Leaders – it's time to refocus on Process Safety Management!

Panel Discussion at ChemUK on 21st May 2025 by the IMechE "Good Practices in Process Safety" working group

Improving the world through engineering

AGENDA

- Introduction - Richard Hellebrand
- Leadership and competence - Richard Roff
- Some short presentations covering specific areas of competency:
  - Feedback from recent events – Graeme Laughland.
  - Mechanical integrity for bolted joints – Chris Mellows.
  - Ageing asset considerations – Alan D'Ambrogio.
- The panel discussion will then:
  - Cover the need for PSM to be driven by business leaders, whether they are technically experienced or not.
  - Guide what to focus on, where to find help and access good practices.
- The discussion will also be interactive with the audience.
- Please approach us afterwards to carry on the discussion!

SPEAKERS & PANEL

Please introduce yourselves

Richard Roff, CEng
FIMechE MIChemE PPSE

Graeme Laughland,
CEng FIChemE PPSE

Alan D'Ambrogio,
CEng MIMechE

Chris Mellows,
CEng MIMechE

Martyn Ralph,
CEng FIMechE MIBD

Richard Hellebrand,
CEng FIMechE FEI

INTRODUCTION

- Serious incidents continue to occur in the process industries.
- The regulatory framework and formal process safety management (PSM) approaches reduce risks, but these rely on competent people.
- Leaders may rely on their teams for (process safety) expertise but…
  - The most experienced are retiring.
  - Comprehensive succession planning may not receive enough attention.
  - There is a shortage of graduate engineers entering industry.
  - New starters may be missing out on vital PSM competence development.
- We have seen fewer serious incidents in the UK of late … but that will change if we don’t maintain high PSM standards and competence.

AMERICAN PROCESS SAFETY EVENTS

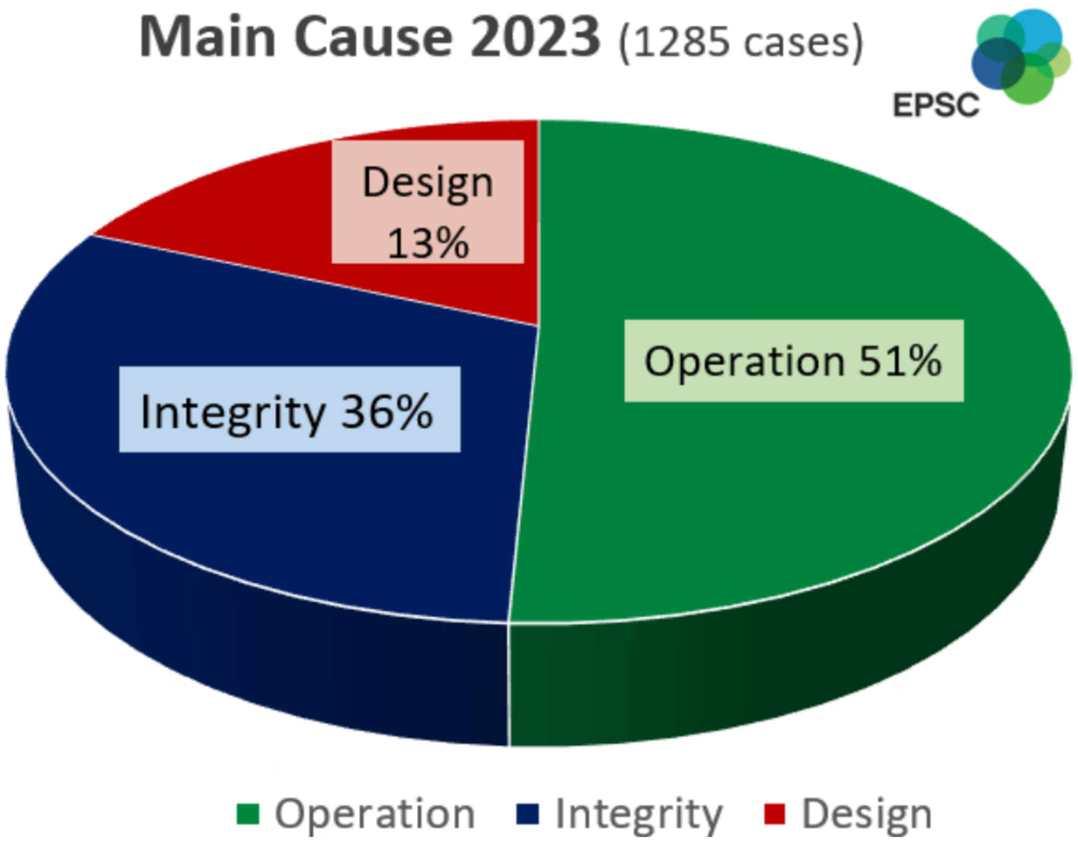
322 PROCESS SAFETY EVENTS IN 2023 AND 260 IN 2024*

Hazardous chemical incidents, including fires, explosions and toxic releases, occur every other day on average in the United States.

* https://preventchemicaldisasters.org/

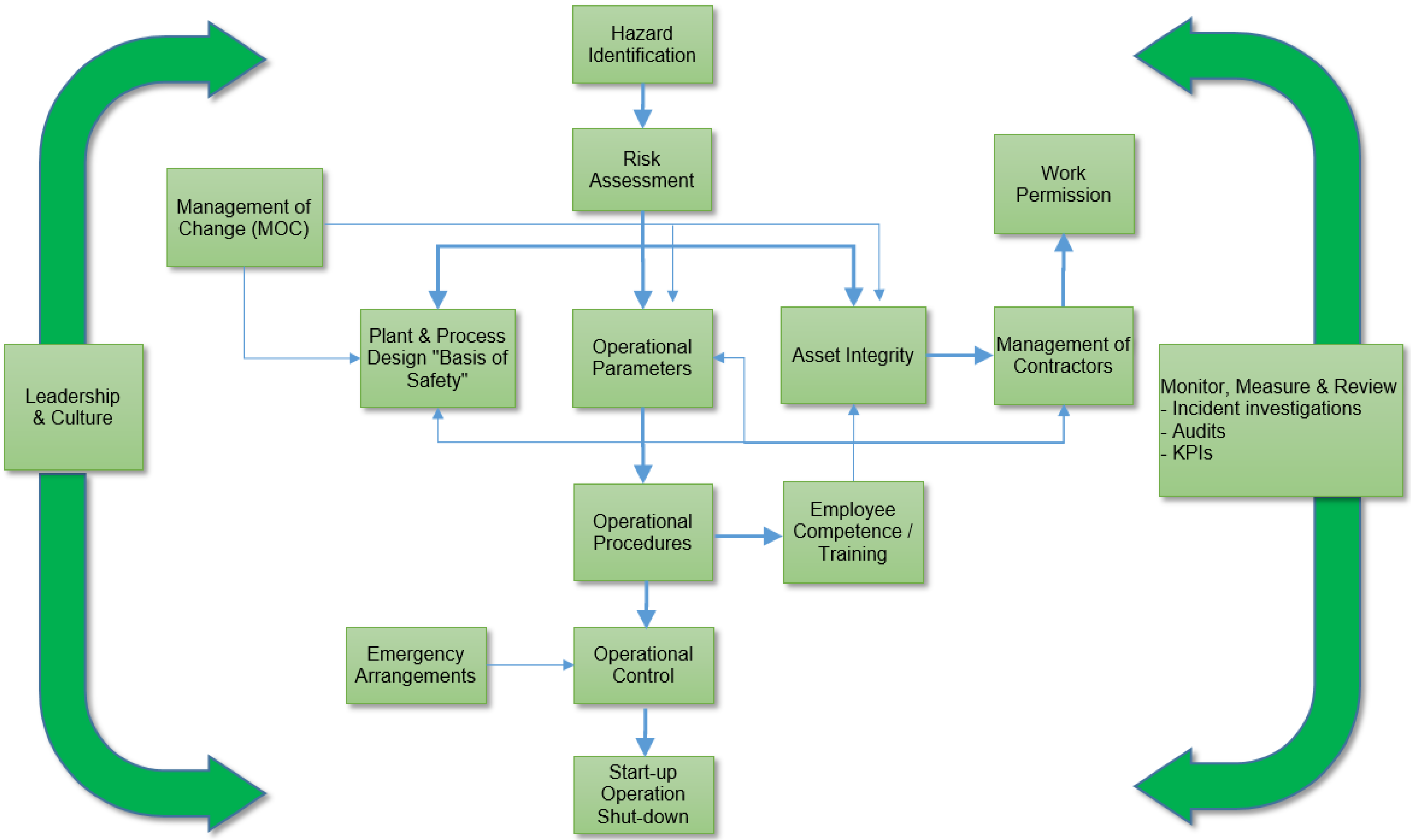
EUROPEAN PROCESS SAFETY EVENTS

1285 PROCESS SAFETY EVENTS* IN 2023



*Cefic and API Tier 1+2

PSM FLOW CHART



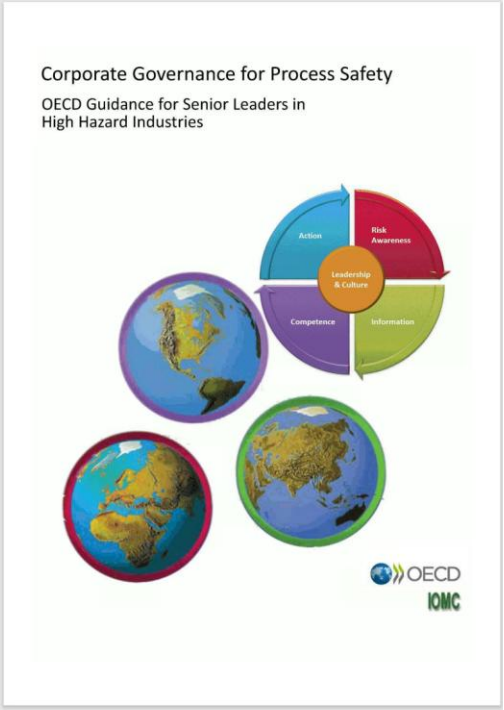
THE KEY QUESTIONS

Leaders, are you sure you can answer these questions:

1. What could go wrong?
2. What "barriers" do we need to ensure that nothing goes wrong?
3. Do such barriers exist and are they operating correctly?

SOME GUIDANCE

Lots of PSM guidance is available from many sources. A few examples:




IChemE ISC Framework

Leadership

Leadership in knowledge and competence in process safety is fundamental. This underpins inherently safer engineering and design and robust safety systems supporting the upholding and continued evolution of systems and procedures for maintaining safer process operations. These are sustained by the best practice in the assurance of process safety in a changing environment taking full account of the contribution of human factors, behaviours and external influences. These elements collectively shape the prevailing culture in the workplace and in society at large in order to build a common understanding of risk issues and to develop and utilise new ways for cost effective and sustainable risk reduction in the process industries. Read more >>

Knowledge and competence

Knowledge and competence is vital in all aspects of an organisation to ensure that decisions and tasks are undertaken correctly and with an understanding of consequences. Knowledge can be generally defined as a familiarity or general awareness of one's actions. Competence is about the ability to consistently perform tasks to agreed standards. Read more >>

Engineering and design

Engineering and design is about applying the hierarchy of controls in the design of equipment and safety systems. This includes the concept of inherently safer design as a starting point. This area also includes design across the entire life cycle of the asset, and the application of robustly engineered safety systems. Read more >>

Systems and procedures

Systems and procedures define how an organisation undertakes all manner of business activities. They allow for a consistent approach to decisions, from governance to on the job tasks. This functional area not only applies to safety management systems, but to other systems, such as how maintenance is undertaken or funds allocated. Read more >>

Assurance

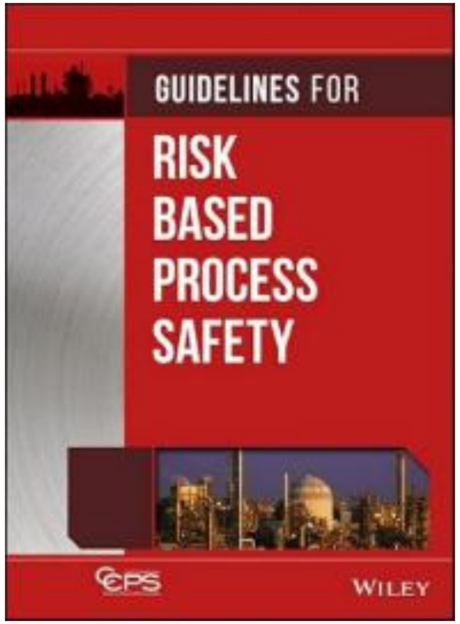
Assurance is a define program for the systematic monitoring and evaluation of all aspect of a business. This includes tools such as inspection, testing, monitoring, verification and audit. This also applies to defining performance standards and metrics for an organisation and reporting performance against them, in addition to the feedback loop, resulting in actions based on data. Read more >>

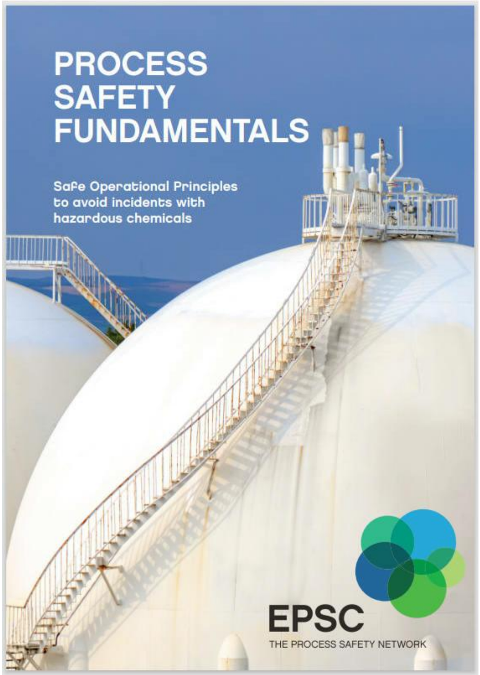
Human factors

Human factors explores the interaction between the human and their performance, the job and the organisation. This goes beyond only ergonomics, and explores other aspects of the interaction. The ISC considers that human factors has been well defined by the United Kingdom Health and Safety Executive. Read more >>

Culture

Culture is most commonly defined as "the way we do things around here". This quote was first used by Bower in his 1966 work The Will to Manage: Corporate Success Through Programmed Management. Understanding and shaping "the way we do things" shapes people's attitudes about safety and how they do their tasks. Read more >>





LEADERSHIP FOR PROCESS SAFETY

- Do you have the potential for catastrophic incidents?
- Have you thought about:
    - A process safety strategy?
    - A process safety management system ?
    - Access to process safety specialists?
    - Wider competence?
    - Auditing for process safety management?
    - Performance indicators for process safety?
    - Leader interventions on process safety?

YOUR COMPETENCE PROGRAMME?

So, what PSM competence do you need throughout the organisation…

- Not just technical people.
- Not just operational people.
- What about leaders?
- What about commercial people agreeing contracts?
- What about budget decision makers?
- What about those who change the organisation?
- What about supply chain partners?

UK PSM COMPETENCE PROGRAMME

- Originated in 2010 following the Buncefield investigation.
- The Programme Board includes industry, regulators and unions. It is supported by Cogent Skills.
- Created and maintains training standards "by industry, for industry" for:
  - ✓ Executive leaders
  - ✓ Managers, engineers and design teams
  - ✓ Operating and maintenance teams

TÜV Rheinland 2024 PSM Conference, Workshops feedback and reflections

Graeme Laughland

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TÜV Rheinland PSM Conference 2024, Workshop - Part 2

Competency ……what is it?

1) Within your company, how do you describe PSM competency?
2) What benchmark(s) have been used to evaluate competency?

Consider the following groups/roles:

a) Board level/corporate management
b) Senior Management (Site manager, Engineering manager, Technical Manager, HSE manager, PSM manager)
a) Technical personnel (engineers, scientists)
b) Support personnel (HR, Procurement, IT)
c) First line supervision (shift supervisors, day supervisors)
d) Technicians (operators, maintenance)
e) Contractors (regular, ad-hoc)
f) Projects

- A mix of things:
  - Formal qualifications.
  - Experience.
  - Skills.
  - Knowledge.
  - SKATE – Skills, Knowledge, Ability, Training, Experience.
  - Non-technical skills: Communication, collaboration, etc.
- Key focus on MAHs.
- Level of competencies varies by role (IChemE model).
- Cogent Skills training.

TÜV Rheinland PSM Conference 2024, Workshop - Part 3

Competency….where are you?

1) On scale of 1 to 10 where are you vs where do you want to be?
   (1 = poor, 10 = excellent)
2) What and where are the gaps?

Consider the following groups/roles:

a) Board level/corporate management
b) Senior Management (Site manager, Engineering manager, Technical Manager, HSE manager, PSM manager)
c) Technical personnel (engineers, scientists)
d) Support personnel (HR, Procurement, IT)
e) First line supervision (shift supervisors, day supervisors)
f) Technicians (operators, maintenance)
g) Contractors (regular, ad-hoc)
h) Projects

- Areas of concern:
  - ➢ Procurement.
  - ➢ HR.
  - ➢ Projects.
  - ➢ Subcontractors.
- Lack of control / influence.
- Key areas of required strength:
  - ➢ Leadership.
  - ➢ Technical resources.
- Different industries have different needs.
- Competency is dynamic and changes over time.

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As process safety leaders, how will we address these challenges?

1. What is stopping you from addressing these gaps?
2. Do you have a plan?
3. Is the plan comprehensive and sufficiently detailed?
4. Are systems in place to ensure that levels of competency will be maintained?
5. Where and how might vulnerabilities arise?
6. What are the highest priority issues to address? (List the top 3 priorities)
7. Can new/emerging technologies help play a part in solving your problems?

- Resources, budgets, culture, ability to influence leadership and head count.
- Generally, yes.
- Mostly but we need to be flexible.
- Yes, they are but, they may not always get used.
- Management of organisational change:
  - Succession planning.
  - People wearing lots of different hats.
- People.
- Yes, but at the ideas stage currently, not a silver bullet. A tool to support the solution.

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Attendee Poll Results from IMechE Webinar on May 7th 2025

Graeme Laughland

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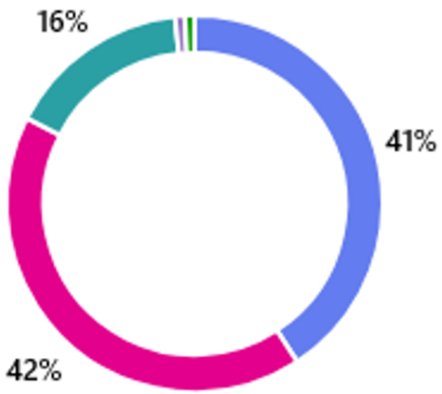
HAZOP Poll Results

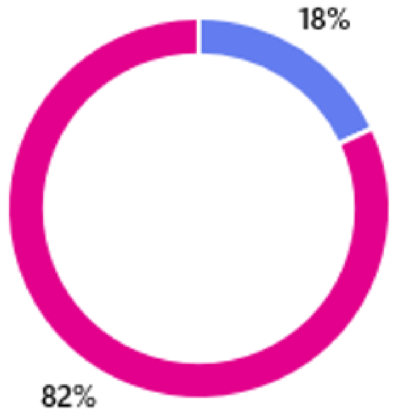
Are mechanical engineers invited to join HAZOP studies to make a useful contribution?

●	a) Always	41%
●	b) Mostly (but not always)	42%
●	c) Occasionally	16%
●	d) Rarely	1%
●	e) Never	1%



Prior to being involved in your first HAZOP study, had you received any formal training?

●	a) Yes	18%
●	b) No	82%



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The state of bolted flange connections on UK COMAH sites

Examples defects found during flange inspections

Christopher Mellows CEng MIMechE
Director, Zulu Joint Integrity & Training Ltd

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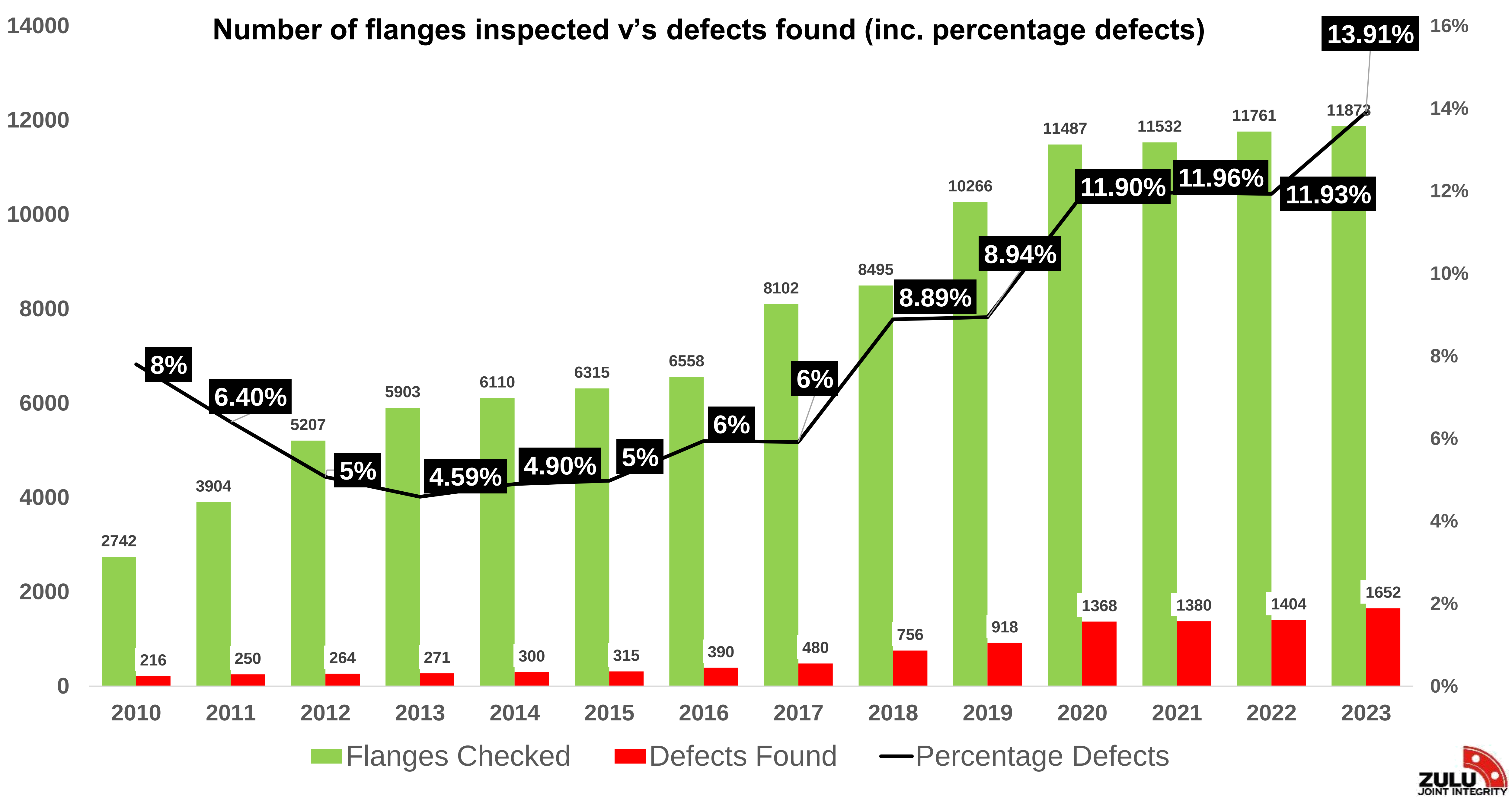

Number of flanges inspected v's defects found (inc. percentage defects)
14000
12000
10000
8000
6000
4000
2000
0
16%
14%
12%
10%
8%
6%
4%
2%
0%
2742
216
8%
3904
250
6.40%
5207
264
5%
5903
271
4.59%
6110
300
4.90%
6315
315
5%
6558
390
6%
8102
480
6%
8495
756
8.89%
10266
918
8.94%
11487
1368
11.90%
11532
1380
11.96%
11761
1404
11.93%
11873
1652
13.91%
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023
Flanges Checked
Defects Found
Percentage Defects

PLANT AGEING – INCREASED RISK

HSE (KP4) on Ageing and Life Extension stated that ‘creeping changes are a challenge to process safety & there are insufficient systems to deal with this risk’.

Creeping change is small changes which go unnoticed, which add up to a significant change; as they are gradual in nature, no hazard identification study or risk assessment has been performed.

Some examples of creeping change are:

- Ageing (including degradation and obsolescence);
- Process changes;
- Equipment/infrastructure changes;
- Management/ownership changes;
- Workforce change/loss of skills;
- Operational Risk Assessments (ORAs),Management of Changes (MOCs) and Culture changes.

How do leaders manage Plant Ageing so that it doesn’t become a safety issue, particularly as experienced staff retire, taking their knowledge with them?

PANEL DISCUSSION + Q&A

Discussion to be led by Richard Roff, Group Process Safety Director at Costain and Chair of the UK PSM Competence Programme Board:

Themes

- Leadership of Process Safety Management.
- PSM – practices and barriers to adoption.
- Competency in organisations – problem areas and how to improve it.
- Panel and audience experiences.

Richard Roff

Richard Hellebrand

Graeme Laughland

Martyn Ralph

Alan D'Ambrogio

Chris Mellows

Institution of MECHANICAL ENGINEERS

PROCESS INDUSTRIES DIVISION

THANKS FOR ATTENDING

WE LOOK FORWARD TO HEARING FROM YOU:

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Process Industries Division: https://www.imeche.org/industry-sectors/process

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To discuss PSM, email Richard.Hellebrand@member.imeche.org

Event Feedback Form

https://forms.office.com/r/6syv77u4SD

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