Robert A. Booth (Winchester) Bridge, Douglas County, Oregon

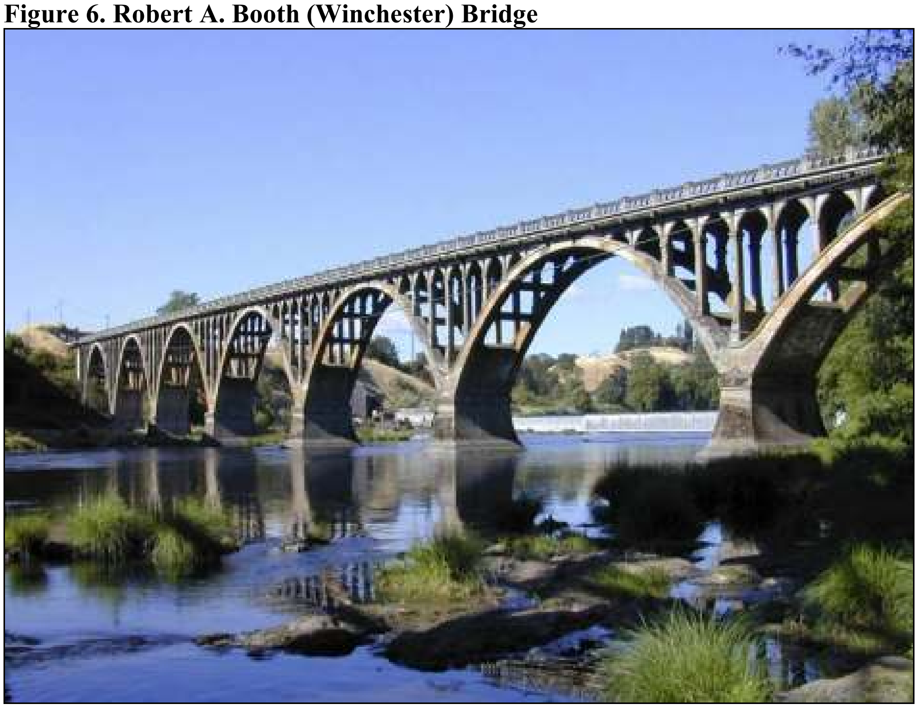
Location and Description of Setting:

The Robert A. Booth (Winchester) Bridge carries Oregon Highway Route 234 over the North Umpqua River, Douglas County, Oregon. It serves as direct access to several historic resources and recreation areas, including the National Register-listed Winchester Dam (ca. 1880), Amacher Park, the Oregon & California Railroad Corridor (ca.1870s), the 1904 Kolhagen Ranch House, and a historic steel bridge upstream. It also provides access to boat ramps and sport fishing along the river, and a fish ladder viewing area. The bridge accommodates pedestrians and bicycles as well as vehicular traffic.

Description of Bridge:

The bridge was built in 1924, and is one of the longest reinforced concrete ribbed deck arch bridge designed by Conde McCullough. The bridge is distinguished by its architectural design, which can be described as Tudor or Gothic in its details. The outstanding features of the bridge include the series of seven delicate arched spans and lancet-arched spandrel walls that support the deck and roadway, cantilevered balconies at the north and south end spans, and the lancet-arched balustrade railings that extend the length of the bridge. The bridge is 887 feet 8 inches in length (one span at 62 feet; seven at 112 feet; and one at 41 feet 8 inches).

Figure 6. Robert A. Booth (Winchester) Bridge



Rehabilitation Project Information

Date/Cost for Rehabilitation:

The bridge underwent a major rehabilitation in 2007 to provide additional roadway width for traffic and sidewalks for pedestrians while preserving its historic value and significant features. The rehabilitation project was completed in 2008 at $10 million.

Project Designer:
Hamilton Construction Co., Springfield, Oregon

Bridge Owner/Client:
Oregon Department of Transportation

Source for Additional Information:
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Project Information

1. **Significant issues associated with project (e.g., bridge condition, reasoning behind decision to rehabilitate versus replacement, reasoning behind selected maintenance activity).**

   There were two significant challenges with this project. One was a political challenge that addressed the extended closure time of the highway route. The design team demonstrated through their study that there were no good and feasible alternatives to closing the facility. As a result, funding was made available to relocate a fire and ambulance team to continue the required response time to the local community. Business consultants were brought in to assist the impacted businesses, helping them manage their operations during the bridge closure, thus minimizing their losses.

   The second big challenge involved drilling into the existing beams and deck sections and placing new steel where necessary. In the 1920s, not only was steel placement not as orderly as it is today, but the concrete cover varied and steel reinforcing hooks were placed randomly. A constructability review suggested the best approach for adding new steal was to drill into the existing steal. In hindsight, however, it might have been better to hydro-blast the beam sections and then place the new steel. This would have avoided the possibility of jeopardizing the existing steel.

2. **Project description, including purpose and need.**

   The scope of this project included widening the structure's roadway from 19 feet 4 inches to 24 feet; adding 11-inch raised curbs and three-foot sidewalks; repairing or replacing floor beams, deck and bridge rails; adding a deck drainage system; and reconstructing a retaining wall, an abutment endwall, and the bridge approaches. The new bridge rails are the Oregon "stealth" rails, which provide a structural steel, vehicle containment rail hidden within a precast concrete rail.

   To ensure long-term durability to the beam repair patches that were inaccessible for cleaning, a cathodic protection system was added. In this system, zinc puck acts as an anode to the steel reinforcement. Fiber-reinforced polymer composite wrapping was used to repair and strengthen concrete members that were weathered and deteriorated. A non-intrusive, visually hidden, deck drainage system was added to the bridge deck and sidewalks to control runoff at joints and bearings.

3. **Section 106 effects finding (no adverse, adverse). Major issues discussed with State Historic Preservation Officer, and how issues were resolved.**

   Oregon DOT made a finding of No Adverse Effect, based on the proposed rehabilitation, and the Oregon SHPO concurred with this finding. The SHPO noted that

   > "Project alternatives included a bypass alternative and various widening alternatives. It was found that keeping the bridge in service as a highway bridge would cause the least overall harm to the resource in the long term. The modest widening of the roadway deck and addition of sidewalks would decrease the roadway deficiencies while not compromising the structural integrity of the substructure."

4. **Lessons Learned.**

   First, it is important to implement early coordination with all stakeholders and resource agencies. As part of applying a Context Sensitive Solutions (CSS) approach to the project, stakeholders were engaged early in the project and their input was incorporated into the project's decision-making process.

   Second, seek public support for the rehabilitation project. The project team prepared extensive renderings for the public and resource agencies, showing the visual affects of the widening and restoration. The renderings were a key feature in demonstrating how the final product would fit within the context of the area's historic resources.

   Third, carefully consider the experience of the project contractor. It is important to have an experienced contractor who can adapt current bridge standards to older structures.

   Fourth, develop a bridge preservation program and general policies for the program. The program should include long-term objectives, with funding support; sustainable program strategies; and a commitment to extending the service life of historic structures. The program should also include strategies for corrosion protection, corrosion resistance, and the use high performance materials.

   The Robert A. Booth Bridge rehabilitation project showcases how to restore and increase the safety, capacity, and load rating of an historic bridge that would otherwise be uneconomical to replicate in today's business and public agency work culture. The project promotes the use of current and emerging bridge technologies, such as cathodic protection technique, fiber reinforced polymer composites, and restoration construction techniques. The project also demonstrates the successful use of CSS protocols and processes. It actively engaged stakeholders and community in order to obtain their support for the project.