

# Using Drones for Engineering: Benefits, Uses, and ROI

## Drones For Engineering

**This article will explain how and why firms use drones for engineering industries. Learn about relevant regulations, the potential for return on investment, industry-specific drone requirements, and more. This information provides credible sources, examples, pictures, and videos.**

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## Introduction

Most drone enthusiasts know that commercial operations are using drones in major industries like real estate, utilities, agriculture, and inspections. But even drone enthusiasts may not realize how much drone use is skyrocketing. Each day, drones are transforming work in technical and labor fields like construction and engineering. As technology becomes more accessible, the way professionals approach engineering tasks is rapidly changing. Technologies like 3D Modeling, laser scanning, and AI interfaces make engineering more efficient and more accurate than ever before.

The use of drones for engineering continues to accelerate, and today, one in 10 engineering companies worth \$50 million or more use drones. In a [report](#) conducted by market analyst group Blue Research, 92 percent of 1,736 companies surveyed saw a positive return on drone investments within the first year of drone operation. This data suggests that US industries are increasingly adopting drone use, with a 35 percent increase in drone use for engineering industries. In addition, one in five survey respondents use drones or expect to use them soon. And 84 percent of companies anticipate an uptick in the overall number of drone flights to increase over the next year.

## Why Do Engineers Use Drones?

Drones collect large amounts of data efficiently and safely, and they provide more accuracy than traditional surveying and monitoring equipment. Using drones for engineering also increases time and cost savings. And drones can gather data in hard-to-reach locations and rugged terrain easier than humans on foot or ground-based vehicles can.

One example is civil engineering firm Taylor Engineering, Inc., which works on water-related projects along the East coast. Typical projects involve coastal protection and restoration, dredging, and flood management. Staff Geologist William Warren initiated Taylor Engineering's drone program in 2017, using a single [Phantom 4 Pro](#) to collect still images and monitor construction progress. The drone's

ability to use aerial mapping and wide-angle shots to assess change over time was impressive, and Taylor quickly accelerated its drone program. Today, Taylor Engineering has assembled a team of eight FAA-certified pilots, established a Remote Sensing Practice Area for training drone pilots, and regularly employs orthomosaic imaging to assess projects, track changes, create topographic maps, and monitor material stockpiles.

## **How are Drones Used in Engineering?**

Engineering firms can use drones to perform inspections, monitor construction, conduct site surveys, and detect code violations. Drones can gather data and create detailed maps and 3D models for accurate, highly detailed reports. And drones for engineering can collect and analyze information faster and with less cost than human workers. Engineers can use drones for:

- **Site Mapping**
- **Project Monitoring**
- **Mapping Topography**
- **Tracking Changes**
- **Inspecting Infrastructure**
- **Monitoring Job Site Safety**
- **Calculating Materials**
- **3D Modeling**

### **Site Mapping**

Drones for engineering collect site data to establish a foundation for design creation. Using traditional methods, a designer would ask a surveyor to record points from a site to gather site data. Engineers use these data points to inform the design. Drones, on the other hand, generate complete site maps using 3D scanners, LiDAR, and photogrammetry. Drones can collect data over large areas, giving engineers highly accurate, large chunks of data in far less time than traditional site surveys. Drones can cover large swaths of remote and rugged terrain with ease and speed. And, as drone technology continues to evolve, improvements in data collection and information-processing methods will further improve accessibility and accuracy.

### **Aerial Photography**

Drones use aerial imaging to capture sweeping panoramic views from towering vantage points, and the unique perspective of drone imagery dominates every market that could benefit from wide-angle imagery and video. Engineering uses this unique capability to document infrastructure and site changes before, during, and after project implementation. Aerial photography has become key for monitoring public structures such as utilities and inspecting towers, public works, and infrastructures like bridges and dams. And, drones' aerial photography helps engineers identify potential hazards and document maintenance remotely, without the need for placing workers or costly equipment in potentially hazardous conditions.

## Community Engagement

Drones provide a fun way to interact with the public using engaging imagery and videos for community websites and social media channels. Drone-powered visuals can help the public understand project purpose and functions, helping to build community engagement and boost support for local projects. For instance, descriptive animations may detail how a new traffic light could help relieve traffic congestion in high-traffic intersections and improve safety for community members. When the public perceives value in proposed projects, investors and community members alike understand why an improvement is worth investment.

## Return on Investment in Using Drones for Engineering

Drone technologies and availability is building exponentially with each year. Tech companies are rapidly advancing drone hardware and software capabilities at lightning speed. With technology advances, demand for drones and drone programs has spiked. At the same time, availability and increased market demand have allowed for reduced cost, allowing engineering firms to onboard drone technology at a small price, especially when compared to short and long-term [return on investment](#).

Drone platforms offer sweeping perspective and extreme accuracy, two points critical to the inspection or design of engineering projects. And drones for engineering perform without the need for multiple-person crews or bulky, expensive equipment that may have been necessary without a drone's unique capabilities. This increased perspective and accuracy present significant cost savings on labor hours, repetitive field visits, specialized tools, vehicle refueling, and other equipment.

Modern drones produce high-definition imaging, video, and modeling to extend the reach and vision of engineering teams beyond anything possible just a decade ago. And drones provide this high-quality information at a fraction of the cost of traditional, human-powered methods. Sending a drone to survey hazardous areas such as quarries, towers, electrical lines, dams, and other dangerous structures or terrain means personnel can avoid facing such dangers.

According to OSHA, US employers collectively pay nearly [\\$1 billion each week](#) in expenses directly related to workers' compensation claims. But employers pay for worker injuries in indirect costs as well, including:

- Training for employee replacement
- Accident investigations
- Corrective measures
- Researching and establishing new policies
- Loss of productivity
- Equipment and property repairs or replacement

Drones can provide a high ROI in worker safety alone. Taylor Engineering, Inc. helps protect employees and reduces costs related to work hazards by using drones to acquire LiDAR data in hazardous areas and inspect structures in areas affected by adverse conditions like flooding, high winds, and other natural hazards. Using drones for engineering projects, Taylor Engineering and other

engineering companies can significantly decrease the frequency and severity of accidents, improving both profit and personnel safety.

## Relevant Regulations in Drones for Engineering

The rules for commercial drone use are ever-evolving, but the FAA Part 107 rule has made using drones for engineering more accessible than ever before. Today, regulations require only that commercial drone pilots register their drones, pass an [FAA license exam](#), and complete a TSA background check.

In the Blue Research survey, 51 percent of company respondents said their company is “eager and excited” to use drones. However, others noted that employee approval for new drone programs within the company has been less enthusiastic. Some of this reticence may be a reaction to tightening regulations on drone use by the FAA, with 49 percent of the Blue Research study’s respondents citing “staying up to date on laws/regulations” as the number one obstacle to drone adoption. Creating processes that ensure adherence to FAA regulations was the second-place concern, cited by 43 percent of survey participants. Some of these regulations include:

- **The 400-foot rule.** Drone pilots must fly at or below a maximum of 400 feet altitude at all times. Commercial pilots, such as those flying drones for engineering, may fly 400 feet above structures and topographical elements, as long as the drone does not enter restricted airspace.
- **Restricted airspace.** Drone pilots must avoid flying directly over public gatherings, such as sports events, concerts, and parades. Remote pilots must avoid flying through military airspace, near airports, in or above emergencies, near government buildings (without a special permit), or in crewed flight airspace.
- **Privacy protections.** Remote pilots may not infringe upon the right to privacy of private citizens, meaning pilots may not fly drones near a person or persons or acquire direct images or video of a person without consent.

Commercial pilots, including those using drones for engineering, are responsible for knowing and upholding all rules and regulations of drone operation in the United States. Breaking these rules, even unwittingly, could result in fines, loss of certification, or even jail time. Therefore, it pays to know the rules inside out. If you need help learning or understanding the complete regulations for drone pilots, you may want to consider taking a course before beginning your career path as a drone pilot in any field.

## Consulting

Drone service providers help relieve compliance concerns by connecting engineering companies and drone pilots with a network of experienced, FAA-certified drone pilots. Companies and individuals who are considering starting drone programs can protect themselves from legal risk by knowing rules and regulations inside out. If you are considering using drones for engineering, [.....] s can help you get started. Call [.....] or email [.....] to schedule your free consultation with an expert drone pilot today.

# Starting a Drone Business For Engineering

As demand for drone pilots in engineering grows, more opportunities open up for people who want to build a business around drones for engineering. There are a few requirements for using drones for engineering, including a high-quality drone equipped with a full suite of scanning and modeling software capable of producing high-definition images and HD video.

Here are the necessities for starting a drone business in engineering:

- Drone-mounted HD camera
- [Photogrammetry](#) software
- [LineVision](#) software
- [Geospatial](#) software

The main challenge for drone pilots seeking a career in engineering is learning how to make the various software programs work together neatly and efficiently. And since new applications are being created, tested, and released regularly, keeping up with the latest technological advances ensures drone pilots can stay relevant in today's ever-changing market. In today's engineering industries, access to more data equals the ability to make better decisions, allowing pilots using drones for engineering to deliver better results to clients than ever before. And in the future, drones may become as essential to engineering as a smartphone is today.

## Engineering Firms Using Drones

Engineers use drones because they improve efficiency, increase safety, and reduce the costs of various operations. Here are some of the most common uses for drones across engineering fields.

- **Construction Engineers** use drone data to analyze site improvements, track progress, and detect problems.
- **Civil Engineers** use drones to view high-risk projects like dams or highways and areas in rough terrain.
- **Chemical Engineers** fly drones inside equipment, small structures, or hazardous compounds to conduct visual inspections.
- **Electrical Engineers** use drones to inspect towers, pylons, grid stations, and other structures at heights dangerous or even inaccessible to humans.

If you're looking for more resources or a place to start further research, here is a shortlist of some major companies using drones for engineering today:

- [Klohn Krippen Berger](#)
- [Keystone Consultants](#)
- [McKim & Creed](#)
- [American Council of Engineering Companies](#)
- [Burns & McDonnell](#)
- [Hoyle, Tanner & Associates](#)
- [McNeil Engineering](#)
- [US Army Corps of Engineers](#)
- [Houston Engineering](#)

To learn more about how you can start a drone business for engineering, you'll find expert advice in a [FREE COURSE](#) from [...]. Follow this step-by-step guide to launching your drone-based business,

and learn from a successful drone business owner in video interviews and a Q&A session that answers the most common questions about starting your own drone business.