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
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
    - E.g.; 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
We cannot predict the likelihood of Process Safety incidents (PSIs) occurring in the same way as we would for Occupational Safety incidents. The needed thought processes will be highlighted later in this presentation.
What Are the Outcomes?
When PSM is not Performed or Goes Wrong

Piper Alpha 1988
167 fatalities
9.3bn USD
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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 became 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 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?

1. Understand the hazards and the risks
2. Identify and specify the barriers
3. Ensure barrier performance .... always

Control high risk and high consequence scenarios
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