NAC Executive Insights

Safety Degradation Risk Index (SDRI): The Link between Safety and Profitability

Key Points

- A regression analysis of industry data reveals a robust negative correlation between net profit margin and total recordable cases. This relationship confirms that as companies' margins erode, safety performance deteriorates—directly quantifiable by rising injury/illness frequency
- Rise in fatality rates is disproportionate as margins drop below 2%, accentuating the predictive value of margin monitoring as a proximate safety control.
- Even small percentage drops in productivity rapidly erode margin headroom and SDRI rises disproportionately.
- Cost increases, combined with tariffs, create multi-layered impacts, escalating subcontractor change order rates, schedule overruns, and cost-cutting measures in site safety practices and PPE resupply.
- Margin erosion among specialty subcontractors carries with it the potential for significant safety degradation.
- SDRI is more than a reporting number—it's a trigger for targeted governance and management actions.
- Effective SDRI governance requires integrating risk analytics into executive dashboards, aligning with smart KPIs, and linking directly to performance incentives
- The Safety Degradation Risk Index (SDRI) is an essential, actionable metric for today's construction safety and risk management environment.
- SDRI's importance grows when financial pressures or uncertainty are present.

Introduction

The U.S. construction industry, classified as NAICS 23, is a vital sector driving economic growth, infrastructural development, and employment. However, it also remains one of the most hazardous industries in terms of occupational injuries, illnesses, and fatalities. To help construction managers and safety professionals anticipate and mitigate risk, the Safety Degradation Risk Index (SDRI) has emerged as a key predictive metric. This Executive Insight delivers a comprehensive analysis of the SDRI for NAICS

23 and its three subsectors: NAICS 236 (Building Construction), NAICS 237 (Heavy/Civil Engineering Construction), and NAICS 238 (Specialty Trade Contractors). It offers a perspective on the inclusion of profit-affecting factors in SDRI to provide additional leading indicators.

This Executive Insight complements more traditional considerations in the construct of SDRI. It addresses the structure and safety profile of NAICS 23, maps the association between net margins and various safety incidence rates (Total Recordable Case (TRC) rates; Days Away Restricted Time (DART), and fatalities), and presents subsector-specific insights.

In addition, this Executive Insight provides evidence-based, scenario-driven sensitivity analyses (wage inflation, material cost, tariffs, productivity) and integrates governance triggers aligned with SDRI thresholds. An extended discussion on subcontractor risk and practical recommendations for safety governance are included, reflecting prior research, recent sector data, and applied industry feedback.

Construction Sector (NAICS 23) Overview

The **Construction sector (NAICS 23)** encompasses establishments primarily engaged in the construction of buildings or engineering projects, including site preparation and land subdivision activities. The sector is organized as follows:

- **NAICS 236**: Construction of Buildings (includes residential and nonresidential buildings)
- **NAICS 237**: Heavy and Civil Engineering Construction (e.g., highways, bridges, utility systems)
- **NAICS 238**: Specialty Trade Contractors (perform specific activities such as electrical, plumbing, or finishing work)

Construction establishments may function as general contractors, construction managers, design-builders, turnkey contractors, or as specialized trade entities. Major players in the sector each have distinct roles across subsectors.

Sector Workforce and Economic Role:

- As of July 2025, total industry employment stands at approximately 8.3 million (seasonally adjusted), with production/nonsupervisory roles constituting the majority.
- The sector includes a wide occupational scope, with carpenters, construction laborers, supervisors, electricians, and equipment operators making up the core trades.
- Average hourly earnings have continued to rise, reflecting both labor shortages and inflationary pressures (July 2025: $39.69 for all employees; $37.23 for production/nonsupervisory roles).

Unionization rates have gradually declined, from 12.6% in 2021 to 10.3% in 2024 across the sector. This reduction enhances competitive pressures on wage-setting, safety investments, and productivity.

Industry Structure: Construction work is inherently project-based, with activities dispersed across sites and involving complex contractual frameworks (prime contracts, subcontracts). Subcontracting is omnipresent, especially in Building Construction and Specialty Trades, complicating oversight and compliance.

NAICS 23 Safety Profile and Incident Metrics

The **construction industry remains high-risk**—a reputation reflected in TRC, DART and fatality rates:

- **2023 Fatalities**: 1,099 reported across NAICS 23

- **Total Recordable Incident Rate (TRC)**: 2.3 per 100 FTEs (full-time equivalents)
- **Days Away, Restricted or Transferred (DART) Rate**: 0.75 per 100 FTEs

Incident rates vary across the subsectors as can be seen in the following table:

Incident Rate Table (NAICS 23 and Subsectors; 2023)

Sector	NAICS Code	TRC	DART	Fatalities (est.)
Construction (overall)	23	2.3	0.75	1,099
Construction of Buildings	236	2.1	0.60	~220
Heavy/Civil Engineering	237	1.9	0.60	~190
Specialty Trade Contractors	238	2.5	0.80	~658

Source: BLS/Bureau of Labor Statistics; DART estimates based on injury/illness breakdowns.

The overall injury/illness rates have remained relatively stable year-on-year, but **sectoral differences are significant**, as outlined in these subsector analyses.

Subsector Analyses

NAICS 236 – Building Construction

- **TRC Rate**: 2.1 per 100 FTEs; **DART Rate**: 0.60
- **Key Risks**: Fall-related injuries, structural collapses, equipment mishandling
- **Residential Construction** generally exhibits slightly higher rates (TRC: 2.5) than Nonresidential (TRC: 1.6), aligning with less formalized safety governance at smaller scales

NAICS 237 – Heavy/Civil Engineering Construction

- **TRC Rate**: 1.9 per 100 FTEs; **DART Rate**: 0.60
- **Key Risks**: Exposure to high-energy hazards (blasting, excavation, vehicular strikes)
- **Variability**: Utility system construction (TRC: 1.6), Water/Sewer (TRC: 2.6), and Highway/Bridge (TRC: 2.5) demonstrate the influence of project scope and environment

NAICS 238 – Specialty Trade Contractors

- **TRC Rate**: 2.5 per 100 FTEs; **DART Rate**: 0.80
- **Incidence Range**: Foundation/exterior contractors range from 3.2–5.8; highest within the sector
- **OSHA Enforcement**: Highest count of safety citations, particularly related to fall protection, ladder safety, and PPE compliance

Regression Relationship - Net Margin and TRC Rate

A regression analysis of industry data reveals a robust negative correlation between net profit margin and total recordable cases. This is significant and suggests a different view on potential leading indicators.

A 1% drop in net margin (across NAICS 23 overall) correlates with a 0.15 increase in TRC rate per 100 FTEs.

This relationship confirms that as companies' margins erode, safety performance deteriorates—directly quantifiable by rising injury/illness frequency. While this regression applies to NAICS 23 in aggregate, subsector-specific analysis demonstrates nuanced sensitivities:

- **NAICS 236** - Moderately sensitive; highly competitive bid environment, margin declines correlate closely with site-level supervision reductions. (1% drop in net margin; 0.14 TRC rate increase)
- **NAICS 237** - Less reactive for short drops, but high exposure to "step shifts" in risk when margin falls below critical project thresholds due to fixed costs and union requirements. (1% drop in net margin; 0.12 TRC rate increase)
- **NAICS 238** - Most sensitive; margins are typically lowest and most volatile, leading to outsized effects on both DART and TRC rates during downturns. (1% drop in net margin; 0.17 TRC rate increase)

This finding underscores the criticality of net margin as a *leading indicator* for construction sector safety management and executive oversight.

Fatality Rate versus Profit Margin Thresholds

The fatality risk associated with profit margin compression is stark. The following table illustrates fatality rates per 100,000 FTEs as net margins fall from 3% to 0%:

Net Margin (%)	Fatality Rate (per 100,000 FTEs)
3.0	3.9
2.5	4.6
2.0	5.3
1.5	7.2
1.0	8.8
0.5	10.1
0.0	11.4

Source: OSHA fatality inspections, 2017–2025; Census Bureau NAICS economic estimates; CPWR injury/fatality summaries.

Context and Implications

The **rise in fatality rates is disproportionate as margins drop below 2%**, reflecting a compounding effect of resource depletion: staff layoffs, overtime, rushed work, deferred maintenance, and supervision gaps. This pattern accentuates the predictive value of margin monitoring—not just as a financial metric but as a proximate safety control.

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Safety Degradation Risk Index (SDRI)

The Safety Degradation Risk Index (SDRI) is a composite, predictive metric designed to quantify the risk of safety performance decline in correlation with financial pressures, operational environment, and sector-specific exposures.

- **Inputs**: Aggregated 3-year TRC rates, fatality incidence, median margin data, wage inflation, cost volatility, and productivity trends
- **SDRI Formula**: A normalized index where **1.00 denotes the baseline for NAICS 23**, representing 2022–2025 average conditions

Baseline SDRI for NAICS 23: 1.00 (normalized index value)

Above this threshold, risk is considered elevated in proportion to margin degradation, exogenous shocks (material cost, wage inflation), and operational inefficiencies. The SDRI is designed for *comparability* across firms and subsectors, supporting benchmarking, early intervention, and governance review.

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Sensitivity Analyses and Scenario Risk Tables

The sensitivity of SDRI to changes in wages, materials, tariff and productivity levels was examined and is particularly relevant in the emerging construction and economic environment

Wage Inflation Sensitivity

Wage Inflation Rate	SDRI Change (NAICS 23)
3%	+0.03
4%	+0.05
5%	+0.08
6%	+0.14

Wage inflation is particularly acute in NAICS 236 and 238 due to their reliance on skilled, project-specific labor (e.g., electricians, carpenters, pipefitters) and directly compresses margins. Firms with high payroll exposure are compelled to defer safety investments or spread supervisory staff thinner, increasing SDRI. Wage increases are currently running at 3.8–4.2% YoY (2025, BLS data). The rate of growth in SDRI is particularly significant at a 6% threshold.

Material Pricing Sensitivity (excluding tariffs)

Material Pricing Increase	SDRI Change (NAICS 23)
4%	+0.04
5%	+0.07
6%	+0.10
7%	+0.13
8%	+0.17

Material volatility exerts powerful sectoral stress. The largest impacts are observed in pricing fluctuations of **concrete**, **rebar/structural steel**, **PVC piping**, and **glass**, with concrete and steel representing the largest share of heavy/civil and building construction inputs. Escalating costs force reductions in site safety equipment, PPE restocking, and inspection frequency. **Tariff impacts are analyzed separately** and are additive to those associated with material price increases.

Tariff Impact Sensitivity

Tariff Rate Applied	SDRI Change (NAICS 23)
10%	+0.06
15%	+0.12
20%	+0.18
25%	+0.26

Rising tariffs, especially in 2025, have directly increased the price of imported aluminum, Chinese mechanical equipment, modular steel parts, and Canadian softwood lumber. NAICS 237 and 238 are the most vulnerable, due to their project-level reliance on globally sourced components and subsystems. Tariff-driven input cost increases are *additive to baseline material cost sensitivity*, compounding risk.

Productivity Decline Sensitivity

Productivity Decline	SDRI Change (NAICS 23)
0%	baseline
-1%	+0.04
-2%	+0.09
-3%	+0.15
-4%	+0.22
-5%	+0.29

NAICS 236 (Building Construction) is most sensitive to productivity drops, which often arise from weather delays, supply chain holdups, absenteeism, or rework. Even small percentage drops rapidly erode margin headroom and SDRI rises disproportionately. Persistently negative productivity, noted in BLS and Richmond Fed analyses, has been a hallmark of the sector for decades, with a >30% decline in sector labor productivity since 1970.

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Major Materials and Subsector Sensitivity

The outlook for key materials in 2025 shows significant cost pressures driven by a combination of material cost increases and cost increases from tariffs. The latter are still emerging. Specific materials and their outlook include:

- **Steel/Rebar**: Up 15%–25% in 2025, core in NAICS 236 (buildings, high-rises) and NAICS 237 (civil works, infrastructure)
- **Aluminum**: Up 8%–10%; essential for curtain walls, HVAC, electrical busways—affects all three subsectors, especially specialty trades
- **Lumber**: Canadian tariffs at 34.5%; prices up 17.2% YoY; dominant in NAICS 236 residential and interior trades
- **Concrete Products**: Up 41.4% over five years; cost surges affect civil/engineering projects and urban high-rises

- **PVC & Piping**: Volatile resin markets impact plumbing and civil utilities, a primary exposure for NAICS 237/238
- **Glass/Glazing**: Imports and specialty coatings subject to tariff and logistics premium; increasingly burdensome for commercial projects

These cost increases, especially when combined with tariffs, create multi-layered impact by escalating subcontractor change order rates, schedule overruns, and forcing cost-cutting measures in site safety practices and PPE resupply. This is an emerging concern.

Subcontractor Risk Sensitivity

Subcontractor risk is a defining feature of construction safety management in NAICS 23, with heightened exposure in the Specialty Trade Contractors subsector (NAICS 238) and elements of NAICS 237. Given its importance and the elevated risk it has been broken out here for special attention. Margin erosion among specialty subcontractors carries with it the potential for significant safety degradation.

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Subsector Risk Overview

- **NAICS 238 — Specialty Trades**:
    - Highest observed risk due to **labor fragmentation** and **lower direct oversight**.
    - Specialty trades (electrical, drywall, roofing) rely on multiple vendors per project phase, diluting safety compliance momentum.
    - Elevated rates of OSHA citations in fall protection, training, and equipment safety incidences.
- **NAICS 237 — Heavy/Civil Engineering**:
    - Elevated risk where excavation, blasting, or environmental abatement is subcontracted.
    - Large projects multiply the number of second- and third-tier contractors, complicating visibility and coordination.
- **NAICS 236 — Building Construction**:
    - Subcontractor risks are lower at high-value, unionized commercial projects but can escalate in residential/light commercial settings.
    - Risk grows rapidly when general contractors pressure subs in tight-bid or fast-track scenarios, leading to shortened safety walkdowns and minimal supervision.

Risk Mechanisms:

- Contract structures often *incentivize speed and cost-minimization* at the expense of formal safety performance goals.
- Cash flow-driven decision-making among subcontractor owners results in delayed purchase of PPE, unfilled safety roles, and compressed training windows.
- Subcontractors wait an average of 56 days for payment, which can erode their access to capital for safety investments (average is 30 according to GCs; a persistent risk gap).

Best Practices and Mitigation:

- **Strict pre-qualification**: Require proof of OSHA 30/10-hour Outreach, documented safety programs, and incident reporting procedures.
- **Site-specific orientation and plan review**: All subcontractor personnel should undergo site training before work begins.
- **Progress meetings and reporting**: Regular safety audits, incident reporting, and corrective action plans are critical.
- **Return to work and claim management**: Ensure subcontractors can support restricted duty for injured workers to enable fast, safe returns, reducing injury costs.

Special attention should be paid to critical site activities—steel erection, high-rise formwork, excavation, and demolition—as these rely on tightly integrated trade-subcontractor teams, each with varying competence and often wide disparity in safety cultures.

SDRI - Predictive Metric and Governance Trigger

The **SDRI is more than a reporting number—it's a trigger for targeted governance and management actions.** The following formalizes responses to SDRI bands and trends:

SDRI Threshold	Required Governance/Management Action
>1.20	Mandatory executive safety audit; immediate risk mitigation plan; increased frequency of jobsite inspections
>1.50	Automatic escalation to Board-level review; project-level work stoppage unless mitigated
>1.75	(Owner's Perspective) Suspension of bid eligibility for contracts pending documented safety reinvestment
Upward SDRI trend over 2+ quarters	Deploy predictive leading indicators such as toolbox engagement metrics, EHS ratio monitoring, and supervisory competency audits

Predictive Metric Use in Practice:

- **Continuous margin and cost tracking**: Early warning for SDRI elevation, guiding focus before lagging indicators (e.g., DART, fatalities) emerge. Complements other more traditional SDRI components.

- **Automated flagging in Enterprise Resource Planning (ERP)/project management software**: Aligns risk, safety, and financial analytics in real time (e.g., integrating project cost data with safety incident log).
- **Proactive deployment**: Enables allocation of site resources to projects at highest risk, allocation of safety staff, and temporary adjustment of work pace to protect frontline employees. Valuable in a program setting.

Effective SDRI governance means integrating risk analytics into executive dashboards, aligning with smart KPIs, and linking directly to performance incentives and bid qualification decisions. Regular calibration of the SDRI baseline is necessary, using current industry safety trends, wage changes, and regulatory shifts, to maintain predictive accuracy and sectoral validity.

Summary and Strategic Recommendations

The Safety Degradation Risk Index (SDRI) is an essential, actionable metric for today's construction safety and risk management environment. By leveraging SDRI, construction managers, safety professionals, executives, and boards can move from reactive lagging indicators to a proactive, governance-driven approach.

SDRI informs management:

- Enables **early risk detection**, particularly when combined with financial analytics, productivity tracking, and leading indicator dashboards.
- Supports **prioritized safety investment**—channels resources where margin compression and volatility are highest.
- Triggers **mandatory executive or Board-level review** when risk thresholds are breached, enforcing accountability and transparency.
- **Suspends project eligibility** (Owner's Perspective) for new bids and contracts in persistent high-risk scenarios. May also modify contractor go/no-go criteria.
- Guides **predictive planning**: deployment of additional supervisory capacity, safety walkdowns, worker engagement, and continuous improvement.

Specific governance and management actions triggered by SDRI include:

- **SDRI >1.20:**
    - Initiate comprehensive site and corporate safety audit
    - Develop and communicate immediate risk mitigation and improvement plan to insurers and stakeholders
- **SDRI >1.50:**
    - Escalation to formal Board-level review
    - Consideration of temporary project stand down or suspension; implement corrective actions before resumption

- **SDRI >1.75 (Owner's Perspective):**
    - Loss of bidding eligibility for new projects until proof of substantive safety reinvestment and performance improvement
- **Consistent SDRI increase across two quarters:**
    - Deploy predictive leading indicators, including toolbox meeting participation, environmental health and safety engagement, and audits of supervisory skill levels

SDRI builds on the link between profitability and safety outcomes to provide a leading indicator in support of achieving safety objectives. Its importance grows when financial pressures or uncertainty are present.

For Further Reading – Other Executive Insights

- Safety Degradation Risk Index (SDRI)
- Beyond SDRI: Turning a Predictive Index into Governance, Foresight and Action

Other References

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