

CHEM DIGEST

- Dialogue Sessions with Government Agencies In 2016
- Dangerous Goods Packaging

A QUARTERLY PUBLICATION BY THE SINGAPORE CHEMICAL INDUSTRY COUNCIL LIMITED



SCIC YEAR-END COCKTAIL RECEPTION



IN THIS ISSUE

CHEM DIGEST



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SCIC ChemDigest is a quarterly newsletter by the Singapore Chemical Industry Council Limited. Whilst Singapore Chemical Industry Council Limited takes every reasonable care to ensure that the information in this publication is accurate, Singapore Chemical Industry Council Limited does not accept any responsibility for any errors or omissions. All information is correct as at date of print.

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Singapore Chemical Industry Council Limited

APPRECIATION TO COMMITTEE MEMBERS

SCIC would like to express our gratitude to the following chairman and committee members for their contributions to SCIC during their tenure as a chairman and member of the following committees:

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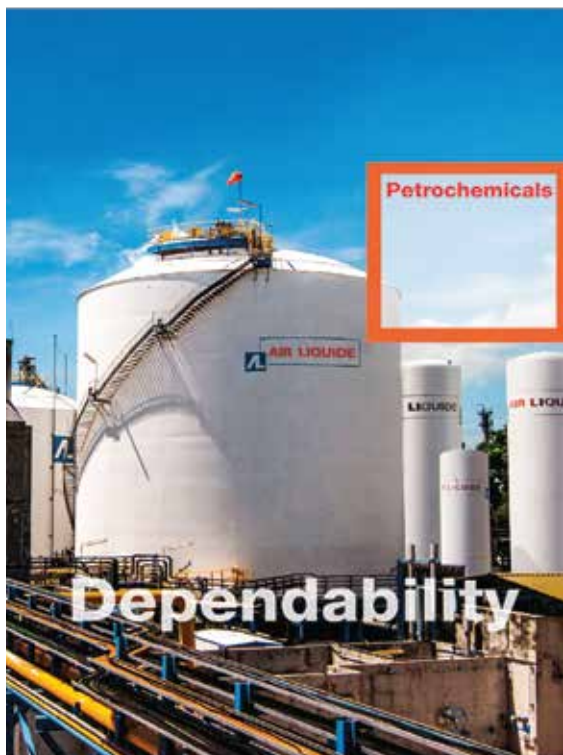
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Round the Clock Assurance

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As the leader in the manufacturing and application of quality gases, Air Liquide Singapore's pipeline networks provides a sustainable, economical, and uninterrupted quality mode of supply to customers. Our long and successful track record bears testament to our service dependability and reliability.

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The advertising space on SCIC ChemDigest 2017 is now open!

ChemDigest is a quarterly publication by SCIC featuring our ongoing and upcoming events, industry activities, seminars and many more! This newsletter will be distributed to all SCIC member companies including manufacturers, logistics service providers, traders, our overseas counterpart associations, government agencies and the Institutes of Higher Learning.

On top of it all, advertiser will also enjoy the benefit of having the placement of their company's logo and link on SCIC website.

For more information, please contact Ms Stella Agustin at stella@scic.sg



18 MAY (THURS) – 19 MAY (FRI) 2017
ROYTON SAPPORO, JAPAN

Royton Hall, Nishi 11-Chome, Kita 1 Jo, Chuo-ku,
Sapporo, Hokkaido, 060-0001, Japan

The Asia Petrochemical Industry Conference (APIC) 2017 will be held in Sapporo, Japan in May this year and is organized by the **Japan Petrochemical Industry Association [JPCA]**. Themed **"The Promise of Carbon Chemistry: Pathway to a Sustainable Future"**

For more information, please visit the APIC 2017 website at:
<http://apic2017.jp>

For delegates in Singapore, please register online via:
www.scic.sg

** Notes: Singapore delegates register through above mentioned website must have a local billing address. We accept cheque or telegraphic transfer.

SCIC YEAR-END COCKTAIL AND NETWORKING RECEPTION 2016

On 11 November 2016, Singapore Chemical Industry Council (SCIC) organized its annual cocktail and networking reception to thank and appreciate its members and industry partners for their continuous support and commitment during the year 2016.

SCIC Chairperson, Ms Suiniaty Basirun, thanked the members and industry partners for their commendable efforts and commitment in SCIC's Committees, activities and initiatives. She also expressed her appreciation towards the SCIC Board of Directors for their stewardship and support to the SCIC and the secretariat office. Not only that, she continued to express her gratitude towards the Government Agencies, mainly MOM, NEA, SCDF and JTC, for their collaborative support in organizing dialogue sessions to address the industry.

During the evening, a token of appreciation was presented to Mr Low Wai Hoe of ExxonMobil Asia Pacific, for his leadership and contributions as the Chairman of the SCIC MHI Committee. Mr Amit Bhatnagar of Singapore Refining Company, Mr Evert Klein of ExxonMobil Asia Pacific and Ms Gloria Wang of Shell Eastern Petroleum were also recognised for their commendable efforts and commitment in the Safety Case Joint Work Group. Lastly, a token of appreciation was also presented to Ms Cissie Yeung of Shell Eastern Petroleum for her dedication and contributions rendered to SCIC and the Chemical Industry during her tenure as the Chairperson of the SCIC Regulatory Affairs Committee.

This year, the reception was held at Grand Copthorne Waterfront Hotel and was well attended by member company representatives as well as the various statutory agencies.



Mr Low Wai Hoe of ExxonMobil Asia Pacific,
Chairman of SCIC MHI Committee



Mr Amit Bhatnagar of Singapore Refining Company,
Lead of Safety Case Joint Working Group



Mr Evert Klein of ExxonMobil Asia Pacific,
Member of Safety Case Joint Working Group



Ms Gloria Wang of Shell Eastern Petroleum,
Member of Safety Case Joint Working Group



Ms Cissie Yeung of Shell Eastern Petroleum,
Chairperson of SCIC Regulatory Affairs Committee





THE CHEMICAL INDUSTRY EXPERIENCE 2016

The Chemical Experience (ChemEx) 2016, held for the ninth year since 2007, took place on the 15th October 2016. This event is an industry profiling initiative driven by SCIC Chemical Industry Manpower Advisory Committee (CHIMAC) which aimed to raise greater awareness of the Chemical Industry among students from the Institutes of Higher Learning in the chemical-related courses.

This year, ChemEx 2016 was back in Jurong Island, Oasis@Sakra after it was newly renovated. It was very refreshing to see students from Institute of Technical Education (ITE) East, Singapore Polytechnic (SP), Temasek Polytechnic (TP), Nanyang Polytechnic (NYP), Ngee Ann Polytechnic (NP), Republic Polytechnic (RP), National University of Singapore (NUS), Nanyang Technological University (NTU) and Singapore Institute of Technology (SIT) visiting Jurong Island and participating in the plant tours hosted by the chemical companies. Students from the Universities had also the opportunity to visit Institute of Chemical and Engineering Sciences (ICES) as part of the programme. The students then gathered back at marquee which was set up at Oasis@Sakra where they were able to visit industry booths, collect goodies and interact with the industry ambassadors.

During the programme at the marquee, students were engaged in several interactive games and followed by some lucky draws at the end of the event. This year, Temasek Polytechnic had clinched the Champion Trophy for their active and excellent participation during the game segment.

The event was overall well-received by over 600 students, lecturers and industry ambassadors. SCIC and CHIMAC would like to thank all 16 participating companies, as well as Institute of Chemical and Engineering Sciences (ICES), JTC Corporation and Singapore Economic Development Board (EDB) for their collaborative support and commitment in making ChemEx 2016 a successful one. Special thanks to all Institutions for their students' active participation in this industry initiative.



SHARING SESSION: SCIC & MAYER BROWN SINGAPORE CHEMICALS ROUND TABLE



SCIC and Mayer Brown Consulting Singapore jointly hosted a General Counsel Forum on 25 November 2016. This sharing session was well attended by 16 industry members who have interest in regulatory affairs or are legal counsels.

General Counsel Form

The objective of the General Counsel Forum was to serve as a platform for discussion and exchange of ideas on industry issues and development with regards to the rapidly changing regulatory and business environment in the Asia-Pacific region.

Mr Jean-Philippe Montfort, Partner at Mayer Brown Brussels and Ms Heng Li, Associate at Mayer Brown JSM Beijing, gave a detailed update on the chemical management summarized the global trends in regulatory compliance and key issues such as confidential business information protection and global data sharing. The participants were given a comprehensive regulatory update on Asia, in particular China, Taiwan and South Korea.

Ms Wong Chian Voen, Director of Mayer Brown Consulting gave an update on the current state & progress of global trade policies (e.g. ASEAN Economic Community, Regional Comprehensive Economic Partnership and Trans-Pacific Partnership) and agreements. She shared with members the implications of the rise of mega-free trade agreements in Asia-Pacific on the chemical industry.

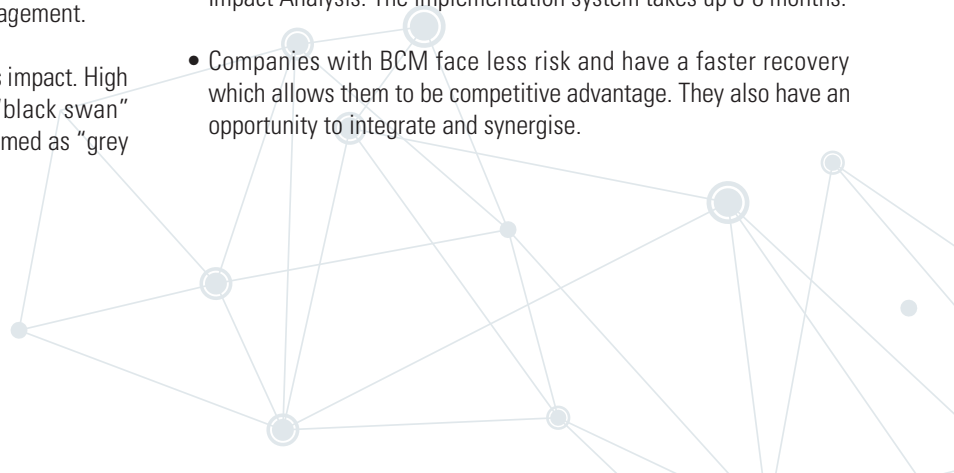
SCIC would like to thank the speakers Mr Jean-Philippe Montfort, Ms Heng Li and Ms Wong Chian Voen for their effort and time in sharing with the industry at this session, and Mr Karim Andalib for co-organising the forum. More information on the General Counsel Forum can be found on SCIC's website.

SCIC LOGISTICS & DISTRIBUTION LEARNING AND SHARING SESSION 2016

Theme: A Resilience Approach to tackling Business Continuity Threats

SCIC Logistics and Distribution committee had organized a half-day sharing session on 26th October 2016 at SCIC office, well-received by 11 participants. The objective of the sharing session was to discuss on the topic of Business Continuity Management (BCM) which means planning ahead for any problems that may arise in a business. There were 6 sub-topics which were being discussed namely:

- Disruption to business was classified into two parts; direct and indirect. Indirect disruption to business included pandemic (e.g. SARS), global natural disasters (e.g. earthquake). Direct disruption includes IT outage, fire outbreak and loss of key management.
- Classification of Disruptions is based on probability vs impact. High probability but low impact events are termed as "black swan" while high impact and high probability events are termed as "grey rhino".
- Case study on Nokia vs Ericsson was shared. Both companies used parts from Philips Semiconductor and in 17 March 2000, a fire broke out. However, only Ericsson was affected and lost an estimated 400 euro millions leading to a cease in manufacture. Nokia managed to maintain production level and is still one of the global market leaders. This case study shows the importance of being BCM ready as faster recovery means greater business opportunity.
- ISO 22301 Standard which is known as BCM Standard Development is integration with other management systems is also discussed.
- BCM implementation system consists of Gap Analysis, Project Initiation, annually reviewed Risk Assessments and Business Impact Analysis. The implementation system takes up 6-8 months.
- Companies with BCM face less risk and have a faster recovery which allows them to be competitive advantage. They also have an opportunity to integrate and synergise.



TRAINING COURSE ON “REGULATORY, TECHNICAL & SAFETY REQUIREMENT OF ISO TANK CONTAINERS”



ISO Tank Containers are the preferred method for bulk transportation of liquids product distribution process. With over 30 year of experience and exposure as a consultant and specialist in the field, SCIC had organized the ISO Tank Training Course which was conducted by Mr Paul Sireci of SEA Train Advisors, on 20th and 21st October 2016.

As most of the product transported in the Chemical Industry are hazardous in nature, it is essential to have proper training and knowledge of this technical equipment before taking charge of any operational activities, like transportation.



Participants who have attended this course gained a better understanding and knowledge on the foundation for the use and application of the ISO tank container where introduction of the regulatory framework and various technical aspects of operating a tank container were taught.

Some of the topics that were covered during the course included:

- Regulatory developments on Training
- Tank specification, tanks for specialized cargoes and their basic designs
- Design and manufacturing aspects including its construction, codes & procedures, remanufacturing and the defects
- Functions and the maintenance consideration for the different fittings
- Operation safety with highlights on the common hazards, identifying of hazards, classes, labels and the hazards & rules of confined space entry.
- Type of surveys & survey guidelines
- Regulatory framework impacting ISO tanks and the statutory requirements imposed for tank certification etc.
- Cargo worthiness, compatibility of tank and its cargo, tank cleanliness and its tightness etc.

SCIC would like to take this opportunity to thank CWT Logistics their continuous support as venue provider and NewPort Tank Containers Singapore Pte. Ltd. for providing an ISO Tank on site, thus making this course a successful one.



SAFETY AND SECURITY WATCH GROUP (SSWG) COUNTER-TERRORISM SEMINAR

On 1 November 2016, the Singapore Police Force and the Singapore Civil Defence Force jointly organised the third in the series of Safety and Security Watch Group (SSWG) counter-terrorism seminars. The seminar, targeted at the chemical industry sector, was graced by Member of Parliament for West Coast GRC, Mr Patrick Tay Teck Guan.

Recent terrorist attacks have shown that chemical plants and storage facilities are vulnerable and high-impact targets that terrorists can exploit. A successful attack will not only cause business disruption and losses, but also significant collateral damage to nearby population and environment.

At the seminar, more than 300 participants were updated on the security threat situation and given advice on how they can tighten their security measures at their workplaces to harden their defences. They were also encouraged to promote a caring and cohesive community in their workplaces to help their staff stay united and recover quickly in the aftermath of an attack.

In addition, the Singapore Business Federation (SBF) shared on the importance of a robust Continuity Plan that would facilitate the businesses to return to normalcy as quickly as possible.

‘Chemical plants and storage facilities are among the most vulnerable high-impact targets that terrorists can exploit. We therefore need the chemical sector to take proactive steps to harden their defences and tighten their security measures given the current terror threat situation. They should also review and exercise their emergency response plans to be better prepared for an attack. They must also have a business continuity plan in place to help them recover quickly in the aftermath of an attack and continuously review the plan.’

DIALOGUE SESSIONS WITH GOVERNMENT AGENCIES IN 2016

As part of SCIC's continued engagement between industry and key government agencies, SCIC's Regulatory Affairs (RA) Committee co-organises a series of annual dialogue sessions with key government agencies. This year, dialogue sessions were organised with Ministry of Manpower (MOM), Singapore Civil Defence Force (SCDF) and National Environment Agency (NEA).

These dialogue sessions further provided a platform for participants to raise queries that they had pertaining to the topics which were presented by the various government agencies and collectively address mutual concerns. SCIC Regulatory Affairs Committee Chairperson provided an update of SCIC's activities such as the engagement and collaboration work with various government agencies, as well as the events organized in 2016. SCIC took this opportunity to share the compiled list and timeline of new or revised regulations by various government agencies during the dialogue sessions. The tight implementation timeline is a challenge for the industry as it would place a strain on company's resources to comply with all the upcoming regulatory requirements. To address industry's concern of the growing number of regulatory requirements in Singapore, an official letter was written to the management of relevant authorities and a joint meeting was proposed. MOM would be coordinating this meeting with NEA and SCDF to jointly discuss this issue with SCIC in Feb 2017.

The following updates were provided by the various agencies:

SCIC-MOM Dialogue Session 2016 – held on 5 October 2016, 53 participants

- Workplace Safety and Health (WSH) Statistics
- Safe Use of Cranes
- Notification of Urgent Asbestos-Removal Work
- Application of Design for Safety (DfS) Regulations for the Process Industry

SCIC-SCDF Dialogue Session 2016 – held on 25 October 2016, 59 participants

- Fire Statistics 2015
- Sharing of Fire Incident
- Sharing from Central Enforcement Department
- Revised CERT Audit Checklist
- Ethylene Oxide Product Hazard Awareness Sharing

SCIC-NEA Dialogue Session 2016 – held on 28 November 2016, 79 participants

- Key Findings of 2014 Energy Use Reports and Energy Efficiency Improvement Plans
- Updates on Non-Incinerable Waste Management
- Proposed Renewal of Written Permission
- Hazardous Substances Licensing Control
 - Updates on Restriction of Hazardous Substances (RoHS) in Electrical and Electronic Equipment (EEE).
 - Tightening of Control for Mercury – added Batteries and Button Cell Batteries
- Proposed Control of New Hazardous Substances and Update on the Joint-Controlled Substances by NEA and SCDF



Highlights of the questions or concerns raised by members during the dialogue sessions and follow-up actions:

During the SCIC-MOM dialogue: members sought clarifications regarding the safety case regime and Design for Safety regulations. After the SCIC-MOM dialogue session, an email was sent to members to inform them of the change in email address as SRMC transits into MHD.

For SCIC-SCDF dialogue, members shared their concerns on licensing issues, fire alarm safety activation and CERT requirements.

During SCIC-NEA dialogue session, NEA shared that the proposed 5-year renewal of written permission will proceed and be included in the regulatory regime despite the various concerns SCIC shared during the industry consultation. In the Q&A session of SCIC-NEA dialogue, members raised questions on the renewal of written permission, control of hazardous substances, energy conservation act and non-incinerable waste issues.

Following up from NEA's dialogue, SCIC would be gathering feedback from members on three items: Proposed Control for Other Mercury-added Products, Proposed Control of New Hazardous Substances and differing security requirements for licensing renewal introduced by multiple agencies under Ministry of Home Affairs' initiative to enhance protective security measures.

SCIC would like to thank SCDF, MOM and NEA for providing the industry with these informative updates, and will continue work closely with key government agencies on future chemical-related regulatory matters.

ASEAN CHEMICAL INDUSTRY REGULATORY COOPERATION WORKSHOP – 3-4 NOVEMBER 2016

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 Cooperation Phase 2 Workshop was held at Kuala Lumpur, Malaysia from 3-4 November 2016. This is a follow up event from the initial Phase 1 Workshop, which took place in Bangkok, Thailand in January 2016.

With the establishment of the ASEAN Economic Community (AEC) on 31 Dec 2015, this initiative on regulatory cooperation provides an opportunity to engage governments in driving a more coherent, risk-based approach to chemical management.

The purpose of this two-day Workshop was to promote a more coherent risk-based approach to chemical management and encourage regulatory cooperation in the ASEAN region to reduce regulatory divergences and non-tariff barriers. This served as a platform for the ASEAN Regulatory Cooperation Project team to engage regulators, who are involved in the development and implementation of key control regulations in the respective participating countries.

The Workshop also provided an opportunity for participants from both government and industry to build stronger relationships, between regulators and the industry, exchange latest regulatory updates and information, understand the challenges faced by the government and chemical industry, and promoting regulatory cooperation and establishing cooperative plans going forward.

The Workshop was well attended by 39 nominated representatives from industry associations and key government authorities from Indonesia, Malaysia, the Philippines, Singapore, Thailand and Vietnam.

The Ministry of International Trade & Industry (MITI) in Malaysia shared the progress of AEC and the importance of the chemical sector in the economic development of the region at the opening. This helps

to set the scene for the importance of regulatory cooperation in the ASEAN region.

Perspectives from government and industry associations were also extensively shared at the Workshop. The format of the Workshop consisted of a mix of power point presentations by as well as breakout group discussions which were held following each section to elicit discussions. Some of the topics that were discussed include Regulatory Cooperation principles, Strategic Approach to International Chemical Management (SAICM) and its 2020 goal of achieving sound chemical management of chemicals, APEC Best Practice Principles for Chemical Regulation, ACC Risk-Based Approach to Sound Management of Chemicals. A few exemplary examples on regulatory cooperation such as ASEAN Cosmetic Directive, US – Canada Regulatory Cooperation Council (RCC) and valuable lessons learnt from existing regulatory systems such as EU REACH were shared at the event. Apart from the sharing by the industry, regulators gave an overview of their regulatory framework, recent regulatory development and challenges.

At the end of the two-day Workshop, participants in attendance identified and voted for potential regulatory cooperation projects which they felt would be most beneficial and helpful to the ASEAN region. Strong support from government and industry representatives was received to pursue projects that aim to align GHS within the ASEAN region, and establishing ASEAN Chemical Inventory and capacity building for risk-based assessment.

As a follow-up to the Phase 2 Workshop, the project team prepared an industry proposal for the aforementioned projects for submission to the relevant ASEAN working groups to obtain the high-level endorsement that would be critical to the success of this Workshop. The project team also developed the 2017 work plan to continue the success of the workshops and is planning to organise a meeting to engage regulators and industry associations from the remaining four ASEAN nations – Cambodia, Brunei, Laos and Myanmar in early 2017.

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



EVENTS IN 2016

SCIC Events

SCIC Events	Date
ASEAN Regulatory Cooperation Workshop	26-27 Jan
Educators' Engagement Programme 2016	15 & 17 Mar
SCIC Annual Dinner 2016 & Responsible Care Awards 2015 Presentation	18 Mar
Responsible Care Induction Briefing	8 Apr, 1 July
SCIC Training Course of "Regulatory, Technical & Safety Requirement of ISO Tank Containers"	14-15 Apr, 20-21 Oct
Safety Case Knowledge-Building Workshop	26 Apr, 31 May, 12 Jul, 30 Aug,
Process Safety Management Seminar	27 Apr, 31 Aug
National GHS Awareness Seminar	12 Apr, 28 Jul
Asia Petrochemical Industry Conference (APIC) 2016	19-20 May
Productivity Council's Training Seminar on Activity Analysis	10 May, 19 Jul
Productivity Council's Training Seminar on 10-10 Analysis	20 Jul
Learning & Sharing Session – Role of Human Error in Process Safety	27 May
SCIC Annual General Meeting 2016	16 Jun
Productivity Improvement Workshop	18 Jul
SCIC Annual Golf Tournament 2016	9 Sep
SCIC-IGAS Seminar on Industrial Gases Safety	11 Oct
ChemEx – The Jurong Island Open Day	15 Oct
SCIC Logistics & Distribution Sharing Session	26 Oct
SCIC Year End Cocktail and Networking Session 2016	11 Nov
Learning & Sharing Session - Effective Operating and Maintenance Procedure	14 Nov
Jurong Island Visit – Community Outreach for Grassroots Leaders	19 Nov
General Counsel Forum	25 Nov
GHS Chemical Users Course	21 Jan, 26 Feb, 29 Mar, 6 May, 10 Jun, 8 Jul, 29 Aug, 26 Sep, 24 Oct
Outreach Sessions to Institutions and Schools	All Year Round

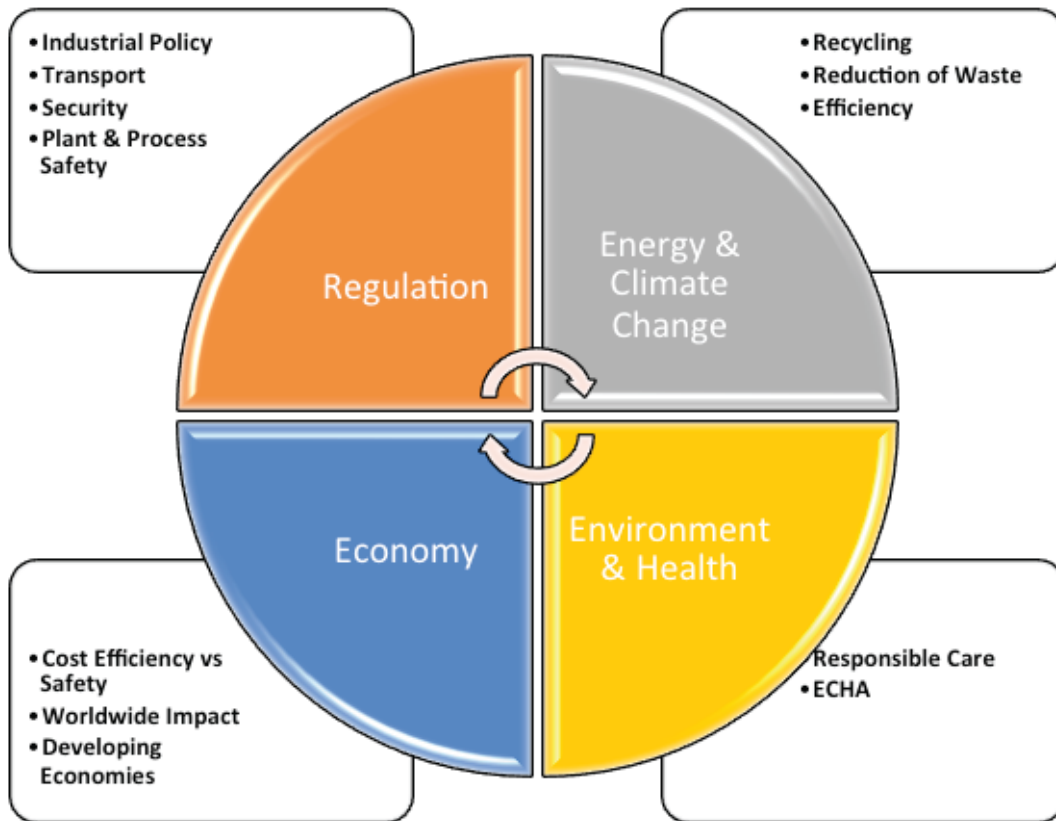
SDO Events

SDO Events	Date
Launch of World's First Standard (TR 48 : 2015) for Bunker Mass Flow Metering	16 Feb
Nanotechnology Standards Adoption Workshop – Measurement and Characterization	22 Mar
Launch of Revised (SS 532 : 2016) Code of Practice for the Storage of Flammable Liquids	26 Feb
Launch of Revised Water-Based Paint Standards (SS 150, SS 345, SS 500, SS 579)	20 Jul
ISO/TC 229 Nanotechnologies 19th Plenary Meeting	7-11 Nov
Industry Briefing Session on LNG Bunkering Standard	8 Dec
Workshop for TR on Bunker Mass Flow Metering (TR 48 : 2015)	8 Mar
Workshop on SS 532 Code of Practice for Storage of Flammable Liquids (SS 532 : 2016)	23 Mar
CSC Strategic Planning Session	19 Feb
Stakeholders Briefing Session - Upcoming Specification for Water-Based Acrylic Road Marking Paint	13 Oct
Nanotechnology Dialogue Session - "How can standards support nanotechnology based innovation?"	7 Nov
Stakeholders Dialogue - New Item Proposal for Handling and Storage of Combustible Dust	28 Sept

Dialogue Sessions

Dialogue Sessions	Date
SCIC-JTC Dialogue	2 Mar
SCIC-MOM Dialogue	5 Oct
SCIC-SCDF Dialogue	25 Oct
SCIC-NEA Dialogue	28 Nov

DANGEROUS GOODS PACKAGING



Dangerous Goods Transport in the Chemical Universe

Figure 1 above is a depiction of the many factors that impact on the Chemical and related Industries across the globe.

The relatively small sphere of **Dangerous Goods Packaging** is an increasingly regulated area within the above that impacts all modes of transport of all classes of dangerous goods. Anyone who has worked in the freight industry and sending goods by air, ocean, road or rail over the past 20 years or so has been a witness to the vast number and complexity of regulations affecting the transport of such goods. As an example, the IATA Dangerous Goods Regulations Manual has now become a veritable encyclopedia on the subject of goods transported by air. Similarly, regulations for transport by Ocean (IMDG) and Road (ADR) have grown exponentially in recent years.

Many regulations were first developed in the more advanced economies. These have since spread worldwide. As this happened, the need for international cooperation and coordination has grown to ensure that those involved in the handling of dangerous goods across the globe share the same common understanding of the hazards and labels.

The results of these efforts have led to a cleaner environment and increased safety for all. Countries that once had little understanding of such regulations have come to learn to take them seriously through bitter experience of accidents and disasters.

The Growth of Specialist Service Companies

Once in the realm of only the major international logistics players, specialist dangerous goods packaging companies have emerged to assist regulators to ensure that the safe handling and transport of dangerous goods is ensured for ALL goods entering, passing through or leaving a particular country. Well run economies have found means to ensure best practices are adhered to by controlling all ports, airports and road borders. Goods not conforming to the strict standards set by the regulators cannot easily be transported across borders. Many shippers and logistics companies who do not have the required expertise to pack goods per regulations now find these services offered by specialist companies who have the required skills and knowledge to pass inspection by the "gatekeepers" of the industry.

The preparation of the **Shipper's Declaration** for the transport of dangerous goods carries considerable responsibility. Those signing the declaration may be held personally responsible for errors. A company who needs to complete these declarations must be able to recruit and train their staff adequately as well as ensure that such staff are kept up to date with the vast number of changes. Many companies therefore choose to use specialist companies to prepare all such documents and the related packaging in much the same way as they choose lawyers or accountants to advise on detailed matters of accounting or legal practice.



Which Business Does this Affect?

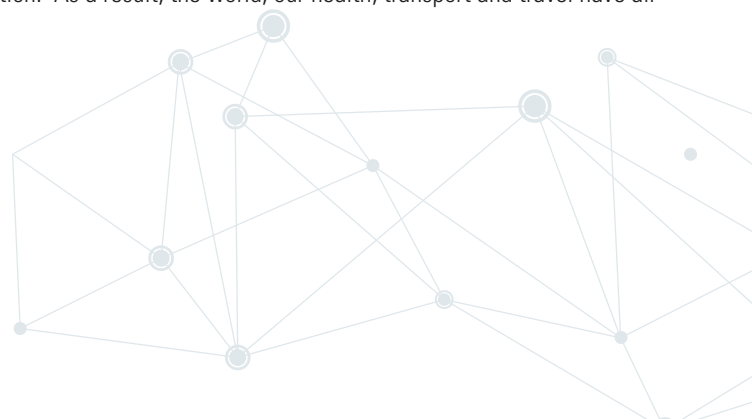
The requirement Dangerous Goods Packaging impacts almost every industry from Electronics, Textiles, Food and Beverages, Perfumes, Industrial Gases and Motor Vehicles to Chemicals, Pharmaceuticals and Farming. Almost every one of them uses chemicals at some stage in the production process and electronics these days means lithium batteries are omnipresent in so many devices from laptops and hand phones to point of sale equipment. Anything that is flammable requires specialist packing to prevent accidental fires during transport. The health care and biotechnology industries have a vast requirement for transporting biohazards such as blood samples or human organs.

Globally Harmonised Systems (GHS)

The labels used in dangerous goods packaging are for transport of goods across borders where regulations and languages vary considerably. The globalisation of industry has meant that common standards are required so that goods travelling across borders meet expected regulations in both the source and destination countries. The same generic products, such as ethanol, may be categorized differently by various producers in various countries. With 16 hazard classes and a vast array of subcategories to choose from there is ample room for confusion. Despite this, there has been significant progress over the years to improve common standards for classification of goods. Whilst still not entirely perfect the actual labels used, including specifications on placement, colour and size have been harmonized internationally so that anyone working in the transport industry can easily recognize dangerous goods, their potential hazards and the appropriate handling and emergency responses.

The simple matter of packaging has therefore become a major international concern employing many thousands of people worldwide and requiring huge international efforts to achieve international understanding and recognition. As a result, the world, our health, transport and travel have all become far safer.

Contributed by SCIC Small and Medium Enterprise Committee



MAJOR ACCIDENT HAZARDS

Major Accident Hazards (MAHs) are low frequency, high severity consequence events usually involving a loss of primary containment of hazardous material and often with the potential to result in multiple fatalities due to Fire, Explosions, Toxic releases and Major accidents to the Environment.

MAHs are inherent aspects of Oil Exploration, Refinery, Petrochemical, Chemical, Fertilizer, Pesticide industries and Storage Facilities. Any uncontrolled releases of the hazardous fluids can lead to the increased possibility of fires, explosions and/or toxic release and potentially resulting in loss of human life, destruction of plant and major environmental damage.

As mentioned above MAHs arise from a loss of primary containment. This can happen in several ways: some of the examples are, Liquid overflow, Discharge through relief valve to atmosphere rather than flare, Brittle fracture (most likely with lighter pressurised liquid hydrocarbons containing equipment due to auto-refrigeration), High temperature due to exothermic runaway reactions, Corrosion under insulation, Corrosion under fireproofing, Internal corrosion due to process fluids (especially acids and caustic), Impact damage (e.g. from plant vehicles or lifting activities), Mechanical failures (e.g. pump seals, valve glands, worn hoses) and Human error (e.g. leaving a vent or drain valve open, incorrect equipment preparation for maintenance, etc.).

Examples of Major Accidents

Date	Description	Lessons Learned
1974	Vapour Cloud Explosion (Flixborough, UK)	Catastrophic effect of VCE on building structures; hazards of large inventory of flammable materials
1984	Toxic Release (Bhopal)	Effect of massive release of toxic materials on the population; hazard of large inventories of toxic materials
2005	Vapour Cloud Explosion Impacting Trailers	Catastrophic effect of VCE on siting portable buildings
2010	Large Oil Spill (Gulf of Mexico)	Inadequacy of blowout preventer to shut off oil flow; severe environmental and corporate reputation impact of massive oil spill
2011	Nuclear Disaster, Fukushima Daiichi (Japan)	Catastrophic effects of earthquake and Tsunami on nuclear power reactors

Hence, the operation of Major Accident Hazard facilities requires a clear understanding of the potential causes of harm and the safeguards and/or barriers that are necessary in order to ensure that the potential for harm is eliminated, managed or reduced to a level which is As Low As Reasonably Practicable (ALARP).

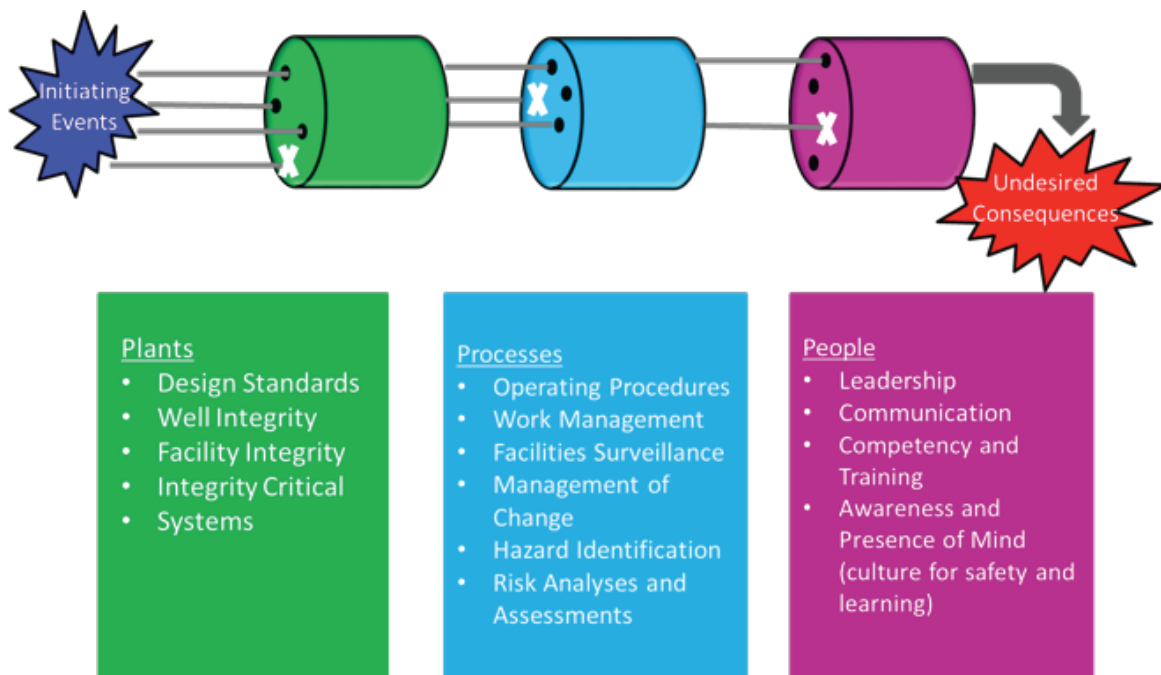
Types of MAHs

Unignited major release	Toxic gas disperses without igniting with serious environmental and health impacts
Jet fire	Ignited pressurised leak (gas or liquid) from process equipment failure
Pool fire	Inside toe-wall or tank dike caused by liquid leak from process equipment
Flash fire	Ignition of drifting gas cloud
Vapour cloud explosion (VCE)	Ignition of gas cloud within a congested area
Boiling Liquid Expanding Vapour Explosion (BLEVE)	Pressurised liquid hydrocarbon vessel ruptures due to external fire
Dust explosion	Adding dispersion of dust and containment to the fire triangle creates the explosion pentagon

Specific Factors Contributing to Major Accidents

Major Accident Hazard causation models are useful illustrations of the primary protective and preventative barriers that are in place to prevent or control a given hazardous event. Therefore, every operation of Major Accident Hazard facilities needs to maintain the key barriers that control those hazards and schedule of verification of the health of those barriers.

Basically, accidents occur because weaknesses or "Windows of opportunity" open in all levels of the system that allow a chain of events to start at the upper echelons of the structure and move down, ultimately resulting in an accident if it is not stopped at any level. The selection of barriers should consider diversity of prevention, alerting and mitigation types with an emphasis on prevention.



How to manage a Risk

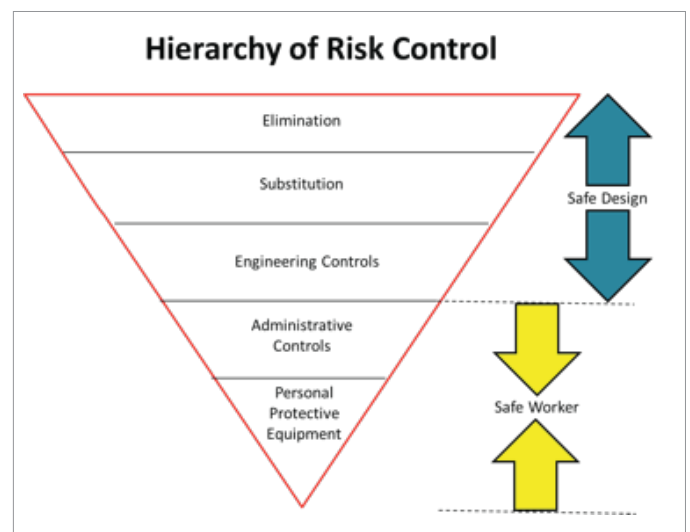
There are three key elements to the safe operation of Major Accident Hazard facilities:

1. Identify all Major Accident Hazards;
2. Assess Hazards and Risks;
3. Proactively Manage the Risks.

A reasonably practicable measure should be taken to eliminate foreseeable risks. If not possible, adopt measures to reduce risks in accordance with the hierarchy of control and make sure the measures are working in practice.

Importance of Safety Case

The potential for major industrial accidents has become more significant as the production, storage and use of hazardous substances have increased. That is the reason why it is important to demonstrate in the safety case that the hazards are identified and all necessary measures are taken to set up and implement a major hazard control system, including siting and land-use planning, analysis of risks, control of causes of accidents, safe operation, on- and off-site emergency planning, duties and responsibilities, informing the public and reporting to authorities.



IMDG CODE 2016 AMENDMENT 38-16

IMDG 2016 Amendment 38-16 Summary of Changes

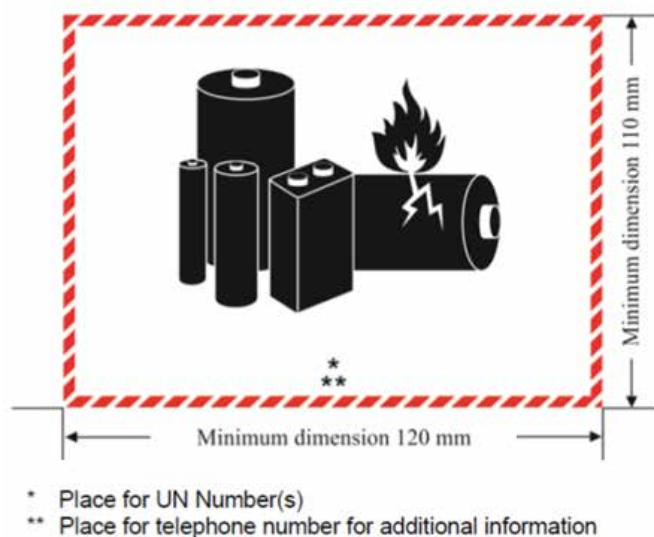
IMDG Code (Amendment 38-16) has been published recently by the International Maritime Organization (IMO). Compliance with Amdt 38-16 is optional from 1st January 2017 and mandatory on 1st January 2018.

There are many changes to the 2016 edition of the IMDG Code. However, a key change which will affect our industry will be the introduction of a new mark for the carriage of lithium cells or batteries by sea.

Changes Affecting the Carriage of Lithium Cells or Batteries by Sea

Because lithium batteries are designed to provide high levels of power, the electrical energy in these batteries is significant, meaning that such batteries can sometimes generate a great amount of heat if short circuited. In addition, the chemical contents of these batteries may catch fire if damaged or if improperly designed or assembled.

Packages containing lithium cells or batteries prepared in accordance with the provision indicated in the IMDG code shall be marked as shown in the figure below:



The code also specifies the use of the mark for

- lithium cells or batteries contained in, or packed with equipment and package containing
- multiple lithium cells or batteries assigned to different UN number

Other Significant Changes in IMDG Amendment 38-16 which may affect the Industry

For class 3 there are updates to the assignment of packing group for viscous liquids as covered in 2.3.2.2 and 2.3.2.5.

For class 2, 3, 6.1 and 8 there are new sections, 2.2.4, 2.3.5, 2.6.2.5, and 2.8.3 respectively, regarding not accepting chemically unstable substances for transport unless precautions have been taken to prevent decomposition or polymerization under normal conditions of transport.

UN 3166 is now just for vehicles. The entries for Engines previously covered by this UN Number have been moved to new UN Numbers 3528, 3529 and 3530

There have been nine new UN Numbers added: UN 0510 and UN Nos from UN 3527 to UN 3534.

Training Requirement

IMDG Code identifies the shore based personnel, who are engaged in the transport of dangerous goods "intended to be transported by sea" that shall receive the training required by the IMDG Code.

These are those that:

- Classify dangerous goods and identify Proper Shipping Names of dangerous goods;
- Pack dangerous goods;
- Mark, label or placard dangerous goods;
- Load/unload Cargo Transport Units;
- Prepare transport documents for dangerous goods;
- Offer dangerous goods for transport;
- Accept dangerous goods for transport;
- Handle dangerous goods in transport;
- Prepare dangerous goods loading/stowage plans;
- Load/unload dangerous goods into/from ships;
- Carry dangerous goods in transport;
- Enforce or survey or inspect for compliance with applicable rules and regulations (e.g. Auditors, Compliance personnel); or
- Are otherwise involved in the transport of dangerous goods as determined by the competent
- Authority

Contributed by SCIC Logistics & Distribution Committee



HOSTING OF 19TH ISO/TC 229 NANOTECHNOLOGIES PLENARY MEETING IN SINGAPORE

Singapore hosted the 19th ISO/TC 229 Nanotechnologies Plenary Meeting from 7 to 11 Nov 2016 at the Grand Copthorne Waterfront Hotel. 162 international and national experts attended the week-long meeting. This is the second time that Singapore has hosted this meeting, with the previous meeting hosted by Singapore in 2007, emphasizing the importance that Singapore places on nanotechnology and its standards. This provided an opportunity for industry, academia and government to interact directly with the key international players in this sphere and helped to enable direct discussions on nanotechnology, nanomaterials as well as their applications as well as their impact on health and the environment. A new Working Group (WG) on 'Products and Applications' was formed at this ISO/TC 229 Plenary Meeting to develop performance-based standards for nano-enables or nano-enhanced products and applications.

To provide a platform to exchange knowledge and information on how standards can support nanotechnology-based innovation, a dialogue session between leaders in ISO/TC 229 and delegates from Singapore was held on 7 Nov 2016. The dialogue attracted 122 national and international experts from the industry, IHLs, academia and regulatory bodies attended the session.

The following topics were presented at the dialogue session:

Topic presented	Presenter
Research, innovation and standards	Dr Denis Koltsov Chairman of ISO/TC 229, UK
Standards perspective	Dr Gert Roebben EU-JRC, Belgium; ISO/TC 229/JWG 2 Expert
Industry perspective	Dr Shaun Clancy Evonik Corporation, USA; ISO/TC 229/WG 3 Expert
Keynote address	Dr Raj. Thampuran Managing Director of A*STAR, Singapore
Singapore perspective – Policy	Mr Kelvin Zin Economic Development Board, Singapore; Singapore National Mirror Committee for ISO/TC 229 member
Singapore perspective – Industry & standards	Dr Shin Watanabe (Represented by Dr Rong Kong) P&G, Singapore; Singapore National Mirror Committee for ISO/TC 229 member

Positive feedback on the hosting and logistics arrangements of this meeting was received from the Chairman, Secretary and experts of ISO/TC 229. The Singapore organising committee Chairman, Dr Ramam Akkipeddi together with the organising committee members received complimentary remarks on the high standard of the arrangements and the hospitality.



COMMUNITY OUTREACH FOR THE COMMUNITY DEVELOPMENT COUNCIL OFFICIALS (CDC) - VISIT TO JURONG ISLAND - "THE PETROCHEMICAL HUB OF SINGAPORE"

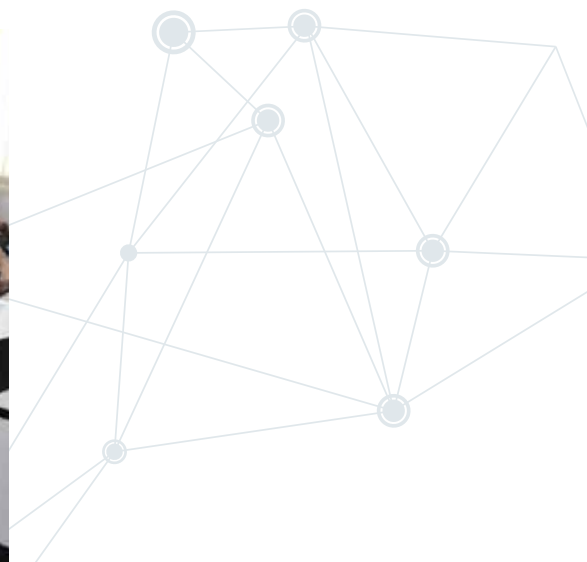


As part of the Responsible Care initiatives specifically on the Community Awareness & Emergency Response Code and our continuous efforts in engaging the members of public, SCIC and its members had organised the annual community outreach session on 19th November 2016

About 150 CERT volunteers from the various district visited Jurong Island and were hosted by member companies at their sites. They were provided information which has helped them to better understand the safety operations of the chemical industry through the presentations sharing, Q&A discussions and site tours arranged. The concerns on flaring incidents associated with the chemical operations in Jurong Island were also addressed and well-discussed during the session.

The community outreach session has also received several positive feedback from by participants who had attended.

SCIC would like to thank member companies; Eastman Chemical Singapore, Evonik Oil Additives Asia Pacific, ExxonMobil Chemical Asia Pacific, Mitsui Elastomers Singapore as well as Rohm And Haas Chemicals Singapore (The Dow Chemical Company) for their support as hosting sites as well as to the SCIC Responsible Care Committee for their continuous support in this community outreach session.



PROCESS SAFETY METRIC IN ANNUAL RESPONSIBLE CARE KEY PERFORMANCE INDICATORS (KPI) SUBMISSION

The Process Safety Harmonization Taskforce of the Responsible Care Leadership Group (RCLG) has recommended that International Council of Chemical Associations (ICCA) to adopt a process safety event rate metric to the annual Key Performance Indicators (KPI) Submission by Responsible Care signatories to its respective country association.

The proposal for process safety event reporting will enable broad-based global reporting of process safety performance across the chemical and petrochemical industries. It will provide a roadmap for regions, associations and companies who are currently not tracking process safety performance to recognize the benefits that tracking and reporting will bring and for those who are already gathering process safety data, to be aligned globally and focused on continuous improvement in process safety performance.

More information and guidance would be provided to all Responsible Care signatories on the Process Safety Metric reporting in 2017 by the SCIC Responsible Care Committee.

The Responsible Care Leadership Group is part of the International Council of Chemical Associations (ICCA), which is the world-wide voice of the chemical industry, representing chemical manufacturers and producers all over the world, to lead and oversee the implementation and promotion of the Responsible Care programme globally.

For more information on the ICCA and Responsible Care, please visit www.icca-chem.org

WELCOME NEW RESPONSIBLE CARE MEMBER COMPANY

SCIC warmly welcomes the following company into the Responsible Care family:



Praxair Singapore Pte Ltd

THE 17TH ASIA PACIFIC RESPONSIBLE CARE CONFERENCE (APRCC) 2017



30th to 31st October 2017

Block Your Calendar Now

A Regional Conference on Responsible Care Not to be Missed!

SCIC would be hosting the 17th Asia Pacific Responsible Care Conference in Singapore on 30th to 31st October 2017. This provides participants a unique opportunity to hear high level sharing by speakers from the global and regional regions as well as an excellent networking platform to meet fellow industry colleagues in exchanging ideas and information.

Look out for the conference programme on SCIC website in Q1 2017. You may also contact SCIC at secretariat@scic.sg for more information on advertising opportunities in APRCC 2017.

Forthcoming Event (January 2017 – April 2017)

DATE	EVENTS
9, 10, 23, 24 January 2017	SCIC - Safety Case Practitioners Workshop (4-days)
11, 12, 25, 26 January 2017	SCIC - Safety Case Practitioners Workshop (4-days)
19 January 2017	Training Workshop on Globally Harmonized System (GHS) for Chemical users
6, 7, 20, 21 February 2017	SCIC - Safety Case Practitioners Workshop (4-days)
8, 9, 22, 23 February 2017	SCIC - Safety Case Practitioners Workshop (4-days)
6, 7, 20, 21 March 2017	SCIC - Safety Case Practitioners Workshop (4-days)
8, 9, 22, 23 March 2017	SCIC - Safety Case Practitioners Workshop (4-days)
24 March 2017	SCIC – Annual Dinner 2017 and Responsible Care Award Presentation 2016
February 2017	Training Workshop On Globally Harmonized System (GHS)_for Chemical users
March 2017	Training Workshop On Globally Harmonized System (GHS)_for Chemical users
April 2017	Training Course on Regulatory, Technical & Safety Requirement of ISO Tank Containers

*** 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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of the average car produced today is made from advanced plastics made from oil and natural gas.

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