Talk on How Web-based Software Applies to Process Relief Safety Management (PRSM)

By : Engr. Mohd Nor Abd Basar, *FIEM, P.Eng, Asean Engineer*

The talk was held on Saturday 4th November at IEM Conference Room.

The speaker, En Abdul Rahman has more than 20 years experience in process simulation software worked locally and overseas companies. He is a graduate in Chemical Engineering (B.E. Hons) from Monash University, Melbourne and MBA from UIA.

The speaker emphasised on the regulation of OSHA 1910.119 for Process Safety Management (PSM) applies to the industries which has become a mandatory requirement in Northern America. Even though Malaysia has not followed this regulation, however there are already some companies had implemented these OSHA requirements as part of their PSM. OSHA 1910.119, (d) Process Safety Information (PSI), requires being updated/audited regularly the pressure relief devices of the plants.

It was basically the application of software applies to pressure relief safety management system, called as iPRSM. It is the latest state-of-art pressure relief safety management that provides web-based tools to identify overpressure sources that includes API 521 "causes of overpressure scenarios" and documentation that:

- Meets OSHA 29 CFR 1910.119 documentation guidelines
- Equipment database including all relevant parameters
- Repository includes all digital documents
  - P&ID Document
  - Isometric drawings-CAD drawings of all relief devise inlet/outlet piping
  - CAD drawing of all flare header system
  - Original equipment datasheets, calculations, certifications
- Identification of all relief contingencies or all devices
- Quantification of required relief rates
- Orifice area calculations for all relief devices
- Mechanical evaluation of applicable devices (noise level, etc)
- Complete documentation package including all calculations, drawings, spec sheets, etc
- Inlet/Outlet piping loss calculations for all devise
- Automatic updating of all files
- Accessibility and standardisation of enterprise wide users
- Wide variety of HTML reports

TABLE 1
Web-based system design requirements[2]

1. Standards compliance
a. Concurrent consistency
b. Distributed security
c. Regulatory and client standards
2. Workflow
a. Accepts all inputs
b. Allows only reasonable tasks
c. Records signoffs and revisions
d. Keeps historical record of all changes
e. Reports generator
f. Offers plug-in devices and libraries
3. Multi-user architecture
a. Concurrent access
b. Groupware tools
c. Multi-tasking
d. Defined levels of authority
4. Platform independent
a. Stand-alone, LAN or WAN
b. Any browser
c. Any server
d. Any database
e. Any hardware
f. Any location with web access

The software resides in the servers located in several locations through out the world and uses Web-standard secure transport protocols (SSL encryption and HTTPS) as do all major financial institutions and secure e-commerce sites). Users can assess to this software provided it is connected to the web site that requires password. No software is required to be installed on the user side. The user will then key in the data and information required to the programmed software for the specific application.

This technology allows plant operators, auditors and engineering personnel instantaneous and concurrent access and analysis to live data on any pressure relief system, at multiple locations, from anywhere in the world that has internet connectivity. Personnel can now quickly resolve problems with the most thorough and systematic approach for the design, analysis and documentation of new or existing system.

This system also provides a centralised document repository as indicated above. It is designed to provide needed industry documents as required by ASME, API, OSHA and EPA. Site reference documents including physical database, safety manuals, company standards and user manuals are captured as well.

WEB-BASED SYSTEM ARCHITECTURE

This architectural model ensures that all equipment in all the protected system is application appropriate. Facilities are comprised of units and the equipment assigned to them. Equipment provides protection, requires protections or has both or neither; and has inlet/outlet fittings. Units are comprised of protected system which in turn contained linked equipment pieces with system sketches portraying protected systems. Overpressures contingencies are assigned to protected systems and describe potential scenarios of concerned to be evaluated by the system.

The protected system model ensures that all the equipment pieces in all the protected systems are appropriate for its application. The overpressure contingency scenarios that have been attributed for each protected system in a plant are calculated and documented.

All API or client specified overpressure scenarios are listed and calculated. These data are cataloged for later use in evaluating the flare system. Other elements include a maintenance database or linking to an existing database, PID navigation (clicking on a relief device or equipment opens the protected system).

The calculation and documentation pages utilise input from equipment files (such as pump deadhead pressure or control valve CV), the physical system (relief device specifications, piping isometrics etc), fluid properties and contingencies. Equipment Libraries be used to store the calculating pages include relief valve-NB Redbook, pipe and fitting catalog, DIERS (Design Institute of Emergency Relief System) calculations, and a number of equipment (or device) for generating various calculation for fire wetted areas, tube failures etc.

Overall, the talk was very informative and interesting to note that there are regulations being enforced in a developed country to protect the industry in term of process safety management (PSM). Last but not least, pressure relief devices are there to protect the equipment, be it, it has been there for several years or regularly maintenance, the purposed and main objective is to provide protection to the equipment/vessel when the needs arise. ■

Report on One Day Seminar on Critical Thinking and Writing for Engineers

By : Engr. Lim Chean Fung, *M.I.E.M., P.Eng.*

Everyone thinks, it is our nature to do so but much of our thinking, left to itself, is biased, distorted, partial and uninformed. The seminar on 'Critical Thinking And Writing For Engineers' was presented by Mr. G. Sivalingam on the 23 November 2006 at the IEM Conference Hall, Bangunan Ingenieur with a total of 98 participants attending it. Mr. Sivalingam gave a very interesting and stimulating presentation on the importance of critical thinking and writing emphasising assessment, research, instructional strategies, questioning, critical reading and writing. He explains that shoddy thinking is costly, both in money and in quality of life. Excellence in thought, however, must be systematically cultivated.

Critical thinking is that mode of thinking-about any subject, content, or problem-in which the thinker improves the quality of his or her thinking by skillfully analysing, assessing and reconstructing it. It is self directed, self disciplined, self motivated and eventually self corrective thinking. It presupposes assent to rigorous standards of excellence and mindful command of their use. It entails effective communication and problem solving abilities, as well as a commitment to overcome our native bias opinions.

An important criteria of critical thinking is to learn to think within its logic, which is to:-

- raise vital questions and problems within it, formulating them clearly and precisely,
- gather and assess information, using ideas to interpret that information insightfully,
- come to well-reasoned conclusions and solutions, testing them against relevant criteria and standards;
- adopt the point of view of the discipline, recognising and assessing, as need be, its assumptions, implications, and practical consequences;
- communicate effectively with others using the language of the discipline and that of educated public discourse; &
- relate what one is learning in the subject to other subjects and to what is significant in human life.

With lively illustrations through examples and practical exercise which was well received, the participants were able to experience and gained invaluable skills to cultivate critical thinking and writing abilities. The speaker concluded his presentation by noting that by making critical thinking and writing a basic value in our life, we will effectively improve the way we think, write and live our life. At the end of the seminar, the speaker, Mr. G. Sivalingam, was presented with a certificate as a token of appreciation from IEM. ■