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The Incident Is the Message: Why Repeated Failures Point to Weak Critical Controls

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ABSTRACT

Persistent serious incidents and high-potential near misses indicate that deficiencies in process safety performance remain, despite widespread adoption of formal management systems and assurance tools. Evidence from incident investigations suggests that failures are more commonly associated with degraded control effectiveness than with the absence of safeguards.

This paper synthesises learnings from incident investigations and technical root cause analyses conducted across major hazard facilities, power generation assets and emerging energy operations. Particular attention is given to incidents occurring during non-routine operating states, including start-up, shutdown and return-to-service, where assumptions about control behaviour are frequently exposed.

Industry analysis of events highlights recurring themes: critical controls lacking clearly defined performance requirements, over-reliance on procedural barriers during abnormal operations, limited verification of safeguard functionality outside steady-state conditions and weak translation of investigation outcomes into sustained operational practice. While bowties and safety cases can be typically well developed, their effectiveness is often undermined by insufficient linkage to frontline knowledge and decision-making.

The presentation challenges the audience to reconsider how effectively incident learnings are embedded, asking why the same control weaknesses continue to appear across different sites and sectors. It concludes with practical, experience-based insights on strengthening control clarity, verification and competence to learn lessons through shared experience and not re-discovered through the next event.

KEY WORDS

Major hazard control effectiveness, Safety-critical controls, Process safety failures, Abnormal and non-routine operations, Safeguard degradation, Incident investigation learnings, Safety case assurance

BIOGRAPHY

Steve Cooper is a Chartered Chemical Engineer and Professional Process Safety Engineer with over 25 years of experience across the energy, chemicals, resources, power, and emerging new energy sectors. He is an accomplished senior leader with extensive experience engaging Boards, executive leadership teams, regulators, and operational workforces. Steve has held global and regional leadership roles with large Consulting organisations. He combines deep operational experience with specialist expertise in process safety, risk assessment, safety cases, and consequence modelling. Steve is a Professional Process Safety Engineer and has served as a Director of IChemE's Fundamentals of Process Safety Course for many years.

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