intenseye

SIF Prevention Playbook for the Food & Beverage Industry

White paper

JUNE 2025

Table of contents

Introduction

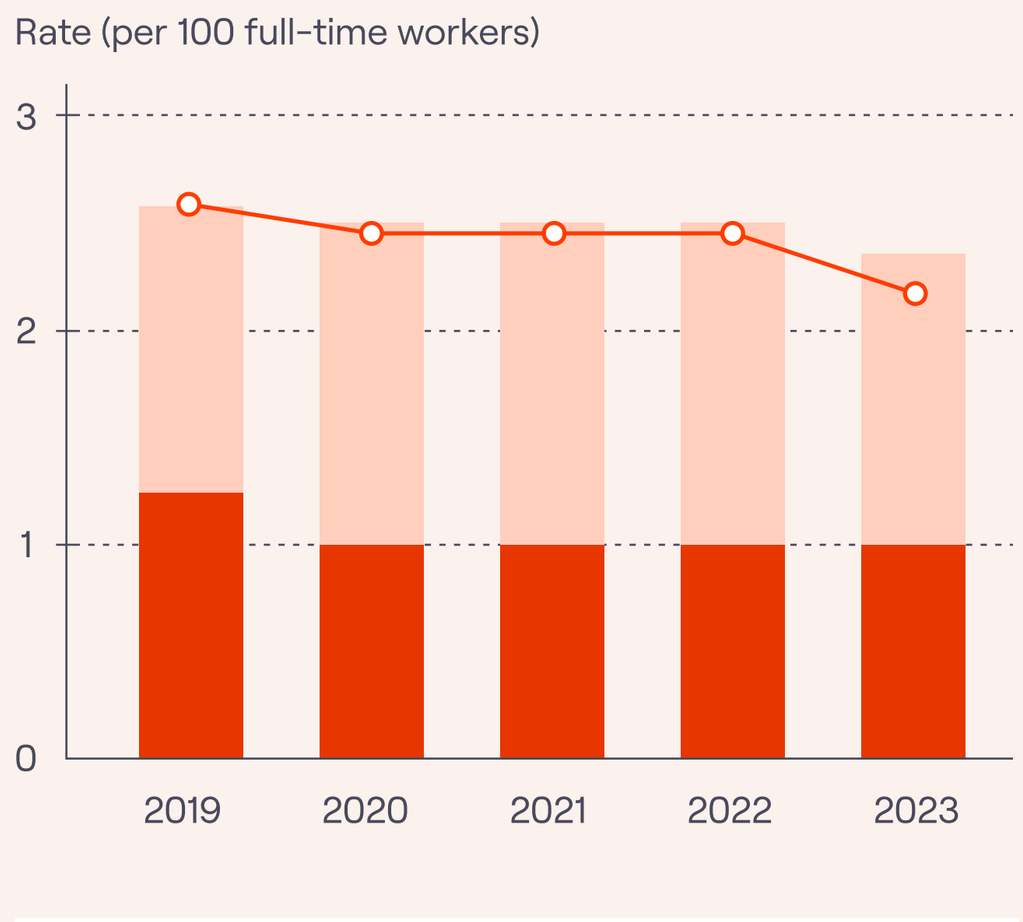
The SIF Dilemma in Food & Beverage

Serious injuries and fatalities (SIFs) remain a stubborn challenge even as overall workplace injury rates decline. U.S. Bureau of Labor Statistics data show that while the Total Recordable Injury Rate (TRIR) in the U.S. fell from 3.4 per 100 workers in 2012 to about 2.7 in 2022, the rate of preventable workplace fatalities held steady around 3.0–3.2 per 100,000 workers.

In other words, routine injuries have decreased, but life altering incidents have not followed the same downward trend.

This paradox is evident in food and beverage (F&B) manufacturing: in 2023 the sector's injury rate fell to 3.6 cases per 100 full-time workers (down from 4.6 in 2022), yet in 2022 there were **75 fatal work injuries in food manufacturing**, including 12 from falls, 17 from exposure to harmful substances, and 18 from contact with equipment. Clearly, traditional safety programs that reduce minor incidents have not eliminated the risk of catastrophic accidents.

Total nonfatal work injury and illness rates



Source: U.S. Bureau of Labor Statistics

Why do SIFs persist?

Research reveals that **the causes of severe incidents often differ from those of frequent minor injuries**. Many organizations still rely on lagging indicators – OSHA logs, incident rates, after-the-fact investigations – which tell a story only after an injury has occurred. Near-miss reporting programs under "Safety-II" approaches improved proactivity by encouraging learning from what goes right.

Yet even these proactive efforts haven't fully solved the SIF problem, partly due to under-reporting: an estimated **79% of EHS leaders believe that hazards, near-misses, and concerns are not reported consistently** within their organizations. In F&B, where fast-paced production and stringent sanitation demands are routine, it's easy for early warning signs to be missed or ignored until a serious accident occurs. The urgency **for a new approach** is underscored by sobering incidents.

For example, between 2015 and 2022 there were 1900 severe injuries reported to OSHA.

1,500	⟶	food processing machinery (mixers, choppers, etc.)
400	⟶	slicers and blenders

Fatalities have occurred from preventable scenarios like ammonia refrigerant leaks and hot work accidents. (In one 2015 case, a welder was killed by an explosion while installing a catwalk at a soybean plant.) These incidents signal that F&B companies need to go beyond compliance checklists and **actively hunt SIF precursors** – the hazardous situations that foreshadow a potential fatal or life-altering event – before tragedy strikes.

From Lagging to Leading (to Real-Time)

Embracing Safety-III

To break through the SIF plateau, safety management is evolving from **Safety-I** (reactive, focused on absence of accidents) to **Safety-II** (proactive, focused on presence of resilience) – and now to an emerging paradigm intenseye team calls **"Safety-III."** In Safety-I, the classic belief was that reducing minor incidents would automatically avert major ones; Safety-II added emphasis on learning and system capacity (e.g. empowering workers, analyzing near-misses).

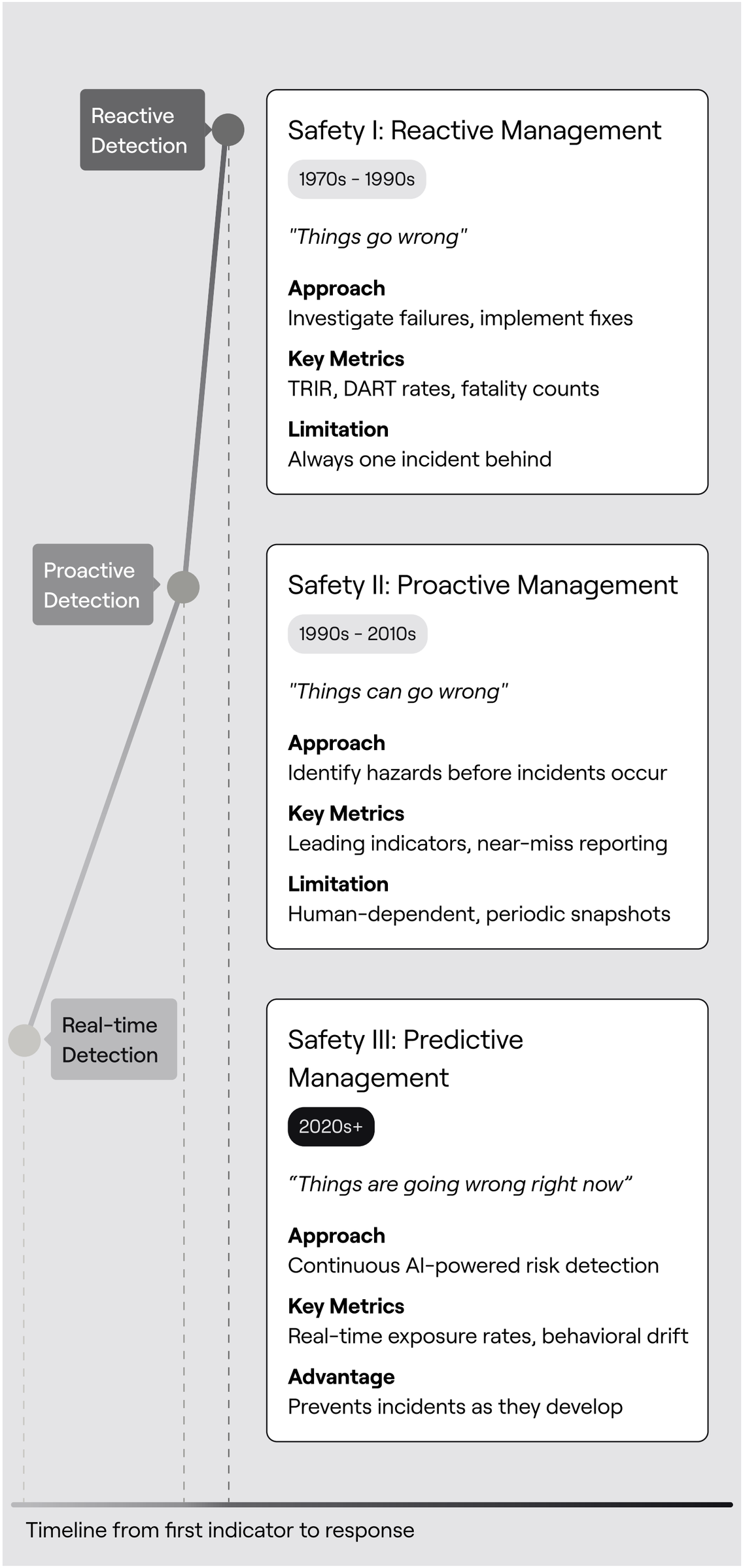
Safety-III builds on these by leveraging real-time technology to intervene before an accident happens. At its core, Safety-III is about moving from lagging indicators to **leading indicators – and further to real-time indicators** of risk.

Rather than waiting for an injury or a near-miss report, a Safety-III approach uses continuous monitoring to detect hazards as they develop. As one set of safety researchers put it, the next step is achieving "greater clarity about how to identify and measure hazards in real time to intervene before incidents occur". This means instrumenting the workplace with sensors, computer vision AI, and analytics that can watch for SIF precursors continuously, much like a control room monitors a chemical process. If an unsafe condition arises – e.g. an employee enters a machine's danger zone or a forklift approaches a pedestrian – the system generates an instant alert or even an automated shutdown, rather than relying on someone to notice or a future report.

Intenseye's real-time safety management platform leads the Safety-III approach. It employs computer vision AI, real-time automated observations and data analytics to provide 24/7 "eyes" on the operation. Cameras analyzed by AI can recognize if a worker is missing required PPE, if machine guards are left open, if a person slips or a spill occurs, or if a forklift and person are too close for safety.

This constant vigilance augments human supervision, addressing the reality that people – no matter how well-trained – **can't be everywhere at once and may miss critical moments** due to fatigue or distraction. By contrast, an AI safety "guard" never blinks. When a hazardous situation is detected, the system can immediately notify supervisors or even trigger engineering controls (for instance, slowing a vehicle or sounding an alarm). This real-time loop compresses the traditional sequence of detect → report → analyze → act into an almost instantaneous intervention.

Crucially, adopting **Safety-III** is not just about installing gadgets – it's a **philosophical shift to managing safety like a process in real-time.** Think of a boiler room: operators watch live gauges and alarms to keep pressure and temperature within safe limits. Safety-III brings that mindset to EHS management at large: live "safety dashboards" display the current state of key risk indicators (e.g. **number of open safety violations right now on the floor**), allowing EHS teams to steer conditions back into safe limits before an incident occurs. Instead of treating safety as a retrospective activity (investigating incidents after the fact) or an occasional audit, it becomes an **active control system** that is always on. Early adopters of this approach have seen that it not only prevents accidents, but also accelerates learning – hazards that would have been near-misses or minor incidents become immediate data points to fix, thereby continually strengthening the system.



Industry Focus

Common SIF Hazards in Food & Beverage

Real-time SIF prevention needs to be tailored to the actual hazards of the industry. In Food & Beverage settings – from processing plants and bottling lines to cold storage warehouses – certain high-risk scenarios consistently account for the most serious injuries. Below we highlight these "SIF hotspots" and how a proactive approach addresses them:

1 Slip, Trip, and Fall Hazards

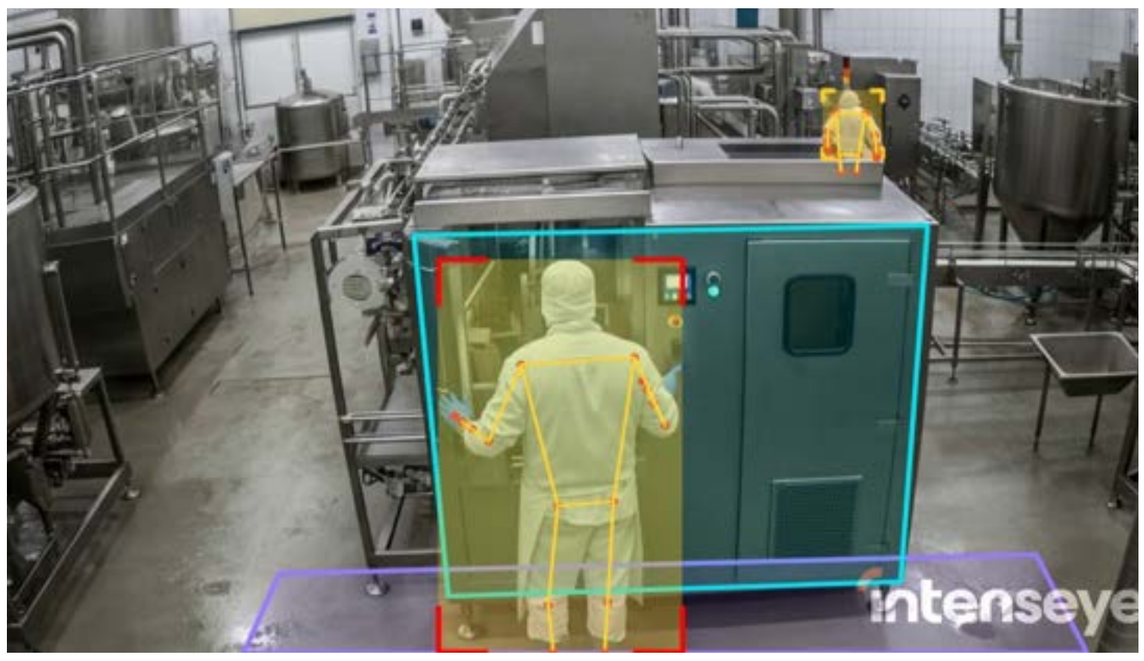
F&B facilities are often wet and fast-moving, making slips and trips a constant threat.

of workers in food processing are more likely to experience a slip/fall than those in other manufacturing sectors due to water, oils, and food debris on floors.

Same-level slips can cause serious injuries (fractures, head trauma), and falls from height (off platforms or tanker trucks during unloading) can be fatal. In fact, falls caused 12 of the 75 food manufacturing fatalities in 2022. Real-time hazard detection can mitigate these by identifying slippery floor conditions or unsafe ladder usage the moment they occur. For example, Intenseye's AI can spot an uncontained spill or wet floor and instantly alert staff to address it. It can also detect when a worker trips or falls, prompting immediate emergency response. By treating every uncontrolled spill or trip as a SIF precursor – not a trivial housekeeping issue – plants can dramatically reduce the chance of a serious fall. (Notably, one Intenseye F&B customer saw their AI system prompt immediate cleanup of slip hazards, contributing to a safer environment and potentially avoiding significant lost-time injuries.)

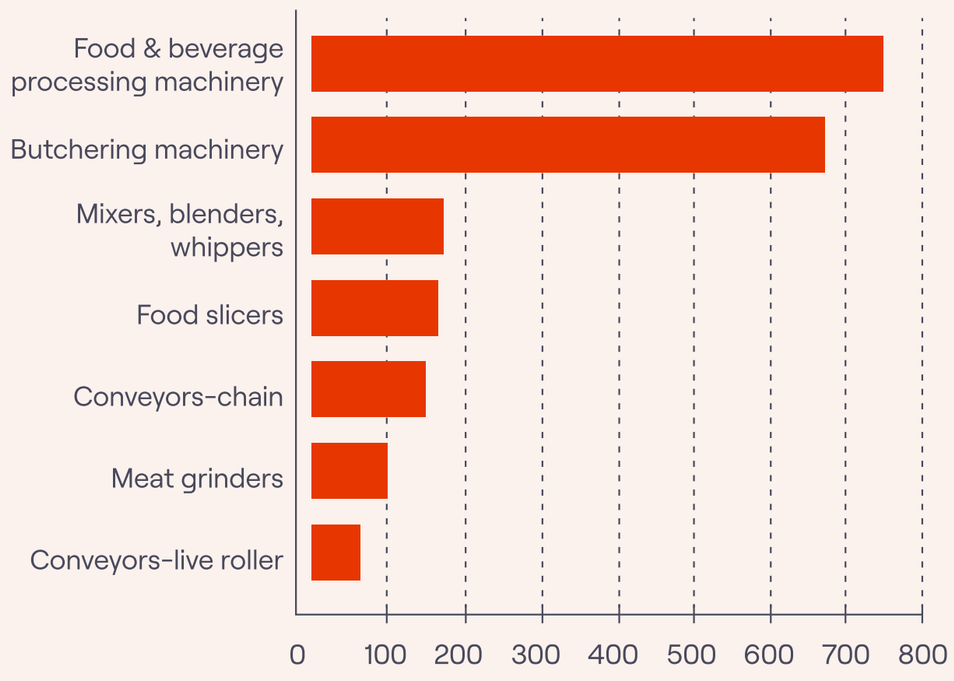
2 Machine Guarding and Lockout Tagout (LOTO) Failures

Food processing involves powerful machinery – mixers, choppers, conveyors, fillers, packaging lines – that can cause amputations or fatalities if proper guards or LOTO procedures are bypassed. OSHA reports hundreds of severe injuries every year from food equipment; between **2015 and 2022, about 1,900 serious injuries** (including amputations) were reported to OSHA from food processing machines like grinders, slicers, and blenders.



SIRs by machine type over the past 7 years

(federal jurisdiction only)



Source: osha.gov

Many occur during cleaning or maintenance when machines unexpectedly energize or when guards are removed. Machine-related SIFs often stem from lapses in controls: failing to lock out power, or workers reaching into machines to clear jams without guarding. Real-time monitoring can significantly reduce these risks. Computer vision can ensure that **guards are in place and workers stay out of "danger zones".**

For instance, Intenseye's system can create a virtual zone around a machine's hazardous area; if a person's body part crosses into that zone while the machine is running, an alert is raised (or the machine can be auto-stopped via integration). Likewise, AI cameras can detect if a machine's access gate is left open or if multiple people enter a confined machinery space when procedures only allow one at a time.

One beverage plant implemented AI-based "line of fire" detection around its palletizer and saw a drastic drop in close calls – employees received audible alerts whenever they stepped under a suspended load or into a robot's swing radius, correcting behavior in real time. On the LOTO front, an AI system can also verify if proper PPE is worn during maintenance (e.g. face shields, cut-resistant gloves) and if a **minimum team count** is present for complex lockout jobs (Intenseye even offers rules to ensure, say, two authorized people are present for certain high-energy tasks). These measures address the root causes identified by OSHA – such as inadequate communication or complacency with lockout – by providing a constant safety net that does not allow critical steps to be skipped unnoticed.

3 Ammonia and Chemical Exposure

Many F&B facilities (dairies, ice cream plants, meat processors, cold storage warehouses, breweries, etc.) use **anhydrous ammonia refrigeration** or other hazardous chemicals (like cleaning acids and disinfectants). Ammonia is a well-known high-severity hazard: it's toxic and can be deadly at 300 ppm concentration, and it's also flammable under certain conditions. A large ammonia leak can endanger dozens of workers at once – for example, a 2021 incident in Georgia saw a release that fortunately caused no injuries, but it occurred just weeks after a separate nitrogen leak at the same plant killed 6 workers.

Because these catastrophic leaks are rare, a complacent culture can develop ("We've never had a big leak, so we're fine") – a classic SIF precursor scenario. Proactive programs treat any sign of abnormal conditions as urgent. Real-time gas sensors integrated with an AI platform can trigger alarms at the first hint of ammonia above safe thresholds, and computer vision can assist by monitoring for behaviors that often precede chemical incidents: e.g. detecting if required **PPE for chemical handling (gloves, face shields, aprons) is missing**, or if an emergency wash station is obstructed.

Intenseye's system can ensure workers are wearing chemical-resistant gloves and face protection when changing out ammonia system valves or using corrosive cleaners, alerting if someone is exposed unprotected. It can also track "time in hazardous area" – ensuring no one spends too long in a ammonia engine room or chemical mixing zone. By enforcing exposure time limits (through features like time-restricted zone monitoring) and flagging unauthorized entries into chemical storage areas, AI helps maintain strict control over chemical hazards.

F&B companies also benefit from AI-driven **process safety audits:** identifying, for example, if a pressure relief vent area is blocked or if hot work is being done without gas monitors. In short, real-time detection acts as a continuous Process Safety Management (PSM) enforcer – a critical need given that compliance gaps in PSM can have catastrophic consequences in this industry.

4 Hot Work and Maintenance Fires

Periodic maintenance in food plants often involves hot work (welding, cutting, grinding) on metal equipment or infrastructure. These tasks carry a high SIF potential: sparks can ignite combustible dust or flammable residues, and improper procedures can lead to explosions.

A stark illustration occurred in 2015 when a welding job at a soybean processing plant ignited vapors, causing an explosion that killed the contractor. In food facilities, even a small welding job (e.g. fixing a conveyor bracket) can trigger a blaze if flour dust or oil residues are present. Safety-III measures ensure no hot work goes unmonitored or unchecked. An AI-based system can detect the heat signature of a hot work operation through an integrated thermal camera.

Intenseye's platform is exploring flame and hot work detection that would immediately alert safety managers when unpermitted hot work occurs or when a welding curtain is missing.

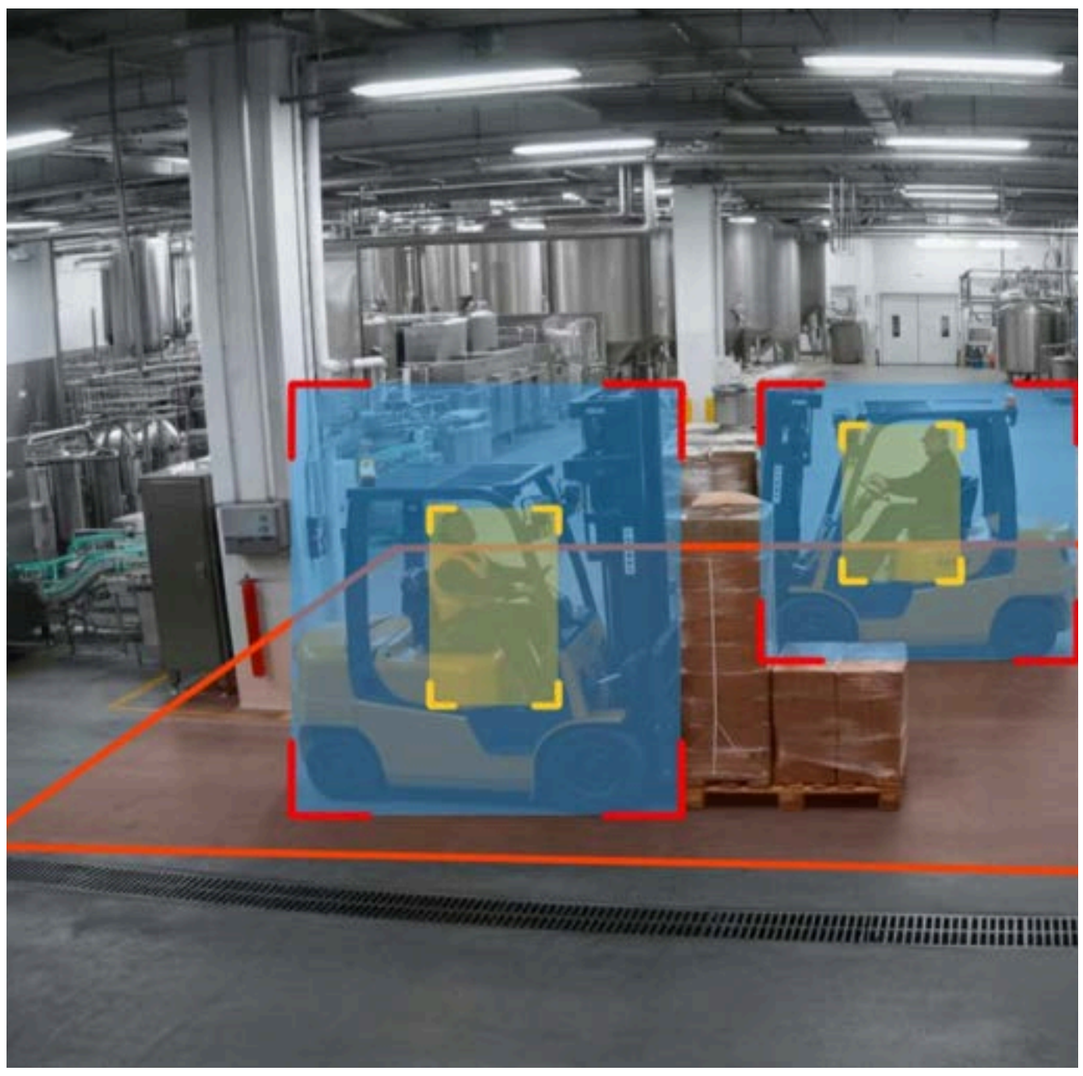
Real-time monitoring also verifies that fire watch personnel are present and that combustible materials have been cleared – think of it as a second set of eyes that "sees" if that acetylene torch is being used outside of designated permit conditions. Furthermore, computer vision can double-check PPE compliance during hot work (e.g. is the worker wearing a face shield and fire-resistant apron?).

By responding to any unauthorized hot work in seconds (e.g. triggering facility alarms or notifying emergency response), such systems **prevent small sparks from becoming infernos.** The result is not only improved worker safety but also asset protection – a critical win-win for operations leaders who fear fires that could halt production for days or weeks.

5 Vehicle and Forklift Interactions

F&B operations often have busy internal traffic – forklifts ferrying ingredients and finished goods, yard trucks at loading docks, Automated Guided Vehicles (AGVs) in larger plants, etc. Tragically, **struck-by incidents** (vehicles hitting pedestrians) are a leading cause of workplace fatalities. In food manufacturing, moving equipment and transport accounted for a significant portion of the fatal injuries in 2022. Given wet or congested floors, forklift skidding or blind corner collisions are constant threats. A proactive approach uses technology to create "virtual barriers" and real-time alerts for vehicle hazards.

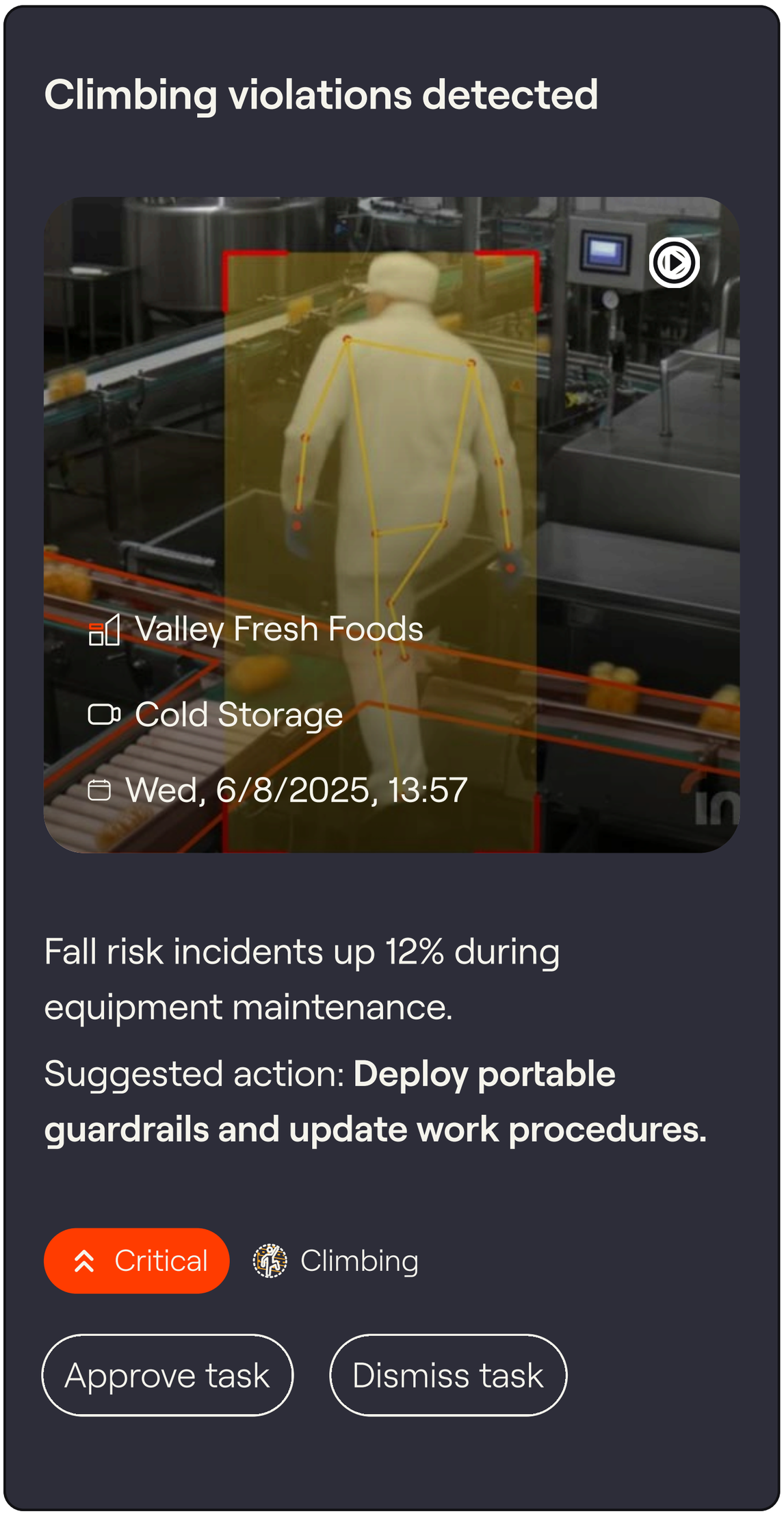
For example, Intenseye's vehicle-pedestrian interaction monitoring watches every forklift and pallet jack, automatically alerting when a pedestrian comes within an unsafe distance or when a driver speeds or bypasses traffic rules. The system can generate heatmaps of near-misses – pinpointing locations in the facility where most forklift-pedestrian close calls occur – enabling managers to add mirrors, floor markings, or barriers in those hotspot zones.

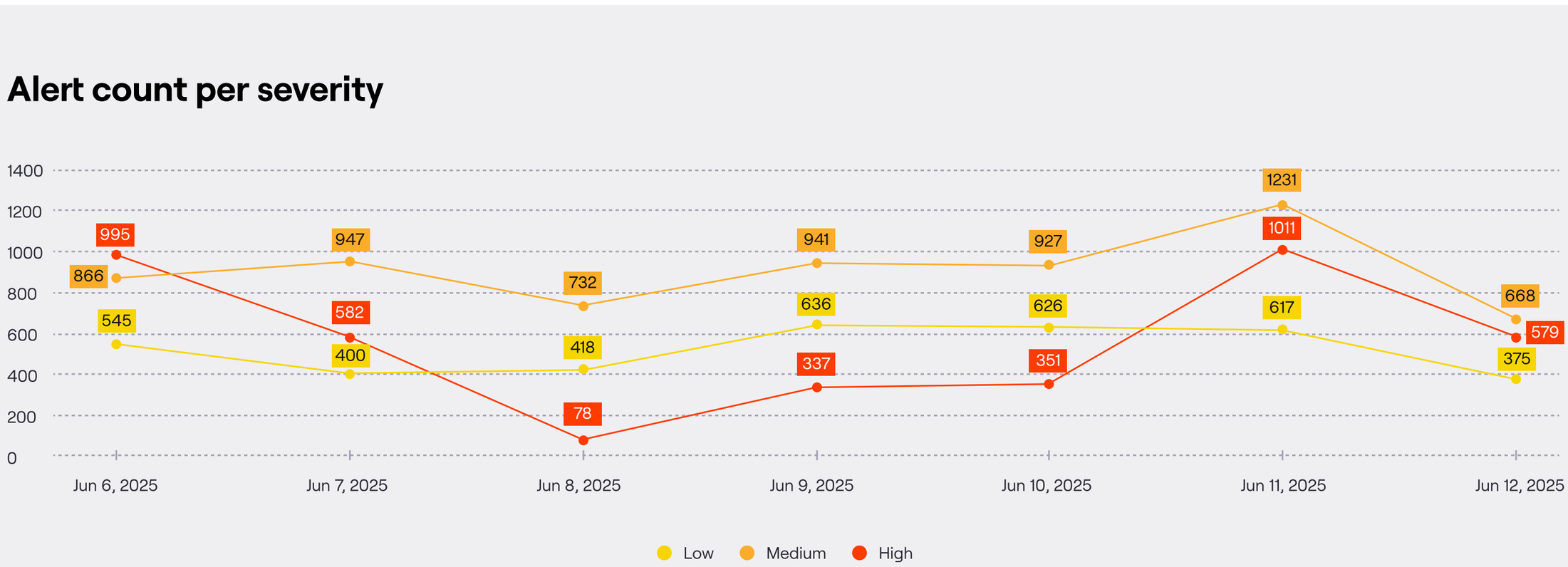


One global beverage manufacturer used such heatmaps to discover that a particular intersection near the bottling line had an outsized share of risky encounters. By redesigning that area's traffic flow and adding AI-alerting, they eliminated those near-misses. The result was a measurable reduction in overall risk exposure time to moving vehicles (more on "risk exposure" metrics later). In essence, real-time tracking of vehicle safety rules transforms mobile equipment from a black box of risk into a transparent, controlled process. Operators become more accountable (knowing unsafe maneuvers are immediately flagged), and pedestrians gain an automatic guardian looking out for them.

Each of the above hazard categories represents a significant SIF exposure in the F&B industry, but all are addressable with the right mix of **engineering controls, training, and real-time monitoring.** A key principle is that **not every incident is equal** – a spilled yogurt might just cause a bruise, but a bypassed machine guard could cause a fatal crush injury. High-performing SIF programs distinguish high-potential incidents from routine safety infractions. For instance, missing a hairnet is a compliance issue; missing a **fall harness while on a roof is a SIF precursor**. By leveraging AI and Safety-III tools, F&B safety leaders can automatically distinguish these, ensuring critical warnings never get lost in the noise.

As Intenseye's data shows, treating every unsafe act as a potential SIF can overwhelm teams, so the smart approach is to **filter and prioritize risks by severity**. Real-time systems do this by categorizing alerts (low/medium/high) based on the likelihood of serious injury – for example, an employee without earplugs might be tagged "low" severity, whereas an employee without lockout protection in a high-voltage area would trigger a "high" severity alert that demands immediate intervention.





Building a Proactive Safety Culture with AI

Case Study

ABOUT

Swire Coca-Cola

Swire Coca-Cola, a major beverage bottler with 36 production facilities and over 37,000 employees worldwide, provides a compelling example of SIF prevention through real-time management.

INDUSTRY

Food & Beverage

COMPANY SIZE

Mid Market (37,000+)

In 2022, Swire Coca-Cola partnered with Intenseye to strengthen safety across its operations (spanning the U.S. and Asia). The focus was on using AI to capture unsafe situations that traditional audits and reporting were missing. The results after implementation were striking: within one year, Swire achieved a **27% decrease in Lost Day Rate (LDR)** – a key injury severity metric – as compared to the prior year. This improvement in LDR (lost workday cases per 200,000 hours) suggests a significant drop in serious incidents causing time away from work.

How did they get there? The Intenseye platform was deployed across multiple Swire plants, tapping into existing CCTV cameras on production lines, loading docks, and high-risk areas. AI algorithms were configured to detect SIF precursors relevant to Swire's operations – such as forklift speeding or pedestrian encroachment in forklift zones, employees working at height without fall protection, missing PPE in production areas, and unsafe interactions with machinery. Almost immediately, the system began capturing far more safety data than the human eye ever could. In fact, Swire found that **AI identified 200× more unsafe acts and conditions than their manual observation methods** had been logging. This included hundreds of near-miss events that had previously gone unnoticed – each one a potential fatal incident in the making.

For example, over a one-month period, Intenseye's cameras at a Swire beverage plant in the U.S. **flagged multiple instances of palletizer operators reaching into the machine without using the lockout procedure.** Each time, the system's alert enabled the supervisors to intervene immediately – coaching the worker and enforcing the proper guarding.

These were incidents that never would have been captured in traditional safety metrics (since thankfully no injury occurred), yet they were precisely the kind of high-potential events that could have led to amputations. By surfacing these hidden precursors, Swire's safety team was able to take targeted preventive action (retraining certain crews, revising SOPs for clearing jams, even minor engineering fixes on the palletizer to make access safer). This proactive intervention is reflected in their LDR reduction – fewer accidents were occurring because the precursors were being eliminated.

Another area of impact was **forklift-pedestrian safety.** Within weeks of deploying Intenseye, Swire's dashboards revealed a pattern of near misses at specific times (shift changes) and locations (the finished goods warehouse). The AI had been tracking "hazard zone entries" – essentially how often someone on foot came within an unsafe radius of a moving forklift. Initially, the cumulative "risk exposure time" to this hazard was high – reports showed workers were unwittingly exposed to active forklifts for several hours each week.

Upon seeing this data, site management took action: they reconfigured foot traffic routes and implemented AI-triggered audio alarms on forklifts. The payoff was evident: **within weeks, risk exposure dropped to just 3 minutes** per week in that area, a dramatic reduction from the baseline (which had been over 3 hours). In other words, the time during which a serious forklift strike could have happened was nearly eliminated by engineering and administrative changes, guided by AI analytics.

The improvements weren't just visible on the dashboards–they were felt by the workers on the floor. A forklift operator at Swire Coca-Cola shared: "In the past, our supervisors had to keep reminding teams to wear reflective vests. After Intenseye was implemented, we observed everyone starting to put on their reflective vests without being asked when entering the warehouse. We can already see the system is having a positive influence on safety behavior."

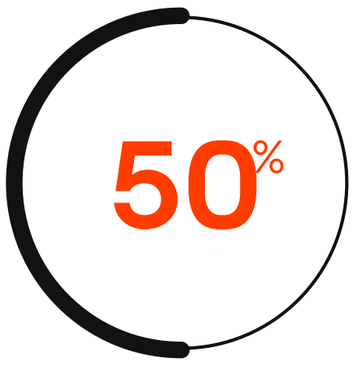
Swire's leadership also credits the **real-time Safety Score** tracking for driving a cultural shift. Intenseye provides a composite "safety score" for each site and for key risk categories (like vehicle safety, PPE compliance, etc.), updated continuously based on the latest observations. At Swire, if a site's safety score dipped, it was visible to all EHS and operations leaders on their dashboards – sparking immediate discussions on why (e.g. "Safety score for vehicle safety in Houston is down by 35%, what happened this week?").

This healthy pressure nudged local teams to respond faster. For instance, one month a China facility saw its **"Working at Height compliance" score drop** after several harness violations were flagged; corporate EHS quickly reached out and an internal safety stand-down was held to address the issue that same week. In the past, such a trend might only be discovered in a quarterly audit or after an injury. Now it was caught and corrected in real-time, preventing potential falls.

Vasilii Gusko

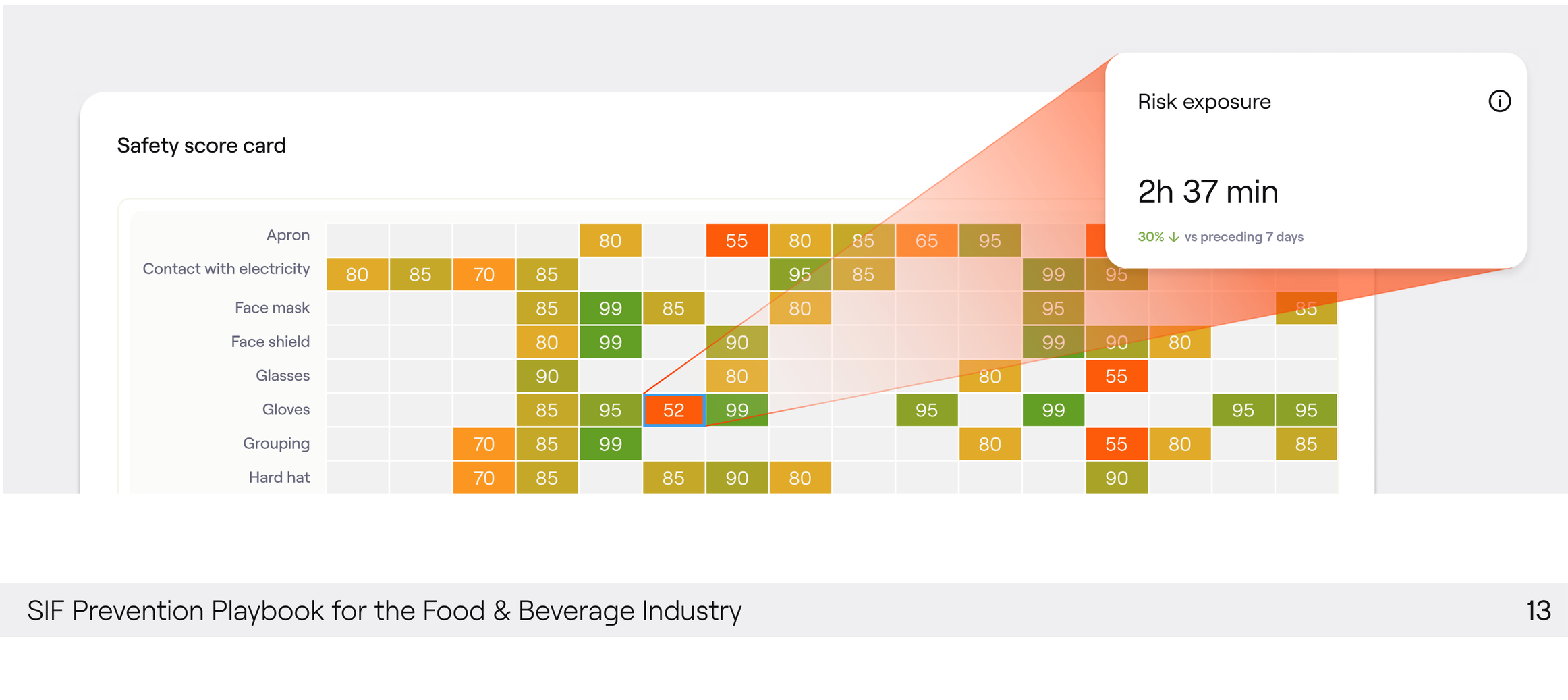
Swire Coca-Cola,
Supply Chain Director

"Within just six months of implementing Intenseye, we've seen great improvements in our operational efficiency and safety culture... We intend to extend AI technology to more facilities and further develop the project."



The success at initial sites has Swire planning broader adoption, aiming for a 50% reduction in Total Incident Rate (TIR) by 2030 as part of their "Vision Zero" commitment.

Swire's case shows that even in a complex, global F&B operation, real-time Safety-III methods can integrate seamlessly (using existing cameras), and deliver measurable SIF prevention results in a short time frame.



90% Hazard Reduction at a Global Beverage Manufacturer

Case Study

ABOUT

A leading food & beverage manufacturer (anonymized here), which achieved an **astounding 90% reduction in unsafe acts and conditions within 6 months** by leveraging AI-driven SIF prevention.

INDUSTRY

Food & Beverage

COMPANY SIZE

40,000+ employees
50+ facilities

A second case study comes from a leading food & beverage manufacturer headquartered in Japan produces a wide range of beverages (including beer, spirits, and non-alcoholics). Despite a strong traditional safety program, they faced a challenge familiar to many large enterprises: how to **proactively identify critical hazards** consistently across all sites before incidents occur. They had plenty of data on past incidents and some near-miss reporting, but the EHS leadership suspected that many high-potential near misses were still "flying under the radar," leaving the company reactive rather than preventive.

Upon deploying Intenseye's real-time safety platform, their focus was on a few SIF-heavy categories: ensuring effective **PPE compliance**, reinforcing behavior-based safety (e.g. proper use of tools and adherence to safe work procedures), and enhancing **vehicle movement safety** in warehouses. The AI began monitoring dozens of rules, from **workers at height without harnesses, to unauthorized entry into forklift aisles, to detection of spills and trip hazards, to verifying PPE** on the line. Very quickly, the system started to "make the unseen visible." In one facility, for example, Intenseye alerted that on night shifts a particular stairway was often used in the dark with a temporary light out – a hazard that hadn't been reported. In another, the heatmap feature revealed that near-misses (like sudden stops of forklifts to avoid collision) were clustering at one intersection in the plant. By aggregating these observations, the company gained a clear picture of where the **highest risks** were occurring enterprise-wide, and could prioritize those for intervention.

The results speak to the power of this data-driven approach: in just the first half-year, the manufacturer realized a **90% reduction in unsafe acts and conditions** (as recorded by the AI system). This means that instances of SIF precursor behaviors – such as walking under a suspended load, bypassing a guard, not wearing required PPE in a hazardous area – dropped to just 10% of what they were before.

Such a rapid and steep decline is rare in safety, and it was achieved by systematically addressing the specific high-risk behaviors the AI highlighted. The platform's **"leading indicators"** enabled targeted improvements: for example, data showed a high frequency of **"falls from height potentials"** (workers on ladders without proper fall protection), so they launched a campaign and engineering fixes (installing tie-off points, adding AI camera coverage on mezzanines) to tackle that. Similarly, the AI flagged frequent **forklift speeding events** in one warehouse; in response, the company implemented speed-limiting devices on those trucks and introduced floor sensors to enforce slow zones. Each feedback loop – identify hazard, implement control, see hazard frequency drop on the dashboard – contributed to the overall **90% reduction.**

Beyond just avoiding injuries, this proactive SIF prevention drive yielded substantial **operational and financial benefits** for the company. They observed fewer unplanned work stoppages (since near-misses and minor incidents that would halt production virtually disappeared), lower workers' compensation and insurance costs (with incident rates dropping), and improved employee morale. Notably, the workforce responded positively to the transparency – when they saw that every unsafe act was noticed and addressed (in a non-punitive way), they took safety even more seriously.

This aligns with building **a strong safety culture**: when employees know that management is watching leading indicators just as closely as lagging ones, it reinforces that safety truly is a core value.

The company's EHS director noted that Intenseye's **Leading Indicators Safety Score** became "invaluable for pinpointing where to concentrate our efforts effectively… providing clear data points and insights to identify critical areas and track safety performance across all operations".

In essence, the AI platform acted like an epidemiologist for safety, diagnosing the "disease vectors" of serious incidents so they could be stamped out systematically.

This case also illustrated how **global companies can standardize SIF prevention** with technology. With sites across dozens of countries, it was historically hard to ensure the same level of safety oversight everywhere. By rolling out a unified AI system, this manufacturer gained a global view of risk. Their dashboard could show, for instance, how the **safety scores** of different plants compare, or how many high-severity alerts each site had this week. Senior executives could celebrate sites with excellent leading indicator performance and direct attention (and resources) to those that were lagging.

Over time, this created a positive competition and knowledge-sharing between plants ("How did you achieve a 50% reduction in line-of-fire events? Let's adopt those practices here."). The result is a rising tide lifting all boats – and a major step toward the company's vision of zero harm. In fact, the company has publicly positioned itself as an innovator in safety, citing this AI-driven SIF prevention as a key part of its ESG commitments. The message to other F&B firms is clear: **harnessing technology not only saves lives but also bolsters reputation and efficiency.**

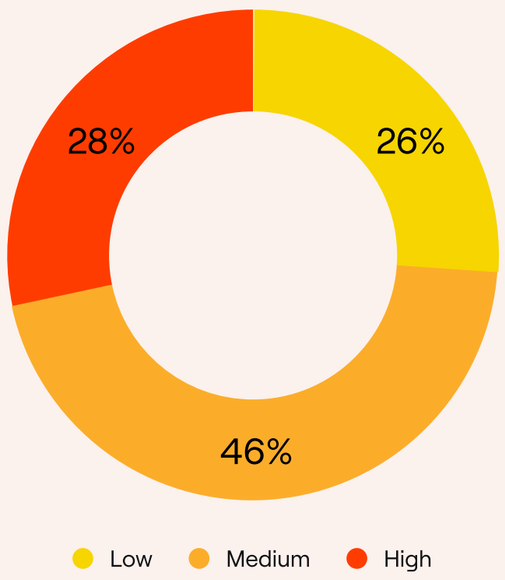
Data-Driven Safety

Turning Analytics into Action

Real-time SIF prevention generates a wealth of safety data. The challenge (and opportunity) for EHS leaders is to convert that data into actionable insights. Intenseye and similar platforms typically provide **visualizations and analytics tools** to make sense of thousands of safety observations. Here are a few key analytics that a "Safety-III" program uses to drive decisions, with examples of their use in F&B environments:

1 Severity Distribution Charts

Severity distribution - All facilities



Intenseye's platform allows filtering data by site, time, and severity, and linking severity levels to corrective actions. In practice, an EHS manager might pull up a chart for "last quarter, all high-severity observations" and see the breakdown – perhaps 30% were related to working at height, 25% to forklift near-hits, etc. That insight directly informs where to allocate safety resources and which issues to escalate to leadership.

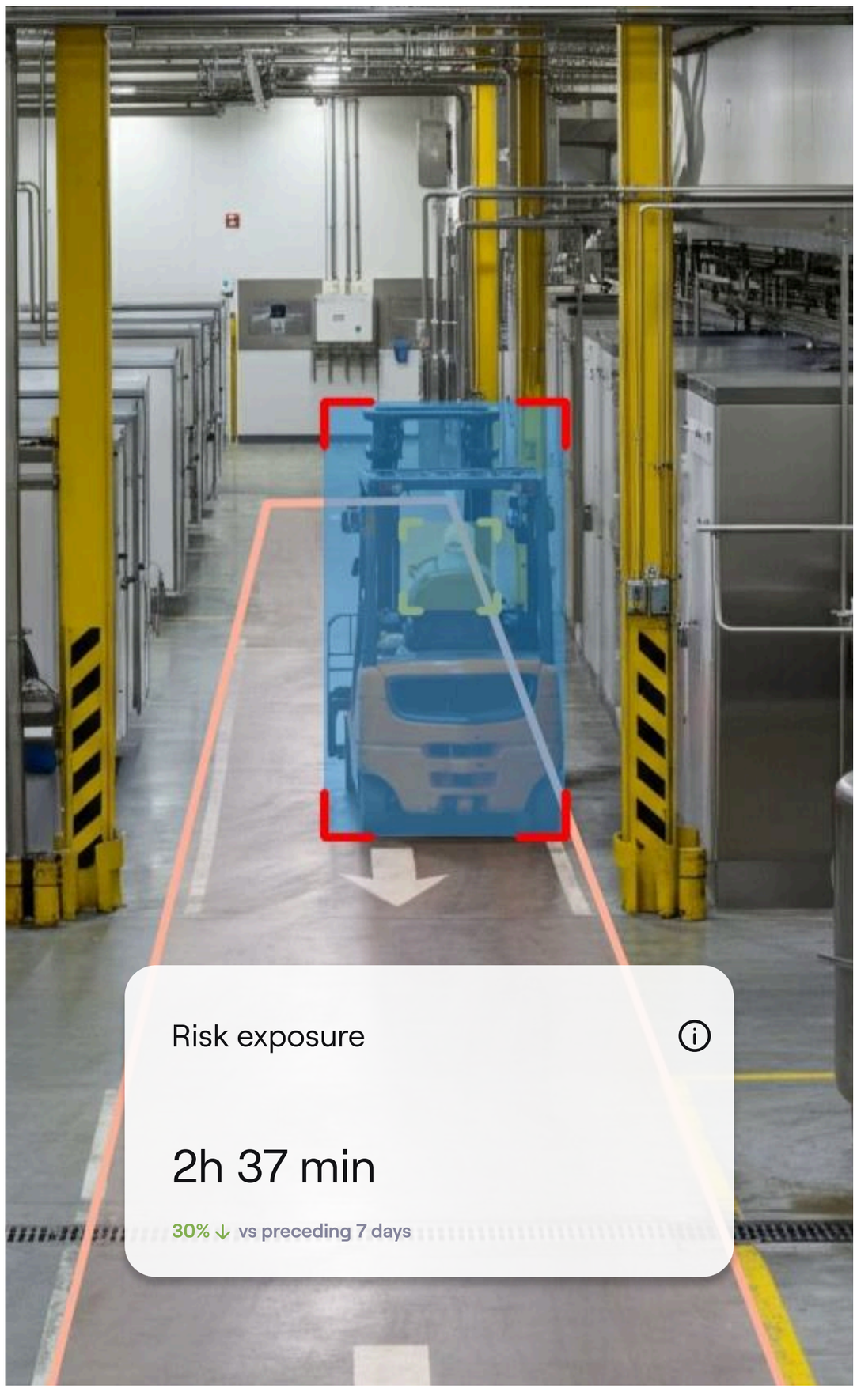
Not all safety observations are equally critical. Severity charts categorize each event or observation (low, medium, high) based on its potential consequence. F&B safety teams can use these charts to ensure they don't get distracted by high volumes of low-severity events while a few critical risks lurk in the background.

For example, a weekly severity chart might show that 36% of alerts were "high severity" (e.g. dangerous behaviors), 24% "medium," and 40% "low". If one site shows a higher proportion of high-severity alerts, that's a flag to investigate further. These charts also help in recognizing patterns: **"High frequency vs. high severity" – a type of risk that happens often (like missing hairnets) isn't necessarily severe, whereas some tasks are inherently high-severity even if issues are rare (like any lapse in lockout/tagout)**.

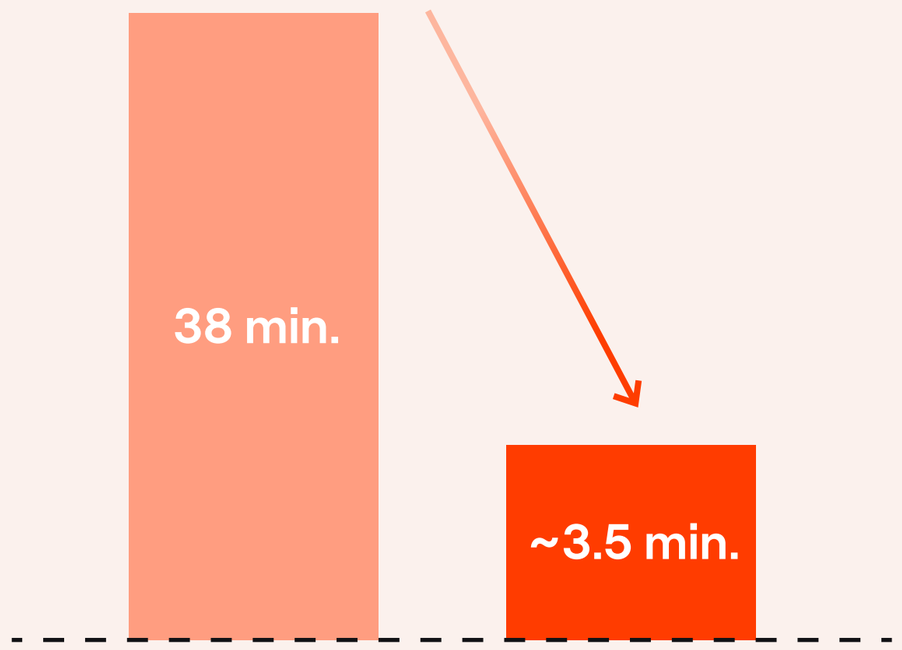
By visualizing this, leaders can avoid complacency ("we had only one PPE miss this week!" – yes, but it was during live electrical work, so it's a big deal).

2 Risk Exposure Timelines

One of the more novel metrics introduced by real-time safety management is **“risk exposure duration.”** This measures how long workers are exposed to a certain hazard or how long unsafe conditions persist before being resolved. For example, how many total minutes were workers unprotected at height this week? How long was that wet floor left unaddressed? Or, as in the Swire case, how much cumulative time were people in close proximity to moving forklifts? Tracking this over time is powerful. You want to see those exposure durations trending downward – it means hazards are being mitigated faster and workers are less exposed.



In one Intenseye use case, a site identified that each day, there were on average hours of “head protection risk” (time workers spent in areas requiring hardhats without actually wearing one).



By using automated alerts and supervisor coaching, they cut that drastically – one chart showed **a drop from 38 minutes of head protection risk in one week down to just ~3.5 minutes in a subsequent week.**

These kinds of timelines can be plotted in dashboards, showing, say, a line graph of “total unprotected exposure time” falling week over week. It’s an excellent leading indicator of SIF prevention, because the shorter the exposure, the lower the chance for a bad outcome. If you remove 99% of the time someone could get hurt, you’ve almost entirely eliminated that risk. EHS leaders can set targets like “reduce exposure to forklift traffic by X%” and use the AI data to measure it in near real-time. It’s a very different mindset from “let’s reduce accidents by 10% this year,” yet it directly correlates – less exposure to hazards eventually means fewer accidents.

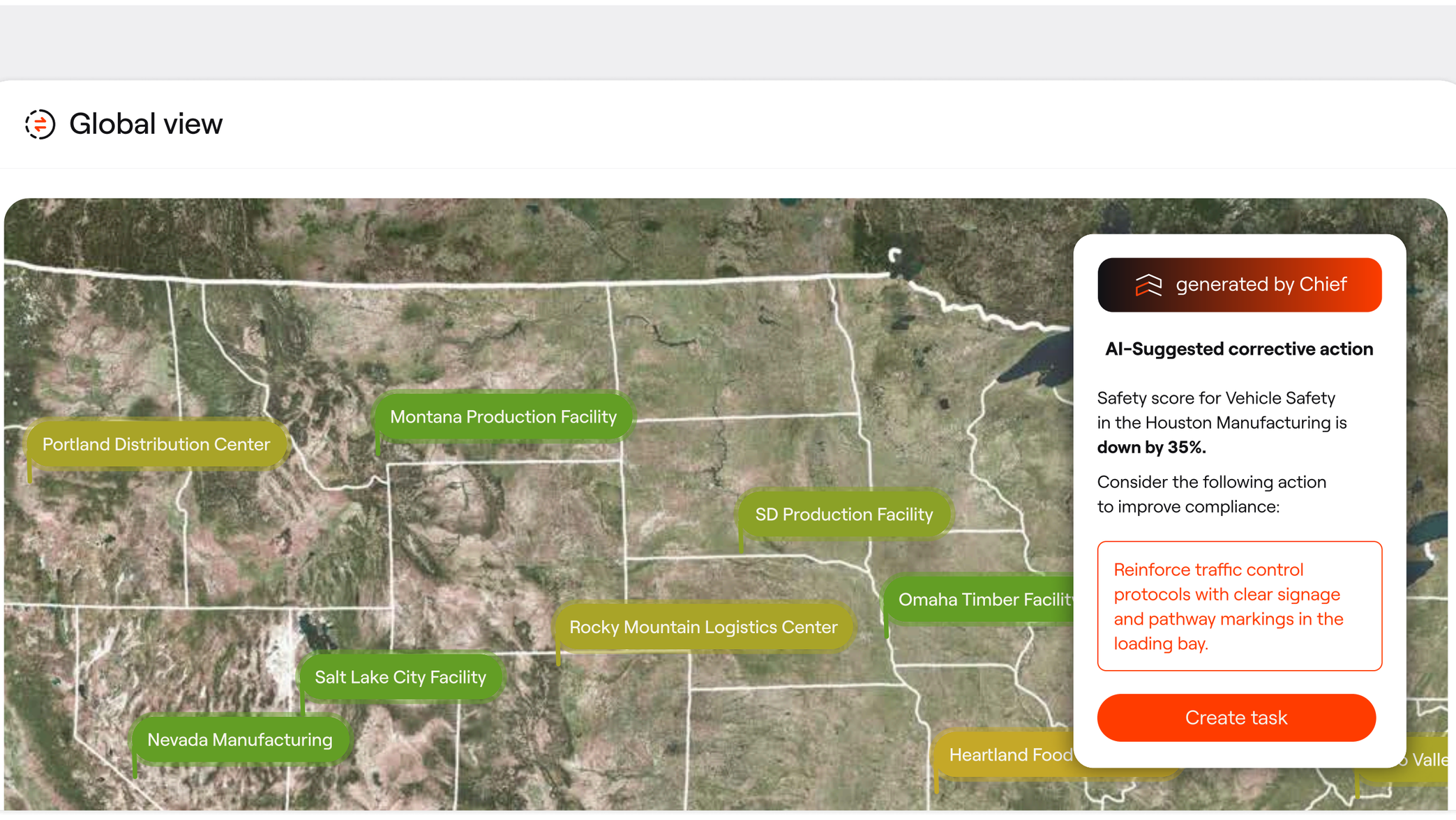
3 pSIF Safety Scores and Trendlines

As mentioned, many advanced safety platforms distill various metrics into a composite **pSIF Safety Score.** This score can be overall or category-specific (e.g. a score for PPE compliance, a score for chemical safety). It functions similarly to a credit score or a quality index – easy to communicate and track at high levels.

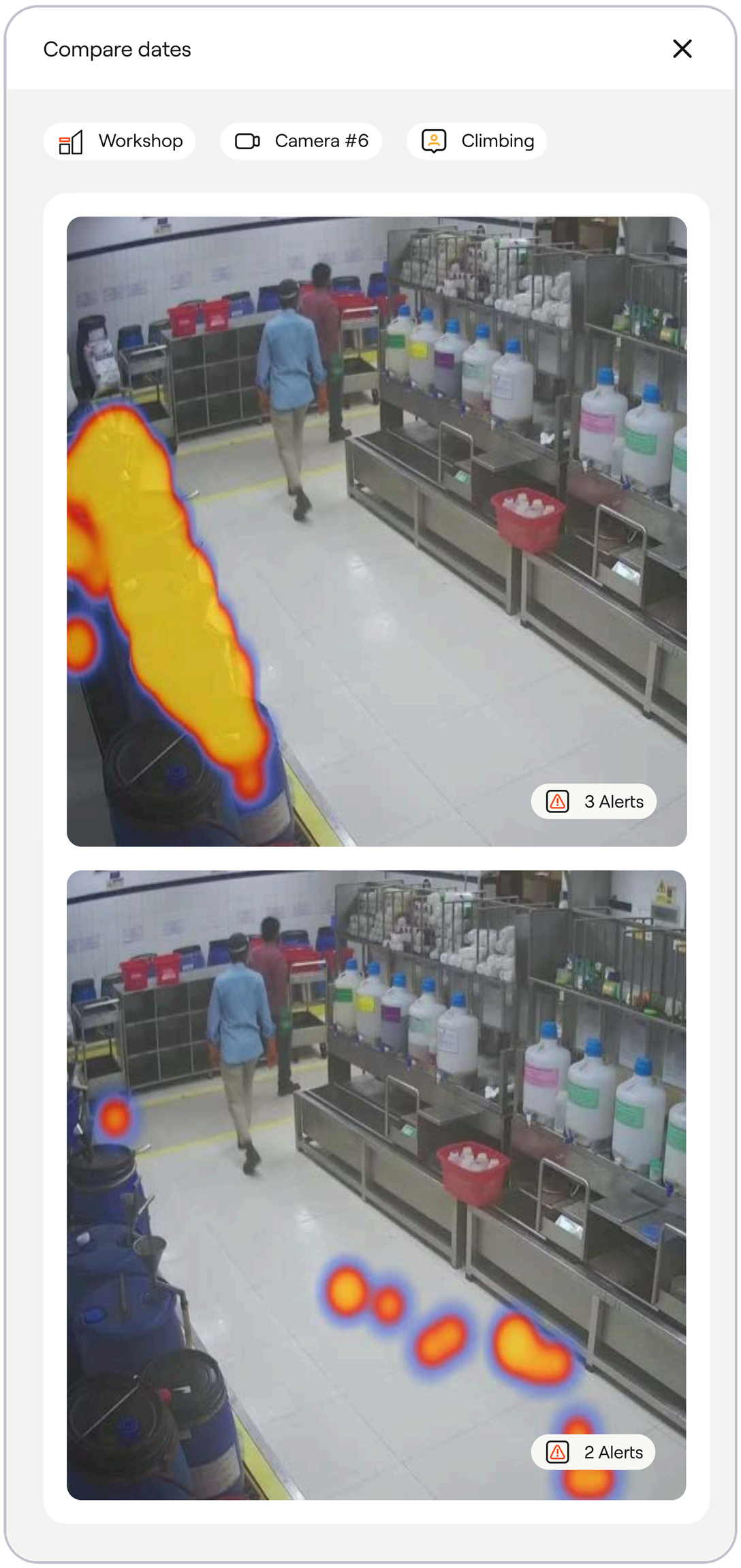
For instance, a site might have a Vehicle Safety score of 88/100 this month, up from 80/100 last month, reflecting improvements after new forklift training. Executives and managers can quickly grasp these scores and include them in KPIs. More importantly, the trend over time is what matters: a rising score means safer conditions, a dropping score flags a concern.

Intenseye's Chief (AI advisor) even auto-generates suggestions when a score drops, as seen in an example where a 35% drop in a Houston facility's vehicle safety score prompted an AI-suggested action: "Reinforce traffic control protocols with clear signage and pathway markings in the loading bay.". This integration of analytics with recommended actions is a game changer – it closes the loop from insight to intervention. Safety leaders no longer have to guess what to do; the system helps prioritize.

In use, a safety score might dip if, say, there were multiple high-risk alerts in a short period; the platform will highlight that and might even pinpoint which process or department drove the change. It essentially provides an early warning system for safety performance, allowing time to react before an actual incident ensues.



4 Heatmaps and Spatial Analysis



A picture is worth a thousand data points. **Safety heatmaps** overlay incident and observation data onto facility layouts or maps, using color coding to show hotspots. In F&B plants, these are incredibly useful for visualizing where hazards concentrate – for example, a heatmap of "slip incidents" might glow red in the raw receiving area where floors are often wet, or a heatmap of "PPE non-compliance" might highlight a particular production line where perhaps compliance culture is weaker. Intenseye's Visual Analytics module provides dynamic, color-coded floorplan heatmaps that **instantly reveal high-risk areas for things like PPE misses, slip/trip events, or near-misses.** This helps teams answer the "where" question in SIF prevention. By examining heatmaps, one global F&B manufacturer discovered that one corner of a packaging area had an outsize number of pallet jack incidents – it turned out to be poorly lit and had a blind turn. With that insight, they improved lighting and added a mirror, and the heatmap cooled off (i.e., the cluster of events disappeared).

Heatmaps also allow for **before-and-after comparisons.** After an intervention, you can literally see the color intensity reduce in an area if it's working. As **Intenseye notes**, teams can "see the tangible impact of safety interventions with trend data and historical comparisons" on the heatmap overlays. This not only validates that solutions are effective but also is a persuasive visual for senior management – it makes safety improvements (often invisible) very concrete. For multi-site companies, a global map (as shown in Intenseye's platform) can display site safety status at a glance, with each facility's risk level indicated (e.g., green/yellow/red).

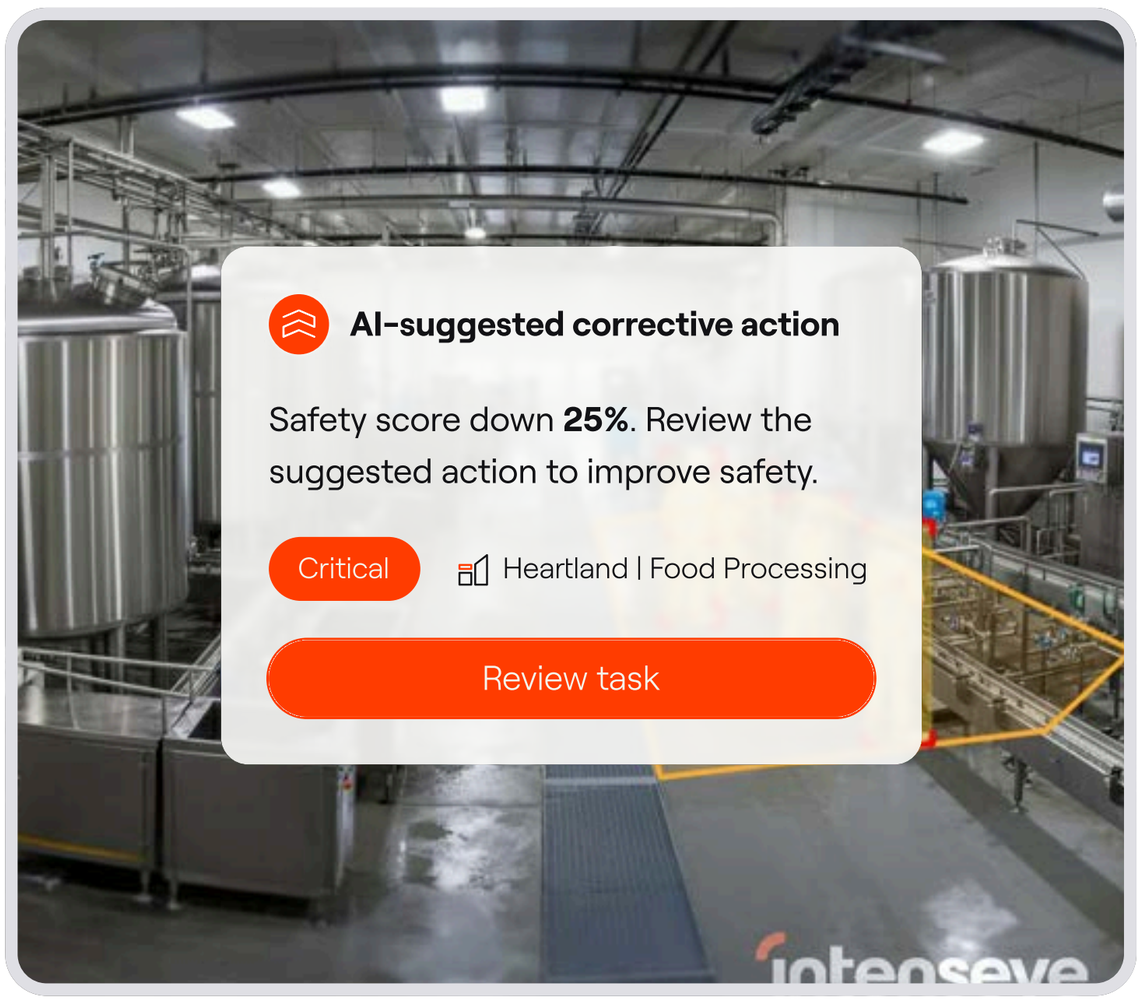
In the SIF prevention control room, an EHS director can literally have a map of all plants and focus attention on any that light up in warning colors. Modern systems even let you drill down: click on a site dot and see that site's internal heatmaps, recent alerts, and so on – bringing unparalleled situational awareness.

5 AI-Suggested Actions and Automated Insights

The ultimate goal of analytics is driving action. Intenseye's platform, for example, doesn't just display numbers; it uses AI (branded "Chief") to highlight the most critical issues and suggest next steps. As seen earlier, if a safety score drops or if a certain SIF precursor spikes in frequency, the system might prompt a specific corrective action ("Increase supervision during cleaning shifts in the Mixing Room" or "Check machine guard interlocks on Line 3"). This helps less-experienced safety supervisors to know where to focus.

It also ensures nothing falls through the cracks when dealing with hundreds of data points. Furthermore, some platforms gamify or benchmark performance: e.g. showing how one plant ranks versus peers in leading indicators, or notifying if a site achieved, say, **50 days with no high-severity alerts** (which can be celebrated). All of this data-driven approach marks a shift to managing safety with the same rigor and real-time feedback that one would manage production quality or efficiency. Instead of annual safety plans gathering dust, the plan can adjust dynamically based on what the data reveals each week.

In summary, **data analytics turn the raw "firehose" of real-time safety data into actionable intelligence**. EHS leaders in F&B should leverage these tools to continuously refine their SIF prevention strategy. By tracking the right leading indicators and visualizing them effectively, companies can preempt the next accident with a level of precision and confidence unimaginable in the era of lagging indicators alone.



As one safety executive remarked, "What gets measured improves. And cameras have no bias or excuses." – meaning that by measuring things like near-miss frequency, hazard exposure time, and compliance rates with unblinking accuracy, we inevitably drive those numbers in the right direction.

Actionable Steps for EHS Leaders

Implementing a real-time SIF prevention program in the Food & Beverage industry might sound complex, but it can be broken down into clear steps. Below is a playbook for EHS and operations leaders to drive this transformation:

1 Identify Your SIF Precursors

Begin by assessing what serious injury/fatality scenarios are most relevant to your operations. Use historical data, industry stats, and site walk-throughs. Common F&B SIF precursors include unprotected work at height, defeated machine guards, uncontrolled energy during maintenance, forklift near-hits, uncontrolled spills, confined space entries, and chemical leaks.

Rank these by potential severity. Action: Make a "Top 5 Fatal Risks" list for your facilities (it might look similar to our list of hazards above). Ensure each has at least one leading indicator you can monitor (e.g., instances of forklifts and people in close proximity, instances of maintenance without LOTO applied, etc.).

2 Leverage Technology for Real-Time Monitoring

Explore solutions that can continuously watch those precursors. This could involve computer vision AI (like Intenseye's platform) using your existing CCTV cameras, wearable devices for workers (to detect falls or no-motion man-down events), and environmental sensors (for things like ammonia levels, temperature, etc.). When evaluating vendors, focus on those that offer out-of-the-box detection for your key scenarios (for instance, PPE detection specific to food manufacturing, slip detection, forklift monitoring).

In a pilot, start with a high-risk area – many companies choose a bottling line or a packaging area with heavy forklift traffic as a testbed. Ensure IT and security teams are on board early, since deploying these systems involves networking and data governance (Intenseye and similar systems can operate on-premise or cloud with strict privacy measures – e.g., video is analyzed but not stored to protect privacy). The goal is to quickly get a "safety nerve system" up and running.

3 Integrate and Automate Responses

For truly proactive control, connect the monitoring system to your response workflows. This can be as simple as configuring real-time alerts to supervisors' phones or as advanced as integrating with machine controls (e.g. the AI detects a person in a restricted zone and sends a stop signal to a conveyor). Many F&B companies integrate their safety AI with existing EHS management software or incident log systems, so that any high-severity alert automatically generates an incident report or a ticket in the maintenance system.

Define clear protocols: when an alert comes (say a worker not wearing a hardhat in a hardhat area), who gets notified? Should production stop immediately for certain critical violations? Having predefined responses ensures the data leads to action. Some organizations form a small "safety ops center" team that watches the live dashboard during critical shifts (just like a security control room). But even without dedicated staff, automated email/SMS alerts and weekly summary reports can keep everyone informed in near-real-time.

4 Train and Engage the Workforce

Introducing AI and cameras can raise employee questions. It's vital to communicate that this is not "Big Brother" to punish people, but a safety enhancement to protect them. Emphasize the positive intent and how it will prevent injuries and save lives.

Many companies hold safety town halls or toolbox talks to introduce the system, even showcasing example detections (often anonymized) to illustrate how it works. Involve frontline workers in setting it up – for example, ask operators what close calls they worry about, and show how the system will address those.
This fosters buy-in and even enthusiasm.

In practice, once workers see hazards being fixed quickly (that they themselves may have been concerned about), trust in the system grows. Also, train supervisors on interpreting the dashboards and responding appropriately to alerts. They should use alerts as coaching opportunities, not witch-hunts. When someone is caught doing something unsafe, the conversation should be "Let's talk about why this happened and how to do it safely," reinforcing a learning culture. Over time, the workforce can even become your "eyes" to validate and improve the AI – encouraging them to report any false alarms or missed detections will help fine-tune the system.

5 Use Leading Indicators in Goals and Incentives

Shift your safety performance tracking to include the new metrics. For example, set targets like "Reduce high-severity alerts by 30% next quarter" or "Increase PPE compliance rate to 98% in high-hazard areas." These should complement traditional lagging goals (like injury rate reduction), creating a more balanced scorecard.

Some organizations have started reporting leading indicator achievements to executives and even in sustainability reports (e.g., "We resolved 5,000 unsafe conditions proactively this year, and reduced average hazard resolution time by 50%").

Recognize teams or plants that excel in these proactive measures. If a facility manages to go a month without any high-severity incident alerts, celebrate it just as you would celebrate a month with zero recordables.

> Tying recognition and even bonuses to leading indicator performance can powerfully reinforce the desired behavior at all levels.

6 Iterate and Expand

Treat the SIF prevention initiative as a continuous improvement cycle. Analyze which alerts are most frequent and why – this often points to underlying system issues. For example, if you're getting dozens of "slip hazard" alerts in a particular area, maybe it's time to engineer a solution (improve drainage or install anti-slip flooring) rather than just responding case by case. Use the data to prioritize safety investments. Likewise, be ready to update the AI's rules – maybe you add new ones as you identify new risks, or adjust sensitivity to reduce noise. Roll out the proven solutions to other sites.

One plant's success with a near-miss reduction can be templated for others. Many Intenseye customers form a cross-site safety analytics team that reviews the company-wide data weekly to spot trends and share best practices. The idea is to create a feedback loop: data → insight → action → safer workplace → new data (hopefully showing improvement) → and back again. Over a year or two, this can transform the safety trajectory of a company. As evidence, recall that the beverage manufacturer above not only cut hazards 90%, but saw broader operational benefits from this evolution.

7 Drive Cultural Change

Finally, technology alone isn't a silver bullet – it must be coupled with a cultural commitment to safety. Use the excitement around real-time safety monitoring to reinvigorate your safety culture.

Reinforce the message that **"every worker is a safety sensor"** too – encourage them to keep reporting hazards and near-misses even as AI monitors things (human judgment and context are still crucial). Build trust by using the data constructively: focus on fixing systems and processes, not blaming individuals. Over time, as workers see proactive fixes and fewer injuries, a culture of **"we predict and prevent"** takes hold.

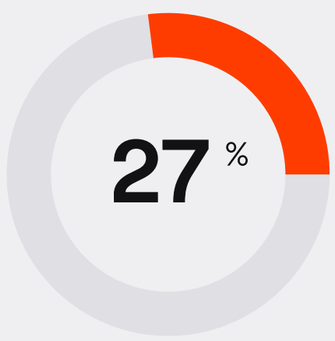
In Safety-III, the motto might be "the best accident is the one that never happened – and we have the data to prove how we averted it." When leadership consistently emphasizes that preventing SIFs is the top priority, and backs it up with investment in tools and training, it creates alignment from the boardroom to the shop floor.

The Food & Beverage industry often has production and quality as dominant priorities; this is an opportunity to put safety on equal footing by using the same real-time, data-driven management techniques that have made those other domains successful.

Conclusion

Real-time Safety as a Competitive Advantage

The Food and Beverage industry faces unique and formidable safety risks, but it also stands to gain tremendously from the new wave of proactive, data-driven safety management. By moving beyond lagging indicators and embracing real-time **"Safety-III"** practices, F&B companies can finally crack the code on SIF prevention – **saving lives and preventing life-altering injuries, while also improving operational efficiency.** The two case studies highlighted – Swire Coca-Cola and the global beverage manufacturer – demonstrate that dramatic improvements are possible.



reduction in lost-time injury rates

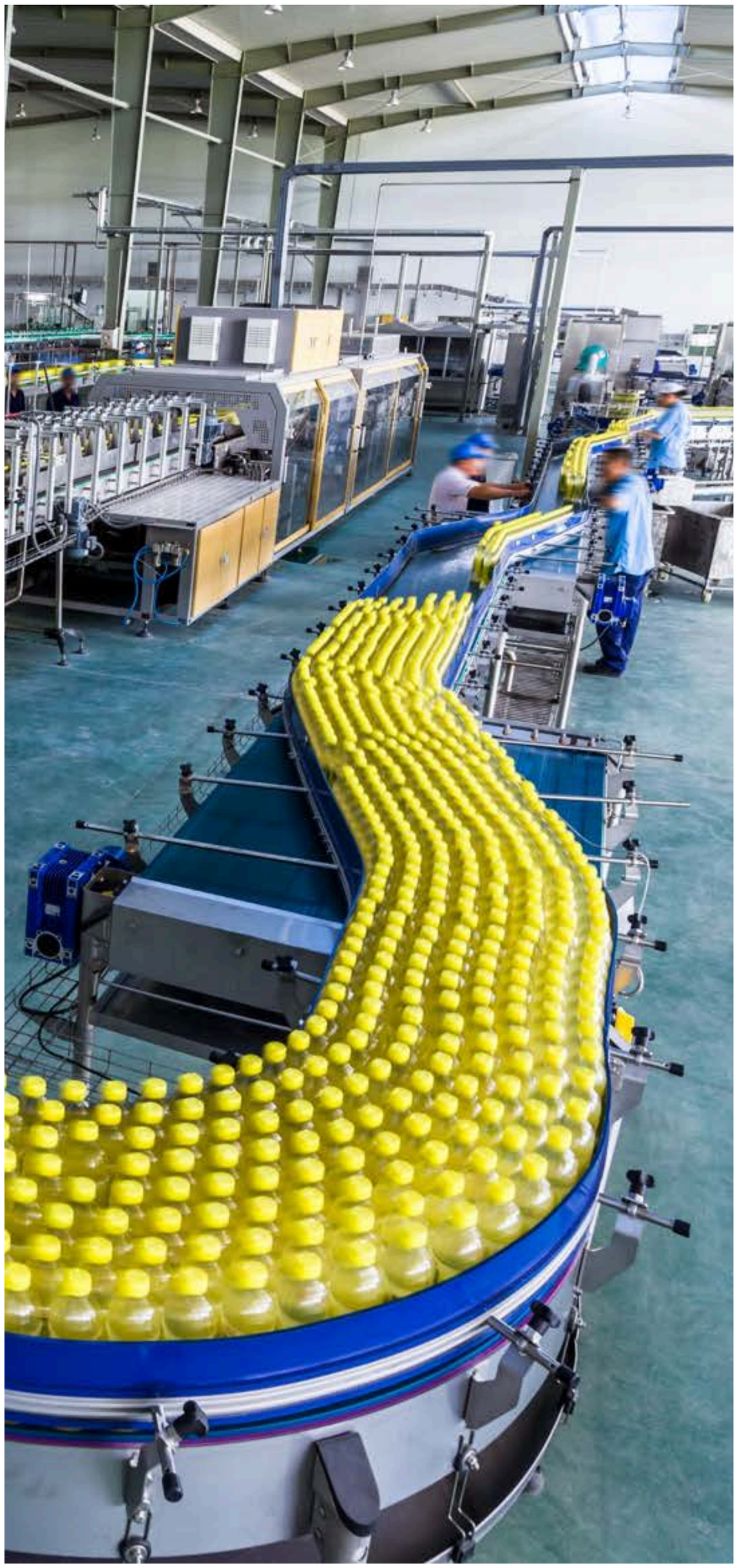
reduction in unsafe behaviors

These numbers are not pipe dreams; they are real outcomes attained by peers in the industry through leveraging AI and analytics. These results were achieved without slowing down operations
– in fact, operations became more efficient and reliable as emergency stops and incident investigations dwindled.

Real-time safety management turns safety from a retrospective exercise into a continuous, interactive process. Just as F&B companies monitor product quality in real time on the line, they can now monitor safety quality in real time in the workplace.

This whitepaper has outlined the key hazards to focus on (from slippery floors to ammonia leaks to machine guarding) and how technology can address them. The actionable steps provide a roadmap to implementation.

It’s worth noting that early adopters often find an unexpected benefit: better data leads to better decisions in all areas.



For example, one Intenseye user discovered inefficiencies in their process (unnecessary foot traffic and congestion) while analyzing safety heatmaps – fixing that not only reduced collision risk but also improved productivity. In this way,
a proactive safety program can be a catalyst for overall operational excellence.

For EHS and Operations leaders in F&B, the mandate is clear. Regulatory compliance and traditional safety programs, while important, are not enough to eliminate the worst accidents. To protect your people and your business, **invest in real-time, leading-indicator-driven safety systems.** The cost of implementation is far outweighed by the cost of a single fatal accident – not just in financial terms (which can be millions in fines, legal fees, compensation, lost output) but in human terms and reputational damage. On the flip side, companies known for innovating in safety often enjoy higher employee morale, easier hiring (people want to work where they feel safe), and strong brand reputation. In an era where ESG (Environmental, Social, and Governance) performance matters to investors and customers, showcasing a cutting-edge safety initiative is a powerful message that you value your workforce.

In conclusion, the **SIF Prevention Playbook for the Food & Beverage Industry** is about combining scientific rigor, technology, and management commitment to create workplaces where serious injuries are not just reduced but actively prevented. By focusing on the precursors to disaster and controlling them in real time, we can finally bend the fatality curve downward in our industry. The tools are ready – from AI that never sleeps to analytics that crystalize risk – and the path has been paved by trailblazers like those profiled here. Now it's up to forward-thinking safety and operations leaders to take the leap. The future state we should all aspire to is one where **every worker goes home safe, every day**, and where our safety programs are so advanced that even near-misses become a rarity. Achieving this will require effort and change, but as we've seen, it is not only possible – it is already happening.

By adopting the strategies in this playbook, your organization can join the frontrunners in making "zero harm" a tangible reality, ensuring that **serious injuries and fatalities in the F&B industry become truly a thing of the past.**