

USE OF DRONES FOR CRANE SAFETY

What's the Risk?

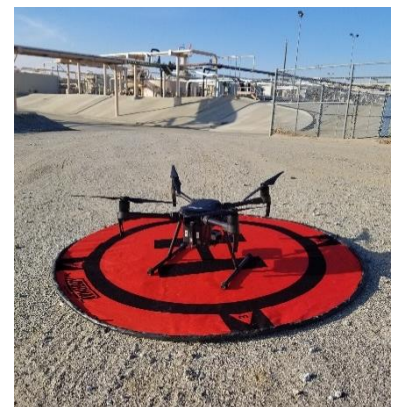
Cranes are essential pieces of machinery across various industries, enhancing operational efficiency and reducing the manual labor needed to lift, transport and place heavy materials on a jobsite. However, crane operations also introduce a range of safety hazards contributing to the risk of serious incidents and fatalities (SIFs).

During site inspections and lift planning, workers often need to perform inspections at height, exposing them to risks of falls, equipment failure and other height-related hazards. Damaged or deteriorated structures can further exacerbate these risks. Additionally, the surrounding environment also needs to be inspected to ensure the terrain is level and stable enough for safe crane operation. Surface expressions, referring to the flow of crude oil, water and/or steam to the Earth's surface, are one such high-risk phenomena. Workers who perform these inspections face hazards such as high temperatures, unpredictable releases of gas or liquids, and compromised ground stability.

In 2009, in response to a job requiring an inspection at height, [Huddleston Crane Service](#) began investing in drones to mitigate the risks faced by their workers and to facilitate both lift planning and emergency response planning.

Impacts

According to Huddleston Crane Service, use of drones has had significant benefits on both safety and operational efficiency. In response to the hazards associated with inspections at height and proximity to surface expressions, drones are used to capture high-definition photos and live videos of the worksite at various angles and elevations. This approach minimizes worker exposure to hazards while also improving the quality of site inspection and planning. Instead of relying on potentially outdated aerial views via Google Maps, drones offer more realistic and detailed visuals, enabling operators to precisely plan crane movements, create lift



plans, identify power sources, inspect cross arms on power poles, and visualize nearby streets or buildings. These images are also used to facilitate emergency response planning, including the identification of emergency shut-offs, evacuation routes and muster locations.

The photos and videos taken via drones have also been proven to improve operational efficiency. More specifically, these visuals can be used as “progress reports” for clients. Instead of a representative needing to be onsite for updates, a drone operator can instead take detailed photos at the precise location, angle and timeline necessary. In another instance, Huddleston Crane Service was able to perform aerial inspections of 300+ tanks, reducing the estimated time of completion from one year to only eight days. This not only reduced the hours of exposure to work at height but contributed to substantial time and cost savings.



Lessons Learned

As an early adopter of drones for safety applications, Huddleston Crane Service noted a couple of key lessons learned during the initial pilot and scaling of the technology.

- **Do your research**

First and foremost, it was recommended those interested in using drones conduct thorough research before purchasing equipment or selecting a vendor. Considerations might include the intended use case of the drone, necessary functionalities (e.g., thermal imaging cameras, artificial intelligence or sensors), payload capacity, and whether the equipment can be used in rugged or harsh industrial environments. Oftentimes, barriers to the successful adoption of drones involve not knowing or not being able to operate drones for certain use cases or locations. Users should familiarize themselves with local regulations and no-fly zones before investing in the technology.

- **Consider the cost and time investments**

It is also important to understand the potential cost and time investments needed to deploy a drone program. Drone operators must be certified by the Federal Aviation Administration (FAA) and familiarize themselves with FAA guidelines, including use of drones for commercial operations, limitations in restricted airspaces and safe operation. This process can be resource intensive, including examination fees and coursework. Failure to adhere to FAA guidelines can also pose the risk of incurring fines, litigation or revocation of a user's pilot certificate.

- **Train more than one operator**

Finally, it is recommended that organizations have multiple drone pilots onsite. By having at least two pilots at the time of deployment, users can rely on each other to answer questions, troubleshoot equipment, and provide coaching for safe and precise operation. This not only enhances operational efficiency and drone safety, but having another qualified pilot onsite ensures operations can continue without significant delay and reduces the workload and strain compared to a single pilot.

Huddleston Crane Service has been utilizing drone technology for nearly 15 years. Since beginning as a small-scale project, it has upgraded the technology an estimated seven times, adding additional capabilities including zoom inspections, thermal inspections, wide-angle visibility, GPS metadata and collision detection.



Huddleston Crane Service

Based in Taft, California, Huddleston Crane Service is a crane and trucking company, performing various lifting, heavy haul or specialty haul jobs in the San Joaquin Valley. The company currently employs 18 workers. Huddleston Crane Service is a third generation, family-owned company. The company prides itself on being one big family that contributes to a safe and enjoyable workplace.

The National Safety Council would like to gratefully acknowledge the partnership and support of the [NCCCO Foundation](#) for this work. These case studies are for educational purposes only and do not constitute an endorsement of any particular technology, vendor or employer. The intention is to provide practical insights into the implementation and applications of safety technology in the crane industry.