

SUMPTER VALLEY RAILROAD RESTORATION

Hostling and Firing Locomotive #3

The #3 locomotive is wood fired and not only requires more physical effort, but also requires the fireman to be about 5 minutes ahead of the demand for steam. The wood fire takes several minutes to increase intensity after wood is added to the boiler and also takes 5 to 15 minutes to burn down and decrease intensity. Added to that is the inherent variable wood quality, moisture content, and bark thickness.

The Heisler fire is relatively easy to light, keep lit, and build pressure. The usual firebox inspection needs to be done, with the added inspection of the steel plates that line the perimeter of the fire grates. Their function is to reduce the cold air flow up along the side sheets (and the tube sheet and back sheet). The Heisler does not require a compressed air source as there is no atomizer and the natural draft is normally sufficient to keep smoke out of the cab and the fire burning well. The blower is useful to create a draft when the firebox door is opened when not using steam.

All the lubrication points can be reached without placing the locomotive over the inspection pit. All grease points are to be greased daily with the exception of the 2 main rod bearings with the button heads. These are to be greased each round trip, preferably when laying over at Sumpter. The oil cups in the cab are to be filled every round trip, the rest of the oiling points are daily. Inspect the axle bearing each round trip for heating, add more oil if the temperature is above normal.

When building pressure, strive for a rise of one pound per minute, or less. This allows for the various components of the firebox and boiler to expand gradually and at the same rate, reducing damage and maintenance issues.

When running, any source of cold air in the firebox will cool the boiler and cause a loss of steam pressure. Thus it is important to ensure the steel plates are out against the firebox side sheets, the wood used is as straight as possible, and short pieces are used across the back of the firebox. Do not needlessly open the firebox door to check the fire or take a long time rearranging the fire with the poker. A good practice is to have a piece of wood to throw in anytime you check the fire. If the piece you just threw in did not hit the hole you wanted to fill, it is often better to add another piece rather than fuss with the poker while the door is open.

Another good way to check the effectiveness of your fire is to watch the steam gauge closely. It should be rising when not adding water to the boiler, and slowly falling when you are. If it is steady or falling when no cold water is going in, you need to respond immediately. DO NOT trade water for steam unless you have a full glass of water.

It is best to add water in short, frequent doses. This keeps the injectors cooler and working more reliably and reduces the boiler temperature fluctuations. Remember a wood fire cannot be extinguished quickly, like an oil fire. It will keep burning and producing heat until the wood burns out or is removed from the firebox. It is good to keep at least 1/3 glass in case you have difficulty adding water to the boiler. Best practice is to keep the water glass between 1/3 and 2/3, if the fire is a bit hot, you can absorb the heat by adding more cold water. If a bit cool, you can reduce adding water for a short period to allow the fire to increase in intensity.

Wood comes in several species, generally larch, Douglas-fir, and lodgepole gives the best heat. Grand fir, ponderosa pine, and other species are not as good. Any thick bark species can cause the screen on the smokestack to clog and reduce the draft. It is a good practice to bang on the screen each run or mid-run if necessary. When fully clogged flames can come out of the draft openings and out the firebox door.

Wood fuel moisture makes firing difficult as the water must be boiled off before the wood will burn. This process takes heat away from boiling water in the boiler and increases the time the added wood starts to burn and produce heat. With dry wood a typical fire will be 2 layers deep, with wet wood it often has to be twice that to dry the top layers out enough to burn.

It is advantageous to sort the wood being loaded each run with crooked or otherwise undesirable wood on one side, the large straight pieces in the center, and the smaller diameter pieces on the other side. That way you can select the ideal piece of wood quickly when it is needed. The large pieces are good when traversing the "no fire" zones as they will last longer. The small pieces are good when you get behind and want to build pressure quickly. The crooked and other "junk" wood is good for drifting downhill or when standing still, times when there is minimal draft coming up through the fire.

The "No Fire" zones are between MP25 (Highway 7) and MP25.2, MP25.4 (Rockcut) and MP26.2 (Powder River curve), 26.8 (Badwater) and MP27 (east Iron Horse), MP 27.3 (west Iron Horse) and 27.5 (Sawmill Gulch Rd). These are areas where there is flammable vegetation close to the track and creating sparks is to be minimized as much as possible. Do not add wood to the fire, open the firebox door, or use the blower. Be aware when these zones are coming up and add additional large pieces of wood to the fire before entering these areas. The engineer should not increase the throttle settings more than one notch at a time or drop the Johnson bar.

Lastly, make sure there is a good broom in the cab and use it frequently to keep the floor clear of bark and wood dust. It is a good safety practice to ensure better footing and to keep the dust from blowing into the engineer's eyes. Likewise. It is also good to periodically clear the water tank top of the bark and wood dust that accumulates over time.

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#19 HOSTLER / FIREMAN CHECKLIST

Pre-Fireup

- Chains down and BLUE FLAG protection in place?
- Check tender tank water level?
- Inspect firebox for warped sheets, leaky flues, steel plates around grate perimeter?
- Check boiler water level, add water if not showing in sight glass?
- Whistle valve open until there is steam pressure?
- Bring up pressure at no more than 1 pound /minute?

Mechanical Checks

- Check for missing fasteners, hammer test nuts for tightness?
- Check for leaks; oil, water, steam, air?
- Check brake rigging and shoes?
- Check bull gear bolts for tightness?
- Check journal oil cellars and waste packing?
- Radio battery charged?
- Sand dome $\frac{3}{4}$ full?

Lubrication

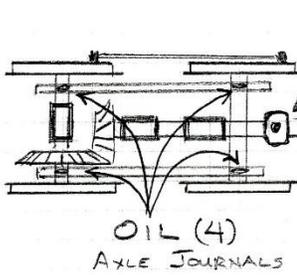
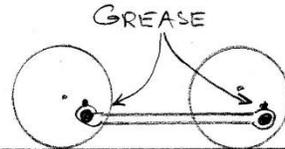
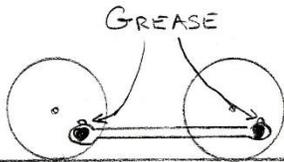
- Steam valve oil lubricator filled (to within 2" of top)?
- Hydrostatic lubricator filled with steam oil lubricator (drain water out first)?
- Air compressor air cups filled with air compressor oil?
- Dynamo oil level checked?
- Oiling done (see diagram)?
- Soft grease completed (see diagram)?
- Oil cans filled and wiped down,
- Fill boiler treatment bottles?

Shutdown

- Was boiler water above top of glass, glasses blown out?
- Steam pressure can be low, does not hold pressure overnight.
- Throttle closed and pinned, reverser centered, cylinder cocks open, chains down, house valves open?
- All steam valves in cab, whistle, and boiler feed valves closed?
- Steam drains (air compressor, blower, dynamo) open?
- All air drains (air reservoirs, eq. reservoir, air strainer) open?

Hostler/Fireman Signature _____ Date/Time_____

Heisler Running Gear Lubrication Points



GREASE

