

# RENEWWRAP®

## Carbon Fiber Strengthening System



STRUCTURAL STRENGTHENING

### CASE STUDY:

Spokane, WA

North Greene Street Bridge  
over Spokane River

### PROJECT OVERVIEW

The North Greene Street Bridge over the Spokane River is a concrete bridge that was designed and built in the 1950s. The arch structure had load restrictions that prevented heavy trucks, including fire trucks, from using the bridge on this major route. The City of Spokane allowed lane closures but required the bridge to remain open during construction.

### CHALLENGE

The City of Spokane and their engineering consultant considered several strengthening options but ultimately selected an FRP solution that was minimally invasive and would cause the least disruption to the users of the bridge and surrounding community.

### SOLUTION

Leewens Corporation and their specialty consultant, KL Structures designed an FRP solution using the multiple products from the family of RenewWrap™ carbon fiber strengthening systems to meet the performance requirements specified on the plans. The following bridge members were strengthened:

- Wet lay-up system for positive moment strengthening of the deck
- Wet lay-up U-wraps for shear strengthening of the floor beams
- High-strength carbon fiber bars installed in a near surface mounted (NSM) configuration negative moment strengthening of the decks

### RESULTS

Leewens Corporation bonded the carbon fiber bars in slots they cut into the top of the deck over the floor beams where the negative moment demands were the highest. High-strength grout was poured over the bonded bars to provide additional protection to the bars.

Leewens accessed the underside of the bridge using a combination of boom lifts, scissor lifts, and an under-bridge-inspection-truck (UBIT) to make concrete repairs, inject cracks, and install the RenewWrap™ CF600 carbon fiber strengthening system. Once the deck and beams were strengthened a UV-resistant paint was applied to the cured FRP to provide additional protection and an aesthetic finish.

### PROJECT DETAILS

**Location:** Spokane, WA

**Application:** North Greene Street Bridge over Spokane River

**Client:** City of Spokane

**Product Used:** RenewWrap® FRP

**Installation:** 2013

**Installer:** Leewens Corporation

**Specialty Engineer:** KL Structures



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Installing CFRP bars in slots for negative moment strengthening



RenewWrap® carbon fiber U-wraps used to increase shear capacity of floor beams



RenewWrap® carbon fiber bonded to deck soffit to increase positive moment capacity



Completed deck strengthening after coating with UV-resistant paint



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