Process safety leadership

HSE inspectors inspect an offshore oil platform.

This element will explore what process safety is and will look at the importance of leadership in the process industries. It will also introduce organisational learning, management of change, and how worker engagement can be managed.

Learning outcomes

On completion of this element, you should be able to:

1.1 Outline the meaning of process safety and how it differs from personal safety.

1.2 Explain the role of leadership in process safety management.

1.3 Explain the purpose of organisational learning, the sharing of lessons learnt and sources of information.

1.4 Explain how 'change' should be managed to effectively reduce risks to people and plant.

1.5 Outline the benefits, limitations and types of worker participation and engagement.

1.6 Outline what is meant by competence and its importance to process safety.

Process safety management meaning

1. The distinction between process safety vs personal safety

When we think about 'safety', we naturally think about the personal safety of individuals who could be affected, and the various, often more traditional actions that can be taken to reduce the risk of injury and ill health. Many types of personal accidents are quite common, simple and therefore reasonably foreseeable; their control measures are often well established and straightforward to implement. These include machine guarding, fire precautions, equipment checks, managing slips and trips and the use of personal protective equipment (PPE). We probably think about low personal accident rates or number of days without an accident as a measure of success.

By comparison, process safety (safety in high-hazard process industries) is rather more complicated. So-called high-hazard process industries include chemical and oil and gas sectors. While they obviously suffer personal accidents like all other workplaces, there is also the potential for a major incident. This is because they deal with dangerous chemicals in large amounts and operate processes that, if not well monitored and controlled, can easily go spectacularly wrong, resulting in major fires and toxic releases, for example. Major incidents like these are very infrequent events and can be difficult to predict (before they happen) because of the multiple causes and complexity of what leads to them. Neglecting seemingly small things (like an intermittently faulty alarm or general maintenance) can end up causing a major accident. In process safety, the emphasis is on the prevention of major disasters that have been historically an issue for the industry. Process safety needs both complex technical controls (on the plant itself) as well as a robust safety management system. It requires a good deal of specialist technical engineering and management skill to get right. Leadership is important to give suitable high priority to process safety even though the standards and controls mean that incidents should be rare and may be outside the experience of operators.

Personal safety and process safety do link together (clearly, there is a risk of slips, trips and falls occurring in any workplace); however, in process safety, the emphasis is on the prevention of the high-risk, large scale catastrophic events that, though thankfully rare, could have devastating consequences.

2. A definition of process safety

You will find various definitions of process safety but the one that we will use here is: "a blend of engineering and management skills focused on preventing catastrophic accidents and near misses, particularly structural collapse, explosions, fires and toxic releases associated with loss of containment of energy or dangerous substances such as chemicals and petroleum products." (Energy Institute, adapted from the Center for Chemical Process Safety of the American Institute of Chemical Engineers[1]).

As you can see, it has all the elements of what we have discussed earlier.

St. Fergus gas terminal, Scotland.

Process safety leadership

HSE inspectors inspect an offshore oil platform.

This element will explore what process safety is and will look at the importance of leadership in the process industries. It will also introduce organisational learning, management of change, and how worker engagement can be managed.

Learning outcomes

On completion of this element, you should be able to:

1.1 Outline the meaning of process safety and how it differs from personal safety.

1.2 Explain the role of leadership in process safety management.

1.3 Explain the purpose of organisational learning, the sharing of lessons learnt and sources of information.

1.4 Explain how 'change' should be managed to effectively reduce risks to people and plant.

1.5 Outline the benefits, limitations and types of worker participation and engagement.

1.6 Outline what is meant by competence and its importance to process safety.

Process safety management meaning

1. The distinction between process safety vs personal safety

When we think about 'safety', we naturally think about the personal safety of individuals who could be affected, and the various, often more traditional actions that can be taken to reduce the risk of injury and ill health. Many types of personal accidents are quite common, simple and therefore reasonably foreseeable; their control measures are often well established and straightforward to implement. These include machine guarding, fire precautions, equipment checks, managing slips and trips and the use of personal protective equipment (PPE). We probably think about low personal accident rates or number of days without an accident as a measure of success.

By comparison, process safety (safety in high-hazard process industries) is rather more complicated. So-called high-hazard process industries include chemical and oil and gas sectors. While they obviously suffer personal accidents like all other workplaces, there is also the potential for a major incident. This is because they deal with dangerous chemicals in large amounts and operate processes that, if not well monitored and controlled, can easily go spectacularly wrong, resulting in major fires and toxic releases, for example. Major incidents like these are very infrequent events and can be difficult to predict (before they happen) because of the multiple causes and complexity of what leads to them. Neglecting seemingly small things (like an intermittently faulty alarm or general maintenance) can end up causing a major accident. In process safety, the emphasis is on the prevention of major disasters that have been historically an issue for the industry. Process safety needs both complex technical controls (on the plant itself) as well as a robust safety management system. It requires a good deal of specialist technical engineering and management skill to get right. Leadership is important to give suitable high priority to process safety even though the standards and controls mean that incidents should be rare and may be outside the experience of operators.

Personal safety and process safety do link together (clearly, there is a risk of slips, trips and falls occurring in any workplace); however, in process safety, the emphasis is on the prevention of the high-risk, large scale catastrophic events that, though thankfully rare, could have devastating consequences.

2. A definition of process safety

You will find various definitions of process safety but the one that we will use here is: "a blend of engineering and management skills focused on preventing catastrophic accidents and near misses, particularly structural collapse, explosions, fires and toxic releases associated with loss of containment of energy or dangerous substances such as chemicals and petroleum products." (Energy Institute, adapted from the Center for Chemical Process Safety of the American Institute of Chemical Engineers[1]).

As you can see, it has all the elements of what we have discussed earlier.

St. Fergus gas terminal, Scotland.

Process safety leadership

There have been a number of incidents in the process industry that have called into question the way that safety is managed; specifically, in relation to inadequate leadership and poor organisational culture.

EXAMPLE

Focus has historically been on the engineering solutions and design improvements that could be made; however, the hydrocarbon explosions at Texas City and Buncefield in 2005, as well as the more recent Macondo blowout (explosion of BP's Deepwater Horizon offshore drilling unit) highlighted the need to focus on not only the physical controls but also the leadership actions that will prevent such events. As a result, in the UK the Process Safety Leadership Group (PSLG) was established in 2007 to work with the regulators in order to form guidelines on the management and leadership actions that are needed.

In the PSLG final report[2] into the Buncefield disaster, the importance of leadership was acknowledged. Appendix 7 of that document contains their "Principles of Process Safety Leadership[2]", which we will broadly cover in this section.

After effects of the fire at Buncefield oil storage facility.

ACTIVITY

We will be discussing Buncefield at several points through the element, so it would be useful for you to be aware of the incident. The report into the HSE's prosecution of companies involved in the Buncefield explosion, together with photographs and video evidence, can be viewed on the HSE's website (at www.hse.gov.uk/news/buncefield at the time of writing.) Review some of the evidence and familiarise yourself with the case.

1. Hazard and risk awareness of leadership teams

Leaders need to be competent and actively engaged. Indeed, the earlier referenced PSLG report states that "at least one board member should be fully conversant in process safety management in order to advise the board of the status of process safety risk management within the organisation and of the process safety implications of board decisions".

History has shown that if process industry leaders do not fundamentally understand the hazards and risks inherent in their business, unless they are extremely lucky, ignorance may ultimately lead to disaster. Lack of understanding may arise from things such as lack of technical knowledge or simply lack of data on which to base a decision (lack of reporting). Leadership teams are key decision-makers. If, through ignorance, they do not fully appreciate the consequences of their decisions (such as delaying plant maintenance on an already elderly plant or cutting critical staff), they will make poor decisions that may make a major accident inevitable (just a matter of time). To appreciate this, leaders need to be involved, competent and actively engaged - it does not happen by chance. They need to be fully aware of the hazard and risk potential of their processing activities and the potential consequences that decisions to do (or not do) things may lead to. Though a major incident may never have happened to the organisation in question, the major accident potential of its processes needs to be treated seriously alongside other business risks, since it is far more likely to have an impact on reputation and the survival of the business as a whole.

Process safety leadership

There have been a number of incidents in the process industry that have called into question the way that safety is managed; specifically, in relation to inadequate leadership and poor organisational culture.

EXAMPLE

Focus has historically been on the engineering solutions and design improvements that could be made; however, the hydrocarbon explosions at Texas City and Buncefield in 2005, as well as the more recent Macondo blowout (explosion of BP's Deepwater Horizon offshore drilling unit) highlighted the need to focus on not only the physical controls but also the leadership actions that will prevent such events. As a result, in the UK the Process Safety Leadership Group (PSLG) was established in 2007 to work with the regulators in order to form guidelines on the management and leadership actions that are needed.

In the PSLG final report[2] into the Buncefield disaster, the importance of leadership was acknowledged. Appendix 7 of that document contains their "Principles of Process Safety Leadership[2]", which we will broadly cover in this section.

After effects of the fire at Buncefield oil storage facility.

ACTIVITY

We will be discussing Buncefield at several points through the element, so it would be useful for you to be aware of the incident. The report into the HSE's prosecution of companies involved in the Buncefield explosion, together with photographs and video evidence, can be viewed on the HSE's website (at www.hse.gov.uk/news/buncefield at the time of writing.) Review some of the evidence and familiarise yourself with the case.

1. Hazard and risk awareness of leadership teams

Leaders need to be competent and actively engaged. Indeed, the earlier referenced PSLG report states that "at least one board member should be fully conversant in process safety management in order to advise the board of the status of process safety risk management within the organisation and of the process safety implications of board decisions".

History has shown that if process industry leaders do not fundamentally understand the hazards and risks inherent in their business, unless they are extremely lucky, ignorance may ultimately lead to disaster. Lack of understanding may arise from things such as lack of technical knowledge or simply lack of data on which to base a decision (lack of reporting). Leadership teams are key decision-makers. If, through ignorance, they do not fully appreciate the consequences of their decisions (such as delaying plant maintenance on an already elderly plant or cutting critical staff), they will make poor decisions that may make a major accident inevitable (just a matter of time). To appreciate this, leaders need to be involved, competent and actively engaged - it does not happen by chance. They need to be fully aware of the hazard and risk potential of their processing activities and the potential consequences that decisions to do (or not do) things may lead to. Though a major incident may never have happened to the organisation in question, the major accident potential of its processes needs to be treated seriously alongside other business risks, since it is far more likely to have an impact on reputation and the survival of the business as a whole.