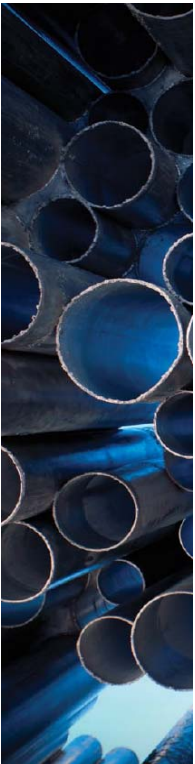




INSPIRED ENGINEERING



Adjusting existing company PSM standards to CSA Z767

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PSM safety moment

Why PSM in Canada?

Canada is represented on the MARSH 100 largest losses:

- Explosion in an upgrader - Jan. 6, 2011 - \$390 M US
- Fire in an upgrader - Jan. 4, 2005 - \$240 M US
- Explosion in a froth treatment plant - Jan. 6, 2003 - \$200 M US
- Fire in a coking unit Aug. 15, 1984 - \$180 M US

PSM

CSA Z767 Process Safety Management definition

Process safety management (PSM) is the application of management principles and systems for the identification, understanding, avoidance, and control of process hazards to prevent, mitigate, prepare for, respond to, and recover from process-related incidents. These principles and techniques may be applied across industry sectors.

PSM in Canada

MIACC – Major Industrial Accidents Council of Canada was active in PSM from 1988 up to its dissolution in 1999.

- MIACC was a partnership of federal, provincial and municipal governments, industry, labour, emergency response groups, public interest groups and academia

PSM in Canada

When MIACC was dissolved, it transferred its intellectual property to the CSChE

- The CSChE initially maintained the twelve elements that were part of the early CCPS structure and found in PSM Guide 4th edition.
- OSHA implemented a 16-element approach, while the CCPS moved to **risk-based** management using a four-pillar, twenty-element basis

PSM in Canada

Canada does not have an explicit process safety management regulation comparable to the US OSHA 1910.119, EPA 40 CFR Part 68 or to COMAH in the United Kingdom

- This is where CSA Z767 comes into play
- The objective of the CSChE was to develop a national standard, CSA Z767

PSM in Canada

Where does CSA Z767 fit in with comparable standards?

Canadian Association of Petroleum Producers

CAPP conducted a regulatory scan for PSM in 2014. The purpose was to provide an overview of process safety regulations and best practices in Canada and the world.

- My starting point for this paper is the CAPP scan, updated with the new Canadian standard CSA Z767

CAPP

Table 1-1 Comparison of Process Safety Management Elements

CCPS Risk-Based 20 PSM Elements ¹ (2007)	OSHA PSM (EPA RMP) Required 14 Elements ²	ILO 16 Recommended Elements of a PSM Programme ³	CSCHE PSM Guide 4 th Ed. 2012 12 Recommended Elements ⁴
Pillar 1: Commit to Process Safety			
1. Process Safety Culture			1. Accountability: Objectives and Goals
2. Compliance with Standards	2. Process Safety Information (PSI)	15. Standards & Regulations	10. Company Standards, Codes & Regulations
3. Process Safety Competency			8. Training & Performance
4. Workforce Involvement	4. Employee Participation	2. Employee Involvement	
5. Stakeholder Outreach			
Pillar 2: Understand Hazards and Risk			
6. Process Knowledge Management	1. Process Safety Information (PSI)	1. Process Safety Information	2. Process Knowledge & Documentation
7. Hazard Identification & Risk Analysis	2. Process Hazard Analysis	3. Process Hazard Analysis	4. Process Risk Management 7. Human Factors
Pillar 3: Manage Risk			
8. Operating Procedures	3. Operating Procedures	5. Operating Procedures	6. Process & Equipment Integrity
9. Safe Work Practices	3. Operating Procedures 9. Hot Work Permit	6. Safe Work Practices & Permits 10. Design Quality Assurance	3. Capital Project Review and Design Procedures
10. Asset Integrity & Reliability	8. Mechanical Integrity	10. Design Quality Assurance 11. Maintenance & Mechanical Integrity	6. Process & Equipment Integrity
11. Contractor Management	6. Contractors	8. Contractor Personnel	
12. Training & Performance Assurance	5. Training	7. Employee Information & Training	8. Training & Performance
13. Management of Change	10. Management of Change (MOC)	4. Management of Change	5. Management of Change
14. Operational Readiness	7. Pre-startup Safety Review	9. Pre-startup Safety Reviews	
15. Conduct of Operations			
16. Emergency Management	12. Emergency Planning & Response	12. Emergency Response	4. Process Risk Management
Pillar 4: Learn from Experience			
17. Incident Investigation	11. Incident Investigation	14. Process Incident Investigation	9. Incident Investigation
18. Measurement & Metrics			
19. Auditing	13. Compliance Audits	13. Periodic Safety Audits	11. Audits & Corrective Action
20. Management Review & Continuous Improvement			12. Enhancement of Process Safety Knowledge
	14. Trade Secrets	16. Trade Secrets	

¹ Based on Table 1.6 from AIChE Guidelines for Risk Based Process Safety, Center for Chemical Process Safety, 2007 (p.13)

² Based on US Department of Labour Publication OSHA 3132 Process Safety Management, 2000

³ <http://www.ilo.org/osihenc/part-vii/chemical-processing/item/377-developing-a-process-safety-management-programme?tmpl=component&print=1>

⁴ Based on the 2012 CSCHE's PSM Guide which is based on the original 1989 AIChE PSM recommendations.

CSA Z767

Table 1
Process safety management elements
 (See Clause 0.5.)

Process safety management elements			
Process safety leadership	Understanding hazards and risks	Risk management	Review and improvement
1 Accountability	5 Process knowledge and documentation	9 Training and competency	13 Investigation
2 Regulations, codes, and standards	6 Project review and design procedures	10 MOC	14 Audits process
3 Process safety culture	7 Process risk assessment and risk reduction	11 Process and equipment integrity	15 Enhancement of process safety knowledge
4 Conduct of operations — senior management responsibility	8 Human factors	12 Emergency management planning	16 Key performance indicators

CSA Z767

Applicability of PSM standards

CCPS Risk-Based 20 PSM Elements (2007)	OSHA PSM (EPA RMP) Required 14 Elements	ILO 16 Recommended Elements of a PSM Programme	CSCHe PSM Guide 4th Ed. 2012 12 Recommended Elements	CSA Z767 Process Safety Management
<ul style="list-style-type: none"> regulatory requirements are met, appropriately applied lessons learned Lagging indicators are used <p>Leading indicators, and risk information are studied by management to help measure and predict the performance of the system.</p>	<p>1910.119(a)(1)(i) A process which involves a chemical at or above the specified threshold quantities</p>	<p>Voluntary guidelines on OSH</p>	<p>All twelve elements apply as soon as a major incident potential is present, regardless of inventory.</p>	<p>This Standard identifies the requirements for a PSM system for facilities and worksites handling or storing materials that are potentially hazardous</p>

Process Safety Leadership

CSA Z767 4 Pillars 16 elements	CCPS Risk Based PSM 4 Pillars 20 Elements	OSHA PSM Reprint 3132
1. Accountability	20. Management review & continuous improvement	
2. Regulations, codes, and standards	2. Compliance with standards	1. Process Safety Information 9. Hot Work Permit
3. Process Safety Culture	1. Process Safety Culture / 4. Workforce Involvement	4. Employee participation
4. Conduct of operations – senior management responsibility	15. Conduct of operations	

Understanding hazards and risks

CSA Z767 4 Pillars 16 elements	CCPS Risk Based PSM 4 Pillars 20 Elements	OSHA PSM Reprint 3132
5. Process knowledge and documentation	6. Process knowledge management/ 3. Process safety competency / 8. Operating procedures / 9. Safe work practices	1. Process Safety Information (PSI) / 3. Operating procedures
6. Project review and design procedures	14. Operational readiness	No specific project requirements
7. Process risk assessment and reduction	7. Hazard identification & Risk analysis	2. Process Hazard Analysis / 7. Pre-Startup Safety Review
8. Human factors		2. Process Hazard Analysis

Risk management

CSA Z767 4 Pillars 16 elements	CCPS Risk Based PSM 4 Pillars 20 Elements	OSHA PSM Reprint 3132
9. Training and competency	12. Training & Performance Assurance / 11. Contractor management	5. Training / 6. Contractors
10. Management of Change (MOC)	13. Management of Change	10. Management of Change
11. Process and equipment integrity	10. Asset Integrity & Reliability / 9. Safe work practices	8. Mechanical integrity 9. Hot Work Permit
12 . Emergency management planning	16. Emergency Management	12. Emergency Planning & Response

Review and improvement

CSA Z767 4 Pillars 16 elements	CCPS Risk Based PSM 4 Pillars 20 Elements	OSHA PSM Reprint 3132
13. Investigation	17. Incident investigation	11. Incident Investigation
14. Audit Process	19. Auditing	13. Compliance Audits
15. Enhancement of process safety knowledge	20. Management review & Continuous Improvement / 3. Process safety competency	
16. Key performance indicators	18. Measurement & Metrics / 11. Contractor management	6. Contractors

CSA Z767 vs. CCPS 20 elements

CCPS element 5 → Stakeholder Outreach

- This is accomplished through **Responsible Care**

Thank you

Who is Guy Brouillard?

- PSM Manager @ GCM Consultants
- CSChE – PSMD member
- Actively participating in Z767 rollout
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Thank you!



Questions?