FLYABILITY

SAFE DRONES
FOR INACCESSIBLE PLACES

COLLINS ENGINEERS INC.

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ELIOS IN ACTION | INFRASTRUCTURES

INDOOR DRONES IN BRIDGE INSPECTION: BETWEEN BEAMS AND INSIDE BOX GIRDER

ELIOS IS USED FOR BRIDGE INSPECTIONS IN MINNESOTA, USA, NAVIGATING THE DIFFICULT TO REACH SPACES UNDER BRIDGES BETWEEN BEAMS AND INSIDE OF BOX GIRDERS.

Elios is used for two different types of missions: flying under smaller bridges to check for potential issues, including accessing the difficult spaces between beams; and flying in the confined spaces of box girders on larger bridges. Both missions save the company significant time, money and resources while contributing to the safety of the engineers.

"IF WE CAN FIND THINGS EARLIER, WE CAN SAVE OUR CLIENTS MONEY AND TAKE CARE OF PROBLEMS BEFORE THEY BECOME LARGER."

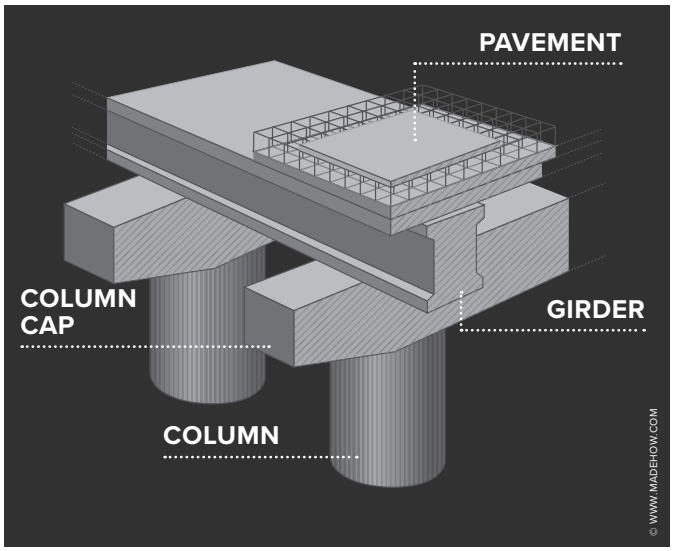
CUSTOMER NEEDS

Minnesota has nearly 13,000 bridges crossing the state's thousands of rivers and lakes. More than 1 in 10 of these critical infrastructure pieces were built prior to 1948. For the experts at Collins Engineers who inspect a number of these bridges, efficiencies in time and costs must be accompanied by excellent data.

The inspection company's primary concern is providing thorough and accurate data to their client. Bridges must be inspected at regular intervals – those considered most vulnerable are inspected every year, but most bridges are inspected every two years. Engineers inspect the bridges to detect issues like cracking in concrete, problems with bearings, or movement of the bridge. Corrosion, paint loss, and rust are other indications that the bridge may require further examination. Without a drone, inspecting the underside of structures or confined spaces can be prohibitively expensive.

The work is typically performed with a bucket truck designed for extreme terrain including the ability to operate in up to 9 feet of water and to climb 45 degree slopes. These trucks can cost over $600,000 to purchase, and are rented for more than $2,500 per day. When the vehicle is procured, it often requires traffic control along the truck's route, and a significant time investment to get the truck to the site of inspection. The truck must be staffed with a vehicle operator in addition to the bridge inspector in the bucket of the truck. Even with the specialized truck, the spaces between girders under the bridge are extremely challenging to reach and accurately assess. Additionally, because the cost of inspecting smaller bridges with a truck is high, these bridges are often not prioritized for inspections.

As part of the inspection of larger bridges, Collins Engineers experts are also responsible for inspecting confined spaces like the inside of box girders. Without a drone, this is performed by setting up ladders and scaffolding inside of the girders so that inspectors can perform a visual inspection. The process of set up and inspection is time consuming, requires 2 or 3 people, and can be dangerous for inspectors.



"WE'RE GETTING A BETTER LOOK AT THE BRIDGE – WE'RE GETTING INTO AREAS THAT ARE DIFFICULT TO ACCESS."

—

Barritt Lovelace, Regional Manager at Collins Engineers

SOLUTION

The inspectors at Collins Engineers use Flyability's Elios drone to fly underneath bridges, in spaces between girders and other areas difficult to reach by traditional methods. They have also used the Elios to fly inside of box girders on large bridges, capturing relevant data without a team of engineers accessing the space on ladders or scaffolding.

Engineers save the video for future referral, but provide a detailed inspection report including still images and actionable insights to their client.

RESULTS

Using Elios instead of a specialized truck for inspecting the underside of bridges provides a major savings for the company, and allows them to provide more information at more frequent intervals to their clients. The drone requires no traffic control to transport, no additional time to reach the site, and can be operated by a single inspector compared to the 2 or more personnel required to operate the truck. Adding together the $2,500 per day cost of renting the truck, the cost of a driver in addition to the bridge inspector, and the cost of traffic control and the Elios is able to save over $3,000 on a small bridge inspection.

Additionally, the drone allows the inspector to see inaccessible areas like the spaces between beams. "For a smaller bridge this is a really good way to be thorough without adding a lot of costs," says Barritt Lovelace, Regional Manager at Collins Engineers. "And, we're getting a better look at the bridge – we're getting into areas that are difficult to access."

For inspections inside box girders, the Elios solution results in at least a 25% reduction in inspection time. The time savings increases when setup time is included: Elios eliminates the need for scaffolding and ladders. The drone can be operated by a single person rather than the 2 or 3 required to inspect on a ladder.

The savings in time and personnel translate to cost savings. The average annual salary of a bridge engineer in the U.S. is $84,140[1]. Saving a day-long setup process and the time of two extra inspectors adds up to a savings of around $1,000 per single inspection in personnel savings alone.

1 U.S. Bureau of Labor Statistics (May, 2016) Occupational Employment and Wages, Civil Engineers, retrieved from BLS.gov

The additional inspections that can be performed by freeing up the workforce is an additional boost to productivity. “It’s significant,” says Lovelace.

The firm is monitoring costs moving forward to get more accurate information. They also recognize a significant value in safety and quality factors. Beyond the time and cost savings in inspections, Lovelace says that the drone allows them to provide a better service for their customer and more savings down the road. While Collins always adheres to national standards, “Elios gives us a much higher quality inspection.”

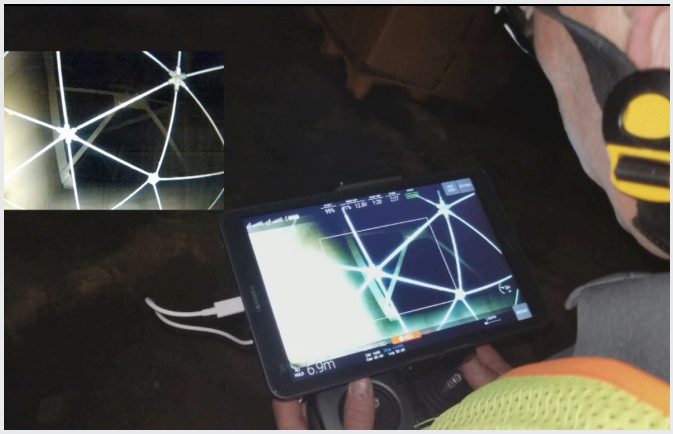
“If we can find things earlier, we can save our clients money and take care of problems before they become larger.”

CONCLUSION

Drones provide bridge inspectors with a significant savings in time and costs, while providing customers with more thorough data for effective resource allocation. Lovelace points out that while safety is a big part of bridge inspections, it is also a critical tool for managing valuable infrastructure assets. Better data allows customers to manage resources and plan maintenance and repairs, providing further efficiencies.

Ease of use, speed and lower costs give drones the potential to transform the way bridge inspections are done across the globe.

MISSION PICTURES TAKEN BY ELIOS



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TIME – COSTS – SAFETY

Flyability builds **safe drones for the inspection of inaccessible, confined, and complex places**. Focusing on the Energy, Oil & Gas, Chemicals & Maritime industries, Flyability enables end-users to save time, costs and reduce risks during visual inspections.