Invisible Icebergs: Latent Safety Risks and Their Toll on Safety Performance

In commercial transportation, safety performance is often measured by what is visible - crash rates, incident reports, CSA scores, and compliance metrics. While these indicators are important, they only tell part of the story. Some of the most significant risks to fleet safety exist below the surface, like an invisible iceberg, embedded within operational systems long before an event occurs.

These hidden risks, known as latent conditions, are especially impactful in operations involving both passenger and property carriers, where variability in routes, environments, schedules, and customer expectations can create constant pressure on drivers and the operational system that supports them.

Latent conditions in transportation can take many forms. They may include the hiring speed of driver over operational fit, onboarding processes that fail to reflect real driving conditions, or routing expectations that do not align with traffic conditions, delivery windows, or customer demands. They can also stem from unclear expectations around defensive driving, inconsistent coaching, or a lack of alignment between safety and operational priorities. OSHA emphasizes using leading indicators to detect these indicators before harm occurs[1].

One of the most critical contributors to latent risk is the disconnect between work-as-imagined and work-as-done. From a policy standpoint, drivers are expected to follow clearly defined rules, procedures, and training standards. But in reality, they must constantly adapt to navigating traffic congestion, tight delivery schedules, unpredictable behaviors, weather conditions, and changing route demands.

To meet these challenges, drivers may develop informal strategies and workarounds. In many cases, these adaptations are necessary and effective. In others, they introduce risk, often without visibility from leadership. Leading indicators focus attention on the effectiveness of safety activities, not just outcomes, helping organizations learn where the system is forcing adaptation.

For example, a delivery schedule that appears reasonable on paper may require drivers to rush between stops. A route with tight turnaround times may limit opportunities for a rest break. Incentives tied heavily to on-time performance or productivity can unintentionally signal that efficiency is valued over safe execution. NHTSA's behavioral safety research documents how time pressure, speeding, distraction and impairment shape driver choices and where countermeasures are effective[2].

Over time, these operational pressures accumulate and can result in a widening gap between expectations and reality that can increase the likelihood of incidents, even in organizations with strong policies and training programs. Companies should focus on designing operational systems that can withstand mistakes by drivers without resulting in crashes or injury. Design may include redundant checks, realistic scheduling, clear communication channels, and built-in safeguards. By shifting the emphasis from individual blame to resilient system design, organizations can better manage risk and create safer outcomes even under demanding operational conditions.

Addressing latent conditions in transportation requires moving beyond compliance and taking a closer look at how operational systems truly function. This starts with evaluating how drivers are selected, trained, and supported. Does training reflect the real conditions drivers face across both passenger and property operations? OSHA's guidance offers practical examples for building leading indicators around training quality, hazard controls, and core program elements[1].

Equally important is understanding the day-to-day experience of drivers. Ride-alongs, telematics insights, video review, and open dialogue can help uncover where workarounds exist and why. The National Safety Council's Campbell Institute details how organizations can utilize learning-oriented leading metrics (participation, usability, local ownership) to surface and address risky drivers[3].

Ultimately, improving transportation safety is not just about reducing driver error, it is about strengthening the system that surrounds the driver. Findings from the Large Truck Crash Causation Study show that crash risk emerges from interactions among driver, vehicle, roadway, and environment, supporting a systematic approach, not a sole focus on individual error[4].

In fleet operations, what lies beneath the surface often matters most. Organizations that recognize and address these "invisible icebergs" move beyond reactive safety and build systems capable of delivering real, sustainable results. As OSHA states, "Leading indicators are proactive and preventive measures that can… reveal potential problems in a safety and health program"[5].

Sources:

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