

ISSUE NO. **3**

A Quarterly Publication
By The Singapore Chemical
Industry Council Limited

CHEM *Digest*

JUL-SEP 2017

SCIC Annual Golf
Challenge Trophy 2017

The 15th Asia Pacific
Responsible Care Conference
(APRCC)



SCIC
SINGAPORE CHEMICAL
INDUSTRY COUNCIL

DO YOU KNOW

- 3 Transport Regulation of Laos, Myanmar and Cambodia
- 4 Effluent Water Treatment Recovery Plant in Singapore Refining Company



HAPPENINGS

- 6 SCIC Annual Golf Trophy Challenge 2017



- 8 ASEAN Regulatory Cooperation Meeting 2017
- 10 Democratising access to High Performance Computing (HPC) with Singapore's first petascale supercomputer



HAPPENINGS

- 11 Zibo City Chemical Industry Association Visit
- 12 National Chemical Management & GHS Task Force
- 13 Productivity Improvement Forum
- 14 SCIC Outreach Programme with Nanyang Polytechnic
- 15 Welcome New Members to SCIC Board of Directors
Appreciation to Mr Georges Grosliere

HAPPENINGS – SDO@SCIC

- 16 Chemical Standards Committee – Driving standards for productivity and safety

HAPPENINGS – RESPONSIBLE CARE

- 18 The 15th Asia Pacific Responsible Care Conference (APRCC)



- 19 Outreach in PCS – A Responsible Care Initiative
- 20 Forthcoming Events (October 2017 to January 2018)

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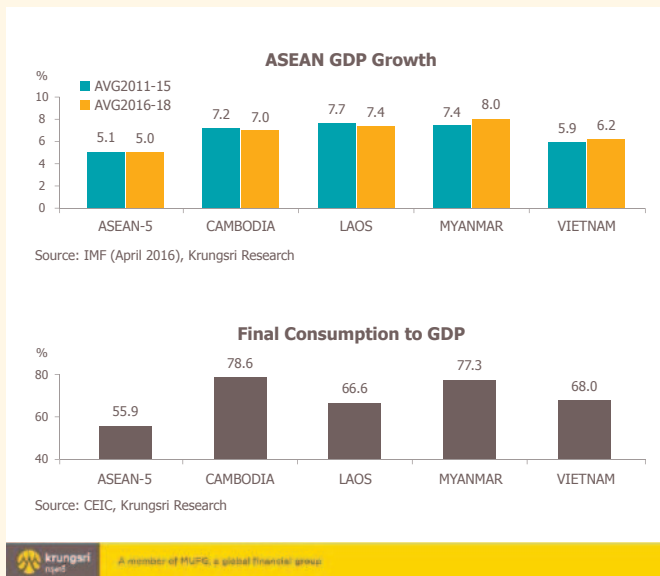
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Transport Regulation of Laos, Myanmar and Cambodia

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In the past decade, Cambodia, Laos and Myanmar (CLM) are considerably the top growing countries in terms of GDP growth with more than 7% per year. Undoubtedly, one of the driving engines to this is trade of goods both general cargoes and dangerous goods. To ensure the import/export trade facilitation, it is indispensable to know about relevant regulations on transport in CLM countries, in particular but not limited to when they are related to the chemical products and dangerous goods transport.



Meanwhile the CLM countries including Vietnam and Thailand are running the project “Sustainable Freight and Logistics in the Mekong Region or Green Freight Mekong Project” of which the safe transport of dangerous goods is one main project activity. With this project co-financed by European Union (EU) and implemented by German International Cooperation (GIZ) as well as partners in the region, a study on the existing situations and gap analysis was conducted.

Under the supports from GIZ, all CLM countries are now translating the ADR 2017 (European Agreement concerning the International Carriage of Dangerous Goods by Road) into their native languages and revising existing regulations as well as issuing new regulations on dangerous goods transport to ensure the facilitation of cross border transport including dangerous goods transport following the Annex 1 Carriage of Dangerous Goods of GMS Cross-Border Transport Agreement (CBTA) which is based on the UN Recommendations on Transport of Dangerous Goods (UN RTDG)

and ADR. The Annex 1 is enforced as all member countries have ratified the agreement. ADB has also been actively supporting the GMS Countries on Cross-Border Transport Facilitation Agreement in the past decades.

For Cambodia, dangerous goods transports are permitted on a case-by-case basis from Ministry of Public Works and Transport and performed the transport according to ADR. The national legal requirements on dangerous goods transport are still in a broad sense and will be amended to facilitate the cross border transport and ensure safe transport of dangerous goods in the country. Similar to Cambodia, dangerous goods transport in Lao PDR also requires permission /approval from the Ministry of Public Works and Transport in coordination with concerned ministries and must comply with the regulations concerning the transport of dangerous goods.

Myanmar has been on the run after the opening of the country in last five years. With the current status, Myanmar has issued 4 notifications on transport of dangerous goods according to ADR, namely, Classification of Dangerous Goods Transport by Road and Regulations, Labeling & Marking, Vehicle Marking and Loading & Unloading of Dangerous Goods Transport. Recently, there were a couple of pilot projects on trailer swapping at Mae Sot (Thailand) – Myawaddy border (Myanmar). Currently, Myanmar and Thailand are negotiating and signing MoU on cross border transport including dangerous goods from Thailand to Myanmar.

In the near future, once the harmonized regulations and mechanisms are in place, the cross-border transport of goods and dangerous goods by land will become more and more convenient, cost-effective, less time and safe which will dramatically support the economic growth in the region.



Contributed By: Logistics & Distribution Committee

Effluent Water Treatment Recovery Plant in Singapore Refining Company (SRC)

SRC has successfully commissioned its Effluent Water Treatment Recovery Plant (ETRP, shown in Fig.1) in July 2016. This plant is the first of its kind in Singapore, targeting industrial wastewater recycle from a refinery. It is also highly automated with minimal operator intervention for daily operation. The recovered water is reused as refinery water in the refinery. The plant uses flat sheet ceramic membranes and a two-stage reverse osmosis process to remove suspended solids, oil, grease and other contaminants from the treated effluent water.

The plant is able to produce ~ 2000 – 2500 m³/day of refinery water by removing suspended solids, oil, grease and other contaminants from treated effluent water exiting the ETP (effluent treatment plant). The integration between the ETP and ETRP is shown in Figure 2. This facility is expected to reduce the company’s NEWater consumption by 2000 m³/day and increase its water recycling rate from the current 18% to 41%.



Figure 1: Effluent Water Treatment Recovery Plant (ETRP)

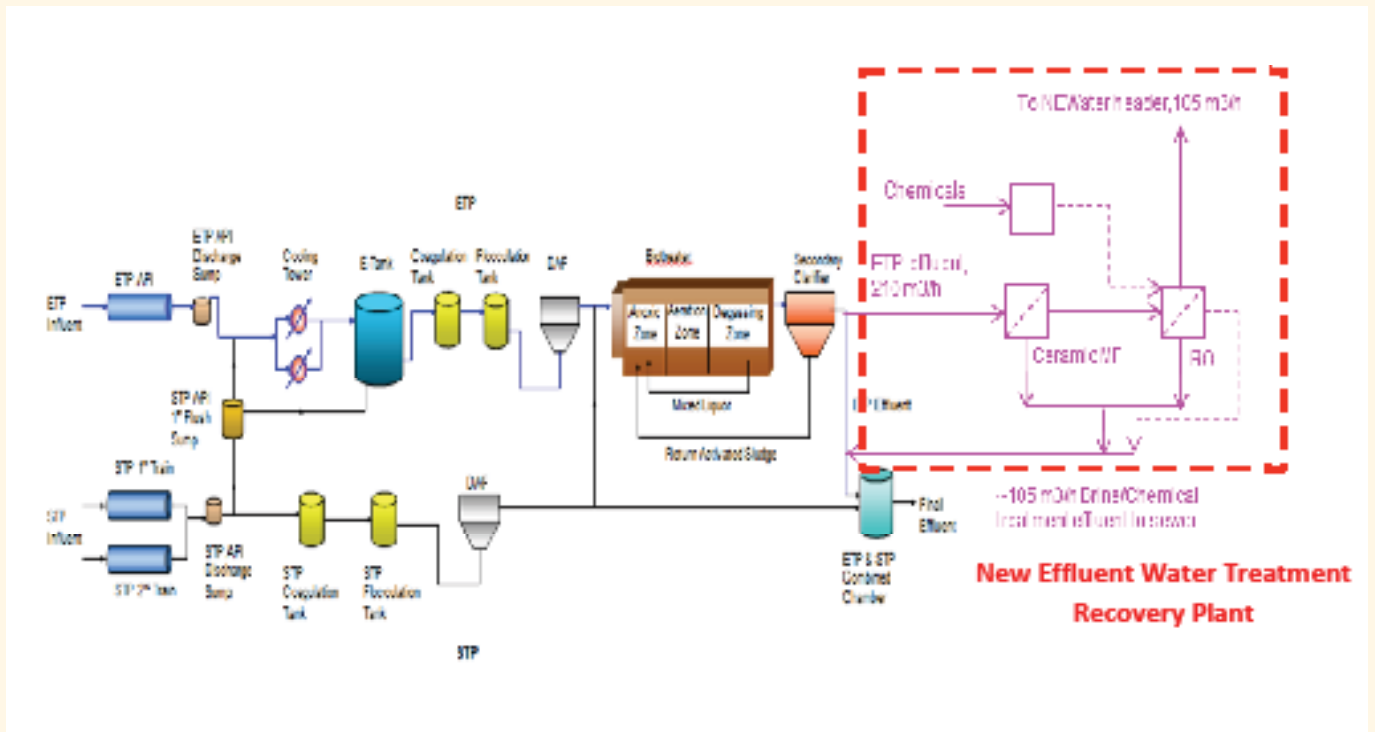


Figure 2: Arrangement of the Refinery's Effluent Treatment Plant

DO YOU KNOW

The water recovery process begins at the Micro-filtration (MF) feed tank (Fig 3 & 4). Effluent water, (originally destined for discharge into the sea), is fed into the MF tank fitted with submerged Ceramic Membranes. The ceramic membranes serve as the first round of filtration and removes particles greater than 0.1 microns from the water. To ensure longer lasting membrane life and lower operating cost, a low flux ceramic membrane is used.

The clear MF Filtrate is then sent through a 2-stage Reverse Osmosis (RO) process (Fig 3 & 4). The RO process uses high pressure to produce clean filtrate through several polyamide

membranes. This process has a high salt rejection of up to 99.5% with an overall water recovery of about 60%. A two stage RO process retains full performance while allowing turn-down operation.

Industrial waste water is hard to treat due to its varying contaminant concentrations and high oil & grease content. After resolving some minor hurdles during commissioning, the ETRP is now fully operational and capable of meeting design rates and specifications. The ETRP is strongly supported and co-funded by PUB as it seeks to reduce the industrial water consumption through water recycle.

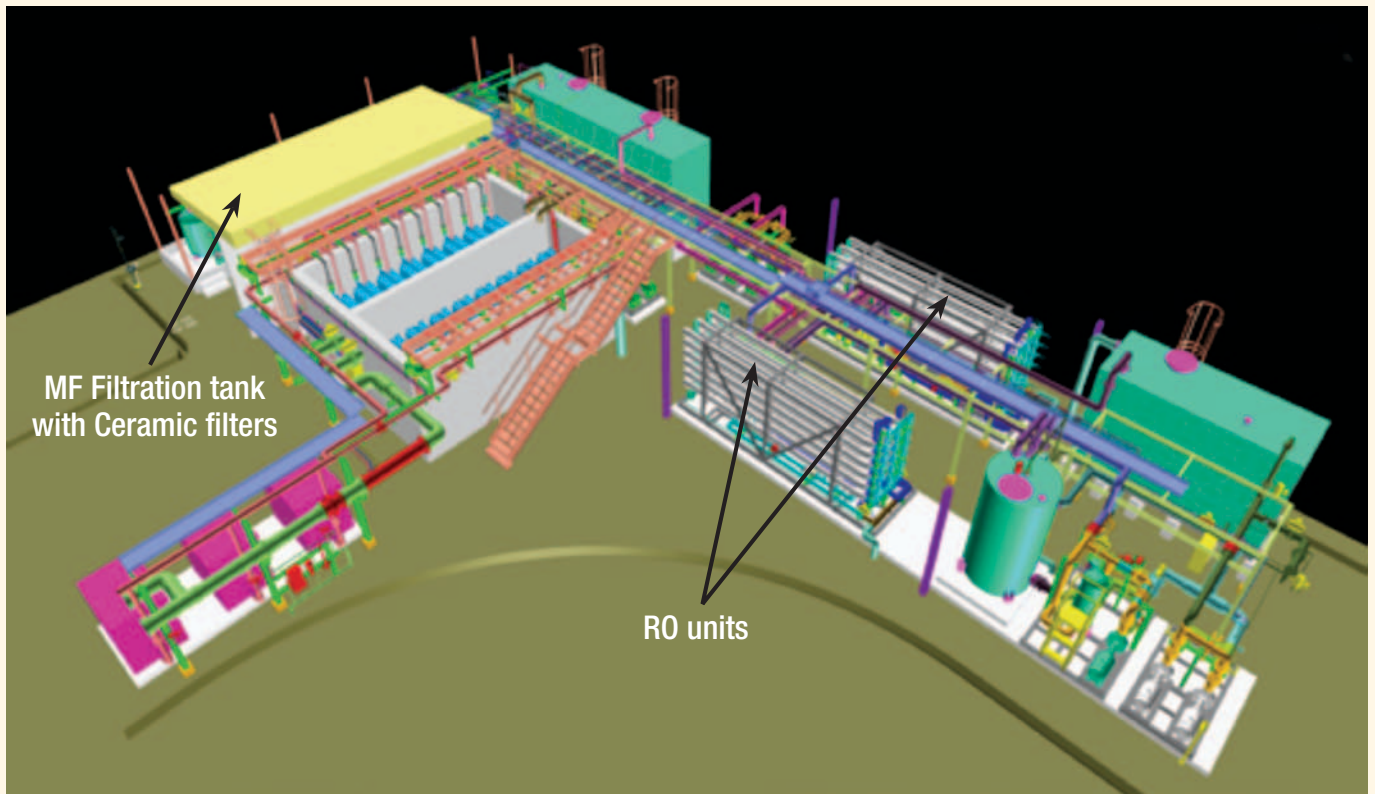


Figure 3: A 3-dimensional Model of Refinery's Effluent Water Treatment Recovery Plant

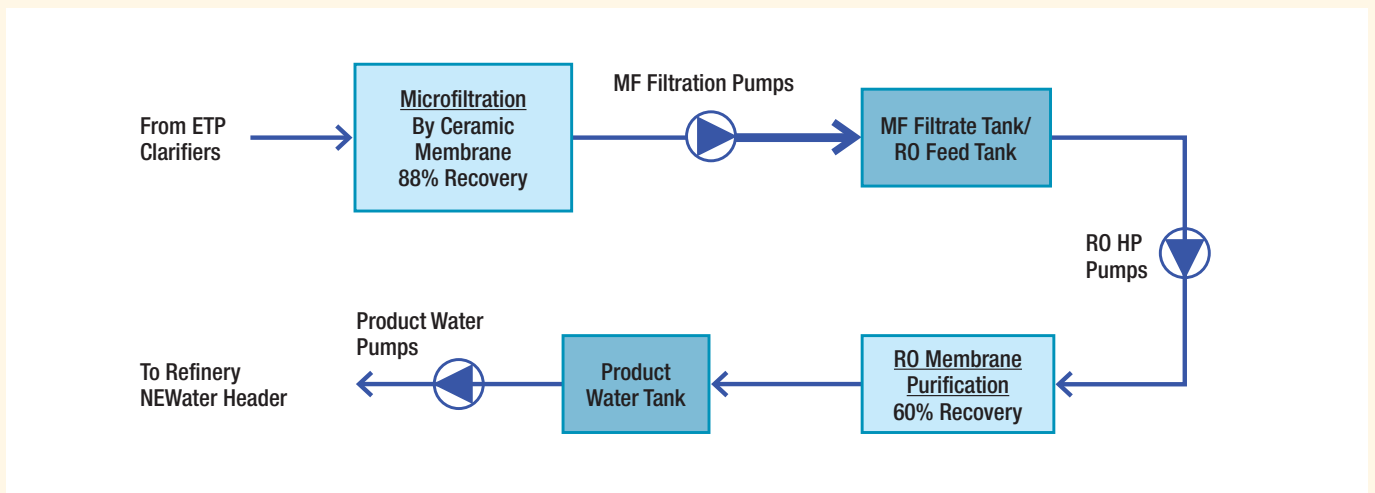


Figure 4: Plant Block Diagram

Contributed By: Process & Engineering Committee

SCIC Annual Golf Trophy Challenge 2017



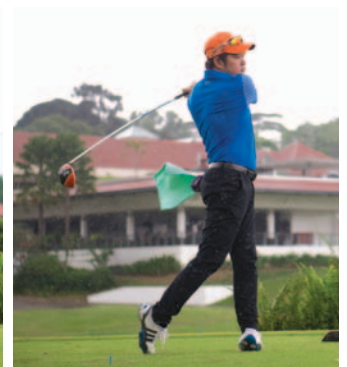
Back for its 8th year, SCIC's Annual Golf Trophy Challenge took place on 15 September at the Sembawang Country Club.

The event commenced at 11am with registration followed by a light buffet lunch where the thrilled and hearty golfers had their opportunity to interact and network with one another. The tournament began at about 1pm and it lasted till 6pm in the evening.

At the networking dinner, Mr Andrew Lim, SCIC Vice-Chair gave an opening speech and a series of prizes and lucky draws were presented.

This year, the championship trophy went to Mr William Ong. He was presented with a Tung Lok Restaurant voucher worth \$400 and a crystal trophy. His name will be engraved on the Golf Challenge Trophy as well.

SCIC would like take this opportunity to thank our sponsors: Air Liquide Singapore Pte Ltd, Pride-Chem Industries Pte Ltd and Methanol Market Service Asia for their generous support for making this event a huge success. SCIC would also like to thank the organising committee, golfers and diners for their active participation in this event.



HAPPENINGS



Mr Andrew Lim, SCIC Vice-Chair Presenting the 2017 Championship Trophy to Mr William Ong



Mr Andrew Lim, SCIC Vice-Chair Presenting the 1st Runner-Up Trophy to Mr Francis Wan



Mr Andrew Lim, SCIC Vice-Chair Presenting the 1st Runner-Up Trophy to Mr Robert Johnston



Mr Andrew Lim, SCIC Vice-Chair Presenting the 2nd Runner Up Trophy to Mr Desmond Foo

ASEAN Regulatory Cooperation Meeting 2017



As part of a joint initiative from American Chemistry Council (ACC), the Japan Chemical Industry Association (JCIA) and Singapore Chemical Industry Council (SCIC) to advance chemical regulatory cooperation in the ASEAN region, the ASEAN Regulatory Meeting was held in Kuala Lumpur, Malaysia on 4 July 2017. This is a follow up event from the Phase 2 Workshop, which also took place in Kuala Lumpur in November 2016.

The half-day meeting was well attended by 54 representatives from industry associations and key government authorities from Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, the Philippines, Singapore, Thailand and Vietnam. The project team expressed their appreciation towards Japan Ministry of Economy, Trade and Industry (METI) for providing this platform to engage the ASEAN nations. Through this meeting, Myanmar has successfully confirmed their participation in the project. Laos and Cambodia thank the team for sharing the information on the project and would discuss internally on their participation.

The objective of this half-day meeting is to bring the other four ASEAN countries from Myanmar, Laos, Cambodia and Brunei on board the ASEAN Regulatory Cooperation Project. The AMEICC Meeting served as a platform for the ASEAN Regulatory Cooperation Project team to engage both regulators and industry members in ASEAN. The involvement of regulators is crucial to advance chemical regulatory cooperation in the ASEAN region

given their involvement in the development of key chemical control regulations.

The meeting provided an opportunity for participants from both government and industry to better understand the objective of the ASEAN Regulatory Cooperation Project and the path forward for the project. The team also shared on the two work items derived from the Phase 2 Workshop in Nov 2016: Virtual Working Group on GHS Alignment and Virtual Working Group on Alignment of Chemical Inventory Requirements. These two items were identified as high priority items by the six participating countries, namely Thailand, Singapore, Vietnam, the Philippines, Indonesia and Malaysia. Preparation for the upcoming workshop in Singapore were also shared during the meeting. The next workshop has been confirmed on 26 and 27 October 2017 in Singapore.

More information on the ASEAN Regulatory Cooperation Project can be found on SCIC's website.

22nd Meeting of AMEICC Working Group on Chemical Industry (WG-CI)

Government and Industry representatives from ASEAN Member States (AMSs) and Japan attended the 22nd Meeting of AMEICC WG-CI which was hosted by Malaysia at the Kuala Lumpur Convention Center from 5-6 July 2017. The 3rd Technical Working





Group on the ASEAN-Japan Chemical Safety Database (AJCSD) was held prior to this meeting from 3-4 July 2017.

During the meeting, a representative from Japan METI reported on the global current state of the petrochemical industry, as well as the anticipated developments from the chemical industry. The National Institute of Testing and Evaluation (NITE) of Japan, operator of the AJCSD,

highlighted the importance of further dissemination of the AJCSD in ASEAN and also reported the access status and results of questionnaire to the AJCSD users. Updates on the current status of chemical industry, business trend and regulatory development were shared by the respective ASEAN countries and Japan. Japan METI's proposed an initiative "ASEAN-JAPAN Chemical Industry's Labor Safety, Operational Safety, and Environment Improvement Initiative" in the 3-year action plan for WG-CI. Japan METI also welcomed suggestions on the capacity building programme that would be held in Japan in early 2018.



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Ms Cissie Yeung, representative from Singapore Chemical Industry Council (SCIC) who is co-chairing the ASEAN Regulatory Cooperation Project (ARCP) with Mr Leendert van Dijk, provided a status update on this project which is a joint initiative by the American Chemistry Council (ACC), Japan Chemical Industry Association (JCIA) and SCIC, to the delegates present at this meeting. There is an urgent need to encourage regulatory cooperation and convergence whilst minimising non-tariff barriers to trade due to divergence of chemical management regulations. The concept and objective of the ARCP was noted by the Meeting, and delegates were provided with a brochure containing information on the ARCP. More information on the ARCP could be found on <http://www.scic.sg/asean/>

SCIC would like to thank the Ministry of International Trade and Industry (MITI), Malaysia for the warm hospitality and look forward to the 23rd Meeting of AEMICC WG-CI in Lao PDR in 2018.

Democratising access to High Performance Computing (HPC) with Singapore's first petascale supercomputer

Democratising access to High Performance Computing (HPC) with Singapore's first petascale supercomputer.

The Chemical Industry has always been leveraging the use of High Performance Computing (HPC) for a number of extremely computationally intensive, highly parallelisable activities such as Computational Fluid Dynamics (CFD), Density Functional Theory (DFT) and stochastic modelling. With the rise of Industry 4.0, companies will be deploying connected systems and advanced analytics models for predictive asset management, process management and control, and virtual plant commissioning to promote strategic growth and streamline operations. The need for HPC resources to process such big data and support applications like Artificial Intelligence (AI) will become more apparent and critical.

Recognising HPC as a strategic, game changing technology with tremendous economic competitiveness, the National Supercomputing Center (NSCC) Singapore was thus established in 2015. NSCC manages Singapore's first national petascale supercomputer, ASPIRE 1, with available high performance computing (HPC) resources to support science and engineering computing needs for academic, research and industry communities. NSCC is funded by its stakeholders including Agency for Science, Technology and Research (A*STAR), Nanyang Technological University (NTU), National University of Singapore (NUS), and Singapore University of Technology and Design (SUTD), with substantial funding from the Singapore Ministry of Trade and Industry (MTI), NSCC aims to democratise access to supercomputing.

NSCC is connected locally to the various A*STAR research institutes via Ethernet links of up to 10 Gbps from their desktops and servers. The stakeholders' sites (NUS and NTU) are connected via Quadruple Data Rate (QDR) InfiniBand (40Gbps) over the Singapore Advanced Research and Education Network's (SingAREN's)

Lightwave Internet Exchange (SLIX) network.

NSCC, as a national facility, has provided HPC resources and network links that have been catalytic to the Advanced Manufacturing industry. The use of HPC enables advanced modelling, simulation, and data analytics that address manufacturing challenges and aid in decision-making, optimise processes and design, improve material quality, substitute physical experiment, and accelerate or even eliminate prototyping and testing.

The economic benefits of investments in HPC resources are also significant. According to the research firm International Data Corporation (IDC) (August 2015 report), enterprises' investments in HPC systems generate US\$515 in revenue and US\$43 in profits and/or cost savings per dollar of HPC investment.

Specifically, for the chemical industry, molecular modelling using HPC provides scientists and researchers a powerful tool to design new chemicals and materials. Since the inception of ASPIRE 1, NSCC has supported several projects which are closely linked to the chemical industry, namely,

1. Influence of Moisture and Temperature on the Deformation and Yield Response of Epoxy.
2. Investigation of Conformation and Adsorption of Polycarboxylate Ether type Concrete Superplasticizers by Atomistic Molecular Dynamics Simulations.
3. Lithium-ion battery research using nanotubes for very fast charging.
4. Study on how magnetic materials impact the behaviour of Skyrmions to bring down the size of memory devices to below 10nm.

NSCC welcomes collaborations with any interested players from the chemical sector.

Aligned with NSCC's vision to democratise



Advanced Supercomputer for Petascale Innovation, Research and Enterprise (ASPIRE 1) – Singapore's First Petascale Supercomputer is housed at Fusionopolis.

HPC and to build a robust ecosystem of HPC users, NSCC organises monthly training workshops. NSCC also engages in partner events to raise awareness on the value-addedness HPC can bring to various scientific and engineering domains.

Armed with the objective of promoting a vibrant and relevant HPC ecosystem in Singapore, NSCC was the organizer of the Supercomputing Frontiers (SCF) conference, held in March this year. SCF17 is Singapore's annual international HPC conference that provides a platform for thought leaders from both academia and industry to interact and discuss visionary ideas, important global trends and substantial innovations in supercomputing. Inaugurated in 2015, the third edition of this conference (SCF17) was attended by over 450 delegates from over 12 different countries. Riding on the success of this conference series, NSCC is embarking on Supercomputing Asia 2018 (SCA18), the inauguration of an Asia-wide and much larger umbrella congress of notable supercomputing and allied events, including the SCF series. SCA18 will be held from 26 to 29 March 2018 at Resorts World Convention Centre. Delegates will be able to gain access to visionary insights from thought leaders in academia and industry, optimum networking opportunities and the HPC community in Singapore. For more information about the conference, visit www.sc-asia.org.

For business and partnership opportunities, please contact the Business Development team at bizdev@nsc.sg or visit our website at www.nsc.sg.

Article is contributed by the National Supercomputing Centre (NSCC) Singapore. All images are copyright of NSCC.

Zibo City Chemical Industry Association Visit (淄博市化学工业协会)

A delegation from the Zibo City Chemical Industry Association, Shandong, China, visited Singapore on 10 and 11 August 2017.

The objective of accepting the visit was to profile Singapore's petrochemical industry as well as showcase how industry associations (Association of Process Industry [ASPRI] and Singapore Chemical Industry Council [SCIC]) have helped the process construction and maintenance (PCM) industry sustain safety and quality works through workers' training and certification. The close collaboration of industry associations, as a combined voice representing the industry, with regulatory authorities, was also highlighted as a success formula for Singapore.

Petrochemical Corporation of Singapore (Private) Limited [PCS] has certain information exchange relationship with Formosa Plastics Group (FPG), facilitated by Marsh LLC, since 2011. Following those exchanges, several PCM service providers in Singapore introduced their services and practices to FPG. A Formosa subsidiary, formed from such collaborations, Formosa Technologies Corporation, who is the developer of software systems for the Formosa group, has businesses in Zibo City, Shandong, China. Zibo City has many small private refineries and chemical plants (nicknamed "teapot refineries" as opposed to larger establishments, such as China National Petroleum Corporation), of which HSE, operations efficiency and maintenance/reliability are deemed not up to mark. The Zibo City government is taking the lead to subsidise these private operators to upgrade and one of the initiatives is to arrange a study visit to Singapore.

The two-day visit, facilitated by ASPRI, and supported by SCIC and PCS, kicked off on 10 August 2017, with an introduction to Singapore's Energy & Chemicals industry by the Singapore Economic Development Board (EDB). EDB presented an overview on Singapore's economics including the economic contribution of the process industry, as well as portraying a strong tripartite partnership (collaboration among unions, employers and the government) within the industry.

ASPRI gave an introduction and its key milestones in propelling the growth of the PCM sector in Singapore. In levelling-up competency and development of workforce, ASPRI also covered briefly the training regime in Singapore through its training division, Institute of Process Industry (IPI), comprising 13 skill sets.

This was followed by a presentation by PCS' General Manager (Plant), Er. Lucas Ng HK, on a topic aptly titled "Always be Prepared – Anticipate – Resolve", covering various areas ranging from safety, security, operations and reliability management, sharing excellent insights on process safety and reliability. He emphasised that asset owners must have adequate knowledge of own facilities and processes to ensure overall integrity and reliability. Owners must also learn lessons from past incidents elsewhere to speed up their learning curve, and should never neglect ignition sources as many catastrophic incidents were due to presence of ignition sources following loss of containment.

Er. Ng also stressed on the benefits of trade associations, and close collaboration and consultation approach with regulatory authorities. PCS, as a SCIC Responsible Care Leadership Award recipient, shares its practices and experience, at various sharing platforms. PCS is also among the handful of leading companies in SCIC, having several staff serving key appointments within SCIC, among them, he is serving as Deputy Chairman, Chemical Standards Committee of the Singapore Standards Council.

The delegation was hosted to a site visit by PCS on 11 August 2017, where SCIC's Ms Agmer Lee shared SCIC's role and thrusts, activities and Responsible Care® programme in Singapore.

The visit brings ASPRI, SCIC and supporting organisations one step closer in promoting regionalisation. All parties are indeed happy with this budding relationship with Shandong, keeping an open mind and exploring ways to achieve a win-win situation for all.



Delegates from Zibo City Chemical Industry Association with host SCIC and PCS

National Chemical Management & GHS Task Force



National Chemical Management and GHS Taskforce

The National GHS Task Force was set up in 2005 to coordinate the implementation of the Globally Harmonised System (GHS) of Classification and Labelling of Chemicals.

On 1 April 2017, the custodianship of the Task Force was transferred from Workplace Safety & Health Council (WSHC) to SCIC and it was renamed as the National Chemical Management & GHS Task Force.

The Task Force is co-chaired by both SCIC and the Ministry of Manpower (MOM), comprising of member participation from AVA, CAAS, HSA, MOM, MPA, NEA, SCDF, SCIC, SISO, SP, SPF and WSHC.

The inaugural meeting was held on 2 May 2017 at SCIC, with attendance from MOM Director of Operational Safety & Health Division, Er Ismadi Mohd, SCIC Executive Director, Mr Terence Koh and Task Force members.



Taskforce at inaugural meeting



Productivity Improvement Forum

On 26 July 2017, the Productivity Council with the support of EDB, SCIC, the Association of Process Industry (ASPRI), the Construction Industry Institute (CII) and NUS, organised the Productivity Improvement Forum (PIF).

The Productivity Improvement Forum is an annual event to display the key results and findings of productivity improvement project. The event was well attended by 108 participants from plant owners and contractor companies.



Activity Analysis Implementation Efforts

Activity Analysis (AA) is a continuous process of measuring and improving the amount of time craft workers spent on actual construction. Activity Analysis has been implemented under the Pilot Project Workgroup in July 2015 and was deployed since July 2016. A sharing on the deployment of AA, challenges faced and benefits of adopting AA were shared during the PIF.

Best Productivity Practices Implementation Index (BPPII)

The Best Productivity Practices Implementation Index (BPPII) is a method and metric for measuring the implementation level of practices that have the potential to improve craft productivity in Construction Projects, Maintenance Activities and Shutdowns/ Turnaround. This year's forum presented the findings from Pilot Projects on BPPII and the tools to improve the productivity.

Mechanisation Index Assessment Tool

Participants were introduced to Mechanisation Index Assessment Tool, which can be used to assess the current level of mechanisation for common construction and maintenance tasks. This tool is to help companies identify mechanisation opportunities for improvement in productivity.

Meanwhile, the Productivity Council and its working groups continue to work towards launching new initiatives to improve productivity in the Process Construction and Maintenance industry.

Stay tuned and please contact our SCIC Secretariat at secretariat@scic.sg if you have any enquiries.



SCIC Outreach Programme with Nanyang Polytechnic

As part of the Polytechnic's efforts to prepare its students for the workforce, SCIC was invited to make a presentation on 5 July 2017 to the graduating cohort from the Diploma in Chemical Engineering course at Nanyang Polytechnic (NYP).

Mr Stephen Fowler, General Manager of Shell Chemicals Seraya and SCIC Board of Director provided the students with an insightful overview of the Chemical Industry in Singapore and the various employment opportunities open to the graduates from course. Mr Fowler went on to give an introduction of Shell Chemicals Seraya and his working experiences as well as his career progression in the Chemical Industry.

The NYP students were also treated to a sharing session from Senior Process Technician, Ms Rahinni Thannimalai,

an alumni and pioneering batch of NYP's Chemical Engineering graduates. She provided the students an overview of a day in the life of a process technician along with the rewards and challenges that comes with it. The knowledge and skills Ms Rahinni has honed throughout the years gave the students a better understanding of her role in the company. Following the presentations by the guest speakers, the session was accompanied by a Question and Answer segment before concluding with a networking lunch.

As the chemical industry grows, there is a need to ensure that the future generation of potential employee to the industry have a good idea and impression of its importance and values. SCIC invites interested companies to participate in this enriching outreach sessions.



Talk by Mr Stephen Fowler, General Manager of Shell Jurong Island



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Welcome New Members to SCIC Board of Directors

SCIC would like to extend a warm welcome to the following Directors as the newest Board Member of SCIC:



MR CHARLES BRIAN ABLETT
Refinery Manager
ExxonMobil Asia Pacific Pte Ltd



MR YOSHIO MAEJIMA
Director, Plant General Manager
Mitsui Elastomers Singapore Pte Ltd

Appreciation to Mr Georges Grosliere

A notable figure and a man who needs no introduction, Mr Georges Grosliere has dedicated 16 years in the Chemical Industry. Mr Grosliere's contribution included steering the Responsible Care the committee in 2003 through a proposal for the board to instil sanctions on signatories who were not serious about the programme. His conviction in driving the Responsible Care helped to uphold the programme's credibility. In 2004, Georges' role as a member of the executive committee enabled SCIC to become an autonomous industry grouping within SMa, which eventually paved the way for SCIC's independence in 2007.

Georges was also a key member of the executive committee to steer SCIC to become an autonomous industry grouping within SMa in 2004. These actions eventually paved the way for SCIC's independence in 2007. Georges' involvement and commitment in SCIC did not stop there. While he left the board in 2007 to take on a new project, he returned to serve SCIC's board in 2014 after the project was successfully commissioned. Georges' returns saw him taking on several portfolios within SCIC. Having been involved with EDB during the earlier years, he served as co-chair to the CHIMAC committee, looking into the future of our industry's workforce but also delving into issues pertaining to after retirement hiring. Besides addressing manpower concerns, Georges' also contributed to many of SCIC'S advocacy engagement and demonstrated his commitment for the industry through them.



As he retires after 16 years, SCIC would like to take the opportunity to thank Mr Georges Grosliere for his extraordinary contribution to not only the council but the industry. SCIC wishes Mr Grosliere the best in his future endeavours.

Chemical Standards Committee – Driving standards for productivity and safety

The Chemical Standards Committee (CSC) is one of the 10 Standards Committees formed under the guidance of an industry-led Singapore Standards Council administered by SPRING Singapore. The CSC spearheads the development and facilitates the implementation of chemical standards to support the chemical cluster and chemical-related industries to enable Singapore to retain its position as a world-class chemical hub.

The CSC develops key standards that boost industry competitiveness through achieving growth, enhancing productivity, optimizing resource efficiency and addressing social and safety requirements. CSC's scope encompasses test methods and best practices in the manufacture, handling, use and disposal throughout the life cycle of chemicals. The CSC works closely with SPRING Singapore to achieve the 4 strategies of the Standards Council Strategic Plan 2020:

- Support Industry Transformation
- Focus on Emerging Areas
- Deepen International and Regional Engagement
- Build Quality & Standards Competency

The CSC has developed key standards to support the Jurong Island Version 2.0 initiative, maintain Singapore's leadership position and boost industry competitiveness digital technology and enhance Singapore's reputation as a trusted hub. The Technical Committees (TCs) and Working Groups (WGs) formed under the CSC, participate actively in the development, review and promotion of standards to support regulatory frameworks and industry needs.

Key areas

- Bunkering
- Chemicals and processes
- Nanotechnology
- LNG bunkering
- Petroleum processes and products
- Surface coatings

Niche areas such as Plastics and Rubbers, Microfilming and Precious Metals are also covered to ensure health, safety, quality, productivity as well as market access.

Key Singapore Standards

- TR 56:2017 Technical Reference for LNG bunkering
- SS 532:2016 Code of practice for the storage of flammable liquids
- TR 48:2015 Technical Reference for bunker mass flow metering
- SS 345:2015 Specification on algae resistant emulsion paint for decorative purposes
- SS 603:2014 Code of practice for hazardous waste management

New key standardisation needs in areas such as fire safety in laboratories and open plant facilities, combustible dust, energy efficient surface coatings, workplace safety and health in the handling of engineered nanoparticles, graphene and LNG transportation are also being developed or assessed.



Chemical Standards Committee Members – 17th Standards Council Term

Singapore also take on a proactive role in standards development at ISO level, leading internationally in ISO committees in the bunkering as well as in nanotechnology.

Welcoming the Standards Council appointed CSC members for the 17th Standards Council Term

The CSC has representations from educational institutions, government agencies, research institutions, industry associations, professional bodies and individual experts.

SDO@SCIC welcomes the newly appointed CSC for the 17th Standards Council Term (April 2017 to March 2020) under the leadership of Dr Keith Carpenter and Mr Lucas Ng.

We continually engage and encourage stakeholders with diverse interests to join us in shaping the future standardisation landscape in Singapore.

For more information, visit the SDO@SCIC webpage on www.scic.sg. Contact SDO@SCIC Secretariat at sdo@scic.sg.

S/N	CAPACITY IN CSC	NAME	REPRESENTATION
1	Chairman	Dr Keith Carpenter	Individual Capacity
2	Deputy Chairman	Mr Lucas Ng	Individual Capacity
3	Member	Mr Terence Koh	Singapore Chemical Industry Council Limited
4	Member	Mr Khong Beng Wee	TC for Petroleum Processes and Products Chairman
5	Member	Prof Loh Kian Ping	National University of Singapore
6	Member	Mr Goh Tiak Boon	TC for LNG Bunkering Chairman
7	Member	Dr Teo Tang Lin	Chemical Metrology Division, Health Sciences Authority
8	Member	Dr Leong Kwai Yin	TC for Chemicals and Processes Chairman
9	Member	A/Prof Timothy Tan	Nanyang Technological University
10	Member	Mr Lim Eng Kiat	TC for Surface Coatings Chairman
11	Member	Mr Lim Kian Chye/Mr Ng Eng Fu (Alternate)	Housing & Development Board
12	Member	Dr Loh Wah Sing	TC for Precious Metals Jewellery Chairman
13	Member	Mr Alan Lim	Maritime and Port Authority of Singapore
14	Member	Ms Pamela Phua	Singapore Paint Industry Association
15	Member	Mr Seah Khen Hee	TC for Bunkering Chairman
16	Member	Ms Suzanna Yap	National Environment Agency
17	Member	Prof Alfred Huan	TC for Nanotechnology Chairman
18	Member	Dr Thomas Liew	National Metrology Centre
19	Co-Opted Member	Mr Pitt Kwan Wah	TC for Microfilming Chairman
20	Co-Opted Member	Ms Christina Loh	TC for Plastics and Rubber Chairperson



Responsible Care Network – Engagement Session with American Chemistry Council (ACC)

The SCIC Responsible Care Committee hosted an engagement discussion with the American Chemistry Council (ACC) on 4 August 2017.

It was a fruitful session of information exchange by Mr Daniel Rocznik, Senior Director, Responsible Care and Value Chain Outreach of ACC with the committee members on the Responsible Care implementation practices by the different country associations.

This is part of the efforts in building a close working relationship with counterpart chemical associations and promoting active sharing of Responsible Care updates and information in respective countries.



Group photo – SCIC Responsible Care committee with Mr Daniel Rocznik of ACC (in jacket)

Pilot Reporting in 2018 (for 2017 data) on Process Safety Metric in Annual Responsible Care Key Performance Indicators (KPI) Submission

SCIC will embark on a pilot reporting on the additional data on the total number of Process Safety Events (PSE) in the annual KPI reporting exercise in 2018 (for 2017 data).

For the purposes of this KPI reporting, signatories are requested to report additional data on the “Total Number of Process Safety Events (PSE)”. The criteria on the determination of PSE is as follows:

1) A chemical substance or a chemical process is directly involved; AND	✓
2) The incident occurred in production, distribution, storage, utility, pilot plant within the site boundaries of company’s facility; AND	✓
3) There was a release of material or energy (e.g. fire, explosion, implosion) from a process unit; AND	✓
4) One or more of the following Reporting Thresholds have been met:	
a) Safety/Injury Injury resulting in a Recordable, Lost Time Accident or Fatality; or Hospital admission of anyone on or off site; OR	✓
b) Direct Damage Cost A fire, explosion or clean up necessary to avoid/remediate environmental damage resulting in a direct cost equal to or greater than \$2,500 USDs; OR	✓
c) Shelter in Place/Evacuation <ul style="list-style-type: none"> • An officially declared shelter in place (on or off site); OR • An officially declared evacuation (on or off site); OR • A precautionary off-site shelter in place or evacuation OR 	✓
d) Threshold Release <ul style="list-style-type: none"> • The material released meets the release thresholds contained in the API RP-754 standard 	✓

Signatories may refer to the proposal which will provide more information on the additional data on **Total Number of Process Safety Events (PSE)** to be reported via the following link: <http://www.scic.sg/index.php/responsible-care-elements/performance-measures>



Outreach in PCS – A Responsible Care Initiative

On 15 September 2017, the Petrochemical Corporation of Singapore (Private) Limited (PCS) welcomed 18 fellow Responsible Care signatories and 15 business partners to their manufacturing facilities at Jurong Island. The event was part of PCS's continuous efforts to contribute to SCIC Capacity Building program, which is also a commitment of being a Leadership Award recipient.

This is the third time that PCS has organised the Outreach, with the objective of increasing awareness and encouraging business partners on adopting good health, safety and environment practices.

Topics shared by PCS included introduction to the Globally-Harmonised System (GHS) and the 16 elements in a Safety Data Sheet (SDS); familiarization of products (such as Toluene and Propylene), their product characteristics and risks; terminal

operations, berth rules and regulations, as well as emergency response plan.

The half-day program was well-received and many visitors commented that the highlight was the plant tour and visit to the live Olefin-II Control Centre where visitors could view operators at work.

In the spirit of Responsible Care, PCS continually strives to promote interaction within the petrochemical industry. This Outreach by Product Stewardship Code is one of the initiatives launched for customers and business partners to promote better understanding and insights into the hazards of the products manufactured by PCS, its proper handling, recycling and disposal, for the betterment of the industry.



SCIC invited guests and PCS's business partners at the Outreach in PCS



Guests at PCS Olefin-II Control Centre being briefed by Mr Leonard Chong (Olefin-II Manager)



Mr Foo Suan Kim (Senior Process Engineer) sharing some product characteristics and their hazards with the audience.



Mr Lim Wee Chiong (Deputy Managing Director) addressing the audience with some background on Product Stewardship



Forthcoming Events

(October 2017 to January 2018)

3 Oct 2017	SCIC Process Safety Management (PSM) Seminar
10, 11, 24 & 25 Oct 2017	SCIC Safety Case Practitioners' Workshop (October Session)
12 Oct 2017	SCIC Safety Case Specialist Workshop – Bow-Tie Analysis
12 Oct 2017	SCIC Workshop on “Conducting an Effective Incident Investigation”
12-13 Oct 2017	SCIC Training Course on Regulatory, Technical & Safety Requirement of ISO Tank Containers
13 Oct 2017	18 th National GHS Seminar
21 Oct 2017	SCIC ChemEx 2017 – The Chemical Experience
23 Oct 2017	SCIC Training Workshop on Globally Harmonised System (GHS) for Chemical Users
26 Oct 2017	SCIC Safety Case Specialist Workshop – ALARP Demonstration
30-31 Oct 2017	The 15 th Asia Pacific Responsible Care Conference (APRCC)
7-8 Nov & 5-6 Dec 2017	SCIC Safety Case Practitioners' Workshop (November Session)
9 Nov 2017	SCIC Safety Case Specialist Workshop – Functional Safety
10 Nov 2017	SCIC Annual Year-End Cocktail Event
9, 10, 23 & 24 Jan 2018	COMING SOON! – SCIC Safety Case Practitioners' Workshop (November Session)

*** Note: SCIC may change/amend the events listed above without any prior notice.*

For more information on the dates of these training courses, you may visit our website at www.scic.sg or contact SCIC secretariat@scic.sg



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