



Pramod Sukhija

Fractional Advisor | Industrial AI, Smart Manufacturing & Digital Transformation | Former AVEVA R&D VP

Zero Harm is Not Enough: How AI Is Redefining Safety in the Steel Industry

The global steel industry has established stringent safety benchmarks over decades of rigorous procedural oversight. However, current data suggests that conventional mitigation strategies have hit a functional plateau. According to the World Steel Association's 2026 Safety and Health Data Report, which analyses comprehensive 2025 global member inputs, the industry faces an increasingly complex hazard landscape. While specific performance vectors like the Lost Time Injury Frequency Rate (LTIFR) show positive momentum, fatalities and underlying critical incidents continue to present a systemic challenge across processing facilities worldwide. This article reflects into this safety report and suggests proposed solution through Industrial AI platform capabilities

Desno Tectix

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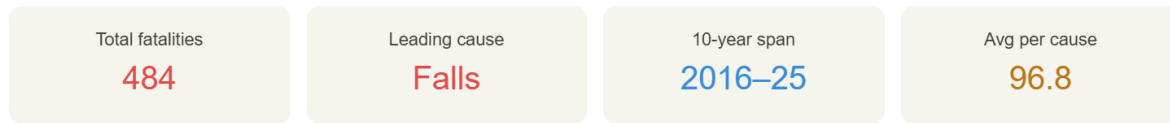
Global Steel Safety Metrics Analysis (2024–2025)

A comparative review of year-on-year data reveals a divergent safety landscape. In 2025, documented industry fatalities increased to 74, representing an uptick of six additional losses compared to the 2024 baseline. Concurrently, the global **Fatality Frequency Rate (FFR)** rose from 0.016 to 0.018. Conversely, operational interventions succeeded in reducing the Lost Time Injury Frequency Rate (LTIFR) from 0.72 in 2024 down to 0.64 in 2025. This variation highlights a critical gap: traditional engineering frameworks are effectively minimizing minor personal injuries but remain insufficient against low-frequency, high-consequence catastrophic events.

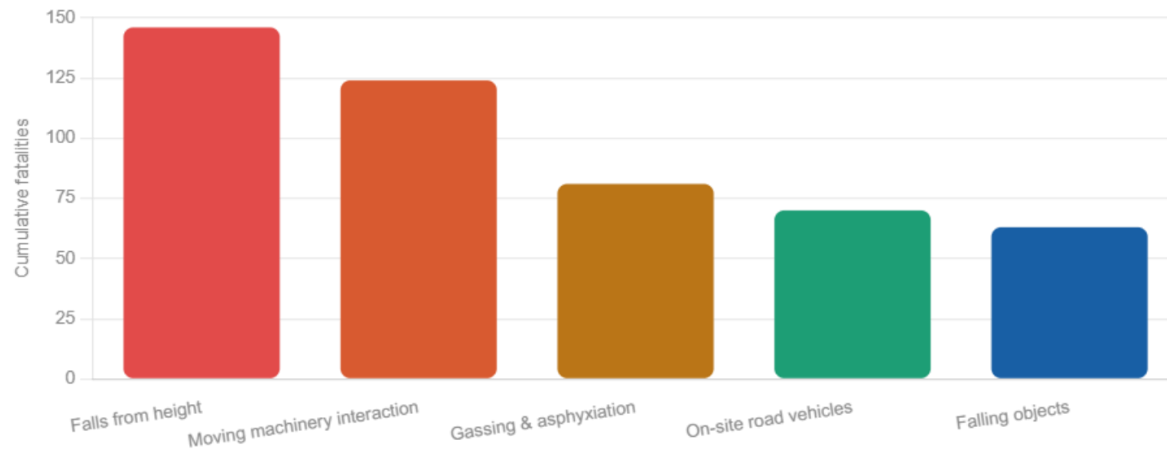
The persistent ranking of primary fatality causes across a ten-year horizon confirms that rules, safety signage, and manual inspections have reached their limits. Real-time situational awareness stands out as the missing technological layer required to breach this ceiling.

Top 5 causes of industry fatalities

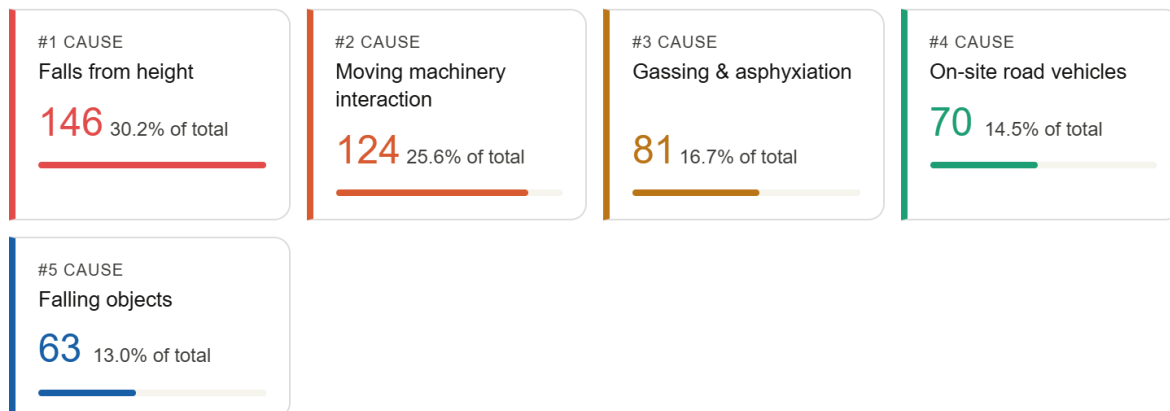
Cumulative fatalities 2016–2025



CUMULATIVE FATALITIES BY CAUSE



BREAKDOWN BY CATEGORY

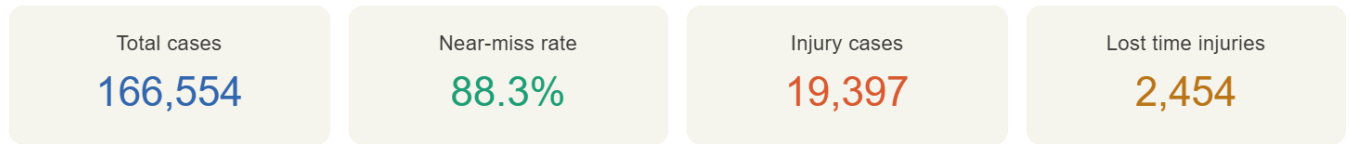


The Lethality Ratio Insight: Crucially, data indicates that certain processes possess low injury-to-death ratios, meaning an incident is highly likely to result in a fatality rather than a non-fatal injury. Gassing and asphyxiation demonstrate a critical ratio of 1.75 Lost Time Injuries (LTIs) per fatality, while explosions exhibit a ratio of 2.74. These processes present minimal advance warning, placing a premium on predictive, automated detection to enable immediate plant intervention.

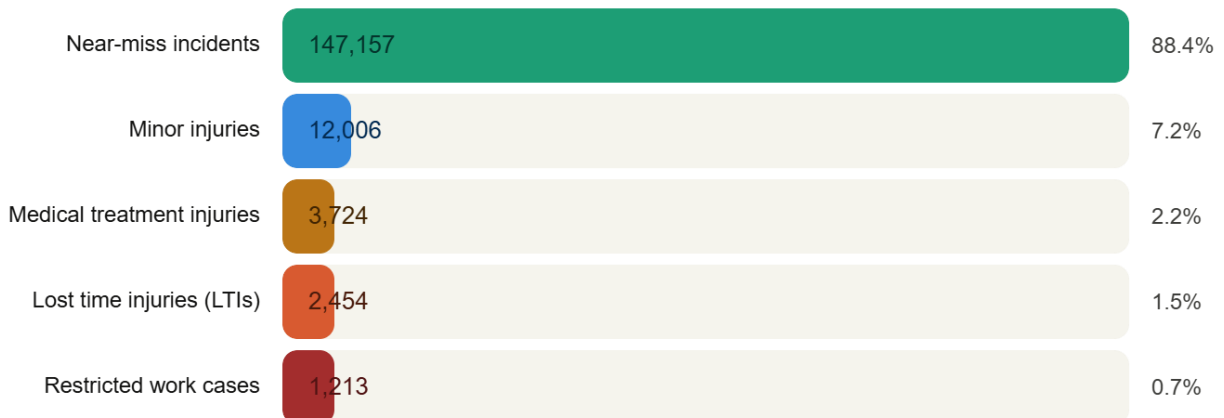
The absolute scale of non-fatal exposure across global steel assets remains significant, demanding deeper data mining capabilities to manage risk effectively. The reported incident distribution for the single year 2025 comprises:

Workplace incident report

Total cases across all severity categories



INCIDENT BREAKDOWN BY SEVERITY



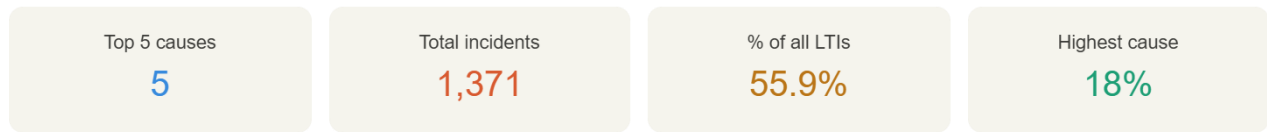
CATEGORY DESCRIPTIONS



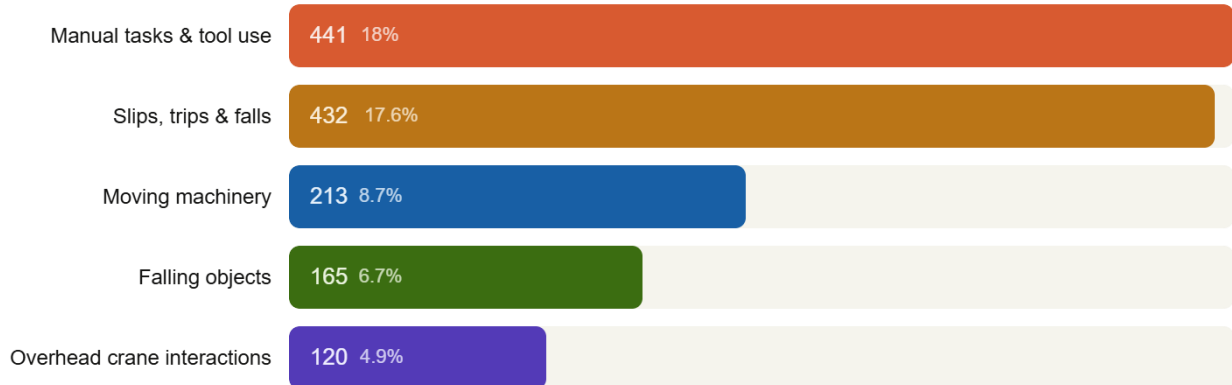
Here's a structured breakdown on deep dive into primary drivers of the **2,454 Lost Time Injuries (LTIs)** in 2025, highlighting the five dominant operational causes and their relative impact:

Lost time injuries — operational causes

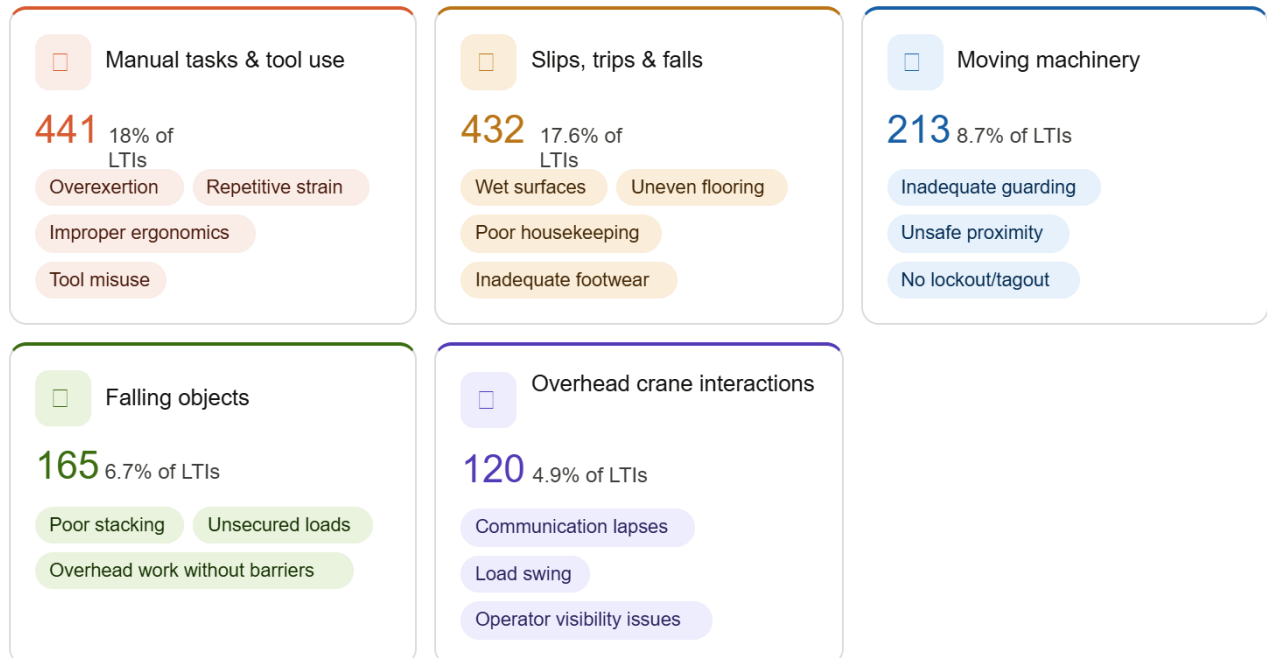
Breakdown of LTI incidents by cause with key risk drivers



INCIDENTS BY CAUSE



RISK DRIVER BREAKDOWN



Parallel to personal safety, severe process safety events continue to manifest across manufacturing floors, highlighting an underdeveloped area in real-time **key performance indicator (KPI)** monitoring and auditing. In 2025, recorded process deviations included 757 fires, 317 hazardous gas and liquid releases, 84 plant explosions, and 68 molten metal/water reaction occurrences.

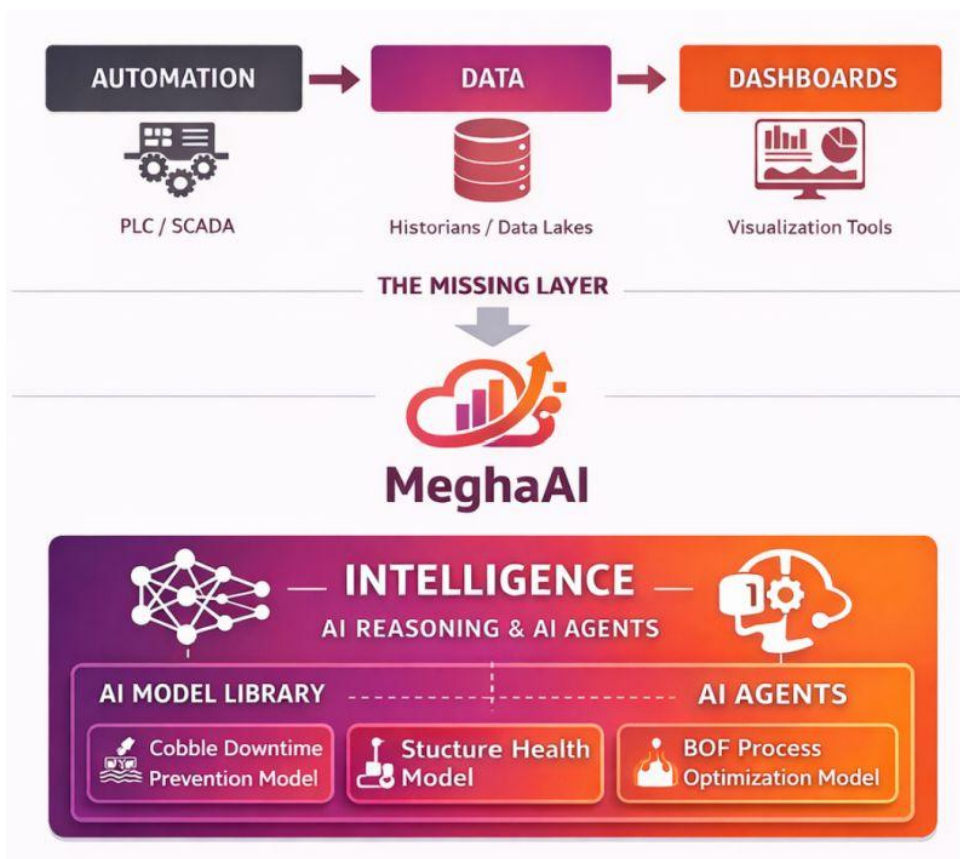
The Contractor Safety Vulnerability Gap

One of the most evident structural patterns across the global industry dataset is the severe vulnerability of external contractors compared to full-time personnel. In 2025, contractors sustained 49 out of the 74 total reported industry fatalities, which accounts for approximately 66% of overall mortality. This disproportion exists despite contractors logging fewer cumulative hours on-site than full-time equivalents. The contractor Fatality Frequency Rate (FFR) stands at 0.022, precisely double the employee rate of 0.011. This vulnerability stems from identifiable operational gaps: shorter site induction schedules, limited familiarity with dynamic local plant hazards, fragmented personal protective equipment (PPE) compliance mapping, and restricted real-time visibility into complex site layouts.

Transitioning to Predictive Intelligence

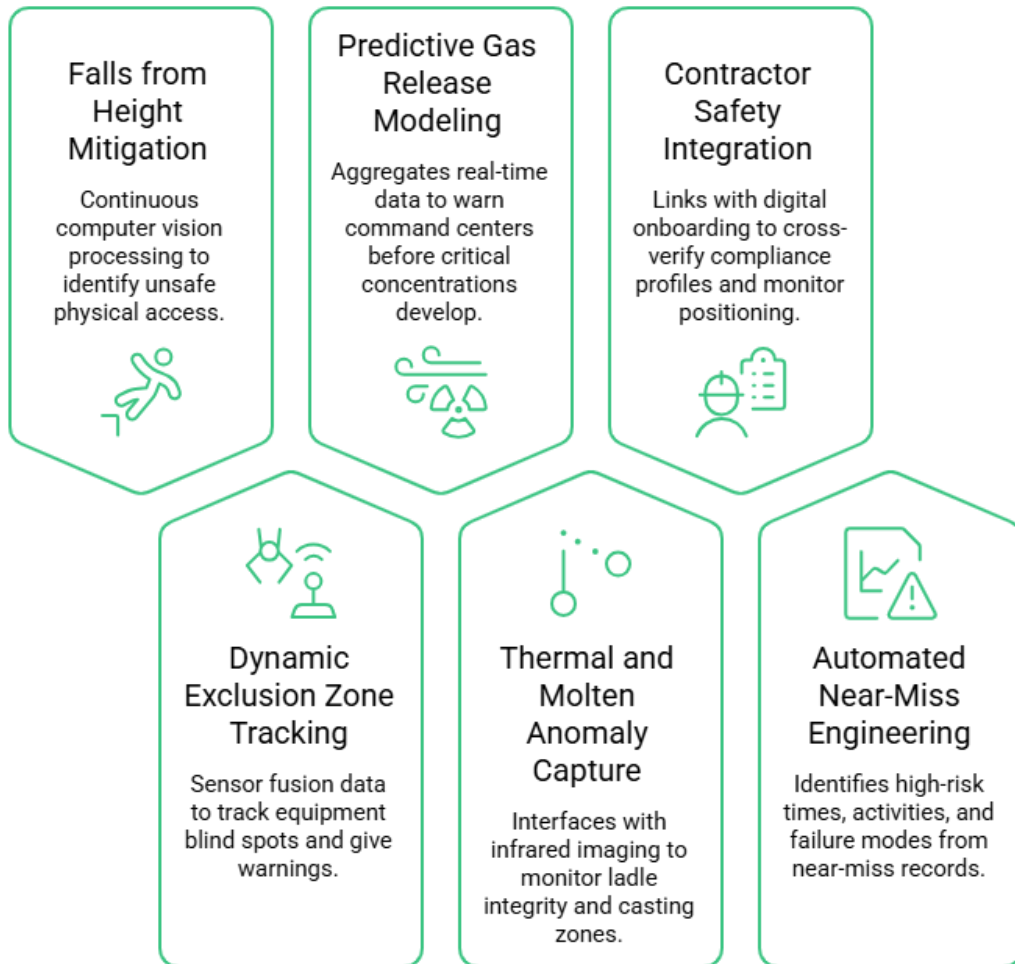
Traditional environment tracking is heavily constrained by lagging indicators, documenting failures only after an injury or release has materialized. Relying on administrative rules, shift supervisors, and manual checklists tests the limits of human attention and capacity, rather than intent.

To bridge this gap, **Desno Tectix provides Megha AI, an intelligent industrial platform** engineered specifically to handle the adverse environmental operational conditions of heavy industry, including extreme thermal load, acoustic noise, particulate density, and multi-contractor operational workflows.



Following are the proposed solutions for the safety issues which can be implemented with our Industrial platform.

Proposed Solutions



Operational and Brownfield Integration Capabilities

Our Industrial AI platform is designed to match the infrastructure realities of brownfield industrial environments, which often rely on legacy machinery and distributed hardware. The platform features a modular deployment model, allowing facilities to secure high-priority zones first before scaling up. Its API-first architecture integrates cleanly with existing SCADA systems, enterprise resource planning (ERP) systems, and specialized EHS safety applications. Localized edge processing handles time-critical alerts to eliminate cloud network latency, while specialized, role-based interfaces present tailored views for plant directors, safety supervisors, and executive teams.

The Strategic Business Case for Predictive Safety

Shifting from a reactive safety model to a predictive framework directly aligns operational resilience with financial performance. While the primary objective is preventing human loss and team trauma, the commercial justification remains clear on its own terms. A single severe injury triggers lost productivity, lengthy investigation cycles, strict regulatory penalties, legal liabilities, and soaring insurance premiums that can easily exceed hundreds of thousands of dollars, while a fatality can exceed millions in total impact. Implementing predictive AI technology protects team members, secures operational continuity, and establishes the regulatory positioning needed for modern industrial leadership. Zero harm is the right target, but reaching it demands sophisticated safety systems that are just as advanced as the heavy industrial processes they protect.

To learn how our Industrial AI Platform can be implemented at your industrial asset,

contact@desnotectix.com, www.desnotectix.com

Key Definitions:

Metric	Definition	Formula	Purpose
Lost Time Injury Frequency Rate (LTIFR)	Measures how often LTIs occur per million hours worked.	$\frac{\text{LTIs} \times 1,000,000}{\text{Total Hours Worked}}$	Tracks injury frequency, benchmarks safety performance.
Fatality Frequency Rate (FFR)	Measures how often fatalities occur per million hours worked.	$\frac{\text{Fatalities} \times 1,000,000}{\text{Total Hours Worked}}$	Evaluates fatal incident risk and severity.
Lethality Ratio	Percentage of LTIs that result in fatalities.	$\frac{\text{Fatalities}}{\text{LTIs}} \times 100$	Indicates severity profile of workplace incidents.
Near-Miss Incidents	Events that could have caused harm but didn't.	Count of near-miss cases.	Early warning data for predictive safety.
Restricted Work Cases	Workers limited to restricted duties due to injury.	Count of restricted work cases.	Tracks impact of injuries short of lost time.