

How to sustain a commitment to process safety in times of change and uncertainty.

Process Safety Management (PSM) requires the continued commitment of people throughout an organisation, from the board room to the operator or maintenance technician on-site. It is particularly appropriate to reiterate the importance of this commitment when faced with a recovering Oil and Gas market that has seen companies downsize or reorganise.

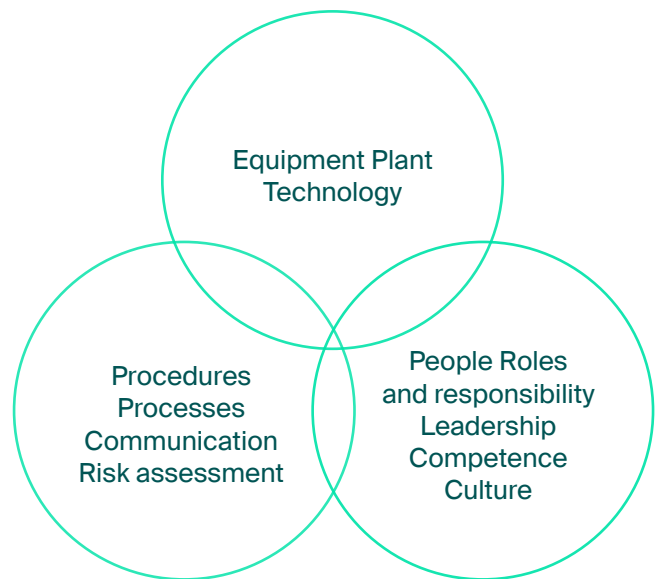
This paper defines PSM and considers the importance of people in ensuring its effectiveness through periods of change and uncertainty. Areas that may require particular attention are highlighted, with the aim of helping organisations guard against erosion of their PSM arrangements and reduce the potential for weakening of their safety performance.

What is Process Safety Management?

PSM is at the core of many high hazard industries and is concerned with preventing a process related accident; one that leads to fire, explosion or a release of flammable or toxic materials.

PSM encompasses the application of good design principles, engineering and operational practices to manage hazardous systems and assure their integrity. In simple terms, continued safe operation of assets requires the components of safe people, safe procedures and safe equipment to be in place.

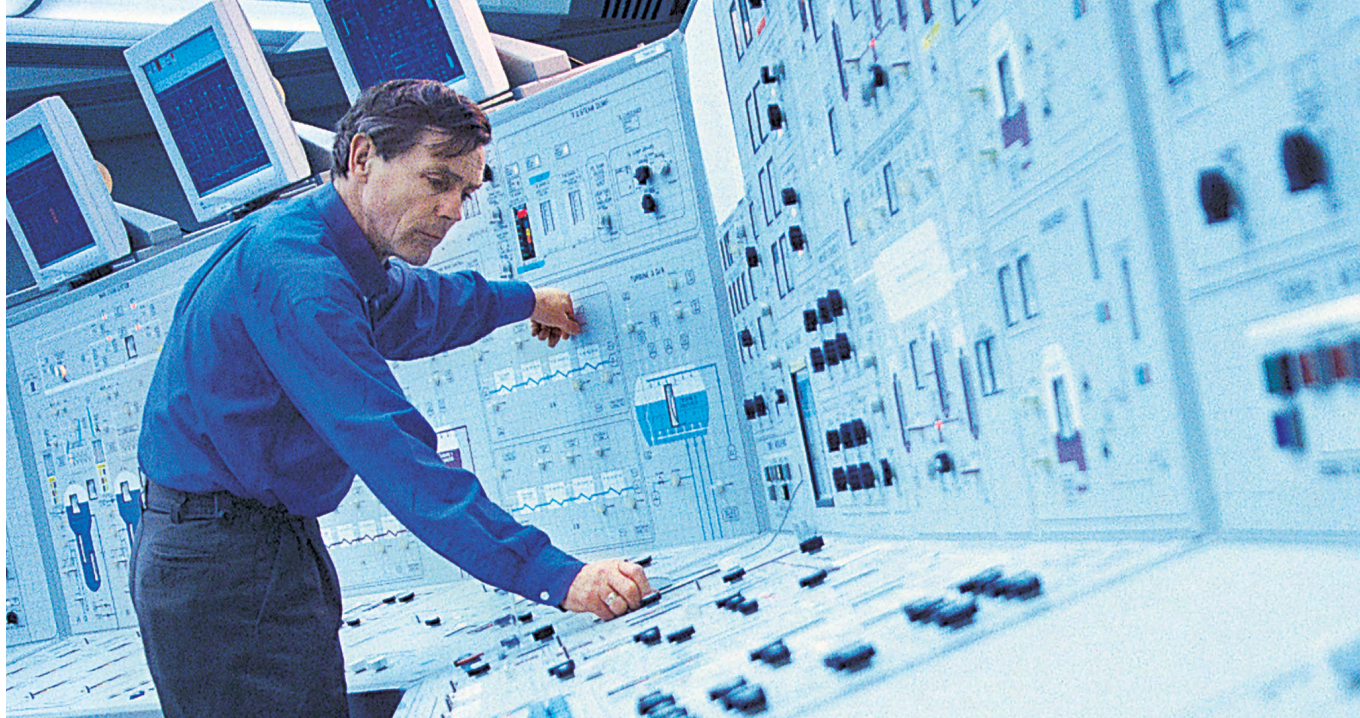
The nature of process safety hazards has driven the development of particular PSM requirements. These are incorporated in legislation (e.g. the OSHA PSM regulations) and various models of good practice (e.g. Energy Institute high level framework for process safety management and AIChE CCPS Guidelines for Risk-Based Process Safety).



The components of safe operation

Many of these models are captured in regulatory frameworks, such as the onshore Seveso III Directive (COMAH) and the Offshore Safety Case regime in the UK. Irrespective of the model or framework employed there are a number of basic elements that need to be addressed (cf. the Energy Institute high-level framework):

¹ High level framework for process safety management, Energy Institute



- **Process safety leadership** - define and communicate the level of performance an organisation is prepared to accept and how they should ensure that they put in place the necessary resources to achieve the required level of performance.
- **Hazard identification and risk assessment** - identify and assess risks that need to be managed in order to assure the integrity of operations, identify the necessary control measures and how they should record and maintain the process safety knowledge developed from these risk identification and assessment activities.
- **Risk management** - implement and manage the control measures that have been identified during risk identification and assessment activities.
- **Review and improvement** - measure and review compliance against the PSM expectations and ensure that lessons learned are identified from these measurements and any findings from incident investigations.

Safety as a value, not only a priority

As the consequences of PSM failure can be visible and costly, high hazard industries are clearly committed to process safety. Most companies have frameworks in place; they write procedures and undertake risk assessments. However, effective PSM requires more than risk assessments and procedures. Workforce behaviours must align with PSM requirements in the workplace so the safety culture of the organisation must also support PSM.

Where people's roles have disappeared or been redefined as part of some wider reorganisation - or worse still, where people's performance is compromised because of personal job uncertainty, then companies can become exposed to increased likelihood of PSM failures. A classic example of the consequences of business change on process safety is the Longford Gas Plant Accident

(1998). A loss of hydrocarbon containment from a vessel resulted in explosions and fire, killing two employees and injuring eight others. A number of key site positions were vacant on the day of the incident with individuals either covering them on a temporary basis (i.e. in an acting position) or in addition to their usual responsibilities. The two men that died were in such roles.

Andrew Hopkins² has reported that the fundamental shortcoming at Longford was in the implementation of the Operations Integrity Management System (OIMS) guidelines and the inadequate knowledge of supervisors and operators because of inappropriate training, lack of proper operating procedures, and failure to conduct a HAZOP for the vessel. This resulted in inappropriate and insufficient actions being taken. It is also believed that a contributing factor was the reduction of supervision at Longford, in part due to the transfer of engineers to Melbourne, which reduced both the amount and quality of supervision available on site. This incident sadly reinforces that effective PSM requires the necessary people, procedures and equipment to be in place at all times. So what are the factors an organisation should be mindful of in times of change to ensure that safety performance is not severely compromised?

Firstly, the process safety culture within the organisation should be assessed to understand if there are any obstacles to achieving effective operation of PSM. The safety culture of an organisation has been defined as 'the product of individual and group values, attitudes, perceptions, competencies, and patterns of behaviour that determine the commitment to, and the style and proficiency of, an organisation's health and safety management'. High hazard industries increasingly recognise the role of safety culture in PSM; safety culture can be an enabler or barrier but it must be considered as part of the PSM operation so that individuals are encouraged to adopt 'safety as a value' in their daily lives.

² Lessons from Longford: The Esso Gas Plant Explosion, Andrew Hopkins

Priorities can change, but a value is a deeply held belief, beyond compromise. Holding 'safety as a value' helps build safety into organisational behaviours.

Safety climate refers to a snapshot of the perceptions a group of workers holds in relation to safety. This can be tested through the use of a Safety Climate Assessment.

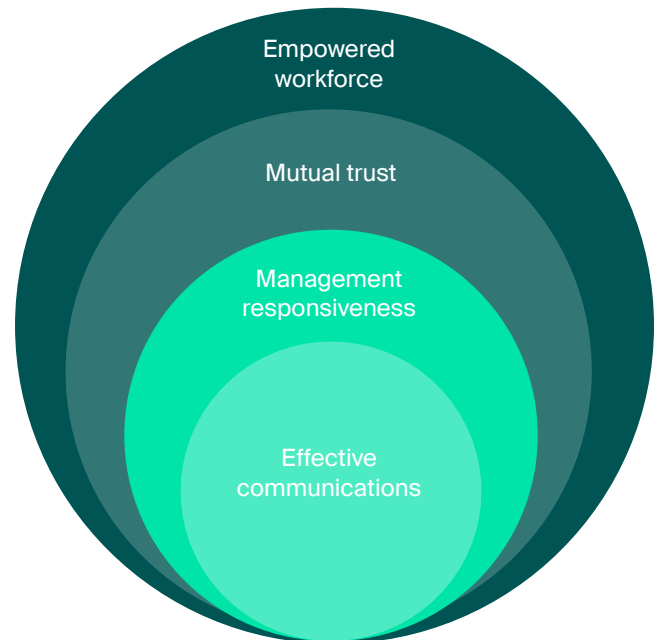
Following an assessment of the safety climate, there may be questions around process safety leadership and whether the message of 'safety as a value' is consistently communicated and demonstrated. The AIChE CCPS Vision 20/20 sets out that leaders need to show commitment to process safety, and demonstrate their belief that accidents are preventable, in order for the workforce to also embrace that belief. Equally important is that the workforce believes accidents are possible - adopting the attitude that 'it could happen here' helps drive the vigilance needed to guard against accidents.

The UK Health and Safety Executive (HSE) has reported that underlying causes of the explosion and fire at the Buncefield oil storage depot included failings in the safety management system and a 'hands-off' approach by management. Recognising that process safety leadership is at the core of a major hazard business, the UK HSE created a Process Safety Leadership Group (PSLG) who collectively outlined the core leadership principles. These principles have fuelled an increased investment in leadership training with a view to improve site safety: in areas such as board level involvement and visibility, workforce engagement, monitoring process safety performance, and sharing of best practice.

Secondly, the workforce must be actively engaged and mechanisms to encourage this should be in place, including a feedback loop. A sound process safety culture requires:

- **Individuals to be empowered** - so people feel they can influence safety practices and will seek safer ways of working.
- **Mutual trust between workers and management** - so every event and idea can be learned from.
- **Timely responsiveness** - to reinforce empowerment.
- **Open and effective communication** - so safety information can be acted upon.

There are many ways to encourage workforce involvement and most organisations will have some sort of programme in place. However, the success of any programme is again dependent on people's commitment to engage with that



A sound process safety culture

process. A safety climate assessment will provide an insight into whether there is healthy engagement within an organisation and will also identify any issues or areas where further measures should be taken.

Thirdly, all critical tasks/activities should be mapped and assigned to specific individual roles. It should be continually considered whether these roles have changed or become obsolete therefore impacting the delivery of critical tasks/activities, and potentially eroding the effectiveness of barriers.

The workforce should understand where their tasks fit in with respect to major hazard prevention and have sufficient knowledge and competence to know what steps should be taken should any deviations occur. Developing workforce competence needs to address critical areas such as hazard identification and risk assessment, management of change, permit to work, and contractor management.

The Bowtie method has been widely employed to visualise major hazards associated with a facility and improve workforce understanding of major hazards and how roles relate to the barriers and controls in place to prevent the realisation of a hazard. There are some clear links with barrier management here, a major subject in its own right.



Why do more?

People, technologies and operations change and evolve over time. Achieving successful PSM is a long-term goal that requires a continued willingness to challenge and question whether process safety hazards and associated risks in the organisation are being appropriately managed. As identified, the following factors, as a minimum, should be reviewed during a prolonged period of market downturn:

- Is there a healthy safety culture within the organisation?
- Is the workforce actively engaged?
- Are safety critical tasks / activities mapped to individual roles, with clear responsibilities and links to major hazards?
- Do employees with safety critical tasks / activities have the required experience and competence, including those employees identified as being in stand-in / acting roles?

A company's ability to benchmark, to challenge and to learn from others will prove to be critical in managing organisational change. The fact that serious incidents do still occur globally, and that they are often traced back to familiar causes seen in previous incidents, shows that industries have some way to go to achieve robust PSM arrangements. Perhaps the belief that 'it wouldn't happen here' is still prevalent. It is therefore reasonable to ask if the PSM frameworks of high hazard businesses might be

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Process safety, the need for it and leadership of it must be properly understood at every level in the organisation.

Judith Hackitt, CBE FREng FIChemE, HSE Chair and IChemE President speaking at the Process Safety Centre symposium, Texas, USA

vulnerable following an industry downturn which has seen organisational restructuring and reductions in workforce numbers.

This view is also reflected in Marsh's recently published 'The 100 Largest Losses 1974-2015'³ in which increased frequencies in losses are observed either during or immediately after significant reductions in the crude oil price. Further, Marsh identifies cost-saving initiatives or reduced investment in safety measures and training as potential factors that could compromise safety performance.

The AIChE CCPS Vision 20/20 sets out that process safety performance will dramatically improve if a company has:

- A committed culture
- Vibrant management systems
- Disciplined adherence to standards
- Intentional competency development
- Enhanced application and sharing of lessons learned

How can Vysus Group help?

Vysus Group offers core expertise in the management of risk throughout the asset lifecycle across the high-level components of 'people, procedures, equipment'. Previous project successes have seen Vysus Group accurately diagnosing and separating problems, staging interventions appropriate to the problem, and helping the client to manage the impact of any changes such that the client becomes self-sufficient.



We can help develop your approach to PSM by:

- Undertaking audits or gap analysis and working with you to define an improvement programme.
- Assessing the process safety culture in your organisation so that you can ensure that this is reflected in your arrangements and improvement plans.
- Supporting the PSM improvement process by, for example:
 - >> Helping you identify and understand process safety hazards and risks through tools such as HAZID, HAZOP and QRA.
 - >> Assessing safety critical tasks, reducing the chance of errors and helping ensure workforce competence in task execution.
 - >> Establishing emergency preparedness requirements.
 - >> Helping to develop your management systems, including appropriate standards and procedures.
 - >> Developing workforce competence in critical areas such as Hazard Identification and Risk Assessment, Management of Change, Permit to Work, Contractor Management.
 - >> Training business leaders so they can better demonstrate process safety leadership.
 - >> Helping you set Key Performance Indicators (KPIs) for process safety.