



A PTTES AND SHELL CATALYSTS & TECHNOLOGIES  
COLLABORATIVE EVENT

# AN INNOVATION CONFERENCE

## EXTENDING THE BOUNDARIES



**2-3 DECEMBER 2019**  
AMARI HOTEL, PATTAYA, THAILAND

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**Shell Catalysts & Technologies**

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# AN INNOVATION CONFERENCE

## EXTENDING THE BOUNDARIES

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### AGENDA: DAY ONE, 2 DECEMBER 2019

	SUBJECT
08:00	<b>Registration</b>
09:00	<b>Safety briefing</b>
09:05	<b>Introduction</b>
09:15	<b>Welcome speech and scene setting</b> Dr. Pichairat Jiranunrat, President, PTES
09:30	<b>Keynote speech: The energy industry's challenges and its important role in decarbonisation</b> Mr. Kelvin Halliwell, Regional VP, Technology Licensing & Services, Asia, Shell
10:00	<b>Green innovations: Avoiding the pitfalls</b> Mr. Stephen Andrew McDonald, Senior Consultant – Process Safety, PTES
10:40	Break
11:00	<b>Shell scenarios – Sky</b> Mrs. Dhanarajata Srirajata, Government Relation Director – Thailand, Shell
11:40	<b>The development of a microscale-based heat exchanger: From laboratory to commercialisation</b> Mrs. Nichaporn Sirimungkalakul and Mr. Supawat Dechwongwathana, PTT Public Company Limited
12:20	Lunch
13:30	<b>Energy transition and Shell's ambition for a lower carbon future</b> Mr. Leigh Hsiang Chong, Energy Transition Manager, Shell
14:10	<b>Maximising value in integrated refinery-petrochemicals operations</b> Mr. Jock Hughson, Hydroprocessing Licensing Technology Manager, Shell
14:50	Break
15:10	<b>Revamping hydrocrackers to increase high-value products</b> Mr. Kyung-Shik Jo, Senior Advisor for Basic Design and President, TELA Solutions
15:50	<b>Innovations in energy efficiency and CO<sub>2</sub> emission reduction</b> Mr. Jason Arthur Peebles, Senior Consultant – Process Performance Improvement, PTES
16:30	<b>Extracting maximum value of refinery hydrocarbon streams, solvents and oleochemicals using innovative specialty catalysts</b> Mr. Desmond Tan, Senior Sales Manager, Shell
17:10–17:30	Closing day one



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### AGENDA: DAY TWO, 3 DECEMBER 2019

	SUBJECT
08:00	<b>Registration</b>
09:00	<b>Safety briefing</b>
09:05	<b>Opening day two</b>
09:15	<b>Interactive case study – Process safety</b> Mr. Alan James Munn, Senior Consultant – Process Safety, PTTES
10:15	Break
10:35	<b>Operational excellence focusing on safety (PTW), maintenance efficiency and vulnerability management</b> Mr. Rakesh Jha, Regional Operation Excellence Manager, Shell
11:15	<b>Oil logistics optimisation</b> Mr. Morakot Pongboriboon, Senior Consultant – Supply Chain Optimisation and Loss Management, PTTES
11:55	Lunch
13:00	<b>Advance inspection techniques</b> Mr. Rajeev Madaswamy, Senior Materials and Corrosion Engineer, Shell
13:40	<b>Bowtie and layers of protection analysis (LOPA) integration</b> Mr. Alan James Munn, Senior Consultant – Process Safety, PTTES
14:20	Break
14:40	<b>Advance process control to improve the “gap to potential”</b> Mr. Vivek Venkatesh, Senior Process Control Engineer, Shell
15:20	<b>Terminal Automation Management (TAM)</b> Mr. Phumin Phuangjaisri, Control System Engineer, Thai Oil Public Company Limited
16:00	<b>Extending the life of cyclic duty pressure vessels</b> Mr. Warakorn Nuntaya, Consultant – Reliability and Asset Integrity, PTTES and Shell
16:40–17:00	Closing day two



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# SPEAKER BIOGRAPHIES AND ABSTRACTS

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## KEYNOTE SPEECH: THE ENERGY INDUSTRY'S CHALLENGES AND ITS IMPORTANT ROLE IN DECARBONISATION

Mr. Kelvin Halliwell, Regional VP, Technology Licensing & Services, Asia, Shell Catalysts & Technologies

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### PROFILE

Kelvin Halliwell is the Regional VP for Technology Licensing & Services overseeing the commercial licensing of Shell's technologies and technical services offerings for Asia.

Kelvin has 32 years' experience in the oil and gas industry. He graduated as a chemical engineer in 1985 from the University of Natal, Durban, South Africa and joined Shell, via the joint-venture company Criterion Catalyst Company (now part of Shell Catalysts & Technologies), in 1992 as a commercial manager in the Europe, Middle East, Africa and Russia region. In 2003, he moved from the UK to Singapore with regional responsibility for South East Asia and the Middle East. In 2006, Kelvin moved to Dubai, where he took on a dual role as general manager for CRI/Criterion and technology licensing manager in the Middle East. In 2013, he was appointed the regional VP for midstream technologies. Kelvin moved to Beijing, where he is currently based, in January 2016 and took up his current role in March 2018.

### ABSTRACT

A brief overview of the global energy challenge, the industry's strategic imperatives, Shell's carbon reduction initiatives and 'Nature-Based Solutions', one of Shell's latest initiative towards reducing the industry's carbon footprint through investment in natural ecosystems.

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## GREEN INNOVATIONS: AVOIDING THE PITFALLS

Mr. Stephen Andrew McDonald, Senior Consultant – Process Safety, PTES Technologies

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### PROFILE

Stephen Andrew McDonald is a Senior Consultant – Process Safety at PTES. His areas of expertise include process safety engineering on major capital greenfield and brownfield projects up to US\$10 billion; process safety management in the USA, Europe and SEA, including management systems, operating procedures, management of change, audits and due diligence. Stephen, an accredited hazard study leader, has led HAZID, HAZOP, LOPA, SIL and QRA studies for BP, Shell, Total, Chevron, Exxon, Maersk and DANA. He also has vast experience in fire and explosion risk assessments, control of ignition sources, chemical reaction hazards, active and passive fire protection. He is well versed in barrier management and emergency response planning and regularly provides accident investigation and expert witness services.

### ABSTRACT

Green engineering, defined by the US EPA as "The design, commercialisation, and use of processes and products that minimise pollution, promote sustainability, and protect human health without sacrificing economic viability and efficiency" aims to promote sustainable economic growth whilst minimising adverse impacts of such activity on people, the planet and prosperity. As with all innovations there will be challenges as well as opportunities along the way and this presentation reviews some spectacular environmental own-goals that have occurred in the name of progress as a reminder that it is always necessary to adopt a holistic approach when contemplating change in order to avoid potential pitfalls that may lie in wait as we journey forward.



### SHELL SCENARIOS – SKY

Mrs. Dhanarajata Srirajata, Government Relations Director – Thailand, Shell

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#### PROFILE

Dhanarajata Srirajata is Government Relations Director for Shell Company of Thailand. She steers all business functions in Shell Thailand to cooperate well with the government and drives initiatives to support government strategies especially on New Energies and liquefied natural gas (LNG). She gained her Bachelor of Business Administration (Hons) from Chulalongkorn University, her MBA from Boston College, USA and her PhD in finance from the University of Houston, USA. She also works as an instructor at the University of Houston. Before Shell, Dhanarajata worked as a risk management expert with many overseas firms such as Coral Energy (USA), Reliant Energy (USA), Essent Trading & RWE Supply and Trading (Geneva, Switzerland) and Shell Eastern Trading (Singapore).

#### ABSTRACT

Shell's Sky scenario models how energy will look over the next 50 years. The model has been updated recently with new information on how countries will meet the Paris Agreement on climate change. The presentation discusses how the model will tell us what energy distribution will look like in the near and distant future.

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### THE DEVELOPMENT OF A MICROSCALE-BASED HEAT EXCHANGER: FROM LABORATORY TO COMMERCIALISATION

Mrs. Nichaporn Sirimungkalakul and Mr. Supawat Dechwongwatthana,  
PTT Public Company Limited

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#### PROFILES

Nichaporn Sirimungkalakul is a researcher for PTT Public Company Limited. Her main area of expertise is in computational fluid dynamic simulation, where she has studied stripper performance for a biogas upgrading unit; flow patterns for a microchannel heat exchanger; gas flow in fuel gas chambers; and two-phase flow in a microchannel reactor. She is knowledgeable in microchannel technology such as biohydrogenated diesel production and microchannel heat exchanger.

Supawat Dechwongwatthana is an engineer for PTT Public Company Limited. His work in engineering and project management includes process design and simulation, and LNG satellite stations with cold energy utilisation. He has also been involved in research and development for detailed design and construction schemes for pilot plants, gas to liquids technology, and micro channel reactors.

#### ABSTRACT

A novel design for a microchannel heat exchanger (MHX) had been developed for the petroleum and petrochemical industry. Our MHX, which contains hundreds microchannels, provides the benefits of high heat and mass transfer. We used ANSYS software simulation to design and analyse fluid movement and stress inside the MHX. The first MHX performance trial was conducted at an LLDPE plant and we are now scaling up the MHX for an LNG satellite station with cold utilisation. We assess in the presentation whether MHX would be a good choice for the LNG regasification process.

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## SPEAKER BIOGRAPHIES AND ABSTRACTS

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### ENERGY TRANSITION AND SHELL'S AMBITION FOR A LOWER CARBON FUTURE

Mr. Leigh Hsiang Chong, Energy Transition Manager, Shell

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#### PROFILE

Leigh Hsiang Chong is Energy Transition Manager for Shell companies in Singapore. He integrates and drives focus across business lines to shape Shell's response to energy transition dynamics as part of Shell's aim to provide cleaner energy solutions through collaboration with government agencies and corporate partners. Leigh Hsiang has served across many different business units including Manufacturing, Shell Global Solutions and Global Commercial. In his 21-year Shell career, he has held leadership positions such as Bitumen Regional Supply Manager and Oil Movements Production Unit Manager in Pulau Bukom refinery. He leverages his technical and operations experience to create commercial value in the business through strong advocacy of manufacturing integration to drive business process improvements in energy efficiency, supply chain optimisation and operational excellence. He has a bachelor's degree in chemical engineering from University College London.

#### ABSTRACT

How do we make a transition to a low-carbon energy future to manage the risks of climate change, while also extending the benefits of energy to everyone on the planet? This requires a change in the way energy is produced, used and made accessible to more people while drastically cutting emissions. This transition is under way. It will move at different paces and produce different outcomes in different countries depending on local factors. Fundamental changes need to happen across the global economy, especially in power, transport, buildings and industry – four major sectors where energy is consumed and that produce significant energy-related carbon dioxide emissions. What is Shell's ambition for a lower carbon future and how does it intend to fulfil it?



### MAXIMISING VALUE IN INTEGRATED REFINERY-PETROCHEMICALS OPERATIONS

Mr. Jock Hughson, Hydroprocessing Licensing Technology Manager, Shell

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#### PROFILE

Jock Hughson is Principal Licensing Technology Manager for Shell Catalysts & Technologies based in Singapore. He is a chemical engineer, with a degree from the University of Melbourne, and has more than 32 years' experience. He has held senior technical positions at Shell's Australian and Qatar operating sites, and specialist design and technology licensing roles for Shell Global Solutions in the Netherlands and Singapore.

#### ABSTRACT

Traditional fuel and petrochemical products face downward pricing pressure, which is prompting more refinery operators to investigate or expand their production of chemical feedstock intermediates. This presentation looks at the regional market supply and demand for chemical intermediates and presents Shell's view on how to extract maximum value from operating integrated sites with a focus on steam cracker feed and aromatics intermediates.



## REVAMPING HYDROCRACKERS TO INCREASE HIGH-VALUE PRODUCTS

Mr. Kyung-Shik Jo, Senior Advisor for Basic Design and President, TELA Solutions

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### PROFILES

**Author:** Min-Gu Her is the team leader of the renovation team at the S-Oil refinery in South Korea. He graduated with a BS in chemical engineering and joined S-OIL in 2005. He worked as a technical service engineer for a hydrocracking and lubricant base oil dewaxing plant for 10 years and was the Project Engineer for Renovation, Revamping of Aromatics, RFCC and Hydrocracking before his current role.

**Presenter:** Kyung-Shik Jo is Senior Advisor for Basic Design and President of TELA Solutions. Upon graduating with a BS in chemical engineering in 1989, Kyung Shik worked as a process and project engineer for distillation units and conversion processes at Hyundai Oilbank refinery. He then moved to Incheon oil refinery where he was Technical Service and Operation Manager before joining Shell Global Solutions and Criterion at Shell Korea as a technical service engineer. Kyung-Shik founded TELA Solutions in 2009 and undertakes basic design and engineering work with Shell Catalysts and Technologies in the South Korean refinery sector.

### ABSTRACT

S-OIL is currently undertaking the S-OIL Upgrading Program of Existing Refinery (SUPER) project to raise profitability by increasing production of high value-added products at the same time as reducing operating costs in refining and petrochemical businesses. This presentation shares two case studies of working with technology partners to revamp and improve the existing dual-fuel lubricants hydrocracker and mild hydrocracker undertaken as part of the SUPER project.

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## INNOVATIONS IN ENERGY EFFICIENCY AND CO2 EMISSION REDUCTION

Mr. Jason Arthur Peebles, Senior Consultant – Process Performance Improvement, PTTES

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### PROFILE

Jason Arthur Peebles is Senior Consultant – Process Performance Improvement for PTTES. He is a gas processing specialist widely experienced and knowledgeable in project management and execution for offshore oil and gas facilities; feasibility and conceptual studies; plant performance testing and debottlenecking studies; process simulations; pipeline modelling and flow assurance studies; pressure relief and flare/vent systems and light liquids processing for LNG, NGL, LPG, condensate, etc. He is also involved in researching and evaluating new gas technologies.

### ABSTRACT

Energy efficiency and reduction of greenhouse emissions is becoming an increasing area of focus in Thailand and internationally. New technologies are being considered for increasing plant efficiency and energy loss reduction, and technologies that may have been unfeasible in the past are now being considered as more practical. This presentation discusses some areas of development for increasing the energy efficiency of facilities, including low-temperature waste heat recovery, and LNG regasification facilities.

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## SPEAKER BIOGRAPHIES AND ABSTRACTS

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### EXTRACTING MAXIMUM VALUE OF REFINERY HYDROCARBON STREAMS, SOLVENTS AND OLEOCHEMICALS USING INNOVATIVE SPECIALTY CATALYSTS

Mr. Desmond Tan, Senior Sales Manager, Shell

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#### PROFILE

Desmond Tan is Senior Sales Manager at Shell Catalysts & Technologies (SCT) – Specialty Catalysts, based in Singapore. He has a bachelors' degree in chemical engineering (with minor in law) from the National University of Singapore and a graduate diploma in business administration from Singapore Institute of Management. Desmond previously worked as a refinery process engineer and held several sales and senior business positions before assuming his present responsibilities in Shell's Specialty Catalysts group.

#### ABSTRACT

With the advent of the large integrated refinery-petrochemical complexes starting up in China and across the Asia-Pacific region, traditional fuel and petrochemical products face downward pricing pressures. More operators need to be creative and look for further growth areas to utilise or upgrade feedstock to higher value products. Specialty Catalyst's range of treatment catalysts and upgrading catalysts for solvents and oleochemicals offers new opportunities to Thailand's oil and gas customers.

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### INTERACTIVE CASE STUDY – PROCESS SAFETY AND BOWTIE AND LAYERS OF PROTECTION ANALYSIS (LOPA) INTEGRATION

Mr. Alan James Munn, Senior Consultant – Process Safety, PTTEC

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#### PROFILE

Alan James Munn is Senior Consultant – Process Safety at PTTEC. He is a hazard study (HAZOP, HAZID, PHR) leader and LOPA/SIL study leader. His areas of expertise include process Safety reviews and health-checks; process safety audits, management and design; incident investigation and plant troubleshooting; refinery emissions reduction strategies; safety case/ALARP assessments; and storage tank process safety design.

#### ABSTRACT: Interactive case study – Process safety

The Institution of Chemical Engineers (UK) has developed a series of interactive case studies where the audience is asked to make decisions that affect the outcome of a particular scenario. A storage tank facility will be used for the exercise. Delegates will vote using 'live' polling software. A best practice roadmap for storage tank facilities based on international best practice will be presented at the end of the session.

#### ABSTRACT: Bowtie and layers of protection analysis (LOPA) integration

Bowties are an excellent way to visualise and manage operational risk and are presently being rolled out across the PTT Group. There is a desire to integrate the existing LOPA analysis on the bowties to quantify the risk in a more detail. There are, however, several differences in each approach presenting some practical problems. This presentation will address these issues and show a live example of how this can be done and the results.



## OPERATIONAL EXCELLENCE FOCUSING ON SAFETY (PTW), MAINTENANCE EFFICIENCY AND VULNERABILITY MANAGEMENT

Mr. Rakesh Jha, Regional Operation Excellence Manager, Shell

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### PROFILE

Rakesh Jha is currently Operational Excellence Lead for East and Middle East regions for Asset Support (DS and 3P/Licensing). He trained as a mechanical engineer and obtained his MBA from Mumbai University, India. Rakesh has 25 years' experience of maintenance, reliability and turnaround issues in the oil and gas industry, covering downstream (refineries and petrochemical), midstream (gas assets) and upstream. His recent work has been in asset performance and competency improvement. He is also the Shell regional focal point for various reliability processes.

### ABSTRACT

**a. Digitalisation:** An electronic tool to support the efficient application of Shell's permit-to-work (PTW) system, which embeds standard PTW and safe isolation systems across all Shell businesses.

**b. Application of motion-amplified HD video:** Vibration issues associated with rotating equipment, piping and electrical motors are encountered in operating assets, but it is not always easy to access these locations. New technology consisting of a HD camera and a laptop is proposed to visualise vibrations in a HD video using motion amplification.

**c. Managing vulnerability using new hot bolt clamp tool:** Corroded bolts or the use of non-standard bolts can cause system vulnerabilities, but it is a challenge to replace these bolts quickly and safely and may cause production losses. A new hot bolt clamp is proposed for replacing bolts on flanged connections with no disruption to production.

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## OIL LOGISTICS OPTIMISATION

Mr. Morakot Pongboriboon, Senior Consultant – Supply Chain Optimisation and Loss Management, PTTES

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### PROFILE

Morakot Pongboriboon is Senior Consultant – Supply Chain Optimisation and Loss Management for PTTES. He has previously been a process engineer at an aromatics plant for SK E&S in Korea. His areas of expertise are in oil movement rationalisation/optimisation; supply chain operational reviews; crude handling optimisation; project development and feasibility studies for refineries and aromatics/olefins plant synergy projects; gasoline/gasoil blending optimisation; front-end engineering for hexamethylene diisocyanate derivative plants; waterfront rationalisation; hydrocarbon stock management; distribution network optimisation and masterplans; process simulations; distribution network optimisation software development; and benchmarking for aromatics plants and oil and gas terminals.

### ABSTRACT

An oil logistics model can be developed and used to optimise the oil logistics network to know how owned and third-party terminals in the network can be best integrated and to decide the best mode of transportation, and where, how and how much it should be utilised. Costs and service levels are considered in this presentation to provide an insightful view on what an optimum network would look like and how facilities in this network could be developed in the future.

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# SPEAKER BIOGRAPHIES AND ABSTRACTS

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## ADVANCE INSPECTION TECHNIQUES

Mr. Rajeev Madaswamy, Senior Materials and Corrosion Engineer, Shell

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### PROFILE

Rajeev Madaswamy is currently Senior Materials & Corrosion Engineer for Shell Projects & Technology Centre, Bangalore, Mechanical, Materials & Integrity section (MMI). He trained as a metallurgical engineer (with a degree from National Institute of Technology, India) and has more than 25 years of experience in materials, corrosion and asset integrity at downstream refineries and petrochemical plants. Rajeev is also a subject matter expert in facilitating and developing risk-based inspection modules and reviews of operating units and new projects in the downstream and integrated gas sectors. Other experience includes asset integrity reviews of operating units, troubleshooting of materials and corrosion issues, failure analysis, pre-start up safety reviews and asset integrity support during pre-commissioning/start-up activities at refineries and petrochemical plants.

### ABSTRACT

Three new advanced techniques will be presented to support challenges in refineries on asset reliability and integrity, and TA:

- MISI (NII, robotic inspection)
  - remotely operated aerial vehicles
  - advanced inspection for corrosion under pipe support.
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## ADVANCE PROCESS CONTROL TO IMPROVE THE "GAP TO POTENTIAL"

Mr. Vivek Venkatesh, Senior Process Control Engineer, Shell

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### PROFILE

Vivek Venkatesh is a subject matter expert and Senior Process Control Engineer at Shell Technology Centre, Bangalore. Vivek has about 20 years of experience in process control, and had developed & commissioned several unit-wide APC applications (refining, petrochemical & gas processing) with complex base-layer control strategies. He is also the Technology Replication Thrust discipline focal point for Instrumentation, Control & Electrical. Vivek holds a Bachelor of Chemical Engineering (1st class, Hons) from Mumbai University and a Master of Technology in Chemicals from IIT Mumbai. After graduation, he worked with numerous companies including ABB, Emerson and Shell refineries.

### ABSTRACT

Advanced process control (also known as model predictive control) is a method of controlling dynamically interacting processes. PACE (Platform for Advanced Control and Estimation) is Shell's revolutionary technology for advanced process control. The application computes control actions based on a multivariable prediction of the future. Advanced process control can be applied to all continuous processes where there is a desire to decrease variability or stabilise operations, maximise production, decrease energy consumption and increase yields.



### **TERMINAL AUTOMATION MANAGEMENT (TAM)**

Mr. Phumin Phuangjaisri, Control System Engineer, Thai Oil Public Company Limited

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#### **PROFILE**

Phumin Phuangjaisri is a control system engineer for Thai Oil.

#### **ABSTRACT**

Terminal automation management (TAM) is a lorry terminal management system that Thai Oil has created to improve the efficiency of oil distribution at its Sriracha terminal by applying advanced queuing management and stable matching technology. The main benefits are leveraging work efficiency and providing high-quality customer service.

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### **EXTENDING THE LIFE OF CYCLIC DUTY PRESSURE VESSELS**

Mr. Warakorn Nuntaya, Consultant – Reliability and Asset Integrity, PTTES and Shell

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#### **PROFILE**

Warakorn Nuntaya is Consultant – Reliability & Asset Integrity for PTTES and Shell. He is widely experienced in maintenance and inspection including strategies, turnaround management, corrosion management and control, piping and pressure vessel inspection, and pressure relief device maintenance and inspection. His reliability and asset integrity management skills include incident investigation and failure analysis, risk-based inspection (API580), process safety management, and mechanical integrity and quality assurance.

#### **ABSTRACT**

Cyclic duty pressure vessels are designed for a fixed number of pressure vessels. Once this life is exceeded, a fitness for service assessment must be undertaken to ensure continued safe and reliable operation. A client in Thailand has several vessels that have exceeded or are close to the end of their life. PTTES and Shell Catalysts & Technologies have joined to deliver a solution that involves finite element stress analysis, critical defect sizing using fracture mechanics and a future inspection scheme. The stress analysis and fracture mechanics were completed remotely by Shell Catalysts & Technologies in Bangalore, while the results interpretation and knowledge transfer to the client was provided locally by PTTES.



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**Shell Catalysts & Technologies**



Conference  
brochure



Interactive  
case study



Conference  
feedback form