

VISUAL BRIDGE INSPECTION

SITUATION

MAINTAINING THE SAFE OPERATION OF BRIDGES REQUIRES REGULAR INSPECTION AND REPORTING TO REGULATORY AGENCIES. THESE AGENCIES KEEP CLOSE WATCH ON THE RELATIVE HEALTH OF ALL BRIDGES IN THEIR AREA OF JURISDICTION.

Collecting and managing this information can be a challenge for the inspection teams of the reporting agency. Worker safety is a key concern in situations where on-site inspectors must occupy hazardous areas. With the requirement for regular reporting on each bridge, many inspection teams are strained by the number of qualified crews. Finally, without adequate field methods information represents a "snapshot in time" and is not collected in a way to be easily shared across an organization.

HOW ARE BRIDGE INSPECTIONS PERFORMED TODAY?

OLD WAY

The typical methods of capturing visual bridge inspection data is a manual process. Although field technology varies by organization, many inspections are still performed with a tape measure and clipboard. Qualitative measurements are determined at an "arm's length." Then the analog data is re-keyed into software for regular compliance reporting.



NEW WAY

Terrestrial photogrammetry cuts time spent on site and increases inspector safety. Photo documentation and measurement means that many of the bridge elements can be inspected remotely, to further protect the safety of workers from occupying hazardous areas on or around a bridge. Pinpoint accuracy in the office enables inspectors to derive the qualitative information, measurements and precise positions needed to complete a visual inspection.



FIELD PROVEN

This workflow has been tested and tuned in the field and office to increase efficiency of a visual bridge inspection process compliant with the National Bridge Inventory (NBI) standards.

In a recent trial conducted near Charlotte, NC, this workflow resulted in a 45% reduction in field time. The data was then processed, and analyzed using Trimble Business Center to complete a standard NBI inspection report. The as-built structure was modeled in SketchUp™ from the panoramic image to document the bridge in 3D.

SUBJECT IN NUMBERS

4392 square ft area of deck
3 concrete spans
17% skewed roadway
17,950 average daily traffic

TRANSFORMING THE WORKFLOW

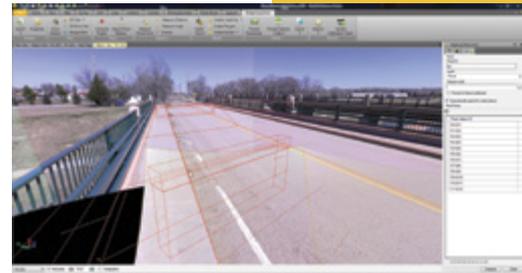
1. Capture comprehensive inspection data in the field with 360° panoramic imaging. Visual data capture cuts field time by about 50%.
2. Process imaging data in Trimble Business Center software to enable in-office inspection, measurement and analysis.
3. Analyze the data to complete the required reporting such as National Bridge Inspection (NBI) reports.

See How We Did It:

- [Bridge Inspection Techsheet](#)
- [Bridge Clearance Techsheet](#)

POWERFUL NEW DELIVERABLES

Photo-measurable point creation allows bridge inspectors to visualize, measure, and model easier than ever before. Anything seen in V10 images can be measured precisely and quickly. Measurements and linework can be overlaid over panoramic photographs for real-world visualization. Export linework to SketchUp or CAD applications to model and create as-builts entire bridges or smaller assets around the bridge. Stitches panoramic images provide a 360 degree perspective of the site conditions. Now photographs are not only used to describe the conditions of bridge elements, but any feature in the same photographs is measurable.



SUCCESS IN NUMBERS

On site image collection:
 • 35 minutes on site (out of traffic)

Inspect from the office:
 • 20 minute hands-off automatic tie point generation
 • 40 minutes hands-on point measurement

More information and detail:
 • As-built generated from ~200 measure photo points
 • 60 geo-located images captured to document and revisit

TRIMBLE'S VISUAL INSPECTION SOLUTION

The Trimble® V10 Imaging Rover offers a solution to this challenge by enabling bridge inspection engineers to take a picture, complete with details and georeferenced positions, of these features quickly and safely from outside of the roadway. Not only are all of the features captured for use now and later, but the user can provide new deliverables to the client – complete panoramic images, measurements of any visible features, and modeling capabilities to create and update as-built drawings.



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