US30: Moisier, Dry Canyon & Chenoweth Creek Bridges
Mosier & The Dalles, OR
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• Technical Information

• Project Completion Date: December 2017

• Project Location: Mosier & The Dalles, OR

• Size of Project: Three Concrete Bridges.

  Two bridges were rehabilitated (Mosier and Dry Canyon).
  One new rapid replacement bridge (Chenoweth).

  At the Chenoweth Creek Bridge the majority of the structure was precast including: five Prestressed Deck BT 45 girders, two concrete end panels comprised of 4 section each, two pile caps, four wing walls, and nearly 250 lf of ornamental bridge rail. 15 yd3 of Ultra High Strength Concrete was utilized in the structure closure joints. 70 yd3 of Class 4000 structural concrete was placed in the end walls, diaphragms, and bridge rail curb.

  Mosier and Dry Canyon bridges received a concrete repair in a combined total of nearly 100 square yards. Both structures were coated with a cementitious materials for a combined total of 3,050 square yards. Concrete repairs were also made on the bridge rail for both structures totaling nearly 560 lf.
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- **Strength Requirements:** Class 4000 Structural Concrete in cast-in-place bridge components at Chenoweth. Girders cast with 9 ksi concrete in bottom flange and web, 5,000 psi for deck flange. Precast Rail Class 4000 Structural Concrete at Chenoweth Ultra High Strength Concrete 20,000 psi in 28-days, Lafarge Ductal Repair Mortar minimum 1,300 psi, maximum 2,500 psi at Mosier and Dry Canyon.

- **Water/Cement Ratio(s):**

- **Unique or High Volume Admixtures:**

- **Describe unique mix designs:**

- **Describe unique specifications/requirements (flatness, color, etc.):** Chenoweth Creek bridge constructed with components from two different precasters and elements of cast-in-place concrete. A cementitious coating applied to the structure (345 yd^2) for a uniform appearance and seal. The Ultra High Strength Concrete (Ductal - Lafarge) had minimum requirements of 14,000 psi in 14 days and 20,000 psi in 28 days. Tensile strength of 720 PSI at 28 days was also required. At Mosier and Dry Canyon the structures underwent a round of concrete repair followed by concrete realkinization treatment. The repaired and treated concrete was coated with a cementitious coating (3,050 yd^2) providing a uniform new-like appearance and seal.
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- **Describe placement challenges or unique techniques:** The bridge over Mosier Creek on Hwy 30 is in town and adjacent to apartments, housing, and a trail head for Mosier Plateau and Mosier Falls swimming hole. One-way traffic over the bridge was maintained during the work. Motorcycles, sports-cars, and bicycles touring the area were often a captive audience for the work when temporary closures under flagging were needed. Work on the Dry Canyon bridge rehabilitation required some imaginative use of space for access, containment, and storage. The site is surrounded by the Tom McCall Preserve near the Rowena Crest Viewpoint. Right of way extended just a few feet from the roadway. Flowers and grasses of surrounding Preserve had to be protected from the work. Traffic on the Historic Highway had to be maintained as well. Work was often interrupted by groups of bicyclists and tourists to the area. Fire Danger in the area was and extreme risk that required constant watering of the surrounding Preserve. High winds often suspended the work. The area is prime rattle snake country and we worked right amongst them. One snake even invited itself to a crew lunch where it slithered into the group. A handful of snakes were removed from the work area during the project. At Chenoweth Creek Bridge the demolition and new construction schedule was limited to 21 days. This rapid replacement approach is intended to lessen the impact to the local area. Work had to be done inside of the in-water work window (July - September) and completed before the school year started up to avoid impacting the school bus routes. Notice to Proceed on May 10th, 2017, Preconstruction Meeting on June 5th, 2017. Demolition work began on August 4th, 2017. Traffic on the new bridge early AM August 25th, 2017.
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- **Describe other special technical aspects:** Concrete at Mosier and Dry Canyon Bridges received a realkinization treatment. This treatment required the structures to be wrapped in such a manner to keep a solution in contact with the concrete while electrical current was applied to push treatment into the structure. This wrap and treat process was repeated on each bridge in seven-day cycles. Strong winds at the Dry Canyon site made installation of access and containment structures a supreme challenge.
Mosier Creek Bridge in the town of Mosier from May 2017.

This is a busy tourist route of Hwy 30. Bicycles, Motorcycles, and sports-cars are frequent in this scenic and windy area of the old highway. The bridge was constructed in 1920 and showing its age in areas like the bridge rail, columns, and footings. Banks to the water are steep surrounding the bridge and heavily vegetated.
Mosier Creek bridge hanging access and containment structure. Hanging steel was threaded along the bridge with careful attention given to the live utilities of water, sanitary sewer, and communication attached to the bridge.

Superficial damage to the spandrel arch and columns required repair with low strength mortar.

The concrete of the structure was treated in a realkinization process.
Mosier Creek bridge near mid-span as seen from the upper level of containment. In the near ground the cementitious surface coating has been applied. In the background the bridge concrete has completed a cycle of concrete repair and realkinization and is readied for surface coating.
Mosier Creek bridge from December 2017. Concrete repairs made to nearly 380lf of bridge rail. Twenty-five yd2 of concrete repairs made to the substructure. Cementitious coatings applied to more than 2,100 yd2.
Dry Canyon Bridge on historic Hwy 30 near the Rowena Crest Viewpoint is surrounded by the Tom McCall Preserve. Limited space available for work to limit impact on Preserve. Bridge built into vertical canyon walls nearly 80 ft tall.

Extensive but mostly superficial damage to the spandrel arch, bridge rails, and columns.

One column on the northern face required temporary support and replacement.
Dry Canyon bridge is complete in this photo with only a structural deck overlay remaining. Concrete repairs made to 200lf of ornamental bridge rail and 68 yd² of substructure. 1000 yd² of cementitious surface coating was applied.
Dry Canyon structural deck overlay. Rapid Set mix applied to deck. Traffic over the bridge was closed for intervals of one hour during the work. The overlay was completed in one long shift. Dry Canyon deck overlay nearly 160 yd².
Chenoweth Creek Bridge after the start of in-water work. The Creek was placed in a free-flow by pass. The original three-span bridge carried communication and sewer utilities.
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The new Chenoweth Creek bridge features elements of the Mosier and Dry Canyon bridges. Bridge components were largely precast: Pile Caps, Deck Bulb-T Girders, End Panels, Wing walls, and Ornamental bridge rail. Diaphragms, end walls and bridge rail curbs were cast-in-place. Ultra High Strength Concrete (20k psi in 28 days) was used in the closure key ways of the deck and end panels.
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Chenoweth Bridge open to traffic and the new eastern portal to the gorge Hwy 30 Oregon Scenic Byway.