

NAC Executive Insights

Beyond SDRI: Turning a Predictive Index into Governance, Foresight and Action

Key Points

- Safety Definition Risk Index (SDRI) is a predictive safety index that moves before incident rates do — giving time to act, not just react.
- SDRI blends leading and lagging indicators, weighted 2:1, to capture both proactive behaviors and outcome trends.
- When margins shrink, pressure on schedules, staffing, and supervision often increases — and safety performance suffers.
- SDRI calibrated to real-world stressors like wage inflation, material costs, tariffs, and productivity — not just internal metrics.
- SDRI is subsector-aware, differentiating risk behavior across Buildings, Heavy/Civil and Specialty Trades.
- SDRI links directly to governance triggers, with thresholds that activate audits, executive reviews, and mitigation plans. It is an executive and board level tool.

Introduction: The Problem SDRI Solves

In construction, safety performance rarely collapses overnight.

It erodes, sometimes invisibly, as small stresses accumulate: a few missed pre-task plans, a dip in training completion, a sudden cost spike that pressures schedules. By the time lagging indicators like TRC, DART, or fatality rates start to rise, the damage is already done.

SDRI is designed to catch the early signals — the subtle shifts in leading indicators and external stressors that tell you your safety “immune system” is under strain.

What SDRI Is — and Isn't

SDRI is calculated as:

$$\text{SDRI} = \left(\frac{\sum W_i}{\sum R_i} \right) \times 100$$

Where:

- W_i represents individual **Weighted Leading Indicators**

- R_i represents individual **Risk Exposure Units**

Leading indicators (weighted 2:1 over lagging indicators) include proactive measures like pre-task planning, safety observations, near-miss capture, leadership walks, and training completion — plus external stressors like wage inflation, material cost changes (excluding tariffs), tariff exposure, and productivity shifts.

Risk exposure units scale the index to your operational footprint: labor hours, project complexity, subcontractor volatility, equipment utilization, and baseline TRC/DART/fatality rates.

What it is:

A forward looking, normalized measure of your organization’s capacity to absorb safety stress without degradation.

What it isn’t:

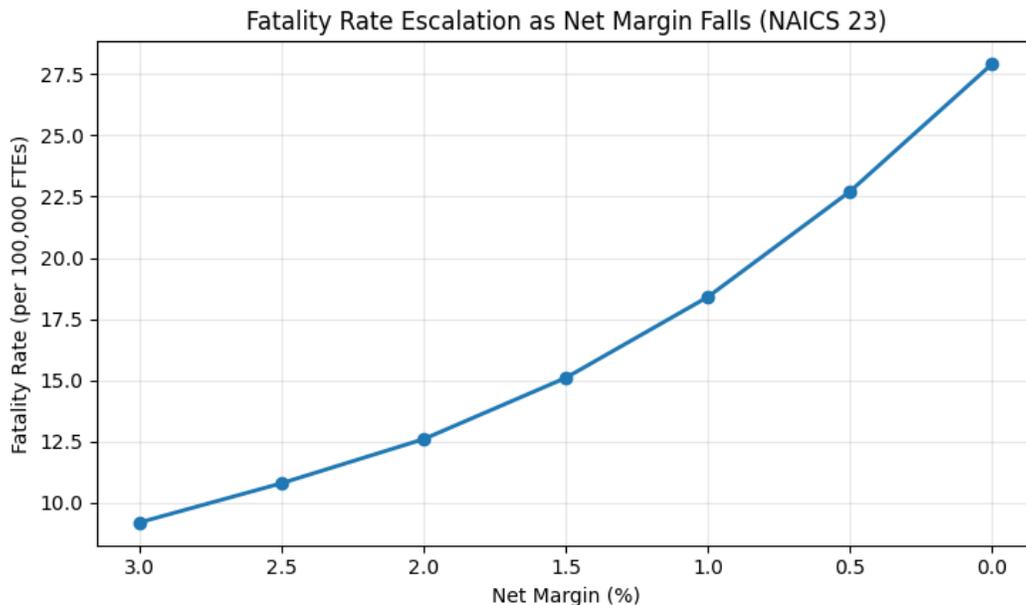
A prediction of individual incidents, or a replacement for site-level hazard identification.

Why Margins Matter: Fatality Rate vs Net Margin

One of the most striking patterns in the Technical Appendix is the link between falling net margins and rising fatality rates in NAICS 23.

When margins shrink, pressure on schedules, staffing, and supervision often increases — and safety performance suffers.

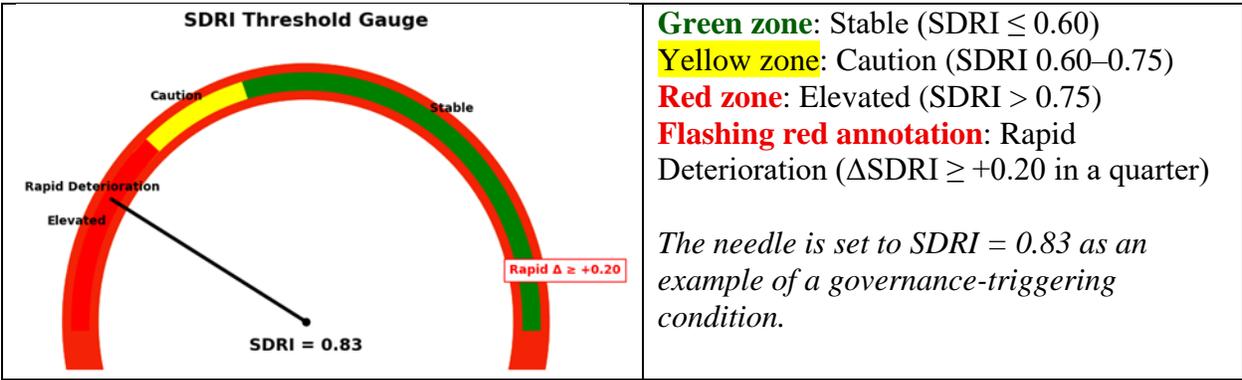
Figure 1 – Fatality Rate Escalation as Net Margin Falls (NAICS 23)



Reading the SDRI “Gauge”

Think of SDRI as a dashboard dial:

SDRI Level	What It Means	What To Do
≤ 0.60 (Stable)	Systems are healthy; stress is being absorbed.	Maintain cadence; monthly SDRI review; quarterly audits.
0.60–0.75 (Caution)	Early signs of strain; risk is building.	Increase vigilance; weekly leading-indicator reviews; targeted interventions.
> 0.75 (Elevated)	High risk of degradation; urgent action needed.	Launch mitigation program; executive review; corrective action plan.
$\Delta \geq +0.20$ in a quarter (Rapid Deterioration)	Risk is accelerating; possible control failure.	Board-level visibility; freeze risky scopes until mitigations verified.



Stress Testing: Seeing Trouble Before It Hits

Stress testing SDRI against “what-if” scenarios help you prepare for shocks.

Baseline SDRI

- NAICS 23 overall: 0.48
- NAICS 236: 0.45
- NAICS 237: 0.50
- NAICS 238: 0.48

Wage Inflation Impact

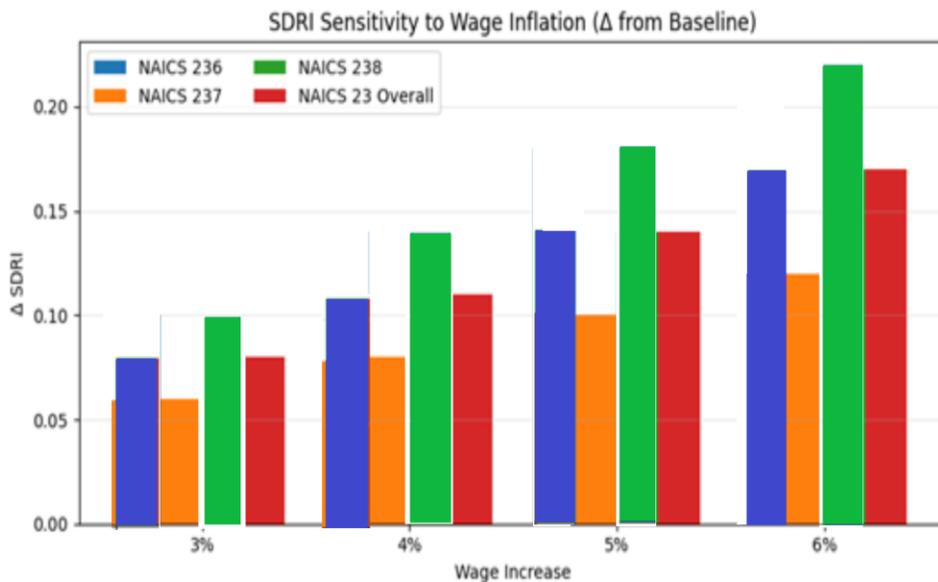
Wage inflation analysis reveals a consistent, quantifiable impact on sectoral safety–profitability dynamics, with implications for both operational planning and governance oversight:

- **Wage Inflation Effects**
 As skilled trade wages rise, SDRI increases across all NAICS 23 subsectors, reflecting the dual pressure on profitability and workforce retention.

- NAICS 238 (Specialty Trades) shows the steepest SDRI slope, driven by its labor-intensive cost structure and high exposure to skilled trade volatility.
- NAICS 236 (Buildings) and NAICS 237 (Heavy/Civil) exhibit more moderate but still material SDRI shifts, with NAICS 237 buffered slightly by capital intensity.
- The composite NAICS 23 curve masks intra-sector divergence, reinforcing the need for subsector-specific escalation modeling.
- **Threshold Sensitivity**
SDRI deltas become governance-relevant at wage inflation levels as low as 4–6%, especially in labor-dense subsectors.
 - A 10% wage increase can push SDRI beyond tolerance bands in NAICS 238, triggering risk-adjusted planning and potential contract renegotiation.
 - NAICS 236 and 237 show more gradual escalation, but cumulative wage pressures over multi-year horizons warrant early-stage monitoring.

Implications for Governance and Decision-Making

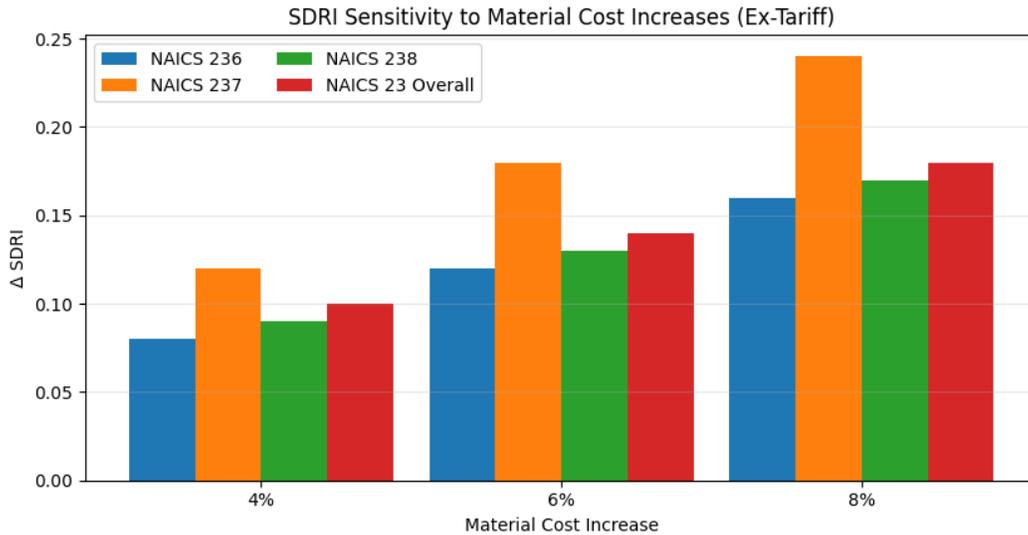
- **Escalation Modeling:** Wage inflation should be embedded as a primary driver in SDRI-based escalation frameworks, with subsector-specific thresholds.
- **Contract Structuring:** Fixed-price contracts in labor-heavy segments (e.g., NAICS 238) require contingency buffers or indexed wage clauses.
- **Workforce Strategy:** Rising wages may signal both cost pressure and retention risk—SDRI overlays should be paired with skilled trades ROI tracking.



Material Cost (Ex-Tariff) Impact

Analyses show a clear, quantifiable relationship between input cost pressures and sectoral safety–profitability dynamics with respect to Material Cost Increases (Ex-Tariff). Across NAICS 236, 237, 238, and the aggregated NAICS 23, SDRI shifts upward in near-linear fashion with rising material costs:

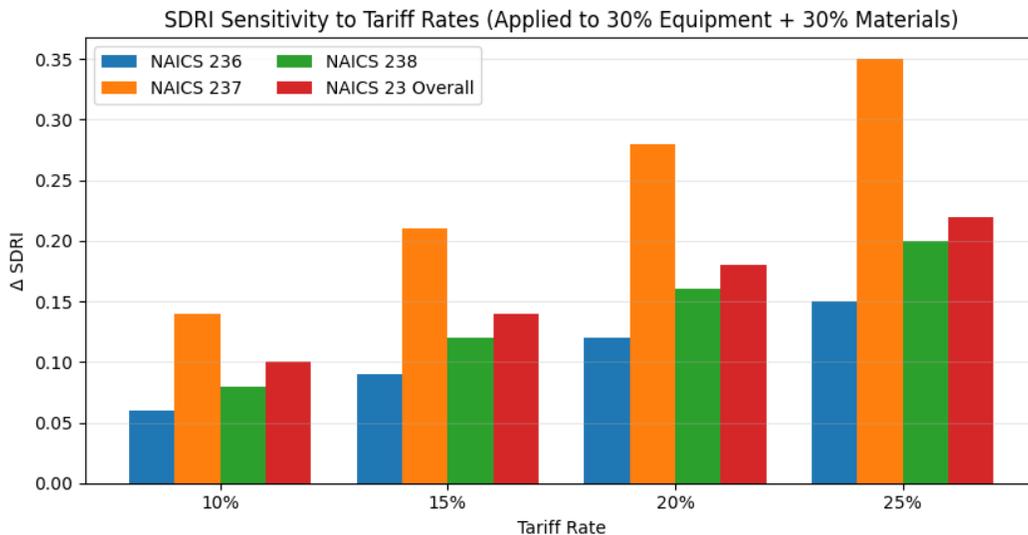
- NAICS 237 (Heavy and Civil Engineering) exhibits the steepest sensitivity, reflecting its higher material intensity.
- NAICS 236 (Buildings) and NAICS 238 (Specialty Trades) show more moderate but still material impacts.
- The overall NAICS 23 composite masks intra-sector variability, underscoring the need for subsector-level governance triggers.



Tariff Impact

Tariff-driven cost increases amplify SDRI changes more sharply than material costs alone, due to the dual exposure of both equipment and materials.

- NAICS 237 again shows the highest escalation slope, suggesting disproportionate vulnerability to trade policy shifts.
- Even modest tariffs (10–15%) produce measurable SDRI deltas across all subsectors, signaling early-stage governance thresholds.



Implications for Governance and Decision-Making

Early Warning Triggers: Both scenarios support embedding SDRI deltas into escalation models, with subsector-specific thresholds for intervention.

Risk-Adjusted Planning: Capital allocation, contract structuring, and contingency reserves should be stress-tested against both ex-tariff and tariff-inclusive cost scenarios.

Policy Sensitivity: Heavy and Civil Engineering (NAICS 237) warrants heightened monitoring in tariff-exposed environments

Conclusion

The SDRI framework offers a powerful, forward-looking lens into safety degradation risk across the U.S. construction sector. By integrating weighted leading indicators with operational exposure, SDRI enables early detection of risk escalation — often weeks or months before lagging metrics like TRC or DART begin to shift.

Stress-testing reveals that:

- Wage inflation and productivity loss are dominant drivers in NAICS 236 and 238.
- Tariff and material cost shocks disproportionately affect NAICS 237.
- Rapid SDRI movement ($\Delta \geq +0.20$) is more dangerous than static elevation — signaling compounding stress and potential control failure.

The dial graphic reinforces these thresholds visually, helping leaders interpret SDRI movements with clarity and urgency.

Actionable Recommendations:

- **Integrate SDRI into monthly governance reviews** - Make SDRI a standing item in safety and operations meetings. Use the dial graphic to anchor discussions and track movement over time.
- **Predefine escalation protocols** - Link SDRI thresholds to specific actions: audits, work freezes, executive reviews, and board notifications. Codify these in your safety governance framework.
- **Run quarterly stress tests** - Model plausible shocks - wage increases, tariff changes, productivity dips - and rehearse your response.
- **Invest in high-leverage leading indicators** - Focus on pre-task planning, near-miss reporting, training completion, and leadership walks. These have the strongest pull on SDRI and the fastest ROI.
- **Tailor controls by subsector** - Use NAICS-specific profiles to prioritize interventions. For example, reinforce subcontractor oversight in NAICS 238, and traffic management in NAICS 237.

For Further Reading – Other Executive Insights

- Safety Degradation Risk Index (SDRI)
- SDRI – The link Between Safety and Profitability

About the Author

Bob Prieto was elected to the National Academy of Construction in 2011. He is a senior executive who is effective in shaping and executing business strategy and a recognized leader within the infrastructure, engineering, and construction industries. Bob received the 2024 ASCE OPAL Award (Outstanding Projects and Leaders) for his Outstanding Lifetime Achievement in Management.

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