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BROCHURE

# Process Safety Management (PSM)

For the hazardous process industries





## Overview

Delivering excellent process safety performance is a must for any operating company in the hazardous process industries.

This is essential for:

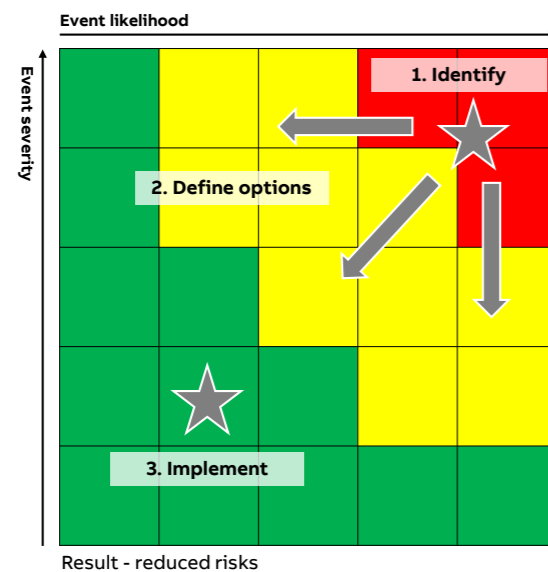
- Protecting their people
- Protecting their license to operate
- Eliminating or minimising the risk of incidents
- Meeting ever more demanding regulatory requirements
- Raising stakeholder and public confidence

There is also general acceptance that any operating companies putting in place the systems to manage production safely, will also create a well controlled and efficient operation - 'a safe operation is an efficient operation'. Process safety needs to be considered throughout the asset lifecycle; design, construction, operation, maintenance, modification and closure.

Operating companies need to be able to answer 'yes' to the following three questions:

- Do we understand what can go wrong?
- Do we know what systems we have to prevent this happening?
- Do we have sufficient information to assure us these systems are working effectively?

Risk identification and assessment process.



To be able to answer 'yes' to these questions means having good risk identification and assessment processes, comprehensive risk controls in place and reliable monitoring of these risk controls.

ABB helps to answer these questions, to identify any shortfalls and put necessary improvements in place. We have expert knowledge of all aspects of process safety, engineering specialists to help implement solutions, rigorous processes to complete comprehensive studies efficiently and an operational heritage to develop pragmatic solutions.

“The inspector remarked that the process safety documentation flowed well and told a coherent story, in fact he did not challenge a single element of our LOPAs or fault trees and was very happy to allow us to continue on without further intervention. An excellent result.”

Operations Safety Manager,  
Chemical Manufacturer

## The benefits of improved process safety

The key benefit from and main justification for improving process safety performance is in the inherent value of reducing harm to people and the environment, by reducing the likelihood of a major incident occurring.

### Additional benefits for PSM

While the key drivers for safety are social and ethical our experience shows that there are significant financial and operational benefits from improving safety.

Process safety incidents are rare events, their cost can reach into billions of USD, so there is real financial value in improving safety performance.

The value of reduced risk can be calculated, so reducing the likelihood of a \$1.5bn USD incident (the cost of the Buncefield incident) occurring from once in 10,000 years to once in a 100,000 years gives a 'mathematical value' of \$135,000 USD worth of risk reduction per year of operation.

However the key financial benefits come from improving the way a process is controlled and operated and to attribute a proportion of plant downtime to incidents that can be prevented through safety improvement actions. Improved safety requires a well controlled, well operated and well understood process. Running an operation in a safe way reduces variability and gives operators more time to optimise performance.

40% of production loss is related to preventable operator error and if improved PSM reduces this by even 1 incident it is worth a significant increase in revenues. In reality many aspects of improved PSM contribute to reducing the amount of lost production time.

“This is what success looks like. One train alone had 6 trips last year compared to 25 the year before. This has significant business value.”

Operations Manager, Gas Processing Plant



# What ABB offers

The management of process safety can be broken down into 5 areas.

## PSM policy and systems

The 'right' goals for any PSM improvement program will be influenced by many diverse factors including corporate tolerance to risk, incident history, inherent risk in the operation, current state of PSM arrangements etc.

ABB provides pragmatic advice, knowledge of industry best practices and performance, experience of similar PSM programs and delivers an independent and realistic view of current state and priority areas for progress.

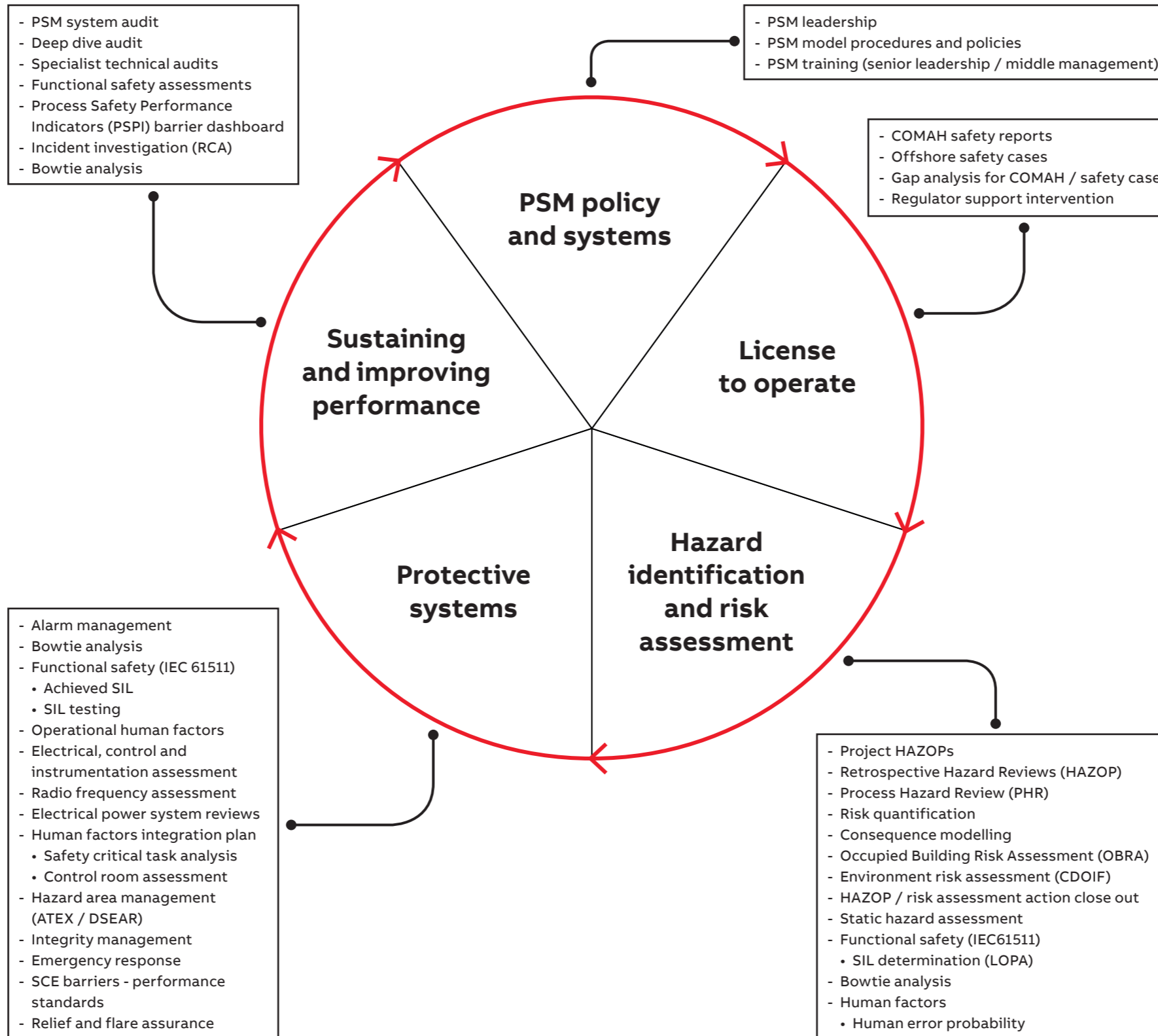
We can help evaluate and improve existing management systems and procedures or provide templates for best practice management systems. Leadership and workforce engagement play a key part in successful delivery of PSM programs and we can help with leadership models and developing an effective safety culture.

## License to operate

We support full technical authoring of safety reports (onshore) or safety cases (offshore), completing specialist sections, providing data for reporting requirements, helping to prepare for regulatory inspections etc. Regulators use the information provided in the safety report / case during their interactions with operators so we align our approach in all PSM areas to the safety report / case. This makes it easier for operators to demonstrate they are managing safety, along the lines of their license to operate.

## Hazard identification and risk assessment

Understanding major accident hazard risks that are present in an operation is vital to managing them effectively, so this is one of the key areas of process safety management. There are many types of risk assessment and they are applied throughout the lifecycle of a production process during conceptual studies, detailed design, before start up, at periodic intervals during normal operation and importantly when any significant change impacting a process occurs.



Whilst ABB can provide a full suite of risk assessment techniques, some of the most common are; HAZID and HAZOP studies, Process Hazard Reviews (PHR), LOPA studies, consequence modelling, hazard analysis, QRA, electrostatic hazards, fire and explosion studies, and human factors assessments. We normally facilitate client teams in risk assessments, using very experienced study leaders and sometimes provide other functional specialist inputs to the team.

## Protective systems

ABB provides services for individual protective systems or across all of the layers of protection for a particular hazardous event. These services include; designing systems, checking / reviewing existing designs or new ones done by others, providing design procedures, standards & training, providing maintenance & testing procedures and performing barrier health checks or tests. Often the overall protection is described through a bow tie diagram to help understanding by non-technical staff.

Our services are very wide ranging and cover many types of protection including; SIS (to IEC 61511), alarm management, hazardous area classification, pressure relief, mechanical integrity, safety critical task analysis, fire and gas detection, fire protection and emergency response.

## Sustaining and improving performance

Having implemented an effective process safety management system it is important to review performance of this system on an ongoing basis, to make sure it is working as intended and that it is still fit for purpose. ABB supports auditing, performance measurement, incident investigation and PSM systems review.

Auditing services include system audits; to confirm the PSM systems are still fit for purpose and have kept up with changes to operations, compliance audits; to confirm that systems are operating as designed and 'deep dive' audits; to confirm in detail that the key risk controls for specific major accident hazards are being managed effectively.



## Working with ABB

We can help operating companies with every aspect of managing process safety.

We can take full responsibility for activities or provide advice and support in delivering tasks.

Process safety needs to be considered throughout the asset lifecycle; design, construction, operation, maintenance, modification and closure.

At all stages of our involvement we work with customer teams to ensure we maximise the use of local operational experience and to share our skills and experience. This approach provides optimum solutions by combining best practice knowledge with a true understanding of operational needs. We also find that operating teams benefit from our approach by gaining a better understanding of the risks and risk controls in the process.

“An excellent piece of work and I am certain that in the future this will be seen as a key milestone document in the management of alarm systems.”

Instrument and Control - Technical Authority,  
Oil and Gas Operator

### Where to start?

Any operating company looking for a partner to work with, helping to drive process safety performance needs to have absolute trust and confidence in that partner: the partner needs expertise across all relevant areas of safety, they need to understand the process and PSM systems and they need to be responsive etc. This trust has to be built up over time and through experiences of working together.

ABB's first engagement with a new customer can come about in many ways and typically involves the delivery of one or more of our services from around the safety lifecycle; e.g. a risk assessment for a new project, support in investigating a specific issue or incident, a training course, an alarm management health check. However we get started, we will be there to support the full beneficial implementation of a solution. Once a good relationship is developed we can look to build a broader partnership and would typically start with an overall assessment of PSM - to develop a prioritised and risk based improvement plan, built around site risks, capabilities etc.



## Why choose ABB?

ABB's operational heritage allows us to understand the practicalities of operational environments so we can offer pragmatic solutions.

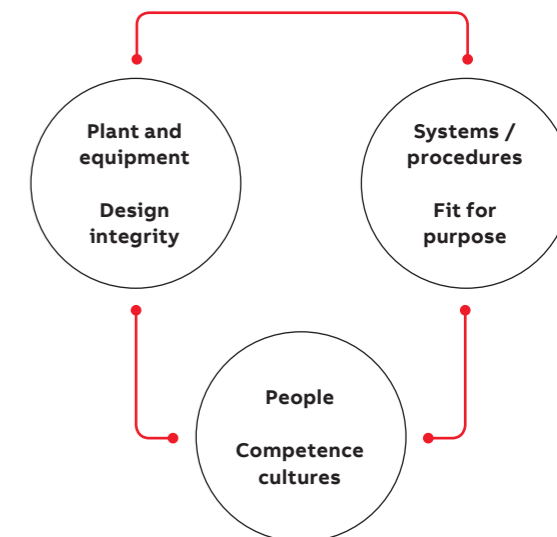
Robust PSM systems delivered cost effectively is an operational goal that requires effective people, plant and processes working together. Plant and equipment must be of an appropriate design, to the right standard and be adequately maintained. Procedures and systems must be fit for purpose and practicable. People must be competent, well led and work within a positive culture.

A key contributor to developing competency is the extensive programme of technical training and events that we run, attended by over 3,000 delegates each year. All courses are run by experienced tutors, with many years of experience. Many of our courses are accredited by professional bodies such as the Institute of Chemical Engineers (IChemE). Our highest feedback ratings are for the practical knowledge of the tutors and the interactive nature of the practical case studies used on the courses.

Our approach is always risk based, putting effort where it is most valuable and not applying the same level of detail in all cases. This ensures that work is carried out efficiently making best use of busy operations and technical staff.

The ABB approach to process safety is built on achieving sustainable risk reductions, through delivering proven solutions that can be practically implemented in potentially hazardous operations.

One of the keys to ABB's success is our people - their experience, knowledge and desire to do an excellent job for their customers. ABB's consultants and engineers are widely respected as thought leaders in process safety; developing new methodologies and approaches, presenting at key industry events, sharing their considerable learning and experience from working across many hazardous process operations.



“This guy is a star in terms of common sense and customer service. Picked up the problem rapidly, brought people together and gave me a total solution. Just what I needed.”

Site Manager, Chemical Operator

“ABB contacted me last week informing me that the HAZOP found a high risk action that they wanted to make us immediately aware of. This excellent spot enabled us to take immediate action and send the relevant information to the offshore asset within 24h.”

Process Engineering Supervisor,  
Upstream Oil Production

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