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HIGHLIGHTS

- Status of Plastic Recycling in Asia Pacific
- Pipeline Corrosion Management
- Metal-Supported for Solid Oxide Fuel Cell (SOFC)

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Dato' Dr. Ir. Ts. Haji Mohd Abdul Karim Abdullah,
President,
Institute of Materials, Malaysia

21st March 2022

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APPLICATION FOR RENEWAL OF MEMBERSHIP						
PARTICULARS OF MEMBER (*update where necessary*)						
PERSONAL INFORMATION						
FULL NAME	:					
TITLE	:		IC/PASSPORT NO.	:		
DATE OF BIRTH	:		AGE	:		
CORRESPONDENCE ADDRESS	:					
MOBILE PHONE NO.	:		HOUSE PHONE NO.	:		
EMAIL ADDRESS	:					
IMM MEMBERSHIP NO.	:					
CURRENT JOB INFORMATION						
NAME OF COMPANY	:					
DESIGNATION/POSITION	:					
ADDRESS OF COMPANY	:					
OFFICE PHONE NO.	:		OFFICE FAX NO.	:		

MEMBERSHIP SUBSCRIPTION AND PAYMENT					
GRADE (Thick the appropriate box)		SUBSCRIPTION PERIOD			
	Fellow (F.I.M.M)		1-year		
	Professional (M.I.M.M)		More than 1-year, please state	:	years
	Associate (A.M.I.M.M)		Amount paid	:	
	Company				
	Ordinary				

MEMBERSHIP ANNUAL SUBSCRIPTION FEES SCHEDULE

Description	Amount (RM)				
	Fellow (F.I.M.M.)	Professional (M.I.M.M.)	Associate (A.M.I.M.M.)	Company	Ordinary
Annual Subscription	150.00	100.00	80.00	200.00	40.00

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Account	:	8009055156
Bank	:	CIMB
Swift Code	:	CIBBMYKL

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The membership renewal online form can be accessed through IMM website at this link

https://www.iomm.org.my/membership-renewal/

MIGRATION OF IMM STANDARD (FP01) TO MALAYSIAN STANDARD

Institute of Materials, Malaysia (IMM) is delighted to announce the successful migration of **IMM Standard FP01:2020** on ***Coating Fingerprinting Overall Procedures for Paints using FTIR and Other Related Methods*** to **Malaysian Standard (MS2736:2022).**

This Standard emphasizes the evaluation of the manufacturer's paint fingerprint, with the aim of reaffirming the consistency of the paint supplied with reference to the qualified paint. This Standard covers the fingerprint requirement of both single-pack and multi-pack paints for qualification, quality control and verification.

✓ This Standard includes:
i. Coating fingerprinting qualification
ii. Test method to fingerprint the paint supplied in the manufacturer's container
iii. Criteria and execution of Coating Fingerprint Certificate

User's requirement on Coating Fingerprint Certificate is listed here:

✓ Shell Global Solutions International B.V. (Shell GSI), Design and Engineering Practice (DEPs) (Technical Specification) (2017) (**DEP30.48.0031-Gen**) on Protective Coatings for onshore and offshore facilities

✓ PETRONAS Technical Standards (2019) (**PTS15.20.03**) (Protective coatings and linings)

Scan here to view the standard

https://mysol.jsm.gov.my/search-catalogue?keyword=fingerprinting

Prepared by:
Hairunnisa Ramli, Nurul Fatahah Asyqin Zainal, Suhaila Idayu Abdul Halim & Melissa Chan Chin Han
Universiti Teknologi MARA,
Coating Fingerprinting Committee

COVER STORY

Pipeline Corrosion Management

Pipeline corrosion management when being reviewed holistically, could provide significant cost savings and safeguard the overall technical integrity of the pipeline. Reliable correlation between reservoir properties and uncertainties, flow assurance, chemical behaviors, operating experiences, *etc*. are considered to best represent the operating envelope for a carbon steel pipeline. This includes the testing and selection of continuous corrosion inhibitors, corrosion monitoring, operational pigging, maintenance, and inspection requirements throughout the field life.

Generally, corrosion management for the pipeline in corrosive service is through designing out by using non-metallic insert considering for instance reinforced thermoplastic pipe (RTP) or unbonded flexible pipelines or metallurgically corrosion resistant alloy (CRA) cladded pipeline. However, those options have limitations due to higher initial costs, technical availability for size and water depth. Another common internal corrosion mitigation is via material selection mainly using the CRA material. However, from the economic perspective, it is often not favorable due to the high CAPEX costs in procuring the CRA metallurgically cladded material for most of the project. Thus, this option is usually not a favorable carbon steel with prescribed corrosion management is still considered as the most competitive solution.

The use of carbon steel pipeline normally come with corrosion allowance (CA) and corrosion inhibitor injection for the pipeline to be able to last for its intended life. A high level of CI availability such as 95% and higher is crucial to ensure the pipeline integrity is maintained. The Corrosion Inhibition (CI) system has been designed and accepted as an integral part of the overall operation philosophy. One of the tools used to ensure that a high continuous CI availability can be achieved is a Failure Modes and Effects Analysis (FMEA) of the corrosion control system. This methodology looks at all the modes of operations of the pipeline and how it impacts the corrosion control system and the barriers that need to be put in place to ensure the pipeline design conditions are met as per the intent.

As for the chemical selection, it is important to ensure the corrosion inhibitor qualification test covers the full range of possible scenarios or operating envelope of this project following an agreed testing protocol. Among the corrosion inhibitor to be done are,

- Materials compatibility
- Compatibility with other production chemicals
- Performance
- Integrity Operating Window (IOW)
- Under deposit
- Flowing persistency
- Shut-in persistency
- Partitioning
- Thermal stability, etc

As part of the requirements to ensure the technical integrity of the pipeline, it was recommended to perform intelligent pigging (IP) on yearly basis using either Ultrasonic Testing (UT) or Magnetic Flux Leakage (MFL) technology that can detect pitting and general corrosion type of defects. It is important to understand the tool sizing accuracy and sensitivity when performing the IP run for better pipeline integrity assessment. Baseline IP surveys should be carried out as soon as possible within 2 years of the pipeline in-service as required by the authority.

- Visual inspection of pipeline to check for signs of corrosion, mechanical damage, coating / cathodic protection (CP) condition, *etc*. using the underwater remote-operated vehicle (ROV) or FIGS (Field Gradient Sensor)
- Side Scan Sonar survey of the subsea pipeline in conjunction with a visual inspection.
- Baseline Cathodic Protection (CP) survey confirms the system is operational and can help to identify any unexpected anomalies that can be tracked over the pipeline service life. The baseline survey is also the starting point for tracking trends in CP system performance over the pipeline service life. This aids in proactive planning for any required remedial actions such as anode retrofit or continuity bond.

Once a reliable baseline of data is obtained, it will be used to reassess the possibility to relax the frequency of the IP. It is also highly recommended to engage the same IP tool and vendor throughout the field life for consistency, repeatability and comparable IP data for the pipeline remnant life assessment.

Non-intrusive corrosion monitoring tools will be installed at the pipeline outlet for real-time understanding of the integrity of the pipeline if there is any excursion due to higher production rates, erosion attacks, etc. Sampling points will be provided for continuous monitoring if there are any changes in the production fluid composition and/ or properties that may affect the internal corrosion rate in the pipeline. i.e., the trending of Iron Oxide (Fe)

For an effective Corrosion Management of pipelines, multi-disciplines such as materials corrosion, inspection, pipeline, process, production chemistry, etc shall work closely as a team to ensure the pipelines' technical integrity can be achieved and their remnant lives can meet design/field life.

IMM One-Day Conference on Corrosion Management and Kossan Paint (M) Sdn Bhd Visit

Reported by: Ir. Ong Hock Guan (IMM Corrosion Committee Chairperson) and
Leow Chun Ho (IMM Corrosion Committee Treasurer)

The holistic Corrosion and Prevention 1-day conference was successfully organized by the Institute of Materials Malaysia (IMM), Corrosion Committee at DoubleTree Hilton Kuala Lumpur on 20th October 2022, Thursday. The event was attended by a total of 156 participants, 30 students from the local university and 52 exhibitors.

The title for this year, Holistic Corrosion and Prevention revolves around corrosion that has been a rising challenge to the power, energy and oil & gas industries. It also aims to explore various latest technologies, researches, digitalisation, data analytics, best practices and innovative solutions that can translate effective corrosion control practices into the broader organisation.

Figure 1: *Group photo of speakers and IMM members*

The title for this year, Holistic Corrosion and Prevention revolves around corrosion that has been a rising challenge to the power, energy and oil & gas industries. It also aims to explore various latest technologies, researches, digitalisation, data analytics, best practices and innovative solutions that can translate effective corrosion control practices into the broader organisation.

Figure 2: *Presentation by Intertek*

Figure 3: *Presentation by Rockwool*

The day started off early morning around 9.00 am with a total of 11 presentations from different fields such as operators, contractors, vendors and academicians. There are breaks in between to encourage participants to visit exhibition booths where a lot of positive energy can be seen from the physical interaction since Covid-19. There are various discussions and exchanges of knowledge throughout the discussion between the participants and the exhibitors on the latest technologies to combat corrosion.

Figure 4: *Question from Audience*

Figure 5: *Question from Audience*

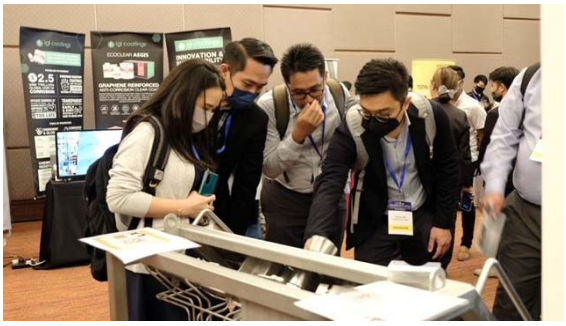

Figure 6: *Participants Looking at Demo*

Figure 7: *Exhibitor Sharing Products*

The second day was a half-day visit to Kossan Paint (M) Sdn Bhd located at Taman Perindustrian Meru, Kapar Selangor. We were given a tour with extension sharing on how the products are manufactured and it was indeed eye-opening for the participants with a lot of intriguing questions throughout the factory walkabout. Our utmost appreciation to Kossan Paint (M) Sdn Bhd.

Figure 8: *Kossan Paint (M) Sdn Bhd Visit*

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MTE Materials Technology Education Sdn Bhd

CORROSION MONITORING

TRAINING & CERTIFICATION PROGRAMS

This certification programs are specified into three (3) levels and they are designed to train participants on process corrosion monitoring, measure and interpret corrosion rates, corrosion monitoring, corrosion management database, cathodic protection monitoring and inspection,

Corrosion Monitoring Practitioner Level 1

Duration: 4 Days

IMM CPD: 56 | MBOT CPD: 20

Corrosion Monitoring Practitioner Level 2

Duration: 4 Days

IMM CPD: 140 | MBOT CPD: 20

Corrosion Monitoring Practitioner Level 3

Duration: 4 Days

IMM CPD: 140 | MBOT CPD: 20

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IMM Authorized Training Partner

MTE Materials Technology Education Sdn Bhd

CATHODIC PROTECTION

TRAINING & CERTIFICATION PROGRAMS

This certification programs are specified into three (3) levels and they are designed to train participants on CP electrical measurements, CP system monitoring and inspection, CP installations, pipeline surveys, operation, maintenance and troubleshooting.

Cathodic Protection Practitioner Level 1

Duration: 4 Days

IMM CPD: 84 | MBOT CPD: 20

Cathodic Protection Practitioner Level 2

Duration: 4 Days

IMM CPD: 140 | MBOT CPD: 20

Cathodic Protection Practitioner Level 3

Duration: 4 Days

IMM CPD: 140 | MBOT CPD: 20

Cathodic Protection Engineer

Duration: 4 Days

IMM CPD: 112 | MBOT CPD: 20

Eligible for MBOT CPD Points

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Materials Mind

Technical Article

Status of Plastic Recycling in Asia Pacific

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Introduction

According to a study by the European Patent Office (EPO), countries from the US, UK and Europe (France, Italy, Netherlands, and Belgium) hold 60% of global patents for recycling-related and bioplastic technology patents from 2010 to 2019. EPO sees a growing innovation trend in recycling and alternative plastics. In the Asia-Pacific (APAC) region, Japan is the leader holding 18% of the global patents. China and South Korea each of them hold 5%. In the last ~~one~~ decade, a growing number of patents related to chemical and biological methods were reported exceeding the patents related to traditional mechanical recycling methods. Nevertheless, basic recycling needs (collection, sorting, separation and washing) will continue to play an important role to support the circular economy of plastics (Figure 1). Some new inventions may be adopted in APAC countries such as a handheld near-infrared device that identifies more than 75% of the plastic for recycling [1], reusable "MEDU garment" with embedded QR technology that could inform health workers how many times it has been washed after which it can be further recycled [2], "Bubble Barrier" that uses ferrofluid to attract microplastics from water [3].

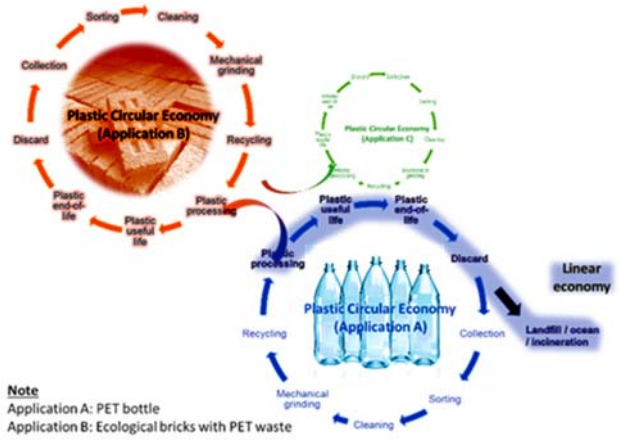

***Figure 1**: Circular economy of plastic.*

Since the ban on the importation of plastic waste and other recyclable items by China in 2018, waste exporting nations have had to find alternatives to their waste management chains. Alternatives to export include landfilling, stockpiling and incineration (with the subsequent environmental hazard). As a consequence of China's ban, many South East Asia countries became the destination for the re-routed waste. To tackle this issue, the government of the affected countries such as Malaysia also began to ban the importation of plastic waste. Although there are countries who still accept plastic waste, they are closely monitored. The export ban creates opportunities for the local recycling industry to grow, provided the right incentives and support is made accessible by the respective governments. Meanwhile, mismanagement of locally produced waste or imported waste on land may lead to an increase in oceanic plastic waste. The increased production of plastics together with the mismanagement of plastic waste are two of the reasons for the rise in oceanic plastic waste. Oceanic plastic waste contributors are largely dominated by two major polluters that account for almost half of the share in ocean plastic waste (Table 1) [4].

***Table 1**: Top 10 countries who emit the most ocean plastic waste in 2021. Source from Meijer et al. (2021) [5].*

Rank	Country	% Share in oceanic plastic waste
1	Philippines	36.4
2	India	12.9
3	Malaysia	7.5
4	China	7.2
5	Indonesia	5.8
6	Brazil	3.9
7	Viet Nam	2.9
8	Bangladesh	2.5
9	Thailand	2.3
10	Nigeria	1.9

Current status and challenges concerning the plastic recycling activities initiated by local agencies or non-governmental agencies or companies in some APAC countries listed above (i.e. Philippines, India, Malaysia, Indonesia, Viet Nam, and Thailand) will be discussed next. In addition, countries such as Singapore, Japan and Australia are also briefly covered as they are among the APAC countries with the cleanest record and possess a technological advantage over the others.

Philippines

Philippines was ranked the largest contributor to oceanic plastic waste by Meijer et al. (2021) [5]. Philippines established an Ecological Solid Waste Management Act (2000) through a systematic, comprehensive and ecological solid waste management program for all the local government units. In 2015, the Environmental Management Bureau bought a non-combustion destruction facility for the removal of polychlorinated biphenyl oil and upgraded it to the now-accredited facility. In 2020, the government had taken more initiatives to ban single-use plastics (e.g. plastic straws and bags) in government offices, restaurants and stores. Some local government units prohibited the sale, use, manufacture and importation of single-use plastics (e.g. in Muntinlupa City). Despite different initiatives, Philippines waste management system continued to be inefficient especially in the highly populated or inaccessible areas. In a recent World Economic Forum news report by Portugal (2021) [6], the journalist mentioned that Philippines government did not have a direction and strategy to tackle the issue of plastic waste. Some regions in Philippines did not even have the enforcement on plastic policies. This issue was further exacerbated by a surge in plastic demand during COVID-19 followed by the unawareness of the public on how to dispose those plastics. The government and many corporations in the Philippines were reassessing on how to best dispose the plastic packaging products as well as plastic waste associated to COVID-19.

India

In 2021, India was ranked the second largest contributor to oceanic plastic waste [5]. The Indian government announced in 2018 that they pledged to phase out single-use plastics by 2022. The resolution took effect on 1st of July 2022. Prior to that, the government also drafted policies and missions such as Swachh Bharat Mission and Solid Waste Management Rules 2016 to tackle the plastic waste issue. The drafted action plan focuses on the use of bio-based polymers and the substitution of virgin polymer with recycled polymer at the same time increasing the supply of good quality secondary plastic feedstock. The monitoring effort for these objectives is done regularly, ranging from short-term (<2 years) and medium-term to long-term (>5 years).

According to Bureau (2021) [7], there are currently more than 10 challenges to foster the plastics circular economy in India, which can be generalized as a lack of investment, waste mismanagement and lack of public awareness. In addition, waste collection is dominated by the informal sector (waste pickers, aggregators, informal recycling units), which results in absence of integration of waste into the formal waste management systems, breaching the mandates of the Solid Waste Management Rules 2016. Despite so, India's Prime Minister said they were on track to meet Paris agreement climate change targets, adding that 5,000 compressed bio-gas plants will be set up to turn waste into energy.

Due to the massive land area of India, plastic recycling societies, agencies and associations are spread across different regions in India. Among them, eight were highlighted by Sharma (2019) [8] for their efforts in simplifying plastic recycling. They are: Skrap (Mumbai), Paperman (Chennai), Saahas Zero Waste (Bengaluru), Citizengage (Bengaluru), Gem Enviro Management (Delhi), Vital Waste (Kolkata), Namo E-waste (Faridabad), Plastics for Change (Bengaluru).

Malaysia

In terms of ocean plastic waste contributors, Malaysia was ranked third in the year of 2021 [5]. In the past, Malaysia became one of the top destinations for plastic scrap exporters in South East Asia. In 2018 alone, Malaysia saw a significant increase in plastic waste imports, from MYR 241.7 million in 2015 to MYR 739.8 million. It was reported that a total of 62 companies have been approved by the National Solid Waste Management Department to import and process plastic waste. Recycling of plastics is encouraged by the Malaysian government through the Malaysian Investment Development Authority (MIDA). Incentives, namely the Pioneer Status or Investment Tax Allowance, are offered to companies with priority for sustainable waste management practices. It was also reported that there was a total of 55 plastic recycling projects with total investments of MYR 199.5 million [9]. The Malaysian government along with other stakeholders in the plastic economy is looking to close their knowledge gaps on the long-term effects of plastics, and to focus on operational efficiency and adaptation of cutting-edge technology for plastic reprocessing.

In 2021, the House and Local Government Ministry announced they are on track to achieve a 40% recycling rate by 2025 under the 12th Malaysia Plan. There are 4,118 recycling collection centres nationwide. Although Malaysia recorded a 30.67% recycling rate in 2020 (exceeding the target of 30% in 2018), more incentives are needed to cut the use of plastics in Malaysia. The Malaysian Plastic Manufacturers Association and Malaysia Plastic Recyclers Association released a roadmap to revamp the advanced plastics recycling industry nationwide. The biggest challenge Malaysia is facing is the lack of investment, opaque regulations and fluid policy directions.

Indonesia

In 2021, Indonesia was ranked the fifth largest contributors to oceanic plastic waste [5] dropping from second position in 2015. This is due to the ambitious goal to achieve near-zero plastic pollution by 2040 set by the Indonesian government. According to a report presented in the World Economic Forum (2020) [10], the majority of Indonesia's plastic waste (70%) was mismanaged. Out of this number, 47% of the waste was burned openly, while 14% was due to poorly managed dumpsites and 9% was contributed by plastics being thrown into waterways.

Due to the geographical landscape of Indonesia with more than 17,000 islands and 81,000 km of coastlines, the solutions to plastic waste management must be customized according to geographical archetypes. These can be divided into four categories (mega, medium, rural and remote) according to the total population and population density as well as the geographical accessibility to aggregating hubs. According to the Indonesia National Plastic Action Partnership estimation from 2017-2040, Indonesia will require a total of US $18 billion to address the many challenges of recycling in order to accommodate effective waste management practices and recycling.

Non-governmental organisations such as plastic recyclers in Indonesia are facing many challenges. According to the secretary-general of Indonesian Plastic Recyclers, one of the major challenges is its heavy reliance on the informal sector. The informal waste collectors are inefficient, the supply chain is convoluted with many middlemen involved. Recyclers have to pay a high price to obtain plastic waste. On top of these, the collected plastics are not separated at the source and contain high amounts of contaminants. Consequently, many waste companies prefer to send the unsorted waste to landfills as it is cheaper. Limited investment in machinery has resulted in slow technological growth of the recycling sector. According to the Chief Executive Officer (CEO) of Circulate Capital (an impact-focused investment management firm), an estimated US$ 5 billion of investments annually in five countries (China, Indonesia, Philippines, Thailand and Viet Nam) is needed to prevent discarded plastic from flowing into the ocean [11].

There are some alliances/ societies in the archipelago of Indonesia who spearhead the movement towards zero plastic waste; for example, Alliance Zero Waste Indonesia, Yayasan Pengelolaan Biosains dan Biotechnology, Gerakan Indonesia Diet Kantong Plastik, Pusat Pendidikan Lingkungan Hidup in Bali. Besides non-governmental organisations, a conservation group for biological wetland called ECOTON also embarked in plastic waste segregation in Gresik's village, Indonesia, which led to a 40% reduction in the organic waste disposal. The group was working with the authorities to pass a landmark regulation that would require at-source waste segregation and at the same time create awareness and boost the life of surrounding communities. There are countless of social enterprises and innovators who take part in the effort to mitigate the

plastic waste issue in Indonesia such as Siklus, gCycle (Australia), Plastic Fischer GmbH (Germany), RiverRecycle (Viet Nam), Duitin, Griya Luhu, Tridi Oasis, Octopus, Rekosistem, Plastic Bank, Second Life (Singapore), Range International, etc.

Viet Nam

In 2021, Viet Nam was ranked 7th [5] among the contributors of marine plastic pollution. Viet Nam long-term strategy plan for 2030 includes: reducing 75% of plastic waste on the sea and oceans, collecting 100% of abandoned, lost or discarded fishing gear as well introducing 100% eco-friendly plastic bags in its shopping centres and supermarkets. In 2019, the Vietnamese Department of Energy and Natural Resources banned all waste imports including polychlorinated biphenyl, used clothing and rags, used motorcycle parts and second-hand vehicles.

Under the Environmental Protection Law (2005), Viet Nam set regulations for reuse, waste segregation at source, and recycling. The government also introduced a national strategy to increase the effectiveness of integrated solid waste management. Viet Nam has recently (in 2022) implemented EPR for packaging to constrain producers to take responsibility for the entire lifecycle of their packaging.

Although Viet Nam created a legal framework for the implementation of a circular economy, they still need international partnerships due to the lack of expertise, e.g. Dutch-Vietnamese collaboration. According to the Vice Chairman and the General Secretary of the Vietnam Responsible Care Council, Đỗ Thanh Bái, Viet Nam receives insufficient investments in waste recycling technologies and resources, thus most of the provinces do not have adequate equipment to separate the waste at source. As of 2019, there were 1322 municipal waste treatment facilities nationwide (381 solid waste incinerators, 37 composting plants, 904 landfills and remaining non-sanitary landfills). Out of 36 plastic recycling plants nationwide, only four accept unsorted plastic waste while others process only specific types of sorted plastic materials. Viet Nam pays more attention to the consumption of single-use plastics and mismanagement of wastes within the tourism and fisheries sectors, given that they have a 2,000-long-mile of coastline. The focus is on plastic recycling and the passing of stringent waste management regulations. Nearly all the recycling collection is done by individual pickers, who tend to look for high-value items like cans, plastic bottles and cardboard.

In 2019, there were nine (9) companies who forged a recycling coalition namely Packaging Recycling Organization Viet Nam (also known as PRO Viet Nam). They were Coca-Cola Vietnam, FrieslandCampina, La Vie, Nestlé Vietnam, NutiFood, Suntory PepsiCo Vietnam, Tetra Pak Vietnam, TH Group and URC Vietnam. PRO Viet Nam's ambition is to create a sustainable packaging collection and recycling. All of its members planned to collect the packaging materials they release in the market by 2030.

Thailand

In 2021, Thailand was ranked 9th among the countries with the most contribution to oceanic plastic waste [5]. According to the Thailand Development Research Institute, the country has nearly half of the total 1.03 tonnes of mismanaged waste entering the sea [12]. The Thai government has an ambitious target to achieve 100% plastic recycling by the year of 2027. They imposed a ban on seven types of single-use plastics because 60% of the ocean leakage comes from plastic packaging (e.g. PET, PE). The goal to ban three types of single-use plastic (plastic bottle cap seals, oxo-degradable plastics, and plastic microbeads) was successfully achieved in 2019. With the roadmap outlined and ready for implementation, there are many investment -linked activities related to packaging materials that emerged in Thailand. However, according to Jacob Duer of the Alliance to End Plastic Waste in Thailand, plastic waste has increased from 1,500 tons to 6,300 tons per day due to an increase in home food deliveries.

Sukholthaman (2012) in his/her thesis investigated the response of Bangkok residents toward an incentive-based recycling program. The author experienced a great welcoming by the communities in Bangkok, with 90% of the total respondents participating in the incentive-based recycling survey. All the participating respondents were aware about the impact of plastic waste on the environment. Out of 580 of them, 32% preferred to have cash-back while some others preferred tax reduction (17%), coupons (14%) or vouchers (11%) Respondents also considered that the waste reduction at the point of a source is the way to reduce household waste generation.

Singapore

In 2019, Singapore's Zero Waste Masterplan was launched in an effort towards a Zero Waste Nation. Singapore also unveiled its Green Plan 2030 in 2021, which outlines their target in the next 10 years. The Green Plan is headed by five Ministries (Education, National Development, Sustainability and the Environment, Trade and Industry, Transport). One of the key areas is to reduce the amount of waste in landfill per capita per day by 20% by 2026 and subsequently 30% by 2030. The Minister for Sustainability and the Environment said that one of their national goals was to achieve a 70% recycling rate and to reduce the amount of waste at the Semakau landfill by 2030.

The National Environment Agency (NEA) launched the Extended Producer Responsibilities (EPR) Scheme for e-waste starting from 1st of July 2021. Under this scheme, the producers are now responsible to manage the end-of-life disposal of electrical products they supply in Singapore. NEA also announced that they will introduce the "Deposit Refund" scheme for beverage containers by next year. Under this scheme, consumers can return their beverage containers waste to reverse vending machines and collect points. The points can then be exchanged for other reward points/vouchers (e.g. Grab, Ohm, Stojo).

Singapore's Ministry for Sustainability and the Environment launched a new association for plastic recycling, called PRAS (Plastics Recycling Association of Singapore), to enhance the best practices for plastic waste management and recycling. PRAS was established by different collaborators from Germany, Austria, Switzerland to assist in designing and building a plastic recycling industry, technology transfer, skills training & services. PRAS plans to implement a "beverage container return" scheme in which the packaging waste can be returned to the producers at designated points while the returnees get a refund. PRAS also explores other novel solutions in plastics recycling by participating in the R&D ecosystem in Singapore.

Despite all the above-mentioned investments and efforts, Oh (2021) reported that Singapore has a low recycling rate (at 4%) for plastic bottles. Experts whom the journalist interviewed agree that Singapore still lacks a proper infrastructure to recycle plastics. In addition, there is also a lack of knowledge among the community about which types of plastics can be recycled and which cannot. These factors contribute to this low recycling rate [13].

Japan

Japan is among the lowest contributors to oceanic plastic waste in 2021. Although Japan is the leader in recycling technologies and has a long history of good record for plastics recycling rate (~85%), their technologies were not commercially viable in their own country. Although Japan possesses technologies, the plastic waste is typically recycled and processed using mechanical recycling method till today. Japan used to ship out their plastic waste to China due to its higher economic efficiency. Since China's ban on waste importation, Japan passed a recycling law in June 2021 to spur the expansion in the capacity of plastic recycling, in particular of the chemical recycling method. The law encourages all manufacturers to re-design their products to ease the recycling process. The law also requires retailers and hotel chains to use plastics that are 60% derived from recycled or biodegradable materials by 2030.

The Japanese Ministry of Environment in 2012 released a report about recycling technologies that are unique to specific industries (e.g. municipal waste incineration technology, medical waste disposal technology, PET plastic bottle recycling technology, home appliance recycling technology, biomass utilization technology, and waste landfill technology) in Japan. Japan does not have as many agencies and non-governmental organizations focusing on recycling as other APAC countries due to the high awareness of residents for recycling.

Australia

In 2019, Australia made bold moves to ban the export of any recyclable waste in a bid to increase their onshore processing activities. Australia remains committed to develop new approaches to recycle plastic waste which, if scaled up, might one day change the landscape of the recycling industry. Australia's National Packaging Targets require the industry to use an average of 50% recycled content in packaging by 2025.

Australia is also looking into facilities that incinerate unrecyclable plastic scraps while producing electricity. In other countries such as Sweden, the waste-to-energy plants have been so effective that the country has begun importing other countries' trash. However, there have been critics by some environmental advocates that the burning of waste facilitates in the pollution of air and water. The argument was dismissed by the Australian Council of Recycling where they said the waste-to-energy technique reduces the use of fossil fuels and cuts potential greenhouse gas emissions from decomposing waste [14].

Australian government agency responsible for scientific research, CSIRO, released a report in August 2021 about advanced recycling technologies to address Australia's plastic waste. According to them, Australia has adequate solutions, technology and capable scientists and engineers. Therefore, there is an opportunity for advanced recycling to be recognised as supporting Australia's waste policy action plan and plastics recovery targets to 2030. However, it is noted that the lack of lifecycle assessment studies relevant to the Australian context is an information gap.

Researchers from the University of New South Wales in Sydney were exploring the possibility of making a "micro factory"; a small, modular machine that can transform many types of consumer waste streams such as glass, plastic and timber into valuable materials for re-use. Compared to the traditionally built recycling factories that require a large area and expensive operations just to produce one or a few recycled products, the modular micro factories can operate on a site as small as 50 m^2 and can be located wherever the waste may be stockpiled. The developed system was aimed to decentralize the large recycling operation.

Conclusion

Some recycling technologies for the circular economy have been presented, from the technologies that can assist the informal sector in collecting plastic waste (e.g. the use of infrared manual sorter, deployment of smart bins, implementation of mobile automated collector, the use of AI system to detect illegal dumping, improving waste management using top-down approach) to large-scale industrial processes that involve proprietary technology (AMP Cortex™, AMP Neuron™, AMP Insights™, ThermoFusion™, Reconophalt™, TRAPO®, NovaCrack®, CreaSolv®, ChemCycling™, UpCycle™, HydroPRS™, Cat-HTR™).

Waste containing pure plastics (thermoplastic or thermoset) can be sorted and separated either with the help of manual labour and/or with the use of a robust combination of infrared technology and AI. Once the plastics are sorted, they need to be ground into a smaller size for further processing. Depending on the waste condition at the collection point, all the labels, glue residues and contaminants need to be removed. The clean plastics can then be extruded into resins before they enter into the mainstream process of virgin polymers. For engineering polymers involving fiber-based composites, chemical process is usually preferred due to the higher value of recovered fibers over plastics.

Some challenges within the circular economy of plastic waste have been identified for APAC region. They are:

- The lack of infrastructure and/or support accompanied with the waste mismanagement in many APAC countries are one of the reasons for the high plastic pollution. Respective governments need to be proactive and innovative in: monitoring the waste management system, providing incentives and support to local players along the supply chain such as government agencies, non-governmental agencies, and industrial sectors.

- The high capital investment and the lack of knowledge about recycling technologies are also the reasons many APAC countries are unable to implement a circular economy. Due to large and scattered information, the first step is to make the knowledge about promising technologies that do less harm to the environment and about key players from government agencies and industrial sectors accessible in open databases.

- The need to involve the local community in the planning and running of the facility by making available open knowledge resources even if technologies were made

- The use of manual labour to sort plastic waste in many parts of APAC region give lower accuracy and therefore influence the value of the recovered plastics. Integration of infrared technology can greatly boost the accuracy of sorting.
- The lack of monetary support to fund research at universities in innovations related to recycling.

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IMM 16 CPD Points

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MTE Materials Technology Education Sdn Bhd

ONE-DAY IMM FACILITY INTEGRITY & MAINTENANCE CONFERENCE 2023

16th March 2023 | 7.30am - 5.00pm | The Marina, Goldenbay Hotel, Bintulu

Asset integrity and maintenance are critical to ensuring the continuous production and a safe workplace. It is critical in effectively managing industrial assets in order to achieve operational excellence and long-term profitability while ensuring asset reliability, integrity, and safety, as well as the smooth operation of the plant without any failures, leaks, accidents, or unplanned shutdowns.

The current COVID-19 mitigation strategy of working at home and social distancing is resulting in an increasing backlog of inspection and maintenance work. Furthermore, the situation is forcing asset inspection management service providers to perform critical asset inspections with fewer personnel. However, the roles of asset management leaders are no longer the same and are undergoing significant change. Remote inspection and collaboration are examples of digital technologies being used to assist organisations in maintaining safe and productive assets.

Today's industries must constantly improve and innovate in order to achieve higher efficiency and lower unit costs of production. Industries cannot continue to operate in the same manner and expect to see improved results. It is critical that technicians and engineers keep up to date on new knowledge and technologies, as well as new ways of operating equipment and facilities.

This Conference aims to bring experiences and knowledge together to share issues, challenges and potential solutions.

WHO SHOULD ATTEND?

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- Petrochemicals
- Chemicals
- Others affected by asset integrity & maintenance issues.

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Programme

0730am Registration & Light Breakfast

0830am Welcome Note by Emcee & Safety Briefing by Hotel Staff

0840am Opening Speech by Dato' Dr. Ir. Ts. Mohd Abdul Karim Bin Abdullah, IMM President

0845am **Revolutionized PRBI for future Asset Integrity Management**
0905am Q&A
By Aid Farhan Maarof and Ahmad Naim A Khairudin (GTS, PETRONAS)

0910am **Holistic Approach Towards Asset Integrity Management Through Digitalisation**
0930am Q&A
By Mathews Varkey
(Ankaa Consulting (M) Sdn Bhd)

0935am **Completing The Service Cycle**
0955am Q&A
By Andrew Thomas (Lava Protocols Sdn Bhd)

1000am Tea Break / Exhibition

1030am **Sea Water Corrosion on Heat Exchanger Tube**
1050am Q&A
By Ir Foo Hwa Chit (Petronas LNG Sdn Bhd)

1055am **On-line leak sealing & pipe reinforcement by composite repair as per ASME PCC-2 / ISO 24817**
1115am Q&A
By Ahmad Sanusi Awang
(In-Situ Petro Services Sdn Bhd)

1120am **Digitalization of Cathodic Protection System - Remote Monitoring**
1140am Q&A
By Muhammad Syafiq Bin Alwi (Ultradex Engineering Supply Sdn Bhd / Norimax Sdn Bhd)

1145am **Grooving at Overhead Condenser, Hydrogen or Erosion?**
1205pm Q&A
By Nurjaimi Ali and Rohana Jaafar
(GTS, PETRONAS)

1210pm Group Photo

1220pm **LUNCH/EXHIBITION**

1400pm **Are my Storage Tanks Safe? Storage Tanks Asset Grading Visualization for Better Asset Integrity Management**
1420pm Q&A
By Hanafi Basri (Petronas Carigali Sdn Bhd)

1425pm **Overview of Engineered Composite Repair System for Aboveground Storage Tanks in accordance with API 653**
1445pm Q&A
By Shann Liew (HJ3)

1450pm **Failure Analysis of Linkage Eyebolt Fracture at Hydro Power Turbine**
1510pm Q&A
By Ir Abdul Rohim Md Said (TNB Repair and Maintenance Sdn Bhd (REMACO))

1515pm **Valve Management System: Balancing HSE Risk and Value Leakage**
1535pm Q&A
By Mohd Fazli bin Abdul Kadir
(Petronas Carigali Sdn Bhd)

1540pm Tea Break/Exhibition

1600pm **Using FMC-TFM Imaging to improve Weld Defect Characterizations and Identification**
1620pm Q&A
By Dr. Muhammad Nur Farhan Saniman
(Integrated PDP Sdn Bhd)

1625pm **The Paradox of PWHT for Austenitic Stainless Steel**
1645pm Q&A
By Ir. Sia Hua Jiuh
(Asean Bintulu Fertilizer Sdn Bhd)

1650pm Closing Remarks from Mr Raymond Phen, Chairman of IMM Bintulu Chapter

1700pm Adjourn

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Metal-Supported for Solid Oxide Fuel Cell (SOFC)

Introduction

The fuel cell was firstly discovered by William Grove in 1839 when he thought that an electric current can be generated through reverse electrolysis by combining hydrogen and oxygen together [1]. According to the previous researcher, a fuel cell is an electrochemical that generates electricity with zero carbon emission device whilst using hydrogen as a fuel [2],[3]. A fuel cell is a device that converts chemical vitality into electrical energy through an elective, ecologically benign electrochemical process. Fuel cell innovation is gaining attention due to its higher proficiency than any other combustion engine. It also can address the consumption of natural resources and worldwide environmental concerns by zero carbon dioxide emissions if hydrogen is utilised [4],[5].

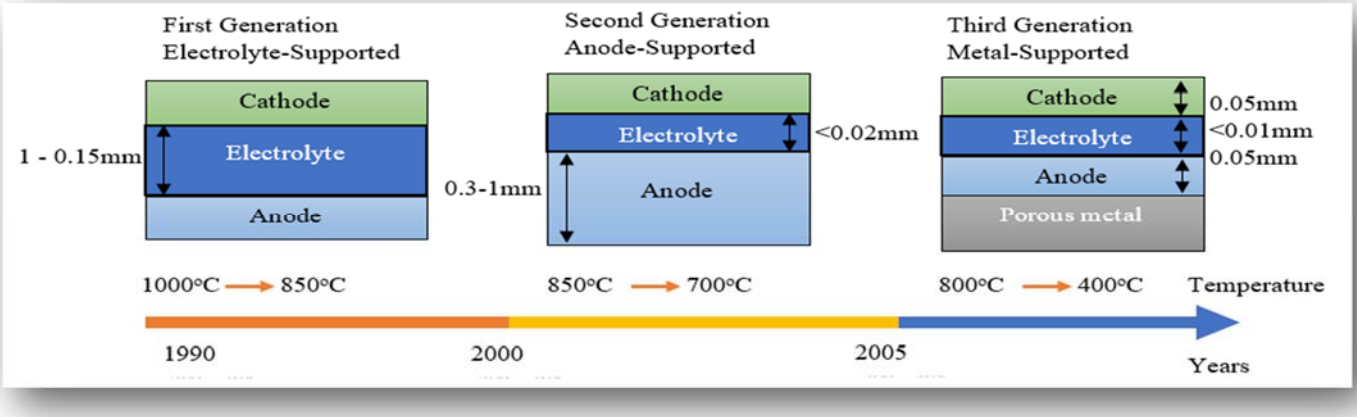

Figure 1: *Schematic diagram for the evolution of SOFC*

Many types of fuel cells have been investigated by researchers to extend the knowledge of fuel cells such as polymer electrolyte fuel cell (PEFC), alkaline fuel cell (AFC), phosphoric acid fuel cell (PAFC), molten carbonate fuel cell (MCFC) and lastly, solid oxide fuel cell (SOFC). Amongst them, SOFC has been considered one of the promising energy technologies for residential and distributed power plants due to its much higher productivity in combination with combined heat and power, multi-fuel adaptability and potentially low production fetched. SOFC also guarantees that it will advance in energy efficiency and provide society with clean energy for innovation. Based on their diffusion mechanism, SOFC is classified into two types which are oxygen ion-conducting SOFC (O-SOFC) and proton-conducting SOFC (H-SOFC). Both types of fuel cells rely heavily on the movement of oxide ions or protons over a ceramic at temperatures ranging from 800 to 1000°C for O-SOFC and 400 to 700°C for H-SOFC.

Recently, there has been a lot of interest in the investigation of the third generation of SOFC, which is a metal-supported solid oxide fuel cell (MS-SOFC). The majority of SOFC development to date focuses on electrolyte metal-supported cell (EMSC), cathode metal -supported cell (CMSC) and anode metal-supported cell (AMSC) which have received a lot of attention and progress in the last decade [6-8]. The EMSC was initially used primarily for SOFC with the structure as shown in Figure 1. A dense yttria-stabilized zirconia (YSZ) electrolyte with a thickness greater than 0.15 mm was used to support the anode and cathode [9]. The ohmic impedance is proportional to the thickness and has an Arrhenius dependence on temperature, therefore, a thick electrolyte requires a high operating temperature to reduce its ohmic impedance during operation [8]. Thus, in the early years, the operating temperature of an EMSC was typically set at around 1000ºC.

As illustrated in Figure 1, a higher operating temperature has restricted the commercialization of SOFC, which can be prevented by adjusting the thickness of EMSC. The development of the AMSC has allowed the cells to be fabricated with a much thinner electrolyte than the EMSC and the operating temperatures can be reduced to 700–800 °C while still providing improved power densities [10]. Previously, in order to improve the electrochemical performance, four different types of anode-supported SOFC including a conventional cell are prepared. The investigation was conducted by studying the effect of mesoscale and nanoscale structural modifications and evaluating their performance at various operating temperatures. Furthermore, it is stated that the improvement in cell performance increases as the operating temperature decreases. Hence, lower operating temperature also has the possibility to increase the performance of SOFC.

On the other hand, due to many metal oxides being sensitive to high-temperature air environments, the material of the perovskite cathode in CMSC has been extensively researched. However, they encountered some limitations in high-temperature SOFC, such as material degradation, short lifetime, long start-up time, lower thermal and redox cycle material stresses, material selection restrictions, and high manufacturing costs for the sustainability factor. It is mentioned from previous researcher that $La_{0.8}Sr_{0.2}$ $MnO_{3-\delta}$ (LSM),

$La_{0.6}Sr_{0.4}Co_{0.2}Fe_{0.8}O_{3-\alpha}$ (LSCF), $Ba_{0.5}Sr_{0.5}Co_{0.8}Fe_{0.2}O_{3-\alpha}$ (BSCF) and $Sm_{0.5}Sr_{0.5}Co_8O_{3-\alpha}$ (SSC) are perovskite cathode materials which possess high electric conductivity at high temperature. However, at low temperatures, these perovskite cathodes possess high polarization resistance and low electronic conductivity [11-12]. The high electronic conductivity of the cathode is needed to reduce the ohmic loss in the circuit of SOFC. When the temperature is reduced, the catalytic activity of traditional cathode materials for oxygen reduction reaction (ORR) decreases, and so does the ionic conductivity, resulting in a significant increase in the cathode's polarisation resistance (Rp) (Yang et al., 2020). Therefore, cathode materials with high oxygen reduction activity at intermediate temperatures (IT) and low temperatures (LT) (<700ºC) are required.

Conclusion

SOFC is the most widely used fuel cell because of its high energy conversion efficiency and low negative impact on the environment. Current research trends show that improvement of SOFC performance relies on each of the metal-supported components, especially for intermediate and low-temperature operation. Due to the operating temperature that has been reduced significantly, metallic material can now be used as metal support in SOFC instead of the traditional ceramic material. This may lead to a new finding regarding the characteristic of porous metal that is suitable for metal support in SOFC. Thus, it is important to focus on an investigation and research of metal support call to further enhance the performance of SOFC.

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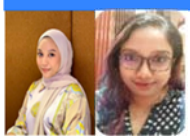
Notes:

1) obs: observer
alt: alternate

Compiled by: IMM Secretariat,
The information was updated as of 15th November 2022

The 2nd Annual Clean Power & New Energy 2022



Prepared by: Ms. Nur Syafika Azis, IMM Secretariat
Reviewed by: Ms. Aberamy A/P Dayalam, Assistant Manager of IMM Secretariat

Date: 20th – 21st July 2022
Venue: Mandarin Oriental, Kuala Lumpur
Organizer: CT Event Asia

The 2nd Annual Clean Power & New Energy 2022 (The 2nd ACPNE 2022) is the most efficient and targeted event for utility-scale renewable companies. Bringing these technologies together will create more value for participants by enhancing opportunities to network, broadening the scope of education, and providing access to an exclusive audience. Incorporating all renewable technologies will be more convenient and cost-effective for multi-tech businesses and companies specialising in wind or solar utility. This forum will benefit and attract decision-makers from large-scale developers, corporate buyers, and utilities.

The Institute of Materials, Malaysia (IMM) had the opportunity to become one of the exhibitors at the 2nd ACPNE 2022. The IMM booth was located at Level 1, Mandarin Oriental, Kuala Lumpur and exhibited co-jointly with Materials Technology Education Sdn. Bhd. (Associate Training Partner), Jotac Academy Sdn. Bhd. (Authorised Testing Center) and Eurofins NM Laboratory Sdn. Bhd. (**Recommended 3rd-Party Testing Laboratories in relation to Coating Fingerprint Certificate for retained paint sample).** We attracted and engaged more than 100 visitors by promoting certification programs, conferences, memberships, **coating fingerprinting and** etc. IMM participation was met with an enthusiastic response from the visitors, and it was beyond our expectations. Coating Inspector and Protective Coating Technician are the two most popular IMM Certification Programs that were highly enquired by visitors at the 2nd ACPNE 2022.

Figure 1: *Datuk Ali anak Biju (Deputy Minister of Energy and Natural Resources) visited the IMM booth on Day 1 of the 2nd ACPNE 2022. From left: Ms. Edayu Fanashim (IMM Admin Executive), Ms. Karen Cheng Siew Hoon (Director of Materials Technology Education Sdn. Bhd.), Datuk Ali anak Biju, Ms. Syafika Azis (IMM HR & Finance Executive)*

Figure 2: *Ms. Karen Cheng Siew Hoon and Ms. Edayue Fanashim promoted the IMM Certification Schemes to the visitors.*

On the first day, Datuk Ali anak Biju, the Deputy Minister of Energy and Natural Resources delivered the keynote address at the opening ceremony of the 2nd ACPNE 2022. At the conference, the speakers presented their ideas according to the highlighted topic; "**Shaping the Future of Energy in Asia**".

Figure 3: *The speakers presented the highlighted topics.*

Figure 4: *Datuk Ali anak Biju delivered the honorary keynote address at the opening ceremony.*

The topic highlighted on the second day of the 2nd ACPNE 2022 was "**Future of Global Energy Transformation**", and the conference ended at 5:00 pm. Overall, the 2nd ACPNE 2022 was a successful event where IMM received a lot of responses and enquiries about the IMM Certification Programs.

Figure 5*: Ms. Edayue Fanashim and Ms. Syafika Azis at the IMM booth on the last day of the 2nd ACPNE 2022.*

ICPAC KOTA KINABALU 2022

22nd – 27th November 2022

International Congress on Pure & Applied Chemistry
Kota Kinabalu, Sabah, Malaysia

"Chemistry & Chemical Innovations for Sustainable Development in Rapidly-Emerging Economies"

Incorporating

20th Malaysian International Chemistry Congress 2022 (20MICC)

&

International Symposium on Advanced Polymeric Materials 2022 (ISAPM 2022)

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Materials Lecture Competition 2022

Prepared by: Dr. Andrew Ng Kay Lup, Xiamen University Malaysia (MLC 2022 Chairperson)
Edited by: Dr. Nor Akmal Fadil, Universiti Teknologi Malaysia (Chairperson, IMM-MLC Committee)

Date: 16th June 2022 (Semi-final) & 7th July 2022 (Final)
Venue: Xiamen University Malaysia (XMUM)

Xiamen University Malaysia (XMUM) has been selected as the host for Materials Lecture Competition 2022 (MLC 2022). The MLC 2022 semi-final and final round were held online on 16th June 2022 and 7th July 2022, respectively by XMUM in collaboration with the Institute of Materials, Malaysia (IMM) and the Institute of Materials, Minerals and Mining UK (IOM3-UK). Both events were held on the Microsoft Teams platform and aired live on the Facebook page of The School of Chemical Engineering, XMUM. Since the year 2020, national and international competitions were held online due to the continued Covid-19 pandemic situation.

The aim of the event was to provide a platform for young talents to exhibit effective and impressive presentation skills in delivering topics in the field of material science and engineering. The MLC 2022 semi-final event was officiated by the Assistant President of XMUM, Assoc. Prof. Dr. Zhang Ying. The semi-final dan final judging panels were selected from academia and industry practitioners (Table 1).

The MLC 2022 semi-final competition was aimed to select five finalists from participants of twelve Malaysian universities as shown in Table 2. The first five participants in Table 2 are the MLC 2022 top five finalists who won the semi-final round. The top five finalists competed in the MLC 2022 final round hosted online by XMUM. The MLC 2022 Final event was officiated by Prof. Dr. Chen Binghui, the Dean of the School of Energy and Chemical Engineering, XMUM. The half-day competition ended with closing remarks given by Ts. Dr. Chew Khoon Hee (Deputy President of the Institute of Materials, Malaysia, IMM).

Rathosivan Gopal from Universiti Teknologi Malaysia was the winner of MLC 2022, while Ammar Zoheir from Universiti Tenaga Nasional and Natasha Voznyuk Jeevan from Universiti Teknologi Petronas came in second and third place, respectively. The winners received a cash prize of RM 3000, RM 2000and RM 1000 respectively, while the last two finalists received consolation prizes of RM 500–each. The cash prize was sponsored by IMM. Rathosivan Gopal will represent Malaysia in Young Persons' World Lecture Competition (YPWLC 2022) in November, which will be organised by IOM3-UK via an online competition.

Figure 1: *MS Teams Screenshot of the twelve MLC 2022 semi-final participants with IMM Representatives, MLC Chairperson, MLC committee members, the judges, and the Assistant President of XMUM, Assoc. Prof. Dr. Zhang Ying.*

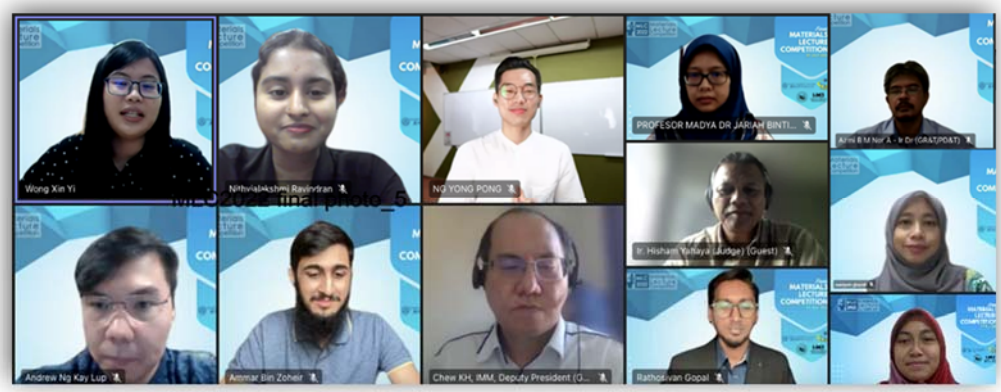

Figure 2: *MS Teams Screenshot of the twelve MLC 2022 final participants with IMM representative, MLC Chairperson, MLC committee members, the judges, and the Deputy President of the IMM, Ts. Dr. Chew Khoon Hee.*

Table 1: *The panel of judges for the MLC 2022 semi-final and final.*

MLC 2022 Semi-final	MLC 2022 Final
1. Mr. Kang Kim Ang, CORRTROL Group of Companies (Moderator) 2. Prof. Ir. Dr. Sapuan Salit, Universiti Putra Malaysia 3. Assoc. Prof. Ir. Ts. Dr. Wan Sharuzi Wan Harun, Universiti Malaysia Pahang 4. Dr. Ismail Ibrahim, Department of Minerals and Geoscience Malaysia	1. Assoc. Prof. Dr. Jariah Mohamad Juoi, Universiti Teknikal Malaysia Melaka (Moderator) 2. Ir. Dr. Azmi Mohammed Nor, Petronas Research Sdn. Bhd. 3. Ir. Ts. Noor Hisham Yahaya, Safe Asbestos Solutions Sdn. Bhd. 4. Prof. Ts. Dr. Mariyam Jameelah Ghazali, Universiti Kebangsaan Malaysia

Table 2: *MLC 2022 semi-final participants and the top five finalists.*

No.	Name	Title	
1.	Rathosivan Gopal, Universiti Teknologi Malaysia (UTM)	Immobilisation of Factor VII through polydopamine grafting on polycaprolactone membrane for cardiac bleeding application	Top Five Finalists
2.	Ammar Zoheir, Universiti Tenaga Nasional (UNITEN)	Graphene: The wonder material in the electronics industry	
3.	Natasha Voznyuk Jeevan, Universiti Teknologi Petronas (UTP)	Potato plastic - A solution to single-use conventional plastic	
4.	Ng Yong Pong, Taylor's University Malaysia	Radiation shielding material – An overview and manufacturing of radiation shielding composite	
5.	Nithyialakshmi A/P Ravindran, Universiti Malaya (UM)	High performance supercapacitors with hybrid MoS_2 /MXene electrodes	
6.	Tan Hui En, Tunku Abdul Rahman University College (TAR-UC)	Extraction of biological hydroxyapatite for biomedical applications	
7.	Harivalagan A/L Siva Kumar, Universiti Kebangsaan Malaysia (UKM)	Modified surfaces of quantum carbon dot (QCD) for modern medicine application	
8.	Syed Assim Hussain Shah, Universiti Tun Hussein Onn Malaysia (UTHM)	Synthesis, characterisation and adsorption Study of deep eutectic solvent molecularly imprinted polymer for the removal of bisphenol A	
9.	Yeow Teck Ann, Xiamen University Malaysia (XMUM)	Your friendly neighbourhood plastic: Glycerol to 1,3-PDO	
10.	Muhammad Haziq Bin Noor Akashah, Universiti Teknologi Mara (UiTM)	Blue-fluorescence emission of graphene quantum dots nanoparticles (GQDs) as a new sensing material towards development of rapid fibre optic biosensors	
11.	Nafis Syahmi Bin Zainal Azali, Universiti Teknikal Malaysia Melaka (UTeM)	Recycle wood PP composite (r-WoPPC) filament	
12.	Muhammad Naziff bin Ahamad Said, Universiti Sains Malaysia (USM)	Surface interaction of particles in emulsion polymerization of PMMA-GO with various surfactant dosages for various applications.	

Figure 3: *FB Live streaming of MLC 2022 semi-final (top) and MLC 2022 final (bottom) events on Facebook page of Chemical Engineering, XMUM.*

Figure 4: *Winners of MLC 2022.*

Figure 5: *Dr. Nor Akmal Fadil, Chairperson of IMM-MLC Committee handed over a token of appreciation from IMM to the MLC 2022 Organizing Chairperson, Dr. Andrew Ng Kay Lup at Xiamen University Malaysia Campus at Bandar Sunsuria, Sepang, Selangor on 21st September 2022.*

Oil and Gas Asia Conference & Exhibition 2022

Reported by: Ms. Ainur Afini Puaze, IMM Secretariat
Reviewed by: Ms. Norita Othman, Assistant Manager of IMM Secretariat
Edited by: Mr. Wong Wing Kiong, General Manager of IMM Secretariat

Date: 13th – 15th September 2022
Venue: Kuala Lumpur Convention Centre

The Region's No. 1 Oil and Gas Exhibition, Oil & Gas Asia (OGA) has merged with the Malaysian Oil & Gas Services Exhibition and Conference (MOGSEC) to take place as one trade show from 13th to 15th September 2022 at Kuala Lumpur Convention Centre. The merged event, OGA incorporating MOGSEC is a culmination of its best highlights, reinvigorated with new ideas and features to match the current industry agenda. Sustainability, growth and future aspirations of the industry are expected to be the dominant themes as the industry reflects on fresh insights and innovative pathways to navigate implications from recent volatile markets, global energy transition ambitions and net-zero carbon emission goals that ultimately contribute towards nation-building and the national economy through overall industry development.

Over 1,000 companies from 30 countries and over 11 Country Pavilions have represented at the event. As one of the supporting associations, the Institute of Materials, Malaysia (IMM) had the opportunity to participate and be one of the exhibitors. The IMM booth was located at Hall 5, 5811-B. The Materials Technology Education Sdn. Bhd. (MTE) (Associate Training Partner), JOTAC Academy Sdn. Bhd. (Authorised Training Centre) dan Eurofins NM Laboratory Sdn. Bhd. (Recommended 3rd-party testing laboratories in relation to coating fingerprint certificate for retained paint sample) were exhibited co-jointly with IMM.

Figure 1: *IMM Secretariat promoted the IMM Certification Schemes to the visitors at OGA 2022.*

Figure 2: *A group photo at IMM Booth. From Left : Mr. Mohamad Ikmal Hisham (Manager of Materials Technology Education Sdn. Bhd.), Ms. Syazana Shahabudin (IMM Secretariat), Ms. Karen Cheng (Director of Materials Technology Education Sdn. Bhd.), Ts. Mohd. Azmi Mohd. Noor (IMM Immediate Past President), Ms. Ainur Afini Puaze (IMM Secretariat) and Ms. Nur Syafika Abdul Azis Rahmat (IMM Secretariat).*

IMM has promoted certification programs, IMM memberships and upcoming conferences. IMM has successfully engaged with over 500 visitors and received an encouraging response from the visitors. The top three IMM Certification Programs that were most highly enquired by the visitors included Welding, Vibration and Mechanical Joint Integrity.

Figure 3 (Left) & 4 (Right): *Ir. Max Ong Chong Hup (Chairman of IMM Education Committee) and Mr. Mark Hew Yoon Onn (IMM Council Member) visited the IMM booth at OGA 2022.*

Figure 5: *A group photo at IMM Booth. From Left : Mr. Hadi Syahirman Hasmadi (IMM Secretariat), Ms. Karen Cheng, Assoc. Prof. Dr. Lim Teck Hock (IMM Council Member), Ts. CEng. Dr. Bernard Maxmillan Sim (IMM Council Member), Ms. Ainur Afini Puaze, Ms. Nurhasanah Sahri (IMM Secretariat) and Mr. Mohamad Ikmal Hisham.*

The booth was also visited by the IMM Management Committee, the Council Members and the supportive members. During the event, there were two conferences held for three consecutive days, namely MOGSEC 2022 and Petrochemicals Sustainability Conference 2022. In addition, the key highlights for OGA 2022 were the MATRADE International Sourcing Programme (MATRADE INSP), networking night and knowledge centre.

Overall, the OGA 2022 has opened up a great opportunity for IMM to promote training courses and certification programs. The event has also provided the right platform for networking and engagement with industry professionals and peers.

UTHM-IMM Materials Lecture Competition 2022

Reported by: Mohammad Fikrey Roslan, Universiti Tun Hussein Onn Malaysia, IMM-UTHM Student Chapter Chairman
Edited by: Assoc. Prof. Ts. Dr. Hamimah Abd Rahman, Universiti Tun Hussein Onn Malaysia, UTHM-IMM Student Chapter Advisor

Date: 30th May 2022
Venue: ZOOM Platform at Center for Global, Online Learning UTHM

Universiti Tun Hussein Onn Malaysia (UTHM)-Institute of Materials, Malaysia (IMM) Student Chapter committee (UTHM-IMM Student Chapter) in collaboration with Mechanical Postgraduate Association (MEPA), the Functional Composite Structure Focus Group and BioMaterials Research Focus Group, Faculty of Mechanical and Manufacturing Engineering have successfully organized a University-level Material Lectures Competition (MLC) 2022 at Center for Global, Online Learning UTHM (CGOL) on 30th May 2022 via online platform ZOOM. The MLC is a national event mainly organized by IMM and Institute of Materials, Minerals and Meteorology (IOM3, UK). This national-wide competition started as an idea by IMM to organize a competition that gives the opportunity to the materials scientists and engineers in Malaysia on the importance of materials engineering and sustainability in the advancement of technology and humankind.

Students from various faculties in UTHM have joined the competition. The participants had delivered 15 minutes of presentation on their works related to materials engineering during the competition. The panels for the competition were led by Ts. Dr. Lee Te Chuan assisted by Dr. Azzura Ismail, Assoc. Prof. Ts. Dr. Mohd. Nasrull Abdol Rahman and Dr. Nur Azam Badarulzaman. The winner of UTHM MLC 2022 was Mr. Syed Asim Hussain Shah of the Faculty of Applied Science and Technology (FAST) and he has presented UTHM at the National-level MLC 2022.

MLC is also a platform for motivating students to perform, excel and offer a lot more rewards than just the winning price. Competitions offer a chance for participants to gain substantial experience, uncover personal aptitude and develop their idea and skills. The committees also hope that more students will join this competition and other activities organized by IMM.

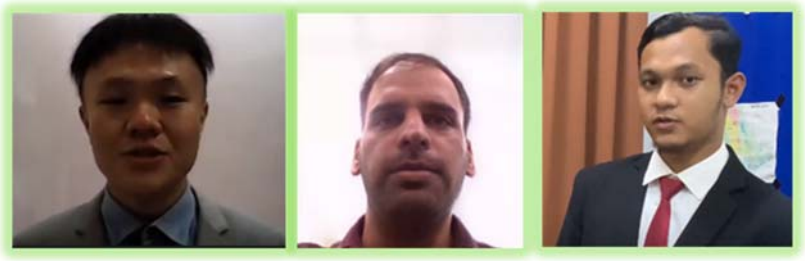

Figure 1: *The winners of UTHM-IMM MLC 2022. From left: Mr Loo Kian Long. (2nd place), Mr Syed Asim Hussain Shah. (1st place) and Muhammad Adam Bukhori bin Hamidon. (3rd place).*

Figure 2*: UTHM-IMM MLC 2022 judges and UTHM-IMM Student Chapter Committee Members.*

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Institute of Materials, Malaysia

www.iomm.org.my secretariat@iomm.org.my +60 18-911 3480

*As updated on 26th Feb 2018

Workshop on Analysis of Rubber Without Using Instrument

Reported by: Nabilah Hauzin, Postgraduate Chemistry Club (PCC), UiTM
Edited by: Prof. Ts. ChM. Dr. Chan Chin Han and ChM. Dr. Amirah Amalina Ahmad Tarmizi, Universiti Teknologi MARA (UiTM)

Date: 4th October 2022
Time: 9.00 am to 12.00 pm
Speaker: ChM Dr. Eng Aik Hwee
Virtual platform: Microsoft Teams

Organizers: Postgraduate Chemistry Club (PCC), UiTM & Institut Kimia Malaysia (IKM)
Collaborators: UiTM-IMM Student Chapter and Institute of Materials Malaysia (IMM), Plastic & Rubber Institute Malaysia (PRIM), Bruker (M) Sdn. Bhd. & Kinematic Resources Sdn. Bhd.

The workshop on "Analysis of Rubber Without Using Instrument" was successfully held on 4th October 2022 with 166 participations from the academic and industries (listed in **Table 1**). The workshop began with a welcoming speech from the Dean of Faculty of Applied Sciences, Universiti Teknologi MARA (UiTM), Prof. Dr. Hjh. Farida Zuraina and followed by the Institut Kimia Malaysia (IKM) President, Datuk ChM. Dr. Soon Ting Kueh. The speaker, ChM. Dr. Eng started his lecture on good practices and the importance of practicing general laboratory safety rules.

The workshop covered with very informative lectures by ChM. Dr. Eng that comprises measurement on rubber measurement of

1. Density
2. Crosslink density
3. Fractionation of polydisperse rubber into different molecular weights
4. Intrinsic viscosity, viscosity-average molecular weight

Figure 1: Opening poster of "Workshop on Analysis of Rubber Without Using Instrument".

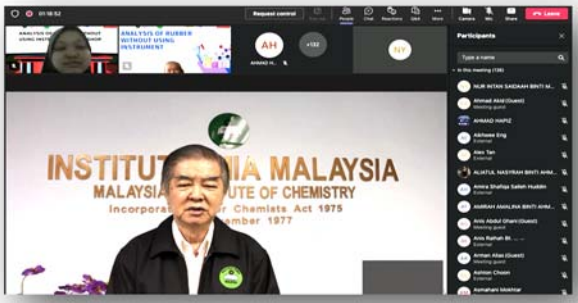

Figure 2: Opening Speech by Datuk ChM. Dr. Soon Ting Kueh, President of IKM.

ChM. Dr. Eng provided useful tips related to the above topics with detailed explanations, examples and laboratory demonstrations using pre-recorded videos to ensure better understanding by the participants. Interactive Q&A sessions were conducted for this virtual workshop. Prizes were given to the seven winners who succeed to answer the quiz on the related topic of rubber analysis correctly. The prizes were sponsored by Kinematic Resources Sdn. Bhd.

The workshop was continued with a short presentation of FTIR spectroscopy techniques and a demonstration video on FTIR imaging by the Bruker Optics Manager, Ms. Renee Teo. Ms. Nabilah Hauzin, the President of the Postgraduate Chemistry Club (PCC) as well as the Chairperson of "Workshop on Analysis of Rubber Without Using Instrument" closed the workshop with appreciation notes to the speakers, organizers and sponsors. The online workshop ended at 12:55 pm.

Figure 3: Opening Speech by Prof. Dr. Hjh. Farida Zuraina Mohd Yusof, Dean of Faculty of Applied Sciences, UiTM Shah Alam.

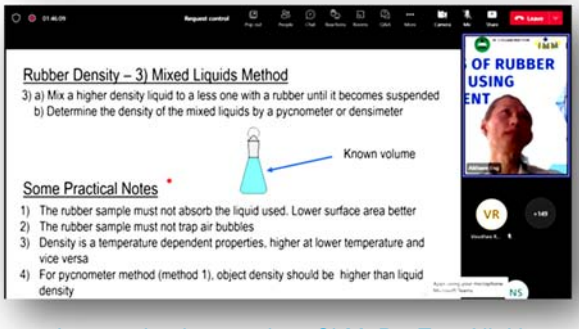

Figure 4: Lecture by the speaker, ChM. Dr. Eng Aik Hwee.

Table 1: Participants of the workshop

No	Organization/University	No of Participants
1	5W2H Consulting Penang	1
2	AFCONA Chemicals Sdn. Bhd.	1
3	Ansell Global Trading Center	1
4	Asia Pasific University of Technology and Innovation (APU)	1
5	Associated First Rubber (M) Sdn. Bhd.	1
6	Baerlocher (M) Sdn. Bhd.	1
7	Cetim-Matcor Technology & Services Pte. Ltd.	1
8	University of Tohoku	1
9	Curtin University Malaysia	3
10	Daikin R&D Malaysia	1
11	Eco Power Synergy Sdn. Bhd.	1
12	Eurofins NM laboratory Sdn. Bhd.	1
13	Fairmont Industries Sdn. Bhd.	1
14	GP Batteries Sdn. Bhd.	1
15	Hartalega Research Sdn. Bhd.	1
16	Ideal Quality Sdn. Bhd.	2
17	International Islamic University Malaysia (IIUM)	4
18	Institut Kimia Malaysia (IKM)	3
19	Institute of Material Malaysia (IMM)	1
20	Institut Kemahiran Tinggi Belia Negara Alor Gajah	1
21	JW Latex Consultant	1
22	Kimberley Clark	1
23	Kinematic Resources Sdn. Bhd.	1
24	Kinta Rubber Works Sdn. Bhd.	1
25	Malaysian Rubber Board (MRB)	12
26	Ominent Sdn. Bhd.	1
27	Panasonic Industrial Devices Malaysia Sdn. Bhd.	3
28	Plastic and Rubber Institute Malaysia (PRIM)	1
29	Pusat Penyelidikan Mineral	1
30	Sun Rubber Industry Sdn. Bhd.	2
31	Synthomer Sdn. Bhd.	10
32	Temperlite Insulation Sdn. Bhd.	1
33	Top Glove International Sdn. Bhd.	4
34	Tunku Abdul Rahman Universiti College	2
35	TUV SUD (M) Sdn. Bhd.	1
36	Universiti Teknologi MARA (UiTM)	43
37	Universiti Kebangsaan Malaysia (UKM)	7
38	Universiti Malaya (UM)	5
39	Universiti Malaysia Pahang (UMP)	5
40	Universiti Malaysia Terengganu (UMT)	1
41	Universiti Kuala Lumpur (UniKL)	6
42	Universiti Malaysia Perlis (UniMAP)	13
43	Universiti Malaysia Sarawak (UniMAS)	1
44	Universiti Tenaga Nasional (UNITEN)	1
45	Universiti Geomatika Malaysia (UGM)	1
46	Universiti Tunku Abdul Rahman	1
47	University of Technology Sarawak	1
48	Universiti Putra Malaysia (UPM)	4
49	Universiti Sains Islam Malaysia (USIM)	2
50	Universiti Sains Malaysia (USM)	2
51	Universiti Tun Hussein Onn Malaysia	1
52	Universiti Teknologi Malaysia (UTM)	1
53	Vitrox College	1
TOTAL		166

Figure 5: Demonstration through pre-recorded video.

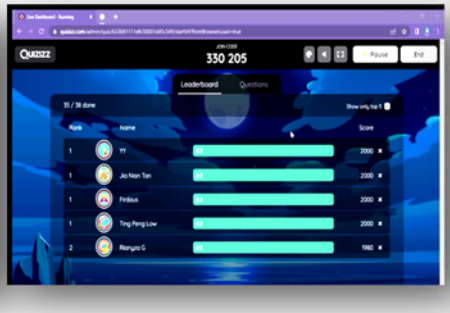

Figure 6: Quiz session through Quizizz apps.

Figure 7: Closing remarks by Ms. Nabilah Hauzin, the Chairperson of "Workshop on Analysis of Rubber Without Using Instrument."

Figure 8 Closing poster of "Workshop on Analysis of Rubber Without Using Instrument."

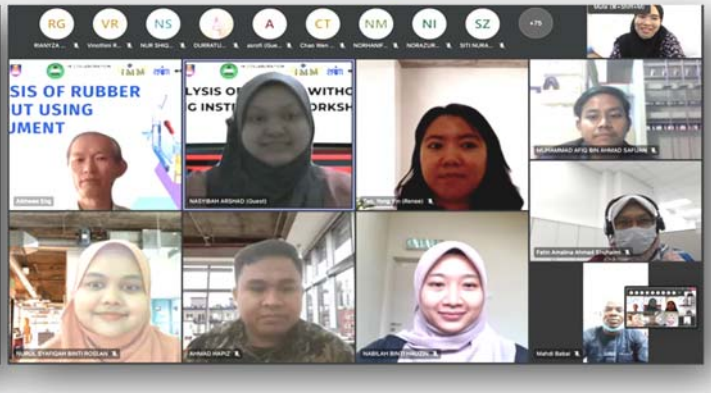

Figure 9 A group photo of the participants and speaker at the end of the workshop.

1-Day IMM Corrosion Conference 2022 – Holistic Corrosion Prevention & Management

Prepared by: Syazana Shahabudin, IMM Secretariat
Reviewed by: Norita Othman, Assistant Manager of IMM Secretariat

Date: 20th October 2022
Venue: DoubleTree by Hilton Hotel Kuala Lumpur

The 1-day Corrosion Conference on "Holistic Corrosion Prevention & Management" organized by the Corrosion Committee of Institute of Materials, Malaysia (IMM) on 20th October 2022 ended on a successful note with participation from 105 delegates, 25 IMM delegates, 25 exhibitors and 15 speakers. The conference began with an opening address by the IMM Deputy President, Ts. Dr. Chew Khoon Hee followed by the first presenter of the day, Mr. Junaidy Abdullah from Norimax Sdn. Bhd. who presented on the Digitalization of Cathodic Protection System-Remote Monitoring.

Figure 1: *Opening speech by Ts. Dr. Chew Khoon Hee (IMM Deputy President)*

Figure 2: *Engaging presentation from one of the speaker*

Since the event has been halted for two years due to COVID-19 crisis, this year's event received exceptional participation from both professionals and students looking to build beneficial networks and exchange expertise.

In this event, IMM was not excluded from being one of the (25) participating exhibitors for the event and successfully drew in participant from various background who interested to know more about IMM Certification Programs. Coating Inspector and Protective Coating Technician are the two most frequently asked about IMM Certified Programs by the visitors.

Figure 3: *IMM Secretariat gave explanation to the undergraduate students from Universiti Tun Hussein Onn Malaysia (UTHM).*

Figure 4: *A group photo with some of the IMM delegates.*

It was a successful 1-Day IMM Corrosion Conference 2022 and IMM would like to express its appreciation to the local presenters, IMM delegates and exhibitors for their contributions.

NEW IMM PROFESSIONAL MEMBERS

DR. TS. NURUL ATIKAH MOHD MOKHTAR

Age: 33 years old
Organization: GP Batteries Sdn Bhd
Position: R&D Specialist
Working experience(s):
• 6 months as R&D Specialist at GP Batteries Sdn Bhd
• 2 years 5 months as Product Development Engineer at GP Batteries Sdn Bhd
• 1 year as Cosmetic/Sales Chemist at Winnia Aromatic Industries
• 2 years as Graduate Research Assistant at Institute of Science, UiTM
• 2 years 9 months as Research Assistant at UiTM.
• 4 years 5 months as Tuition Teacher at Akademi Super
• 2 years as Lecturer at UiTM Negeri Sembilan
Qualification(s):
• PhD in Advance Materials, [Universiti Teknologi MARA]
Professional membership(s):
• Member (MBOT) • Member (IKM)
• Member (ECS) • Web of Science Researcher ID: AAB-3669-2020
• Open Researcher and Contributor ID (ORCiD)

DR. FARAH HANANI ZULKIFLI

Age: 35 years old
Organization: University Malaysia Pahang
Position: Senior Lecturer
Working experience(s):
• 8 years as Senior Lecturer at University Malaysia Sabah
Qualification(s):
• PhD in Advanced Materials, [Universiti Malaysia Pahang]
Professional membership(s):
• Member (IFM)
• Member (TESMA)

MR. ALAGARASAN GOVINDHAN

Age: 45 years old
Organization: Sapura Offshore Sdn Bhd
Position: Head- Welding, NDT & QC
Working experience(s):
• 6 years 6 months as Head of Welding, NDT & Quality Control at Sapura Energy Berhad, Malaysia.
• 8 years as Senior Welding Manager at Technip Singapore, Subsea Division
• 2 years 5 months as Welding Engineer at Belleli Saudi Arabia Heavy Industries Limited, Al-Jubail, Kingdom of Saudi Arabia.
• 1 year 5 months as Executive Cadre E2 at Larsen & Turbo Limited. Heavy Engineering Division, Powai works, Mumbai.
• 2 years 6 months as Deputy Manager at Godrej & Boyce Manufacturing Company Limited. Process Equipment Division, Vikhroli, Mumbai.
Qualification(s):
• Degree of Master of Engineering at Bharathidasan University, India
Professional membership(s):
• Member of The Welding Institute, UK

MEMBERSHIP

Open to all individuals and companies in developing the contribution of Materials science, technology and engineering towards industrial growth in Malaysia

Social interaction and networking

Employment opportunities

IMM publications

BENEFITS

Career development in skilled trades

Technical events

FEES SCHEDULE

- Annual subscriptions shall be payable in advance on 1st January of each year.
- Those admitted into the IMM between 1st July and 31st December in any year shall pay only half the annual subscription.
- Seniors (above 55 years old) get 50% discount off their annual subscriptions.

Description	Annual Subscription (RM)
Fellow (F.I.M.M.)	150
Professional (M.I.M.M.)	100
Associate (A.M.I.M.M.)	80
Company	200
Ordinary	40
Student	10
Ordinary / Company for affiliates	Nil

IMM EVENTS






For the most up-to-date information, visit

Institute of Materials, Malaysia

www.iomm.org.my secretariat@iomm.org.my +60 18-911 3480

IMM TRAINING AND CERTIFICATION PROGRAM OVERVIEW

The Institute of Materials, Malaysia (IMM) offers engineering & technical professionals and practitioners a range of Certification Schemes and technical training courses to meet the requirements of the oil & gas, refining, petrochemical, transport, construction and other industries. Our programs have been developed together with the industry, academia and relevant stakeholders to ensure that the technical training and certification provided meet the relevant industry standards and requirements.

PROGRAM: COATING

IMM Certification Schemes and Courses	Technical Training Courses (Non-certification)
• Certified Protective Coating Technician (Blaster and/or Painter) Level 1 and Level 2 • Certified IMM-B1/B2 Assistant Blaster & Painter • Certified Coating Inspector Level 1 • Certified Coating Inspector Level 2 • Certified Blasting and Painting Supervisor • Certified Thermal Spray Coating Applicator • Certified Coating Quality Control Technician	• Refresher Course of Certified Protective Coating Technician (Blaster and/or Painter) Level 1 and Level 2 • Refresher Course of Certified Coating Inspector • Basic Knowledge on Corrosion Protection for Technicians and Engineers • Corrosion Control by Protective Coating • Basic Corrosion & Coating Course

PROGRAM: COATING FINGERPRINTING

IMM Certification Schemes and Courses	Technical Training Courses (Non-certification)
• Certified Coating Fingerprint Quality Controller Level 1 • Certified Coating Fingerprint Quality Controller Level 2 • Certified Coating Fingerprint Trainer	• Coating Fingerprint Foundation Course • Refresher Course of Certified Coating Fingerprint Quality Controller Level 1/Level 2

PROGRAM: CORROSION

IMM Certification Schemes and Courses	Technical Training Courses (Non-certification)
• Certified Corrosion Monitoring Practitioner Level 1 • Certified Corrosion Monitoring Practitioner Level 2 • Certified Corrosion Monitoring Practitioner Level 3 • Certified Cathodic Protection Practitioner Level 1 • Certified Cathodic Protection Practitioner Level 2 • Certified Cathodic Protection Practitioner Level 3 • Certified Cathodic Protection Engineer	• Corrosion Control by Cathodic Protection

PROGRAM: VIBRATION

IMM Certification Schemes and Courses	Technical Training Courses (Non-certification)
• Certified Vibration Practitioner Category 1 • Certified Vibration Practitioner Category 2 • Certified Vibration Specialist Category 3 • Certified Vibration Specialist Category 4	-

PROGRAM: MECHANICAL JOINT INTEGRITY (MJI)

IMM Certification Schemes and Courses	Technical Training Courses (Non-certification)
• Certified Technician in Mechanical Joint Integrity (MJI) for Flange Bolted Connection • Certified Technician in Mechanical Joint Integrity (MJI) for Small Bore – Piping, Tubing, Valves	• Mechanical Joint Integrity • Pressure Safety Valve • Small Bore Tubing

PROGRAM: THERMAL INSULATION

IMM Certification Schemes and Courses	Technical Training Courses (Non-certification)
• Certified Thermal Insulation Installer	• Introduction to Thermal Insulation

PROGRAM: WELDING

IMM Certification Schemes and Courses	Technical Training Courses (Non-certification)
• Certified Welding Inspector • IMM-JWES Certified Associate Welding Engineer • IMM-JWES Certified Welding Engineer • IMM-JWES Certified Senior Welding Engineer	• Repair Welding of Pressure Equipment in Refineries & Chemical Plants • Welding & Joining Technology for Non-Welding Personnel • Steel Technology for Non-Technical Personnel

MISCELLANEOUS MATERIALS SCIENCE AND TECHNOLOGY (NON-CERTIFICATION) COURSES

Technical Training Courses	Technical Training Courses
• Materials Selection & Corrosion • Metallurgical Failure Investigation • Basic Course on Operation of Mobile Air Compressor • Competent Mobile Industrial Compressor Operator • Competent Mobile Industrial Equipment Inspector • Practical Approach to Inspection and Maintenance of Steam Turbine	• Practical Approach to Precision Alignment Methods • Practical Approach to Precision Balancing Methods • Reciprocating Compressors: Operations, Maintenance, Inspection and Troubleshooting • Troubleshooting Techniques for Rotating Equipment • Valve Operations, Maintenance and Inspection Including Flange Breaking

Note: A certifcate of attendance will be issued to all participants of non-certifcation professional development training courses while candidates who pass the assessment/examination of IMM-certification schemes will be certified with the issue of IMM competency certificate and IMM certification ID card in addition to the certificate of attendance.

More information on training and certification is available on IMM's website at www.iomm.org.my.

For further enquiries:

Call : +603 7661 1591
Email : secretariat@iomm.org.my
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Suite 1006, Level 10, Block A, Kelana Centre Point, No. 3 Jalan SS 7/19,
47301 Petaling Jaya, Selangor.

IMM AUTHORIZED TRAINING BODY (ATB)/ AUT
TRAINING PARTNER (ATP) FOR I

AUTHORISED TRAINING BODIES (ATBs)

(Offer IMM Certification Training Programs and Courses)

ATBs	Training Programs & Courses
	Coating
Seacademy Sdn. Bhd. (Sarawak) **Topfields Borneo Sdn. Bhd.** (Sarawak) **Sabah Skills & Technology Centre** (Sabah) **SRC Global Resources Sdn. Bhd.** (Peninsular Malaysia) **Advance Multiskills Training Centre Sdn. Bhd.** [Excludes courses marked with *] (Sarawak)	Certified Assistant Blaster & Painter Level 1 & Level 2 Certified Protective Coating Technician (Blaster and/or Painter) Level 1 & Level 2 Certified Blasting and Painting Supervisor Certified Coating Inspector Level 1 & Level 2 Certified Quality Control Technician* Certified Thermal Spray Coating Applicator* Basic Knowledge on Corrosion Protection for Technicians and Engineers* Corrosion Control by Protective Paints* Corrosion Control by Protective Coating*
	Mechanical Joint Integrity
Sabah Skills & Technology Center (Sabah) **SRC Global Resources Sdn. Bhd.** (Peninsular Malaysia)	Certified Mechanical Joint Integrity for Small-bore Piping, Tubing and Valves Certified Mechanical Joint Integrity for Flange Bolted Connections
	Thermit Welding
Prasarana Malaysia Berhad (Malaysia)	Certified Thermit Welding Practitioner (Level 1) Certified Thermit Welding Senior Practitioner (Level 2)

Note: The respective coverage area is indicated in brackets.

AUTHORISED TESTING CENTRE (ATC)

(Offers IMM Examination and Assessments)

ATC: JOTAC Academy Sdn. Bhd.
(Peninsular Malaysia)

Certification Examination/Assessments

- Certified Protective Coating Technician (Blaster and/or Painter) Level 1 & Level 2
- Certified Coating Inspector Level 1 & Level 2
- Certified Corrosion Monitoring Practitioner Level 1
- Certified Cathodic Protection Practitioner Level 1

HORIZED TESTING CENTRE (ATC)/ AUTHORIZED IMM COURSES & CERTIFICATION

ASSOCIATE TRAINING PARTNER (ATP)

(Offers IMM Certification Training Programs and Courses)

ATP: Materials Technology Education Sdn Bhd
(Malaysia and Overseas)

IMM Training Programs & Courses

Coating

- Certified Protective Coating Technician (Blaster and/or Painter) Level 1 & Level 2
- Refresher Course for Certified Protective Coating Technician (Blaster and/or Painter) Level 1 and Level 2
- Certified Assistant Blaster & Painter Level 1 & Level 2
- Certified Blasting and Painting Supervisor
- Certified Coating Inspector Level 1 & Level 2
- Refresher Course for Certified Coating Inspector Level 1 and Level 2
- Certified Coating Quality Control Technician
- Certified Thermal Spray Coating Applicator
- Basic Knowledge on Corrosion Protection for Technicians and Engineers
- Corrosion Control by Protective Paints
- Corrosion Control by Protective Coating

Coating Fingerprinting

- Coating Fingerprint Foundation Course
- Certified Coating Fingerprint Quality Controller Level 1
- Certified Coating Fingerprint Quality Controller Level 2
- Refresher Course of Certified Coating Fingerprint Quality Controller Level 1/Level 2

Train-the-Trainer

- Certified Trainer

Corrosion

- Certified Corrosion Monitoring Practitioner Level 1
- Certified Corrosion Monitoring Practitioner Level 2
- Certified Corrosion Monitoring Practitioner Level 3
- Certified Cathodic Protection Practitioner Level 1
- Certified Cathodic Protection Practitioner Level 2
- Certified Cathodic Protection Practitioner Level 3
- Certified Cathodic Protection Engineer
- Corrosion Control by Cathodic Protection

Thermal Insulation

- Introduction to Thermal Insulation
- Certified Thermal Insulation Installer

Vibration

- Certified Vibration Practitioner Category 1
- Certified Vibration Practitioner Category 2
- Certified Vibration Specialist Category 3
- Certified Vibration Specialist Category 4

Welding

- Certified Welding Inspector
- Repair Welding of Pressure Equipment in Refineries & Chemical Plants
- Welding & Joining Technology for Non-Welding Personnel
- Steel Technology for Non-Technical Personnel

IMM-JWES Courses

- Certified Associate Welding Engineer (AWE)
- Certified Welding Engineer (WE)
- Certified Senior Welding Engineer (SWE)

Mechanical Joint Integrity

- Certified Mechanical Joint Integrity for Small-bore Piping, Tubing and Valves
- Certified Mechanical Joint Integrity for Flange Bolted Connections
- Valve Operations, Maintenance & Inspection Including Flange Breaking

Loss of Primary Containment

- Mechanical Joint Integrity
- Pressure Safety Valve
- Small Bore Tubing

Rotating Equipment

- Competent Mobile Industrial Compressor Operator
- Competent Mobile Industrial Equipment Inspector
- Inspection & Maintenance of Pumps
- Practical Approach to Inspection and Maintenance of Stream Turbine
- Practical Approach to Precision Alignment Methods
- Practical Approach to Precision Balancing Methods
- Reciprocating Compressors: Operations, Maintenance, Inspection & Troubleshooting
- Troubleshooting Techniques for Rotating Equipment

Other Materials Courses

- Materials Selection & Corrosion
- Metallurgical Failure Investigation
- Basic Course on Operation of Mobile Air Compressor

Doc No: IMM-CF-316 | Rev No: 2 | Date: 13 Aug 2022

INSTITUTE OF MATERIALS, MALAYSIA

CONTINUING PROFESSIONAL DEVELOPMENT REPORT

NAME: ..... **YEAR:**.....
IMM MEMBERSHIP NO:..... **CERTIFICATION NO:**.....
IMM CERTIFICATION:.....

CONTINUING PROFESSIONAL DEVELOPMENT (CPD) LOG
(Supporting documents to be submitted wherever applicable)

Date or Period	Professional Development Activity Code & Description	Role	No. of Activity Hours	Weightage	No. of CPD Points
				TOTAL	

Professional Development Activity Code	Professional Development Activity Scope	Weightage Factor
A	Attending Online or Physical Training Courses/Workshops	4
B	Online or Physical Course Trainer/Facilitator/Examiner/ConferencePresenter	3
C	Attend Online or Physical Seminar/Conference/Webinar	2
D	Paper Author Main Author (max 30 hours/year)Co-author (max 10 hours/year)	2
E	Attend Online or Physical Committee Meeting	1
F	Fieldwork (max claimable 480 hours per year) **	0.1

** 1. Need to submit an endorsement from the superior/supervisor as evidence.
2. Calculated based on the assumption that the minimum project duration of 3 months and 8 hoursper day for 20 days.
3. The minimum number of CPD Points accumulated for 5 consecutive years shall be 100 points.

CPD Points per year : **10 points minimum.**
CPD Points per 5 year for re-certification : **100 points.**

Year						Total CPD Points
CPD Points						

I hereby declare that the information and particulars provided by me in this form is true and correct.

....
(Signature) (Date)

IKM PROFESSIONAL CENTRE

TRAINING CALENDAR 2023

Date	Event	Trainer
4 - 5 Jan 2023	General QA/QC Procedures for Testing Laboratories (In-Person Training)	ChM PUA HIANG
9 - 10 Jan 2023	MS ISO/IEC 17025:2017 Management Systems Internal Auditing (In-Person Training)	ChM PUA HIANG
14 - 15 Jan 2023	Statistical Methods for Chemists (ONLINE TRAINING)	PROF ChM DR SHARON TEH GEOK BEE
7 - 8 Feb 2023	Calibration of Test and Measuring Instruments and Metrological Traceability (ONLINE TRAINING)	MR CHEN SOO FATT
13 - 14 Feb 2023	Understanding the Elements of MS ISO/IEC 17025:2017 (In-Person Training)	ChM CHANG HON FONG
15 - 16 Feb 2023	Method Validation & Quantification of Measurement Uncertainty in Microbiological Testing (In-Person Training)	DR NEW CHIA YEUNG
20 - 21 Feb 2023	Procedures of Method Validation & Verification (In-Person Training)	ChM CHANG HON FONG
6 Mar 2023	Decision Rules and Conformity Assessment Meeting The MS ISO/IEC 17025:2017 Requirements (ONLINE TRAINING)	ChM CHANG HON FONG
7 Mar 2023	Root Cause Analysis and Corrective Actions on Unsatisfactory PT Performance (In-Person Training)	ChM LI HUI LING
11 - 12 Mar 2023	Basic Laboratory Skills & Techniques (ONLINE TRAINING)	PROF ChM DR SHARON TEH GEOK BEE
6 - 7 Apr 2023	Management of Chemicals & Chemical/Lab Wastes (ONLINE TRAINING)	ChM DR MALARVILI RAMALINGAM
8 - 9 May 2023	Chemical Safety and Security (In-Person Training)	DATIN ChM DR ZURIATI ZAKARIA
30 - 31 May 2023	Advanced Nuclear Magnetic Resonance Spectroscopy: 2 Dimensional 1H and 13C NMR (In-Person Training)	ChM DR CHE PUTEH OSMAN
7 - 8 June 2023	Interpretation Of Infra Red Spectra (In-Person Training)	ASSOC PROF ChM DR INTAN SAFINAR ISMAIL

Email us for more information:

ayu@ikm.org.my / azizi@ikm.org.my

Tel: **03–77283272**

https://ikm.org.my/ikm-professional-centre/training-calendar/

Institut Kimia Malaysia

INSTITUTE OF MATERIALS, MALAYSIA

Updated on 30th December 2021

Institute of Materials, Malaysia (IMM) is a non-profit professional society that promotes honourable practice, professional ethics and encourages education in materials science, technology and engineering. Engineers, academicians, technicians, skilled workers and professionals are amongst its members exceeding 6800.

Registered with the Registrar of Societies on 6th November 1987, the Malaysian Materials Science & Technology Society (MMS) changed its name to the Institute of Materials, Malaysia (IMM) on 16th June 1997. The objectives of IMM include the training and development of individuals and companies in Malaysia to attain professional recognition in various fields of materials science, technology and engineering.

IMM is administered by a council of 30 members, with volunteers leading more than 15 materials committees and more than 4 regional chapters, and supported by a secretariat with full time staff.

IMM Vision

To be internationally recognised leading institution in Materials Science and Technology.

IMM Mission

(1) To be the technical authority on material science and technology
(2) To develop an enhance competency and skills for all categories and practitioner
(3) To become an internationally recognized certifying body
(4) To be the forum for industry and academia collaboration
(5) To positively contribute to society and quality of life

The IMM membership is categorised into 6 different grades and open to anyone above the age of 17 years - individuals and companies keen in developing and contributing towards the growth of materials science, technology and engineering in Malaysia.

Over the years, IMM have conducted courses on coatings, coatings fingerprinting, corrosion, welding, vibration etc in support of the oil and gas industry in Malaysia. Over 750 Coatings Inspectors have been trained and certified as well as more than 3300 Blasters & Painters, Supervisors, Corrosion Technician and Vibration Practitioners. Its certification programmes are recognized by PETRONAS and all oil & gas operators. Since January 2011, more than 80 Associate Welding Engineers, more than 90 Welding Engineers, more than 30 Senior Welding Engineers and more than 45 Coating Fingerprint Quality Controllers were trained and certified.

IMM has also organised 10 International Materials Technology conferences (IMTCE) on a biennial basis, and numerous technical seminars, educational programmes, technical visits, and materials awareness programmes since 1988.

Public courses, such as Microbiologically Influenced Corrosion (MIC) and Welding Technology for Non-Welding Personnel, are being offered occasionally. Training on materials awareness has also been conducted in public listed companies.

The courses and programmes are being organised by Authorized Training Body/Bodies and Authorized Event Organizer/Organizers.

Collaborations with the Asian Welding Federation, Sabah Skills Technology Centre (SSTC), and local universities continue to be part of IMM's vision and long term mission to educate, train and serve the materials fraternity.

GENERAL INFORMATION ON MEMBERSHIP

The IMM Membership is open to all individuals and companies in developing the contribution of Materials science, technology and engineering towards industrial growth in Malaysia. The technology of materials is advancing day-to-day throughout the world. Membership to the IMM will enable networking and exchange of knowledge from a very wide variety of specialised areas of expertise. Please feel free to download or print a copy of the application form together with the IMM regulations. If you have any doubt, please do not hesitate to contact our secretariat through the phone; +603-76611591 or email to secretariat@iomm.org.my

Annual subscriptions shall be payable in advance on 1st January of each year. Those admitted into the IMM between 1st July and 31st December in any year shall pay only half the annual subscription. Seniors (above 55 years old) get 50% discount off their annual subscriptions.

We have an online application for membership for selected grades. Membership application forms in document format can be accessed from www.iomm.org.my.

Kindly fill the form and email to secretariat@iomm.org.my or send it to :

IMM SECRETARIAT
Suite 1006, Level 10, Block A, Kelana Centre Point,
No. 3 Jalan SS 7/19,
47301 Petaling Jaya, Selangor

IMM MEMBERSHIP BENEFITS

(1) IMM activities offer members to interact and network with representative from the industry, academia and government related to the Materials profession.

(2) Members will gain knowledge on career opportunities for their children, friends etc as IMM offers certification courses in skilled trades *e.g.* Welding, Painting, Inspection, Corrosion *etc*.

(3) IMM-JWES Welding Engineer Certification program leading to a Welding Engineer Certification which offers great employment opportunities in the oil & gas, heavy industry, marine and energy sectors.

(4) IMM publications – quarterly magazine plus annual conferences offer presenters an opportunity for their technical research or industry-academia papers to be published in ISI- and Scopus-index journals.

(5) IMM organizes many free technical events for members to acquire new knowledge and networking opportunities. Participants to these events will also receive Certificate of Attendance for their Continuing Professional Development records.

IMM MEMBERSHIP FEES SCHEDULE AS PER BELOW:

Description	Amount			
	Entrance Fee	Processing Fee	Transfer Fee	Annual Subscription
Fellow (F.I.M.M)	-	RM 300.00	RM 10.00	RM 150.00
Professional (M.I.M.M)	-	RM 150.00	RM 10.00	RM 100.00
Associate (A.M.I.M.M)	-	RM 150.00	RM 10.00	RM 80.00
Company	RM 50.00	-	-	RM 200.00
Ordinary	RM 20.00	-	-	RM 40.00
Student	RM 10.00	-	-	RM 10.00
Ordinary/ Company for affiliates	RM 40.00/ RM 50.00	-	-	NIL

INSTITUTE OF MATERIALS, MALAYSIA

Updated on 30th December 2021

REGULATIONS GOVERNING ADMISSION AND TRANSFER OF MEMBER GRADES

The Council shall establish a Membership Committee which will be responsible for these Regulations and for review of applications for new membership and transfer to other grades (upgrades). The Membership Committee shall recommend for Council approval for admission and transfer of membership. All grades of memberships are awarded at the discretion of the Council and may be withheld or withdrawn in the event of conduct likely to prejudice the standing of the Institute. Every member shall receive a membership certificate.

Every application for membership, individual or company, shall be proposed and seconded according to these regulations and shall be forwarded to the IMM Secretariat who on behalf of the Honorary Secretary will process for consideration and approval of the Membership Committee before tabling for Council's endorsement. The Council may at its discretion reject any application without assigning any reason thereof. The Council may use its discretion to exempt the need for proposer and seconder for Student, Ordinary and Company membership.

Each company on admission as a member shall be entitled to nominate one representative to exercise all rights of membership. Only representatives of Company membership, as well as Fellows (F.I.M.M.). Professional Members (M.I.M.M.) and Ordinary members shall have the right to vote and to hold office in IMM.

Only Malaysian Citizens can become Ordinary Members, Associate Members (A.M.I.M.M.), Professional Members (M.I.M.M.) and Fellow Members (F.I.M.M.) with voting rights. Foreigners can have membership to similar grades but shall have no voting rights.

MEMBERSHIP GRADE & REQUIREMENT

Honorary Fellow (Hon. F.I.M.M.)
The Council shall have the power to elect Honorary Fellows who shall be persons of eminence in science or industry. The election shall be based on a majority vote within the Council. Honorary fellows shall enjoy such privileges as may from time to time be determined by the Council.

Fellow (F.I.M.M.)
A person at least 35 years of age with approved academic qualifications, training and 8 years relevant responsible experience who has made significant contributions to the science and practice of profession of Materials Science and Engineering or has given distinguished service to industry or education.

Professional Member (M.I.M.M.)
A person at least 25 years of age, with approved academic qualifications and training, having at least 3 years responsible experience in Materials Science and Engineering, or a person at least 40 years of age, with at least 15 years of experience with practical responsibility, as demonstrated by thesis/dissertation or report and interview.

Associate Member (A.M.I.M.M.)
A person at least 25 years of age, who possesses an interest in Materials Science and Engineering but have not acquired the necessary experience or obtained the qualification, governing entry to Member grade. An Associate Member, on obtaining the necessary qualifications, may apply for transfer to Member grade.

Company Member
Any company that is involved or has interest in Materials Science and Engineering will be qualified to join as a company member.

Ordinary Member
Any Malaysian Citizen and above the age of 18 years engaged in activities related to research, development and applications in Materials Science and Engineering shall qualify for Ordinary Membership. Only Ordinary Members who meet the necessary minimum requirements may apply for transfer to membership grades of Fellow, Member and Associate Member and may use the abbreviated titles upon transfer.

Student Member
A student member shall be a person not under 17 years of age who at the time of application satisfies the Council that he has received a good general education and is studying subjects related to Materials Science or Engineering. A student member shall transfer to the grade of Ordinary Member after graduation provided he or she is suitably qualified and as soon as he or she is earning a full-time salary. A Student shall not become member of the IMM without the prior approval of the Vice-Chancellor or Head of Department of the university or relevant authority concerned.



IMM Week 2021: The Evolution of Material, Science and Technology in The Post-Covid Era

1-Day Rheology Workshop on Polymers

Materials Lecture Competition 2021 (MLC 2021)

FREE Ordinary Membership for Affiliates:

The Institute of Materials, Malaysia will recognize members of various professional institutions and societies for membership at "Ordinary Grade" without any annual subscriptions. Such members shall submit to IMM proof of their current membership of the respective institutions together with their application.

Members of the following institutions and societies are eligible to apply for affiliate membership:

1. American Welding Society
2. Asian Welding Federation
3. Board of Architects Malaysia
4. Board of Engineers, Malaysia
5. Engineering Institutes under the Engineering Council of UK
6. Geological Society of Malaysia
7. Institut Kimia Malaysia
8. Institute of Corrosion UK
9. Institute of Materials Singapore
10. Institute of Physics Malaysia
11. Institution of Engineers, Malaysia
12. Jabatan Minerals & Geoscience
13. Malaysian Medical Association
14. Malaysian Nurses Association
15. Malaysian Society for Non-Destructive Testing
16. Malaysian Welding & Joining Society
17. Persatuan Arkitek Malaysia
18. Plastics & Rubber Institute of Malaysia
19. Singapore Welding Society
20. Society of Petroleum Engineers
21. The Welding Institute UK

FREE Company Membership for Affiliates:

The Institute of Materials, Malaysia will recognize various professional institutions and associations for membership at "Company Grade" without any annual subscriptions.

Companies registered with the following Trade Associations are recognized for Affiliate Company Memberships:

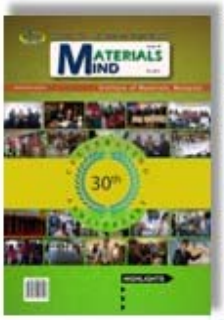
1. Federation of Malaysian Manufacturers (FMM)
2. Malaysian Offshore Contractors Association (MOCA)
3. Malaysian Oil & Gas Engineering Council (MOGEC)
4. Malaysian Oil & Gas Services Council (MOGSC)

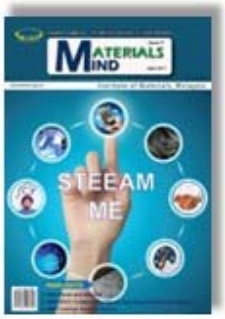
The companies shall submit to IMM proof of their current membership at the respective trade associations together with their application.

NOTE: The above provisions for affiliate membership for individuals and companies was approved by the IMM Council in accordance with the powers vested in the Council as per Clause 6.1.3 of the IMM Constitution and was subsequently endorsed by members at its 21st Annual General Meeting held on 19th March 2011.

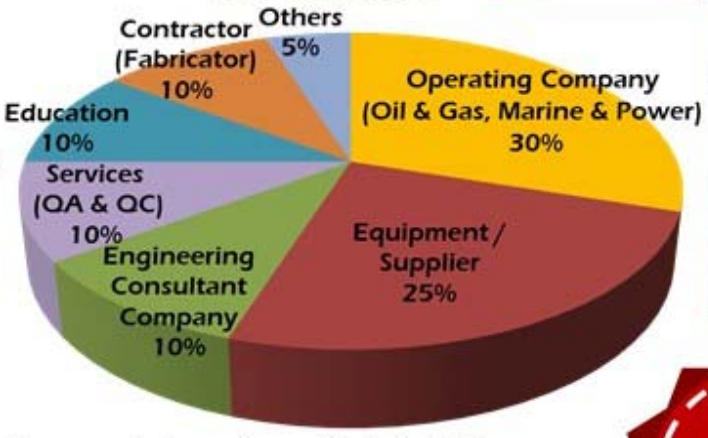
MATERIALS MIND

Quarterly Magazine of Institute of Materials, Malaysia





Our Readers



General Information

Frequency: Quarterly Magazine
Format: Print & Online Editions
Reader: ~ 8000
ISSN: 2289-9030

Magazine Content

Event & Activity Reports, Conference Information, Technical Papers, Information on IMM, IMM Course Details, Advertorial, IMM Supporting Events and many more…..

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A	**Standard Full Page** Size: A4 210 (w) mm × 297 (h) mm	**Bottom right side bar** Size: 60 (w) mm × 60 (h) mm	**RM 600** / 3 months
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www.iomm.org.my
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Institute of Materials Malaysia

MATERIALS MIND

Invitation to Advertise in Materials Mind, published by Institute of Materials, Malaysia for in Print and Online

Please tick your preferred date, write the year and preferred code for advertisement.

☐ 1st Quarter – **January** ☐ 2nd Quarter – **April**

☐ 3rd Quarter – **July** ☐ 4th Quarter – **October** of the **year**: _____

Preferred **code**:_____ (refer front page of this leaflet)

Technical Requirement

- JPG / Ai / PDF / PSD Format
  Ai / Illustrator – Text must be outlined and saved together with high resolution picture embedded.
- Image quality should be at least 150 pixel per inch.
- Artwork prepared by the customer.

Payment

Full payment to be made 2 weeks before date of the advertisement.

Cancellation

10-day notice before the advertisement date, otherwise deposit will be forfeited.

PAYMENT NOTE

1) Payment can be made by cheque, telegraphic transfer & bank draft as follows:

Account Name: **Institute of Materials, Malaysia**
Account No: **8009055156**
Swift Code: **CIBBMYKL**
Bank Name: **CIMB BANK Berhad**
Country: **Malaysia**

Cheque can be sent to
Suite 1006, Level 10, Block A, Kelana Center Point (Lobby A), No. 3 Jalan SS 7/19, Kelana Jaya, 47301 Petaling Jaya, Selangor
via post/mail or direct bank-in.

2) Payment can also be made by IBG, GIRO or Cash Deposit Machine (CDM) as follows:

Account Name: **Institute of Materials, Malaysia**
Account No: **8009055156**
Bank Name: **CIMB BANK**

Please email your bank-in slip as your payment proof to **secretariat@iomm.org.my**

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