



Society of

Loss Prevention

In the Process Industries

news

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Peeling The Onion . . . To Keep Tears Away

A total of 21 participants gathered at SPGG - Singapore Polytechnic Graduates Guild on 18th & 19th August, 2009 to “peel the onion... layer by layer”.

They were learning the ropes from John Lockwood about LOPA - Layer of Protection Analysis.

This 2-day course was specially put together for SLP by John Lockwood with the able support of Yokogawa Engineering. The objective was for the participants to learn about LOPA so that they will apply the principles at their workplaces and “keep the tears away”.

The course covered,

- the fundamentals of the LOPA process & methodology, and
- the criteria & determination of Independent Protection Layer (IPL), Safety Instrumented Function (SIF) and their associated Safety Instrumented System (SIS).

Feedback was encouraging. The training was rated “Very Good” with an overall score of 4 out of 5. Comments included:

- A very well organized course
- An informative training course
- Good presentations with interesting case studies
- Good sharing of experience & expertise by trainers
- Good resource references & web links provided
- The course should be re-run for those who missed out this time;
- Trainers were particularly good & explained things very well
- Breakout discussions & exercises were good
- Successfully catered to vegetarian and Muslim participants
- Interactive Q&A sessions were excellent – effectively injected & shared real practical issues.

Without doubt, the sharing of experience with case studies by John had generated much positive exchanges of opinions & ideas. Participants commented about the gap between the ideals of LOPA and the reality on the ground. Companies had to take LOPA seriously if LOPA is to give the level of protection expected and hoped for..

Just as John promised -- the course is no walk in the park -- participants enthusiastically hard at work in their groups



President's Message



First of all, I am delighted to share my views through the first edition of our electronic newsletter. The Executive Committee decided in August to do away with the paper edition and to exclusively publish our newsletter on our SLP website instead. This is good for the environment as it will save some trees. With our newsletter appearing exclusively in the electronic form, we hope that more members and other interested persons will visit our website. When you visit our website, could you

take a few moments to provide us some feedback on the newsletter's contents, its layout and its usefulness to you and other users. Your ideas on improvement are always welcome. Keep them coming!

Secondly, I am pleased to announce that SLP is now officially represented in the Workplace Safety and Health Council (Chemical Industries) Committee. Personally, I think that this committee is long overdue. As we all know, the chemical industry is one of the main pillars of Singapore's manufacturing sector. Although the number of serious accidents including fatal ones in our chemical industry is relatively low when compared to the construction and shipbuilding industries, efforts must not be spared to continuously improve our process safety management system and safe work practices. Our industry is one that has inherent hazards that potentially can lead to major or catastrophic accidents. A number of major and catastrophic accidents have occurred in chemical and process industries in other parts of the world. These can and will happen if we let our guard down. In this period of poor economic performance for our country and the rest of the world, it is even more important to do all we can to maintain the integrity of existing good process safety management and safe work practices. There is always a temptation for companies to reduce costs in maintaining these systems, to do less or even to do away with some steps or practices perceived to be non-value adding. It seems wrongly that good safety practices are not in sync with lean manufacturing. Typical examples

of good process safety management practices that have been compromised include,

- use of less rigorous and disciplined approaches in managing process, equipment and personnel changes,
- use of leaner operating crews without a robust system to ensure that whatever the number of people left to manage the process units have sufficient technical knowledge, capability and capacity to deal with multiple tasks including handling of emergencies,
- extending periodic shutdown maintenance cycles that potentially can subject the plant equipment to higher stress when they are pushed to the limit.

As most of you may already know, the Workplace Safety and Health (WSH) Council was formed on 1 April 2008. The Council has statutory powers (more muscle) to lead and partner industry in engagement and capability building efforts. You can find more information about the Council in the following web link www.wshc.gov.sg.

Under the Council, five industry committees were initially formed to address the specific WSH challenges in their respective sectors:

- Construction and Landscaping
- Healthcare
- Logistics and Transportation
- Marine Industries
- Metalworking and Manufacturing

Recently the Chemical Industries Committee was formed and SLP was asked to nominate a representative for the Committee. I am thus honored and privileged to represent SLP. To ensure continuity, I have nominated our Honorary Secretary, Ngiam Tong Yuen, to be the alternate representative for SLP when I cannot be present because of my work related business travel. Work is underway to finalize the strategic plan for this Committee. We will update SLP members from time to time on the progress made. We also encourage members to provide their feedback, suggestions and recommendations on how to further improve the process safety management system and safe work practices in chemical and process industries. You can do this through our Secretariat at secretariat@slp.org.sg.

Editorial

As our President has said, this is the first all electronic edition of our newsletter. Apart from the beneficial environmental impact of an electronic newsletter, there is a cost saving credit. Using the internet also gives us speed and presents opportunities to readers to interact with the writers. Again, as the President has said, we welcome your comments. Every writer would like to know what his reader thinks and whether his work has met its objectives.

SLP, as an organization, has changed over the past few years. While, in the past, we had many members from the petroleum refining and petro-chemical industries, now our membership is more diverse and we have members from a wider spectrum of industries – from the expected petroleum and petro-chemical companies, to pharmaceutical manufacturers, to environmental companies and now companies from bio-technology/life sciences companies. It is a good question whether these new individual and corporate members are adequately catered for. What do you say? What would you like SLP to do? Let's hear from you.

SLP had its annual general meeting at the end of June. Since 2009 is an in-between year, we only had an election for a new Honorary Treasurer. He is a long-serving Executive Committee Member, Jacob Soh. In order to introduce some new blood into its ranks, Ivan Sin was co-opted into the committee. Ivan is a senior officer from SCDF and we look forward to his contributions. He has already been put to work. He is the writer of the article on the recently conducted course on LOPA. What is LOPA? Read Ivan's article.

At the time of writing this editorial, we are awaiting the responses for the Plant Visit, Technical talk and Dinner that will be hosted by Yokogawa Engineering Asia Pte Ltd at its premises. Yokogawa is a leader in instrumentation and it recently co-facilitated the LOPA course. The event will definitely be an interesting and informative one.

There is one more interesting feature in this electronic newsletter. Two of our members, Tay Cheng Pheng and Teng Chong Seng, have written summaries of interesting articles that they have read in the recent literature and have provided internet links to the host sites. We hope you find these articles and links useful. In fact, we hope you will feel inspired enough to do the same and post your summaries onto our SLP site so that others may benefit. Thanks for your support!

Happy Reading!

Peeling The Onion . . . To Keep Tears Away

Prasad & Wee Tiong of Yokogawa Engineering supported and supplemented John very well. They successfully conveyed the message about the critical importance of reliability engineering. For those who had forgotten their mathematics, they were glad to make a re-acquaintance with the equation for the simplified failure mode,

$$y = mx + c$$

(I shall not mention the sound of embarrassed laughter that greeted the admission of this fact.)

The 2 days provided opportunities for networking amongst participants. During tea breaks and lunches, participants were busy playing catch-up with the trainers and making new acquaintances.

Personally, I think all the participants had a number of fruitful sessions over the 2 days. The knowledge gained and the contacts made exceeded expectation.

When it came time to go our separate ways, all the participants had a wish that the tools available to us – inherently greener and safer designs, instrumentation and LOPA technology – would lead us to a future of ZERO incidents. IMPORTANTLY NOBODY DIES! NOT EVEN INJURED !

By Ivan Sin

Editors Note: Our Exco has decided to do a 2nd run of the LOPA course in early 2010. Watch out for the announcement!

John Lockwood in full flow -- can any participant not catch his passion for SAFETY?



Yokogawa's Prasad ably speaking about Reliability Engineering and the role of instrumentation in LOPA practice



Wee Tiong the second instructor from Yokogawa doing his part to spread the message of the importance of instrumentation in safety



John presenting a well deserved certificate to a participant



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

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Mobile: 9893 0746 Fax: 6483 5418 E-mail: secretariat@slp.org.sg
<http://www.slp.org.sg>

18th Annual General Meeting

SLP held its 18th Annual General Meeting on 30 June 2009. President Ong See Hee called the meeting to order at 6.30 pm.

In the tradition of SLP, See Hee conducted this meeting in the usual brisk manner. He noted that this was the first year after we had changed our constitution to allow nominees of corporate members to have the vote and to hold office in our Executive Committee.

See Hee reported an interesting 2008/9 session. Apart from our normal technical talks, SLP conducted two sessions on Corporate Best Practice Sharing. These best practice-sharing sessions broke new ground -- attendees and speakers engaged each other in a true spirit of exchange of valuable insights into good practices of safety management. Both the speakers, Ms Stella Eccles of Pfizer Asia Pacific and Ms Charleen Dickson of Chevron Phillips Chemical, fully deserved our thanks. See Hee also reported about the successful training course on HAZOPS Leaders that was held in November 2008. For this happy state of affairs, we had to thank John Lockwood who is an Honorary Fellow of SLP and a founder member. In another first, we organized a plant visit to Chartered Semiconductor Manufacturing Pte Ltd. This was our first visit to an electronic wafer fab plant. Despite its name as a semiconductor manufacturing plant, it has a large component of sophisticated chemical processing operations. We didn't forget to relax either. Our Members' Night in September 2008 had an F1 theme to be in sync with the first night time F1 grand prix anywhere in the world in Singapore.

SLP members continued to be good citizens by serving in advisory committees set up by MOM, SPRING Singapore, SCDF and other regulatory bodies. SLP Executive Committee members



President Ong See Hee and Hon Secretary Ngiam Tong Yuen keeping things moving along



More members at the AGM



Our members paying attention to the proceedings of the meeting - - must be serious business being discussed here

continued to teach the Incident Investigation section of the SEI course on Management of Hazardous Substances.

SLP was able to register a surplus for the financial year 2008/9. This was mainly due to the training course on HAZOPS Leaders. During the financial market turmoil in the last quarter of 2008, SLP was able to exit the market at a profit. SLP now holds preferential shares in DBS and OCBC. These continue to pay generous dividends. We also hold an insignificant amount of shares in a REIT. This is also paying a generous dividend.

As 2009/10 is an in-between year, we only voted for a new Honorary Treasurer. He is Jacob Soh. Congratulations Jacob! Thank you Michael Yan. See the table below for a listing of our Executive Committee members.

Our Hon Auditors were also changed. Our new Honorary Auditors are Hor Nam Chook and Anthony Neo. Thank you Harry Ho and Dennis Tay.

We finished the evening by enjoying dinner together. This is another fine SLP tradition.

EXECUTIVE COMMITTEE

July 2008 to June 2010

President	Ong See Hee
Vice President	Tay Cheng Pheng
Hon. Secretary	Ngiam Tong Yuen
Hon. Treasurer	Jacob Soh

Committee Members

Michael Yan	Teng Chong Seng
Gregory Poi	Reginald Tan
Lam Kit Wing	Sam Tsan
Ivan Sin	

DUST EXPLOSIONS

As mentioned in the Editorial, we are introducing summaries of current articles from the technical press that we believe would be of interest. The internet links are also provided for readers who want more details. Below is the first of such articles. Tay Cheng Pheng is the contributor.

"Understand the hazards associated with Hazardous Combustible Dusts"

Combustible dust explosions have resulted in many catastrophic accidents in the past and have caused the loss of many lives and serious injuries.

Combustible dusts are fine particles such as organic or metal dusts, finely ground into very small particles, fibers, fines, chips, chunks, flakes, or a mixture thereof, with diameters of less than 420 microns.

There are five elements necessary for a dust explosion to occur, i.e. combustible dust, an ignition source, oxygen in the air, dispersion of enough concentrated dust particles, and confinement of the dust cloud.

To better understand the nature of hazardous combustible dust and learn how to prevent dust explosions, you can refer to "*Hazard Communication Guidance for Combustible Dusts*," published by the Occupational Safety and Health Administration (OSHA). The document describes how to identify and control hazardous dusts, how to prepare material safety data sheets and product labels, and how to train workers to detect and control hazardous chemicals. The guide can be found at: <http://www.osha.gov/Publications/3371combustible-dust.pdf>.

On the same subject, the Chemical Safety Board (CSB) in the US released a safety video on combustible dusts entitled "*Combustible Dust: An Insidious Hazard*."

The video includes computer animations of three dust explosions that were investigated by CSB. It also dissects the anatomy of an explosion. A clear message is that employers can prevent combustible dust explosions by following standards promulgated by the National Fire Protection Association (NFPA). The video is available at <http://www.csb.gov/videoroom/detail.aspx?VID=30>.

These documents are useful reference resources to help prevent potentially catastrophic dust explosions.

Centre for Chemical Process Safety: CCPS Process Safety Beacon

As most of us know, CCPS is an important part of the American Institute of Chemical Engineering. The Beacon is published monthly. Below is some essential information about it. If you are not yet a registered reader, we recommend that you become one.

What is the Beacon?

The CCPS Process Safety Beacon is a resource aimed at delivering process safety messages to plant operators and other manufacturing personnel. The Process Safety Beacon is sponsored and produced by [CCPS](#). The monthly one-page *Process Safety Beacon* covers the breadth of process safety issues. Each issue presents a real-life accident, and describes the lessons learned and practical means to prevent a similar accident in your plant. With an estimated distribution of around a million, the Beacon is CCPS' most widely read publication. To see a sample edition of the Process Safety Beacon, [click here](#).

Register for the Beacon

Help us bring a process safety message to an even larger world wide audience each month by encouraging your colleagues to register at <http://www.aiche.org/apps/ccps/safetybeaconfrm.asp>. Registration is quick and easy. After you register, the Beacon will be sent to you FREE each month via email. During the registration process, you may choose to receive the Beacon in as many of the available languages as you wish.

Teng Chong Seng has provided us information from the May, August and September 2009 issues of the Beacon.

To give you some idea of what the Beacon looks like, here is the May issue in half-size.



Center for Chemical Process Safety

Process Safety Beacon

<http://www.aiche.org/CCPS/Publications/Beacon/index.aspx>
Messages for Manufacturing Personnel

Sponsored by
CCPS Process
Safety Incident
Database (PSID)

May 2009

Mechanical Integrity





A compressed air tank failed, blowing the bottom off of the tank (1) and sending fragments flying into a concrete wall, puncturing the wall (2). Investigation following the incident revealed several serious problems with the condition of the tank, including severe corrosion and rust at the bottom of the tank (3), where it failed, and an improper weld repair (4) which had been made to the tank at some time in the past. Although the weld repair did not contribute to this incident, it is a symptom of improper maintenance and inspection, and could have caused a tank failure. Fortunately, nobody was in the area when the tank failed, and there were no injuries.

What can you do?

- Look at vessels, piping, and other equipment as you walk through your plant, and report anything which appears to be corroded or improperly maintained. Include visual inspection of piping, vessels, compressed gas cylinders, and other equipment in routine safety inspections. Follow up and make sure that problems are corrected.
- Understand the equipment inspection and maintenance program in your plant, and understand your role in ensuring that all activities are completed as required.
- When you do mechanical work that requires removal of insulation from equipment, take the opportunity to look at the condition of the equipment and report any corrosion or other problems that you observe. Corrosion under insulation may be hidden, but mechanical work which requires removal of the insulation provides an opportunity to observe problems.
- Make sure that all welds and other repairs follow all required standards, and meet the original design specifications for the equipment.
- Assure that all pressure vessels in your plant, including portable tanks and tanks which are a part of "packaged systems" (for example, compressors, refrigeration units, compressed air systems, etc.), are included in the plant mechanical integrity inspection program and are being inspected by qualified pressure vessel inspectors. This may include inspection for internal corrosion at an appropriate frequency.
- Make sure that compressed air tanks and other portable compressed gas cylinders are stored in dry locations to prevent external rust and corrosion.

Watch out for damaged or corroded equipment!

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The Beacon is usually available in Afrikaans, Arabic, Chinese, Danish, Dutch, English, French, German, Greek, Gujarati, Hebrew, Hindi, Hungarian, Indonesian, Italian, Japanese, Korean, Malay, Marathi, Norwegian, Persian, Portuguese, Russian, Spanish, Swedish, Tamil, Thai, Turkish, and Vietnamese.

The May article is about the failure of a pressure vessel – a compressed air tank. It reported that several serious problems existed with the tank, including severe corrosion and rust at the tank bottom. In addition, the article illustrates what can happen when a good mechanical integrity program is not in place.

The article in the August issue highlights the danger of underestimating chemical hazards even when a chemical is used in small quantities. It describes an accident in a lab. Initial investigation of the incident found that the student had not been properly trained on the transfer procedure, and was not wearing the proper clothing and personal protective equipment. The chemical that was released, splashed onto the student, caught fire and burned her clothing. She suffered serious burns and died of her injuries several weeks later.

In September the article focused on a tank farm fire. It was traced to a tank overflow of a flammable material that was then ignited. The lesson here is that operators had to be alert to the hazards around them and for systems to be in place to minimize the risks. For instance, both the tank level gauge and the high level alarm had failed. Questions, about the correct balance of instrumentation redundancy, instrumentation reliability and using administrative control in combination with automatic systems to increase the protection level, had to be answered.