

Process Safety Management

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ISSF & Process Safety Management (PSM)

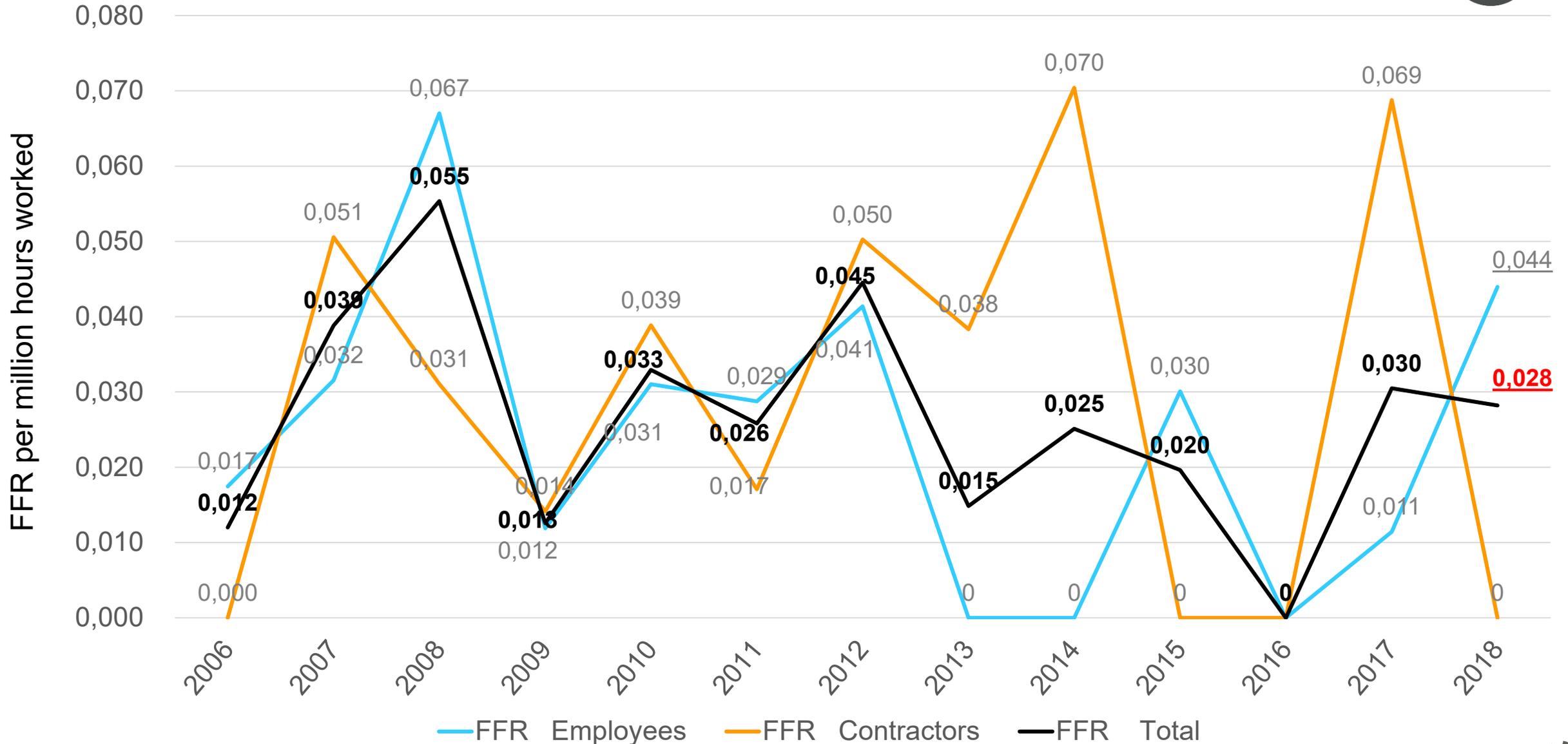


- Key questions
- Why is PSM important to all of us in the stainless steel industry ?
- What are the ISSF doing to support our members in PSM ?
- What can we do to protect ourselves from Process Safety Incidents ?

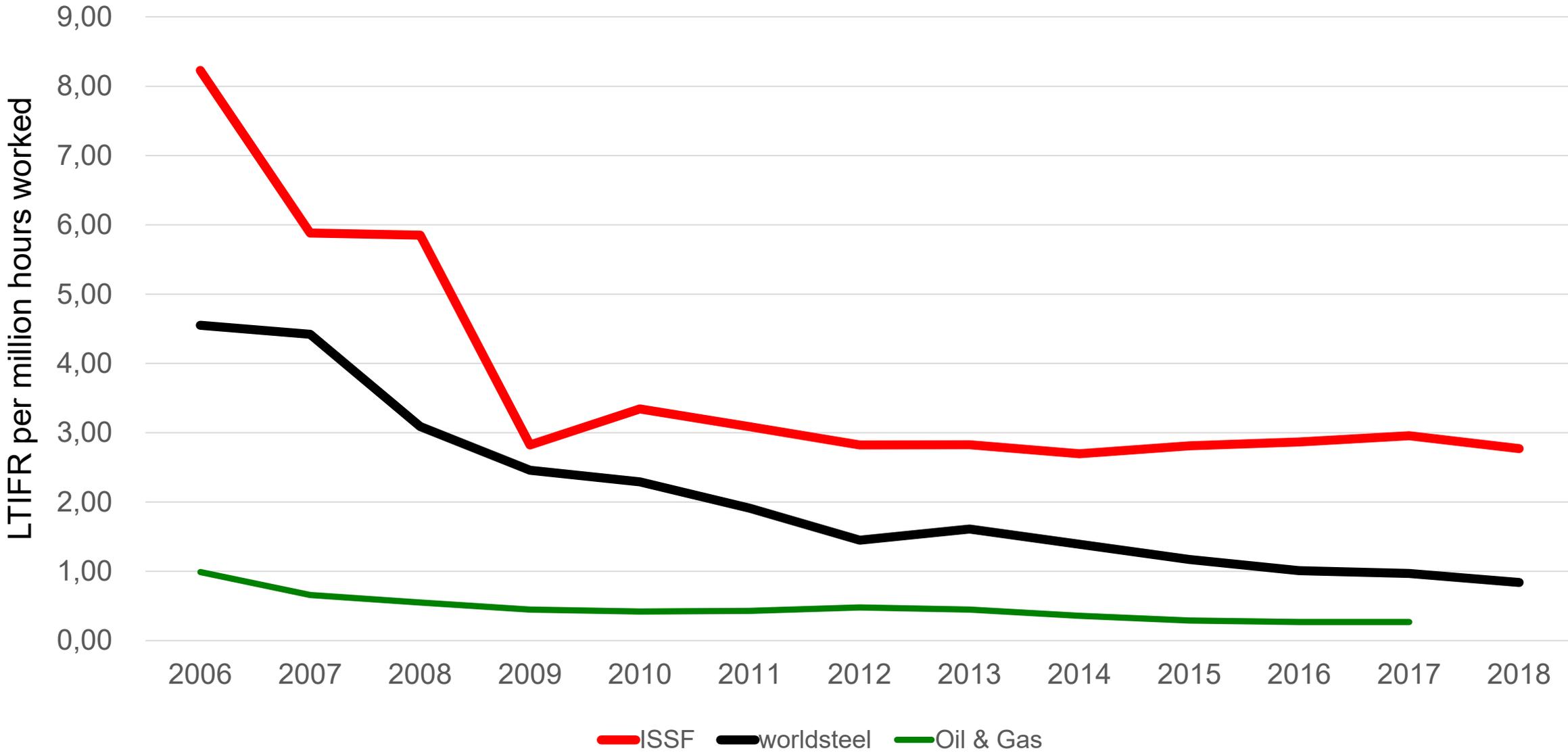
Why is PSM Important ?

- Process safety incidents are the highest single cause of fatalities
 - In our industry
- Process safety incidents can lead to
 - Multiple fatalities
 - Many serious injuries
 - Massive pollution
 - Major economic disruption
 - Significant corporate fines
 - Prosecution and imprisonment
- Process safety incidents are less easy to predict
 - Compared to occupational safety incidents
 - and will frequently necessitate complex countermeasures

ISSF Fatality Frequency Rate (FFR)



ISSF Lost Time Injury Frequency Rate (LTIFR)

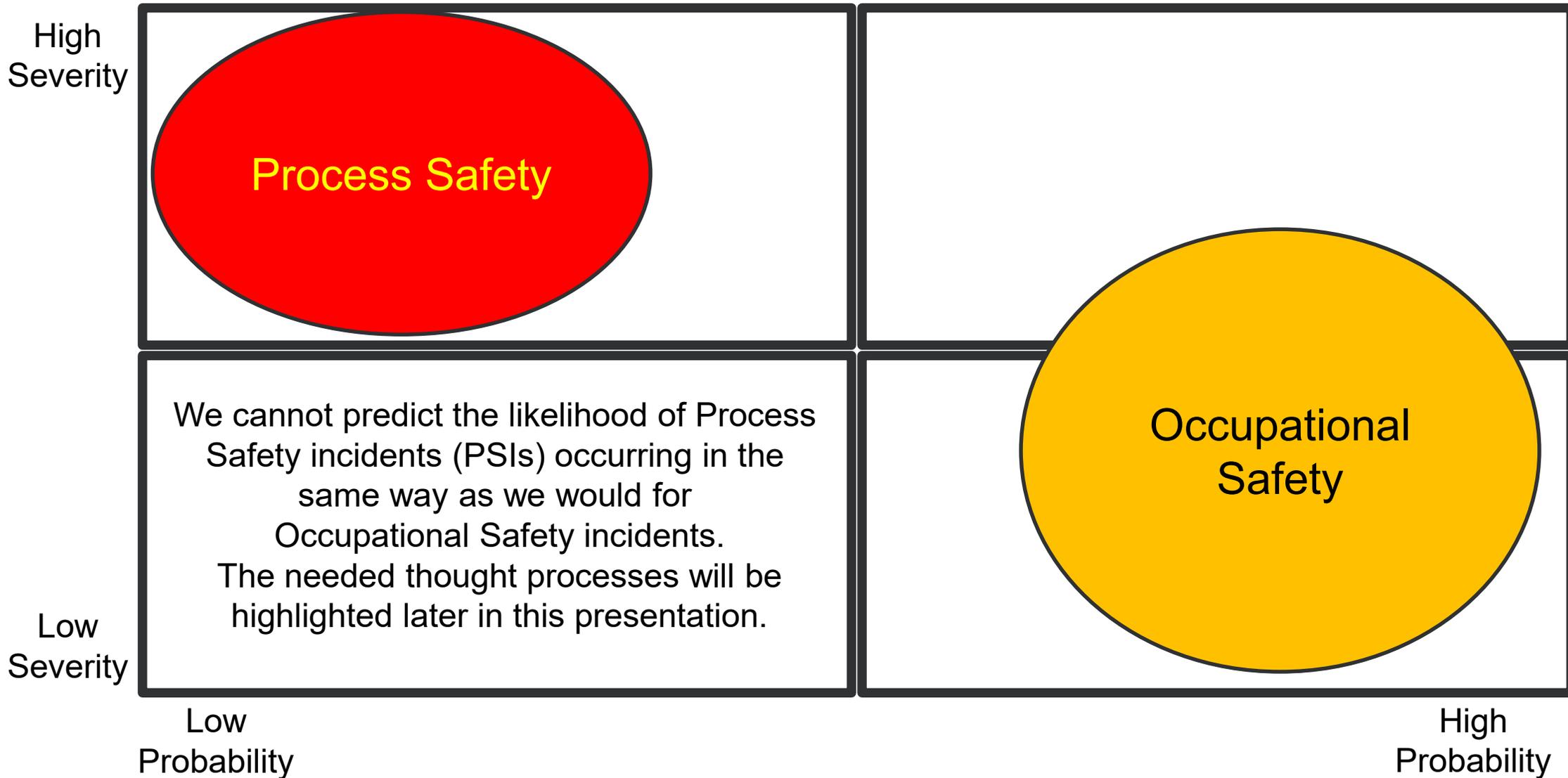


What is Process Safety Management ?

- PSM is a blend of engineering, operations and management skills
- Focused on preventing catastrophic accidents, particularly
 - Structural collapse
 - Explosions
 - Fires and toxic releases
 - ☒ Associated with loss of containment of energy or dangerous substances
 - ☒ eg; toxic gases, molten metal, chemicals and petroleum products.
- The manufacturing of all steels involves processes with intrinsic hazards that need careful management.
- The measures needed to control these hazards are often complex.
- The primary focus of PSM needs to be avoiding loss of containment
 - Some well-known and devastating examples are shown in this presentation

PSM; Initial Thinking

Understanding Process Safety Incidents



What Are the Outcomes ?

When PSM is not Performed or Goes Wrong



Piper Alpha
1988
167 fatalities
9.3bn USD
**



Deepwater
Horizon
2010
11 fatalities
44.8bn USD
**



Texas City
2004
15 fatalities
1.1bn USD
**



Flixborough
1974
28 fatalities
0.5bn USD
**

** costs indexed to 2019

An ISSF Example of Loss of Containment

6 December 2007; ThyssenKrupp's Terni Plant in Italy

- The plant was in the process of being shut down
- Seven men working the line were in the pulpit cooking their lunch
- A line fire occurred and lubricating oil hoses become disconnected

What Actually Happened ?

6 December 2007; ThyssenKrupp's Terni Plant in Italy

- The men ran to the line to solve the problem
- Oil was being sprayed into the air at pressure
- The men were soaked in oil
- A flash fire occurred
- The fire resulted in the immediate death of 1 worker
- Severe injuries for a further 6 workers
- All 6 workers died from severe burns in the subsequent days

What Were the Consequences ?

- **A devastating human tragedy**
- The lives of 7 families destroyed forever
- Deep societal impact, serious reputational damage
- Company accused of failure to maintain adequate systems and safety procedures
- CEO convicted of 2nd degree murder 10 years in prison
- 5 other executives convicted of manslaughter
 - Sentenced to 6-7 years in prison
- Company fined €1M and barred from advertising in Italy, denied tax breaks and subsidies, for six months.
- Relatives of the 7 deceased workers given financial compensation
- Civil action was filed against the firm

PSM; Avoid the Domino Effect

- Not undertaking PSM can create the following unwanted outcomes

1. Kill and injure many people
 2. Create massive pollution
 3. Deliver major economic disruption
 4. Severely damage a company's reputation
 5. Deliver major negative financial impacts
 6. Paralyse a company's activities
 7. Paralyse entire organisations
 8. Removal and prosecution of company leaders or the company itself
 9. Individuals being imprisoned
- Situations become Domino Effects very quickly**



What Are the ISSF Doing to Support PSM ?



HSE Committee and Knowledge Sharing with Worldsteel



PSM Expert Groups run by Worldsteel



PSM Workshops run by Worldsteel



Steel Safety Day



PSM Webinars



PSM Awards

- Plus
- Metrics
 - Useful tools
 - Guidance notes
 - Best practice sharing

Protecting Ourselves from PSIs

- Establish some clear fundamentals
- Ensure there is a commitment to Process Safety Management
- Establish a hazard evaluation and risk analysis programme
- Implement and maintain a risk management and control system
- Strive towards excellence in learning from experience
- Utilise continuous improvement
 - To ensure Process Safety Management system effectiveness.
- Maintain a sense of vulnerability in Process Safety Management

Ensure There is a Commitment to PSM

- Develop and maintain a process safety culture
- Ensure good workforce involvement and participation
- Ensure strong stakeholder involvement
- Develop workforce competencies in PSM
 - Thinking about the domino effect when several features come together
- Deliver safe performance based on adherence to standards

- Is Process Safety Management a core value in your organization ?

Establish a Hazard Evaluation and Risk Assessment Programme

- Ensure your workforce has solid process and equipment knowledge
- Ensure the workforce understand legal process / storage issues
- Establish a hazard identification and risk analysis (HIRA) process
- Ensure consideration of the domino effect
 - What hazards could come together to create a devastating outcome ?
 - Do we have barriers in place to prevent these situations from happening ?
- Do you understand your PSM hazards and risks ?

Implement and Maintain a Risk Management & Control System

- Establish good operational practices
 - Ensure good asset integrity and reliability
 - Ensure contractors are part of the whole programme
 - Investing in training and monitor performance
 - Apply robust management of change processes
 - Be prepared for and practice emergency procedures
-
- Do you manage your PSM risks to keep them at tolerable levels ?
 - Do you have emergency plans in all your units ?

Strive for Excellence in Learning From Experience

- Investigate all PSM incidents including near misses
- Monitor external sources of information and act
- Measure and use industry standard metrics

- “There is only one thing more painful than learning from experience and that is not learning from experience”
 - Archibald MacLeish, American Poet & Writer

Utilise Continuous Improvement

- Audit your PSM system regularly
 - Look at ongoing safety performance
 - Identify hazards and likely consequences arising from those hazards
 - Look at impacting hazards and the likely outcomes of those impacts
 - Undertake safety behavioural observations when working in hazardous areas
- Undertake management reviews of the audits and PSM system
- Train, train, train in PSM

- “If you think training is expensive, try ignorance”
 - Peter Drucker, US Management Guru

Maintain a Sense of Vulnerability

- Never consider it can't happen here
- Use PSM training to always consider what can and could happen
- Remember the Titanic was billed as 'unsinkable'

The Three Critical Questions

- Your leadership team must be able to answer the following
- Do you know what could go wrong ?
- Do you know what barriers we have to ensure that it doesn't go wrong?
- Do you know if our barriers are effective and working properly?



Summary

- PSM is something that we must all consider deeply
- We have to ‘live and breathe’ PSM in our industry
 - We have many significant hazards and associated risks
- It’s a long term game
- PSIs can happen in our plants
- Repeating the PSM message is vital

- The ISSF can support members in their PSM system development
 - In conjunction with ‘worldsteel’ resources
- Please ask if you need some guidance and support