PSDC's cutting-edge expertise and facilities are able to provide companies with the greatest level of brand protection. "To offer high quality and dependable services to our customers, PSDC employs state-of-the-art software technology, numerous printing processes and techniques, as well as competent security designers and technical teams," she added.

Subsequently, PSDC's security printed products are all equipped with overt and covert security capabilities, unique security paper and security inks, and integrated solutions that combine track and trace technologies such as QR codes and RFID applications. The track and trace technology application provides a monitoring and tracking system for product authentication purposes.

In terms of security, its personnel, processes and even building are highly safeguarded by multi-tiered surveillance systems, such as a high fence and gate, doors with security access, CCTVs and a vault room to keep confidential and high-value security substrates and products.



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## :: The Future of Security Design ::

Rafidah goes on to highlight the importance of educating consumers and the general public on this matter. "They must be informed about the risks of purchasing counterfeit items."

While government officials, brand owners and e-commerce platforms are always seeking ways to protect customers from product counterfeiters, she believes that the greatest form of protection has to come from the consumers themselves. "Aside from safety considerations, they should be reminded of their indirect role in supporting crime and the expansion of illicit trades," she added. Besides that, she is confident that proper enforcement and cutting off access to the supply chain are required to beat counterfeiters.

Moving ahead, as PSDC expands into smart packaging, including security design aspects as well as track and trace solutions for security packaging will be one of its top focuses. PSDC is also looking into improving anti-counterfeiting technology in smart card solutions.

"We will continue to explore and offer the most up-to-date security technology solutions, which can provide multi-level security and be tailored to the client's needs and specifications. This programme will serve to address the industry's counterfeiting issue, therefore assisting in the growth of the country's economy," shared Rafidah.

## SIGNIFICANT MILESTONES

1977 →

Commenced printing of Malaysian Standard developed by SIRIM when SIRIM was appointed as the national Standard Development Agency

1994 →

Security design and printing of security labels with MS Mark for certified products under SIRIM QAS product certification scheme

2001 →

Secured its first job to print packaging, which was later incorporated with security features for a company producing traditional medicines

2006 →

Secured its first job to print the confidential Sijil Tinggi Agama Malaysia certificates

2019 →

The MS Mark security labels were enhanced with QR code features incorporating track and trace applications for product authentication



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*Khalid Libar*

SENIOR EXECUTIVE,  
SIRIM STS SDN BHD

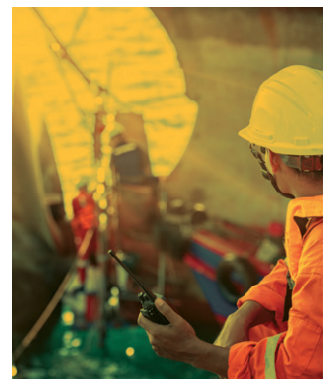
# UPHOLDING THE INTEGRITY OF SHIPBUILDING



WHEN IT COMES TO SHIPBUILDING, SAFETY IS OF UTMOST IMPORTANCE, RIGHT FROM THE START. WE NEED TO GO BACK TO THE BASICS TO ENSURE THAT THE SHIPS BEING BUILT ARE STRUCTURALLY SOUND; THIS IS WHERE WELDING CAPABILITIES AND TESTING MATTER.

As a maritime nation, the economic prosperity of Malaysia is closely knitted with the efficiency of our maritime industry. In tandem with an expanding global maritime landscape, the country's shipbuilding sector, for one, stands to gain from enhanced welding capabilities and testing measures.

"The shipbuilding sector is considered high-risk and dangerous. Welding is one of the most crucial activities in ship construction, as it directly affects the navigation, safety and service life of the ship. When the welding process fails, the ship's whole structure frequently fails as well. As such, it is vital that the various welding operations and testing are conducted by highly competent welders," shared Khalid Libar, Senior Executive of SIRIM STS Sdn Bhd (SIRIM STS).



*The shipbuilding sector is considered high-risk and dangerous. Welding is one of the most crucial activities in ship construction, as it directly affects the navigation, safety and service life of the ship. When the welding process fails, the ship's whole structure frequently fails as well. As such, it is vital that the various welding operations and testing are conducted by highly competent welders.*



The Technology and Certification Department at SIRIM STS offers programmes on welding and non-destructive testing (NDT), which can help with this issue. The courses are led by certified facilitators and segmented into theoretical and practical components, with certifications being granted by reliable approved organisations.

"Spurred by the demands of these two critical areas of welding and NDT, SIRIM STS has spent years working to become a test facility accredited by the American Welding Society (AWS). Today, we have this Accredited Test Facility by AWS that offers local and international welding programmes, through which participants are able to obtain their skills competency certifications," added Khalid.



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## SHIPBUILDING AT A GLANCE

- ⌘ Considered a **strategic industry** in Malaysia
- ⌘ Encompasses the **manufacturing** of a variety of ships
- ⌘ Approximately **100 shipyards** located across Malaysia
- ⌘ Capable of producing vessels of up to **120m in length**

Source: Malaysian Investment Development Authority



According to him, the welding procedure should be executed by skilled welders and efficiently supervised by the quality control engineer and certification society in order to ascertain that the safety and integrity of the ship structure are not compromised. It is, therefore, necessary for all welders to be properly certified as well as adhering to acceptable processes, known as Welding Procedures Specifications (WPS), which must be created in the shipyard.

"In actual fact, welding technology is a universal engineering process required by all industries, not just shipbuilding, and the quality of the welding highly depends on the welder's skills. Here at SIRIM STS, we are committed to providing the proper training to elevate engineering competence as a whole," he said.



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#### ⚡ Fundamental Testing Procedures ⚡

In the modern shipbuilding industry, the welding and subsequent inspection processes are intertwined. Khalid emphasises that both these processes cannot be separated because they are vital components in the shipbuilding process, with inspection being essential in verifying and validating weld quality.

Welding inspection can be classified into two categories: destructive inspection and NDT. NDT is the most important and most commonly used. It employs various detection methods such as radiography, ultrasonic, magnetic particle, liquid penetrant and advanced NDT technologies.

"The NDT method is used to ensure that the welding is of high quality. We conduct the NDT procedure after the weld sample has been cooled to ambient temperature, i.e. the air temperature of the immediate surroundings, and, if applicable, following post-welding treatment," Khalid explained, noting that there are several NDT methods that may be utilised to assure the quality of the ship's hull, structure steel and welds during the building process of the new ship.

#### STANDARDS FOR WELDING AND NDT

*Well-structured assessments have been established in ensuring that the welders, NDT personnel and the infrastructure meet the standards of various international authoritative bodies, such as:*

- ⚡ American Welding Society (AWS)
- ⚡ EN standard
- ⚡ ISO standard
- ⚡ American Society for Nondestructive Testing (ASNT)
- ⚡ American National Standards Institute (ANSI)

#### TRAINING & CERTIFICATION PROGRAMMES BY SIRIM STS

- ⚡ Welding Procedure Specification (WPS)
- ⚡ Welder Qualification Test (WQT)
- ⚡ Certified Welding Inspector (CWI) recognised by AWS
- ⚡ Certified Welding Engineer (CWE) by AWS
- ⚡ Training & examination on NDT using radiography & ultrasonic method
- ⚡ Level 1-3 NDT training based on ISO 9712 standard accredited by Jabatan Pembangunan Kemahiran Malaysia (JPKM)
- ⚡ Certified Welder on Shielded Metal Arc Welding (SMAW) by AWS
- ⚡ Certified Welder on Gas Metal Arc Welding (GMAW) by AWS
- ⚡ Certified Welder on Gas Tungsten Arc Welding (GTAW) by AWS

## Comprehensive Services

As part of the welding and NDT certification process, the shipbuilding company is required to develop its WPS for specific tasks. "This is an important document as it establishes the specifications needed for building the new ship. It will subsequently serve as a reference for certifying the welders and NDT.

"The WPS and Welder Qualification Test (WQT) are basically documentations of the procedure, and are developed according to the demand, specification and requirements of our customers," explained Khalid.

Besides providing training and certification programmes for welding and NDT personnel, SIRIM STS is also able to develop the WPS as well as conducting the WQT and Certified Welding Inspector (CWI) and Certified Welding Engineer (CWE) programmes, which are recognised by AWS. It also conducts training and examinations on two NDT methods: radiography and ultrasonic.

"SIRIM STS is a designated training centre by Jabatan Pembangunan Kemahiran Malaysia (JPKM). We offer Level 1 to Level 3 programmes, which are accredited by JPKM. These certifications demonstrate the competencies of the welding and NDT personnel," added Khalid.



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*To stay ahead, we are ready to adapt to and adopt new technologies for the future.*



The AWS, EN, ISO, British Association (BA) and ASME standards are the general standards that are referred to. Besides that, there are also specific standards for oil & gas, shipbuilding, railway and pressure vessels, depending on the job at hand. With sound knowledge and competencies in these areas, SIRIM STS has the expertise and capabilities to assist the industry in developing the welding procedures to meet applicable code requirements and production standards.

Nevertheless, as the shipbuilding industry continues to evolve and grow, SIRIM STS is committed to keeping abreast with the latest developments and expanding its capabilities and services accordingly. One such advancement that it is eyeing is the use of ceramic welding, which is easier on the welders and can shorten the planning and production period.

"To stay ahead, we are ready to adapt to and adopt new technologies for the future," concluded Khalid.



## ADVERTISEMENT RATES (RM)

| Full Colour                   | Insertions |       |       |       |
|-------------------------------|------------|-------|-------|-------|
|                               | 1          | 2     | 3     | 4     |
| ROP                           | 3,500      | 3,000 | 2,500 | 2,000 |
| Back Cover (A4)               | 5,000      | 4,500 | 4,000 | 3,500 |
| Inside Front Cover (A4)       | 4,500      | 4,000 | 3,500 | 3,000 |
| Inside Back Cover (A4)        | 4,000      | 3,500 | 3,000 | 2,500 |
| Specified Positions (A4)      | 4,000      | 3,500 | 3,000 | 2,500 |
| Half Page Specified Positions | 3,000      | 2,500 | 2,000 | 1,500 |
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