Technology Spotlight
PROXIMITY SENSORS

TECHNOLOGY SUMMARY

Proximity sensors detect objects within a specific range to avoid physical contact. When an object, such as a person, vehicle or equipment, enters the sensor's detection zone, the sensor registers the activity and transmits data to connected systems, triggering alerts or interfacing with other devices. Effectiveness may be limited by factors such as signal range, connectivity, low visibility, or high-traffic areas; therefore, it is critical to select devices with proven performance in similar operation environments. To avoid overdependence on automated systems, ongoing safety training emphasizing situational awareness remains key.

Proximity sensors can reduce struck-by incidents and collisions between industrial vehicles, like forklifts or mobile robots.

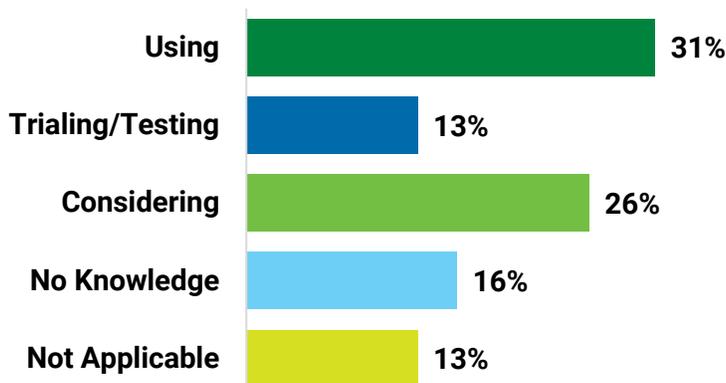*Proximity sensors can reduce equipment strikes, even in low-visibility or confined spaces.*

Proximity sensors can prevent collisions in high-traffic areas, like construction sites and manufacturing facilities.
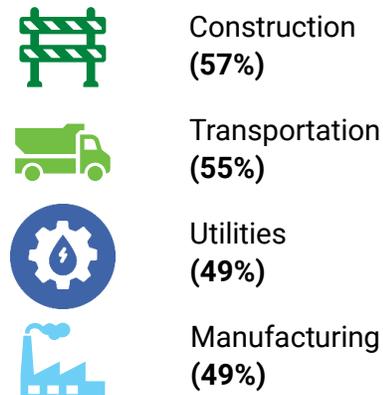
SAFETY TECHNOLOGY 2024 SURVEY RESULTS

According to an **NSC survey** of 500 employers and 1,000 employees in safety sensitive industries, 31% of employers reported currently using proximity sensors in the workplace, while 39% said they are either testing or considering its use. The highest reported use of the technology came from employees in construction, transportation and warehousing, utilities, and manufacturing.

Use of Proximity Sensors in the Workplace:

Category	Percentage
Using	31%
Trialing/Testing	13%
Considering	26%
No Knowledge	16%
Not Applicable	13%

Top Industries Testing or Using:

- Construction (57%)
- Transportation (55%)
- Utilities (49%)
- Manufacturing (49%)

Voices from the Workplace:

"Proximity sensors prevent collisions, injuries and damage by automatically detecting nearby obstacles. Safer than relying on human awareness alone."—*Employer (Agriculture)*

"'Inconsistency in operation. Difficulty in detecting objects due to weather conditions (snow, rain or sun)."—*Employer (Manufacturing)*

"Sensors are on all of our equipment to notify if there is any obstructions around the equipment, especially people, and will provide visual and audible communication to the operator."—*Employee (Construction)*

"Frequent warnings may be issued, especially in busy work environments, causing fatigue for operators and pedestrians."—*Employee (Mining and Quarrying)*

Benefits of Proximity Sensors

- Proximity sensors can mitigate the risk of struck-by incidents or collisions with industrial vehicles, heavy machinery, and other equipment.
- Wearable proximity sensors can promote situational awareness by alerting workers when they are near operating machinery or equipment.
- Early warning alerts can notify operators when a pedestrian or equipment enters the area, helping prevent collisions.
- Some proximity sensors use geofencing to create virtual boundaries that trigger alerts when workers or vehicles enter high-risk areas.

Considerations for Adoption

- In some use cases, workers may need to adorn a wearable receiver, which may contribute to additional privacy concerns or the need for additional equipment.
- Total lifetime ownership costs may be a barrier to adoption for small and medium-sized organizations.
- Range, connectivity and sight limitations may limit the use of proximity sensors for some industries or worksites.

BEST PRACTICES

- **Engage with employees to identify areas of the worksite with the highest potential** for struck-by incidents or equipment collisions and determine if proximity sensors can help mitigate these risks.

- Consider how factors like the physical environment, network connectivity and specific risks like low visibility, blind-spots, or high-traffic areas may **impact sensor performance and technology needs**.

- **Provide ongoing safety training, particularly emphasizing situational awareness,** to safeguard against workers or operators becoming overly reliant on proximity sensors.

- **Begin with small-scale pilots** to evaluate how the technology performs in specific use cases or environments, identify technical or operational challenges, gather worker feedback, and make adjustments before scaling up to reduce initial monetary and resource investments.

For more information, see our report Proximity Sensors to Avoid Equipment Strikes at the Worksite. **For additional resources and guidance on adopting safety technologies, explore the** Work to Zero *Safety Innovation Journey*.