Incorporating Risk Concepts Into Engineering Education

Presented by:

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Engineers Canada

A paper written at the request of the CCPE's (*Engineers Canada*) research committee

RISK MANAGEMENT – AN AREA OF KNOWLEDGE FOR ALL ENGINEERS

A Discussion Paper By:
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Prepared For:
The Research Committee of the Canadian Council of Professional Engineers

February 2006

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RECOMMENDATIONS FOR THE ENGINEERING PROFESSION IN CANADA

Based on the analysis in this paper we offer the following suggestions to advance the state of risk management education, training and practice by engineers in Canada:

Canadian Engineering Accreditation Board (CEAB):

- Consider the retention of risk management as a required graduate attribute in the draft revised accreditation criteria.
- Consider the development of specific questions and measuring tools concerning risk management for use by accreditation visiting teams.

Canadian Engineering Qualifications Board (CEQB):

- Consider the development of a national *Guideline on Risk Management for all Professional Engineers*, the concept being similar to the existing national *Guideline on the Environment and Sustainability for all Professional Engineers* (in that risk management is an area of knowledge for ***all*** engineers).
- Consider the development of documentation that is more detailed than a national guideline; such documentation would be practice-oriented and would provide best-practice methodologies for specific applications.

Canadian Council of Professional Engineers (CCPE):

- Consider holding a national workshop on risk management, the concept being similar to the previous CCPE-organized national workshop on climate change adaptation.
- Consider mechanisms to enable Canadian engineers to benefit from international initiatives in risk management education and development of practice methodologies.

CCPE Constituent Members (CMs):

- Consider participation in a survey of CCPE CMs concerning risk management activities and needs of the CM and its members.

National Council of Deans of Engineering and Applied Science (NCDEAS):

- Consider surveying Canadian Faculties of Engineering concerning risk management courses, programs, and integration of concepts in coursework. Both undergraduate and graduate offerings would be useful information to know.

Engineering Technical Societies:

- Consider participation in a survey of Canadian engineering technical societies concerning risk management tools, courses, case studies, and other products and services available through the society.

CCPE Research Committee (RC):

- Consider co-ordination of the above activities (e.g. surveys) as appropriate.

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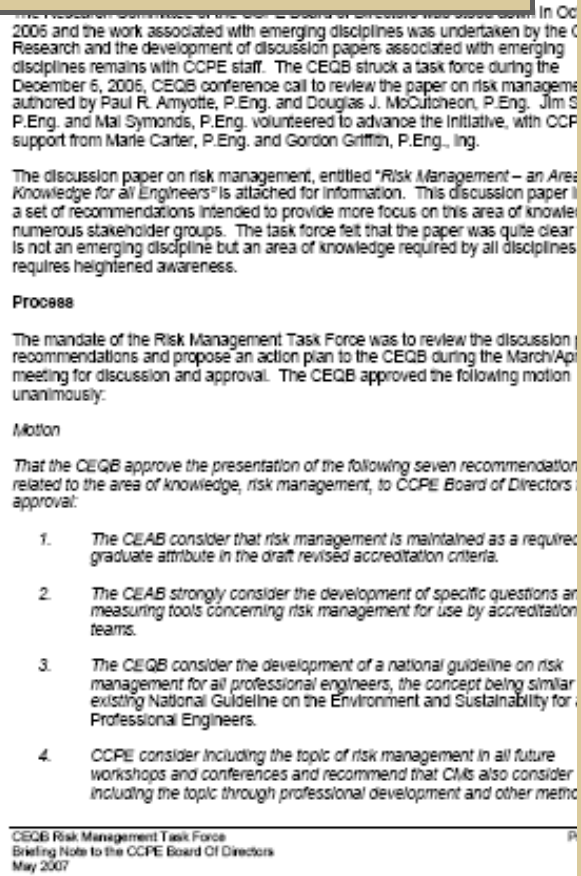
"The task force felt that the paper was quite clear that this (PSM) is not an emerging discipline but an area of knowledge required by all disciplines that requires heightened awareness."



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2006 and the work associated with emerging disciplines was undertaken by the C
Research and the development of discussion papers associated with emerging
disciplines remains with CCPE staff. The CEQB struck a task force during the
December 6, 2006, CEQB conference call to review the paper on risk managem
authored by Paul R. Amyotte, P.Eng. and Douglas J. McCutcheon, P.Eng. Jim S
P.Eng. and Mal Symonds, P.Eng. volunteered to advance the initiative, with CCP
support from Marie Carter, P.Eng. and Gordon Griffith, P.Eng., Ing.

The discussion paper on risk management, entitled "*Risk Management – an Area*
Knowledge for all Engineers" is attached for information. This discussion paper i
a set of recommendations intended to provide more focus on this area of knowle
numerous stakeholder groups. The task force felt that the paper was quite clear
is not an emerging discipline but an area of knowledge required by all disciplines
requires heightened awareness.

Process

The mandate of the Risk Management Task Force was to review the discussion
recommendations and propose an action plan to the CEQB during the March/Ap
meeting for discussion and approval. The CEQB approved the following motion
unanimously:

Motion

That the CEQB approve the presentation of the following seven recommendation
related to the area of knowledge, risk management, to CCPE Board of Directors
approval:

1. *The CEAB consider that risk management is maintained as a required graduate attribute in the draft revised accreditation criteria.*
2. *The CEAB strongly consider the development of specific questions an measuring tools concerning risk management for use by accreditation teams.*
3. *The CEQB consider the development of a national guideline on risk management for all professional engineers, the concept being similar* existing National Guideline on the Environment and Sustainability for Professional Engineers.
4. *CCPE consider including the topic of risk management in all future workshops and conferences and recommend that CMs also consider including the topic through professional development and other metho*

CEQB Risk Management Task Force
Briefing Note to the CCPE Board Of Directors
May 2007

"Motion: (Engineers Canada Board of Directors – May 2007)

1. *That the CAEB consider that risk management is maintained as a required graduate attribute in the draft revised accreditation criteria.*
2. *The CEAB strongly consider the development of specific questions and measuring tools concerning risk management for use by accreditation visiting teams.*
3. *The CEQB consider the development of a national guideline on risk management for all professional engineers, the concept being similar to the existing National Guideline on the Environment and Sustainability for all Professional Engineers*
4. *CCPE consider including the topic of risk management in all future workshops and conferences and recommend that CM's also consider including the topic through professional development and other methods.*
5. *CCPE consider mechanisms to enable Canadian engineers to benefit from international initiatives in risk management education and development of practice methodologies through both the CEQB and the International Committee.*
6. *CCPE brings the issue of risk management for discussion through the Canadian Engineering Leadership Forum (CELF) with the engineering technical societies and others to promote the offering of continued professional development courses.*
7. *CCPE distribute the report: Risk Management – An Area of Knowledge for all Engineers to its constituent members and the members of CELF to raise the awareness of this very important issue ."*

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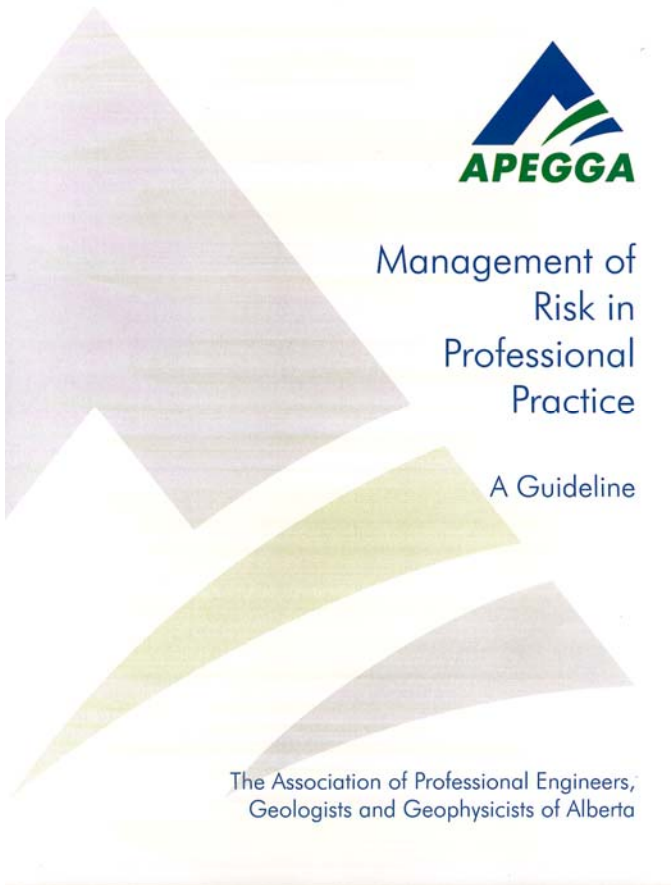

In place as of 2006

CSChE-PSM Subject Division Education Committee – Summer Institutes

OBJECTIVE and PERFORMANCE INDICATORS

1. To facilitate the process of industry and academia working together with the ultimate aim of improving industrial safety and loss management in the workplace.
   - Is the Summer Institute an annual event?
   - Does the Summer Institute program enjoy a broad base of support from academia (i.e. not just ChE)?
   - Is there an effective mechanism for Summer Institute attendees to "speak with one voice" concerning the future of the Summer Institute program?

2. To enable educators to acquire industrial safety and loss management knowledge, including available resources and how to incorporate topics in their curricula.
   - Do educators continue to support the Summer Institute program by their attendance and encouragement of colleagues to attend?
   - How many new educational modules/case studies have been developed for rollout during a given Summer Institute?
   - What percentage of programs (ChE and others where appropriate) are members of SACHE?

3. To enhance industry's awareness of ways to effectively assist universities with respect to resources and support in the field of industrial safety and loss management.
   - What is the level of commitment from industry with respect to setting and delivering the Summer Institute curriculum?
   - What is the level of commitment from industry with respect to financial support?
   - How effective is communication to industry of the Summer Institute objectives, results, etc?

4. To provide a vehicle by which the CSChE PSM subject division and Minerva Canada support universities on a continuous basis with respect to integration of topics into the undergraduate curriculum.
   - What is the level of follow-up with attendees from a given Summer Institute?
   - How many contacts have been made between university educators and industrial practitioners (e.g. guest lectures, advisory boards)?

5. To encourage universities to commit to an implementation strategy on coverage of environment, health and safety topics in their programs.
   - How many universities have committed to, and actually implemented, such a strategy (and in which programs)?
   - How effective is communication between the Summer Institute program committee and the Association of Canadian Chairs of Chemical Engineering (ACCCE)?
   - How many university educators attend and participate in the PSLM symposia during the annual Canadian chemical engineering conferences?

CSChE-PSM Subject Division Education Committee – Summer Institutes 2004 & 2005

Agenda 2004 – Hosted by Nova Chemicals

- Summer Institute Overall Introduction - Doug McCutcheon
- Industry's Needs - Jan Windhorst
- Team Development - Daneve McAffer
- Introduction to Activities & Additional Reason for Institute - Paul Amyotte
- NOVA Chemicals Opening Remarks - Tom Strifler
- Engineer-in-Training Perspective - Jeff Harris
- University's Needs -John Shaw
- Process Safety Management Educational Module - Graham Creedy
- Introduction to Piper Alpha Video - Paul Amyotte
- Process Safety Management Elements - Steve Coe
- St. Clair River Tour – Environmental Speech - Scott Munro
- Major Accidents and Lessons Learned - Rob Cairns
- Responsible Care - Graham Creedy
- Dow Fire & Explosion Index - Steve Coe
- Introduction to Inherent Safety Video - Paul Amyotte
- Toxic Releases – US EPA Risk Management Plan, Dow Chemical Exposure Index - Doug McCutcheon
- Imperial Oil Opening Remarks - Steve Griffiths
- Occupational Health and Personnel Safety Program – "Nobody Gets Hurt" - Tony Pasteris
- Equipment Overpressure Protection - Don McKessock
- Human Factors in Plant Design - Eric Bristow
- Behaviour Based Safety - Rob Menzies
- Emergency Response Facilities Design Considerations - Syed Ahmed
- Emergency Preparedness - Dave Beer
- Ongoing Professor Support - Renzo Dalla Via
- Summary and Feedback - Doug McCutcheon

CSChE-PSM Subject Division Education Committee – Summer Institutes 2004 & 2005

Agenda 2005 – Hosted by Lanxsus

- Summer Institute Overall Introduction - Doug McCutcheon
- Industry's Needs - Manny Marta
- Team Approach to Success - Daneve McAffer
- Introduction to Activities & Additional Reason for Institute - Paul Amyotte
- NOVA Chemicals Opening Remarks - Tom Strifler & Winston Ramharry
- Engineer-in-Training Perspective - Wendy Alexander & Emmanuelle Hagey
- University's Needs - John Shaw
- Process Safety Management Educational Module - Graham Creedy
- Introduction to Bhopal Video - Paul Amyotte
- Process Safety Management Elements - Steve Coe
- St. Clair River Tour – Environmental Speech - Scott Munro
- Major Accidents and Lessons Learned - Rob Cairns
- Responsible Care - Graham Creedy
- Reactive Chemicals - Brenda Prine
- Dow Fire & Explosion Index., Chemical Exposure Index, Layer Of Protection Analysis, US EPA-Risk Management Program - Doug McCutcheon
- Introduction to Inherent Safety Video - Paul Amyotte
- Imperial Oil Opening Remarks - Steve Griffiths
- Joint Session National Safety Council" - Tony Pasteris & Mei Li Lin
- Human Factors in Plant Design - Syed Ahmed
- Environmental Risk Based Design Strategy- Decision Making - Nina Mankovitz
- Fires and Explosion Video - Manny Marta
- Summary and Feedback - Doug McCutcheon

Minerva – and the Summer Institutes 2006 & 2007

Minerva's mission is to train tomorrow's corporate leaders with the knowledge and commitment to implement Safety Health and Environmental (SHE) management systems.

- To achieve this goal, Minerva vigorously encourages engineering and business schools to incorporate SHE management into their training curricula. By using this strategy we target future corporate executives and decision-makers. Our vision is to eliminate injuries in Canadian workplaces.
- To entrench SHE management in the curricula of all major engineering and business schools, Minerva must pursue five main strategic goals:
- Obtain adequate and sustainable funding for a five year period
- Promote the Summer Institute training venue for academic faculty as the main way to entrench SHE management into course curricula
- Expand the Summer Institute to target faculty at MBA business schools
- Increase the number of case studies and educational materials produced each year
- Market our organization effectively through communication with stakeholders.

Results of SI 2006 & 7

- Connection to Business Schools achieved
- Industrial case studies used and under development
- More professors in Canadian universities are aware of safety and loss management and Process Safety Management

Minerva – and the Summer Institutes 2008

The 2008 CSChE Conference in Ottawa May see Minerva put together a 4 hour teaching seminar on various EHS topics covered in Summer institutes and thus try and get a bigger audience to promote health and safety education. Minerva would deliver the course along with participation from CCPA and industry. It could also promote Minerva with industry ie for new funding sponsorship.

Any Questions?