



10 Hard Questions Mining & Metals Leaders Must Ask to Own Safety

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Protect. Transform. Sustain.

The mining and metals industry isn't just hazardous — it's uniquely volatile. Leaders who think of safety as a compliance requirement are playing with fire.

What follows isn't a checklist. It's a leadership reckoning — a set of tough questions designed to question status quo and provoke action. If you're in the driver's seat, these are the conversations you need to be having now.



Understanding the Unique Safety Challenges in Mining and Metals

1 What makes safety in the mining and metals industry unique – and more hazardous?

Mining doesn't deal in ordinary risks. It's a convergence zone — **activity-based risks** (people and behaviour) intersect with **process-based risks** (infrastructure and chemistry). That dual exposure raises the stakes.

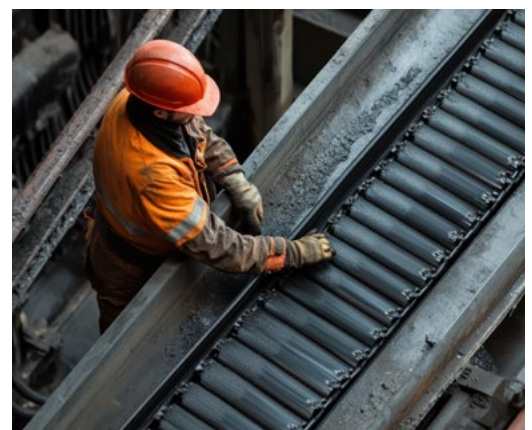
Where other industries deal with mainly one, you juggle both. One moment it's a haul truck operator; the next, a furnace running at 1,200°C. When a system fails here, it's not just downtime. It's a headline.

To put it into further perspectives, most industries must contend, predominantly, with either activity-based risks or process-based risks. Activity-based risks typically arise from actions by people. In construction industry, the risk of falling from height is an activity-based risk. Meanwhile, Process-based risks typically arise from operational processes and equipment. In the chemicals industry, for instance, the risk of an explosion due to a leak is a process-based risk.

The mining and metals industry is unique. It has significant exposure to both activity-based and process-based risks.

The potential for incidents involving mobile equipment interactions is high in mining; So is the potential for incidents in smelters where conditions include high heat, high pressure and the presence of hazardous chemicals.

This means equal effort must be placed on both types of risks. This is especially true in the context of integrated mining.





2 Why is this differentiation important? Isn't all risk the same?

You shouldn't be treating all risks the same, and here's why:

- **Activity-based risks** are visible, frequent, and usually manageable with frontline discipline and behavioural controls.
- **Process-based risks** are silent, complex, and when they go wrong — devastating.

The real trap? A **subset of high-severity activity risks** masquerades as routine. They're not. They're one mistake away from serious injury or fatality. If you're not verifying controls *before* the job starts, you're rolling dice.

Incidents associated with activity-based risks tend to occur more frequently, but their consequences are typically not as severe. For these, we adopt behaviour-based safety approaches, conducting safety observations, for example, and implementing safety system.

One subset of activity-based risks does not follow the traditional model of incident hierarchy. This subset is associated with high-risk activities that often directly result in serious injuries, or even fatalities when there is failure of control. For this, we should ensure that controls are in place and functioning before activities begin. This must be done through disciplined control verification.

Incidents associated with process-based risks do not occur often, but when they do, the impact can be catastrophic. These risks are more complex and difficult to understand. We need **safety design and engineering controls to be incorporated into processes and equipment** as much as possible.

So, not all risks are the same. The critical step is recognising that these two different types of risks exist in the mining and metals industry in a significant way. Often, safety leaders who enter the mining and metals industry from another will adopt the mindsets of their previous industries, where risk profiles are different, leading to blind spots.





Ensuring Risk Management in Operations

3 How can my organisation embed risk management early into our DNA?

We must embed risk management beyond the technical aspects. We must ensure competency, the right mindset and strong governance.

First of all, operations are easier if **risk management concepts** are considered early and incorporated into operational design. Build it safe, then keep it safe. Integrating risk management at the earliest stages of project development is crucial. It allows controls to be built into the **operating philosophy, process design and organisational structure**. It is easier to adjust a blueprint than it is to tear down infrastructure and rebuild it.

Operational culture also needs to be deliberately set at the outset. Set up safety expectations early, develop competency – focus on learning and not just training, and help the organization internalise safety as a core value.

The need for an early start is especially relevant today. More mines are being opened and smelters built in response to demand for critical minerals and metals that go into low-emission technologies. These integrated projects need to incorporate safety early if they are to meet stakeholders' environmental, social and governance expectations.



4 My operations are already set up. Is it too late for me to incorporate risk management into my business? What's the blueprint for revamping safety in existing operations?

It's never too late to instil safety, but be wary of spending too much time on standards and systems. A facility in operation is exposed to risks that may require immediate attention.

Forget waiting for audits or writing new protocols.

Step 1: Map your critical risks.



Step 2: Act fast on what could destroy lives and/or damage the environment.



Step 3: Build systems that hold the line.



Step 4: Scale from there.

For existing operations, adopt a risk-based approach. Begin with a thorough risk-mapping exercise, prioritise critical areas, assess and address high-risk items, work on developing or strengthening systems to ensure these high-risk items are sustainably managed, then expand the system to other risks. Aim for control — especially where it counts most.



Maximising the ROI of Safety Initiatives

5 How do I decide what is most critical?

Every organization has risk tolerance. But, if your list of "critical risks" is long, you're not **prioritising**. You're avoiding decisions.

Ask. **What could cost lives? What could destroy the environment?** Don't be blinded by statements like "it will never happen", "... but we have this control and that control", etc. Will your control work when there is a demand? How would you know? It is best to **ignore controls when identifying your most critical risks**.

6 What hidden factors could be undermining our risk management efforts?

You can have world-class systems — and still fail. Why? Because **risk accelerators** creep in:

- Budget cuts that stall maintenance
- Skill gaps from attrition or weak onboarding
- Complacency bred by "zero incidents"
- Subtle changes to operational profile

These factors can insidiously erode safety margins over time. Each one chips away at resilience. Combined, they set you up for the fall.

Organizations are often tempted to cut amount spent on risk management to conserve cash. Given the pressure to produce, management may prioritise other aspects of the business over safety. Labour shortages or skill gaps are also a common risk factor. All these are risk accelerators that increase the likelihood and/or the severity of incidents.

7 How do I justify the huge investment in risk management? How can we quantify the true value of robust safety management?

Safety isn't a cost centre. It's a **strategic investment**.

If you're asking for ROI, ask what it costs to **rebuild trust, recover operations, and restart your culture**.

Beyond avoiding catastrophic losses and preventing the loss of lives, effective safety management **drives operational excellence, enhances productivity and creates significant competitive advantages** in terms of talent retention and stakeholder trust. The Center for Chemical Process Safety (CCPS) of the American Institute of Chemical Engineers reviewed 12 major accidents in four countries and four industry sectors. In all cases, share prices of companies involved in these accidents fell for a year or more after the accident. This is on top of the cash costs that might be incurred.

Here's what the data tracks and says:

- Fatality = ~ US\$18M per person (Environment Protection Agency estimate)
- First-aid incident = US\$28,000 per person
- Regulatory violation, example groundwater contamination = ~US80,000 for vegetation damage
- Productivity gains from process safety = up to 5%
- Maintenance cost reduction = 5%
- Share prices of companies post-major incidents = long-term drag



Cultivating Leadership for a Safety-First Future

8 As a leader, what do I need to do?

If safety isn't in your language, calendar, or site visits — it won't be in your team either.

First, recognise the **breadth of the risk profile** in your operations. Do not underestimate the effort required to manage those risks. Then, set the tone and adjust your mindset and behaviour. You need to be **a role model** for safety in your organisation. Your peers and subordinates should be able to see you behaving in a way that is reflective of how safety is embedded as a value. Model the right behaviour. Demonstrate your commitment and engagement. Reinforce desired behavior and mindset throughout the organisation - relentlessly. Be just but fair.

Understand the decisions that lead to observed behavior.

Invest in your people. Build their competency.

Be aware of risk accelerators that can derail your operations.

Finally, be your toughest critic. Following an incident, you will be judged by how you respond. Do you foster learning, or do you destroy trust? In the end, all incident traces back to the decision you made, or did not make, as a leader.

9 How do I change my own mindset and behaviour?

Most companies think about how to manage safety, rather than how to manage risk.

Being safe as a concept is lagging and it is binary – safe or not safe. Employees may walk around the smelter without hardhats or safety boots without incident.

By the time an incident occurs to indicate that this practice is unsafe, it's too late. Risk thinking, on the other hand, is proactive. It is assessed on a continuum.

It is more personal. You cannot eliminate risk. You assess and decide whether you want to take a risk. Once this mindset is established, leaders understand that risk management is continuous and requires constant awareness and the involvement of everyone

10 What are some common mistakes that leaders might make in this process?

The absence of incidents doesn't mean your site is safe. It might just mean you've been lucky.

The moment leaders start asking: "*What are we missing?*" instead of "*How many days since the last injury?*" — that's when real change starts.

A mindset focused on managing safety may lead to an illusion of performance, with the assumption that a lack of incidents implies safe operations. A mindset focused on risk will ensure that leaders are constantly vigilant and asking themselves: What and where might the next incident be?

So, when all your safety indicators are 'green', look again, or change the indicators. In safety, 'no news' could be 'bad news'

Final Word: Safety Isn't a Metric. It's a Mindset.

The best mining and metals leaders aren't just compliance-savvy. They're **risk-intelligent**. They understand that true **operational excellence — reliability, resilience, growth** — begins with a clear-eyed approach to managing what can go wrong.

Because in this industry, you don't often get second chances.

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About dss⁺

dss⁺ is the operational transformation partner for complex and high-hazard industries. Driven by our purpose, we help organisations achieve breakthroughs in safety, performance and sustainability that build business endurance and ensure long-term success. We engage deeply within organisations to empower teams to shift mindsets, shape cultures, and establish the capabilities required at every level. We combine technical expertise and operational experience with a people-centered approach and data-driven insight.



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