

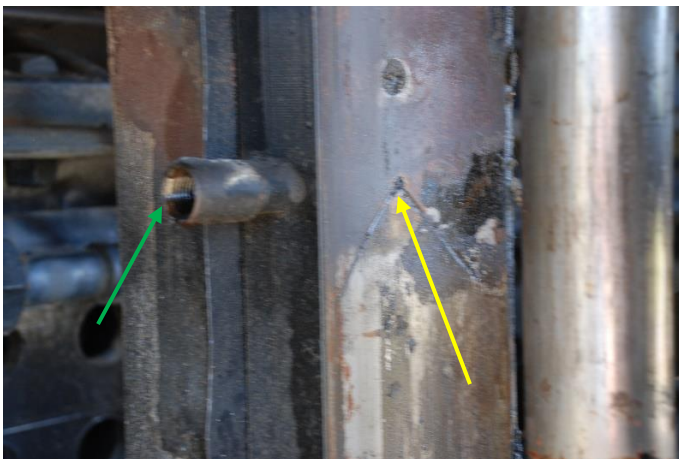


Willamette # 7 Work Party Notes

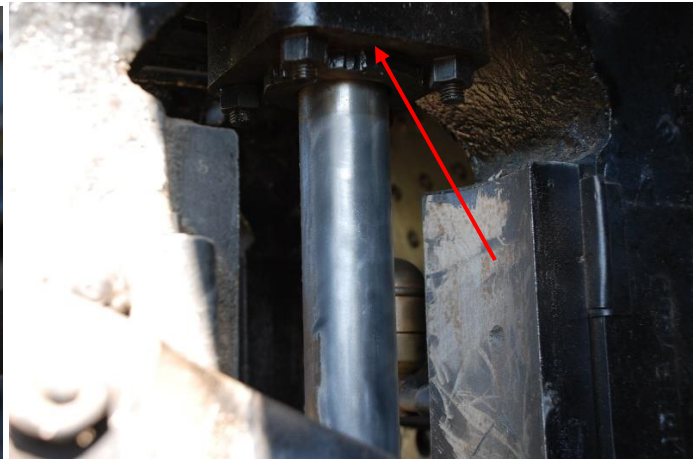
Historic Museum Fort Missoula, Missoula, MT
7/22/19 to 8/31/19 - # 7 – A, B, C, D, E, F

This is a combined report for latter part of July, and August due in part to several Work Parties being rained out, and a number of conflicting events, such as the Fair and several steam shows across the state. Work was still completed and we made good progress on a number of fronts. The first of which is design of the Shed (cover or building) to protect the locomotive in the future. This was designed to offer not only protection but to have the look of a structure that the lumber companies would have built. Estimates were completed for construction including if we contracted out the entire project or completed it with volunteers and donations.

On the locomotive the Crosshead “Gibs” were cleaned of old paint, primer and light rust. This was an on going process over several weekends due to the amount of paint. The piston rods were also done at this time. This was a process of using chemical paint striper (Ace Hardware) along with lightly scraping (as not to damage “bearing” surfaces). Then using a wire cup on an angle grinder, along with die grinder with wire brush to fit into the tight places. The oil holes in the gibbs were completely plugged with sand and oil congealed oil. These were leaned using compressed air and a wire to clean the passages. Oil flowed freely when complete. The crossheads were moved to complete the task by jacking and blocking.



1 Gib (inside) prior to cleaning



3 Piston Rod cleaning in progress

Yellow Arrow Shows Oil Galley Hole, Oil flows from cup with was removed from pipe shown at Green Arrow Packing Gland showing with Red Arrow. This gland contains the “packing” Paxton Mitchel Style the holds steam inside the piston on the lower side.

Oil cups, located on rotating surfaces were removed and it was found that twelve were missing. These were located at Flywheel Supply Co., and were found to be identical to the ones that Willamette used. These cups were originally for grease, but had been drilled in the top with a ¼" hole and packed with 100% wool yard to serve as oil cups. This is an acceptable use; it is not sure at this writing if this was a Willamette modification or by Heron or ACM. The remaining original cups were cleaned and reused. They were found to be completely packed solid with sand and oil so much so very little entered the bearing surface where they were used.



Gunk and Sand from Original Oil Cups



Original Oil Cups after cleaning



Replacement Oil cups modified and ready

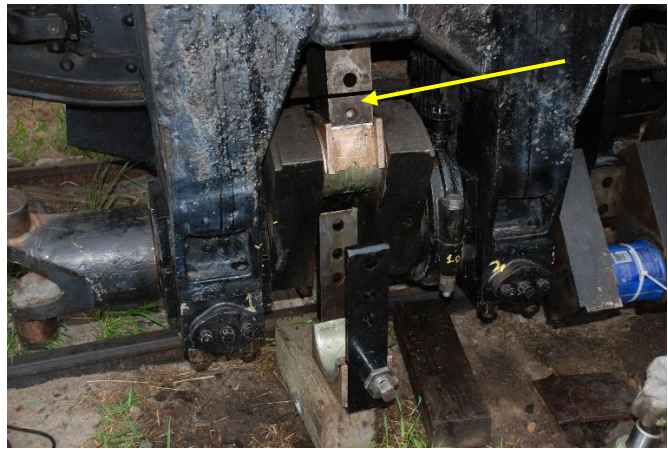


Larger Crosshead Oil Cups Cleaned and serviced

The rod straps (hold the bearing and the connecting rod assembly) were cleaned, inspected and qualified. The bearings had been previously cleaned and conditions noted (see Report # 5). The shims (on top and bottom bearings) were cleaned and inspected and new ones cut to replace # 3-T which were in poor condition. The straps were then reinstalled, using a bottle jack to lift the (with the lower bearing) into position on the crankshaft. The crosshead was then jacked up to allow room to install the upper bearing and wedge. The crosshead was then lowered to allow the bottom (butt end) of the connecting rod into the strap. Several (#'s 2 and 3) were too tight to fit onto the connecting rod. A threaded rod was used through one of the bolt holes with nuts on the inside to spread the strap and allow installation. This appears the way Willamette manufactured the straps, which are a forging. They were sprung about 1/8" to 3/16" and too heavy to move by hand.



Jack Raising Crosshead and Connecting Rod



Strap Ready to install Yellow Arrow is Wedge



Jacking of # 1 strap into place



All straps and bearings back in place

Once all of the straps, bearings and connecting rods were in place and all of the bolts were torqued appropriately the crank shaft and the rod bearings were adjusted. This was done according to a July, 1923 reprint of Lima Locomotive Works Shay Instruction Sheet No. 3. As both Willamette and Shay used identical systems on the crankshaft and connection rods this was the best reference available.

The big event of the day 8/31/19 was the operation of the engine. We connected compressed air to the throttle and applied 25 PSI of air to the intake of the engine. The engine ran both forward and in reverse. Being this is the first time since 1954 (about 65 years). It ran quite well needs a little additional clean up and some additional adjustments. This also puts to bed all of the rumors that it was frozen, locked up and pistons broken, not true. Remembering this was just the three cylinders turning the crankshaft no connected to the line shafts (trucks). We still have a long way to go, but a great milestone.

After a bit of cheering, we moved on to the trucks. We started on the Front Truck, Rear Axle, Right hand side. The truck was jacked up, with blocking under for safety. The packing was removed. This is Wool Yarn, need to be 100% wool so it is not affected by lubricating oils. The packing was dirty and show a very slight bit of moisture, which is to be expected as the oil gallery was/is exposed to weather, and most likely under snow at times. The bearing was removed cleaned and inspected along with the axel. Will need to make a puller for the other bearings 5/8"-14 Thread hole in the brass to pull them out.

The journal box was also cleaned. Remaining to complete is the removal of nests (Bee's) and dirt from the oil gallery used to fill the boxes. In future Work Parties we will go through all of the bearings and axels on the three trucks.



Jacking Truck/Cleaning Journal Box



Journal Brass after removal and cleaning



Debris in Journal Oil Gallery prior to cleaning