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*by Ir. Lee Chang Quan*  
Chairman, Oil, Gas  
& Mining Technical Division

## COVER NOTE

### Managing ESG Risk and Transition to Net Zero Carbon Emissions Goal

**A**t the 2019 United Nations Climate Action Summit at New York, Greta Thunberg, then a 16-year-old Swedish girl, made a roaring speech, exclaiming "How dare you..." and demanded that world leaders put words into real action in combating the

climate change. Three years have passed and there have been three United Nations Climate Change Conferences (also known as COP) held separately in Madrid, Glasgow, Cairo.

The world has changed much with new geopolitical risks at play, especially the Ukraine crisis. While some countries have accelerated growth in renewable energy, some have reviewed their energy policy with the growing concern over energy security amidst the energy supply risk. The oil and gas industry remains in the hot seat. There is a growing demand for the industry to do more and act faster to reduce emissions or even to switch to alternative energy sources.

In this issue of *JURUTERA*, the Oil, Gas and Mining Technical Division (OGMTD) will address this issue by sharing views from industry players in managing the Environmental, Social, Governance (ESG) risks. Meanwhile, COP28 will be held soon in Dubai, UAE, on 30 November to 12 December 2023 and it will be most interesting to know the outcome.

Whether you are in the O&G industry or not, engineers should contribute to the country's aspiration of net-zero carbon emissions by year 2050, as well as the success of the newly-launched National Energy Transition Roadmap. Stay tuned! ■

## EDITOR'S NOTE

*by Ir. Razmahwata bin Mohamad Razalli*  
Principal Bulletin Editor

### "Neither Snow nor Rain nor Heat nor Gloom of Night..."

**T**he most battle-hardened team in IEM is without doubt, the Membership Department. This is the team that has, many a time, faced the irate blast of members. Nonetheless, the 10 Secretariat staff members who make up this team still



*Membership Department*

endeavour to maintain a smile and a cordial response. They diligently handle membership processing, conduct examinations, qualifications checking, CPD evaluation, membership drive and recruitment as well as administer IEM Structured Training and Logbook Scheme.

In 2022, they processed a total of 4,066 applications for IEM membership, 346 IEM Professional Interviews, approximately 200 PAE cases and numerous membership recruitment exercises at IHLs and exhibitions among other functions. We greatly appreciate their contributions to the growth of membership in IEM. ■





# Navigating the Just Energy Transition for Oil & Gas Sector: *Moving Forward*

*As climate awareness gains momentum globally, the imperative to address climate change has cast its spotlight on the oil and gas (O&G) industry. Amid mounting pressure for O&G companies to decarbonise their operations and embrace low-carbon solutions, JURUTERA talks to Puan Nurzalina binti Jamaluddin, Vice President of Low Carbon Ventures at Hibiscus Petroleum Berhad. This insightful dialogue delves into the complexities, challenges and opportunities that shape the O&G sector as it navigates the path toward sustainability.*



The global shift towards recognising the urgency of climate change places greater expectations on the energy industry to drive initiatives that mitigate greenhouse gas emissions (GHG). In Malaysia, the energy sector contributes approximately 78% of the GHG emission in Malaysia\*. A significant driver for change comes from the Malaysian Government's ambitious target to achieve net zero emissions by 2050, a goal articulated in the National Energy Transition Roadmap launched in July this year. This ambitious aspiration underscores the importance of getting the support of O&G companies in attaining the national objective.

Part of this transition involves a pronounced emphasis on renewable energy as a cornerstone of Malaysia's energy system. With the Ministry of Economy announcing a target of 70% renewable energy in the power mix by 2050, the country is positioning itself to simultaneously fuel economic growth and combat climate change.

### Balancing Ambition with Equity: The Just Energy Transition

Puan Zalina advocates for a balanced approach to the energy transition. In her view, transitioning to renewable energy must be organised to ensure affordable energy access for all. The transition should consider the specific context of South-East Asia and safeguard against energy inequality which can arise due to the higher costs associated with renewable energy.

She underlines the significance of the energy trilemma — affordability, accessibility and sustainability — when embarking on the energy transition journey. Sustainability should not overshadow the other two elements; instead, they should be harmonised. Balanced energy policies must facilitate affordability, accessibility and sustainable practices, maximising economic and social benefits while minimising environmental impacts.

Puan Zalina stresses on the need for an industry platform that

includes broader industry players in co-creating the energy transition roadmap. "It is important to have a common platform where many players are heard, not just the big players... and to convert the discussions into tangible action plans. Otherwise, we may be blind-sided by only what big players can do and cannot effectively bring others in on this journey and move from where we are," she says.

### Meeting ESG Requirements

On the importance of the Environmental, Social & Governance (ESG) and the United Nations' Sustainable Development Goals (UN SDGs), Puan Zalina says: "As an industry, we should broaden our views on sustainability rather than be just ESG-specific. ESG is a good starting point and can act as a reporting and stewardship tool. What is more important is to define what sustainability means to businesses, which boils down to sustaining the businesses for the long term."

For her, sustainability encapsulates not only financial considerations but also environmental and social aspects, reflecting evolving stakeholder expectations for businesses.

Commenting on the O&G industry commitments in managing ESG issues, Puan Zalina says that these differ, depending on the size of the company, nature of the business and their role in the supply chain, among other factors. While listed companies such as Hibiscus Petroleum adhere to comprehensive ESG metrics, she acknowledges that there are different challenges which small and medium-sized enterprises (SMEs) face, due to their varied nature and resources.

"As a listed company, Hibiscus Petroleum is committed to reporting ESG metrics as it is part of Bursa Malaysia's requirements. We are proud to be one of the few O&G companies in Bursa to have maintained our standing in the FTSE4Good Index Series (designed to measure the performance of companies)". Hibiscus Petroleum has already scored well in



**Puan Nurzalina binti Jamaluddin**

*Vice President of Low Carbon Ventures at Hibiscus Petroleum Berhad, Puan Nurzalina binti Jamaluddin spent over 2 decades in various roles in ExxonMobil Malaysia in Surface, Planning & Subsurface and as Senior Commercial Advisor in Talisman Energy Inc. She was one of the founding members and VP of Malaysia Petroleum Resources Corporation. She later served as Chief Business Development Officer and Secretary to the Board of Governors at the Asia School of Business. She also coaches and mentors young professionals and women leaders.*

'S' and 'G' aspects, so its focus has been on the 'E' part of ESG – emphasising environmental management in its energy transition strategies.

Energy transition strategies for Hibiscus Petroleum revolve around three pillars: Investment in gas assets as the cleanest form of fossil fuel, decarbonisation of current assets and diversification through low-carbon investments. With its acquisition of Repsol Malaysia's assets and Block 46 in Vietnam, Hibiscus Petroleum upped its natural gas production in 2022 to 35% of its total production, an increase of 4% from the previous year.

### Decarbonisation: Path to Net Zero

Puan Zalina elucidates the multi-dimensional challenges of decarbonisation in the O&G sector. The growing pressure from investors and stakeholders to commit to net zero by 2050 underscores the importance of aligning decarbonisation efforts with a clear roadmap. She acknowledges the industry's predicament: The need to balance production growth with reduced emissions.

\*Malaysia's Fourth Biennial Update Report, The United Nations Framework Convention On Climate Change (UNFCC), December 2022



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At the interview session with Puan Nurzalina binti Jamaluddin, Vice President, Low Carbon Ventures, Hibiscus Petroleum Berhad. From left: Ir. Abdul Razak bin Yakob, Puan Nurzalina binti Jamaluddin, Ir. Nur Azhani binti Mohamad Rosli and Ir. Razmahwata bin Mohamad Razalli

While increased hydrocarbon production corresponds to heightened emissions, the transition can be facilitated through the increased utilisation of gas and the adoption of new technologies to reduce flare/vent emissions and energy-efficient designs which offer a lower carbon footprint.

Clear policies to support decarbonisation efforts are deemed crucial. Puan Zalina points out the importance of fostering emerging technologies such as Carbon Capture and Storage (CCS). "Currently, it is still costly to undertake a CCS project, so supportive tax incentives and carbon credits will help to improve the economics," she says. Likewise, incentives are pivotal to catalysing clean energy investments, particularly in renewable energy projects where current margins often fall short of covering capital costs.

### Balancing Portfolios: Pragmatic Investment Strategies

Balancing investment portfolios with sustainability imperatives is a complex, yet critical endeavour. Puan Zalina emphasises the need for pragmatic strategies that prioritise sustainable practices without compromising business viability. "There is the conundrum of how much money to invest in green investments vs. conventional oil & gas portfolios and we see different companies deploying different strategies to green investment portfolios. This requires a more nuanced approach

for each company," she says. "As an industry, we are continuing our quest to work on commercially viable opportunities, while being bound by the environmental requirements. The industry needs to strike that balance and to understand the trade-offs between being environmentally sound and maintaining commerciality. There is no silver bullet. We need to keep improving and the way to go is to address it through the demand side."



### Carbon Fluency: Equipping for the Transition

As the industry transitions, Puan Zalina emphasises the necessity of carbon fluency (CF) — a deep understanding of carbon-related issues, technology impacts and climate science.

"We cannot simply jump on the bandwagon and meaningfully solve this complex issue without understanding science and systems thinking. Engineers can offer innovative solutions in this area by working alongside other engineers and scientists. As we journey into the energy transition phase, our industry needs to start embedding and building CF as a skill set," she says.

Puan Zalina adds that the future of energy also lies in understanding the externality or consequence of industrial or commercial activities which can impact other parties. "There will be a time, maybe not now but in 5-10 years... when we will start to incorporate the externality and climate impacts in all our investments. There is already a push in this direction by Bursa which has set specific requirements for listed companies to comply and fulfill under the TCFD," she says.

TCFD refers to Task Force on Climate-Related Financial Disclosures, which requires listed companies to provide information to investors about what they are doing to mitigate the risks of climate change as well as being transparent about how they are governed.

"Securing funds for new assets poses challenges without well-defined environmental strategies. Given the substantial investments required by our industry, these strategies will dictate our ability to finance our investments and growth," she says.

### Sustainability Mindset and Local Expertise

Puan Zalina says that besides acquiring carbon fluency, it is also very important to embed a sustainability mindset in the O&G industry. She stresses: "Going forward, if we want to thrive as an industry, our emphasis

on sustainability has to be similar to how we have placed importance on Health, Safety & Environment (HSE). This is my passion – to develop the know-how for our engineers and to tap into opportunities to build technologies to decarbonise. This is where IEM can play a role to help build the skills of the future; it is time for engineers to rise to the challenge and to find novel ways to do these and more.”

She continues: “If engineers want to grow their career in the energy of the future, they must be conversant with the climate risk assessment which forms part of TCFD. They must understand the processes involved in climate risk assessments and it’s an opportunity to look beyond the

technical aspects of the energy industry.”

Ir. Abdul Razak bin Yakob, Vice-President of IEM and Advisor to the Oil, Gas & Mining Technical Division (OGMTD), says IEM is organising activities to help its members learn and improve, all in support of the UN’s 17 SDGs. IEM has also created a team to lead the Towards a Responsible Future initiative, which promotes sustainability. He adds that the team will explore ways in which IEM can make sure its members and the public are ready to contribute towards this important agenda.

“We’re focusing on following the SDG goals and our annual reports will show how we’re working toward a better future. This means we’ll match

our actions with these goals and point out the most effective ones to encourage others to do the same,” he says.

### Collaboration and Commitment

As the interview concludes, Puan Zalina acknowledges the significant challenges that lie ahead, necessitating the alignment of stakeholders’ determination, government policies, incentives and the right talent pool. The road ahead is undeniably long but, with strategic collaboration, unwavering commitment and a pragmatic approach, the energy transition journey holds great promise for a sustainable future.

One month after the interview with Puan Nurzalina binti Jamaluddin of Hibiscus Petroleum on 28 July 2023, Prime Minister YAB Dato’ Seri Anwar bin Ibrahim launched the country’s National Energy Transition Roadmap (NETR) on 29 August 2023.

# Managing ESG Risk in View of NETR



In the NETR, Malaysia has committed to revising its RE capacity target to 70% by 2050, up from the previous target of 40% by 2035, as part of its energy mix. This poses an important question: With the oil and gas industry currently contributing about 70% to the energy mix, how will this transition impact the industry?

The fossil fuel industry in Malaysia has been a significant driver of economic growth but has also contributed to carbon emissions. Therefore, there is a pressing need to accelerate emissions reduction and pursue a just energy transition. A just energy transition aims to green the economy in a fair and inclusive manner, creating job opportunities and leaving no one behind, as stated in the National Energy Transition Roadmap – Part 1 by the Ministry of Economy in August 2023.

As a developing nation, Malaysia advocates for a just transition to ensure no one feels left behind or is powerless in terms of energy security and economic disparity. We remain committed to the goal of achieving net-zero emissions and the NETR provides essential guidance and policy changes for our economy. It's important to note that addressing climate change is not the sole responsibility of the oil and gas industry, even though it's under scrutiny.

According to NETR, Malaysia faces the critical task of transitioning from a conventional fossil fuel-heavy economy to a high-value green economy while aspiring to achieve net-zero greenhouse gas emissions by 2050. It is imperative for the O&G industry to integrate ESG practices into its business operations for survival. Companies like Hibiscus Petroleum, PETRONAS-listed entities and other O&G companies listed on BURSA Malaysia have been incorporating ESG practices and reporting their ESG performance in annual reports to comply with BURSA requirements.

Many companies have taken measures to reduce flaring, identify fugitive emissions sources, adopt energy-efficient equipment and

digitalise operations to optimise efficiency and reduce emissions. Engineers are actively contributing to emissions reduction efforts in their daily work, as emissions and energy usage are closely monitored and reported. Therefore, engineers have a unique advantage in adding value to other industries by improving energy efficiency and waste management, aligning with broader ESG goals.

PETRONAS outlined its carbon capture and storage (CCS) project, Kasawari, in its 2022 Integrated Report and PETRONAS Activity Outlook 2023-2025. In NETR, CCS is identified as one of the key flagship catalyst projects and initiatives. With their expertise in geotechnical and reservoir management, O&G players can lead CCS development in the country. While there is a growing shift towards renewable energy sources like solar, wind, biofuels and hydrogen, fossil fuel products still have applications across various industries, including chemicals, manufacturing and construction. CCS projects are pivotal in our journey toward a net-zero emissions goal.

On the social and governance fronts, the O&G industry can share best practices in safety management and governance policies, especially concerning local participation. Safety is of paramount concern due to the hazardous nature of hydrocarbons. The industry has demonstrated its ability to manage worker safety and health effectively during construction activities, turnarounds and plant commissioning, aligning with international standards for social and governance performance. These experiences can be shared with other industries to elevate ESG efforts in Malaysia.

To adapt to external pressures and to ensure business sustainability, the industry has been exploring non-



**Ir. Lee Chang Quan**

*The Chair of OGMTD, IEM (2022/2023) is also serving Stand Comm. of InfoPub. He has experience in engineering and project management of petrochemical plants projects.*

fossil fuel opportunities, including renewables such as solar, wind, biofuels and hydrogen. PETRONAS, for instance, has initiated a feasibility study for a biorefinery to produce sustainable aviation fuel (SAF) as part of its decarbonisation efforts.

Collaboration among industry leaders and research institutions will accelerate the transition to a greener path while balancing cash flow with investments in new technology. Engineers and researchers will play a crucial role in driving the growth of biofuels in Malaysia, aligning with NETR's flagship catalysts such as biomass demand creation and future fuels.

IEM can play a significant role by integrating the 17 UN SDG goals into its activities, raising awareness among engineers about ESG and influencing businesses to incorporate ESG practices. OGMTD can also engage in outreach programmes aimed at engineering students to dispel concerns about future careers in the O&G industry and to emphasise the demand for engineering talents in achieving the transition to a green economy. Indeed, NETR's success hinges on active and immediate participation by engineers in shaping the country's future. ■

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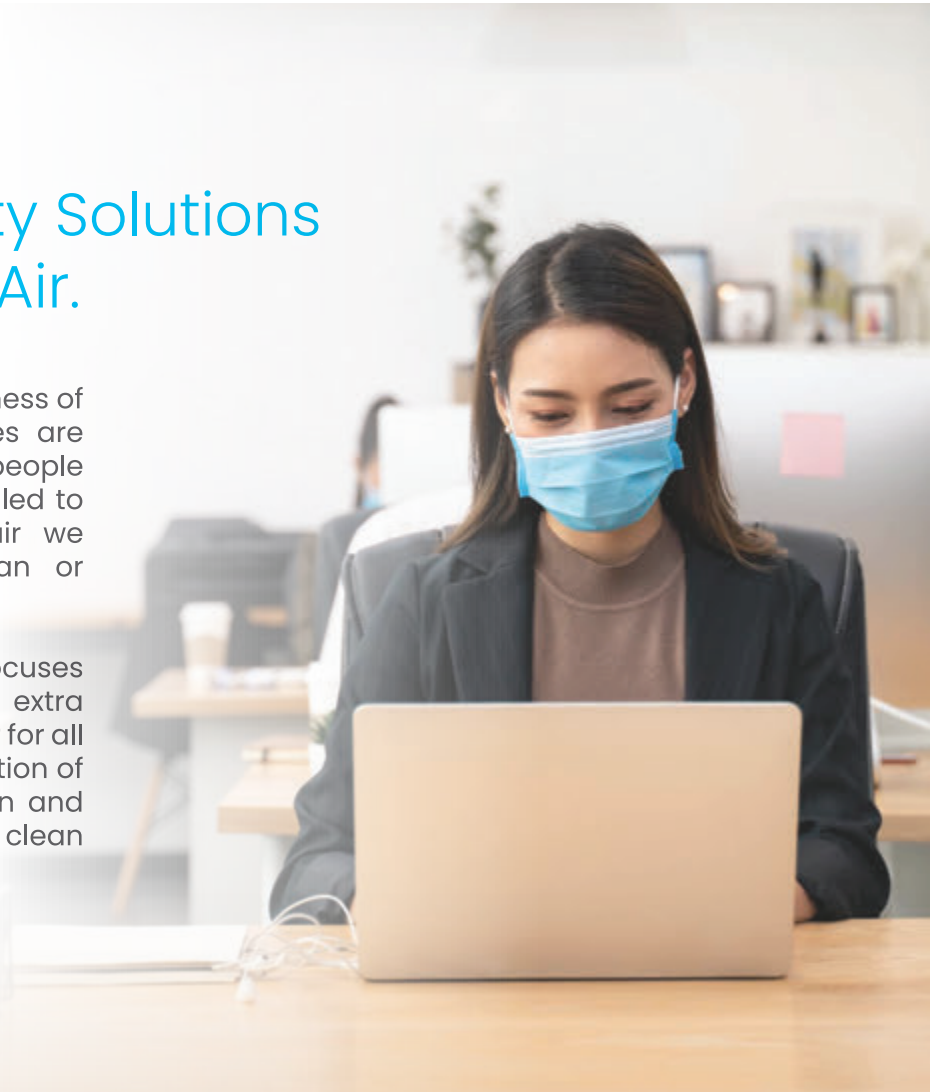
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# Unveiling Hidden Risk of Major Hazard Incidents: Bridging the Gap between Natural Disasters and Industrial Safety

Written and Prepared by:



**Ir. Tajul Ariffin bin Mohamed Nori**

*Chairman of Safety in Engineering Special Interest Group, SESIG IEM and a senior officer with Forensic Engineering Division at DOSH Headquarters Putrajaya.*

**M**ajor hazard accidents can arise from factors such as human error and other contributing factors, including design or construction errors, operational mistakes, technical failures, hazardous spills, fires, explosions, dam failures, structure collapses, inadequate maintenance or supervision issues.

However, another factor that can trigger major hazard accidents is Natech or Natural Disaster-Induced Technological Accident. This refers to a situation where a natural disaster triggers a technological failure, leading to serious environmental and social consequences. Such accidents can damage infrastructure, cause loss of life and/or have significant economic impacts. Even though the risk is not new, Natech must be addressed.

As technology advances and industrial growth accelerates, so does climate change (which causes natural hazards) keep changing in time and location. Thus it is essential to review this to avoid any catastrophic event from natural risks triggering technology disasters. Earthquakes, floods and storms significantly affect large areas in single or continuous occurrences, posing a major threat to any major hazards plant or industrial zone. The domino effect can propagate from natural events and affect any man-made plant auxiliary systems and utilities, causing worst-scene situations for emergency response and rescue.

Safety engineering protection barriers in place such as warnings or alarm systems, instrumentations or failed-safe-system, may not be able to deal with natural disasters

to prevent major technology incidents. Thus it is crucial to manage the Natech risk.

Managing the risk of natural disasters or Natech can be challenging. The risk assessment process stage may identify those who will be impacted by the threat of specific hazards. For instance, in the case of Natech risk, the population as a whole, especially those staying in close proximity to the hazardous area, may experience harm rather than just individuals or specific groups of people employed within the working perimeter of the Major Hazard Installation plant. Effective risk management involves continuous communication and consultation with both internal and external stakeholders. It is important to acknowledge that stakeholders may perceive risks differently due to variations in values, interests, needs, assumptions, concepts and concerns.

In order to ensure safety for all, laws and provisions have been established to encompass major hazard undertakings. The Occupational Safety & Health Act, Control of Industrial Major Hazard (CIMAH) Regulations 1996 [1] mandates plant owners to engage with stakeholders, including the public. Even though the provision is in place to protect the public via engagement with nearby residents, it is still minimal to protect the public from being affected by Natech risk. Furthermore, due to limited awareness of Natech risks, the public often relies on industrial operators or plant owners to ensure their safety without considering their emergency preparedness.



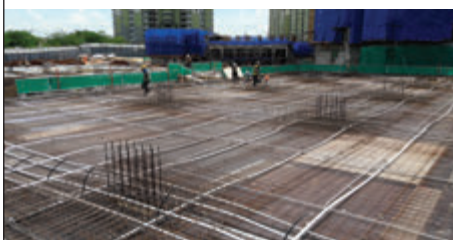
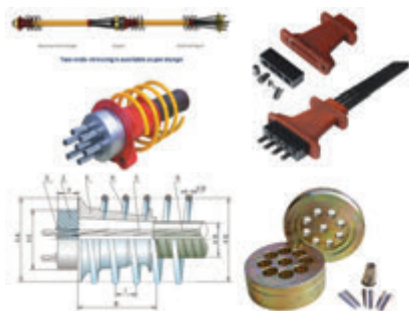
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## Managing Natech Risk

Risk management is essential for preventing such accidents. It involves identifying hazards, assessing their risks, developing strategies to mitigate them and regularly reviewing and updating these strategies. Prevention measures include hazard-resistant design, early warning systems, emergency response plans and regular maintenance of technological systems. By effectively managing risks and implementing preventive measures, the impact of Natech accidents can be minimised, ensuring the safety of individuals and communities.



*Climate change poses great potential risk for natural induced event to major hazard industry  
(Royalty-free image from pixabay.com)*

## Plant Design & Resilience Strategies

The potential consequences and unforeseen incidents of technological accidents can arise due to climate change impact. When developing resilience to prevent technical and industrial catastrophes triggered by natural disasters, it is crucial to incorporate the impacts of natural phenomena into the risk assessment process. For example, engineers and designers should consider the effects of calamities during the disaster risk reduction design phase to create structures which can effectively withstand such events.

However, the inputs guiding the design decisions risk assessment can significantly influence the design of industrial plants or structures. Reliable and valid data, such as meteorological department data, is crucial for accurate risk assessments. It enhances precision and reliability, providing valuable insights of weather patterns, climatic conditions and natural hazards. This data makes risk assessments more comprehensive, enabling informed decision-making and effective mitigation measures. Reliable data sources contribute to a better understanding of risks and so will support successful risk management strategies. Consequently, incorporating climate change considerations into sustainable design against Natech accidents can be challenging and will require careful decision-making for optimal outcomes. A technical report published in 2022 by the Joint Research Centre (JRC), the European Commission, Natech Risk Management – Guidance for Operators of Hazardous Industrial Sites and National Authorities [2] would serve as a comprehensive guide in managing Natech risk.

## Emergency Response Plan

Another important strategy in managing Natech risk is preparedness. By implementing effective emergency response measures, the severity of consequences in natural disasters can be significantly reduced, leading

to fewer casualties. It's important to note that Natech accidents have the potential to affect not only industrial facilities but also adjacent areas, as indicated in the Bhopal accident, where residential areas located 2-3km away from the disaster site were impacted [3]. An occurrence of a Natech accident could lead to cascading scenarios similar to major hazard accidents within industrial or chemical parks.

In Malaysia, plants classified as "Major Hazard Installations" are required to comply with CIMAH Regulations 1996. Plant owners have a legal obligation to protect the off-site society from the adverse effects of their operations. The regulation emphasises the importance of raising public awareness by providing necessary and adequate information about technological disasters. Technological advancements such as social media tools can enhance the implementation of these requirements by facilitating the effective dissemination of frequent and timely information. Additionally, engagement programmes can be organised to ensure the public possesses sufficient knowledge to protect themselves during a Natech accident.

### Case Study of Natech Risk

Since Malaysia experiences two distinct tropical seasons, namely the monsoon and dry seasons, lightning strikes are common. This random phenomenon can potentially erupt at any hazardous plant to trigger a major hazard incident. For example, a major fire outbreak which occurred at a crude storage tank of a local refinery in Port Dickson, Negeri Sembilan, in 2020, was believed to be triggered by a lightning strike. Fortunately, most hazardous material (hazmat) facilities and major installation sites are equipped with lightning arrestors. The fire was successfully contained, preventing it from affecting the crude oil content which could have worsened the impact. This case study highlights the importance of managing Natech risks through proactive measures such as installing fire prevention and mitigation systems in chemical storage facilities.

In 2020, a massive major hazard in Beirut, Lebanon, sparked global concern over how such an incident could have happened. The catastrophic port explosion caused a huge number of deaths and injuries and over US\$15 billion in property damage, resulting in a great economic loss. This event underscored the critical importance of effective risk management and raised awareness of the devastating consequences that could arise from a major hazard. This is a reminder for seaports, jetties or other facilities in Malaysia which store, process or engage in trading activities involving various hazardous bulk materials. Such facilities can cause major hazard incidents that can jeopardise public safety, especially during natural disasters which may trigger such events.

In Malaysia, many plants, such as oil refineries, petrochemical plants and electric power plants, which fall under the major hazard category under CIMAH Regulations 1996, are located along the coastline. Since coastal areas can be affected by hurricanes and tsunamis, engineers and



*Safety engineering barriers may not be able to withstand natural disaster hazards  
(Royalty-free image from pixabay.com)*

designers should consider these natural disaster hazards in their risk assessment and design the safety factor appropriately. The natural disaster impact should not be undermined although some of the hazards are perceived to be uncommon in Malaysia. The 2004 Indian Ocean earthquake and tsunami for example, affected Malaysia and caused significant damage to the north coast[4].

### CIMAH Safety Report

A safety report is an essential tool for CIMAH-competent persons to effectively manage, prevent, control and mitigate major hazard accidents within major hazard plants. However, it is crucial to emphasise Natech risk in the safety report prepared by CIMAH competent persons. The report should outline specific measures and strategies to address Natech risk, such as incorporating resilient design and engineering practices, developing emergency response plans that account for natural hazards and establishing communication protocols with relevant authorities and neighbouring communities.

Moreover, the safety report should provide clear guidelines and procedures for monitoring, reviewing and updating the management of Natech risk over time. This includes periodic assessments of the effectiveness of existing control measures, the identification of emerging risks and the implementation of necessary control measures and improvements. By integrating Natech risk into the safety report, CIMAH competent persons can ensure a holistic and proactive approach to managing major hazard accidents. This facilitates better preparedness, response and resilience against the potential impacts of natural hazards on industrial facilities, surrounding communities and the environment.

In addition to the CIMAH Regulations 1996, the Department of Occupational Safety & Health (DOSH) had also published the Guidance on Preparation & Updating of Report on Industrial Activity, to assist industries, specifically CIMAH-competent persons, in preparing safety reports. It outlined some essential information which could be related to Natech risk, as outlined in part D, Schedule 6 (d): Information relating to the Potential Major Accidents - D.1 "A description of the potential sources of



major accidents and conditions or events which could be significant in giving rise to one and D.4 - Information about the prevailing meteorological conditions in the vicinity of the site)" on the possibility of external factors such as earthquakes. Even though earthquakes [5] are not a typical occurrence, Malaysia remains vulnerable to various other environmental disasters, including flood, landslide and tsunami [6]. While the growth and expansion of industry are getting more developed, climate change may bring unexpected natural disasters. This should be a part of the continuous hazard study for CIMAHA-competent persons, especially for plants in areas where it prompts natural risk.

### Summary

Natech accidents pose significant risks to the environment and human lives, necessitating the implementation of robust risk management and prevention strategies. These measures are crucial in mitigating the potential consequences of natural hazards on technological systems and ensuring the well-being of both our ecosystems and society. By identifying Natech hazards, assessing risk, developing strategies and regularly reviewing and updating these strategies, it is possible to manage the risk of Natech accidents more effectively. The CIMAHA Safety Report plays an important role in managing Natech risk and must include considerations for Natech risk management. ■

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## NOTICE

### NOMINATIONS FOR ELECTION TO FILL VACANCIES FOR THE COUNCIL SESSION 2024/2025

The IEM Council at its 437th meeting on 17 July 2023 had decided to fill Council vacancies for the Session 2024/2025 in accordance with Article 5.2 of the Constitution. An election programme had also been approved by the Council for implementation.

The following Council vacancies will arise for Session 2024/2025 as a result of Council members retiring at the end of Session 2023/2024.

Office	No of Vacancies	Term of Office
Vice President	Three (3)	2 sessions (2024/2025 and 2025/2026)
Honorary Secretary	One (1)	1 session (2024/2025)
Honorary Treasurer	One (1)	1 session (2024/2025)
Council Member – Chemical & Other Representative	One (1)	3 sessions (2024/2025, 2025/2026 and 2026/2027)
Council Member – Ordinary Representative	Ten (10)	3 sessions (2024/2025, 2025/2026 and 2026/2027)

A notice inviting nominations for the Election of Council Member for Session 2024/2025 will be posted on the IEM Notice Board and on the website on 10 November 2023 for the information of all Corporate Members.

Nomination Forms may be obtained at the IEM Secretariat or downloaded from the IEM website [www.myiem.org.my](http://www.myiem.org.my) on and after 10 November 2023.

All Nomination forms, duly completed, shall be sent in a sealed envelope marked "**Confidential: Nomination Paper for Session 2024/2025**" to:

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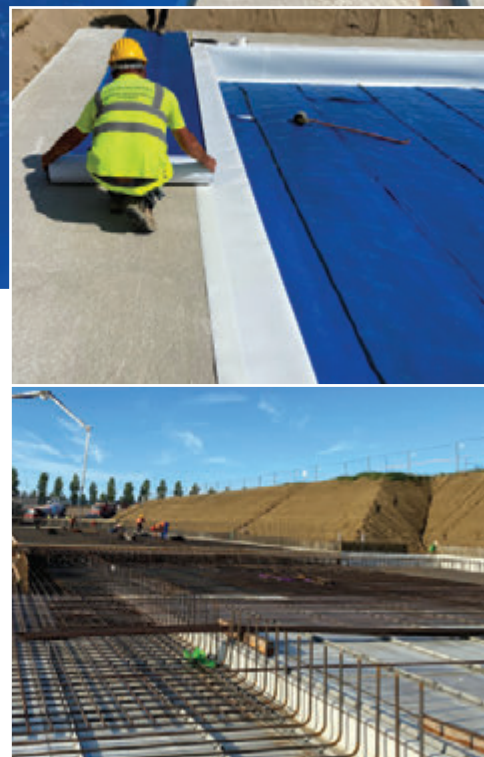
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# To Blast or Not To Blast?

Written and Prepared by: \_\_\_\_\_



**Ir. Hj Look Keman bin Sahari**

*A Committee Member of OGMTD, he is Consultant Engineer specialising in Explosive Engineering & Blasting Engineering and Expert Witness in Blasting dispute.*

**W**hen hard rock is encountered during excavation work, it can be removed either mechanically or by using explosives. However, fear of causing accidental damage to property, risk of human injury, limited expert knowledge of proper blasting techniques as well as difficulty in securing the necessary permits for blasting have resulted in more and more contractors opting for mechanical rock excavation methods instead. In most cases, however, mechanical excavation is slower and may end up being more costly than if controlled blasting is employed.

This article discusses the concerns and factors that affect the implementation of controlled blasting and offers a practical approach for developing a controlled blasting programme. Common public perception of the dangers of blasting and the necessity for carrying out risk analysis and management are also explored.

## Blasting Dilemma

To blast or not to blast? This is a common question that engineers and contractors often ask themselves when faced with the need to remove hard rock within an urban setting. Increasingly, the tendency is to opt for mechanical excavation or even the use of chemical means rather than to drill and blast although the former options are usually more costly.

Why is this so? Often, in urban construction work, there is immense pressure from government agencies to avoid blasting as far as possible because blasting creates a huge public relations problem for project owners as well as their design consultants. The overall public perception of the safety of blasting has largely been shaped by negative outcomes of events in Iraq, Syria or Palestine as well as explosions in Kenya, Oklahoma and many other locations worldwide that have claimed the lives of many civilians. These events have created great fear among the general public on the extensive damage that can arise from the use of explosives especially when such devices are to be deployed at a site close to their homes. As a result, this public uneasiness has had a significant influence on the choice of the preferred excavation method in cases of populated areas.



*Outcrops and boulders at a project site that need to be removed*

According to a recent newspaper report, a municipal council in Selangor had rejected an application by a contractor to undertake blasting work at a construction site when nearby residents expressed fear that the blasting would endanger their lives. In addition to the resulting tremendous and unbearable noise disturbances, the residents were also worried that the blasts might create fly-rock or ground vibrations that could damage their homes.

These public objections might leave the contractor with little choice but to adopt mechanical and/or chemical means to remove rock, such as by using breakers to break up granite outcrops or boulders and chemicals to fragmentise the rocks. However, the residents would now be subjected to lengthy periods of continuous rock hammering caused by the breakers rather than just a few weeks of minimal disturbance if the blasting was carried out professionally.

The overall cost of mechanically breaking the rock would be enormous while the nearby residents would have to tolerate the noise, dust and other disturbances longer than was necessary. Another result of this “no blasting” rule was that the high cost of rock removal would ultimately be passed down to the prospective home buyers and property investors who would eventually have to pay higher prices.

While litigation for alleged blasting damage is common, particularly in the United States, this is not yet the case in Malaysia. While contractors here have been threatened with lawsuits by certain quarters, many have not materialised due to the lack of technical knowledge on the associated risks and effects of blasting on various structures, as well

as failure on the part of the litigant to prove that he has, in fact, suffered a loss as a result, especially if the blasting contractor is backed by a competent consultant with expert knowledge in this field.

Many house owners assume that any blasting work is likely to cause damage to their existing properties, regardless of whether the resulting vibrations are below or beyond the maximum limit imposed by the authorities, which is usually 10 mm/s. This limit is actually well below the threshold limit of possible cosmetic damage of 50 mm/s, as recommended by the United States Bureau of Mines (USBM). Regardless of the validity of the claims, these can be very costly for a contractor to defend as he will need to hire one or more experts to investigate the claims, as well as a lawyer to defend him in court. Additionally, the threat of a "stop work" order can mean a complete halt to the work while the complaint or allegation is being investigated by the authorities. Since the cost of defensive action can be astronomical, the blasting contractors must plan their work extremely carefully to ensure that it is in compliance with the relevant codes and regulations. The blasting process must be carefully selected, controlled and monitored to prevent property damage which can lead to complaints and possible litigation.

### Blasting Perception vs Reality

People are primarily concerned about blasting in urban areas because they believe it is dangerous or that it commonly causes property damage. When blasting accidents do occur, they are highly publicised by the media, while the numerous success stories go unreported. As a result, the local populace has developed a negative view of rock blasting. Unfortunately, many blasting accidents are caused by human error or by a lack of expert knowledge on the part of the contractor. These include making the wrong decisions, incorrect blast design, selecting an unsuitable loading arrangement and adopting improper control measures for a specific site or situation. The implementation of inconsistent or differing regulatory requirements by the authorities may also be a contributory factor.

Human error may be reduced significantly by tightening the training and experience requirement for licenced blasters. Currently, there are no institutions in Malaysia offering specialised training on blasting techniques in urban and other sensitive areas nor is there a requirement for a blaster to attend such a course. The Institute of Quarrying, Malaysia, and the Malaysian Police conduct shot-firing courses but these are tailored more for quarry work than for civil engineering infrastructure work. Due to security reasons, only those with the need to know this field of work are allowed to attend such courses.

Blasters are only required to possess a Shot-firer's Certificate which is issued jointly by the Police and the Department of Minerals & Geoscience. However, this certificate is more relevant to those who work in quarries where the applicable blasting techniques and the resulting risks are quite different. The blasters and engineers,

unfortunately, are only able to learn from practice through trial and error or by reading and self-study of technical literature if they are fortunate to be members of learned societies such as the International Society of Explosive Engineers. It is very difficult for the blasting engineer to acquire appropriate experience in blasting at close quarters, since there is no requirement for a blasting contractor to hire one.

Generally, blasting contractors are reluctant to hire competent professional engineers to oversee their blasting work on the pretext that their blasters do not need to be supervised. Moreover, it is claimed that in many instances the engineers themselves rely on the blaster to make key decisions. In fact, many blasting contractors will argue that the hiring of engineers adds little value and only increases their operational costs.

There is therefore a clear need for the specialised training of blasting engineers to improve their competency levels and to prove their worth. Unfortunately, there is a lack of interest from engineers to specialise in blasting work as the tasks are seen to be difficult and dirty and requires one to be continually exposed to the hot sun.

There is also a parallel need for the proper training for blasters working outside of the quarrying and mining industries as the specific requirements related to controlled blasting practice will improve their levels of expertise and lead to fewer accidents or adverse events. This will also increase the confidence of the public and reduce unnecessary anxiety.

### Blasting Approach

Before a project owner considers a proposal to incorporate blasting as an appropriate engineering solution, he or she must consider several pertinent factors. Blasting work in an urban or sensitive area is definitely much more costly than blasting work in a quarry or mine. The blasting engineer has to consider the higher risk of accidents and thus needs to implement stringent precautionary controls to ensure that nearby properties are safe and protected. The estimated volume removed per blast has to be kept at a very low level, measured in hundreds of cubic metres per blast compared to several tens of thousands of cubic metres at a quarry.

Quite often, civil engineering consultants have been found to unknowingly borrow specifications meant for blasting at quarries (or other blasting sites) and inappropriately apply them for blasting work in an urban or sensitive environment. There had been instances when the initiation method specified, such as the safety fuse or the detonating cord, was incorrect for a particular location or where the stipulated electrical system had been chosen to save cost rather than to ensure greater safety.

In another example, the specified explosive was not even available in the country, suggesting that the specifications had been reproduced from a foreign source.

At present there is no blasting standard for vibration and air-blast control in our country. Different consultants tend to adopt standards from developed countries such as



Australia, the United Kingdom and USA. Some consultants prefer to choose the lowest possible limit to ensure approval by the authorities only to discover later that the limit is unsuitable for the specific location and is very expensive to comply with. While the Australian Standard limits of 10 mm/s for vibration and 120 dB(L) for air-blast are applicable in most cases, there may, however, be circumstances where a lower or even higher limit may be more appropriate. It is therefore, essential that the specifications proposed for implementation be appropriate and practical for the particular location to avoid the problem of non-compliance which can lead to cost overruns and the need to appeal to the relevant authority for modification of the original specification.

It is quite common practice in Malaysia for a consultant to be hired to prepare the blasting specifications when the approving authority requires a written Method Statement to be submitted for review but to save costs, he is not appointed by the project owner or blasting contractor to oversee and supervise the job after that.

One very important requirement in any blasting specification is the need for the blasting work to be recorded correctly. The blast design must be clearly indicated, with details of burden, spacing, depth, blasting location, type of explosive used as well as the protection methods to control fly-rock properly recorded with reference to an accompanying site plan. Videos or photographs of the blasting work must be taken throughout the entire procedure until completion. Vibration and air-blast monitoring plans must be implemented and recorded correctly to check and confirm compliance. This is actually a necessity to protect the owner from possible complaints from the public, which can result in claims for compensation and litigation in court. The records also serve as supporting documents during routine inspections and discussions with the authorities.

Finally, the most important element in the carrying out of controlled blasting is public relations. The blaster, the project manager, the owner and the engineer must develop and maintain good relationships with the surrounding community and keep them informed of ensuing developments. If all parties show genuine concern and respect for the safety and well-being of those affected by the blasting work, they will in turn ensure that the operation proceeds smoothly. "Make them feel safe and you will feel safe."

## Conclusion

Blasting work is actually very safe when performed by competent and qualified personnel. It is also much cheaper on sites where extensive hard rock is encountered compared to rock breaking by mechanical or chemical means and is much faster too. However, the blasters and the engineers involved in this field must be willing to improve their technical skills and competency as well as prove that they are able to perform the required tasks safely while causing minimal disturbance to the public.

They must also be knowledgeable of the effects and the inherent risks of blasting work on nearby structures and understand the psychological impacts of blasting on the affected community. It should be noted that most blasting works have been completed safely and successfully in the past and will be so in the future. It can be very satisfying when the job is well done and appreciated. ■

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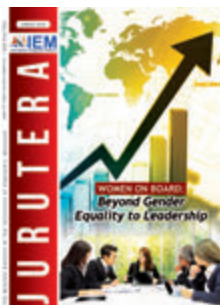
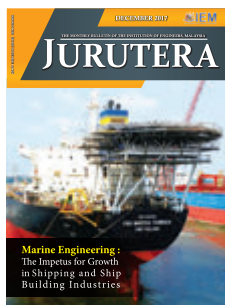
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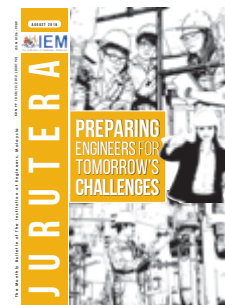
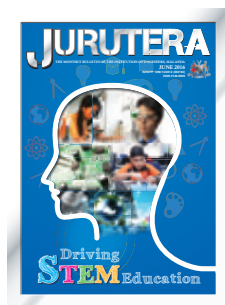
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# Distributed Cold Blowdown Analysis With Finite Element Wall Model

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**I**n this analysis, a fuel gas import system on a Floating Processing Storage & Offloading facility is subjected to a cold blowdown or depressuring analysis using the HYSYS process simulation software. As part of the system shut down procedure, it is necessary to depressurise the system from its operating pressure of around 150 barg down to 6.9 barg. When the system is depressured, the fluid and corresponding piping and equipment wall temperatures will drop due to expansion and the Joule Thompson effect.

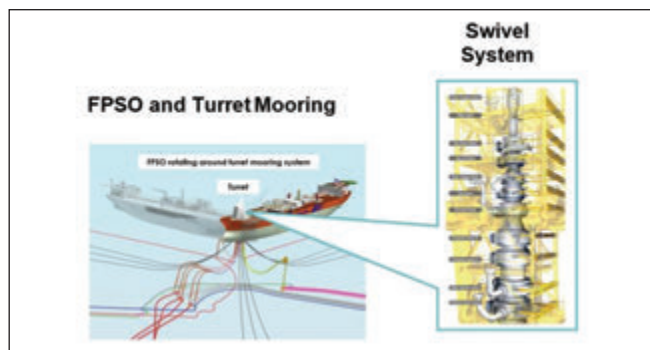


Figure 1: FPSO Turret and Swivel System

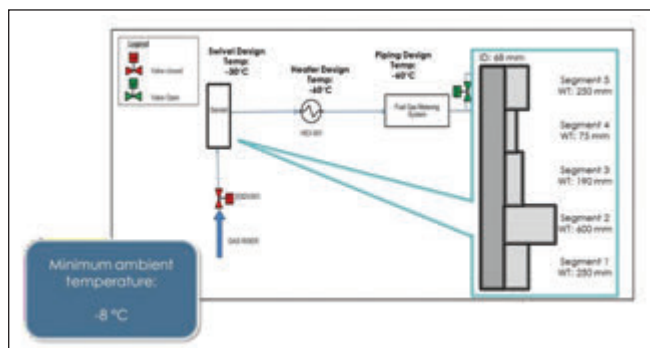


Figure 2: Fuel Gas Import Schematic

The objective of a cold blowdown analysis is to determine the minimum metal temperature for the piping and equipment within the system. In cases of design, this temperature would be used as the minimum metal design temperature. For existing systems, this analysis would be used to determine if a blowdown strategy would result in the system temperature approaching or breaching the minimum design metal temperature. A common approach used in performing a cold blowdown analysis in using commercial simulation software like HYSYS, is the lumped model strategy where the whole system, piping and equipment is represented using a single vessel. The minimum metal temperature determined by this simulation is considered the minimum temperature for this system.

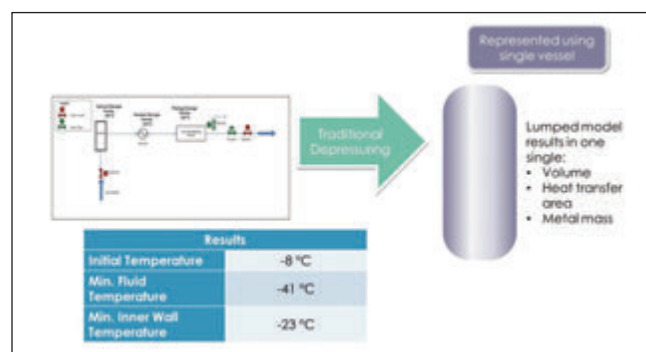


Figure 3: Lumping Strategy

## Lumped Cold Blowdown

Prior to conducting a distributed cold blowdown analysis, the client had conducted a traditional lumped cold blowdown using the HYSYS simulation software.

This analysis indicated that the minimum observed fluid temperature was -41°C and the minimum inner wall temperature was -23°C.

The problem in this case was the inlet swivel piping and equipment design temperature was  $-30^{\circ}\text{C}$  whereas the inlet heater, metering and downstream piping design temperature was  $-60^{\circ}\text{C}$ .

The lumped model had insufficient granularity to determine:

- The location of cold spots and accurate inner wall temperatures.
- Where temperatures may be lower than the “average/lumped” predicted temperature. Could the minimum metal temperature be lower than  $-23^{\circ}\text{C}$ ? The default model did not consider forced convective heat transfer effects.
- If every point in the system was at a safe margin above minimum design temperature.

There was concern that the low temperatures predicted by the lumped model may occur at the swivel section, which had a design section of  $-30^{\circ}\text{C}$ .

The solution to this was to perform a transient analysis based on a distributed model approach to:

- Account for individual equipment/piping inventory, pressure drop and heat transfer
- Create a finite element-based rigorous wall model for better thermal and temperature gradient prediction across the wall.

The software environment at that time, Aspen HYSYS version 7.3, lacked the necessary features to enable this rigorous analysis, so it was necessary to develop custom in-house heat transfer tools to account for the fluid side heat transfer, conduction, free and forced convection as well as a Finite Element Method for the wall conduction.

## Results

The distributed blowdown indicated that the coldest fluid temperature of  $-40^{\circ}\text{C}$  occurred at the heat exchanger and that the minimum observed inner wall temperature was close to  $-30^{\circ}\text{C}$ .

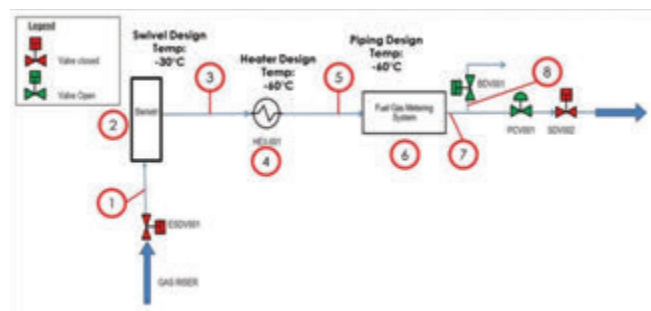


Figure 4: Fuel Gas Import Section Schematic and Temperature Analysis Points

However, these temperatures occurred where the material design temperatures were  $-60^{\circ}\text{C}$ . So there should be no risk of material embrittlement. The QR code below links to an animation of the blowdown and its effect of the axial temperature profile from the gas riser to the outlet of the fuel gas metering system.

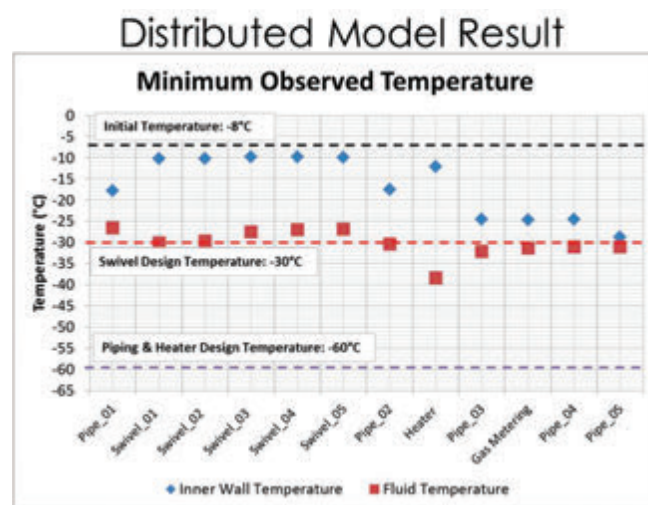


Figure 5: Axial Temperature Profile

Axial Temperature Profile QR Code

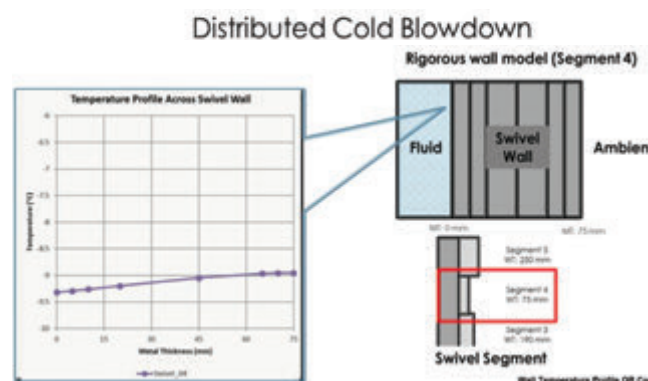


Figure 6: Wall Temperature Profile

Wall Temperature Profile QR Code



In addition to this, the Finite Element Analysis computation indicated that the minimum wall temperature at the swivel was around  $-9.5^{\circ}\text{C}$ , far above the design temperature of  $-30^{\circ}\text{C}$ . The QR code below links to an animation of the blowdown and its effect of the temperature profile across the thinnest swivel wall section.

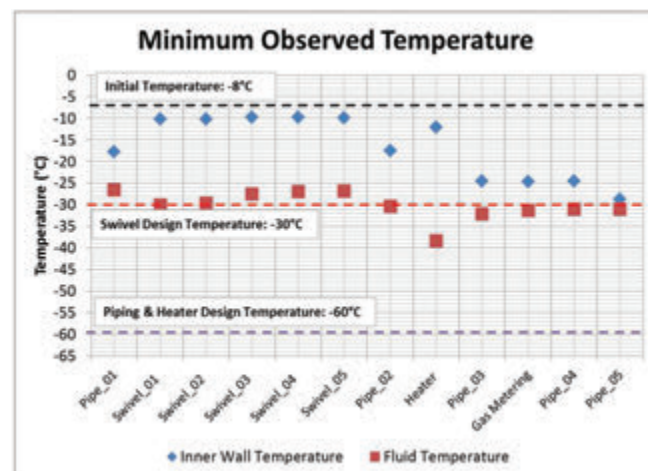


Figure 7: Temperature Profile Summary



## Conclusion

Implementing this distributed cold blowdown and finite element method heat transfer analysis allowed for the determination of the detailed spatial temperature distribution in this system.

Table 1: Comparison between Lumped and Distributed Models

	Lumped Model	Distributed Model
Minimum Fluid Temperature	-41°C	-40°C
Location of Minimum Fluid Temperature	unknown	Heater HEX-100
Minimum Wall Temperature	-23°C	-30°C
Location of Minimum Wall Temperature	unknown	Downstream metering piping
Metal Design Temperature	-NA-	-60°C

This study was conducted for an upstream FPSO. However, the methodology is applicable for any high-pressure system in a refinery or downstream facility, hydrogen and gas recovery or storage systems and reactor units.

This detailed analysis enables:

**CapEx Reduction:** By accurately identifying potential embrittlement areas, eliminating unnecessary usage of expensive low-temperature construction materials.

**Enhanced Safety & Reliability:** By getting high resolution visibility on temperatures across the system and thus ensuring piping and equipment metal temperatures remain above the minimum design metal temperatures, avoiding potential embrittlement failure during blowdown. ■



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# Iconic Golden Bridge of Danang, Vietnam

Written and Prepared by:

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Committee Member of Standing Committee  
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**T**he Golden Bridge in Ba Na Hills resort is the most attractive tourist spot in Danang, central Vietnam. It is a unique and stunning architectural wonder that is a must-see for any traveller visiting that part of the country.

This yellow-hued pedestrian bridge appears to be supported by two gigantic hands symbolizing the hands of God carrying the gift from the ground, it is 1414 meters above mean sea level.

The Golden Bridge is 150 metres long and has 8 spans and 7 supports, designed to connect Marseille cable car station and Le Jardin d'Amour Garden. Most spectacular are two supports made in the form of five-finger "stone" hands

constructed of fibreglass and wire mesh, giving the visual effect of the entire bridge being held by that two hands.

The Golden railings of the bridge are made of stainless steel and the flooring is made of dense and high-quality wood that can withstand heavy loads.

Construction of the bridge began in July 2017 and was completed in April 2018. The bridge opened in June 2018 and since then it became the tourist icon of Danang. Standing on this bridge offers visitors breathtaking panoramic views of the surrounding mountains, forests and rivers.

At the end of the bridge, there are some stone statues of gigantic hand and legs, equally interesting. I enjoyed the visit of this tourist spot very much on August 19, 2023. ■



*Another View of The Golden Bridge*



*Stone Statues of Hand and Legs*



*The Golden Bridge of Ba Na Hills Resort*





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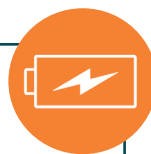
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# 11th Episode of Sembang Chillex at KLCC on 9 September 2023

Written and Prepared by: \_\_\_\_\_



Ir. Dr. Nor Ilia Anisa binti Aris

**T**he 11th episode of Sembang Chillex, an initiative by the Institution of Engineers, Malaysia (IEM), was held on 9 September, 2023, at the Kuala Lumpur Convention Centre, to coincide with the Engineer & Marvex conference. The event, moderated by Ir. Dr. Nor Ilia Anisa binti Aris and Ir. Ts. Dr. Denesh a/l Sooriammoorthy, centred around discussions on sustainability in the engineering profession.

The panellists were engaged in a lively discussion on the shared mission of elevating IEM as a pivotal platform for fostering science and technology in the field of engineering, particularly among young enthusiasts. We extend our heartfelt appreciation to our panellists: Ir. Abdul Razak bin Yakob (Chairman, Towards a Responsible Future Task Force, IEM), Ir. Dr. Siow Chun Lim (Senior Lecturer at the Faculty of Engineering, Multimedia University) and Ir. Assoc. Prof. EUR. ING. Ts. Dr. Syuhaida binti Ismail (Director of Research, Maritime Institute of Malaysia, Kuala Lumpur).

There were discussions concerning IEM's mission and vision for sustainable engineering. The conversation encompassed opportunities and challenges that IEM faced in its quest to promote sustainability within the engineering realm. Moreover, the dialogue touched on activities carried out in universities to instill a sense of sustainability among

students. The panellists also offered insights into IEM's engagement with the government and policymakers to influence policies and regulations, with a strong emphasis on IEM's support for the transition to a circular economy in local engineering projects. Finally, each panel member shared valuable advice on how engineers could actively contribute to sustainability.

The question-and-answer session featured active participation from the audience, with six questions and suggestions received from various individuals, including Ms. Dalili Fahimah binti Zaid, a student from USIM, Ms. Nur Afiah Amira binti Mohd Shahiman, a member of the IEM student committee from UiTM, Ir. Thayala Rajah a/l C. Selvaduray, the IEM Southern Branch Chairman for 2023/2024, Tc. Harreez bin Iskandar (UTM, Space KL) and Ir. Dr. Siti Hawa binti Hamzah. To conclude the event, tokens of appreciation were also presented to the audience members who actively participated in the question-and-answer session, as well as to all the panellists.

The Sembang Chillex event was marked by excitement, emotional resonance and active engagement among both panellists and the audience. One could sense their collective hope for a more sustainable Malaysia and the critical importance of supporting IEM in this noble endeavour. ■



Candid Moments Captured at Sembang Chillex, KLCC, during the IEM Convention. The Gathering was Graced by the Presence of IEM Council Members (Ir. Prof. Dr. Jeffrey Chiang Choong Luin, Ir. Mohd. Khir bin Muhammad, Ir. Dr. Siti Hawa binti Hamzah, Ir. Wong Chee Fui, Ir. Thayala Rajah a/l Selvaduray and Ir. Rusnida binti Talib), IEM Members and a Diverse Audience Comprising Students and Seasoned Engineers

# Empowering Girls in Science: Women in Zcience (WiZ) is Back, Physically!

Written and Prepared by:



Ir. Mah Siew Kien



Ms. Choong Pooi Ying



Ms. Jacquelyne Anne Boudeville

**D**iversity plays a crucial role in scientific excellence and advancement. Recognising the importance of promoting diversity in education, IEM Women Engineers Section (WE) has been playing a role in supporting Women in Zcience (WiZ) each year. This signature programme, organised by Tech Dome Penang, in collaboration with the Penang Women's Development Corporation (PWDC), is aimed at fostering scientific learning among children and building a strong foundation of continuous learning for their future.

This year, the programme was launched on 28 March 2023 with workshops and competitions in science, technology, engineering and mathematics (STEM). Some 250 students from six schools benefitted from this programme.



The Launching of WiZ 2023

During the launch of WiZ, IEM WE representative Ir. Mah Siew Kien delivered a talk titled From Classroom to Career, which emphasised the importance of STEM subjects. She gave inspiring advice and reminders to participants to stay steadfast as they diligently pursue their dreams in the engineering profession.

Next, a speaker from Intel, Dr Beth Yam, delivered an interesting talk titled Inspiring Women Engineers. She shared the contributions of women in the engineering industry as well as the breaking stereotypes surrounding gender roles within the STEM field. To enhance the learning experience, there was also a panel sharing session comprising women

engineers from top semiconductor companies such as Intel, Flex, Plexus and Jabil. The session provided opportunities for participants to interact face to face with the panellists. This way, they would gain invaluable advice on embracing diversity at workplace and overcoming challenges which would lead to successful careers in engineering.



The IEM-WE Drone Team

One of the highlights of the WiZ programme was the drone workshop and challenge on 13 May 2023 at Tech Dome, Penang. The workshop was conducted by 3 IEM representatives – Ir. Mah, Ms. Pooi Ying and Ms. Jacquelyne – and students from First City University College, headed by lecturer Ms. Shuhada from the Faculty of Engineering and Computing as well as representatives from Tech Dome.

At this workshop, students were exposed to drone technology including the essential 21st century developmental skills such as coding, problem-solving and teamwork.

During the workshop, the students were given an hour-long tutorial on drone coding and control. This introductory session familiarised them with the basic principles of drone manoeuvrings and laid the foundation for the practical segment of the workshop. Subsequently, the participants were allocated another hour to apply the coding skills to control the drones for executing set tasks. The workshop not only exposed the students to cutting-edge drone technology but also demonstrated that STEM was





Panel Sharing on STEM and Engineering

interesting, thus encouraging them to embrace STEM subjects and to pursue careers in engineering and its related fields. The hands-on experience with drones and coding were aimed at igniting curiosity, nurturing problem-solving abilities and inspiring passion for scientific explorations.



Students Trying the Controls of the Drone

To conclude the workshop, a thrilling drone challenge was organised where participants had the opportunity to showcase their skills and compete for the top honours. It required participating teams to complete a set course with their drones in the fastest time to test their agility, precision and control. These required participants to effectively apply coding techniques to optimise the flight paths of drones

The support and commitment rendered by the Women Engineers Section, Tech Dome Penang and the PWDC in promoting diversity and scientific learning were commendable. IEM WES is honoured to be able to contribute to the programme which has created an inclusive and innovative future driven by women's talents in science. ■

## CONGRATULATIONS

*IEM Council and Management would like to extend our heartiest congratulations to the following award recipients on their conferment by YAB Tuan Yang Terutama Yang di-Pertua Negeri Pulau Pinang, YB Tun Dato' Seri Utama Ahmad Fuzi bin Haji Abdul Razak on the occasion of his 74th birthday on 8 July 2023.*

**YBhg. Tan Sri Dato' Seri Academician Ir. Professor Emeritus Dr Chuah Hean Teik** on being conferred the Darjah Gemilang Pangkuan Negeri (D.G.P.N.) which carries the title Dato' Seri.

**YBhg. Dato' Seri Ir. Ahmad Zakiyuddin bin Abd Rahman** on being conferred the Darjah Gemilang Pangkuan Negeri (D.G.P.N.) which carries the title Dato' Seri.

**YBhg. Dato' Seri Dato' Indera Ir. Baharin bin Din** on being conferred the Darjah Panglima Pangkuan Negeri (D.P.P.N.) which carries the title Dato' Seri.

**YBhg. Dato' Ir. Ratna Rajah a/l Sivapiragasam** on being conferred the Darjah Setia Pangkuan Negeri (D.S.P.N.) which carries the title Dato'.

**Ir. Bernard Lim Kee Weng** on being conferred the Darjah Johan Negeri (D.J.N.).

**Ir. Dr Lee Choo Yong** on being conferred the Pingat Kelakuan Terpuji (P.K.T.).



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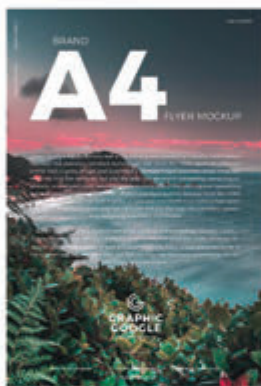
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# The 34th International Invention & Innovation Exhibition (ITEX) 2023

Written and Prepared by:



Ir. Prof. Dr Leong Wai Yie

**Y**B. Tuan Chang Lih Kang, Minister of Science, Technology & Innovation inaugurated the 34th International Invention & Innovation Exhibition (ITEX) which highlighted the outcomes of Innovation Education in May 2023. Many young inventors from various institutions, both local and foreign, were present to present their innovations and ideas.



Picture 1: Of Over 700 Entries, More than 80% Focused on Climate Technology Solutions



Picture 2: Tuan Chang Lih Kang, Minister of Science, Technology & Innovation at ITEX 2023

ITEX had taken proactive steps to address the climate crisis by bringing together inventive minds from around the world to create sustainable climate technology solutions.

Tuan Chang said he was excited about the impact to be obtained through ITEX in dealing with climate change. He said: "As the theme is Technology Reversing Climate Change, I am excited to see innovative new solutions which have been built based on energy efficient technology or using renewable energy sources, reducing carbon emissions and using recycled or recyclable materials."

He was also proud of the role that ITEX had played in advancing invention and innovation in the country and

encouraging the growth of local creators as this was in line with Creativity, one of the core aims of Malaysia MADANI. The exhibition went hand in hand with the Government's desire to spearhead future-oriented policies designed to stimulate local creativity and expertise, as well as to empower the people in developing solutions engineered towards a peaceful and prosperous country.

The two-day exhibition received over 700 entries with more than 80% focussing on climate technology solutions. Local institutions and individuals made up nearly 60% of the participants who had come from 19 countries and regions. ■



Picture 3: Inventors from Hong Kong



Picture 4: Inventors from Indonesia





AN EVENT OF IEM CONVENTION AND HELD CONCURRENTLY WITH  
THE 2ND ENGINEERING EXHIBITION & CONFERENCE 2023 (ENGINEER 2023), MALAYSIA  
FROM 8-9 SEPTEMBER 2023 AT KUALA LUMPUR CONVENTION CENTRE, KUALA LUMPUR

# IEM Convention - ENGINEER 2023

## Standards Drive Environmental, Social and Governance Excellence



The ASEAN Electrotechnical Symposium & Exhibition (IESE 2023), held on 6-7 September 2023 at Plenary Theatre, Kuala Lumpur Convention Centre, centred on the theme, Standards Drive ESG Excellence. It was jointly organised by The Institution of Engineers, Malaysia, Standards Malaysia and Suruhanjaya Tenaga (Energy Commission of Malaysia).

Officiating at the event was YBhg. Datuk Seri Isham bin Ishak, Secretary General, Ministry of Investment, Trade & Industry. A total of 14 speakers were invited to speak on various related topics. The second day featured a forum on Sustainable Energy Solutions & Green Technology, where experts engaged



Organising Chairman Ir. EUR ING Ts. Dr. Lau Chee Yong (right) and the President of the Electrical Engineering Technical Division, IEM, Ir. Dr. Siow Chun Lim (left) with four keynote speakers.

in discussions on ESG, electric vehicle (EV) development, electrical standards, safety, energy efficiency and energy audit.

Taking part were engineering professionals, government officials and policymakers, standards organisations, manufacturers, suppliers and solution providers as well as owners and operators from both domestic and ASEAN countries.

They participated in the four individual sessions on the following topics: Standards Drive ESG Excellence, Energy Efficient Buildings, Climate Change & Carbon Footprint Reduction and ASEAN Power on Electrical Standards. ■

## Safety in Engineering Symposium 2023 (SES 2023)

The Safety in Engineering Symposium 2023, hosted by the Safety in Engineering Special Interest Group under the patronage of The Institution of Engineers, Malaysia, was an enlightening and impactful event. Held under the guidance of organising chairman Dr Ong Chong Yong, it brought together enthusiastic participants from various backgrounds, including an academican, practising engineers, developers, contractors, consultants, manufacturers and the authorities.

The guest of honour was Ir. Zamzurin bin Maarof (Director of Department of Occupational Safety and Health Wilayah Kuala Lumpur & Putrajaya) who officiated at the event. The success of the event could be attributed to the involvement and support from sponsors, honourable speakers, participants and the organising committee.

Key highlights in SES 2023 included presentations on OSCHIM, innovative safety technologies, risk assessment methodologies,



IEM President Ir. Prof. Dr. Norlida binti Buniyamin and Organising Chairman Dr Ong Chong Yong presenting a token of appreciation to Ir. Zamzurin bin Maarof. Looking on are IEM Vice President Ir. Abdul Razak bin Yakob and Chairman of Safety in Engineering Special Interest Group, Ir. Tajul Ariffin bin Mohamed Nori.

and case studies on safety mishaps and their preventive measures.

The vision of the upcoming Safety in Engineering Symposium (SES) is to champion a transformative culture within the engineering community, one in which safety is paramount. We aspire to create an environment of robust knowledge exchange, embracing innovation in safety technologies and methodologies. Through education and heightened

awareness, we aim to empower engineers to proactively embed safety in every facet of their work.

The symposium seeks to bridge local and global collaboration, uniting diverse engineering professionals to collectively address safety challenges. The ultimate goal is to propel the industry toward a future where engineering projects are synonymous with safety, thus ensuring a safer, more secure world for all. Come join us at Safety in Engineering Symposium 2024. ■



## 2nd International Symposium on Recent Advances in Structural Design in Regions of Low-to-Moderate Seismicity



*Invited speakers and symposium sponsors with IEM Deputy President, Ir. Prof. Dr Jeffrey Chiang Choong Luin and the Organising Chairman, Ir. Ng Beng Hooi*



The main organiser for IRASD'2023 is IEM Civil and Structural Engineering Technical Division (CSETD), supported by Swinburne University of Technology Sarawak, The University of Hong Kong, Monash Malaysia, IStrctE Malaysia Chapter and Concrete Society of Malaysia. A total of about 140 participants attended the one-day symposium at KLCC plenary theatre on 8 September 2023, in conjunction with the IEM Convention 2023.

Following the first IRASD'2019 held in Hong Kong, the IRASD'2023 is to resume the series after four years, bringing nine distinguished speakers, with a balance of academics and practitioners from Australia, Hong Kong, Singapore and Malaysia to share with the Malaysian engineering community on the updated knowledge of structural design of building structures in regions of low-to-moderate seismicity.

The topics presented by the speakers include free online seismic analysis tools, design of shear walls and coupling beams, seismic assessments, post-installed rebars, precast concrete connections, high damping rubber in bridges, philosophical design for tall buildings in low seismic but strong wind regions and geotechnical seismic isolation.

It was observed that many practicing engineers were interested in the tall building seismic design and directed the questions to speakers like Dr Goman Ho, Dr Kam, Dr Ray Su and Prof. Nelson Lam. Some feedback received from student participants was that the topic of geotechnical seismic isolation was interesting. ■

## 1st Malaysia China Engineering Digital Transformation Summit 2023

The 1st Malaysia China Engineering Digital Transformation Summit 2023, with the theme, Convergence of Digital Transformation & Sustainability, was held on 8 September 2023 at the KL Convention Centre in Kuala Lumpur, based on a hybrid version. It was jointly organised by the Institution of Engineers Malaysia, Infrastructure University Kuala Lumpur (IUKL), Huaqiao University, TusStar Malaysia, The Federation of Chinese Associations Malaysia (Huazong), Chinese Mechanical Engineering Society Malaysia Chapter and ASEAN Engineering Inspector for Manufacturing.

The sub-themes were Women in Digital Transformation, Belt & Road initiative, Digital Organisation, Digital Process & Technology and Sustainability. The welcome speech was delivered by the IUKL President/Vice-Chancellor YBhg. Dato' Prof. Dr Noor Inayah binti Ya'akub and IEM President Ir. Prof. Dr Norlida binti Buniyamin. The Distinguished Opening Guest of Honour was YBhg. Academician Dato' Ir. Dr Lee Yee Cheong, the Honorary Chairman of International Science Technology & Innovation Centre for South-South Cooperation under the

auspices of UNESCO (ISTIC), KL. The Distinguished International Keynote Speaker was Prof. Dr Shahbaz Khan. The honorary Keynote Speaker was Dr Pei Huang, Deputy Secretary General of the International Coalition of Intelligent Manufacturing. The organising Chair of the Summit was YBhg. Dato' Prof. Dr Noor Inayah binti Ya'akub, President/Vice-Chancellor of IUKL; she was assisted by Ir. Ts. Prof. Dr Tan Chee Fai, Deputy Vice-Chancellor, IUKL and Vice President of IEM.



*Presenters at the Summit*



*IEM President with invited guests of the Summit*

The participants were from ASEAN countries, Asia Pacific and African countries. Counsellor Zhao Xiangdong of the Chinese Embassy in Malaysia visited the summit to give support. There were 30 panellists from various organisations such as National Aerospace Industry Corporation Malaysia, MATRADE, IUKL, Huazong, Malaysia Productivity Corporation, Malaysian National Computer Confederation, Malaysia Association of Sustainable Supply Chain & Innovation, Small & Medium Enterprises Association of Malaysia, IEM, Huaqiao University, University of Glasgow and IEEE Malaysia.

The new Malaysia National Industrial Master Plan and various topics in digital transformation and sustainability were discussed during the forum. ■



## 2nd Edition of Project Management Conference 2023

The 2nd edition of Project Management Conference (PROMAC) 2023 took place on 9 September 2023 at the Kuala Lumpur Convention Centre, in collaboration with IEM Engineer's Week. The theme was Advancing Project Management: Agile and Beyond 2023.



Participants at the 2nd edition of Project Management Conference 2023

The welcome speech was delivered by IEM Deputy President Ir. Prof. Dr Jeffrey Chiang Choong Luin. Following this, the Guest of Honour, YBhg. Datuk Ir. Ahmad Redza bin Ghulam

Rasool, the Director General of Jabatan Kerja Raya (JKR) Malaysia, delivered a thought-provoking keynote address titled Agile and New Ways of Project Management, setting the tone for the entire conference.

PROMAC 2023 focused on three core sub-themes, each of which played a pivotal role in shaping the discussions and insights shared during the conference:

Theme 1: Governance and Integrity in Managing Projects.

Theme 2: Adapting to the Post-Pandemic Era: Embracing Digitalisation in Project Delivery.

Theme 3: Agility in Supporting Sustainability Initiatives: Energy, Renewable Resources and Low Carbon Economy.

There was active participation from the 145 delegates; 105 attended in person and an additional 40 joined in virtually. This hybrid approach ensured that our valuable insights could reach a more diverse and broader audience.

The Organising Committee extends its deepest gratitude to the platinum sponsors, Affin Bank Berhad and Bina CloudTech Sdn Bhd., whose unwavering support and commitment have helped make the conference a huge success. We also applaud the entire organising team whose dedication, hard work and tireless efforts have made PROMAC 2023 a reality.

Together, we are not merely shaping Project Management in Malaysia but we are also paving the way for innovation, excellence and sustainable progress in the industry. As we look forward to future editions of PROMAC, we are confident that the momentum and enthusiasm generated by this event will continue to drive positive change and elevate the field of Project Management in Malaysia and beyond. ■



## Smart & Sustainability Cities Engineering Symposium 2023

The Smart & Sustainability Cities Engineering Symposium 2023 (SSCES 2023) was held on 9 September 2023 at the KL Convention Centre, Kuala Lumpur. With Advancing the Future of Smart & Inclusive Developments as its main theme, the event was organised by the Urban Engineering Development Special Interest Group of The Institution of Engineers, Malaysia (IEM-UEDSIG).

IEM-UEDSIG would like to express its gratitude to the guest of honour, YBrs. TPr. Md. Nazri bin Abdullah, the Deputy Director (Planning) of the Federal Department of Town & Country Planning Malaysia (PLANMalaysia). He was accompanied by IEM Vice President Ir. Yau Chau Fong at the opening ceremony. The support given by PLANMalaysia at SSCES 2023 shows its dedication and readiness to catalyse the future advancement of the smart cities planning and development in the country.

The hybrid symposium was attended by 124 physical participants and 178 virtual attendees who came from various backgrounds, including Government Body GLC Institution Consultants and Contractors from Malaysia and Indonesia, Developers, Universities Professors, Lecturers, Sponsors Representatives from Danfoss Malaysia Sdn Bhd, Veolia Water (Malaysia) Sdn Bhd, IJM Corporation Sdn Bhd, AAE Solution Sdn Bhd, Ecolink Engineering Sdn Bhd, BSS Development Sdn Bhd, Danfoss Malaysia Sdn Bhd, Ecolink Engineering Sdn Bhd, AAE Solution Sdn Bhd, Hisense (Malaysia) Sdn Bhd, SaveLite Engineering Sdn Bhd and PLUS PM Consultant Sdn Bhd.

The speakers' topics highlighted three main aspects – Smart, Sustainable and Engineering



– which facilitated the future of living in the concept of a smart city. Speakers shared their experiences and insights into the current technologies of smart, sustainable cities, the challenges they faced and the future trend in smart cities development. The development of smart and sustainable cities will focus on decarbonisation through carbon footprint reduction



Organising committee of the SSCES 2023 Symposium

programmes such as green building design, energy generation transition, circular economy and lowering the dependency on fossil fuels in future. With the participation of TNBX Sdn. Bhd.,

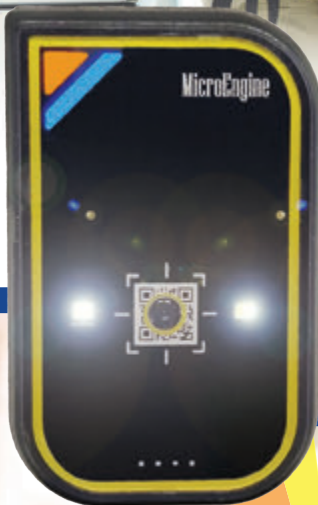
participants were exposed to smart and innovative solutions in renewable energy and energy efficiency for homes and businesses towards achieving net-zero target.

SSCES 2023 served as a pivotal platform for the exchange of ideas, experiences and insights into smart and sustainable city development. Here are some highlights during the event:

- Energy transition
- Green building design
- Advance technologies focusing on energy efficiency
- Sustainable conscious community
- Citizen centric smart cities. ■

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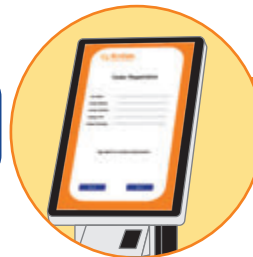
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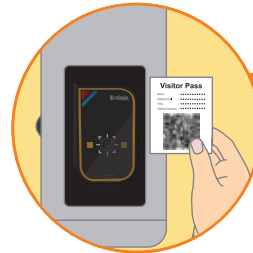
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# Chemical Safety Essentials: Protecting Lives and the Environment

Chemicals are pervasive in our daily lives, contributing to various industries such as manufacturing, agriculture, healthcare, and research. While they are essential, improper handling and management of chemicals can lead to serious hazards for human health and the environment. Herein, we briefly explore the fundamental principles of chemical safety, with a focus on the applicable Malaysian laws and regulations governing their safe use and management.

## Understanding Chemical Hazards

It is crucial to grasp the various hazards associated with chemicals. This is imperative so we can comprehend and thus protect and prevent ourselves from chemical hazards. Chemical hazards can be broadly categorised into four (4) main types that are (i) physical, (ii) health, (iii) environmental and (iv) biological hazards. Physical hazards encompass properties like flammability, explosiveness, reactivity, and corrosiveness. Chemicals with physical hazards can lead to immediate dangers if not handled with care. Chemicals can also pose risks to human health, potentially



An employee working with chemicals wears complete Personal Protective Equipment (PPE)



There are numerous chemical applications in a factory like this

causing toxicity, carcinogenicity, or other adverse health effects, and this falls under health hazards category. Environmental hazards occur when some chemicals harm the environment by polluting soil, water, and air. They may also accumulate in ecosystems, causing long-term harm to biodiversity. Finally, biological hazards happen when certain chemicals harbour biological risks, such as promoting the growth of harmful microorganisms if not stored or handled correctly.

## Basic Principles of Chemical Safety

It's essential to embrace fundamental principles of chemical safety when working with or around chemicals. The following are the key basic principles of chemical safety:

### 1. Hazard Identification and Classification

Recognise and classify chemicals according to their hazards. Ensure proper labeling, safety data sheets, and hazard communication, and following the Global Harmonized System (GHS) guidelines and local regulations.

### 2. Risk Assessment

Conduct thorough risk assessments for chemical handling and storage activities. Identify potential hazards, evaluate the risks, and implement appropriate control measures.

### 3. Personal Protective Equipment (PPE)

Provide and use appropriate PPE, such as gloves, goggles, lab coats, and respirators, as needed to protect against chemical exposure.

### 4. Safe Handling and Storage

Follow recommended handling and storage practices to prevent accidents, chemical reactions, and environmental contamination. Store chemicals in compatible containers and storage areas.

### 5. Emergency Preparedness

Develop and implement emergency response plans, including spill containment procedures and first aid protocols, to minimise harm in case of accidents.

### 6. Training and Education

Ensure that all individuals working with chemicals receive proper

Written and Prepared by:



Ir. Ts. Assoc. Prof.  
Dr Zaki Yamani  
bin Zakaria

Committee Member of SESIG, and a Fellow Researcher at the Centre for Engineering Education and from the Faculty of Chemical & Energy Engineering, Universiti Teknologi Malaysia.

training on safe handling, storage, and disposal practices in compliance with Malaysian regulations.

### 7. Environmental Responsibility

Emphasize responsible chemical management by adhering to environmental laws and regulations. Dispose hazardous waste in accordance with DOE guidelines and schedule waste management practices.

## Applicable Malaysian Laws and Regulations

Key laws and regulations that govern chemical safety in Malaysia include:

- Occupational Safety and Health Act 1994 (OSHA 1994)
- Environmental Quality Act 1974 (EQA 1974)
- Use and Standard of Exposure Chemical Hazardous to Health Regulations 2000 (USECHH Regulations)
- Chemical Health Risk Assessment (CHRA)
- Globally Harmonised System of Classification and Labelling of Chemicals (GHS)

## Conclusions

In sum, prioritising chemical safety is crucial for safeguarding both human lives and the environment. By adhering to rigorous safety protocols, conducting risk assessments, and enforcing regulations, we can minimise the potential hazards posed by chemicals. Preserving our health and the planet's well-being is a shared responsibility. Embracing these essentials is an essential step towards a safer and more sustainable future for all. ■



Tarikh: 18 Oktober 2023

Kepada Semua Ahli,

**SENARAI CALON-CALON YANG LAYAK MENDUDUKI TEMUDUGA PROFESIONAL TAHUN 2023**

Berikut adalah senarai calon yang layak untuk menduduki Temuduga Profesional bagi tahun 2023.

Mengikut Undang-Undang Kecil IEM, Seksyen 3.8, nama-nama seperti tersenarai berikut diterbitkan sebagai calon-calon yang layak untuk menjadi Ahli Institusi, dengan syarat bahawa mereka lulus Temuduga Profesional tahun 2023.

Sekiranya terdapat Ahli Korporat yang mempunyai bantahan terhadap mana-mana calon yang didapati tidak sesuai untuk menduduki Temuduga Profesional, surat bantahan boleh dikemukakan kepada Setiausaha Kehormat, IEM. Surat bantahan hendaklah dikemukakan sebulan dari tarikh penerbitan dikeluarkan.

**Ir. Prof. Dr Zuhaina binti Zakaria**

Setiausaha Kehormat, IEM

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84270	LEE SHEE ZIE	BE (UTM) (CIVIL, 2018)
33564	MOHAMMAD LUFMAN BIN SABRI	BE HONS (UTM) (CIVIL, 2009)
115734	NORLIDA BINTI RAMLEE	BE HONS (UTM) (CIVIL, 2014)
62163	NORSHAZWINA BINTI JOHARI	BE (UTM) (CIVIL, 2012) ME (UTM) (GEOTECHNICAL, 2017)
111319	SUHAILY BINTI SALEH	BE HONS (UTM) (CIVIL, 2014)
78478	YEW CHOO YANG	BE HONS (UMS) (CIVIL, 2012)

KEJURUTERAAN KOMUNIKASI		
113134	MUHAMMAD HAFIYFIY BIN SAFRI	BE (QUEENSLAND) (ELECTRICAL, 2015)

KEJURUTERAAN ELEKTRIK		
96913	LEE XIAN HUAI	BE HONS (NOTTINGHAM) (ELECTRICAL AND ELECTRONIC, 2015) MSc (STAFFORDSHIRE) (ELECTRICAL, 2016)
73728	MUHAMMAD ZUHDI BIN CHE RAHIM	BE HONS (UTeM) (ELECTRICAL, 2018)

<b>KEJURUTERAAN ELEKTRONIK</b>		
21028	ANWAR BIN MOHD ABD MAHI	BE HONS (UTM) (ELECTRICAL, 2001) ME (UTM) (ELECTRICAL-MECHATRONICS & AUTOMATIC CONTROL, 2013)

KEJURUTERAAN MEKANIKAL		
103635	WONG SOONG SENG	BE HONS (SUNDERLAND) (MECHANICAL, 1997)

**KEJURUTERAAN PETROLEUM**

87171 CHEONG ING KEITH

BSc (COLORADO SCHOOL OF MINES)  
(PETROLEUM, 2010)**PERPINDAHAN MENJADI AHLI KORPORAT**

No. Ahli	Nama	Kelayakan
<b>KEJURUTERAAN KIMIA</b>		
94131	MOHD AMINUDIN BIN MANSOR	BE (UTM) (CHEMICAL, 2008)
77956	NG KAY LUP, ANDREW	BE HONS (UTAR) (CHEMICAL, 2016) PhD (UM) (2019)

**KEJURUTERAAN AWAM**

67778	DZULHILMI BIN ZULKIFLI	BE HONS (UTM) (CIVIL (INFRASTRUCTURE), 2016) MSc (USM) (PROJECT MANAGEMENT, 2022)
105667	LIEW ZHEN MIN, EDMUND	BE HONS (UCSI) (CIVIL, 2018)
85532	TIE TZER SHENG	BE HONS (IUKL) (CIVIL, 2017) MSc (UM) (CIVIL, 2022)

**KEJURUTERAAN ELEKTRIKAL**

112882	WONG KOK HONG	BE HONS (UTeM) (ELECTRONICS (COMPUTER ENGINEERING), 2011)
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**KEJURUTERAAN MEKANIKAL**

100912	ONG JING YUAN	BE HONS (UTAR) (MECHANICAL, 2018)
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Pengumuman  
yang ke-180**SENARAI PENDERMA KEPADA WISMA DANA BANGUNAN IEM**

Institusi mengucapkan terima kasih kepada semua yang telah memberikan sumbangan kepada tabung Bangunan Wisma IEM. Ahli-ahli IEM dan pembaca yang ingin memberikan sumbangan boleh berbuat demikian dengan memuat turun borang di laman web IEM <http://www.myiem.org.my> atau menghubungi sekretariat di +603-7968 4001 / 5518 untuk maklumat lanjut. Senarai penyumbang untuk bulan September 2023 adalah seperti jadual di bawah:

NO.	NO. AHLI	NAMA
1	19096	Ir. SHYAM LAKSHMANAN
2	26970	MR. S. VEERAKUMAR A/L S. SUBRAMANIAM
3	38354	MR. AZALAN BIN AHMAD

**CONGRATULATIONS**

Heartiest Congratulations to

**YBhg. First Admiral (R) Dato' Ir. Hj. Ahmad Murad bin Hj. Omar**  
on his appointment as  
President of Maritime Strategic Association of Malaysia  
(MASTRA)  
for session of 2023 - 2025.

**YBhg. Dato' Ir. Dr Dennis Ganendra**  
who has been awarded the prestigious  
British Royal Academy of Engineering (RAE)  
International Fellowship for  
Outstanding Engineering Contributions.





CONTINUATION FROM  
OCTOBER ISSUE 2023PERMOHONAN MENJADI AHLI (MELALUI  
PEPERIKSAAN PENILAIAN PROFESIONAL)

No. Ahli	Nama	Kelayakan
<b>KEJURUTERAAN AWAM</b>		
118565	ERZAL AZDIDI BIN KAMBALI	BE HONS (UITM) (CIVIL, 2010)
118564	FAUZIAH BINTI SIPLI	BE HONS (UITM) (CIVIL, 2009)
118690	LIM HOCK HOO	ME HONS (LONDON) (CIVIL, 2007)
118561	MOHAMED SHAHROM BIN HISHAM	BE HONS (UTM) (CIVIL, 2000)
118849	MOHD SHAHRUL EFFENDY BIN AHMAD	BE HONS (UTM) (CIVIL, 2008)

**KEJURUTERAAN ELEKTRIKAL**

118562	MUHAMMAD ZAMIR BIN MOHD ZAMBERI	BE HONS (UTM) (ELECTRICAL, 2007)
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**KEJURUTERAAN KIMIA**

118689	CHONG CHIEN LOONG	BE HONS (UKM) (CHEMICAL, 2012)
118566	SUHAIMI BIN DERAMAN	BE HONS (SHEFFIELD) (CHEMICAL PROCESS & FUEL TECHNOLOGY, 1991)

**KEJURUTERAAN MEKANIKAL**

118691	HAZRY BIN DESA	BE (TOKUSHIMA) (MECHANICAL, 1997) PhD (OITA) (2007)
118563	MOHD NAJIB BIN TUGIMAN	BE HONS (UITM) (MECHANICAL, 2002)

## PERMINDAHAN KEPADA AHLI 'SENIOR'

No. Ahli	Nama	Kelayakan
<b>KEJURUTERAAN ELEKTRONIK</b>		
89716	RAVINTHRAN A/L MARIAPPAN (Dr)	B.E.HONS.(UKM) (ELECTRICAL, ELECTRONIC & SYSTEM, 2000) M.Sc.(UNITAR) (INFORMATION TECH., 2008) PhD.(OUM)(BUSINESS ADMINISTRATION, 2014)

**KEJURUTERAAN MEKANIKAL**

58699	MOHD AZHARI BIN MOHD RODZI	BSc HONS (RENSSELAER POLYTECHNIC INSTITUTE) (MECHANICAL, 2012) MSc (UITM) (MECHANICAL, 2017)
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PERMOHONAN KEPADA AHLI  
'SENIOR GRADUATE'

No. Ahli	Nama	Kelayakan
<b>KEJURUTERAAN AWAM</b>		
118453	TIONG KUNG LEONG	BE HONS (UTM) (CIVIL, 2006)
118973	LEE PEI CHOW	PhD (UTM) (2014)
118457	THONG WEI YUNG	BE HONS (UTM)(CIVIL, 2007)
118452	ADNAN BIN AZIZ	BE HONS (UTM) (CIVIL, 2001)
118707	AHMAD SELIHIN BIN CHE SAID	BE HONS (UNIMAS)(CIVIL, 2002)

**KEJURUTERAAN ELEKTRIKAL**

118451	SHERYWINA STEPHEN	BE HONS (UMS) (ELECTRICAL & ELECTRONICS, 2011)
118704	ALFRED KUMBAR DAULIN	BE HONS (UMS)(ELECTRICAL & ELECTRONICS, 2011)
118706	LIAW CHONG BENG	BE HONS (SWINBURNE UNI. OF TECH.)(ELECTRICAL-COMMUNICATION & ELECTRONICS, 1992)

**KEJURUTERAAN ELEKTRONIK**

118705	CHUA SING YEE	BE HONS (UTM)(ELECTRICAL-ELECTRONICS, 2005) PhD (MONASH UNI.)(2017)
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**KEJURUTERAAN MEKANIKAL**

118972	ABDUL RAHMAN BIN SAYED ABDULLAH	BE HONS (UNITEN) (MECHANICAL, 2012)
118456	LAI HIN WAI	BE (ADELAIDE) (MECHANICAL, 2002)
118455	LOW SAINT YOUNG	BE HONS (UPM) (MECHANICAL, 2002)
20634	JOLLIFFE ANAK NICHOLAS MUYA	BE HONS (UITM)(MECHANICAL, 2001)
118454	MOHD RAZIF BIN IDRIS	BSc HONS (SUNDERLAND) (MECHANICAL, 1987) PhD (PORTSMOUTH) (2007)

## PERMINDAHAN KEPADA AHLI SISWAZAH

No. Ahli	Nama	Kelayakan
<b>KEJURUTERAAN ALAM SEKITAR</b>		
117336	FONG RUI QIAN	BE HONS (UTAR KAMPAR) (ENVIRONMENTAL, 2022)

**KEJURUTERAAN AWAM**

97756	LAU CHUN WEI, RASLEY	BE HONS (CITY UNI.)(CIVIL, 2020)
94526	WONG WILSON	BE HONS (CURTIN UNI.)(CIVIL & CONSTRUCTION, 2022)
90248	AHMAD KAMIL BIN AMIRUDDIN	BE HONS (IUM)(CIVIL, 2019)
68947	JOANNA ANAK ALI	BE HONS (UITM)(CIVIL, 2016)
81614	LOW YONG LER	BE HONS (UMP)(CIVIL, 2018)
88915	ASNIDAH BINTI ARIF ABDULLAH	BE HONS (UMS)(CIVIL, 2018)
52112	LIM MEI SHING, MICHELLE	BE HONS (UNIMAS)(CIVIL, 2015)
102116	CHING LIANG YI	BE HONS (UTAR SG LONG) (CIVIL, 2022)
104417	MANDY SO SHYUN	BE HONS (UTAR SG LONG) (CIVIL, 2022)
68715	AZIZUL BIN SHAARI	BE HONS (UTHM) (CIVIL, 2015)
92768	LEE MING YUAN	BE HONS (UTM)(CIVIL, 2020)
21258	LEE HONG KIAT	BE HONS (UTM)(CIVIL, 2022)

**KEJURUTERAAN ELEKTRIKAL**

90967	THANG WEN WAI, ERIC	BE HONS (USM)(ELECTRICAL, 2020)
35519	LIM LIEN TZE	BE HONS (UTAR)(ELECTRICAL & ELECTRONIC, 2009) PhD (UPM)(PHOTONICS & FIBER OPTIC SYSTEMS, 2016)
63161	NUSHENTHAN NAIDU A/L CHANDREN	BE HONS (UTeM) (ELECTRICAL, 2016)
63022	MOHAMMAD FITRI ASNAWI BIN ROSMAN	BE HONS (UTeM) (ELECTRICAL-INDUSTRIAL POWER, 2017)
48723	GOH ZAI PENG	BE HONS (UTHM) (ELECTRICAL, 2013) PhD (UPM)(2017)

**KEJURUTERAAN KIMIA**

80768	WONG WAI CHUNG	BE HONS (CURTIN UNI.) (CHEMICAL, 2018)
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**KEJURUTERAAN MEKANIKAL**

71052	PHUA YEONG SIANG	BE HONS (KDU UNI.COLL. ) (MECHANICAL, 2018)
109605	YEOH CHEN WEI	BE HONS (TARC) (MECHANICAL, 2021)
116493	MUHAMMAD FARHAN BIN ROSLAN	BE HONS (THE UNI. OF NEW SOUTH WALES) (MECHANICAL, 2022)
76011	DINIE BIN ABDULLAH ZAMAWI	BE HONS (UITM) (MECHANICAL, 2018)
97696	NAJWA SYAKIRAH BINTI HAMIZAN	BE HONS (UITM) (MECHANICAL, 2020)
51755	NG CHAW SING	BE HONS (UKM) (MECHANICAL, 2016)
105885	LIM DAO YUAN	BE HONS (UTAR SG LONG) (MECHANICAL, 2022)
104397	TAN CHUN WEN	BE HONS (UTAR SG LONG) (MECHANICAL, 2022)
107703	TAI KHAH XIEAN	BE HONS (UTAR SG LONG) (MECHANICAL, 2022)
93385	MOHAMAD SHAFIQ ALI BIN MOHAMED HASSAN ALI	BE HONS (UTM) (MECHANICAL, 2020)
60466	SUE WEI PING	BE HONS (UTP)(MECHANICAL, 2015)
70734	VOON FOO CHUAN	BSc HONS (UMP) (MECHANICAL, 2016)

**KEJURUTERAAN PEMBUATAN**

109704	TIE WEITING KENRICK	BE HONS (UTAR SG LONG)(MATERIALS & MANUFACTURING, 2022)
102128	NG JIA JUN	BE HONS (UTAR SG LONG)(MATERIALS & MANUFACTURING, 2022)
75142	AMMAR FAKHRULLAH BIN ARIFIN	BE HONS (UTeM) (MANUFACTURING, 2019)

## PERMOHONAN MENJADI AHLI SISWAZAH

No. Ahli	Nama	Kelayakan
<b>KEJURUTERAAN AEROANGKASA</b>		
119004	STEVENSON BIN GURAMUN	BE HONS (USM)(AEROSPACE, 2005)

**KEJURUTERAAN ALAM SEKITAR**

119740	LOO YI XIN	BE HONS (UTAR KAMPAR) (ENVIRONMENTAL, 2022)
119739	PAN DE WEI	BE HONS (UTAR KAMPAR) (ENVIRONMENTAL, 2022)

119738	TAN SIN YING	BE HONS (UTAR KAMPAR) (ENVIRONMENTAL, 2022)
119737	TAN YU HENG	BE HONS (UTAR KAMPAR) (ENVIRONMENTAL, 2022)
119736	WARREN TONG MENG WEI	BE HONS (UTAR KAMPAR) (ENVIRONMENTAL, 2022)

**KEJURUTERAAN AUTOMOTIF**

118959	AUDREY WOON SU FERN	BE HONS (UNI. OF HERTFORTHSHIRE) (AUTOMOTIVE, 1998)
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**KEJURUTERAAN AWAM**

118433	CHUA CHUNG CHEAK, REX	BE HONS (CURTIN UNI. OF TECH.)(CIVIL & CONSTRUCTION, 2008)
118413	HO KIEN BING, SAMUEL	BE HONS (CURTIN UNI.)(CIVIL & CONSTRUCTION, 2021)
119027	NOR AMEERA TASHA BINTI KAMARULBAHRIN	BE HONS (IUM)(CIVIL, 2020)
118446	TAN JIN SOON	BE HONS (INTI INTERNATIONAL UNI.)(CIVIL, 2017)
118702	CHUNG XIANG ZHI	BE HONS (IUKL)(CIVIL, 2017)
118436	MOHAMAD ASRUL BIN RAMLY	BE HONS (IUKL)(CIVIL, 2017)
118445	AVINASH RAM A/L KERTARA RAM	BE HONS (KUTTHO)(CIVIL, 2006)
118424	NG SHU MIN	BE HONS (MONASH UNI.) (CIVIL, 2021)
119017	NG CHEE XUAN	BE HONS (MONASH UNI.) (CIVIL, 2022)
118425	CHUNG YUAN LIN, KENNETH	BE HONS (SWINBURNE UNI. OF TECH.)(CIVIL, 2016)
118982	ALBERT CHAI JIN TSONG	BE HONS (SWINBURNE UNI. OF TECHNOLOGY)(CIVIL, 2017)
119020	WONG SE CHENG	BE HONS (SWINBURNE UNI. OF TECHNOLOGY)(CIVIL, 2018)
119028	NAZIA OTHMAN BIN YAHYA	BE HONS (THE UNI. OF BIRMINGHAM)(CIVIL, 1999)
118430	NATASSHA MAE WILIS	BE HONS (THE UNI. OF SHEFFIELD)(CIVIL, 2018) MSc (UNI. OF BIRMINGHAM) (ROAD MANAGEMENT & ENGINEERING, 2019)
118442	KHOR KHER LEE	BE HONS (UCSI UNI.)(CIVIL, 2021)
118943	MUHAMMAD ZARUL AIMAN BIN ZAMREE	BE HONS (UITM)(CIVIL, 2017)
118945	NUR LOKMAN BIN LOKENG	BE HONS (UITM)(CIVIL, 2017)
118708	NUR SYAMIN FATIHAH BINTI JOHARI@BAHA	BE HONS (UITM)(CIVIL, 2021)
118419	MOHAMAD SYAZWAN BIN RADZI	BE HONS (UKM)(CIVIL, 2021)
119016	RUBENDHRAN A/L THAMBIRAJAH	BE HONS (UKM)(CIVIL, 2021)
119011	COLIN HO WAI HON	BE HONS (UKM)(CIVIL, 2021)
118992	MUHAMMAD BIN ALI	BE HONS (UMP)(CIVIL, 2013)
119012	MUHAMMAD IBRAHIM ADHAM BIN GHAZALI	BE HONS (UMP)(CIVIL, 2018)
119000	THIEW JIH HERNG	BE HONS (UMP)(CIVIL, 2021)
118957	JULINDA HENA JUOH	BE HONS (UMS)(CIVIL, 2008)
118427	IGNATIA PIUS	BE HONS (UMS)(CIVIL, 2020)
119005	LIM CHOON KIAT	BE HONS (UNI. OF NOTTINGHAM)(CIVIL, 2010) MSc (UNI. OF NOTTINGHAM) (CIVIL, 2012)
118950	ALEX LIAW TZE WEI	BE HONS (UNI. OF PORTSMOUTH)(CIVIL, 2014) MSc (UNI. OF PORTSMOUTH) (CONSTRUCTION PROJECT MANAGEMENT, 2015)
118981	MOHAMED INAS KAMEL BIN AKBAR BATCHA	BE HONS (UNIMAP)(CIVIL, 2020)
119006	VANESSA ANAK GOLAYOUS	BE HONS (UNIMAS)(CIVIL, 2013)
118441	MUHAMMAD ZUL FATHI BIN AHMAD ZAWAWI	BE HONS (UNITEN)(CIVIL, 2021)
118703	KING SIE WEI	BE HONS (UNSW)(CIVIL, 1989)
118426	TEH SEK YEE	BE HONS (UNSW)(CIVIL, 2012)
119759	GOH YEE HAO	BE HONS (UTAR SG LONG) (CIVIL, 2022)
119757	LIM HAN YUEN	BE HONS (UTAR SG LONG) (CIVIL, 2022)
119751	WANG WEI DONG	BE HONS (UTAR SG LONG) (CIVIL, 2022)

118996	CHUA YI WEI	BE HONS (UTAR)(CIVIL, 2019)
118958	TEO JIEN SHENN	BE HONS (UTAR)(CIVIL, 2020)
118516	ARUMUGAM A/L MUNIAPPAN	BE HONS (UTM)(CIVIL, 2000)
118991	NORSYAZMIRA BINTI NORZAI	BE HONS (UTM)(CIVIL, 2016)
118994	AMIRUL ASYRAF BIN MOHAMMAD	BE HONS (UTM)(CIVIL, 2017)
118439	ABDUL RASAD BIN PATAWI	BE HONS (UTM)(CIVIL, 2021)
118979	MOHD ZAKI BIN DERAMAN	BE HONS (UTM)(CIVIL, 2021)

118949	MOHD RAFI BIN MOHAMED SULAIMAN	BE HONS (UTM)(CIVIL, 2021)
118414	AMIR MOHAMMAD ALIZADA	BSc (MARSHAL FAHIM NATIONAL DEFENCE UNI.) (CIVIL, 2021)
118997	YAP CHUN KEAT	MSc (UITM)(STRUCTURAL, 2021)
118709	TEE RUI JIAN	ME HONS (HERIOT-WATT UNI.) (CIVIL, 2020)
118437	LAU LEE WAY	ME HONS (THE UNI. OF NOTTINGHAM)(CIVIL, 2020)
118448	NG KAI JIA	ME HONS (THE UNI. OF NOTTINGHAM)(CIVIL, 2021)
119008	LYE JIN HONG	ME HONS (UNI. OF NOTTINGHAM)(CIVIL, 2019)

KEJURUTERAAN BIO-PERUBATAN

119763	BOO SHANE PINK	BE HONS (UTAR SG LONG) (BIO-MEDICAL, 2022)
119760	GAN FEI YING	BE HONS (UTAR SG LONG) (BIO-MEDICAL, 2022)
119756	LOW SHIH YI	BE HONS (UTAR SG LONG) (BIO-MEDICAL, 2022)

KEJURUTERAAN ELEKTRIKAL

118984	HUI WAI YAN	BE HONS (UCSI)(ELECTRICAL & ELECTRONIC, 2019)
118435	TAN HONG TZUAN, GABRIEL	BE HONS (UKM)(ELECTRICAL & ELECTRONIC, 2021)
119026	VJANDRAN MANIAM	BE HONS (UMP)(ELECTRICAL, 2015)
119010	LOW KOK HIN	BE HONS (UMP)(ELECTRICAL-POWER SYSTEM, 2017)
118954	MUHAMMAD ARIF BIN MOHD YUSDI	BE HONS (UMP)(ELECTRICAL-POWER SYSTEM, 2020)
118976	TIRUVARASU A/L ARJUNAN	BE HONS (UNI. OF LEICESTER) (ELECTRICAL & ELECTRONIC, 1992)
118980	SYAFIQAH BINTI WAHAB	BE HONS (UNIKL) (ELECTRICAL, 2022)
119001	AHMAD MUDZAFFAR BIN DZULKIFLI	BE HONS (UNIMAP) (ELECTRICAL, 2018)
118418	OOI CHIAN JIN	BE HONS (UniMAP) (ELECTRICAL, 2019)
118985	DARISHINI A/P NADARAJAH	BE HONS (UNITEN)(ELECTRICAL & ELECTRONIC, 2017)
118952	SARAVANA RAJ MARUTHIAH	BE HONS (UNITEN) (ELECTRICAL & ELECTRONICS, 2010)
118947	WAN MOHAMAD ERFAN BIN WAN MUSTAFA	BE HONS (UNITEN) (ELECTRICAL & ELECTRONICS, 2013)
118447	AMIR FIKRI BIN ROSLI	BE HONS (UNITEN) (ELECTRICAL POWER, 2014)
118856	MITRAAMBIGAI SIVANANDHAN	BE HONS (UNITEN) (ELECTRICAL POWER, 2016)
118699	LAVINDREN A/L RAVE	BE HONS (UNITEN) (ELECTRICAL POWER, 2017 )
118443	SALENDRA A/L SATIANESAN	BE HONS (UNITEN) (ELECTRICAL POWER, 2021)
118998	HASBULLAH BIN ABDUL AZIZ	BE HONS (UNITEN) (ELECTRICAL, 2012)
118450	JASON ANANDARAJ VICTOR	BE HONS (UNITEN) (ELECTRICAL POWER, 2018)
118429	MUHAMMAD AMIRUL MUHAM BIN SAZRIL	BE HONS (UPNM) (ELECTRICAL & ELECTRONIC (POWER), 2019)
118422	RIN AMIRUL BIN ISKANDAR KHOR	BE HONS (UPNM)(ELECTRICAL & ELECTRONIC, 2017)
119024	SIVASHANGARI MARUTHAVEERAN	BE HONS (UPNM) (ELECTRICAL POWER, 2020)
118421	MUHAMMAD HELMI BIN HARUN	BE HONS (USM)(ELECTRICAL, 2019)
118415	MUHAMMAD HAZREEQ BIN ABU HASSAN	BE HONS (UteM)(ELECTRICAL - INDUSTRIAL POWER, 2012)
119007	DALE MOJINGKIN	BE HONS (UTHM) (ELECTRICAL, 2008)
118968	AZZJIFAH AH SIONG	BE HONS (UTM)(ELECTRICAL, 2019)
118440	CHOU TING MIN	BE HONS (UTP)(ELECTRICAL & ELECTRONICS, 2020)
119003	MOHD HANAFI BIN MUSTAFFA	BE HONS (UTP)(ELECTRICAL, 2011)
119030	YEO YIN MAY	ME HONS (HERIOT WATT UNI.) (ELECTRICAL & ELECTRONIC, 2021)

## KEJURUTERAAN ELEKTRONIK

REKOR PENAKSI ELEKTRONIK		
118962	CHEW WHEI YI	BE HONS (CURTIN UNI. OF TECH.) (ELECTRONIC & COMMUNICATION, 2016)
118951	AQIL BIN ABDUL KALTHANI	BE HONS (MMU) (ELECTRONIC-COMPUTER, 2012)
119025	MUHAMMAD FAJRL BIN JAFRIM	BE HONS (UITM) (ELECTRICAL-ELECTRONIC, 2020)
118431	MUHAMMAD NASHIHIN BIN MOHD ROKHMAN	BE HONS (UITM) (ELECTRONICS, 2018)
118999	NEOH PHAIK YENG	BE HONS (UNI. OF SHEFFIELD) (ELECTRONIC, 2006) MSc (UNI. OF SHEFFIELD) (CONTROL SYSTEMS, 2007)

118987	NORSYAM AZALI BIN MUHAMMAD SYAMSUL RIDZUAN SIU	BE HONS (UPNM) (ELECTRICAL & ELECTRONIC-COMMUNICATIONS, 2020)
119021	SHAHRLU EIZHAM BIN ROSLAN	BE HONS (UPNM) (ELECTRICAL & ELECTRONIC-COMMUNICATIONS, 2020)
119743	KHAW YI XUAN	BE HONS (UTAR KAMPAR) (ELECTRONIC, 2022)
119742	LEE ZHAO MIN	BE HONS (UTAR KAMPAR) (ELECTRONIC, 2022)
119741	NG WEI SHENG	BE HONS (UTAR KAMPAR) (ELECTRONIC, 2022)
118423	TEE JEN LOOI	BSc (PURDUE UNI.) (ELECTRICAL, 2003) MSc (TAYLOR'S UNI.)(2019)
118941	SITI JUHAIDA YUSOF	BSc (UNI. OF TULSA) (ELECTRONIC, 1999) MSc (UTM) (PROCESS PLANT MANAGEMENT, 2006)

## KEJURUTERAAN KIMIA

118946	KIRESHWEN A/L MARAN	BE HONS (MONASH UNI.) (CHEMICAL, 2022)
118989	MOHD HAFIZ BIN HAMJAH	BE HONS (THE UNI OF MELBOURNE)(CHEMICAL, 2011)
118960	MOHAMED HIZAM BIN MOHAMED NOOR	BE HONS (UiTM)(CHEMICAL & PROCESS, 2017) Mphil (UTM)(ENVIRONMENTAL 2018)
118993	RAJA NOR SYUHADA BINTI RAJAAZAC	BE HONS (UiTM)(CHEMICAL, 2019)
118444	KOH JING YING, GENEE	BE HONS (UPM)(CHEMICAL, 2021)
119762	CHOO KIAN ZUNG	BE HONS (UTAR SG LONG) (CHEMICAL, 2022)
119750	WONG YIK CHUN	BE HONS (UTAR SG LONG) (CHEMICAL, 2022)
118434	CHIN WEI KIT, DANNY	BE HONS (UTAR)(CHEMICAL, 2017)
118942	MUHAMAD AMIRUL LUTFI BIN MOHAMAD AMIR	BE HONS (UTP)(CHEMICAL, 2016)
119014	WONG SI EN	ME HONS (THE UNI OF BIRMINGHAM)(CHEMICAL & ENERGY, 2017)
118953	MATTHEW PANG CHUNG MENG	ME HONS (UNI. OF NOTTINGHAM)(CHEMICAL, 2016)

## KEJURUTERAAN MEKANIKAL

118428	PHOON CHI KIT	BE (MONASH UNI.) (MECHANICAL, 2016)
118412	FIRDAUS BIN MUHAMAD	BE (UMP)(MECHANICAL, 2012)
119018	TAN HOCK CHOY	BE HONS (COVENTRY UNI.) (MECHANICAL, 1998)
118417	WONG ZHEN SIANG, MARVEN	BE HONS (intl INTERNATIONAL UNI.)(MECHANICAL, 2021)
118955	WEE YONG XIN	BE HONS (MMU) (MECHANICAL, 2016)
119015	LUI KAI LUN	BE HONS (MMU) (MECHANICAL, 2018)
118983	NUR ZAFIRAH BINTI SAMSUDIN	BE HONS (SWINBURNE UNI. OF TECHNOLOGY) (MECHANICAL, 2018)
118701	DONNY LIM TOH SENG	BE HONS (THE UNI. OF HERTFORDSHIRE) (MECHANICAL, 2004)
118969	LIM CHERN RUEY	BE HONS (THE UNI. OF NOTTINGHAM) (MECHANICAL, 2013) MSc (UNI. OF MANCHESTER) (AEROSPACE, 2014)
118438	LENG SONG LING	BE HONS (THE UNI. OF SHEFFIELD)(MECHANICAL, 2015) MSc (THE UNI. OF SHEFFIELD) (MECHANICAL & INDUSTRIAL MANAGEMENT, 2016)
118956	MOHD FAUZI BIN HASSIM	BE HONS (UiTM) (MECHANICAL, 2016)
118416	MUHAMAD HILMY BIN MOHAMMAD MUSTAFA AMIN	BE HONS (UiTM) (MECHANICAL, 2017)
118948	MUHAMMAD NASRI BIN MOHAMAD HIDAYAT	BE HONS (UiTM) (MECHANICAL, 2019)
118990	SYIFA SYUHADAH BINTI MEOR ZAINAL	BE HONS (UKM) (MECHANICAL, 2018)
118986	ZAID OTHMAN	BE HONS (UM)(MECHANICAL, 2013)
119013	YIT JING EE	BE HONS (UM)(MECHANICAL, 2018)
119002	KHOSHILA A/P RAJASURIAN	BE HONS (UMP) (MECHANICAL, 2019)
64666	GANANDRAN A/L B. GANESARAJA SINGAM	BE HONS (UNITEN) (MECHANICAL, 2013) ME (UPM)(ENGINEERING MANAGEMENT, 2018)

## NOTICE ON NOMINATION PAPERS FOR COUNCIL ELECTION SESSION 2024/2025

A notice inviting nominations for the Election of Council Members for Session 2024/2025 will be posted on the IEM Notice Board and IEM website by 10 November 2023 for the information of all Corporate Members of IEM. Following the close of nominations on 9 December 2023, the election exercise will proceed. All Corporate Members residing overseas are requested to take note of the requirements of the Bylaw, Section 5.17, as shown below.

*The voting paper (in hardcopy or electronic form) shall, not less than twenty eight (28) clear days before the date of the Annual General Meeting, be sent by post or in electronic mail or message to all Corporate Members. The voting paper (in hardcopy or electronic form) shall be returned or submitted online and in turn notified to the Honorary Secretary in a sealed envelope or electronically encrypted format so as to reach her by a specified date not less than seven (7) days before the Annual General Meeting.*

Electronic Ballot Papers to be sent to all Corporate Members by 4 March 2024.

Thank you.  
*Election Officer, IEM*



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### OPPORTUNITIES, CHALLENGES AND WAY FORWARD ON CARBON CAPTURE FOR CCUS

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Prof. Azmi Mohd Shariff

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9:00 AM - 11:00 AM

AUDITORIUM MALAKOFF  
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# ONE-DAY COURSE ON "HAZOP STUDY WORKSHOP FOR ENGINEERS & MANAGERS "



*When >>*

**30 November 2023 / Thursday**  
9.00 am – 6.00 pm

*Where >>*

**C&S and TUS Room**  
**Wisma IEM, Petaling Jaya**

*Speakers >>*

**Ir. Dr. John Eow**



**BEM Approved CPD Hours: 7.0**  
**IEM23/HQ/081/C**

## Registration Fees

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IEM Corporate Member	<b>400.00</b>	<b>450.00</b>
Non-IEM Member	<b>800.00</b>	<b>900.00</b>

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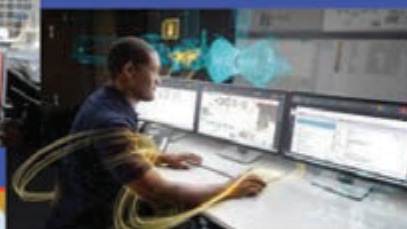
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# ONE-DAY COURSE ON "OFFSHORE SAND SEPARATION: DESIGN, OPERATION & MAINTENANCE"



**When >>**

**1 December 2023 / Friday**  
**9.00 am – 6.00 pm**

**Where >>**

**C&S and TUS Room**  
**Wisma IEM, Petaling Jaya**

**Speakers >>**

**Ir. Dr. John Eow**



**BEM Approved CPD Hours: 7.0**  
**IEM23/HQ/314/C**

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- ☐ National/regional/local government
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