

ON TRACK!

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CSRМ'S TURNTABLE: A PROJECT IN TWO PARTS



AL DI PAOLO AND JOSH MORGAN ADJUSTING THE SCREWS AS THEY ASSEMBLE THE TABLE.

THE RESTORATION SHOP RECENTLY completed rebuilding the turntable, a key piece of the museum's rail infrastructure. Originally built in 1911 by the American Bridge Company for use by the Union Pacific in Yakima, Washington, the turntable was installed in 1980 as a feature of the roundhouse portion of the Museum.

Over time, it became apparent that the turntable was not functioning correctly. Heavy locomotives caused the turntable to deflect downward; preventing the turntable from rotating. The outrigger wheel bearings were found to be worn, and the

air motor that turns the table also showed signs of wear. In addition, the turntable's wooden decking was degraded.

With funding provided by the CSRМ Foundation, it was decided to break the

project into two phases: first, rebuild the air motor and outrigger wheels; second, inspect and service the center bearing and resolve the deflection problem.

During the winter of 2012, the Restoration Shop turned its attention to the air motor and the outrigger wheels. The motor was taken to the shop and completely rebuilt with new bearings and wearing surfaces. Also, the outrigger wheels were re-machined and new bearings fitted. The rebuilt motor and the outrigger wheels were re-installed and, after some adjustment, improved the turntable's operation. By April

Continued on page 3

CSRM's TURNTABLE *from page 1*



AL DI PAOLO DOING SOME MACHINE WORK ON THE SCREWS.

of 2013 the turntable was back in use.

The second phase of the turntable's rehabilitation began during the winter of 2013. This phase involved raising the table to inspect and service the center bearing, removing the rails and decking, painting the table, and resolving the binding issue.

The turntable is essentially a bridge supported at its very center, and it tips, rather like a teeter-totter. The table also bends downward under load. Measurement revealed that the turntable was too low, causing it to bind when turning heavy locomotives. We concluded the table needed to be raised and research in old trade journals confirmed our observations. To determine how much to raise the table, tests were done starting with our SW-8 and moving up to CSRM's heaviest locomotive, Southern Pacific 6891, (the tunnel motor). Deflection measurements were taken and these data indicated how much to raise the table.

The center bearing is the heart of the turntable. It takes the entire weight of the turntable, about 60 tons, plus the weight of any engine or car placed on it. For example, our E-9, Southern Pacific 6051, weighs 168 tons, so the gross load on the turntable center bearing is 228 tons. The turntable saw an even heavier load last September during the UP 150th celebration, when the Union Pacific brought in a new 212-ton mainline diesel locomotive for display.

To get at the center bearing, the turntable needed to be raised about four feet above its operating position. Lifting beams were fabricated and placed under the table for use with air jacks.

A considerable amount of time was spent planning and lifting the table; fortunately, many volunteers were on hand to help. With the turntable raised and safely blocked in position, the center bearing was removed along with the adjustment screws. These screws allow the table's height to be adjusted to compensate for deflection.

The bearing's top race and rollers were brought to the Shop, thoroughly cleaned, inspected, and polished to remove rust and pitting. Unfortunately the adjustment screws were frozen on their nuts and could not be salvaged, so the shop made new screws. These have special threads designed to support massive loads and required exacting machine work to complete. Fortunately, the equally massive nuts in which the screws turn were reusable. The adjustment

screws have special ball shaped heads resting in sockets on top of the center bearing, so the weight on the table, plus any load, bears on about 10 square inches.

Prior to the turntable's reassembly, a painting contractor gave it a coat of gloss black paint. Finally, the day came to reassemble the turntable. Things went smoothly as the center bearing was positioned in place. Once that was installed, the new adjusting screws were installed, and, finally, the turntable was lowered to its operating position. Minor adjustments were required to adjust the table to its correct height.

With the major work completed, Maintenance-of-Way took over and a new deck and rails were firmly attached to the turntable. With the rails in place, the turntable was once again tested with various locomotives—including the tunnel motor—and can now turn our heaviest locomotives with ease. ■



JIM BAYS PROUDLY SHOWING OFF THE NEWLY COMPLETED JACK SCREWS. THE ENTIRE WEIGHT OF THE TABLE SITS ON THESE SCREWS.