Wednesday Plenary

Leveraging Technology: 3-D Laser Recordation for Historic Structures, Brooklyn Subdivision Bridge, Oregon

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State Historic Preservation Officers (SHPOs) throughout the country regulate effects on historic properties under Section 106 of the National Historic Preservation Act. This regulation frequently comes into play on railroad projects when a federal permit is needed, such as a U.S. Army Corps of Engineers Section 404 permit, triggering compliance with Section 106. Although Section 106 does not prohibit the alteration, removal, or demolition of a historic property, it does require a consultation process that generally results in some type of mitigation. This mitigation often takes the form of documenting the historic property, which can be an expensive and time-consuming effort.

For UPRR's replacement of the bridge across the Willamette River on the Brooklyn Subdivision in Oregon, UPRR implemented an innovative approach to Historic American Engineering Record documentation. The large size and remote location of the bridge, spanning a waterway, presented a challenge for completing required documentation.

UPRR met this challenge by using a 3-dimensional laser scanning (3DLS) process to capture the details and measurements of the bridge, which resulted in a focused field effort and streamlined documentation process. Benefits of this approach were no downtime for the active railroad facility while providing greater details than could be gained with more traditional documentation methods.

The 3DLS remote-sensing technology captures real as-built information by sending and receiving millions of pulses of light. The scanner can collect points upwards of 500,000 points per second and can reach up to 300 meters away. These scans are then stitched together to create a comprehensive 3-dimensional set of points. CAD extractions, reverse engineering, and 3-dimensional modeling are a few of the deliverables that can be developed from 3DLS technology. This technology can be used to capture highly detailed physical information for any railroad structure, and is particularly effective for documenting historic structures before their removal.

This presentation discusses how UPRR was able to fulfill the Section 106 stipulations mandated in its Memorandum of Agreement with the SHPO, how the 3DLS technology was implemented at this challenging site, and displays the laser-scanning renderings."