



SLP SOCIETY of LOSS PREVENTION news

In the Oil, Chemical & Process Industries (Singapore)

MAY 2004

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SLP Members

This year's SLP Members' Night took on a traditional look. Held at the Ruby Suite in Orchid Country Club on 28th February, the 40 guests who came despite the heavy thunderstorm had a roaring good time.

The night started with a cocktail reception. Vegetable dips and snacks were provided to keep members and guests happy and chatting.

Dr Wong Yunn Chii from the NUS Department of Architecture was the guest speaker for the evening. His presentation on the "Emerging Trends of Design in Singapore Buildings" generated some nostalgia among people who were familiar with the landmarks of Singapore.

Shortly after dinner started, seven couples sportingly participated in the first game. 'Sumo wrestlers' required each couple to burst the balloon with their bellies within the shortest time.



Jason Oh, Tan Siew Keow and Lillian Low proving that SLP people can smile.

Our President, Richard Gillis and his wife really took their time to burst theirs. The other fun game that had all the people guffawing was 'Mr. Universe'. 7 macho men "voluntarily" came up to show off their muscles with the help of balloons that were stuffed into large sized T-shirts that they had put on. Willing assistants did their best to stuff as many balloons as possible into strategic locations. The 'contestants' then executed different Mr. Universe poses to the amusement of the cheering crowd. The one receiving the loudest cheers won the prize. All who participated in both games did not leave empty-handed.

Most of the guests were glamorously dressed according to the traditional theme. The Chairman of the Organizing Committee,

Celebrate

Mrs Lim Boon Khoon, Angela Loke and Gan Hui Hui in traditional Asian costumes



Angela Loke a winner of the Best Dressed Lady prize

Jacob Soh, and his wife came in dashing Punjabi combinations. Amongst the guests, Mrs Lim Boon Khoon who wore an elegant pink cheongsum, won the 'Best Dressed Lady' prize. Angela Loke who was in a Sarong Kebaya was also a winner in the 'Best Dressed Lady' category. Jacob Soh and Jonathan Ng won the 'Best Dressed Gentleman' title.

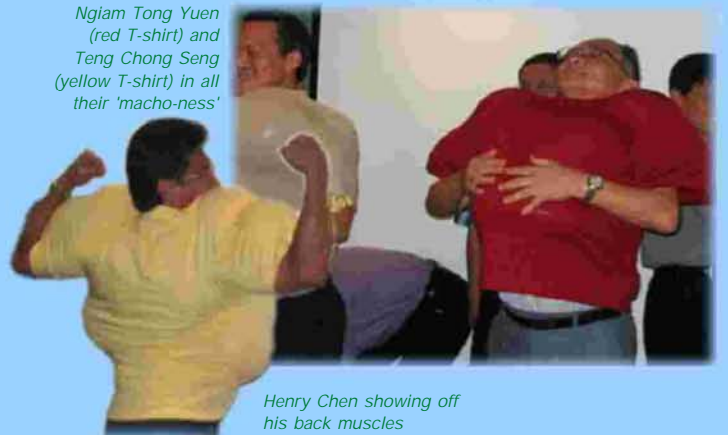
Everyone loved the musical entertainment provided by Los Santos, a 3-piece band who went around the tables to serenade and tease the guests with evergreens and cheeky songs like 'Speedy Gonzales'.

It would not have been a party without the usual individual and table lucky draws. Ms Lillian Law and Merck, Sharp & Dohme donated several prizes for this. In addition, everyone went home with very practical door gifts. We must thank Vopak Terminals and Pfizer Asia Pte Ltd for donating these.

After this great 2004 party, we just can't wait for 2005.

By Jacob Soh

Ngiam Tong Yuen (red T-shirt) and Teng Chong Seng (yellow T-shirt) in all their 'macho-ness'



Henry Chen showing off his back muscles

In the February 2004 issue, we had referred to the industrial accident in Toa Payoh. Since then, we have had the cave-in at Nicoll Highway and the accident at a building site in the Science Park/Buona Vista area. Again, investigating committees will be set up to determine the causes of the accidents. As SHE professionals and citizens, we would be interested in the outcomes. More by coincidence than by plan, this issue of the newsletter deals with pertinent and related matters.

Our President has written about the "unreliability of humans". This factor is inherent in all human beings. Having said this, it becomes obvious that "operator error" as a root cause is a non-starter. What do you think is the right question to ask?

Ong See Hee's review of the book called "Lessons from Longford" seems exactly right to support Richard's message.

Tay Cheng Pheng's article about LOPA (Layer of Protection Analysis), Safety Instrumented Systems (SIL) and Safety Integrity Level (SIL) address the issue of "how safe is safe? or the concept of Risk Tolerance and Risk Acceptance.

After these "heavy" topics, we have some light relief from our Members' Night and the cheerful faces from that occasion. Prof. Wong's article should provide us a fresh look at our world.

We have continued our practice of writing about our corporate members. This time it is about Pfizer Asia Pacific.

At this time every year, we remind members about their responsibilities. First, we hope you have returned the form for authorizing GIRO payments for your annual subscriptions. GIRO payments would automate the payment and save you the annual chore of writing a cheque for SLP. The prompt collection of your subscriptions would lighten the administrative burden for our Secretariat.

Secondly, this is the time of the year for our Annual General Meeting and the election of our Executive Committee. By the time you receive this newsletter, you may have received the notice for the AGM and the invitation to nominate fellow members for the committee. Over the years, we have brought new members into Exco. This is as it should be. The old veterans cannot go on forever. This year is particularly important because we will be electing the entire Exco. Please consider this matter seriously and either put yourself forward or persuade a worthy fellow member to stand for the elections. We have said this many times and we say it again, the SLP is as good as its members want it to be!

See you at the AGM !

PRESIDENT'S MESSAGE

I recently saw a new book¹ that quoted some statistics that surprised me. In the USA, the Institute of Medicine has stated that around 100, 000 Americans die each year as a result of human error in health care. This reinforced my view about the "unreliability of humans". A frequently quoted statistic of human unreliability is 2 errors in 100 routine tasks/activities.

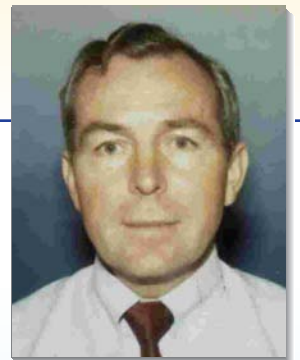
We are not in the health care business but we do have many people in our plants that are likely to have similar unreliability rates. The first medical inspector of factories in the UK, Sir Thomas Legge, recognized this back at the turn of the last century. He said "If you can bring an influence to bear external to the employee, over which he can exercise no control, you will be successful, if you cannot, or do not, you will never be wholly successful."

This reinforces the importance of eliminating or substituting the hazards or controlling the exposures by good engineering as the highest priorities in the risk management hierarchy. This also explains why risk management controls that are in the control of the employee, such as protective equipment, is the lowest level in the risk management hierarchy.

The tendency to blame the injured individual in the event of an accident is not only counter productive, it also ignores the "unreliability of humans". Our risk management systems should recognize the unreliability of humans and devise means to minimize the effects of human error. The management of an organization needs to know why an incident occurred before action can be taken to prevent a recurrence of the incident. If the incident investigators arrive at a vague recommendation such as "Remind operator to be more alert", then they have not found the root cause.

The reliability of our systems is the easiest parameter we need to manage. Our systems need to be (i) robust ie. they can function in unexpected conditions and (ii) adaptable ie. they can function in conditions where normal procedures do not work. Robust and adaptable engineering designs will mitigate the effects of the inherent "unreliability of humans".

"To err is human" is a proverb. Our role, as SHE professionals, is to minimize the possibilities for human error.



¹ B.S. Dhillon, Human Reliability and Error in Medical Systems, World Scientific Publishing Co., ISBN 981-238-359-X, 2003

Book Review

LESSONS FROM LONGFORD - The Esso Gas Plant Explosion,

Andrew Hopkins, CCH Australia Limited, ISBN 1 86468 422 4

If you have not read a book written by a sociologist about a catastrophic accident in the oil and gas industries, or have not come across a sociologist who was called as an expert witness at an inquiry into the causes of the accident, this is the book I would recommend you to read. Keep an open mind so you can make your own judgment about the value of sociology in understanding accidents -- especially one with catastrophic consequences.

The author, Andrew Hopkins, analyzed this catastrophic accident in a holistic way. He examined all the pertinent information and circumstances that led to the disaster from a sociological perspective. Process safety professionals are very well versed in investigating and arriving at root causes of process incidents and accidents. But many times we are left wondering if the "root cause" is really the right one. Too often investigators have been distracted by the "blame culture". Who is to be "blamed" for causing the accident? In this particular case,

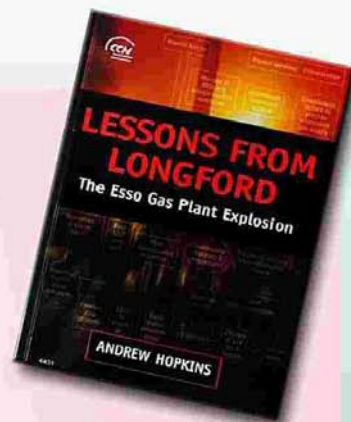
- Was it the operators who made the "critical error" by reintroducing the warm oil into the heat exchanger after it had become extremely cold (-50C) when they should have known the danger of cold temperature embrittlement?
- Was it the site management who failed to identify the hazard that led to operator error?

- Was it the top management of the company who failed to ensure that systems were in place to identify the hazard to avoid operator error?

- Was it the regulator or government who failed to introduce more effective regulations to ensure that systems were in place to avoid operator error?

So, how far do you think we should go in identifying the root cause or causes of the accident that would be readily accepted by all parties directly or indirectly concerned? In reality, it is not as straightforward as one might think. Not every level of the organization, including the government, would readily accept a typical outcome of investigation using standard methodologies such as fault tree analysis, why tree analysis, etc. Acceptance of the root cause carries a concomitant requirement to accept the recommendations to prevent a recurrence. Political (organizational and governmental) and sociological aspects certainly have their influence on the final outcome.

By Ong See Hee



Lessons Learned from:

LOPA and SIS Implementation At a U.S. Plastics Manufacturing Facility.

Mr. William L. Valerioti PE, the Engineering and Technical Service Manager of Chevron Phillips Chemicals Company Pasadena Plastic Complex, Houston Texas USA presented a talk on LOPA and SIS Implementation at a U.S Plastics Manufacturing Facility. He shared the lessons learned with 25 SLP members and local Loss Prevention professionals from ExxonMobil, PCS, SRC, Foster Wheeler and Pfizer on April 20, 2004. The talk was held at a conference room at the Singapore Manufacturer's Federation office.

In his presentation, Mr. Valerioti gave a brief introduction on why LOPA (Layer of Protection Analysis) and SIS (Safety-Instrumented Systems) such as alarms, emergency shutdown systems and safety interlocks are needed in the process industries.

LOPA is a simplified risk assessment method. It provides an objective, rational and reproducible method of evaluating risk scenarios and comparing the results with risk tolerance criteria to decide if existing safeguards are adequate.

LOPA is a recognized technique for selecting the appropriate Safety Integrity Level (SIL) of safety-instrumented systems (SIS) per the requirements of standards such as ANSI/ ISA-84.01.

He described the LOPA methodology as outlined in IEC 61508 and ISA S.84.01. He stressed the importance of having a strong PHA/ LOPA Team and an experienced Risk Mitigation Design Team. He also pointed out that a company

*The smiles say it all.
The talk must have been good.
From left - Tay Cheng Pheng,
Bill Valerioti (the speaker),
Richard Gillis and
Ngiam Tong Yuen*



*General view of the
Audience paying keen
attention to the speaker*

must first of all establish the Risk Tolerance and Risk Acceptance criteria for mitigating process safety risks. This guidance is the responsibility of senior management.

Mr. Valerioti briefly discussed the four basic steps for implementing SIS/ IPL using the LOPA findings:

1. Determine the SIL (Safety Integrity Level)
2. Define the SIS instrumentation, architecture and testing frequency
3. Verify that the SIL is met
4. Operate, maintain, and test the SIS to ensure the SIS reliability

He also highlighted the lessons learned during the pre-engineering, detailed engineering and design phases of a project.

It was a very interesting and informative session. Our President, Mr. Richard Gillis, ended the proceeding by thanking Mr. Valerioti and presenting him with a memento.

The stimulating talk and discussion was carried over to a dinner with Mr. Valerioti at Jurong Country Club.

By Tay Cheng Pheng

Pfizer Asia Pacific Pte Ltd

Pfizer Asia Pacific Pte Ltd (PAPPL) is part of Pfizer Global Manufacturing, the manufacturing division of global pharmaceutical company Pfizer Inc. Its purpose is to manufacture high quality Active Pharmaceutical Ingredients (API's), enabling Pfizer to improve the quality of people's lives. PAPPL constructed Pfizer's first large scale API manufacturing facility in Asia, a S\$600 million investment that occupies a 22 acre site, at the Tuas South Biomedical Park I. When fully operational in the year 2004, the multipurpose manufacturing facility will be one of Pfizer's sixteen API manufacturing facilities in the world.

Equipped with state of the art automation and utilizing global technological and operational best practices, PAPPL will supply the API building blocks of health care products to the region and the global market through Pfizer's extensive manufacturing and distribution network.

State of the Art Facility

The PAPPL plant has been designed with the integration of new technologies and pharmaceutical manufacturing processes. Environmental, health and safety considerations for both our colleagues and the community were also a priority when designing this state of the art facility. In addition, the plant has been built with expansion in mind to prepare for the next stages of growth. These features provide colleagues an exciting, challenging and safe place of work.

Automated Sequence Control

It is notable that PAPPL has invested significantly in the automation of the entire batch process of making our products. The site uses the state of the art Emerson DeltaV process control system, which programs all the unit operations and process steps to make up the master recipe for our products. Our process technicians are trained to use this system where they learn to control the chemical processes through the use of automation.

Bin systems for solids handling



Intermediate Bulk Container

This is the first facility in Singapore to extensively utilize bin technology. This means that the raw materials are transferred into the process equipment by using intermediate bulk containers (IBCs). This takes into consideration the environmental, health and safety aspects of handling solid materials, where any dust exposure or direct contact with products is eliminated and



the work environment is extremely clean. The IBCs are used from the start of the manufacturing process in the dispensary area, to the main production building, to the final pack-out where the product is transferred into finished goods containers prior to shipment from the site.

Solvent Recovery Systems

PAPPL has designed a solvent recovery system that promotes resource conservation, waste minimization, cost effectiveness and environment protection in the product manufacturing processes. The solvent recovery distillation columns are 22 meters in height and 1 meter in diameter. The design provides an efficient and effective method for recovering and reusing solvents.



Solvent Recovery Plant

RTO Device

To ensure that the plant is environmentally friendly and meets Pfizer corporate standards, the plant is equipped with a Regenerative Thermal Oxidizer (RTO) device. This system routes residual vapor emissions from the process in the production building, tank farm and solvent recovery area to a thermal oxidizer where the high oxidation temperature of over 900° C ensures essentially complete conversion of any solvent vapors into carbon dioxide and water, which are environmentally safe.

Designed for Increased Capacity

The plant is designed to allow for a doubling of the site capacity to meet increasing demands with minimum disruptions and faster market response. Utilities such as the steam boilers, air compressors, cooling towers, and chillers have in built capacity and piping considerations that allow for additional units to be installed with minimum disruption. The wastewater treatment plant is designed for additional loading. The engineering, laboratories and administration offices have all been built with future expansion in mind.

Emerging Design Trends of Buildings in Singapore

This article is based on a talk on the same subject by the writer. The talk was presented at the Members' Night on Feb. 28.

Changes in building forms and typologies have been attributed to many factors, not least, the creative spirits of architects, technological transformations, social conditions, etc. At some juncture in history, all human actions, their practices, cultures and artifices have been subsumed under an all encompassing *zeitgeist*.

However, such a meta-historical category is romantic and does not serve the purpose of elucidating the particular nature and conditions of Singapore and its built forms. Instead, a better understanding could be found in the contextual treatment of the material conditions of Singapore, namely, its:

- "SMALL" SIZE
- "SHORT" HISTORY, and
- 3rd GENERATION SENSIBILITIES

The nation's "small" size contributed its survivalist ethos, and these have shaped the inventive quests to intensify, create advantage and create balance in its buildings and environments. As instrumental as these goals appear, the pragmatism has led to innovative forms.

An example of the first category of transformation included the low-rise terrace workshops of the seventies giving way to high-rise flatted factories.



"Create and Intensify Spaces" - Tech Park 21 & Terrace

Such an intensification of the shape of the workplace also changed the conduct of work and other chains of everyday practices.

In time, the space creation imperatives gave rise to performative ones, namely how to leverage the use, placement and relationships of the created space resources. In the case of industrial environments for example, the logistic considerations of transportation, storage and protection figured significantly. Further, the constitution, placement and planning of the polytechnics and the training institutes, as a way to produce skilled labor and managers, earnestly entered into the design orbit for the first time.

The nation's "short history," real and perceived, has also fueled its creative angst and energy. Over the past decades, the retrospection on our origins has fueled the discursive space of "identity." How, it has been asked, should buildings reflect the collective values and aspirations of the nation and its



"Short history" - History as styles at Hwa Chong Jr College and Chinese High

aesthetic sensibility? The quick fixes through imported and transferred styles which served well a generation of corporate architecture continues, but other modes, albeit raw, have begun to appear. They have drawn upon the vernacular-cultural and vernacular-climatic conditions of Singapore.

Finally, and singularly, the most significant condition that has impelled the design trends in our built environment ensues from our "third generation" sensibilities. Broadly characterized, we tend to consume more than we produce, and the propensity is towards life-styling and experiencing as life's primary objectives. Some critics have lambasted these growing trends as superficial, ephemeral and thin. Others have viewed such a re-orientation as a form of invigoration. Whether as narcissism or as hedonism, the design trends are increasingly driven technologically. The popular nature of this trend is evident in its mass audience, and new spaces are produced through hybridized programs to capture as broad a consumer base as possible. There are no spaces of sanctity that cannot be thematized for consumption. History is mobilized to create cultural distinction. Nature, which has been viewed as places of sanctity and danger, has similarly been rendered approachable as playgrounds.

*By Wong Yunn Chii
Department of Architecture, NUS*



"3rd Generation Sensibilities" - Technologized Culture - Cineleisure, Serangoon Stadium

Welcome

We extend a warm welcome to:

Ordinary Member Mr. Thiam Sai Chung

Sai Chung is the HSE Officer for Poval Asia Pte. Ltd., It is a joint venture between Kuraray Co. Ltd. and Nippon Synthetic Chemical Industry Co. Ltd.. The plant is located on Sakra Avenue in Jurong Island and manufactures Poly Vinyl Alcohol (POVAL). It is worthwhile noting that Kuraray and Nippon Synthetic Chemical are the world leaders in the POVAL business.

We look forward to meeting and networking with Sai Chung.

Corporate Member Chevron Oronite Singapore

Chevron Oronite's Singapore Manufacturing Plant is a fully integrated facility that produces a comprehensive range of quality additives for the petroleum products industry.

Located on a 22-hectare site on Jurong Island, it is the largest additive manufacturing plant in Asia Pacific. The plant manufactures more than 25 unique additive components and intermediates, and blends more than 150 finished formulations to specific customer requirement.

Protection of the environment and maintaining the best interests of the local community are fundamental business practices of Chevron Oronite. These principles are strictly adhered to at the Singapore Manufacturing Plant, where a key strategy is the reduction or elimination of wastes at source. Remaining wastes are disposed off in a state-of-the-art, solid-liquid incineration system with tail gas scrubbing and waste heat recovery for steam generation.

The Chevron Oronite Singapore Plant operations are guided by the Responsible Care Codes of Practice.

The nominees of Chevron Oronite in SLP are Alan Chong, its Compliance Manager and Peter Tang, its Compliance Specialist. We look forward to the active participation of Alan and Peter in our activities.



Chevron Oronite products ready for delivery

Chevron Oronite technicians controlling operations from a state-of-the-art control room.

We want to hear from you

The SLP Newsletter is circulated among members and other like-minded persons and 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 The Institution of Engineers, Singapore
70 Bukit Tinggi Road Singapore 289758
Tel: 6469 5000 Fax: 6467 1108
E-mail: secretariat@slp.org.sg
<http://www.slp.org.sg>