



How technology can

give lift truck operators a hand

Operator assist systems help reinforce best practices

Today's warehouses face constant pressure to do more – fulfilling greater volumes of orders at an increasingly fast pace. Meeting these intense throughput targets depends on lift truck operators performing at their best, day in and day out. As operations work to maximize productivity at every turn, maintaining a strict focus on lift truck best practices and facility-specific traffic rules can be a challenge. In the event errors do happen, businesses risk compromising equipment, facility infrastructure and even the safety of personnel, while accumulating financial costs and unplanned downtime they simply cannot afford.

With so much riding on the performance of lift truck operators, it's imperative to build and support safe, effective habits through proper, comprehensive training. And just as technology has optimized other aspects of warehouse operation, it can also elevate lift truck operator training, from virtual reality simulators that can supplement OSHA-mandated instruction to modernized training videos and instructional formats that can support engagement and comprehension in adult learners.

But what if you could go a step further, with technology that offers alerts and automated assistance to operators in real time on the warehouse floor? This white paper introduces operator assist systems (OAS), breaking down both advanced capabilities on the warehouse floor and the technologies that power them.













What are operator assist systems (OAS)?

While some may be familiar with systems that consider equipment status or load stability to provide a visual alert or even performance intervention in limited circumstances, a more advanced OAS delivers real value by going several steps further. A solution like Yale Reliant™ also leverages information related to the operating environment, including precise, real-time location and proximity data to enable automatic performance adjustments for a range of scenarios tailored to warehouse operations.

The following illustration depicts some of these capabilities in action:

-  **Hydraulic arrest** to prevent lifting and carrying loads that exceed weight limits
-  **Automatic speed reduction** when cornering for stability
-  Prevent equipment from entering designated **pedestrian-only zones**
-  **Blind spot monitoring** to help reinforce operator awareness
-  **Anti-tailgating speed reduction** to help maintain proper following distance to equipment ahead
-  **Location-based lift height restriction** to help avoid low-hanging beams or other obstacles
-  **Automatic slowdown** when approaching the end of an aisle or intersection
-  **Limited speed and acceleration** when moving in pedestrian-heavy areas

The enabling technology suite

The Yale Reliant solution is an industry-first tool that uses a robust technology stack to make those operator-assist functions possible. The system's core, proprietary technology continuously analyzes truck performance and operating condition inputs from the three key technologies to implement performance adjustments without upsetting stability.

Together, this unique suite of four key technologies works to adjust truck performance based on real-time information.



Proximity detection

Uses ultra-wideband tags connected to equipment, personnel and facility infrastructure to provide real-time proximity information that alerts the operator and informs proactive performance adjustments.



Real-time location sensing

Uses the same network of ultra-wideband proximity tags together with beacons set up throughout the facility to determine location within sub-meter accuracy and enable location-based rules like equipment exclusion zones and end-of-aisle slowdown.



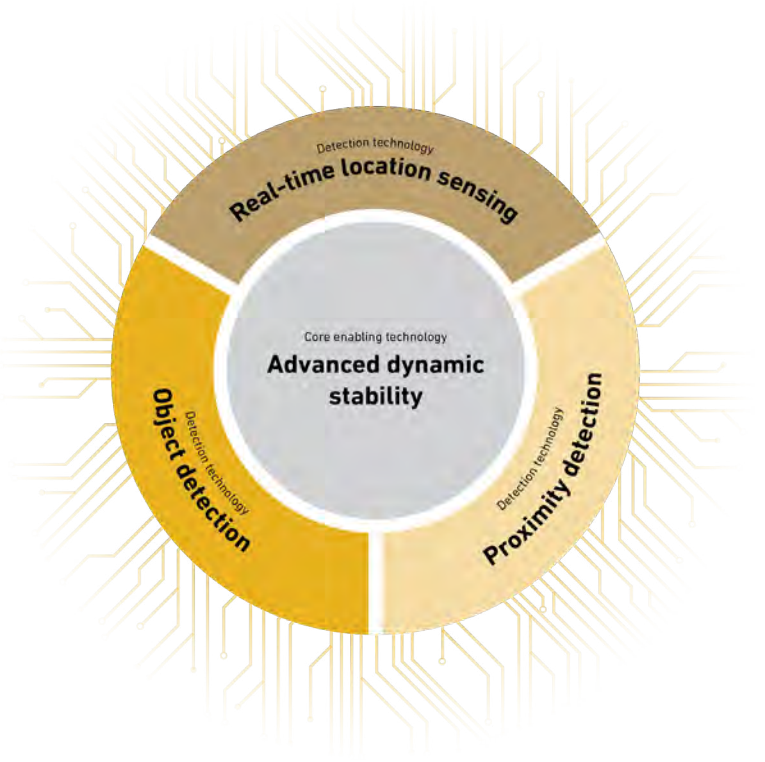
Object detection

Leverages lidar detection to monitor the surrounding environment by sensing objects in the path of travel – even pedestrians or equipment not connected to the tag-to-tag mesh network and other obstructions like a stray box or debris.



Advanced dynamic stability

The core, proprietary technology that continuously gathers inputs from the three detection technologies to implement performance adjustments to travel speed, acceleration and hydraulic functions based on site-specific rules, while supporting optimal truck stability.



The user experience

From the perspective of end users, what do alerts and automated performance intervention look like in practice?

In many warehouse settings, employees are accustomed to wearing a lanyard with an access card or ID badge. Wearable electronic tags with proximity sensors look very similar. In the work environment, when pedestrians wearing proximity tags come within a pre-defined distance of a piece of connected equipment, their tag vibrates to help

make them aware of the situation. For lift truck operators, the system tracks the distances between their trucks, other connected equipment and tag-wearing pedestrians. If a proximity threshold is breached, operators receive both a visual alert from the truck-mounted OAS display and a performance alert, as the lift truck automatically slows down to provide the operator with clear notice of the issue and with additional reaction time.



While the system limits performance based on real-time equipment status, location and operating conditions, the operator always remains in control of the lift truck. With the truck slow-down functionality, for instance, the system activates automatic speed reduction based on rules specific to certain areas of the facility like ends of aisles or heavy pedestrian zones. The truck speed will proactively slow down to reinforce adherence to location-specific rules, but the operator maintains control of steering and braking to enable the operator to steer away from a hazard or bring the truck to a complete stop.

The system behaves similarly with hydraulic functions such as lift, lower and tilt. When the system senses an attempt to lift a load that is too heavy, truck performance is automatically limited to prevent the operator from attempting to move such a load. The OAS display also informs the operator that exceeding the designated load weight threshold is the cause for performance adjustment. Because of this additional layer of feedback that communicates why the system intervenes, OAS can be a helpful tool to reinforce proper lift truck operation already established during operator training.

TRAINING TOOLS

Lift truck operator training starts with a strong foundational program that fulfills OSHA certification requirements for formal instruction, practical training and operator evaluation. Formal instruction requires classroom training, and modern approaches designed to incorporate adult learning techniques can help support better engagement and comprehension. For example, dividing material into shorter sections broken up with hands-on learning periods helps keep learners engaged to improve comprehension. Likewise, modernized videos with engaging graphics present information in a visual, easy-to-understand format and pace.

While not a replacement for hands-on instruction, virtual reality simulators can allow operators to get additional training exposure in an immersive environment without using actual equipment, preventing interference with regular operations

and potential risk of injury or damage to the equipment, product or facility. Virtual reality simulations can even be customized to mimic the particular environment in which trainees will work, complete with racking layouts, aisle widths and more.



A solution for a challenging labor market

According to industry research, best-in-class warehouse operations experience less than 5% annual workforce turnover. But for most, that's far from reality, as industry-wide turnover has averaged over 40% for 5 straight years, and some businesses experience even higher rates.

With such high turnover, businesses are challenged to cope with the revolving door and must prioritize training and constantly reinforce operating best practices. Investing in OAS technology like Yale Reliant can help warehouses get the most out of mission-critical labor resources and keep pace with demand.



To learn more about how OAS technology can help reinforce lift truck operating best practices in your operation, reach out to our experts at reliant@yale.com, or [schedule a consultation](#).