Strategies for Documenting Covered Bridges Using 3D Laser Scanning and 3D Modeling

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Goals of Documentation

“The goal of the collections is to provide architects, engineers, scholars, and interested members of the public with comprehensive documentation of buildings, sites, structures and objects significant in American history and the growth and development of the built environment.”

Standard I. Documentation Shall Adequately Explicate and Illustrate What is Significant or Valuable About the Historic Building, Site, Structure or Object Being Documented.

Standard II. Documentation Shall be Prepared Accurately From Reliable Sources With Limitations Clearly Stated to Permit Independent Verification of the Information.


Standard IV. Documentation Shall be Clearly and Concisely Produced.

The Secretary of the Interior’s Standards for Architectural and Engineering Documentation
http://www.nps.gov/history/local-law/arch_stnds_5.htm
Capturing scan data in the field
Leica ScanStation 2
Range: 300m
50,000 points/sec.
Noise: 2mm
3R class laser

Leica ScanStation C10
Range: 300m
50,000 points a sec.
Noise: 2mm
3R class laser

Much lighter, faster, and less field equipment required.
Traverse scan method
Free Target Scan Method
Recent fieldwork:
17 Stations
297,306,453 points
Scan-shadows
Filling the gaps in scan data

Hands-on investigation and measuring

Field notes

Field photos
Normal Exposure  Overexposure  Underexposure

Twenty-four shots with a fish-eye lens to complete 360° HDR Panorama
Software used to view pointclouds in AutoCAD
Kubit (.ptx, .pts)
Leica Cloudworx (.imp)
AutoCAD (.pcg)
Parametric 3D modeling

Parametric: A set of measurable factors that define a system and determine its behavior. A factor that determines a range of variations; a boundary.
Section A-A
By-Products
Non-archival data that exists outside the collection. Panoramas, 3D models, fly-throughs, animations.
Geospatial Data

GPS Feature Points

Mapping topography
360° High Dynamic Range (HDR) Panoramic Photography
Truss Detail End Post, South Side
1/2"=1'-0"
1:24
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