

ProSmart

Process Safety Measurement

If You Can't Measure It, You Can't Improve It

CCPS International Conference and Workshop

Toronto, Ontario

October 3, 2001

Lord Kelvin

“When you can measure what you are speaking about and express it in numbers, you know something about it; but when you cannot measure it, when you cannot express it in numbers, your knowledge is of a meager and unsatisfactory kind.”

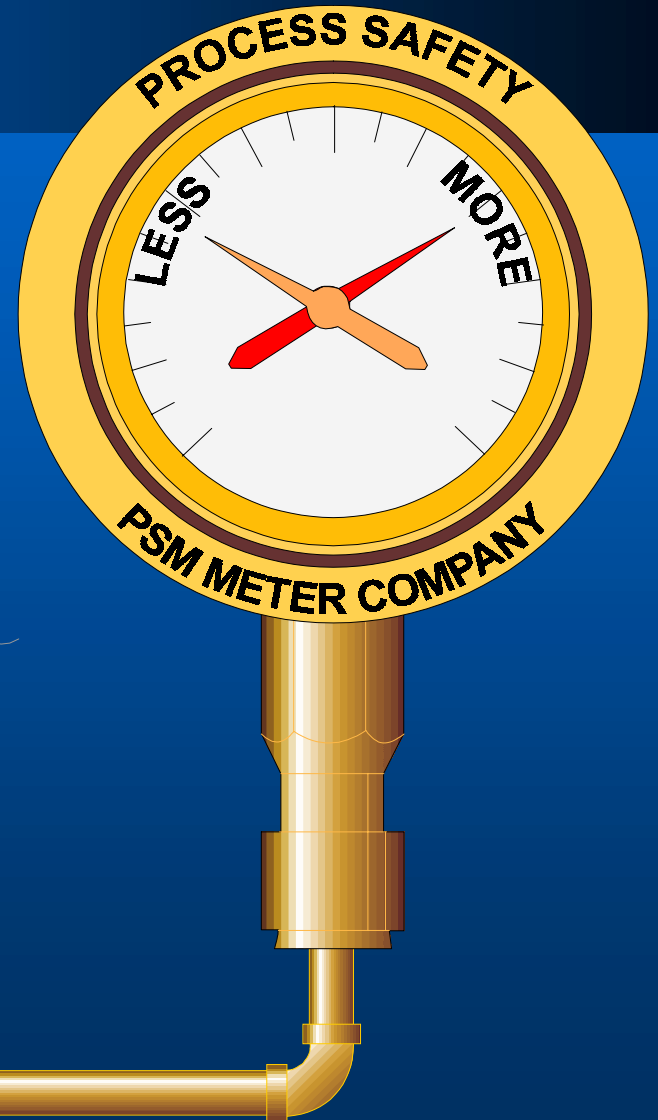
The Need for a PSM Measurement System

- Wondering how "close to the edge" your plant is to having a major accident?
- Confronted with a management decree to cut PSM resources and not able to defend against the cuts with some... "what if" data?

The Need for a PSM Measurement System

- **Wondering where the weak link in your PSM program is?”**
- **Considering the redeployment of resources to strengthen poorly performing areas in your PSM program, but don't know where to start to be most effective?**

PSM



CCPS Has the Answer

ProSmart®

BETA TEST PARTICIPANTS

- BAYER --- Berkeley, CA
- CELANESE --- Clear Lake, TX
- GOODYEAR --- Beaumont, TX
- 3M --- Cordova, IL
- PFIZER --- Groton, CT

Presentation Outline...

- What is ProSmart?
- CCPS PSM System
- Using ProSmart
- Development Process
- Measure Structure
- Software Features

What Is a Performance Measure ?

“The extent or degree of something...”

- **If measurable variables or indicators" can be defined, the job is easier.**
- **The measurement for 100 meters dash, is easy (One variable).**
- **As the number of variables increase weighting becomes an issue.**

Challenge:

How do you handle multiple indicators?

- Finding “right” indicators enable others to successfully collect the same data.
- With “multiple” indicators for complex systems you must utilize mathematical formulas to relate the indicators to performance.

What Is ProSmart ?

- A quantitative measure of a PSM program
 - quality and
 - thoroughness of implementation
- Not a measure of outcomes,
 - such as the number of incidents
 - or hazardous chemicals released, but a
- "Real time" barometer of the health of a PSM system - not a periodic audit

What Is ProSmart ?

- Defines the data to be collected
- Provides the computer interface, and
- Calculates a value or index of performance.
- Based on the CCPS 12-Element PSM System, but
 - inclusive and flexible enough to be used as "best practices driver" for PSM systems based on other "structures"

CCPS's PSM System (cont.)

- **Accountability, Objectives, and Goals**
- **Process Knowledge and Documentation**
- **Capital Project Hazard Review**
- **Process Risk Management**
- **Training and Performance**
- **Human Factors**

CCPS's PSM System

- **Management of Change**
- **Process Equipment Integrity**
- **Company Standards, Codes, and Laws**
- **Incident Investigation**
- **Audits and Corrective Actions**
- **Enhancement of Process Safety Knowledge**

Use of ProSmart

- Intent statements provide information for each action statement or question
- Users input numerical ratings reflecting facility performance for each action
- Software calculates score relative to CCPS expert-derived ratings
- ProSmart provides ongoing performance measurement, plus “what-if” evaluations

Benefits of ProSmart

- Reduce risk of catastrophic accidents
- Improve cost-effectiveness of PSM activities
- Benchmark against PSM performance expectations
- Establish priorities for PSM improvement efforts

Development Process

- Early R&D lessons learned on MOC/Training
- Development of a robust set of essential features of a management system
- Identification of generic, cross-cutting aspects
- Creation of measure/element structure
 - Written program indicators
 - Program implementation indicators
 - Product evaluation indicators/worksheets

CCPS PSM Performance Measure Structure

- **Written program**
- **Program implementation**
- **Product evaluations**
- **Incorporates the essential features of a management system**

Written Program Indicators

- **Measure the effectiveness of the PSM written program. These indicators are generic and do not change from element to element**

Program

Implementation Indicators

- **Measure the effectiveness and completeness of the program implementation. To an extent, these indicators are also generic, but the structure recognizes and provides for differences in implementation from element to element**

Product Evaluation Indicators

- **Element-specific indicators that measure the quality of products produced by a particular PSM element**

CCPS Essential Features of a Management System

- **Planning**
- **Organizing**
- **Implementing**
- **Controlling**

A. Planning Features

- A.1 Explicit objectives and goals
- A.2 Well-defined scope
- A.3 Clear-cut desired outputs
- A.4 Consideration of alternative achievement mechanisms
- A.5 Well-defined inputs and resource requirements
- A.6 Identification of needed tools and training

B. Organizing Features

- B.1 Strong sponsorship
- B.2 Clear lines of authority
- B.3 Explicit assignment of roles/
responsibilities
- B.4 Formal procedures
- B.5 Internal coordination and communication
- B.6 External coordination and communication

C. Implementing Features

- C.1 Detailed work plans
- C.2 Specific milestones for accomplishments
- C.3 Initiating mechanisms

D. Controlling Features

- D.1 Performance standards and measurement methods
- D.2 Variances
- D.3 Procedure renewal and reauthorization
- D.4 Reevaluation of goals and objectives
- D.5 Corrective action mechanisms

ProSmart - [Process Safety Management (PSM) - M... ins Plant]

File Element Tools Window Help

PSM Rating: 77 9. II Rating: 82

Outline	Rating	Comment	Date	Update Interval (Days)	Days to Update
5. Management of Change (MOC)	76				
6. Process Element Integrity (PEI)	76				
7. Human Factors (H)	66				
8. Training and Performance (T&P)	74				
9. Incident Investigation (II)	82				
+ Written Program Indicators (II)	76				
- Implementation (II)	82				
+ Program Implementation Indicators (II)	76				
+ Product Evaluation - The Investigations and Associated Documentation for an Incident or Near Miss (II)	86		2/20/2001 10:47 AM	30	23
10. Standards, Codes, and Regulations (SCR)	82				
11. Audits and Corrective Actions (ACA)	80				
12. Enhancement of Process Safety Knowledge (EPSK)	78				

Guidance [Parent Section](#)

Incident Investigation (II)

Design Intention

Incident Investigation is a system for scheduling, staffing, and documenting investigations of

Process Safety Management (PSM)\9. Incident Investigation (II)

Menu Bar

Ratings Toolbar

Element Toolbar

Standard Toolbar

Column Headings

Grid

Splitter

Guidance Window

Path Toolbar



Outline	Sensitivity...	Rating	Comment	Date	Update Interval (Days)	Days to Update
Process Safety Management (PSM)		77				
+ 1. Accountability (Acc)		82				
+ 2. Process Knowledge and Documentation (PKD)		79				
+ 3. Capital Project Hazard Review (CPHR)		83				
+ 4. Process Risk Management (PRM)		78				
+ 5. Management of Change (MOC)		76				
+ 6. Process and Equipment Integrity (PEI)		76				
+ 7. Human Factors (HF)		66				
+ 8. Training and Performance (T&P)		74				
+ 9. Incident Investigation (II)		82				
+ 10. Standards, Codes, and Regulations (SCR)		82				
+ 11. Audits and Corrective Actions (ACA)		80				
+ 12. Enhancement of Process Safety Knowledge (EPSK)		78				

Guidance

Process Safety Management (PSM)

This PSM performance measure is based on the structure developed by CCPS (Reference 1); it consists of the following twelve CCPS Elements:

1. Accountability (Acc)
2. Process Knowledge and Documentation (PKD)
3. Capital Project Hazard Review (CPHR)
4. Process Risk Management (PRM)

ProSmart - [Process Safety Management (PSM) - Mayberry Resins Plant]

File Element Tools Window Help

Auto Calculate PSM Rating: 76 9. II Rating: 82

Outline	Rating	Comment	Date	Update Interval (Days)
+ 5. Management of Change (MOC)	77			
+ 6. Process and Equipment Integrity (PEI)	62			
+ 7. Human Factors (HF)	66			
+ 8. Training and Performance (T&P)	74			
- 9. Incident Investigation (II)	82			
- Written Program Indicators (II)	76			
- A. Planning (II)	74			
- A.1 Explicit Goals and Objectives (II)	85			
- A.1.1 A program goal with explicit objectives is stated. (II)	2		11/20/2000 10:14 AM	
- A.1.2 A program design intent statement exists that addresses product quality requirements and system capacity limitations. (II)	1		11/20/2000 10:08 AM	
+ A.2 Well-defined Scope (II)	67			
+ A.3 Clear-cut Desired Outputs (II)	100			
+ A.4 Consideration of Alternative Achievement Mechanisms (II)	67			
+ A.5 Well-defined Inputs and Resource Requirements (II)	75			
+ A.6 Identification of Needed Tools and Training (II)	67			
+ B. Organizing (II)	78			
+ C. Implementing (II)	82			
+ D. Controlling (II)	73			
+ Implementation (II)	82			
+ 10. Standards, Codes, and Regulations (SCR)	82			
+ 11. Audits and Corrective Actions (ACA)	80			
+ 12. Enhancement of Process Safety Knowledge (EPSK)	78			

Process Safety Management (PSM) - Mayberry Resins Plant

Outline	Rating	Comment	Date	Update Interval (Days)	Days to Update
9. Incident Investigation (II)	82				
+ Written Program Indicators (II)	76				
+ Implementation (II)	82				
+ Program Implementation Indicators (II)	76				
- Product Evaluation - The Investigations and Associated Documentation for an Incident or Near Miss (II)	86		3/2/2001 9:31 AM	30	0
- 1/14/99 Incident	45		8/25/2000 8:47 AM		
- 7/13/2000 Near Miss	49		9/25/2000 9:31 AM		
- 8/16/2000 Near Miss	50		10/24/2000		

Guidance

[Parent Section](#)

Product Evaluation - The Investigations and Associated Documentation for an Incident or Near Miss (II)

The product evaluation should address the following questions.

- Did the program products meet the quality standards?
- Were work activities sufficiently thorough?
- Were the specified work products produced?
- Do program activities document consideration of alternate methods and selection of the best to achieve the objectives?
- Were adequate resources (people, funding, time) made available at all times and used to accomplish the program objectives?
- Were the specified inputs available for program work?
- Were the specified tools available and used?

Lord Kelvin

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