



SLP SOCIETY of LOSS PREVENTION news

In the Oil, Chemical & Process Industries (Singapore)

MAR 2006

MITA NO.: MICA (P) 142/08/2005

Joint SLP/IES course on Emergency Response Planning

In line with its strategy of making optimum use of scarce SHE resources, SLP held a joint ERP course with IES on January 19 and 20, 2006. The course, held at the York Hotel, attracted 41 attendees from a wide spectrum of industries – food manufacturing and processing, ship building/repair, electronic chip making, pharmaceutical manufacturing, construction, logistics/transportation and of course the petroleum and petro-chemical industries. Regulatory authorities also sent their representatives.

ERP is now more important than ever because of the current international situation. To reflect this reality, topics on security and business continuity were included. These topics were presented by two leading industry players, Mr Chris Bala on Security Considerations in Emergency Crisis Preparedness and Mr Nathaniel Forbes on Business Continuity Planning. From the participants' feedback, these two topics provided very useful information that could be promptly applied in their work places.

Major Teong How Hwa from the SCDF made a presentation on HazMat Security – Cooperate or Catastrophe. This provided an overview of the SCDF's capabilities in handling a hazardous material/chemical emergency. This is also a reflection of the current situation where a chemical attack is a probable scenario. Emergency Planners have many issues to worry about at present.

To cater to persons in the construction industry Prof. N Krishnamurthy talked about the Impact of Civil Engineering on Emergency Preparedness. He discussed several real life incidents eg. September 11 and the Hurricane Katrina, to illustrate the good civil engineering principles to be applied in emergency preparedness. The principles are not dissimilar to those used in any good emergency preparedness plan eg. hazard analysis, good design, training, drills, community relations and communications.

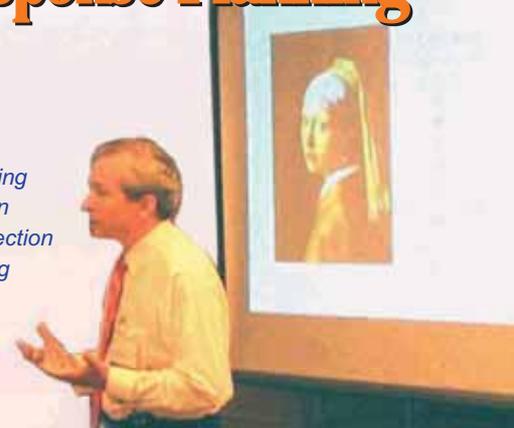
Two speakers from SLP, Richard Gillis and Ngiam Tong Yuen, spoke on the fundamentals of any good ER plan – Hazard Identification and Assessment, Mitigation, Organization, Communication, Training, Support Facilities and Recovery. These are topics from SLP's Emergency Response Planning Guide. No emergency response plan can be complete without an adequate consideration of these factors.

Ong See Hee, SLP's VP, presented his experience and insights on Planning and Executing a Table Top Exercise for an ER Plan. Drills such as these serve to train and familiarize key staff of their roles and responsibilities in an emergency. The critique after such a drill is absolutely essential. The purpose of the critique is to identify the lessons learned. It is much better to identify a weakness during a drill than to find out during an emergency. See Hee emphasised the importance of sufficient planning and preparation in order to derive the maximum benefit of such an exercise/drill.

Feedback from the participants indicated that they considered the course to be useful for their work. Some participants felt that more examples from their industry would have been more useful to them. This comment is valid and not unexpected because of the many industries represented in the course. It is worthwhile noting however that the principles of ER planning are universally applicable. Being prepared is half the battle won!

By Ngiam Tong Yuen

Richard setting the course in the right direction by answering the question WHY?



Major Teong How Hwa presenting the national overview



Ong See Hee imparting his insights on the intricacies of a table top exercise



A hands-on experience of why Business Continuity Planning is necessary



Readers of this publication would know that SLP has had a busy start to 2006.

On January 19th and 20th, we held a 2-day training course on Emergency Response Planning in collaboration with the Institution of Engineers, Singapore. This is not the first time that we have collaborated with other like-minded professional bodies on subjects of common interest. Readers will know that the Institution of Chemical Engineers, UK, is also one of our partners. So is SPRING Singapore (formerly the Productivity and Standards Board). Collaboration with other like-minded professional bodies is a strategy that we have adopted to make the optimum use of scarce SHE resources in Singapore.

In February, we had a very interesting talk on Dust Explosion Protection. If we didn't know before, we now know that people in very many industries should be concerned about this subject. Read the article to find out more!

Our President, in his usual way, has written a thoughtful piece about the new Workplace Safety and Health Act. Every workplace in Singapore is covered in the act. As pointed out in the President's message, the act will present a major challenge to SME's. There is much work for SLP in this area. Can we rise to the challenge?

It will be time soon for our Annual General Meeting. This year our AGM will be held on June 22. AGM's are always important occasions for any self-governing society. For 2006, the AGM is even more important. Firstly, we will be voting for the whole Executive Committee. We do this once every two years. Secondly, not all Exco. members will be available to serve again. New blood will be needed. It is therefore important for all members to think about coming forward and offering themselves for election. SLP is as good as its members want it to be. We have come this far and we are capable of going further. It is not a job to be delegated to others.

This is also the time to renew our memberships. Our Secretariat has sent notices to all members, Individual members should take advantage of the GIRO facility to automate their payments. Corporate nominees should follow up with their accounts department to make payment. Prompt payments will lighten the administrative burden of our Secretariat. It behoves all members to do the right thing and keep their memberships current.

Fortunately, life is not all work. Our Annual Members Night is scheduled for May 27. So mark your diaries. Teng Chong Seng and his committee are planning a night to remember.

See you all at the party!



The Ministry of Manpower has recently introduced significant changes in its laws. The changes have good and bad results for Singapore's industry.

The changes are similar to the laws that have been in place in the United Kingdom and Australia since the 1980s. In these countries the laws have evolved to provide a sound regulatory basis.

The main change in the Workplace Safety and Health Act is in the philosophy of the Act. That is the Act is changing from a prescriptive to a performance basis. This means that the Act does not attempt to legislate against all hazards and risks that may exist in Singapore. The old Factories Act was prescriptive and had been shown to be inadequate for regulating all risks in Singapore. The MOM had introduced Safety Management Systems to close these gaps for some industries. However, SMS's were insufficient to manage the many other different types of workplaces. The outcome is the new act that makes each company responsible for the safety and health for all work done in the company. Failure to keep a company safe and healthy is a breach of the legislation.

A few of the regulations left prescriptive controls in place but most requirements are performance based.

Each company is required to know the hazards associated with the chemicals they use, the equipment they operate and the risks employees face at the site. Each company should conduct a risk assessment to determine what risk management control measures must be in place to protect their employees and their assets.

This is excellent for large companies. For these companies they will continue doing what they have been doing already.

Unfortunately, in all countries, small and medium sized enterprises (SME's) are an issue. In the United Kingdom the authorities found that most SME's did not know what regulations existed. And most of those that knew did not have the skills to implement the regulations. There was even a small group of SME's that was not interested in compliance.

The United Kingdom's Health and Safety Executive (HSE) has published a great deal of information to assist SME's. The most successful tool published by HSE is the Control of Substances Hazardous to Health (COSHH). The COSHH tool has been published on the internet for anyone to use. By using information from the MSDS and the amount of the chemical being used, users can determine how they can safely use the chemical. This tool has been so successful that COSHH is now being used by the ILO to help manage chemicals globally.

Nevertheless SMEs will need help to remain in compliance with the new Act and its Regulations.

The intent of the law is to drive the overall incident rate down 5% per year. The large chemical companies are achieving a 10% per year reduction in incident rates. However this is insufficient. The construction companies had achieved 10% for several years but over the last 2 or 3 years the reduction rate had slipped to less than 5%. Overall, industry is now achieving an annual reduction rate of about 3%. SME's will need to better manage their risks if they are to drive down the incident rate in the future.

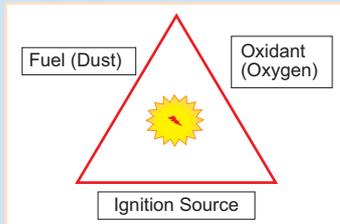
It goes without saying that SLP members will need to manage the safety and health performance of their companies. The SLP itself will need to determine how we can improve the safety and health performance of the SMEs associated with our profession.

Dust Explosion Protection

On February 15, 2006, Mr Felipe Ong, Regional Sales Manager of BS& B Systems, gave a talk on a subject that is of interest to people in many industries that on first sight are not related eg. flour milling and pharmaceutical manufacturing. Where is the connection? It is in the presence of dust particles suspended in air that may explode under the right conditions.

Many of the powders and dusts found in industry and even in the home can explode when they are mixed in the right proportion with oxygen in the air. An ignition source is all that is required to set off an explosion. In industry, such materials are often processed, conveyed and stored in equipment of light construction that are not designed to contain an explosion. Hence safety measures are required to protect equipment handling combustible particulate solids.

The conditions for a dust explosion to occur is best illustrated by the well known 'Dust Explosion Triangle' shown on the right.



Substances that could explode under the right conditions include common materials such as plastics, inks, dyes and toners, pesticides, carbonaceous dusts, pharmaceutical products, grains, sugars, cocoa, flour, milk powder, starch and wood dust. The risk level is represented by an 'explosive index' or 'Kst' value. This index is a measure of the explosive power of a dust and is used to determine the appropriate protection measures for dust explosion protection and prevention.

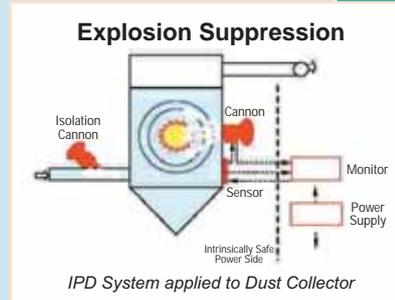
Typical types of process equipment at risk when handling combustible dusts are: reactor vessels, blenders, mills, ovens, screens, grinders, mixers, pulverizers, dryers, filters, dust collectors, and cyclones. Material handling equipment such as pneumatic or screw conveyors and bucket elevators must be included in protection and prevention strategies as well as storage equipment such as low pressure tanks, bins, and silos. Laboratory and pilot plant equipment such as hoods, glove boxes and test cells are also at risk when handling combustible dusts.

Mr Ong emphasised that connected pieces of process equipment must be considered when deciding on explosion prevention and protection strategies. This is because a dust explosion travels at high speed and requires fast detection and response in order to mitigate the risks from a fully developed overpressure.

He gave examples of the devices used by BS&B for explosion prevention and protection. Frequently these are used in combination. Examples of these are Explosion Vents for process equipment protection, Explosion Vents for building protection, Explosion Suppression Systems for process equipment protection, Fast Acting Pinch Valves for mechanical isolation of connecting ductwork and chemical isolation systems. These latter provide a barrier to flame transmission through connecting ductwork.

*We not only feed the intellect
we also feed the body*

Explosion venting techniques are well known in industry. In this regard, it is important that calibrated vents are employed with a low set pressure and that these vents are appropriately sized for each application. The technique of suppression is less well known; Suppression is designed to detect the earliest stages of an explosion and prevent its full development by injecting a quenching agent into the developing fireball to end the combustion process.



The BS&B 'IPD Explosion Suppression System' uses a highly accurate sensor to detect the pressure wave that runs ahead of the flame front in the early stages of an explosion. (The sensor is designed to prevent false activations arising from vibration or other non explosion pressure wave events.) An electrical signal generated by the operation of the sensor activates the opening of 'cannons' mounted directly on the protected equipment causing the injection of the food grade sodium bicarbonate flame quenching agent into the equipment. The agent is efficiently dispersed by an integral nozzle and extinguishes the flame before it has time to build into a deflagration that would develop levels of pressure dangerous to the process equipment. The IPD system typically limits the pressure developed within enclosures to less than 0.2 Bar. By comparison, an unprotected explosion will typically reach more than 8 bar in less than 1/4 of a second (value is different for each combustible dust).

Propagation of explosions between connected enclosures can cause catastrophic secondary dust explosions. **NFPA (National Fire Protection Association, USA)** has highlighted this risk in the most recent change to Standard **NFPA 654**, published in Oct 2005.

NFPA 654 is the standard for prevention of Fire and Dust Explosions from the Manufacturing, Processing and Handling of Combustible Particulate Solids. (2006 edition)

Below is an extract from this standard:

7.1.4 Isolation of Equipment.

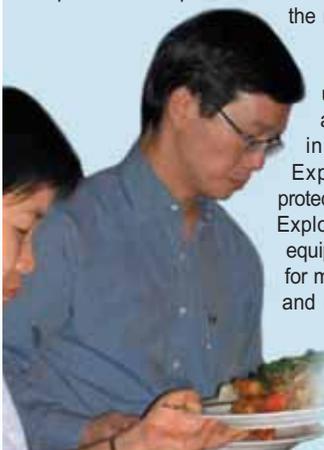
7.1.4.1 Where an explosion hazard exists, isolation devices **shall** be provided to prevent deflagration propagation between pieces of equipment connected by ductwork.

Note: The use of the word "**Shall**" indicates a mandatory requirement. This and other related NFPA standards, such as NFPA 68, 69, 61, 664 & 30B, related to Explosion Protection were also discussed.

The talk concluded with a case study of an explosion that occurred in a grain handling facility in Europe.

This interesting talk generated much animated discussion between Mr Ong and members of the audience. These discussions continued into the dinner that followed.

By Ngiam Tong Yuen



BS&B's Toh Thiam Boon attentively listening to a member of the audience

Felipe Ong in full action

Felipe receiving his well deserved momento from VP Ong See Hee

Attentive audience not missing a single point

WELCOME

We extend a warm welcome to:

Ordinary Member

Mr James Samuel --- James is an EH&S Global Improvement Leader for Dow Chemical. He has an Honours degree in Production Engineering and an Msc in Management Science. He has more than 20 years of working experience in the Oil and Gas, and Chemical Industries. He has experience in managing large capital projects, engineering, production and EH&S activities. He is an EH&S Six Sigma Black Belt for Dow and is currently leading several global projects.

Corporate Member



BS&B Safety Systems (AP) Pte Ltd

Established in 1931, BS&B Safety Systems is the originator of Rupture Disk Technology & Explosion Vents. BS&B has expanded its products and services to cover the full scope of explosion protection technology from Venting to Suppression and now Isolation techniques for the protection of interconnected equipment. Active in both North American and European Codes & Standards development, BS&B has assembled a global team to support these industrial risk management activities. The team is familiar with the interpretation of today's best engineering practice and prepared for the important changes coming in 2006 and 2007 as revised NFPA and CEN Standards are introduced.

The corporate nominee is Felipe Ong, Regional Manager, Explosion Protection.

We look forward to meeting and interacting with these members at our activities. We have no doubt that they will not only gain some new knowledge and insights, they will also contribute their share to the sum of SHE knowledge in Singapore.

WE WANT TO HEAR FROM YOU

The SLP Newsletter is circulated among members and other like-minded organizations. We are always seeking to improve the quality of this publication.

We welcome contributions of interesting news that cover loss prevention in the oil, chemical and process industries.

Please send your contribution or any queries to:

SLP Secretariat

c/o Choa Chu Kang Central Post Office
PO Box 004, Singapore 916833
Tel/ Fax: 6764 7238
E-mail: secretariat@slp.org.sg
<http://www.slp.org.sg>



COURSE REVIEW

Course Review: System Safety, by Prof Nancy Leveson

This course is available through MIT's OpenCourseWare:

<http://ocw.mit.edu/OcwWeb/Aeronautics-and-Astronautics/16-358JSystem-SafetySpring2003/CourseHome/index.htm>

The course is based largely on a popular book by Prof. Leveson entitled "**Safeware: System Safety and Computers**" (Addison-Wesley, 1995) and its new version which is available on-line, and covers the analysis and design of safety-critical systems involving computers. Upon accessing the website for the course, the usual information such as syllabus, assignments and projects can be viewed. There are also extensive readings (mostly from the above-mentioned book) and course notes, which can be read on-line or downloaded.

The notes and readings are very useful. The author begins from the premise that the traditional reliability engineering approach to safety planning and design assumes that accidents are the result of quantifiable component failures. However, in the case of computer-operated and computer-controlled systems, accidents may occur without any component "failure", for example equipment operating outside their set parameters or time limits or by interactions of components all operating according to specification. To take the argument further, the standard recommendations such as preventing failure events through redundancy, increasing component reliability and learning from experience will not work in the case of software and computer system failures.

The author therefore propounds a holistic view of System Safety through an iterative process of hazard analysis and control, which is applicable for all safety-critical systems involving computer systems and software. Interesting topics covered include Accident Models, Software Integrity (why software "fails"), and Design for Safety (including software and the human-computer interface). There are numerous practical examples and case studies scattered throughout the course notes and textbook, ranging from Bhopal to aircraft instrument landing system failures.

By Reginald Tan

SLP MEMBERS' NIGHT 2006

CUM

CHINESE DUMPLING FESTIVAL CELEBRATION

a night of fun . . .

Date : Saturday, 27 May 2006

Time : 6:30 pm to 10.30pm

Venue : Albizia 1 & 2, Level 2

Jurong Country Club

9 Science Centre Road

Singapore 609078

Banquet: 6569 7011

<http://www.jcc.org.sg/location.asp>

Dress Code : Traditional Chinese with Best Dressed Contest

- * Cocktail with Chinese Dim Sum
- * Live Traditional Chinese Music & Opera with Makeup Demo
- * Win the first prize by telling the Tallest Story on the "Festival"
- * Dumpling Making Contest
- * Mandarin & Canto Pop
- * Sumptuous Chinese Dinner starts with the Sampling of various Dumplings
- * Door Gifts & Table Draws

