2026 SURVEYORS' Conference

AWK CONSULTING ENGINEERS

205: Using Laser Scanning to its Fullest with Trimble Business Center

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WHY SCAN

2026 SURVEYORS' Conference

- Why use laser scanning instead of traditional surveying?
- Safety
- More efficient
- Cost

- Busway (8.5 miles in length – curb to curb). Traditional surveying would have taken up to 45 days between setting control and survey. By ustilizing Mobile Lidar the actual field time took 5 days (between setting up control and scanning). Utilizing T.B.C points were picked and exported to Civil 3D. Processing the entire 8.5 miles only took 3 weeks.

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SCANNERS

For large projects, we will set control and sub out for mobile laser scanning.
AWK uses a Trimble SX12 Total Station and a Trimble R10 GPS, a Trimble Access Data collector, and the Trimble Business Center software.

The Trimble SX12 scanning total station offers the following accuracy specifications:

Angular Accuracy: Achieves 1″ accuracy for demanding projects.

Standard Deviation: According to ISO17123-3 and ISO17123-4, with specific values for different conditions.

Point Cloud Accuracy: Provides ultra-clean point clouds at up to 26,600 points per second.

Measurement Accuracy: EDM accuracy of 1.5 mm + 2 ppm to the prism.

The Trimble R10 GPS system offers high-precision positioning capabilities, achieving centimeter-level accuracy under optimal conditions.
Key Features Affecting Accuracy

High Channel Count: With up to 672 GNSS channels, the R10 can track multiple satellite signals, improving reliability and accuracy in various conditions.

Tilt Compensation: The system allows for full tilt compensation, enabling measurements even when the survey pole is tilted up to 15 degrees. This feature helps in capturing points that might be inaccessible to other GNSS systems.

Correction Services: The R10 supports Trimble CenterPoint RTX correction services, which can maintain centimeter-level accuracy for up to 5 minutes of occupation time, making it suitable for high-precision applications.

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POINT CLOUDS

- 1) Understanding Point Clouds:

- AWK was hired to scan a historic Bridge. The parapets were substandard and needed replaced. The district wanted to maintain the same look for the parapets, so by scanning a section of the parapet, the engineer was able to duplicate the same appearance, yet make them stronger.

- Engineer needed to determine exact locations for bore holes that would not affect the integrity of the structure. By scanning the underside of the bridge, we could provide them areas of voids (no stringers). Utilizing this information, the engineer was able to provide exact coordinates to bore through the bridge deck enabling the driller not to hit any of the beams or cross-members.

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POINT CLOUDS
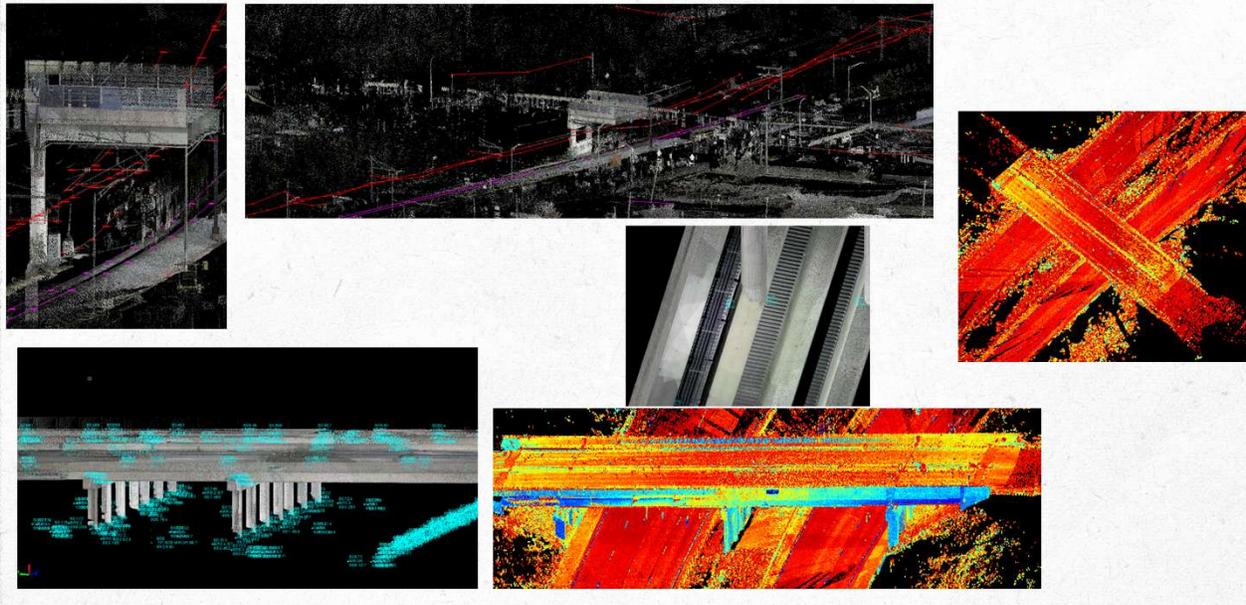
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POINT CLOUDS

- AWK was hired to perform an as-built survey of a water tank. Original plans were non-existent, and there was a need for the internal piping structure to be updated.

- Piping in a parking garage. Scope of the project was to locate pipe runs in an underground parking garage.

- A bridge replacement project was being delayed because a rail entity would not grant access to survey catenary wires above and below a bridge deck that is overtop of the railroad. The catenary wires were necessary to develop a building envelope for placement of the beams for the new bridge. A scanner was used outside of the L.R.O.W. of the railroad to locate the whole wire to develop the precise sag location, and the elevations of the bridge envelope.
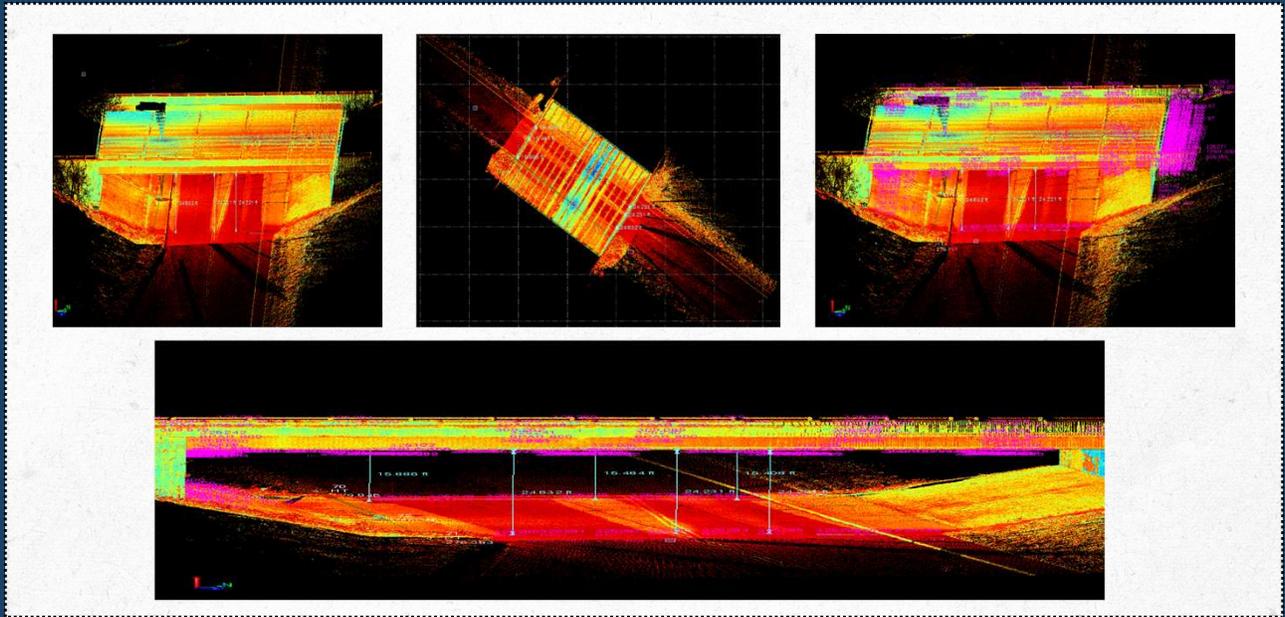
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POINT CLOUDS
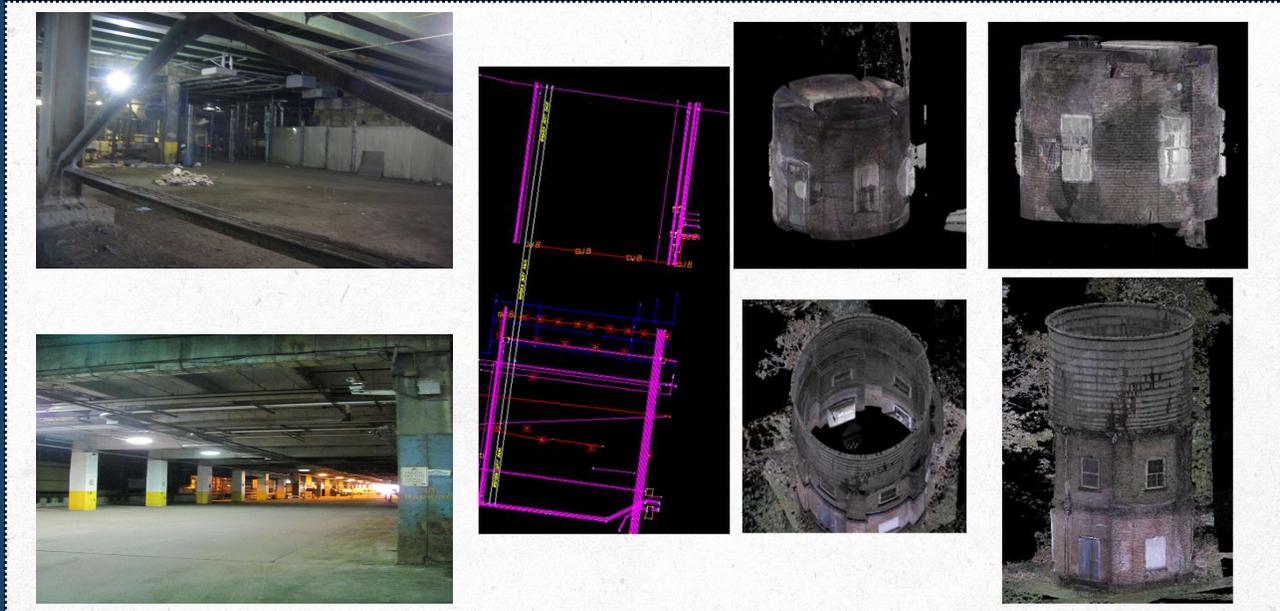
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POINT CLOUDS

- 2) Explaining why it is better to use Laser Scanning on Roads and Intersections for Safety-

- Scanning of a high traffic area for lane markings allowed field crew to be out of traffic without the need for Traffic Control.

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POINT CLOUDS

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POINT CLOUDS

- Don't be afraid of point cloud data, understand the software and what the tools can do for you. Slice a bridge into parts to pick points- I feared doing bridges. Did I choose the right point under the bridge? I sliced the bridge so I could see all parts and then pick the points.

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POINT CLOUDS

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205:SESSION EVALUATION

HTTPS://WWW.SURVEYMONKEY.COM/R/PSLS2026EVAL

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