



SAFETY INNOVATIONS FOR CONSTANTLY EVOLVING OPERATIONS

In Europe, the largest share of all fatal accidents at work took place while people were driving or on board transport or handling equipment (17.2 %). Losing control of machines, tools, or transport and handling equipment is also the leading cause of both non-fatal and fatal accidents, accounting for 25.7 % of the latter in the EU.

Likewise, industrial sites, including those involving lift trucks, are prone to incidents. Industrial sites account for more than three in ten of all non-fatal workplace accidents.

There is a similar picture in other global markets. For example, industry statistics estimate that approximately one out of every 10 forklifts is involved in an accident in the United States each year, which can lead to serious injuries and deaths.

APPROXIMATELY
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Safety requires constant focus and attention from lift truck operators, pedestrians and supervisors alike as industrial operating environments continue to evolve at a rapid pace. Rising demand and just-in-time strategies rely on lean, finely-tuned supply chains operating quickly and precisely. Even in the case of reshoring and nearshoring, operations need to be extremely efficient, building in resilience to accommodate fluctuating conditions without creating waste. As a result, operators face intense pressure to perform at their peak and increase throughput. They work in environments with new, high-performing technologies – including some that reinforce operating best practices.

- **Power sources**, including lithium-ion batteries, allow for a one-to-one power source to lift truck ratio – no need to store extra power units and burden personnel with the task of swapping out lead-acid battery packs.
- **Telematics systems** track lift truck performance and can isolate data pertaining to specific operators, helping to boost accountability and identify those in need of additional training.
- **Operator assist systems** alert operators and reinforce proper lift truck operation through automatic truck performance adjustment based on real-time equipment status, location and operating conditions.
- **Lights and alarms**, including work lights, directional spotlights and audible alerts, can help support site safety initiatives in certain work environments.



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POWER SOURCES: REDUCE INJURY RISK AND EMISSIONS

The lift truck power market is more robust than ever, with new technologies maturing to join the ranks of traditional options like lead-acid batteries and internal combustion engines.

Extremely durable, the internal combustion engine (ICE) provides consistent power and can offer fast, low-effort refueling. However, ICE models that use liquified petroleum gas have fuel tanks that must be switched out when depleted, which can require lifting and twisting by operators, subjecting their bodies to physical musculoskeletal strain. What's more, ICE trucks can produce potentially harmful emissions that must be accounted for inside facilities and as part of operational planning. As such, internal combustion engines are most commonly used in outdoor or wellventilated indoor applications.

Lead-acid batteries were the first electrification option for lift trucks, with relatively low startup costs and no emissions while in operation – making them ideal for indoor applications. However, with battery packs being very heavy, and in some applications needing extraction using a hoist or magnetic arm at least once per shift, this can introduce additional risk to and strain on operators. Another potential issue is that the corrosive materials in the batteries themselves can be harmful, especially if they come into contact with a person's eyes or skin.

More operations are turning to lithium-ion batteries as an electrification alternative. Compared to lead-acid batteries, lithium-ion batteries have a key difference that exists in the charging process. Rather than requiring removal and replacement to charge, operators can simply plug in lithium-ion batteries directly from the equipment – no lifting and twisting to remove tanks or batteries manually or with tools.

Like lead-acid and lithium-ion batteries, hydrogen fuel cells do not produce any harmful emissions. What's more, hydrogen-powered forklifts can be refueled in as quick as three minutes in a process similar to fueling an ICE-powered lift truck. This process does not require removal or replacement of heavy components, which decreases the risk of musculoskeletal injuries associated with changing out lead-acid batteries and can get operators back to work sooner.

DESIGNING AROUND NEW POWER SOURCES

Rather than using existing truck designs and outfitting them with new power options via battery box replacements, Hyster has introduced a lift truck designed around the form factor of a lithium-ion battery pack. This approach enables several ergonomic enhancements that can keep operators more comfortable and alert all shift long, and ultimately help contribute to operational safety. For example, a low seat and floor plate can make entry and exit easier, while extra space underneath the seat allows for a more comfortable operating position. Other advantages include a lower centre of gravity for greater stability and manoeuvrability.





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TELEMATICS IMPROVE SAFETY THROUGH VISIBILITY

Lift truck telematics systems can track many aspects of lift trucks, from equipment diagnostics and utilization analysis to operator performance and more. Management can access all of this information in real-time via desktops, laptops and mobile devices to make informed fleet management decisions and safety-related calls.

One important feature of telematics is the ability to restrict truck access to only operators with proper certification for that truck type. Every operator must swipe an individual access card with certification information encoded, or else they cannot start the equipment. The system also provides notifications when operators have certifications expected to expire shortly.

Tracking truck information by the specific operator provides visibility to their travel locations, idle time and impact alerts. Managers receive notifications when and where impacts happen and who was operating the truck – helping identify high performers who deserve recognition and those who may require more training. Additionally, employers can utilise the telematics system to limit truck performance based on operator experience and skill level. For example, new hires might have their trucks capped at slower speeds to help reduce potential risk while more experienced operators can still operate the same truck at levels that allow maximum performance.





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OPERATOR ASSIST TECHNOLOGY: REINFORCE BEST PRACTICES

Operations can also leverage new operator assist technologies that proactively monitor real-time equipment status, location and operating conditions to instantly alert the operator and reduce truck performance to help reinforce proper lift truck operation. Hyster Reaction™, for instance, keeps the operator in ultimate control of the truck but employs a range of equipment performance controls that adapt based on location, equipment-specific thresholds, and proximity to obstacles or pedestrians to proactively adjust truck performance.

- **Forklift proximity sensors** – Speed is automatically limited when approaching pedestrians and equipment or according to location-specific rules. For example, when lift trucks approach a four-way cross or designated pedestrian zone. Local or real-time location technologies use tags to detect trucks, pedestrians, and beacons, helping inform performance controls. Object detection with LiDAR technology also detects obstacles in the path of travel, including those not connected to proximity tags.
- **Hydraulic function control** – Hyster Reaction continuously gathers inputs from the multiple detection technologies to implement performance adjustments to travel speed and acceleration. It also uses these inputs to adjust hydraulic functions, including lift, lower and tilt. This helps improve load stability and helps reduce the risk of tipping and load slip. It includes an overload arrest function to prevent operators moving loads that exceed specified weight thresholds.
- **Dynamic operator alerts** - When Hyster Reaction detects a pedestrian or obstacle in the path of travel, a location-based speed limit, or other condition, the system initiates a performance reduction that is noticeable to the operator as well as providing visual and audible alerts. These support operator awareness and provide additional reaction time.

FORKLIFT PROXIMITY SENSORS



HYDRAULIC FUNCTION CONTROL



DYNAMIC OPERATOR ALERTS





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LIGHTS AND ALARMS: INCREASE CONFIDENCE, BOOST AWARENESS

Whether navigating dark trailers or dim storage areas, lift truck operators can encounter poorly lit environments. To help increase visibility so operators can perform at their peak, operations can take advantage of truck-mounted lighting solutions.

- **Dome/compartment lights**, brighten operator compartments so controls and paperwork are more visible.
- **Rear work lights** provide additional lighting for travel in dark areas, such as truck unloading, and automatically activate during reverse travel.
- **Work lights** illuminate poorly lit areas and can be installed on masts or trucks.

In addition, the following types of lights can help aid pedestrian awareness in certain environments.

- **Blue LED spotlights**, are cast in front or behind the directional paths of lift trucks, providing an additional alert to pedestrians and other mobile equipment of approaching trucks.
- **Red zone lights** are projected onto the ground level, forming a curtain around the sides of the truck to remind pedestrians to avoid the lift truck's operating area.
- **Strobe lights** flash bright amber on top of trucks to notify pedestrians and other mobile equipment of a lift truck's presence.

Audible alarms help notify pedestrians and other lift truck operators of equipment in close or immediate proximity. They even automatically self-adjust to five decibels louder than surrounding ambient noise, eliminating the need for constant manual adjustments.





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A TRUE TEAM EFFORT

Intensive industries are more advanced now than ever before. And although some technologies are developed to meet performance targets and respond to labour challenges, they may still have an impact on operating a forklift safely. Managers must carefully evaluate the technologies available to determine which are most suitable for their operations, lift trucks and employees. After all, safety is a true team effort.

To learn more, visit [Hyster.com](https://www.hyster.com).



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