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How to bridge process safety into operation and maintenance planning, executive decision making proves, and board of governance of large energy companies and tie it in their risk matrix

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Abstract

In most large energy companies, particularly publicly traded organizations, risk management is one of the most critical responsibilities of the board of directors and executive leadership. As part of strong governance practices, CEOs and CFOs are expected to identify, register, and oversee the key risks associated with the business.

ISO 31000 provides useful guidance on risk management, including how to categorize risks and assign ownership across different operational layers of an organization based on severity, likelihood, and potential impact. However, fire protection and process safety risks are often diluted under broad categories such as "operational risk" or "safety risk." As a result, corrective actions may not be properly assigned to the right areas of the organization, such as engineering, operations, maintenance, or project development teams.

This panel will discuss the importance of bringing process safety and fire protection systems into the boardroom conversation. The discussion will focus on why these risks deserve clear visibility at the governance level, how organizations can better assign accountability, and what practical lessons can be learned from industry experience.

Five Key Gaps in Fire Protection and Process Safety, and How Engineers Can Help Bridge Them:

Fire protection and process safety are critical to public safety, asset protection, and business continuity. However, several gaps still exist between technical knowledge, regulatory expectations, procurement practices, and senior-level governance.

These gaps are not only technical. They also affect how organizations understand risk, assign responsibility, select qualified service providers, and make long-term decisions. Below are five key areas where the industry needs more attention, leadership, and engagement from engineers.

1. Educational Institutions

Canada does not currently have a well-established fire protection or process safety education pathway compared to the United States. In the U.S., universities such as the University of Maryland offer bachelor's, master's, and PhD programs in fire protection engineering. These programs attract strong industry support, research funding, and help develop competent professionals.

In Canada, we have some college-level programs, such as Seneca and Red Deer Polytechnic, along with a few university-level courses or research areas. However, these programs are often dependent on individual professors or local interest rather than being driven by a national industry need.

Another challenge is the historical reliance on union training facilities for sprinkler fitting and related trades. As more companies operate in non-union environments, access to this training becomes more limited. At the same time, some training seats remain unused, creating a disconnect between available education and industry demand.

As a result, the public, clients, and even some organizations may not fully understand the importance of using qualified subject matter experts for life safety systems. This gap also affects procurement decisions and supply chain strategies.

2. Regulatory and Professional Bodies

Engineering and technical associations, such as APEGA and ASET, have not yet developed enough governance capacity around fire protection competency, technical authentication, and professional accountability.

For example, many sprinkler designs in the market are sealed by certified engineering technologists or professionals with limited fire protection specialization. At the same time, NFPA codes are becoming more performance-based, requiring deeper technical understanding and judgment.

There is also a gap at the government and AHJ level. Many Authorities Having Jurisdiction are not fully up to date with the latest NFPA and ULC standards. For example, newer requirements such as ULC-S1001 integrated systems testing are sometimes misunderstood or resisted, even though they provide significant value in confirming overall system performance.

In some provinces, including Alberta, sprinkler fitting is not a compulsory trade. This means that, in certain situations, people who are not certified sprinkler fitters may still work on life safety systems at the discretion of their employer. This creates uncertainty around competency, responsibility, and public safety.

3. Legacy Engineering and Design Philosophy

Many older industrial and infrastructure projects were designed and built under past engineering practices. While they may have met the expectations of their time, they may not fully align with modern process safety principles.

For example, in many oil and gas facilities, fire and gas detection devices are connected directly to a DCS or PLC system. In some applications, a dedicated fire and gas controller with CPU redundancy, fail-safe design, and appropriate SIL ratings may provide a more robust solution.

The challenge is that new expansions often follow the configuration of the existing facility rather than reassessing the system based on current risk, technology, and code requirements.

In Canada, harsh winter conditions often require equipment skids to be enclosed. Once enclosed, they may be treated more like buildings under the building code rather than as specialized industrial process safety assets. However, building code solutions are often designed for cost-effective commercial applications and may not be suitable for complex industrial suppression and detection requirements.

For example, a typical fire alarm panel, such as a Honeywell Notifier system, may be very suitable for commercial building fire alarm applications. However, it may not be the right platform for sophisticated industrial fire and gas detection, tiered alarm logic, or complex suppression release sequences.

4. Board Governance and Executive Risk Awareness

Most director education programs teach the importance of risk registers, risk matrices, and enterprise risk management. However, many board members come from accounting, legal, financial, or general business backgrounds, with limited exposure to engineering, process safety, or fire protection systems.

As a result, safety risk is often viewed mainly through the lens of EHS, incident reports, and workplace injury statistics. These are important, but they are often lagging indicators.

In the hierarchy of safety, prevention and engineering controls are the first lines of defense. PPE and incident response are the last lines of defense. However, once a project moves from construction into operations and maintenance, the original process safety knowledge often fades over time.

This gap can be even more visible in not-for-profit organizations and public institutions. Boards often have a strong understanding of risks such as cybersecurity, cash flow, financial performance, social media exposure, and reputational damage. However, they may have less awareness of low-probability, high-consequence events, such as a major fire, explosion, or process safety failure.

These are “black swan” type risks. They may be unlikely, but when they happen, the consequences can be severe.

5. Procurement Models

Over the past several years, procurement models have pushed many technical services toward commoditization. Larger companies are often able to satisfy formal bid requirements such as bid bonds, Indigenous partnership requirements, ISNetworld compliance, and master service agreement conditions.

However, technical competency and specialized qualifications are not always properly weighted.

This becomes a serious issue when third-party supply chain companies evaluate proposals mainly based on commercial criteria or standardized vendor categories. Specialized services, especially low-volume but high-risk services such as process safety and fire protection, can be misunderstood or treated like general maintenance work.

The lowest price or the largest vendor is not always the safest or most competent choice. For life safety and process safety systems, procurement models must give proper weight to technical expertise, experience, accountability, and system performance.

What Engineers Can Do:

We cannot simply stay outside the arena and complain about these gaps. At the same time, we may not be able to change the entire system overnight.

The practical starting point is for more engineers to step forward and participate in governance, education, and community leadership.

Boards of directors need more than accountants, lawyers, and business professionals. They also need people with operational, technical, and engineering perspectives. Engineers can help boards better understand risk, infrastructure, safety, maintenance, and long-term asset performance.

This does not have to start at a large scale. Engineers can begin by joining community boards, non-profit organizations, industry committees, chambers of commerce, technical associations, or advisory groups. They can also mentor university students and young professionals.

Small actions can compound over time.

By educating the public, mentoring future professionals, supporting stronger technical standards, and bringing engineering thinking into governance, we can help bridge the gap between technical safety and executive decision-making.

The goal is not only to build better systems. The goal is to build better awareness, better accountability, and a stronger culture of safety.

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