intenseye

SIF Prevention Playbook for the Air Cargo, Logistics & Transportation Industry

White paper

JUNE 2025

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Introduction

The SIF Challenge in Air Cargo & Logistics

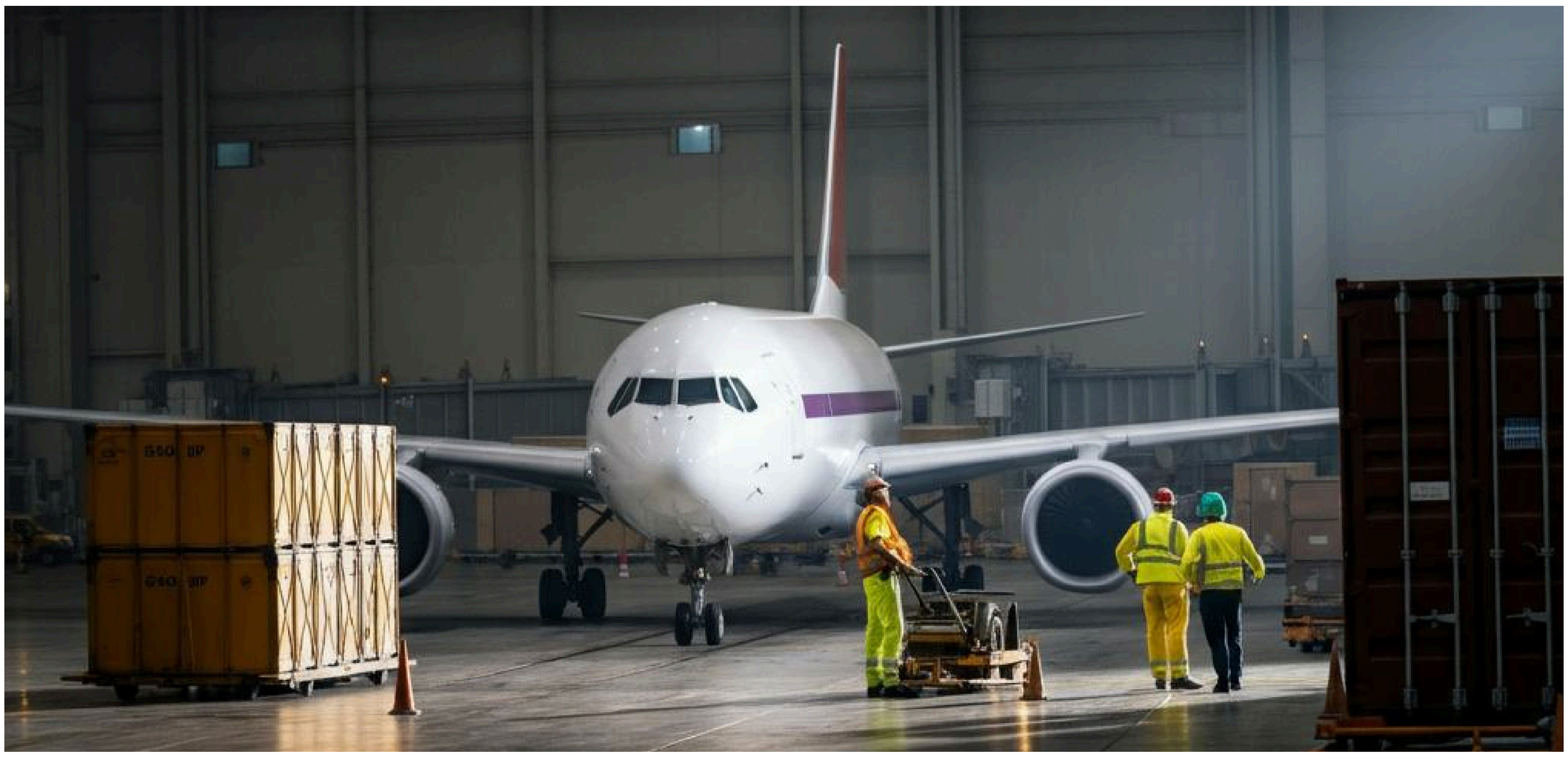
Serious injuries and fatalities (SIF) remain a stubborn problem in the air cargo, logistics, and transportation sector, even as minor incident rates improve.

In the United States, the transportation and warehousing industry suffered **1,053 worker fatalities in 2022, accounting for the second-highest total of any sector**.

2023	930 workers	**11.7%** ↓
2022	1053 workers	

Transportation-related incidents (vehicles) are the single largest cause of workplace deaths (about 38% of fatalities), followed by falls (~16%) and contact with objects or equipment (~14%).

This industry's working environments—airport ramps, warehouses, loading docks, trucking yards—are rife with high-consequence hazards. Workers navigate around heavy moving vehicles, lift and maneuver bulky cargo, work at heights on aircraft or loading equipment, and interface with automated machinery. Tragically, these conditions lead to cases such as employees being crushed between forklifts and trailers at loading docks or fatal falls from pallet lifts and cargo loaders. While general workplace injury rates have gradually declined, **the rate of fatal injuries has not fallen in parallel,** indicating that traditional safety practices that reduce minor incidents have not eliminated the risk of catastrophic accidents.



In short, **SIF events have plateaued at an unacceptably high level**, and industry leaders recognize an urgent need for a new approach to protect workers' lives.

Under-reporting is widespread – an estimated **79% of EHS leaders believe that hazards, near misses, and concerns** aren't reported consistently within their operations.

Compounding the challenge, conventional safety metrics and reporting methods are lagging indicators – they only tell us what went wrong after the harm is done. Many organizations still rely on OSHA logs, incident counts, and after-the-fact investigations, which do little to prevent the next tragedy. Even proactive programs under "Safety-II" (like near-miss reporting and behavioral observations) have limitations.

In a busy cargo terminal or distribution hub, early warning signs (a close call with a forklift, an employee bypassing a safety procedure) are easily missed or not communicated until a serious accident occurs. Clearly, **business-as-usual safety strategies are not enough** – to truly shift the SIF trend, the industry must actively **hunt SIF precursors** and intervene before a life-altering incident materializes.

Embracing Safety-III

From Lagging to Real-Time Prevention

To break through the SIF plateau, safety management is evolving from the reactive and compliance-focused **Safety-I** (where safety is viewed simply as the absence of accidents) to **Safety-II** (which emphasizes resilience, learning from why processes go right, and near-miss prevention) – and now toward what we term **Safety-III**. In Safety-I, the classic belief was that reducing frequent minor injuries would automatically avert major ones; Safety-II added proactive improvements like empowering workers and analyzing near-misses. **Safety-III builds on these paradigms by leveraging real-time technology to intervene before an accident happens.**

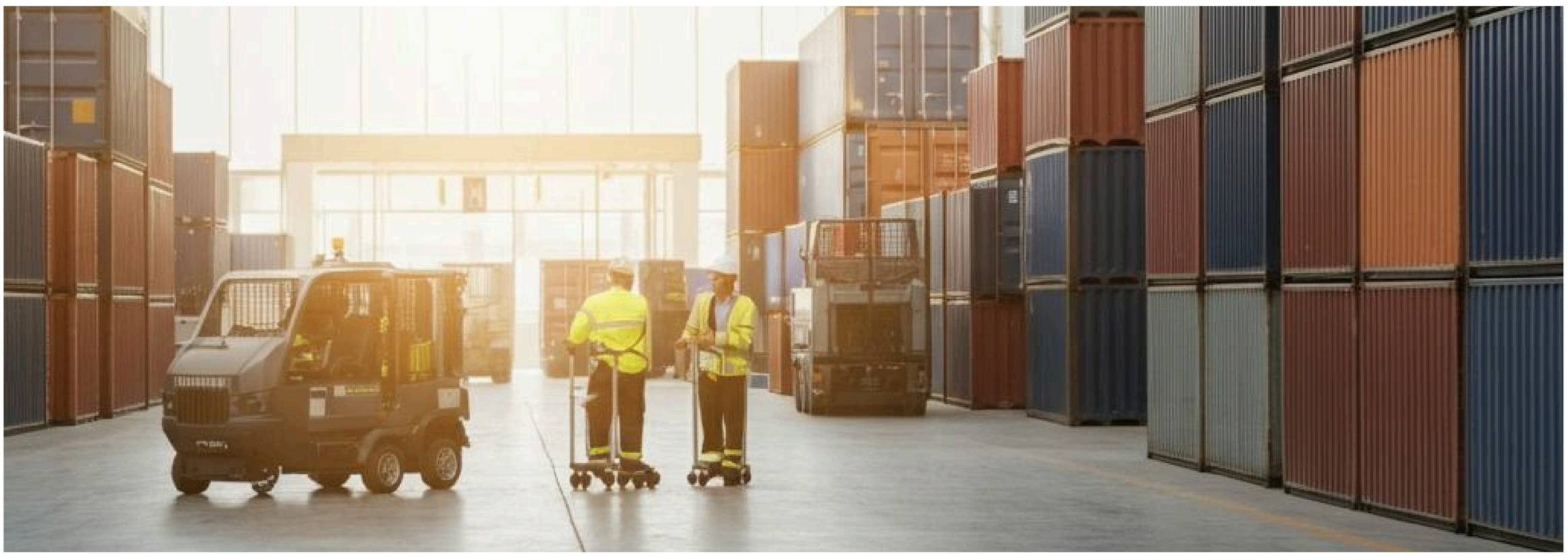
Instead of reacting after an incident or relying solely on people to foresee and report issues, Safety-III uses continuous monitoring and advanced analytics to detect hazards in the moment. As one group of safety researchers put it, the next step is achieving "greater clarity about how to identify and measure hazards in real time to intervene before incidents occur".

In practical terms, this means instrumenting the workplace with smart sensors, computer vision, and IoT devices so that emerging dangers are spotted and addressed immediately, much like a control room monitoring a process in real-time.

Under a Safety-III approach, the cycle of detect → report → analyze → act is **compressed into an instantaneous feedback loop**. For example, if a worker enters a machine's danger zone or a forklift is on a collision course with a pedestrian, an AI-driven system can flag the hazard and trigger an alert (or even an automated shutdown) on the spot, rather than waiting for someone to notice or for a near-miss report later on. Emerging technologies make this possible: high-definition cameras analyzed by artificial intelligence, wearables and tags that track movements, and real-time dashboards that aggregate alerts.

AI computer vision is especially game-changing – it can monitor 24/7 and recognize over 30 unsafe behaviors or conditions (e.g. missing PPE, unsafe lifting posture, a spill on the floor, a person too close to moving equipment) across an operation. Unlike human supervisors, an AI "safety sentinel" never gets tired or distracted; it can effectively be everywhere at once. When an unsafe situation is detected, the system notifies personnel instantly and may even initiate immediate controls (for instance, slowing down a conveyor or sounding an alarm) to prevent an incident. As an illustration, if a worker is on a rooftop without required fall protection, the AI can recognize the violation and instantly alert both the worker and a supervisor, averting a potential deadly fall on the spot. This real-time, technology-enhanced vigilance is the hallmark of Safety-III.

Crucially, **Safety-III is not about gadgets for their own sake – it's about using technology to drive a cultural shift.** It transforms safety management from relying on lagging indicators to focusing on leading indicators and even real-time indicators of risk. By capturing near-misses, unsafe acts, and hazard conditions as they happen (rather than after an accident), we create a rich stream of data on precursors to SIF events. This data enables proactive intervention and learning. Patterns of risk that were previously invisible become visible – often, companies discover "unseen hazards" that had been occurring regularly without any reports. Equipped with these insights, EHS and operations leaders can allocate resources to the highest-risk situations and fix systemic issues before someone gets hurt. In essence, Safety-III marries the empowerment and positive culture of Safety-II with cutting-edge technology to finally **"see the unseen"** and neutralize imminent dangers. The remainder of this playbook explores how Safety-III, enabled by real-time AI, addresses the specific SIF risks in air cargo and logistics, and how organizations can implement it to achieve a step-change in safety performance.



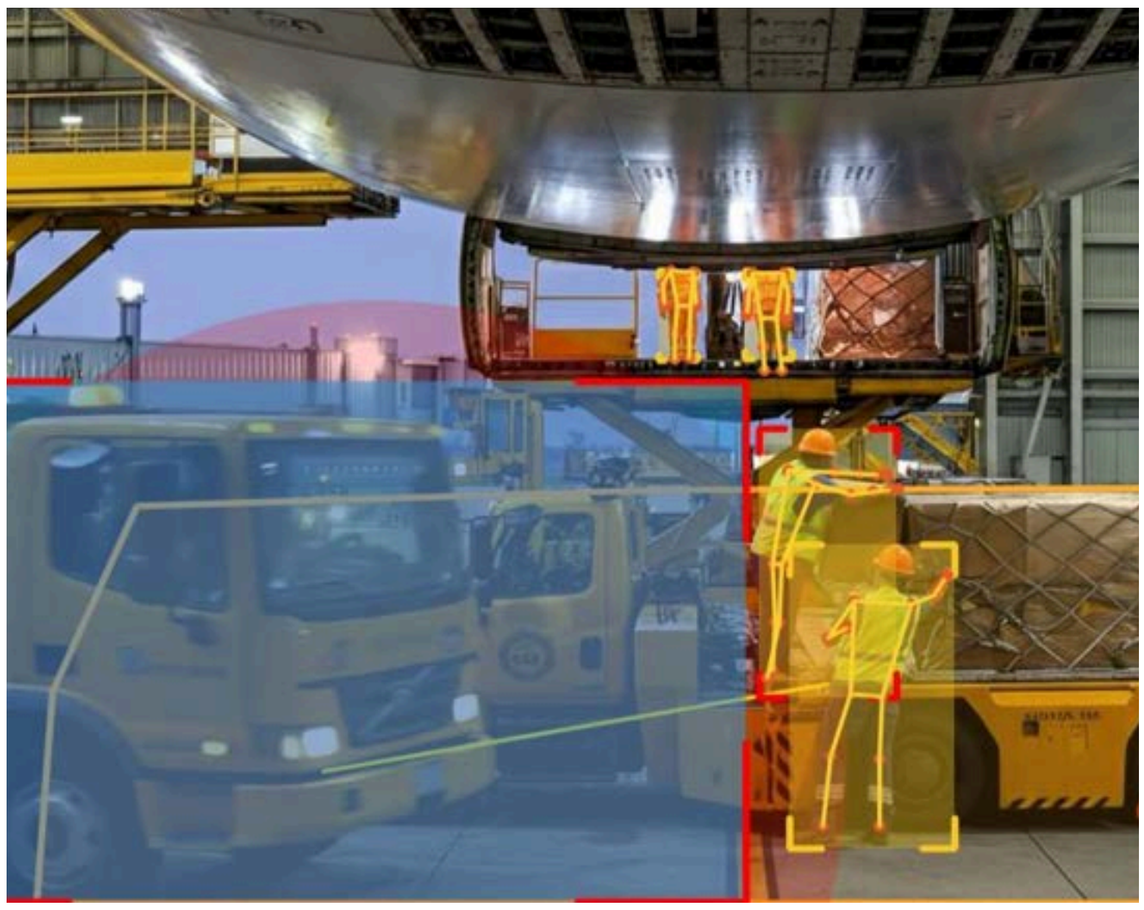
Major SIF Hazards in
Air Cargo, Logistics & Transportation

Real-time SIF prevention needs to be tailored to the actual high-severity hazards of the air cargo, logistics, and transportation industry. Based on industry incident data and field observations, the following are **five major SIF exposure categories** that demand focus in North American air cargo and logistics operations:

1 Vehicle–Pedestrian Interactions

Warehouses, freight terminals, and tarmacs are dynamic environments where forklifts, tugs, pallet jacks, trucks, and dollies are constantly on the move. Being **struck by moving vehicles** is a top cause of fatal injuries – **nearly 37–38% of transportation industry fatalities involve being hit by a vehicle or mobile equipment.** Forklift accidents alone caused 73 worker deaths in the U.S. in 2022, roughly one fatality every five days. Common scenarios include forklifts colliding with pedestrians, workers being pinned between a truck trailer and loading dock, or getting hit by a reversing vehicle. Even near-misses are frequent (one analysis found **15% of reported forklift injuries involve a pedestrian being struck or nearly struck).** These are precisely the kinds of SIF precursors traditional programs struggle to capture. Computer vision AI can drastically improve control of this hazard: It can monitor forklift and vehicle speed and spacing, ensure operators and pedestrians stay segregated, and generate alerts when a person comes dangerously close to moving equipment.

Intenseye's platform, for instance, watches for both vehicles too near to people and people entering forklift drive paths or "no pedestrian" zones, enabling immediate intervention (horn alarms, supervisor notification) before a collision occurs. By tracking each risky interaction in real time, companies can spot hotspot areas and times of day with frequent close calls, then make targeted changes. The result is a significant reduction in the time workers are exposed to vehicle strike hazards – in one case, a site discovered workers were unwittingly in close proximity to active forklifts for **over 3 hours per week**, and after implementing AI alerts and re-routing foot traffic, they cut that exposure down to **just 3 minutes per week.**



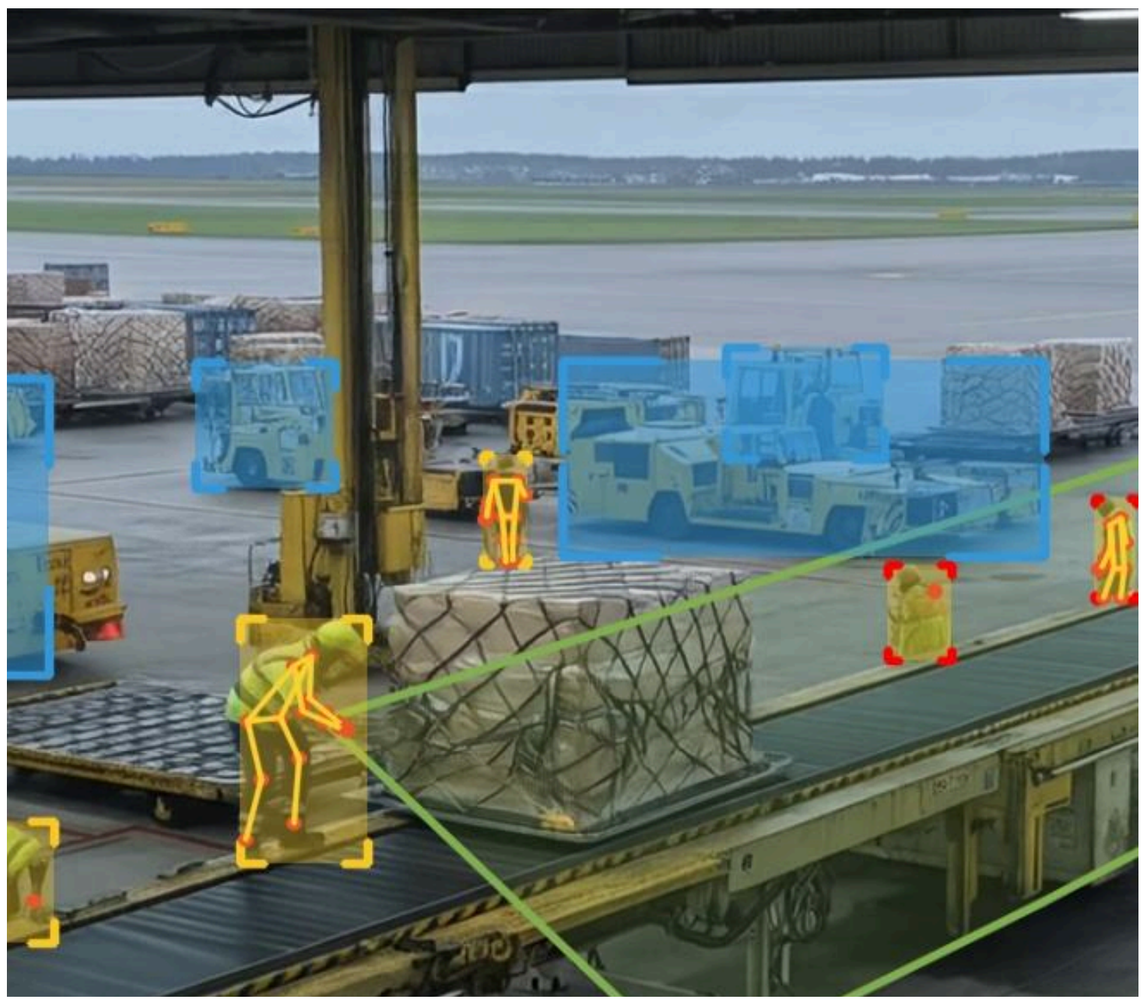
2 Aircraft Ramp Operations and Ground Support Equipment

In air cargo terminals and airport operations ("ramp" environments), personnel face all the vehicle hazards above plus additional dangers unique to servicing aircraft. Airside aprons are congested with baggage/cargo tractors, belt loaders, container loaders, mobile stairs, fuel trucks, and more – often operating under time pressure. Jet engines introduce risks of jet blast or even ingestion, as highlighted by rare but tragic cases of ramp workers being sucked into running engines. Working around aircraft also means dealing with moving propellers, tight choreography with taxiing planes, and sometimes extreme weather conditions. A lapse in situational awareness or protocol on the ramp can be fatal. One major hazard is **equipment collision with aircraft or other equipment,** which can cause not only injuries but costly damage. Another is workers riding on or too near moving GSE (ground support equipment) – for example, hitching a ride on a cargo tug or standing in the radius of a spinning propeller.

Fall hazards are also present (e.g. falling from a catering truck platform or from the cargo door of a freighter aircraft). Given high noise and activity levels, human spotters may miss a person in a danger zone.

Here, AI provides an always-alert set of eyes: it can enforce safety zones around aircraft (detecting intrusions into jet blast areas or under a suspended load like a catering truck lift) and ensure compliance with ramp safety protocols.

For instance, the AI can watch that **personnel follow designated walkways on the tarmac and do not take unsafe shortcuts** behind planes or across active taxi lanes. It can also monitor GSE spacing – flagging if a belt loader or high-loader comes too close to a person or if multiple vehicles are at risk of collision. By catching these scenarios, real-time monitoring helps ramp managers intervene (via radio or visual warning systems) before they escalate. The overall effect is a safer, more controlled ramp with fewer near-misses – essential for a zero-harm, zero-accident ground operation.



3 Falls from Height (Docks, Equipment, and Storage)

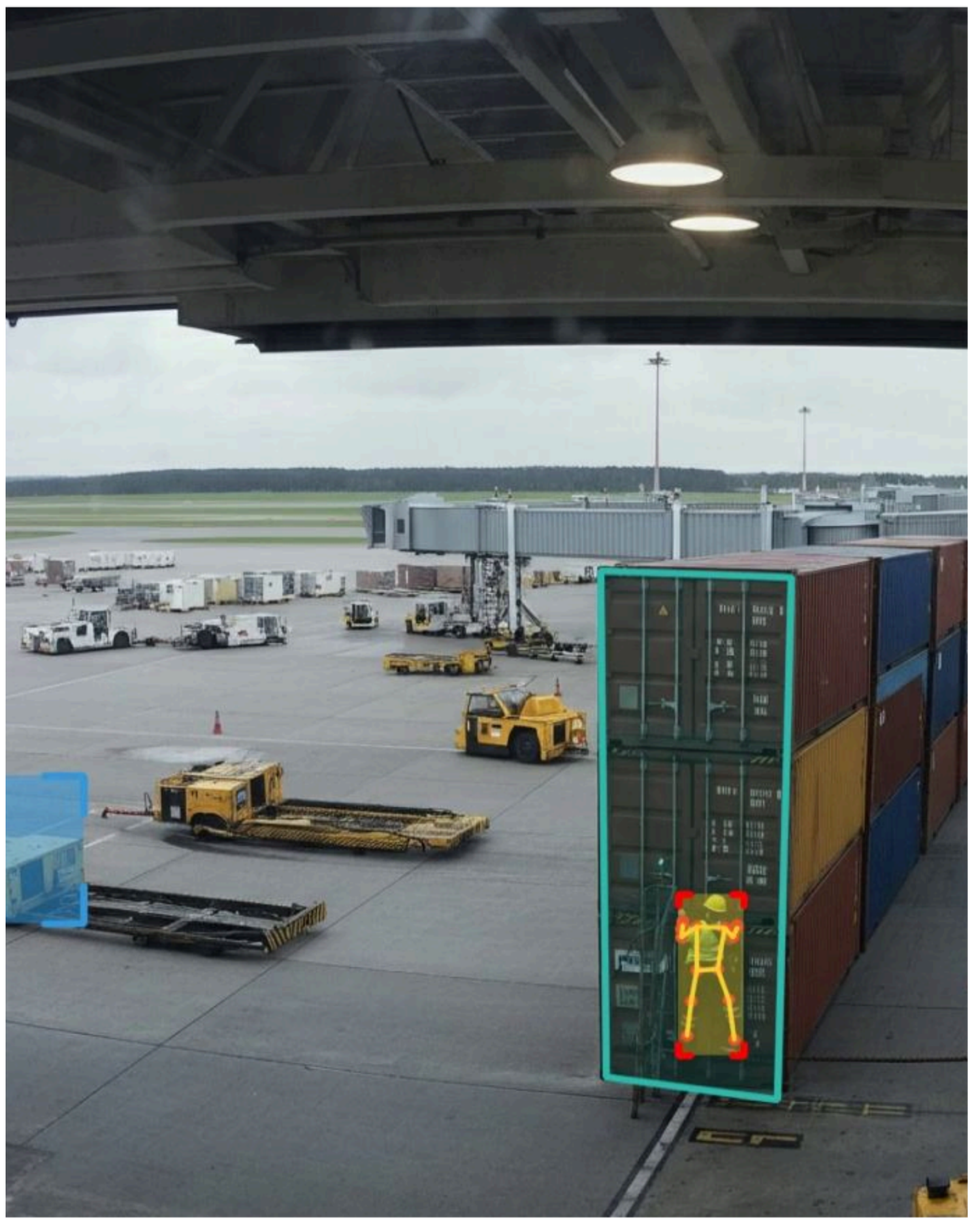
Falls are a leading cause of workplace death across all industries, and logistics is no exception. Loading docks, mezzanines in warehouses, order-picking ladders, and aircraft boarding operations all present fall-from-height risks.

In 2022, falls, slips, and trips caused **885 worker fatalities in the U.S. (16% of all deaths)**, and within transportation settings many serious injuries come from falls off trailers or docks.

Typical SIF events include a freight handler stepping backward off an open dock edge, a technician falling from the top of a container stack or aircraft cargo door, or a driver slipping off a truck during tarping/unloading. Such falls can be deadly or cause permanent disabilities (head trauma, spinal injuries).

Contributing factors are often lack of fall protection, slippery surfaces, or simply a moment of lost balance. Real-time AI can help by **detecting when work-at-height protocols are not being followed** – for example, if a worker on a loading dock isn't secured by a dock safety gate, or if someone is climbing on a pallet or rack without fall protection.

In the cargo terminal context, Intenseye's system is configured to recognize if an individual is on an elevated platform or container without the required harness or guardrails. The moment such a scenario is seen, an alert can be sent so that supervisors intervene immediately (stopping the work or reminding the employee to hook in). Additionally, AI can monitor environmental conditions that lead to falls (like a spill that makes a floor slick – some vision systems can spot liquid on the ground). By catching these precursors (the lack of fall protection, the hazard on the walking surface), **the technology prevents the fall before it happens.** The result is a marked reduction in fall incidents; several facilities using vision-based fall detection have reported employees quickly correcting behavior (e.g. using harnesses) when they know non-compliance will trigger an instant alert.



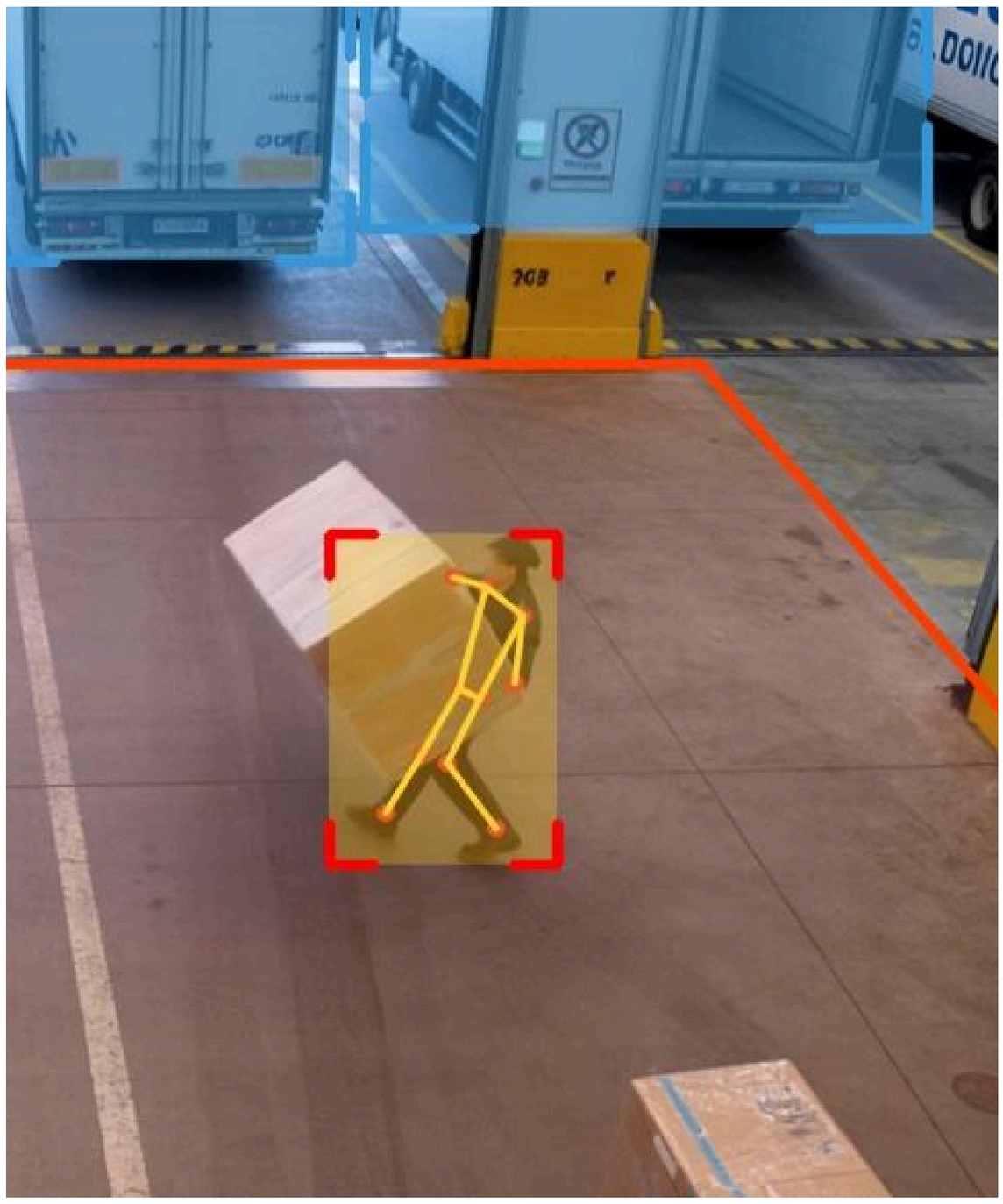
4 Manual Material Handling and Load Securement

Air cargo and logistics work is physically demanding, involving constant lifting, pushing, pulling, and securing of freight. Overexertion and bodily reaction is actually the **number one cause of nonfatal workplace injuries in the U.S.** (over 1,000,000 cases in 2021–2022), and in warehouses the injury rate for musculoskeletal strains is well above average. While many musculoskeletal injuries from manual handling are not immediately life-threatening, this category also includes **high-severity events** – for example, a loader handling an awkward heavy package could lose control and be crushed, or a team lifting a multi-hundred-pound piece of cargo could drop it on someone's foot, causing an amputation or fracture.

Improper stacking and securement of goods is another serious hazard; if a pallet is not wrapped or tied down, loads can topple from height. (Forklift operators have been **crushed by falling pallets** when a load shifts suddenly.) To address these issues, companies are training workers on safe lifting techniques and requiring team lifts or mechanical assist devices for heavy items. AI can support these efforts by ensuring compliance with **safe handling practices in real time.**

For instance, computer vision AI can verify if a required two-person lift is in fact being done by two people (Intenseye's platform can count personnel in an area to ensure a team lift rule is followed). It can also detect if a worker appears to be straining to lift something alone and issue a prompt to get help.

Furthermore, AI can monitor storage areas for signs of improper stacking – e.g. identifying pallets stacked too high or cargo protruding dangerously – and alert staff to re-stack or secure the load before it collapses. By catching these "unsafe manual handling" situations proactively, the system not only prevents injuries like muscle tears or hernias, but also averts potentially fatal accidents (such as a heavy object falling from a height). An added benefit is reduction in product damage and smoother operations, since fewer loads are dropped or mishandled.



5 Machinery and Automation Entanglement

Modern logistics facilities often rely on automated material handling systems – conveyor belts, sortation systems, automated guided vehicles (AGVs), robotic arms for palletizing, freight elevators, etc. While these improve efficiency, they introduce **"caught-in" and entanglement hazards** that can lead to grievous injuries. For example, a worker's clothing or hand might get caught in a moving conveyor; a mechanic could be struck by an unexpectedly energized sorter; or someone could enter a robotic cell while equipment is still live.

According to U.S. data, **contact with objects and equipment is responsible for roughly 14% of workplace fatalities,** and that includes incidents like getting caught in running machinery.

In air cargo hubs, there have been incidents of fingers amputated by conveyor belts or technicians pulled into cargo handling system gears. Traditional lockout/tagout (LOTO) procedures and machine guarding are vital controls here, but SIF incidents still occur when procedures aren't followed or guards are bypassed. Real-time AI offers a solution by **actively monitoring machine danger zones.** Vision systems can be set to create virtual perimeters around hazardous machinery and detect any human presence in those restricted areas when the machine is running. Intenseye's platform, for instance, can enforce that a conveyor area is clear before operation and will instantly flag if a person reaches into a running conveyor or if a machine guard is left open.

Additionally, AI can ensure LOTO compliance: by checking if a maintenance person has placed the required lock/tag or if power is truly off before someone accesses the equipment (this can be done via computer vision recognizing LOTO devices or through IoT sensor integration). Some systems also detect if tools or hands are dangerously close to moving parts (using video analytics to measure distances). By intervening the moment a violation occurs – e.g. pausing the machine or setting off an alarm – these solutions prevent the entanglement.

Companies have found that after deploying such real-time monitoring, not only do actual machinery injuries drop, but workers develop a much healthier respect for machine safety protocols. In sum, automation doesn't have to mean more risk – if we also automate the oversight. An AI watching a robot never gets complacent, ensuring that **"no-go zones" stay truly no-go areas.**

Each of the above hazard categories represents a significant SIF exposure in air cargo and logistics, but **all are addressable with the right mix of engineering controls, training, and real-time monitoring.** A key principle in SIF prevention is that not every incident is equal – a simple trip on a level floor might cause a bruise, but a bypassed interlock on a cargo loader could cause a fatal crushing.

High-performing safety programs therefore prioritize controlling the "critical few" scenarios with the highest catastrophic potential. By deploying AI and analytics tailored to these top hazards (vehicle strikes, falls, heavy load handling, machine entanglement, etc.), logistics and transport companies can finally get ahead of SIF events. The next section will illustrate how this works in practice through real-world examples.

Real-World Results in Serious Injury Prevention

Case Study

Sites equipped with Intenseye's real-time computer vision platform achieved a **Total Recordable Incident Rate (TRIR) of 1.56, compared to 2.81 at similar sites without the system – a 44% improvement** in recordable injury rate.

Sites with Intenseye	Sites without Intenseye
1.56	**2.81**
Total Recordable Injury Rate	Total Recordable Injury Rate

In one use case, the AI detected frequent vehicle-pedestrian interactions in a warehouse's forklift lanes, where pedestrians were at risk. In response, management provided one-on-one retraining and improved floor markings; **within 6 weeks, the site achieved near-total compliance** with pedestrian segregation rules – the daily near-miss alerts dropped to essentially zero, dramatically reducing the risk of a collision. The power of Safety-III is perhaps best illustrated through concrete examples.

Leading organizations in the logistics sector are already piloting and scaling real-time SIF prevention tools, with compelling results.

As unsafe behaviors and conditions were systematically identified and corrected, the volume of **AI-detected unsafe events fell by 48%,** indicating major behavior change.

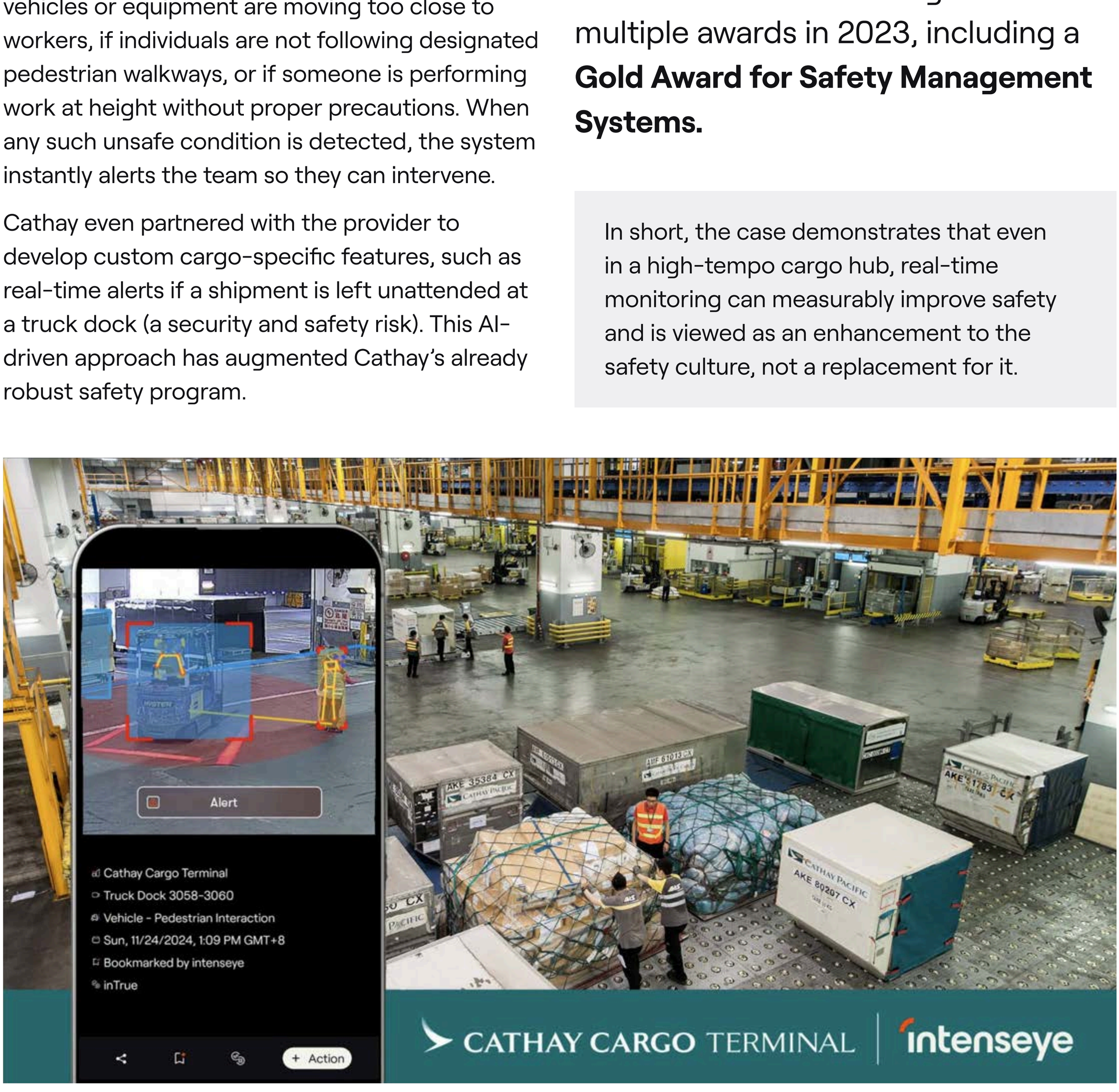
Over 35 proactive mitigation actions (engineering fixes, training sessions, etc.) were implemented based on the AI's insights, along with new administrative controls.

One public example comes from Cathay Pacific's cargo operations in Hong Kong. **Cathay Cargo Terminal** (HKG) recently became the first air cargo terminal in Asia to integrate Intenseye's AI platform into its extensive CCTV network. Intenseye's AI now provides constant safety oversight across Cathay's terminal buildings, effectively acting as a digital safety officer that never sleeps. It monitors for a range of hazard scenarios in real time – for instance, if required PPE isn't being worn, if vehicles or equipment are moving too close to workers, if individuals are not following designated pedestrian walkways, or if someone is performing work at height without proper precautions. When any such unsafe condition is detected, the system instantly alerts the team so they can intervene.

Cathay even partnered with the provider to develop custom cargo-specific features, such as real-time alerts if a shipment is left unattended at a truck dock (a security and safety risk). This AI-driven approach has augmented Cathay's already robust safety program.

According to Cathay Cargo Terminal's COO, the technology helps **"see the unseen"** – revealing hidden hazards and strengthening leading indicators as they strive for zero harm. Notably, Cathay's adoption of AI-powered safety was part of a broader safety excellence initiative that garnered multiple awards in 2023, including a **Gold Award for Safety Management Systems.**

In short, the case demonstrates that even in a high-tempo cargo hub, real-time monitoring can measurably improve safety and is viewed as an enhancement to the safety culture, not a replacement for it.



Beyond publicly known cases, **many companies are seeing similar gains through anonymized pilot programs.** As shown in the figure above, a global manufacturing and logistics firm that rolled out Intenseye's AI across dozens of sites saw a dramatic reduction in incident rates and unsafe conditions. Sites using the AI had significantly lower injury rates than control sites, and they observed continuous improvement as the system "learned" their operations. For example, one large distribution center discovered through AI data that it was averaging over 1,000 vehicle-pedestrian near-miss alerts per week (workers stepping in front of forklifts, etc.). By acting on that data – adding physical barriers, adjusting pedestrian routes, and conducting targeted training for forklift drivers and pedestrians – they drove those alerts down by nearly half in a few months, eliminating the majority of risky interactions.

An **EHS manager at the company noted** that the AI effectively "gave us a second set of eyes everywhere" and that employees quickly adjusted their behavior when they knew hazards were being flagged in real time.

Another Intenseye user focused on **PPE compliance:** at one site, the system kept track of "head protection missing" incidents (people in hard-hat zones without helmets) and provided daily reports. The site used this to coach contractors and staff, and within a month, head-protection compliance improved from roughly 70% to >98%, almost eliminating that hazard exposure. These kinds of leading indicator improvements translate into concrete outcomes: in internal analyses, companies have tied the introduction of real-time safety monitoring to double-digit percentage reductions in lost-time injuries and a significant **drop in serious near-misses** (events that could have been catastrophic).

It's also worth noting the **speed and scale** at which AI-driven safety can deliver ROI.

One Fortune 500 logistics company started with a pilot in 4 facilities and, after seeing immediate risk reduction, scaled the system to 15, then 20+ sites within 9 months (a rollout that would be nearly impossible for a purely manual safety intervention). Across those sites, they estimate the program has prevented dozens of potential serious injuries, contributing to an enterprise-wide safety ROI in the seven figures. This is achieved by avoiding costs associated with accidents (workers' comp, downtime, investigations) and improving productivity (fewer stoppages, more reliable operations).

As more data is collected, the AI becomes more accurate and facility-specific in detecting issues – some sites even **coached the AI** by feeding back when an alert was a false positive or if a near-miss wasn't caught, continuously fine-tuning the system for their environment. The following section will delve into how the data and analytics from such systems provide unprecedented visibility, enabling these successful interventions.

Data-Driven Safety

Analytics, Metrics and Visual Insights

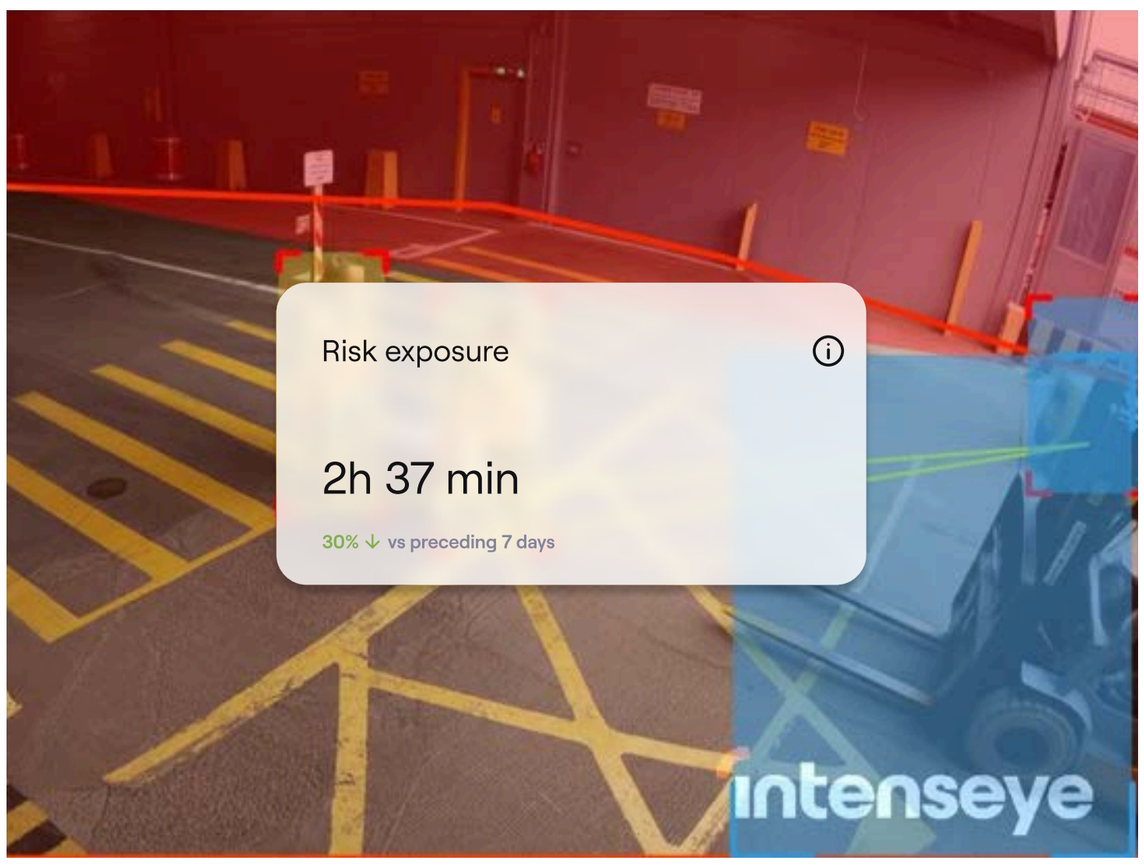
One of the greatest advantages of a real-time SIF prevention platform is the rich **analytics and visualization** it provides. Traditional safety programs often struggle to measure leading indicators quantitatively – but an AI-driven system generates a wealth of data on safety performance. Modern dashboards can display **metrics like the number of unsafe acts detected per day, types of hazards observed, response times to alerts, and "exposure hours" to various risks.** By analyzing this data, safety leaders gain actionable intelligence to target their efforts. For example, tracking "risk exposure duration" has emerged as a powerful leading metric: how long workers are exposed to a given hazard or how long an unsafe condition persists before being corrected. You want to see those exposure times trending downward – if workers are only unprotected for 1 minute instead of 10, the odds of an accident are far lower.

In one Intenseye deployment, the dashboard revealed that each day workers collectively spent **several hours unprotected in forklift zones** (i.e. time during which a person and forklift were in dangerous proximity). Upon seeing this, site managers reconfigured pedestrian routes and even equipped forklifts with AI-triggered audible alarms.

The result

Within weeks the weekly exposure time plummeted from over 3 hours to just 3 minutes in that zone.

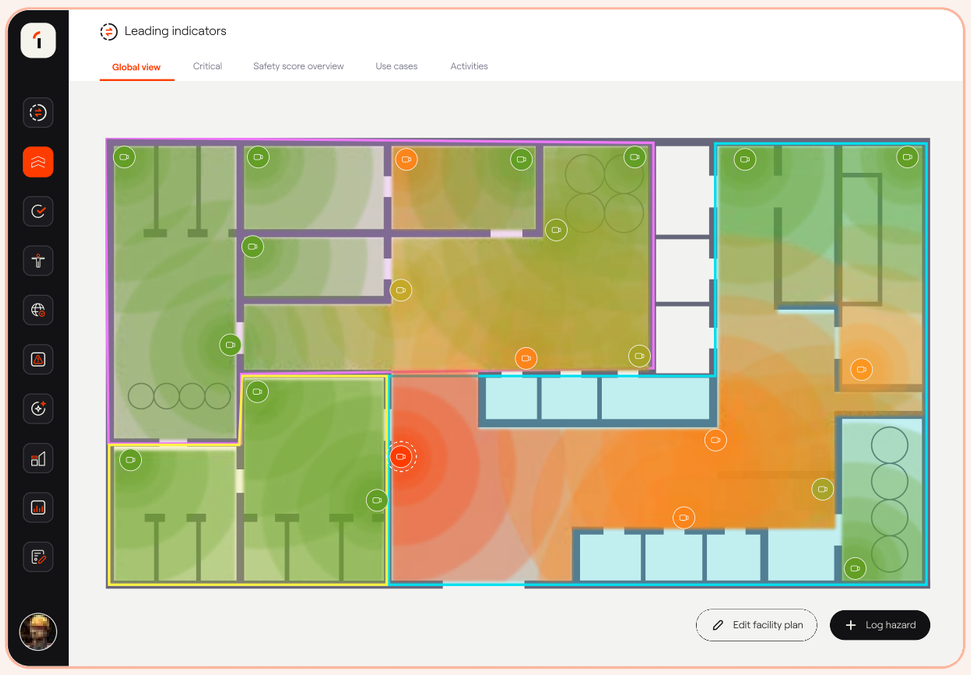
In other words, the team eliminated 98% of the time during which a deadly forklift strike could have occurred.



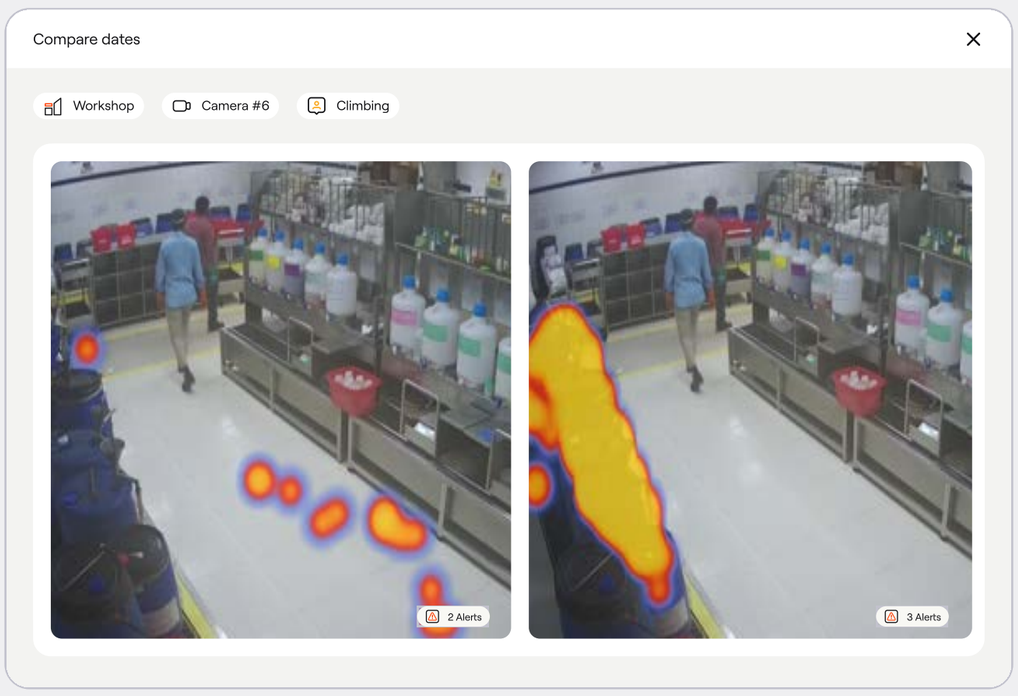
This kind of metric – total unprotected exposure time – is a leading indicator directly tied to SIF risk, and now for the first time it can be measured and displayed. EHS leaders can set concrete targets (e.g. "reduce exposure to moving vehicles by 50% this quarter") and watch progress in near-real-time. It's a proactive mindset shift: rather than simply aiming to reduce the number of accidents (lagging indicator), you are reducing the underlying risky conditions and trusting that injuries will fall as a result – which they do when exposure is minimized.

Another invaluable analytics feature is **spatial analysis through safety heatmaps.** Intenseye and similar platforms can produce dynamic, color-coded floorplan heatmaps that overlay incident data on the actual facility layout.

These heatmaps immediately highlight hotspots – areas with high concentrations of certain alerts or near-misses.



Heatmaps also allow for before-and-after comparisons: you can literally see the colors change after an intervention, providing visual proof of improvement. For example, if a "PPE non-compliance" heatmap initially glows red around a certain production line, and then after a campaign to enforce PPE it turns green, that's an immediate validation of success. Such visuals are excellent for communicating to executives and frontline teams alike – they make the abstract concept of risk tangible.



For instance, a heatmap of "forklift pedestrian near-hits" might show bright red around a particular intersection in the warehouse aisles. If one corner of a loading zone is consistently a problem (say, near misses cluster where an aisle meets a dock door), management can investigate why. In one case, a global beverage manufacturer discovered via heatmaps that a corner of their packaging area had an outsized number of pallet jack incidents; it turned out that spot was poorly lit with a blind turn. They promptly improved lighting and added a mirror, and on the next month's heatmap that area "cooled off" – the cluster of near-misses disappeared. This illustrates how visual data can drive fixes that **prevent accidents before any injury occurs.**

Beyond heatmaps, **trend charts and automated reports** play a key role in sustaining SIF prevention efforts. Dashboards typically offer time-series charts (e.g. unsafe acts per week, by category) so you can spot trends – are incidents trending down overall? Are there seasonal spikes? – and drill into specific hazard types.

For instance, you might notice that "working at height without fall protection" alerts spiked in a particular week; on investigation, you find a subcontractor was on site doing roof work without proper gear, which gets addressed. The platform can also break down data by department, shift, or location, which is useful for benchmarking.

Some Intenseye users leverage a **“Leading Indicators Score”**, which rolls up various metrics into a composite safety score for each site (factoring things like PPE compliance rate, average response time to high-severity alerts, etc.). This score can be used in management reviews just like one would use a lagging metric; in fact, one EHS director noted that having such a score **focused leadership attention on what truly matters** – it helped pinpoint where to concentrate efforts before an injury happens.

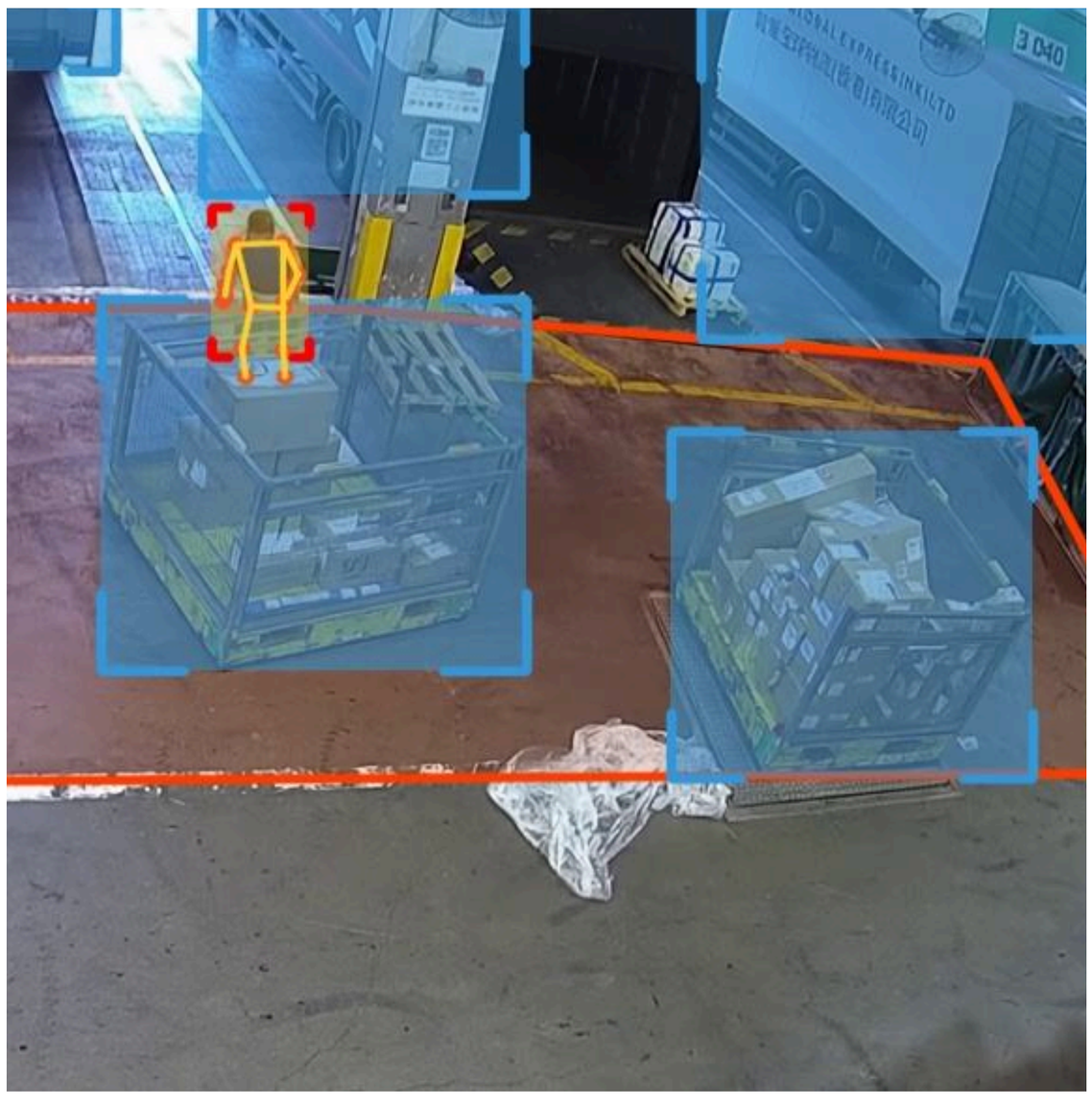
One **food company’s CEO** put it this way: “We went from guessing where the next accident might happen to actually knowing where our risks are daily, and that’s been a game changer.”

The data can also be integrated with existing EHS software, so that high-risk alerts automatically generate incident records or corrective action tickets. By tying real-time data into the safety management system, nothing slips through the cracks – every serious near-miss is treated with the same rigor as an actual incident, reinforcing a culture of continuous improvement.

The analytics not only tell you where you stand, but also motivate the organization by making safety performance visible and quantitative. This transparency, coupled with timely intervention, leads directly to fewer SIFs. In short, data analytics turn the firehose of real-time observations into a clear map of where the next accident could happen – and often, enables you to stop it in time.

Finally, it’s worth mentioning how **accessible and actionable the data becomes** with these modern tools. Instead of drowning in raw video or big spreadsheets, the system filters and prioritizes what you need to know. Many platforms send automatic weekly summaries, highlighting top 3 risks observed and progress on key KPIs. Some use AI to even suggest actions (“75% of slip alerts come from Area X – consider floor treatment or stricter housekeeping in that zone”). Mobile apps and notifications ensure that as soon as a critical alert fires, the relevant supervisor is pinged to respond.

All of this drives a cadence of real-time safety management that mirrors how operations or quality is managed – with up-to-the-minute data.



Actionable Recommendations for
Deploying AI-Based SIF Prevention

Implementing a real-time SIF prevention program in the air cargo, logistics, and transport environment might sound complex, but it can be broken down into clear steps. Below is a practical playbook for EHS and operations leaders to **deploy AI-driven safety systems** and drive cultural change:

1 Identify Your Top SIF Risks and Precursors

- Begin with a focused risk assessment. What are the **"Top 5" serious injury or fatality scenarios** most relevant to your operation?
- Use historical incident data, industry statistics, and site walk-throughs to pinpoint where the next catastrophic accident could occur. In an air cargo or logistics context, your list may include things like "forklift striking a pedestrian," "fall from a loading dock or equipment," "caught in conveyor mechanism," "struck by falling cargo," or "exposure to a hazardous material (e.g. lithium battery fire)."
- Rank these by potential severity and frequency.
- For each, define at least one leading indicator you want to monitor (e.g. number of forklift-pedestrian close calls, instances of work at height without fall protection, etc.). This exercise ensures you deploy technology with specific goals in mind.

Action

Draft a "Serious Risks Dashboard" that you'd like to have – essentially, imagine the metrics or alerts that would let you sleep better at night. This will guide what to look for in a solution.

2 Select and Pilot Real-Time Monitoring Technology

- Evaluate solutions that can continuously watch those critical SIF precursors. Prioritize technologies that integrate with what you already have (for example, computer vision AI that uses your existing CCTV cameras is often a quick win).
- When researching vendors, look for **out-of-the-box detection capabilities** aligned to your top risks – e.g. does the system natively detect PPE compliance, vehicle zones, person in restricted area, slip and fall, etc., and specifically in environments like warehouses or ramps?
- Also consider privacy and IT requirements: involve your IT, security, and legal teams early to vet how the system works (ensure video feeds are analyzed in real-time but not stored, that data is encrypted, and that the solution complies with privacy laws and labor agreements).
- A good approach is to **start with a pilot at a high-risk site or area.** Many companies choose a busy warehouse aisle or an airport apron gate as the testbed – somewhere with frequent near-misses that you've struggled to fully control. Establish the pilot scope (e.g. 20 cameras covering the loading dock and forklift routes) and success criteria (e.g. "reduce pedestrian intrusions into forklift zone by 80% in 3 months"). Make sure to set up dashboards and alerts in this phase so you can experience the real-time data flow.

Action

Develop a pilot plan with clear objectives, and get buy-in from site managers who will champion the new system. Ensure all stakeholders (operations, union reps, IT, facilities) know what's coming and why.

3 Integrate Alerts into Response Workflows

Technology alone won't save lives – how you respond to its insights is key. From the outset, plan how real-time alerts will be handled.

Define escalation protocols:
Who gets notified for each type of critical alert, and what should they do?

For example, if the AI detects a person in a restricted conveyor zone, does it trigger an audible alarm on the floor? Does the shift supervisor get a text message with a snapshot? If a forklift speeding is flagged, do you want an automatic signal to a warning light? Some interventions can be automated (e.g. the system could be connected to cut power to a machine if someone enters a danger zone), but most will route through people.

Establish a clear chain: an on-site safety officer or area manager should get the real-time alerts on their phone or console, and they must be empowered to act immediately (hit pause on operations if needed).

Additionally, integrate the system with your existing EHS management processes – for instance, configure it so that any high-severity alert automatically logs an entry in your incident management software or sends an email to the EHS team for review. **The goal is to ensure every alert results in action.**

In practice, many organizations create a small "safety operations center" or designate a rotating responder who watches the live dashboard during peak shifts. Also decide what data will be reviewed in daily or weekly safety meetings (e.g. reviewing top alerts of the week every Monday morning).

Action

Write a brief response protocol document for the pilot – e.g. "If AI alerts 'no harness on mezzanine', then:

1) Automated audio alarm sounds in area
2) Safety officer confirms if harness absent;
3) If yes, work is stopped and employee is coached on the spot."

This level of clarity will drive faster adoption and trust in the system.

4 Train and Engage Employees (Build a Safety-III Culture)

Introducing AI in safety should be framed as a positive for the workforce – an investment in their well-being – **not as "Big Brother" surveillance**. Be transparent about what the system does and does NOT do.

For example, clarify that the AI is looking for hazards like missing PPE or unsafe positions, not monitoring individual productivity or penalizing anyone. Emphasize that the goal is to prevent accidents and that the system is there to help everyone get home safe. It's crucial to get employee buy-in: involve frontline workers in pilot feedback sessions, and consider forming a cross-functional safety committee that reviews the AI findings and suggests improvements. Train supervisors and managers first, so they understand the alerts and can confidently explain them to their teams. Then provide brief training to all affected staff – show them what an alert looks like, what they should do when one occurs, and how the data will be used (e.g. "We will use these insights not to blame, but to improve our processes and training").

Encourage a **"just culture"** approach where employees aren't punished for being the subject of an alert, unless it's willful egregious misconduct. In fact, encourage workers to see the AI as a second pair of eyes that can even protect them from others' mistakes (for example, it might catch a coworker driving a forklift behind you that you didn't see).

Over time, you can even invite employees to help "coach" the AI by reporting any false alarms or hazards the system missed – this drives engagement and continuous improvement of the technology. Reinforce to the team that every worker is still a critical safety sensor; the AI doesn't replace human insight, but augments it. When employees see proactive fixes happening and fewer injuries, a culture of "we predict and prevent" will take hold.

Celebrate early wins: if the system helped avoid an incident or identified an issue, share that story and give credit to the employees involved in resolving it. This will build trust and enthusiasm for the new Safety-III approach.

5 Scale Up and Continuously Improve

- After a successful pilot that demonstrates value (and ideally, some quick wins like reduced near-misses or a caught-in-time prevention), build the case to expand the program.
- Use the data collected to show ROI – for example, quantify the reduction in hazardous situations or near-misses, and if possible, any reduction in actual incidents or downtime. Many companies find that the **data speaks for itself,** making it easier to get budget for additional cameras, licenses, or new modules. When scaling, do it in phases: prioritize the next set of sites or areas with the highest SIF risk or incident history.
- Create a playbook from your pilot experience that can be shared with new sites (including the response protocols and training materials). It can help to identify a local "champion" at each new site – someone passionate about safety who will drive the implementation and adaptation locally.
- As you roll out, remain flexible: different facilities might have unique hazards that require tweaking the AI configurations (e.g. a rail yard might care more about safe coupling procedures, whereas an air hub cares about apron vehicle spacing).
- Most AI platforms allow customization – leverage that to address each site's critical scenarios. Also, continue to refine your use of the analytics. Set up periodic reviews (monthly or quarterly SIF prevention reviews) where you examine enterprise-wide trends: Which alerts are trending down? Which new risk is emerging?
- Use these to update your training, engineering controls, or policies. In essence, treat the system as a living, learning part of your safety management.
- As the program matures, you can integrate it into ESG and business KPIs – for instance, some companies have started reporting "SIF leading indicator improvements" to executives and even in sustainability reports, as a mark of operational excellence.
- Finally, share success stories: if a near-fatal incident was prevented due to an alert, or if one site went 12 months without a SIF because of proactive management, communicate that widely. Not only does this reinforce the value internally, but it contributes to industry knowledge sharing. By scaling up thoughtfully and continuously improving, you embed Safety-III deeply into the company's DNA, where it becomes the new normal for safety management.

By following the above steps, EHS and operations leaders can methodically introduce cutting-edge safety technology and achieve the cultural buy-in needed to sustain it. The key is to remember that **technology is a tool, not a silver bullet** – it must be deployed with clear intent, integrated into processes, and championed by people to really transform outcomes. Fortunately, early adopters in related industries have shown that this is achievable and yields significant reductions in risk.

Conclusion

Leading the Way to Zero Harm

The air cargo, logistics, and transportation industry faces unique and formidable safety risks, but it also stands to reap enormous benefits from the new wave of proactive, data-driven safety management. In an era where supply chains are under pressure and skilled workers are in short supply, ensuring a safe workplace is not just a moral obligation – it's a strategic imperative. Every serious injury or fatality is a human tragedy that also disrupts operations, damages morale, and can tarnish a company's reputation. Forward-looking executives in EHS and Operations increasingly recognize that **the old reactive models must give way to predictive and preventive approaches.**

This playbook has outlined how the emerging Safety-III paradigm, enabled by real-time AI and analytics, can finally bend the fatality curve downward. By focusing on the precursors to disaster and controlling them in real time, we can prevent the **"accident that never happened,"** which is the ultimate goal of any safety program. Adopting real-time SIF prevention tools is more than an investment in technology – it's an investment in a culture of care and excellence. Companies that have embraced these tools are finding that it differentiates them in multiple ways.

From an ESG standpoint, a strong safety record and the use of advanced safety technology signals to stakeholders that you value your people and are innovating to protect them. This can enhance corporate reputation and even be a selling point to customers who prioritize socially responsible partners.

In terms of operational resilience, preventing catastrophic events means avoiding costly disruptions and emergency responses that can shut down a facility or route for days. It means less unplanned downtime, smoother workflows, and greater confidence in meeting business commitments.

For workforce retention and engagement, there's a clear link: when employees see that their company is actively investing in their safety – using cutting-edge tools to keep them out of harm's way – it builds trust and loyalty. Frontline workers are more likely to stay with an employer who demonstrably puts safety first, and this commitment helps foster a positive, alert, "we've got each other's back" team atmosphere. Real-time feedback also gives workers a stronger voice in safety, as every alert is an opportunity for dialogue and improvement, not just a reprimand.

Ethically and practically, the case for action is overwhelming. The tools needed to prevent deaths and life-altering injuries are here today – from AI "guardians" that never sleep, to sensors that can detect hazards invisible to the naked eye, to analytics that crystallize risk into actionable insight. And the path has been paved by trailblazers in the field, like the cargo and logistics teams profiled in this playbook, who have proven that these approaches work without hindering productivity – in fact, they often enhance it.

As we look to the future, we envision an industry where the SIF rate drops to zero, not by luck or solely by hindsight, but by design and real-time management. In the words of Safety-III advocates, "the best accident is the one that never happened – and we have the data to prove how we averted it." Now it's up to forward-thinking safety and operations leaders to take that leap.

By embracing a Safety-III mindset and the technology that enables it, air cargo and logistics companies in North America can lead the way to making serious injuries and fatalities a relic of the past. The journey to zero harm is challenging, but with AI and human intelligence working hand in hand, it is finally within reach. Let's get to work.