WORKtoZERO
an nsc program

Technology Spotlight
DRONES

TECHNOLOGY SUMMARY

Drones are aerial or land-based vehicles equipped with navigation and control systems that support remote, semi-autonomous, or fully autonomous tasks. In safety applications, they're commonly used for high-risk activities like inspections at height or confined space entry. Adoption may be limited by high upfront costs, training requirements, and evolving regulation compliance. Environmental conditions like inclement weather or poor connectivity can also affect performance, making it essential to select equipment suited to the operating conditions, such as weather resistance, extended battery life, obstacle detection systems, or high-resolution imagery capabilities. Organizations can address some of these challenges by forming dedicated "drone task forces" to drive adoption and provide peer-to-peer training and support.

Drones can be used for the inspection or monitoring of livestock, crops or soil, even in challenging terrain.

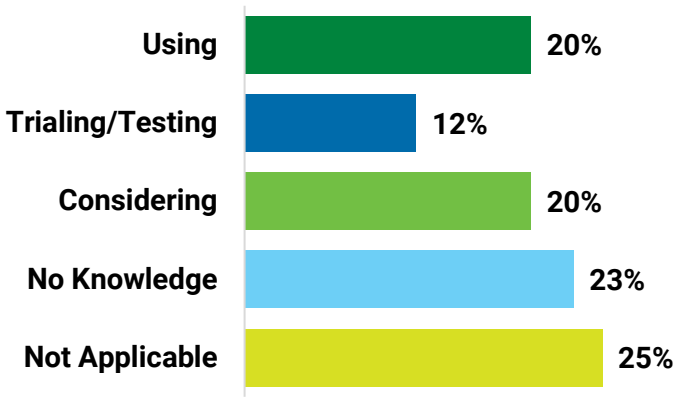
Drones can capture high-resolution images or videos to facilitate site planning and emergency response preparation.

Drones can eliminate the need for workers to enter hazardous areas by performing tasks like confined space or at-height inspections.

SAFETY TECHNOLOGY 2024 SURVEY RESULTS

According to an NSC survey of 500 employers and 1,000 employees in safety-sensitive industries, 20% of employers reported currently using drones in the workplace, while 32% said they are either testing or considering its use. The highest reported use of the technology came from employees in construction, utilities, and agriculture.

Use of Drones in the Workplace:



Top Industries Testing or Using:

Construction **(43%)**

Utilities **(36%)**

Agriculture **(33%)**

Voices from the Workplace:

"Drones may reduce or perhaps completely replace the need for human workers to access dangerous situations or perform height-related jobs."—*Employer (Manufacturing)*

"Flying drones in confined spaces or at heights can be technically challenging due to obstacles and potential signal interference."—*Employer (Agriculture)*

"We can safely view areas without putting humans in danger. The drones have also found unsafe things we would not have seen on the ground."—*Employee (Construction)*

"There is a learning curve, and [they are] somewhat underutilized. Costs have led to them not being available where they are needed or could be used."—*Employee (Utilities)*

Benefits of Drones

- Drones offer end-to-end project services, including site and emergency response planning, visual inspections and site monitoring.
- Drones can reduce worker exposure to hazards by performing tasks such as confined space entry and at-height inspections.
- Often equipped with advanced sensors, drones can detect hazards such as gas leaks, structural weaknesses, or temperature anomalies.

Considerations for Adoption

- Drones may encounter operational challenges in adverse conditions, such as inclement weather or in areas with limited connectivity.
- Evolving and state-specific drone regulations can make compliance challenging.
- Mid-air collisions, ground impacts, and injuries from contact with drone propellers may pose safety concerns for operators and bystanders.
- High initial costs, resource demands, and training requirements can be barriers, especially for small and medium-sized organizations.

BEST PRACTICES

- **Form dedicated "drone task force" teams**, comprised of technology champions who can help provide peer-to-peer support and support the adoption of drone technology across the organization.
- Before investment, **assess whether additional functionalities, such as collision avoidance, thermal imaging or advanced sensors are needed** to meet your specific safety and operational requirements.
- **Select equipment that is suited to the operating environment**, especially if being used in harsh or industrial environments, by prioritizing durability, extended battery life, and functionality in low-connectivity areas.
- **Training multiple operators** provides greater flexibility, ensures coverage during absences, and promotes peer-to-peer troubleshooting and coaching for safer, more efficient drone operations.

For more information, see our report Drones for Working at Height and Confined Space Inspections. For additional resources and guidance on adopting safety technologies, explore the Work to Zero *Safety Innovation Journey*.

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Learn More:
nsc.org/WorktoZero

National Safety Council