

Steam Locomotive Operating Procedures
SVLS Locomotive 1973
Steam Up

These procedures have been developed to help both the novice and experienced engineer prepare the steam engine for service. While some deviation due to personal preference is expected, in general, following the steps in order will give satisfactory results.

0. Move the engine to the steaming bay you wish to use. When the engine is in position, chock the #2 driver on the engineers (right) side of the engine to prevent unwanted movement. Move the throttle lever full forward and center the reverse lever. You will also need:

- a. The tool box
- b. Water hose with fittings
- c. Air hose
- d. Grease gun
- e. Rags
- f. Battery

1. Grease. The engine has 17 zerk grease fittings. Seven of the fittings are under the engine: 6 journal boxes and the eccentric strap of the water pump. The others are located on the side and main rod ends and cross head wrist pins. Use no more than $\frac{1}{2}$ pump stroke! The boxes, strap, rod ends and pins are already full and grease pumped out is wasted and messy. Wipe the underside of the engine, removing any excess grease from the boxes, strap, and anywhere else that needs it.

2. Water.

a. Engine: Screw the water fitting into the front blow down cock. Be sure the opposite cock is closed! Pour 2 capfulls of boiler treatment into the hose, and then connect it to the fitting. Turn the faucet handle on. Open the valves to allow air in the boiler to vent. When the sight gauge shows $\frac{3}{4}$ full of water, close the valve on the hose and close the injector handle

b. Tender: Ensure that the tender drain valve is closed. Pour 1 cap full of boiler treatment into the tender and then fill with water to within 3 inches of the top of the tender. Any higher than that will cause the water to splash out of the top deck which is not sealed.

3. Air. Connect the air hose to the left side of the engine and open the valve on the air blower line just enough to be heard. This will purge the firebox of any propane gas. Check that the upper manifold blower valve is closed.

4. Propane. Install the handles onto the gas pressure regulators on the propane car and tender. Open the main propane tank shutoff valve and set the tank regulator to 15 psi. Adjust the blower volume just enough to prevent flames from coming out around the firebox.

5. Oil. Oil the valve motion and fill the cups on the upper cross head guide bars (use chain saw or 30wt. non-detergent motor oil). Top off the cylinder oil tank located above the right upper cross head guide bar (use 600wt cylinder oil).

6. Blower. When the boiler pressure reaches 60 psi. Close the air blower valve and adjust the steam blower volume to control the burner flame blow back. Disconnect the air.

7. Pressure. Allow the boiler to continue building pressure until the safety pops at 120 psi. Observe the pressure gauge, the safety should reseal at 115 psi. The other safety is set to pop at 125 psi. Due to the high relief of the low-pressure safety, it may not be possible to pop this safety. Turn on injector to quickly seat the safeties.

8. Test.

a. Injector: Around 80-100 psi, prior to the safety release. Open the tender water valve (approximately aimed at the corner of the tender). A steady stream of water should come from the injector over flow line. Quickly open the injector steam valve all the way. If the injector does not pick up, (steam coming from the over flow) open the water valve until it does. If water pours from the over flow line reduce the water flow until the injector picks up. Shut off the injector after the test.

b. Brakes: Open the brake valve and ensure that the brakes set. Close the valve and check that the brakes release

c. Sight Glass: Perform what is referred as a L.U.L.U (Lower, Upper, Lower Upper). Close the lower sight glass valve, then open the sight glass drain. The sight glass should empty. Close the sight glass drain and open the lower sight glass valve. The glass should return to previous level quickly. Close the upper sight glass valve, then open the sight glass drain. You should have water coming out the drain tube. close the sight glass drain. Followed by opening of the upper sight glass valve. The water should quickly fill the whole glass followed by returning to the previous level. Do this procedure twice, yes it is redundant but this way you know the glass has clear pathways.

d. Battery: If not already done, hook up the leads to the battery

and test the head light circuit. After the test, turn the light off.

9. Rollout. Before moving the engine, be sure the air and water lines are clear, the cylinder relief valve is in the closed (cocks open) position, and the wheel chock is pulled. Set the reverse lever to the forward position and slowly pull the throttle back. Check that water and steam are being ejected from all 4 cylinder relief cocks. Move the engine onto the turntable, and then onto the departure track. Once clear of the turntable, install the tender foot pegs and climb aboard. Exercise care when departing the round house. The track is on a grade and usually greasy. Heavy-handed throttle control can cause the drivers to slip. As a general rule the headlight should be on when the engine is in motion. During daylight hours it is difficult to tell if the light is on. Turn the center light shield over so that the bulb is visible, this will serve as a pilot light.

10. Switching. The final task to perform is making up your train. While switching, it is recommended that the blower remain on and the cylinder cocks open. The reverse lever should be operated in full gear for maxim power and smooth starts.

Operation

There are too many variables, such as, ambient temperature, wind, condition of the rails, load, grade, etcetera, to be able to create a step-by-step guide on how to operate the steam engine. With that said what follows is a body of recommended practices, which have been compiled from members who are current on the locomotive.

1. Waiting on Spot. While standing in the station, waiting for your train to be loaded, you should have the blower adjusted to prevent flames from the firebox rolling up around the cab sides. If the boiler pressure rises with the main burner set to a spot fire, reduce the pilot burner or open the fire door. If necessary use the injector to put water into the boiler, being careful not to over fill it. The idea is to prevent the safeties from lifting. Of course you can always turn around and yell at the stationmaster! The reverse lever is centered in the quadrant and the cylinder cocks should still be open from your last movement into the station. The head light should be off.

2. Departure. When you are given permission to depart,

acknowledge the order with the appropriate whistle signal. Turn the head light on. move the reverse lever to the corner notch. Slowly bring the throttle back until the engine starts to move and adjust it for a smooth start. Now is the time to adjust your firing valve to its initial setting. By now you will have started in to the cut at the east end of the station, because it is a blind curve and the junction of the freight main and engine terminal, it strongly suggest sounding the whistle general warning (- - o -). The cylinders will be hot by now and no longer blowing water from the cocks so you can close them by opening the control valve.

3. Trip Setup. Run at reduced speed until clear of the turnouts in the upper Boxcar yard. As you start down the trestle grade check the water glass to see if the engine needs water. You should have already decided how you are going to manage your water, the injector, the mechanical pump, or both. The pump, once set, offers the advantage of automatic water feed but tends to over fill the boiler unless closely monitored. Additionally, since the water entering the boiler is cold it requires more fuel to maintain pressure. The injector, on the other hand, pumps water heated to about 200 degrees but will reduce pressure when in use and is easy to forget. Further it can be tricky to use if you cannot see the over flow pipe. That being said, the injector, is preferred.

4. Arrival. The rest of the trip is a combination of train handling, and engine management. Eastbound- As you start into the grade at Meadow towards the pond bridge I suggest the reverser to control train speed. Maintain a slow speed (roughly 3mph) till you cross the bottom bike trail crossing and continue up the grade. When you pass Cordova Junction start setting up for the station stop. The burner should be adjusted to maintain pressure. As the train is being unloaded, open the cylinder cocks. Leave them open while you pull forward to the passenger loading point. Turn the head light off. Repeat!

Shut Down

The goal when shutting down the engine is to drain the boiler and then dry it as much as possible, before putting it away.

1. Dropping the fire The boiler should not be blown down until the pressure has dropped to 40 psig or less. To save time, the fuel can be shut off in the station. This must be done at the main tank shut off valve. Next, remove the pressure regulator handle. Now turn the burner regulator handle to 0 psi and remove it. Leave the blower on for a short time, to purge any gas that may be left in the firebox after the fire goes out, and then turn it off. When you are cleared,

proceed to the upper car yard and put your train away. From the upper yard, back down the main line and onto the roundhouse departure track stopping short of the turntable. Open the tender drain after you have dropped off the cars at the boxcar..

2. Blow down When the boiler pressure reaches 40 psig or less, the blow off cocks can be opened to start the blow down. As a courtesy to others, do not allow the water from the blow off to spray other people or equipment.

3. Clean up. While the tender is draining, you can start wiping down the engine, tender, and tank car. As you clean, inspect the consist for any loose, damaged, or leaking parts. Report any discrepancies to the Train Master. If you find any condition that you feel may be unsafe and should be inspected before the engine goes out again, fill out a Bad Order card and place it on the engineers seat. Again, be sure to notify the Train Master as soon as you can.

4. Wrap up. Once the tender is empty, coil the water and air hose around the propane tank car's regulator guard. Move the engine into the roundhouse. Disconnect and remove the battery from the tender and connect it to the charger. Make a final check to insure that all tools and supplies are secured and then lock the tool cabinet and roundhouse.