

CHEM DIGEST

A quarterly publication by the Singapore Chemical Industry Council Limited

MICA (P) NO. 023/12/2013

- + Responsible Care Awards 2013 Winners
- + Launch of Guidebook on Globally Harmonised System (GHS)
- + SCDF-SCIC Responsible Care Collaboration and Recognition Scheme

SCIC
SINGAPORE CHEMICAL
INDUSTRY COUNCIL

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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



Dear Industry Colleagues,

2013 has proven to be yet another challenging year for our industry as we grappled with the uncertainties of the global markets. The chemical cluster comprising the petroleum, petrochemical and the specialty chemicals sectors, registered a lower output of \$97billion based on the preliminary results released as compared with \$110billion in 2012. This was in part due to the weaker demand from major importer markets as well as lower selling prices and margins resulting from stiff competition from production economies around the world.

Nevertheless, the Singapore economy rebounded with a growth rate of 5.5% for Q4 of 2013, lifting the year's GDP to 4.1% as compared with the forecast of 3.5 to 4.0%. As the chemical cluster continues to play its part in contributing to the growth of Singapore's economy, the changing regulatory landscape has required our industry players to be forward thinking in their strategies to operate within the new statutory requirements. Also, ongoing efforts by our regulatory affairs committee and subject matter experts continue to engage the regulatory and statutory agencies on issues pertaining to pipeline licensing, new air emission standard, QRA for Jurong Island V2.0, amongst many other new requirements. The foreign labour policy remains a key issue for the industry where a major percentage of our manpower requirements come from this source. We do hope to see compromised outcomes that would help to put our industry in a more sustained and conducive environment to compete in the global arena.

The Energy Conservation Act was introduced in 2013 to pave the way for Singapore to achieve the target of 35% improvement in energy intensity by 2030 from 2005 levels. As the industry is inherently energy intensive, and given the fact that the cost of energy continues to be a key concern, SCIC strongly encourage industry members to look into energy efficiency efforts that could be put in place to help sustain the business operations for the longer term. Industry members are also urged to take advantage of the energy efficiency grants that are currently being promoted and offered

by various government agencies. More details of these schemes will be disseminated to the industry in the coming months.

By end March 2014, SCIC would have completed the first 3 year term as a Standard Development Organisation (SDO) for SPRING Singapore. The SDO @SCIC manages the Chemical Standard Committee (CSC) under SPRING Singapore's standardisation Programme. Many of you would have attended the standard exchange and launches that we have organised over the past years. In fact, many of the standards are related to our business operations as they have either become industry's voluntary standards or standards required as part of a regulatory compliance. I am pleased to announce that we have far exceeded our first term KPIs and have also been reappointed by SPRING Singapore to continue managing the CSC for a second 3 year term. We would like to thank all our standard partners for their representation in the CSC, the technical committees and the working groups.

By end March 2014, SCIC would have completed the first 3 year term as a Standard Development Organisation (SDO) for SPRING Singapore.

SCIC would also like to appreciate and thank all our industry members represented in our committees, for their dedication and relentless efforts in promoting Responsible Care, sharing knowledge on health, safety, environment, process safety and addressing issues on human resources, Jurong island infrastructure and trade.

We wish one and all a safe, healthy and fruitful year ahead.

Terence Koh
Executive Director
Singapore Chemical Industry Council



SCIC Annual Dinner 2014 and Responsible Care Awards 2013 Presentation



On 21 March 2014, more than 440 guests attended the SCIC Annual Dinner and Responsible Care Awards Presentation held at the Shangri-La Hotel Singapore. In its 13rd year running, the SCIC Responsible Care Awards re-affirmed the chemical industry's strong commitment towards health, safety and environmental standards.

Petrochemical Corporation of Singapore (Private) Limited was the sponsor for the Responsible Care Awards 2013, delivering their continuous commitment and support for the Responsible Care Programme. The event was graced by Mr Tan Chuan-Jin, Acting Minister, Ministry of Manpower and was attended by invited guests including representatives from various government agencies.



Responsible Care Awards 2013 Winners

Category – Manufacturers

1	Air Products and Chemicals (S) Pte Ltd	Achievement	<ul style="list-style-type: none"> Employee Health and Safety Code Product Stewardship Code
2	Air Products Singapore Pte Ltd	Gold	<ul style="list-style-type: none"> Product Stewardship Code
3	Akzo Nobel Surface Chemistry Pte Ltd	Excellence	<ul style="list-style-type: none"> Community Awareness and Emergency Response Code Employee Health and Safety Code
		Gold	<ul style="list-style-type: none"> Pollution Prevention Code
		Achievement	<ul style="list-style-type: none"> Distribution Code Product Stewardship Code
4	BASF South East Asia Pte Ltd (Banyan Avenue- Jurong Island Site)	Achievement	<ul style="list-style-type: none"> Community Awareness and Emergency Response Code Distribution Code Employee Health and Safety Code Process Safety Code
5	BASF South East Asia Pte Ltd (Tuas Site - Tuas Avenue 11)	Achievement	<ul style="list-style-type: none"> Community Awareness and Emergency Response Code Distribution Code Employee Health and Safety Code Pollution Prevention Code
6	BASF South East Asia Pte Ltd (35 Tuas West Avenue)	Achievement	<ul style="list-style-type: none"> Community Awareness and Emergency Response Code Distribution Code Employee Health and Safety Code Pollution Prevention Code
7	Celanese Singapore Pte Ltd	Gold	<ul style="list-style-type: none"> Community Awareness and Emergency Response Code Employee Health and Safety Code
		Achievement	<ul style="list-style-type: none"> Pollution Prevention Code Process Safety Code
8	Chemical Specialties (Singapore) Pte Ltd	Achievement	<ul style="list-style-type: none"> Community Awareness and Emergency Response Code
9	Chevron Phillips Singapore Chemicals Pte Ltd	Achievement	<ul style="list-style-type: none"> Community Awareness and Emergency Response Code Employee Health and Safety Code Process Safety Code
10	Croda Singapore Pte Ltd	Achievement	<ul style="list-style-type: none"> Community Awareness and Emergency Response Code
11	DuPont Company (Singapore) Pte Ltd	Excellence	<ul style="list-style-type: none"> Employee Health and Safety Code
		Gold	<ul style="list-style-type: none"> Process Safety Code
		Achievement	<ul style="list-style-type: none"> Pollution Prevention Code Product Stewardship Code



The evening saw the presentation of Responsible Care Awards 2013 with a total of 123 Responsible Care Awards being presented to 47 Responsible Care signatories this year.

SCIC wishes to take this opportunity to Petrochemical Corporation of Singapore (Private) Limited for sponsoring the Responsible Care Awards 2013 and at the same time extend our heartfelt gratitude to all members for their support towards making the evening a successful one.



12	Eastman Chemical Singapore Pte Ltd	<ul style="list-style-type: none"> 🏆 Excellence <ul style="list-style-type: none"> • Employee Health and Safety Code • Process Safety Code 🥇 Gold <ul style="list-style-type: none"> • Community Awareness and Emergency Response Code Achievement <ul style="list-style-type: none"> • Pollution Prevention Code
13	ExxonMobil Chemical Asia Pacific Pte Ltd	<ul style="list-style-type: none"> 🏆 Excellence <ul style="list-style-type: none"> • Pollution Prevention Code • Process Safety Code 🥇 Gold <ul style="list-style-type: none"> • Community Awareness and Emergency Response Code • Employee Health and Safety Code • Product Stewardship Code
14	FUJIFILM Asia Pacific Pte Ltd	<ul style="list-style-type: none"> Achievement <ul style="list-style-type: none"> • Pollution Prevention Code
15	Huntsman (Singapore) Pte Ltd	<ul style="list-style-type: none"> Achievement <ul style="list-style-type: none"> • Employee Health and Safety Code
16	Infineum Singapore Pte Ltd	<ul style="list-style-type: none"> 🏆 Excellence <ul style="list-style-type: none"> • Employee Health and Safety Code Achievement <ul style="list-style-type: none"> • Community Awareness and Emergency Response Code
17	Kuraray Asia Pacific Pte Ltd	<ul style="list-style-type: none"> Achievement <ul style="list-style-type: none"> • Community Awareness and Emergency Response Code • Distribution Code • Pollution Prevention Code
18	Lubrizol South East Asia Pte Ltd	<ul style="list-style-type: none"> 🥇 Gold <ul style="list-style-type: none"> • Community Awareness and Emergency Response Code • Distribution Code Achievement <ul style="list-style-type: none"> • Employee Health and Safety Code • Pollution Prevention Code • Process Safety Code
19	Lucite International Singapore Pte Ltd	<ul style="list-style-type: none"> 🥇 Gold <ul style="list-style-type: none"> • Employee Health and Safety Code • Process Safety Code Achievement <ul style="list-style-type: none"> • Community Awareness and Emergency Response Code • Pollution Prevention Code
20	Mitsui Elastomers Singapore Pte Ltd	<ul style="list-style-type: none"> Achievement <ul style="list-style-type: none"> • Community Awareness and Emergency Response Code • Employee Health and Safety Code • Process Safety Code
21	Mitsui Phenols Singapore Pte Ltd	<ul style="list-style-type: none"> Achievement <ul style="list-style-type: none"> • Community Awareness and Emergency Response Code • Process Safety Code
22	Perstorp Singapore Pte Ltd	<ul style="list-style-type: none"> Achievement <ul style="list-style-type: none"> • Community Awareness and Emergency Response Code • Distribution Code • Employee Health and Safety Code • Pollution Prevention Code



Responsible Care Awards 2013 Winners

Category – Manufacturers

23	Shell Chemicals Seraya Pte Ltd	Excellence	• Employee Health and Safety Code
		Gold	• Community Awareness and Emergency Response Code • Process Safety Code
		Achievement	• Pollution Prevention Code
24	Singapore Oxygen Air Liquide Pte Ltd (J6 HYCO Plant)	Achievement	• Process Safety Code
25	Singapore Oxygen Air Liquide Pte Ltd (J8 ASU Plant)	Achievement	• Process Safety Code
26	Singapore Oxygen Air Liquide Pte Ltd (J5 Electronic Specialty Gases Centre)	Gold	• Employee Health and Safety Code
		Achievement	• Process Safety Code
27	Singapore Oxygen Air Liquide Pte Ltd (J1 CFTC)	Achievement	• Community Awareness and Emergency Response Code
28	Singapore Oxygen Air Liquide Pte Ltd (J3 Special Gas Centre)	Gold	• Employee Health and Safety Code
29	Singapore Oxygen Air Liquide Pte Ltd (EGO-AMK Gas Centre)	Achievement	• Employee Health and Safety Code • Process Safety Code
30	Sumitomo Chemical Singapore Pte Ltd	Gold	• Community Awareness and Emergency Response Code • Distribution Code
		Achievement	• Employee Health and Safety Code • Process Safety Code
31	Sumitomo Seika (Singapore) Pte Ltd	Achievement	• Community Awareness and Emergency Response Code • Employee Health and Safety Code • Process Safety Code
32	The Polyolefin Company (S) Pte Ltd	Gold	• Community Awareness and Emergency Response Code • Process Safety Code • Product Stewardship Code
		Achievement	• Distribution Code • Employee Health and Safety Code • Pollution Prevention Code

Category – Logistics And Service Providers

1	Connell Bros Co. (Singapore) Pte Ltd	Achievement	• Distribution Code • Employee Health and Safety Code
2	CWT Logistics Pte Ltd	Achievement	• Distribution Code
3	Damco Logistics Singapore Pte Ltd	Achievement	• Employee Health and Safety Code
4	Hoyer Global (Singapore) Pte Ltd	Achievement	• Community Awareness and Emergency Response Code • Employee Health and Safety Code
5	LTH Logistics (Singapore) Pte Ltd	Gold	• Community Awareness and Emergency Response Code
		Achievement	• Distribution Code • Employee Health and Safety Code
6	KMG Ultra Pure Chemicals Pte Ltd	Achievement	• Community Awareness and Emergency Response Code • Distribution Code • Employee Health and Safety Code • Pollution Prevention Code • Product Stewardship Code
7	Sembcorp Industries Ltd (Utilities Singapore)	Excellence	• Community Awareness and Emergency Response Code • Pollution Prevention Code
		Achievement	• Distribution Code • Employee Health and Safety Code
8	Vopak Terminals Singapore Pte Ltd (Penjuru Site)	Gold	• Community Awareness and Emergency Response Code
9	Vopak Terminals Singapore Pte Ltd (Banyan Site)	Achievement	• Community Awareness and Emergency Response Code
10	Vopak Terminals Singapore Pte Ltd (Sakra Site)	Achievement	• Community Awareness and Emergency Response Code

Category – Traders

1	Absotech Pte Ltd	Achievement	• Employee Health and Safety Code
2	BASF South East Asia Pte Ltd (Trading)	Excellence	• Distribution Code • Product Stewardship Code
3	Bayer (South East Asia) Pte Ltd	Excellence	• Community Awareness and Emergency Response Code • Distribution Code • Employee Health and Safety Code • Product Stewardship Code
4	Megachem Limited	Achievement	• Employee Health and Safety Code
5	Shell Eastern Trading (Pte) Ltd	Excellence	• Product Stewardship Code
		Gold	• Distribution Code



SCIC Annual Golf Tournament 2014

Date: 24 July 2014

Time: 11.15am

Venue: Singapore Island Country Club

SCIC Golf Tournament provides an unquie yet interactive platform to network with key industry players. To enhance the networking experience, we will be incorporating light lunch, dinner and prize presentation into the program as well. To find out more information, please contact SCIC at secretariat@scic.sg

*This event is open to you and your customers.
Register early to avoid disappointment.*



Your sponsorship is just 1 stroke away....

This is the 5th year that SCIC is organising the SCIC annual Golf Tournament. We welcome your sponsorship for this tournament by the various ways:

- Sponsorship of Golf Balls
- Sponsorship of holes
- Sponsorship of gifts and Prizes

For more information, please contact the SCIC Secretariat Office at 6267 8891 or via secretariat@scic.sg



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Singapore Workforce Development Agency (WDA) supporting the growth of the Chemical industry



The Singapore Workforce Development Agency (WDA) is the national agency championing workforce development. To support the growth of the Chemical industry, WDA has put in place several initiatives and programmes that employers can tap on to upgrade the skills of their workforce. Over the next few issues of ChemDigest, WDA will be sharing on various training initiatives, scholarships, and manpower schemes that are available for the Chemical industry.

Transition of Ministry of Manpower (MOM) regulated courses to WSQ Framework

In 2013, WDA collaborated with Ministry of Manpower (MOM) and Workplace Safety and Health Council (WSHC) on the transition of selected safety training courses currently offered by MOM Approved Training Providers (ATPs) to the WSQ system. With effect from 1 July 2013, the following MOM courses have been replaced by the equivalent WSQ competency units under the Process WSQ framework.

No	MOM Course	Equivalent WSQ Course
1	Oil/Petrochemical Safety Orientation Course for Workers	Apply Workplace Safety and Health in Process Plant
2	Oil/Petrochemical Industry Safety Course for Supervisor	Supervise Workplace Safety and Health in Process Plant
3	Safety Orientation Course (Manhole) for Workers	Perform Work in Confined Space Operation
4	Safety Instruction Course (Manhole) for Supervisor	Supervise Work in Confined Space Operation

The above WSQ courses are designed to meet the requirements stipulated in the Factories (Safety Training Courses) Order, Clause 2(6) and 2(7) which stipulates that any worker who is carrying out work in a factory of the Oil and Petrochemical industry or any person who supervises any process or work in a factory of the Oil and Petrochemical industry must undergo a safety and health training course conducted by approved institutions approved by the Commissioner for Workplace Safety and Health. MOM will recognize graduates of the WSQ courses as Competent Persons under the aforementioned Order.

Employers who send their workers for WSQ training programmes (applicable only to Singapore Citizens and Singapore Permanent Residents) can enjoy WDA funding support. Details are in the table below:

Funding Components	Conducted By	Courses targeted at Rank and File	Courses targeted at PMETs
Course Fee Support	External	80% of course fees capped at \$7/hr SME Enhanced Funding: 90% of course fees capped at \$30/hr	50% of course fees capped at \$15/hr SME Enhanced Funding: 90% of course fees capped at \$30/hr
	In-House	\$7/hr SME Enhanced Funding: \$15/hr	\$15/hr SME Enhanced Funding: \$15/hr
Absentee Payroll Support	Both External and In-house	80% of hourly based salary capped at \$4.50/hr SME Enhanced Funding: 80% of hourly based salary capped at \$7.50/hr/trainee	

Contact

Companies who are interested to leverage on WDA's funding to adopt WSQ training may contact the following officer for more information:

Mr Jovin Teo, Manager,
Manufacturing &
Construction Division
DID : 6512 6554
Email : jovin_teo@wda.gov.sg

About WDA

The Singapore Workforce Development Agency (WDA) enhances the competitiveness of our workforce by encouraging workers to learn for life and advance with skills. In today's economy, most jobs require not just knowledge, but also skills. WDA collaborates with employers, industry associations, the Union and training organisations, to develop and strengthen the Continuing Education and Training system that is skills-based, open and accessible, as a mainstream pathway for all workers – young and older, from rank and file to professionals and executives – to upgrade and advance in their careers and lives. For more information, please visit <http://www.wda.gov.sg>

Contributed by:
Singapore Workforce
Development Agency

ExxonMobil launched its expanded chemical plant in Singapore



The Singapore Government is committed to growing the energy and chemicals industry, said Prime Minister Lee Hsien Loong.

PM Lee was speaking on January 8 at the opening of ExxonMobil's Singapore Chemical Plant expansion on Jurong Island, attended by more than 200 guests.

"I want to assure all the energy and petrochemical companies here that the Singapore Government stands fully behind them and will continue to help them succeed. We will fully honor our commitments to these companies which have placed their trust in Singapore," PM Lee said.

This multi-billion-dollar expansion, the largest manufacturing investment in Singapore, reinforces ExxonMobil's long-term supply commitment to the fast-growing Asia-Pacific market. "Two-thirds of that growth in chemical demand will be here in the Asia-Pacific region. ExxonMobil's expanded Singapore Chemical Plant is uniquely positioned to serve these growth markets," said Mr Rex W. Tillerson, ExxonMobil's chairman and chief executive officer, at the event.

The Singapore chemical facility, which now accounts for about one-quarter of ExxonMobil's global chemical capacity, incorporates

Prime Minister Lee Hsien Loong officially launched the newly expanded Singapore Chemical Plant on Jurong Island.

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more than 40 new proprietary technologies. The new technologies enable products to be made efficiently and with reduced environmental impact, said President of ExxonMobil Chemical Company Steve Pryor. The new steam cracker for instance is the first in the world that is able



Singapore Chemical Plant employee Tang Meng Lee guiding Prime Minister Lee through the expansion showcase.

to process crude oil directly into petrochemicals. This helps reduce raw material costs, energy consumption and carbon emissions.

ExxonMobil also celebrated 120 years of operations in Singapore with a gala dinner on January 8 at Shangri-La Hotel, graced by Singapore president, Dr Tony Tan Keng Yam.

The company started as a kerosene trading outpost, and opened its refinery in 1966, shortly after Singapore's independence.

Contributed by:
ExxonMobil Asia Pacific Pte. Ltd



President Tony Tan and Mayor Amy Khor joined ExxonMobil to celebrate their 120 years of operation in Singapore.



Training Requirements for Handling Dangerous Goods in Warehouse Storage

Dangerous materials are subject to chemical regulations as they are harmful to living organisms, property, and the environment. In Singapore, the regulatory framework for dangerous goods handling and storage are formulated through Acts, Regulations, Standards and Codes of Practices by the respective government agencies.

While the Acts stipulate the main legal requirements, the Regulations provide detailed requirements on the protection of the environment, the health and safety of the workers. Further, the Singapore Standard and Code of Practices sets out implementation guidance such that these Acts and Regulations are being complied with.

The Workplace Safety and Health (WSH) Act provide guiding principles on cultivating good safety habits in all individuals, thus promoting strong safety culture in the workplace. Reasonable practicable measures are to be enforced to ensure the safety and health of staff and others that are affected by the work being carried out. It is the duty of employers to ensure that workers have adequate instruction, information, training and supervision to perform their tasks.

It is imperative that chemical warehouses operators undertake safety orientation/induction programs for all new and existing employees, permanent or on contract basis. Such programs, conducted on a regular basis (in simple layman's terms), must cover the firm's

- ✓ Safety and Health Policy
- ✓ Warehouse layout and emergency evacuation routes
- ✓ Fire fighting systems
- ✓ Emergency Response Procedure
- ✓ Safe working systems
- ✓ Use of Personal Protective Equipment

Employees concerned must know their role in the safe handling and storage of chemicals, the identification of dangers / hazards posed to their health, and the precaution measures to observe and prevention of such hazards. Much of the information on chemical safety can be obtained from safety data sheets (SDS) prepared, reviewed and updated on a regular basis by the chemical manufacturers or suppliers.

In addition to orientation/induction programs, the employer shall, on a regular basis, organise forums/sessions to educate staff on

- Safety and Health rules and regulations (including MOM, NEA and SCDF under the various Acts, Regulations, Singapore Standard and Code of Practices)
- the hazards associated with exposure to hazardous chemical handled, stored and used at the work place
- Risk assessment including identification, evaluation and control of safety and health risk
- the use of information provided on labels and safety data sheets
- how to apply the information provided in the safety data sheets, the labelling of Workplace Chemical Containers, along with information specific to the workplace. Such instruction should be made available in written form for future reference as and when required
- the procedures and practices to be followed for safety in the handle (eg. Safe lifting techniques), store or use of chemicals at work
- Personal Protective Equipment and appliances
- Emergency equipment and procedures

In situations where contract workers/sub-contractors are engaged, selection criteria should include an assessment of the company's safety performance and programme.

Refresher training should be conducted regularly (preferably at least once every 3 years and more frequent if necessary) to ensure that employees understand and follow the correct work procedures. Safety training records should be

kept and training materials reviewed for further improvements.

In terms of equipment handling, forklift trucks are commonly used in loading / unloading and transporting chemicals in the warehouse premises. Serious accidents may occur if untrained persons are tasked to handle such operations. Negligence or poorly-trained / unsupervised operating of forklift trucks could damage storage containers and may lead to fire, explosion or release of hazardous chemicals. Forklift drivers must attend and pass approved training course before they are allowed to operate a forklift.



It is vital that both supervisors and staff are familiar with and keep themselves abreast of the Safety and Health rules and regulations.

Operators of the Very Narrow Aisle (VNA) truck for rack storage of dangerous goods in the chemical warehouse should be train on fall prevention, mobile elevation working platform and working at height for supervisors/workers under the new requirement of WSH (Work at Heights) Regulation 2013.

The Fire Safety (Petroleum & Flammable Materials) Regulations stipulates that a chemical warehouse operator who stores more than 5,000 litres of petroleum or flammable liquid or more than 5,000 kg of solid or gaseous flammable material must establish / provide an in- house emergency response team. The team must be trained and competent in handling incidents involving any petroleum or flammable material in the event of any fire, explosion, leakage or other similar emergency.

Likewise, under the Environmental Pollution Control (Hazardous Substances) Regulations chemical warehouses that store and /or transport hazardous substances must ensure that their employees, contract workers or drivers are armed with adequate knowledge and training to enable them to understand the nature of the dangers of all hazardous substances being stored or transported and the emergency action plan to be implemented in the event of any such accident or emergency.

The WSH (First-Aid) Regulations required that for the number of employees between 26 and 100, one first aider must be appointed. For over 100 employees, one first aider is required for every

100 persons employed. If shift work is scheduled, there must be a sufficient number of first-aiders corresponding to the number of employees working on that shift to provide adequate coverage for each shift. Selection criteria of first-aider include maturity, responsibility and fitness level and fast response time. A trained first-aider is one who successfully completed a first-aid course approved by the Ministry of Manpower.

With the regular training, familiarity with the various legal framework and regulation, coupled with the Management of the Hazardous Chemical Programme (MHCP) in place, the overall risk in handling

dangerous goods for the warehouse storage can be significantly mitigated, ensuring a safe chemical warehouse working environment.

Contributed by: Koh Pee Kok
CWT Logistics Pte Ltd

At the forefront of the
petrochemical industry
today, and the future



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*Care for the Health,
Safety and Environment.
Share with our Community*



Source: www.csb.gov

Preventing Dust Explosion

On 7 February 2008, a series of sugar dust explosions at the Imperial Sugar manufacturing facility in Port Wentworth, Georgia, resulted in 14 worker fatalities. Eight workers died at

the scene and six others eventually succumbed to their injuries. Thirty six workers were treated for serious burns and injuries. The explosions and subsequent fires destroyed the sugar packing buildings, palletizer room, and silos, and severely damaged the bulk train car loading area and parts of the sugar refining process areas. For more details, refer to www.csb.gov.

Overview of dust explosion

A dust explosion occurs when a combustible dust cloud is ignited. Heat and pressure peak are generated as flame propagates through the combustible particles, which are dispersed in air. The resulting pressure waves are called deflagrations if they are subsonic and detonations if they are supersonic.

Dust explosion can cause fatalities, injuries and property damage. The hazard exists in many processes handling powder in industries, such as food processing, pharmaceutical, cosmetic, petrochemical, refining, metal and textile. The types of combustible dust include flour, aspirin, wood, most plastics, aluminum and cotton, just to name a few.

A good understanding of dust explosion and associated risk management is critical in preventing dire consequences.

Mechanism of dust explosion

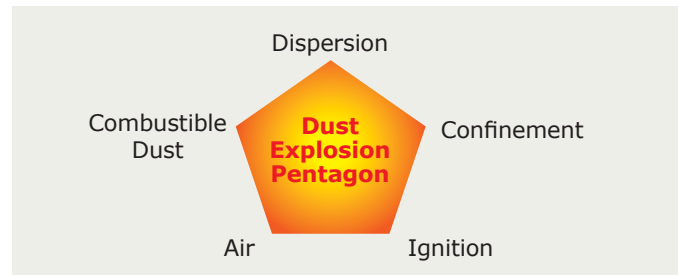
In most processes, dust particles are contained inside their containment, such as mixers, crushers, hoppers, bag filters, silos, pneumatic or flight conveyors, sieves, dryers and packing equipment. Dust explosions that occur in these vessels are known as primary explosions.

Primary explosion can rupture equipment, dislodge dust gathered at ceilings, unsettle dust layers on surfaces and disperse them within a large confined space, forming a huge dust cloud. The heat generated from the primary explosion can ignite this dust cloud. The resultant explosion is known as secondary explosion. Since the secondary dust cloud usually occupies a bigger volume, resulting damage would be more devastating and it can trigger a series of explosions in its vicinity.



Dust explosion pentagon

The dust explosion pentagon illustrates the five ingredients for dust explosion.



While combustible dust (fuel), air and ignition source are familiar elements found in the fire triangle, some explanation may be required for the two additional conditions.

Dispersion

In order for a dust cloud to explode, the concentration of dust particles must be within certain limits. These limits are analogous to the upper and lower flammability limits for gases. With regards to dust explosion, the upper concentration limit is dictated by the minimum amount of oxygen needed for explosion, the lower concentration limit is constrained by the minimum quantity of dust particles required to sustain flame propagation.

Confinement

In an open space, there is little overpressure generated from dust cloud combustion. On the other hand, in a confined space, overpressure can build up and cause severe damage.

Preventive measures

Dust explosion is preventable. Numerous preventive measures can be employed. These preventive measures aim at removing one or more elements indicated on the dust explosion pentagon. The following will explore these elements one by one:

Air

Inerting can reduce the amount of oxygen available for combustion. Blanketing by nitrogen or addition of moisture or other inert gases are some common preventive measures. However, risk of asphyxiation to personnel must be carefully considered if inerting is to be applied.

Combustible dust

Good housekeeping should be a priority in preventing secondary dust explosion by removing the fuel. In addition, the design of facilities can be improved to reduce dust emission (e.g. dust collection system) and dust accumulation (eg. sloped surfaces, smooth walls). If possible, it is most favorable to replace combustible materials with non-combustible ones.

Dispersion

To reduce the possibility of dust cloud reaching its flammable limit, sufficient ventilation should be provided and inert particles can be added to the combustible dust stream. Furthermore, an increase in the size of particles will discourage dispersion. A caveat is that particle size can be reduced by friction during conveying and handling. Hence, it may be a good idea to invest in conveying technology (e.g. special piping and elbows) to reduce particle attrition.

It is important to be aware that, unlike flammable gases, common gas meter is not able to detect dust concentration exceeding its flammable limit.

Confinement

It is a good idea to eliminate confined spaces in areas where secondary dust explosion is possible. However, if it is not practical to do so, secondary dust explosion can still be prevented if primary dust explosion within piping or equipment is diverted to a safe location. This can be achieved by installing piping which direct the pressure of an explosion to a vent at a safe location. Rupture disk, dampers, etc, are suitable for this application.

Ignition

The following are the different types of ignition source and their respective preventive measures:

Ignition source	Preventive measure
Electrostatic discharge	Grounding; avoid the use of non-conductive material
Electrical spark	Only allow dust explosion proof equipment within classified area
Mechanical friction	Use non-sparking tools and equipment
Hot surfaces	Ensure that equipment have the correct insulation class
Exothermic reaction	Check that the management of hazardous material is in order
Explosion suppression and containment	Install barriers, fire suppression system and flame arrestor to stop possible domino effects

Contributed by:
SCIC P&E committee



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Nanotechnology Standards Awareness Seminar Update on Health and Safety Aspects in Nanotechnology

The seminar organised by the National Working Group (NWG) for Nanotechnology on 18 February 2014 attracted more than 70 participants, which is about 50% above target. The seminar provided the current landscape of nanotechnology health and safety standards.

The health and safety standards aspects for nanotechnology were presented with a focus on the Personal Care Products given the exponential growth of nanotechnology applications in this sector.

Professor Andy Hor, NWG Convenor and Dr Ramam Akkipeddi, Singapore Delegation Leader provided an overview of the ISO/TC 229 Nanotechnologies Standards and highlighted the relevant standards for Singapore. The "Cosmetics Industry Standards Landscape" was presented by Dr Alain Khaiat, Convenor for the NWG for ISO/TC 217 Cosmetics. Dr Shin Watanabe, Analytical Section Head for Global Prestige Skincare, Colour Cosmetics and Aircare Products Category of Procter and Gamble gave a presentation on the "Industry Applications of Nanotechnology in Personal Care Products".

Associate Professor Ong Wei-Yi, Member of the NWG presented his work in the presentation on "Studies on Effect of Nanosize Ingredients on Health and Safety". Professor Rob Aitken, Managing Director of IOM



Singapore Pte Ltd then shared on the "Applications of Standards for Nanotechnology Risk Management" which included the ISO TC 229 nanotechnology standards on health and safety.

Presentation slides are provided through the link below: <http://www.scic.sg/index.php/events-a-activities/sdoscic-past-events>



Note:

The National Working Group (NWG) for Nanotechnologies participates actively in ISO TC 229 Nanotechnologies that has already published 40 ISO standards. The NWG is one of the 26 committees that the Chemical Standards Committee (CSC) manages. The CSC is facilitated by the Standards Development Organisation at SCIC and is one of the 11 committees under the national standardisation programme administered by SPRING Singapore.

Launch of SS 5:2013 Methods of test for paints, varnishes and related materials

In February 2012, a Working Group was formed to review the Singapore Standard, SS 5 : 2003, Methods of test for paints, varnishes and related materials . This review exercise updated the series of test methods to ensure their validity and relevance to the current paint and related industries. These test methods are used for the manufacturing, purchase and testing of paint products by industry and users range from commercial to government entities. The review resulted in the original 54 parts being reduced to 49 parts, 4 parts of which are new parts.

The new edition, SS 5 : 2013, Methods of test for paints, varnishes and related materials was launched on 28 Feb 2014. This event was well-received by more than 80 participants consisting of the manufacturers, suppliers, contractors, testing laboratories, architects, consultants, purchasers, relevant government agencies and facilities management professionals. The final number of participants exceeded the targeted number by 50%.

The launch commenced with a welcome address by Mr Steven Tan, Group Director, Quality and Standards of SPRING Singapore. Dr Keith Carpenter, Chairman of the Chemical Standards Committee, provided an overview of *'Chemical Standards and Industry'* followed by Mr Lim Eng Kiat, Chairman of Technical Committee for Surface Coatings, who spoke on *'Standards in the Paint Industry.'*



The Convenor and members of Working Group on SS 5 spoke on the highlights of SS 5:2013 which include the key revisions and new test methods as well as both the current and future engagement and communications with stakeholders. Ms Kee Xin Pei, Engineer of Product Inspection Centre, TUV SUD PSB Pte Ltd, which administers the Product Listing Scheme, was an invited speaker who presented on 'Conformity to SS 5 – Testing and Surveillance'. This launch also had 3 exhibitors of test equipment which were mentioned in the revised standards. A follow up detailed workshop was requested by more than 20 participants.

Presentation materials for this event are available at the following weblink: <http://www.scic.sg/index.php/events-a-activities/sdoscic-past-events>



Acknowledgement of the following Working Group on SS 5 who contributed in their individual capacity:

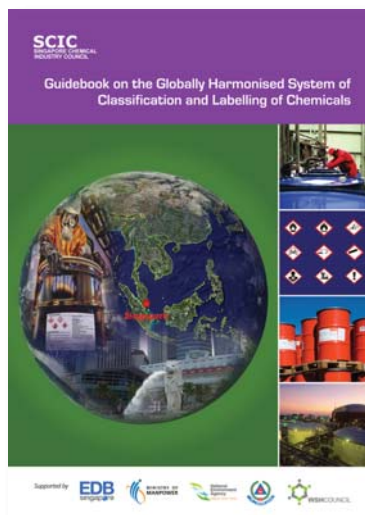
	Name of member	Organisation
WG Convenor	Dr Li Sihai	TUV SUD PSB Pte Ltd
WG Members	Ms Karen Chen	DNT Singapore Pte Ltd
	Ms Guo Yilin	Pidilite Innovation Centre
	Mr Lim Kian Chye	Housing Development Board
	Ms Shirley Lim	Setsco Services Pte Ltd
	Ms Ellna Poh	Nippon Paint Singapore
	Mr Simplicio Escano Sala	AkzoNobel Paints (Singapore) Pte Ltd

Note: Acknowledgement of the contribution by the following former WG members: Mr Teo Kiat Guan and Ms Kee Pei Ling



Launch of Guidebook on Globally Harmonised System (GHS)

In conjunction to the launch of latest edition of the Singapore Standard SS 586:2014 Specification for Hazard Communication for hazardous chemicals and dangerous goods, the SCIC also launched the guidebook on Globally Harmonised System (GHS) – 2nd revision on 7 March 2014. This 2nd revision of the GHS guidebook provides guidance on the requirements specified in the SS 586:2014 through explanation, case studies and examples.



Who should obtain the Guidebook:

This Guidebook will help readers to understand how chemicals are classified under the GHS, the proper way to label a container and the information to be provided in SDS. Communicating the hazards of chemicals

through labels and SDS is essential to safeguard persons who are required to handle the chemicals, and to protect the environment.

A complimentary copy of the guidebook will be mailed to all SCIC members. Additional copies may be purchased from SCIC via the order form at <http://www.scic.sg/index.php/index.php/publication-order-form>

The key changes in the 2nd revision GHS guidebook with reference to SS 586:2014 included:

- Classification Updates
 - Criteria for sub-categories of the hazard classes such as germ cell mutagenicity (Cat 1A/1B), reproductive toxicity (Cat 1A/1B), carcinogenicity, respiratory and skin sensitiser category (Cat 1A/1B)
 - Criteria for long term aquatic hazard
- Classification criteria for mixtures
 - Included additive formula for calculated equivalent toxicity based on chronic aquatic toxicity data
 - Updated multiplying factors for highly aquatic toxic ingredients of mixtures
- Classification for Aerosols included
- Classification for Hazardous to Ozone Layer
- Summary on the requirements of NEA and SCDF regarding Storage SEIP and Transport TEIP
- Guidance on selection of precautionary statements for label and the tool available
- Provide guidance on reduced labelling through examples for specific situations such as containers used in laboratories, small containers (125ml or less) etc.
- Provide guidance on other special labelling such as tank/vessel/silos, export-only products, transport vehicle used as intermediate storage of hazardous chemicals
- A new chapter on Training included, providing an example of hazard communication programme
- Comparison between old EU pictograms and GHS

SCIC would like to thank the following working group members for their time and efforts towards the review of the guidebook:

Chairperson

Ms Cissie Yeung *Shell Eastern Petroleum Pte Ltd*

Advisor

Mdm Veronica Chow *Ministry of Manpower*

Members

Ms Linda Lai *ExxonMobil Chemical Asia Pacific*

Ms Francis Wong *Evonik Oil Additives Asia Pacific Pte Ltd*

Ms Vivian Mak *Infineum Singapore Pte Ltd*

Ms Soo Sze Mun *Ministry of Manpower*

Ms Ong Li Lian *National Environment Agency*

CPT Alice Seto *Singapore Civil Defence Force*

Ms Tee Ying See *Singapore Chemical Industry Council Limited*

Welcoming New SCIC Members

SCIC would like to welcome the following companies:



INNOCO OIL PTE LTD

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- 1) Distribution: We supply fuel products like diesel, kerosene, lubricants and Adblue®.
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 www.newporttank.com

Welcoming New Committee Members

SCIC would like to extend a warm welcome to the following members and companies into the:

REGULATORY AFFAIRS COMMITTEE

Mr Leendert van Dijk

Product Stewardship & Regulatory Affairs Manager, Asia Pacific
Eastman Chemical Asia Pacific Pte Ltd

RESPONSIBLE CARE COMMITTEE

Mr Lim Choon Meng

Manager – HSEQ & Industrial Management System
Singapore Oxygen Air Liquide Private Limited

PROCESS AND ENGINEERING COMMITTEE

Mr Sundar Rajaraman

Process Safety and Risk Section Supervisor
ExxonMobil Manufacturing Engineering Singapore

Mr Amit Bhatnagar

Process Safety Manager
Singapore Refining Company Pte Ltd

Appreciation of Contributions Rendered to SCIC Director – Mr Hiroshi Suzuki



The Board and secretariat of SCIC would like to extend our heartfelt appreciation to Mr Hiroshi Suzuki of Mitsui Elastomers Singapore Pte Ltd for his contributions towards SCIC during his tenure as a Director of the Board from Nov 2011 to Mar 2014.

As the sponsor of the Process & Engineering Committee, Mr Suzuki had guided the SCIC secretariat office in addressing concerns and helping to build capacity on process engineering, process safety and other technical issues in the industry.

SCIC extends its best wishes to Mr Hiroshi Suzuki in his new assignment in Japan.

Appreciation to Committee Member

SCIC would like to express its thanks to the following Committee member for their outstanding contributions to SCIC during their tenure as a member of the following committee:

PROCESS AND ENGINEERING COMMITTEE

Mr Tay Yong Thai

Process Design Section Supervisor
ExxonMobil Manufacturing Engineering Singapore

SCDF-SCIC Responsible Care Collaboration and Recognition Scheme

Responsible Care signatory members who have achieved Responsible Care Gold Award for CAER Code and have also met the standard equivalent to SCDF's CERT audit (documentation) requirement would be recognised under the SCIC-SCDF Responsible Care Collaboration and Recognition Scheme developed by SCIC and SCDF.

This recognition scheme allows the organisation to seek exemption for the documentation assessment component under the annual SCDF CERT audit scheme in WY2014 (April 2014 – March 2015).

Companies recognised under the SCIC-SCDF Responsible Care Collaboration and Recognition Scheme 2013:

1	Akzo Nobel Surface Chemistry Pte Ltd
2	Celanese Singapore Pte Ltd
3	Eastman Chemical Singapore Pte Ltd
4	ExxonMobil Chemical Asia Pacific
5	LTH Logistics (Singapore) Pte Ltd
6	Lubrizol South East Asia (Pte) Ltd
7	Sembcorp Industries Ltd (Utilities Singapore)
8	Shell Chemicals Seraya Pte Ltd
9	Sumitomo Chemical (Singapore) Pte Ltd
10	The Polyolefin Company (S) Pte Ltd

Appreciation to Panel of Judges and Organising Committee

The Singapore Chemical Industry Council wishes to thank the panel of judges of the Responsible Care Awards 2013 for their time and effort towards the unenviable task of reviewing and judging award submissions from Responsible Care signatory companies.

PANEL OF JUGES

Co-chairs

Mr Bernard Leong

Petrochemical Corporation of Singapore (Private) Limited

Mr Kew Jin Woon

Eastman Chemical Singapore Pte Ltd

Members

Ms Jaime Lim

Ministry of Manpower

Mr Raymond Loh

National Environment Agency

CPT Saw Guang Zheng

Singapore Civil Defence Force

Mr Ooi Tiat Jin

Absotech Pte Ltd

Mr Tommy Chng

BASF South East Asia Pte Ltd

Ms Dahliyah Hamid

Bayer (South East Asia) Pte Ltd

Mr Varian Han

Borouge Pte Ltd

Mr Andrew Ong

Dow Chemical Pacific (Singapore) Pte Ltd

Mr Vinay Narsimha Nayak

DuPont Company (Singapore) Pte Ltd

Mr Yeo Soo Hock

Infineum Singapore Pte Ltd

Mr Ng Chee Wai

Petrochemical Corporation of Singapore (Private) Limited

Ms Cheong Shu Jun

Sembcorp Industries Ltd (Utilities Singapore)

Ms Hannah Yu

Shell Chemicals Seraya Pte Ltd

Mr Tay Khoon Eng

The Polyolefin Company (S) Pte Ltd

SCIC RESPONSIBLE CARE COMMITTEE

SCIC SECRETARIAT OFFICE

Welcoming New Responsible Care Member Company

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



**Mitsubishi Chemical
Singapore Pte Ltd**



Hean Nerng Logistics Pte Ltd



**NewPort Tank Containers
Singapore Pte Ltd**

We look forward to their support in the continued advocacy of the Responsible Care in Singapore.



**An excellent platform to reach out to the Students!
Happening in Jurong Island on 02 August 2014**



🔍 Forthcoming Events

2014 < >

17 April

Training Workshop on Globally Harmonised System (GHS) for Chemical users

23 April

Workshop Management of Hazardous Chemicals Programme

24-25 April

SCIC Training Course on "Regulatory, Technical & Safety Requirement of ISO Tank Containers"

Don't miss! 👍

29 April

Sharing session with SMEs – Challenges in implementing Process Safety Management (PSM) and incident sharing

April

IGAS 2014

5-6 May

Conference cum Workshop on the Globally Harmonised System (GHS) of Classification and Labelling of Chemicals 2014 – Singapore

Don't miss! 👍

15-16 May

Asia Petrochemical Industry Conference (APIC) 2014

21-23 May

Compliance of the International Maritime Dangerous Goods (IMDG) Code

May

Training Workshop on Globally Harmonised System (GHS) for Chemical users

May

Workshop Management of Hazardous Chemicals Programme

June

Globally Harmonised System (GHS) Classification for Single Substance

June

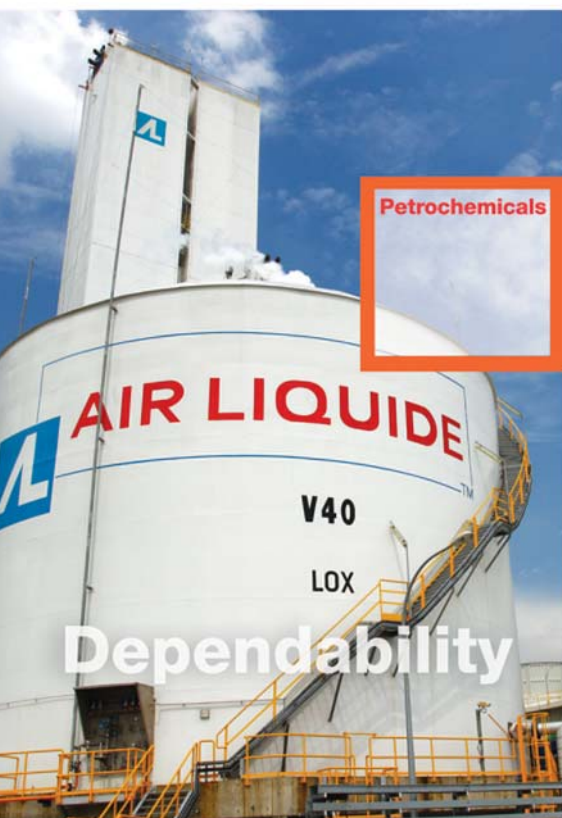
Training Workshop on Globally Harmonised System (GHS) for Chemical users

June

Workshop Management of Hazardous Chemicals Programme

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

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



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