

# FRRS Mechanical Department Instruction

## How to use form M1001

Employees starting locomotives shall use form M1001 to conduct and record inspection of the locomotive prior to placing it in service. Any employee starting a diesel locomotive shall be properly qualified under rule 1208 and thoroughly familiar with the operating manual for the specific model locomotive, including shutdown and emergency procedures.

Form M1001 shall have a single version that is suitable for all locomotives, with several copies printed for placement in the cab of each operational locomotive.

Employees conducting inspections shall record all conditions and defects. Mark each inspection item with a checkmark in the appropriate box for 'OK', 'DEF' (defective), or 'N/A' (not applicable).

Each item marked defective shall have a corresponding entry in the table on the lower portion of the form noting the item number and providing a clear description of the issue found. If repairs are made, a description of the repair shall be provided and the employee making the repair shall be indicated in the 'Repaired By' column. Certain defects may render the locomotive unfit for service if not repaired. If any doubt exists regarding operation with a specific defect, consult a mechanical or supervisory employee.

Once inspection is complete, assuming the locomotive has been found safe to operate, the employee conducting the inspection shall sign the 'Initial Inspector' line on the back side of the form, indicating both the inspection form and the locomotive itself are ready for review by the operating employee.

The first employee to operate the locomotive following the inspection shall, prior to operation, thoroughly review the form to verify a proper inspection was completed, noting any limitations or defects found. If the inspection is not complete, not signed, or otherwise found to be unsatisfactory, the operating employee shall not operate the locomotive until a satisfactory inspection is completed and the locomotive is found safe to operate. If the operating employee is satisfied the inspection is complete and concurs with the decision to designate the locomotive as safe to operate, the operating employee shall sign the 'Initial Operator' line and may then place the locomotive in service.

***TAKE NOTE: Both the inspector AND the initial operator are responsible for determining if the locomotive is safe to operate.***

No employee should feel compelled to place any locomotive in service if they are not comfortable with its condition. No task at the museum is so urgent that it cannot be done safely. *If there is any doubt about the locomotive's safety, reject the locomotive.* Use a backup locomotive, or cancel the planned activity until such time as the locomotive is repaired and made safe to operate. **SAFETY FIRST.**

Any discrepancies or concerns noted during operation should be recorded on the back side of the form in the 'NOTES AND COMMENTS' section.

Following shutdown of the locomotive, place the completed form on the CMO's desk in the operations office.

## Inspection Item Guidance

The following information is not a substitute for proper training and qualification under rule 1208. This guidance is intended to serve only as a refresher to the qualified employee. It does not contain all possible conditions that may render the locomotive unsafe. If there is any doubt or confusion about how to conduct the inspection properly, seek help from a mechanical or supervisory employee.

Each inspection item on form M1001 is numbered for easy reference.

Inspection Items 1-12 shall be completed and found satisfactory *prior to starting the locomotive*. All other inspection items may be performed while the locomotive is warming up.

### 1. Inspection Location

- a) Pre-filled with 'PORTOLA', since that is the only location we have

### 2. Date and Time

- a) Record in MM/DD/YY HH:MM format

### 3. Last Daily Date

- a) The last time the locomotive was inspected. This can be taken from the locomotive's form M1002

### 4. Unit Initial and Number

- a) The locomotive unit identification. Example, 'WP1503'

### 5. Engine Lube Oil Level

- a) Inspect oil level in sump using dipstick on either side of engine.
- b) Remove dipstick, wipe clean, and reinstall. Remove and read oil level, verifying reading is above the 'ADD' mark.
- c) Reinstall dipstick and record oil level on graphic chart located in the center right of the form.
- d) Perform this check again after 15 minutes of engine runtime.

### 6. Governor Oil Level

- a) Verify governor oil is present at a safe level.
  - i. If gauge glass is marked with two lines, oil level should be between the two lines. The upper line represents full, while the lower line indicates 'ADD'.
  - ii. If the gauge glass is marked with a single line, oil should show in glass but may not be up to the line. Single line gauges are intended to indicate proper level when engine is at warm idle. Recheck these gauges once engine is running and warm
- b) Should oil need to be added, contact mechanical personnel to perform the task. If no mechanical personnel are available:
  - i) DO NOT OVERFILL
  - ii) ALWAYS ADD GOVERNOR OIL SLOWLY. Use governor specific oil, available in pitcher marked 'GOVERNOR' on the mechanic's workbench. Add a small amount, then wait two full minutes for it to settle out before checking gauge and/or adding more. Two full minutes. Two minutes.
  - iii) DO NOT OVERFILL
  - iv) If governor oil gauge has two lines, fill to the top line.
  - v) DO NOT OVERFILL
  - vi) If gauge has only one line, then fill until oil is just above the line.
  - vii) DO NOT OVERFILL.

### 7. Air Compressor Oil Level

- a) Unscrew compressor dipstick and remove. Wipe clean and re-install firmly.
- b) Remove dipstick and read oil level, verifying oil is above the 'Add' line. Reinstall firmly.

## **8. Cooling System Level and Color**

- a) Check coolant level in glass adjacent the coolant tank.
- b) If glass is equipped with a scale, the coolant level should be between the 'LOW' and 'FULL' marks of the 'DEAD ENGINE' zone. If no scale is present, coolant level should be at least halfway up the glass.
- c) Glass should be clean and clear and coolant should have a red, green or yellow tint.

## **9. Water, Oil, Exhaust and/or Fuel Leaks**

- a) Inspect cooling tank, lines, pumps and radiators for leaks. Minor seepage at flange and hose connections is of minimal concern but any leaks that manifest as visible flow or pooling should be investigated before startup.
- b) Inspect engine for excessive oil leaks that may indicate component or seal failures. Some seepage is expected and should be wiped off during inspection. Note and address any significant accumulation(s).
- c) Check for exhaust leaks at manifolds and mufflers. Look for black streaks and corrosion damage.
- d) Check fuel filters, fuel lines, fuel pump, and fuel glass for any signs of leakage. Any findings must be addressed before startup, as there is no acceptable amount of fuel leakage.

## **10. Steps, Walkways, Doors and Hinges**

- a) Inspect stairwells, walkways and all access doors/panels. Verify all latches, floor and stair tread, toe plates and handrails are secure and sound.
- b) Inspect folding walkway bridge, rails and safety chains. Verify all mounts, hinges and latches are secure.
- c) Inspect all grab bars, verifying they are secure and sound.

## **11. Handbrake**

- a) Verify locomotive handbrake is tightly set.
- b) Verify chain is tight and pulling on brake rigging.
- c) Verify actuated brake shoe is fully and firmly engaged with the wheel.

## **12. Fire Extinguisher Less Than 1 Year Old**

- a) Verify extinguishers are properly installed in the locomotive engine room and cab.
- b) Verify service date stamped on yellow tag of each extinguisher is within the past 365 days.
- c) Report any extinguisher that has a service expiration date within 90 days in the "NOTES AND COMMENTS" section on the back of the inspection form.

## **13. Clean Eductor Tube / Carbon Traps**

- a) This field is pre-marked 'N/A' as this task is performed by the mechanical department during the locomotive annual inspection.
- b) This inspection field will be removed in the next form release.

## **14. Guards, Protective Covers and Stencils**

- a) Verify all guards and protective covers are securely fastened in place, with particular attention paid to the cab interior.
- b) Verify all stencils are in place and legible for fire extinguisher, emergency brake lever(s) and emergency fuel cut-offs.

## **15. Horn, Bell and Wiper Operation**

- a) Test horn with a brief sounding.
- b) Test bell with a brief ringing.
- c) Test wipers ONLY after verifying rubber wiper on all blades is in good condition and firmly attached. Avoid window scratches.

## **16. Speed Indicator and Seal**

- a) Mark this field 'N/A' since we don't seal the indicators and we have no practical way for the engineman to test them prior to operation.

- b) If the first operator finds the indicator is not functional, they should note this in the defects portion of the report so the mechanical department is aware of the failure.
- c) This inspection field will be removed in the next form release.

**17. Drain air tanks**

- a) Operate all manual drain valves until no visible moisture is observed.
- b) Close valves with a light touch to avoid damaging the valve seat.
- c) For manual drain valves attached to automatic drain mechanisms, be sure to close only with a counter-clockwise motion.

**18. Clean Cab and Remove Trash and Graffiti**

- a) Clean cab of trash, debris, tools and personal items left from previous crews
- b) Clean cab again prior to shutdown. Empty trash can.

**19. Trucks, Underframe and Side Bearings**

- a) Inspect trucks for any signs of damage or loose hardware.
- b) Inspect springs and hangars for failure or damage.
- c) Inspect roller bearing oil level. Oil should be visible at overflow.
- d) Inspect suspension bearing oil wells. Oil should be at least 1/2 inch deep.
- e) Inspect frame members and pilots for damage.
- f) Inspect MU and brake hose conditions at each pilot. Inspect brake hose glad hand gasket.

**20. Wheels, Traction Motors and Air Ducts**

- a) Inspect wheels for flat spots, gouges, chips, broken flange, etc.
- b) Inspect traction motor cables for orderly routing, secure mounting and insulation in good condition.
- c) Inspect rubber bellows between locomotive frame and traction motors, looking for damage or loose mounting.

**21. Sander Nozzles, Hoses and Operation**

- a) Inspect sander nozzles for secure attachment and clearance from wheels.
- b) Inspect all sander hoses for secure attachment to sander tubing, keeping in mind the truck's full range of motion.
- c) Sand is not generally kept on locomotives, as the museum's regular operations do not have a need for it and the sand attracts moisture and promotes (more) rust in the sand hoppers. Unless performing special operations, such as snow work, there is no need to take on sand or test the system operation.

**22. Inspect MU Cut Out Cocks**

- a) Verify all valves are in the 'off' position for single engine operations.
- b) Note that most MU valves are opposite common fluid valves, meaning the 'off' position will have the handle in-line with the tubing. Check for a bar indicator at the valve - when the bar indicator is perpendicular to the tubing, the valve is 'off'.

**23. Brake Shoes and Rigging**

- a) Inspect all brake shoes for excessive cracking or missing friction material.
- b) Inspect brake shoe thickness for minimum 3/8 inch (composite), 1/2 inch (cast iron).
- c) Verify brake shoes are fully aligned with and firmly grip wheels when set.
- d) Verify brake shoes are clear of wheels when released.
- e) Inspect brake pistons for maximum of 6 inches extension when set, per rule 1520.
- f) Inspect all brake rigging, looking for broken fasteners and bent or damaged levers.

**24. Fuel Cap, Gauge and Vent Line**

- a) Verify fuel cap(s) are installed and secure.
- b) Verify at least one fuel gauge or glass is functioning and legible.
- c) Verify vent line is not damaged or blocked.

**25. Fuel Quantity (Gallons)**

- a) Record the value indicated by the fuel tank dial gauge.
- b) For tanks that have a gauge glass, estimate the percentage of the glass filled by the fuel and multiply this figure against the fuel tank capacity. Record the result.

- c) Notify a mechanical or supervisory employee anytime available fuel is less than 200 gallons.

**26. Check Operation of Heater/Air Cond**

- a) If temperate conditions are expected, mark 'N/A'.
- b) If cold conditions are expected, verify operation of all cab heaters.
- c) If hot conditions are expected, bad news. Air conditioning units, if installed, are not in service. Sweat is good for the pores. Open all windows, drink more water and mark 'N/A'. Point and laugh at the conductor and/or brakemen who are standing in the sun.

**27. All Exterior and Interior Lights**

- a) Verify illumination of all interior and exterior lights when actuated by their respective switch(es).
- b) Verify low, medium and high intensity settings for both front and rear headlights.

**28. Check Reverser Interlock**

- a) Install reverser handle and verify throttle can be moved to position 1 (NO HIGHER).
- b) Return throttle to idle, remove reverser handle and verify throttle cannot be moved to position 1.

**29. Indicators, Annunciators and DID Panel**

- a) This field is pre-marked 'N/A' as this task is performed during the locomotive annual, where needed.
- b) This inspection field will be removed in the next form release.

**30. Radio Transmits and Receives Clearly**

- a) Perform a radio check with another crew member or the gift shop, noting response content and clarity.

**31. Seats, Windows and Mirrors**

- a) Verify all seats are securely mounted and can be properly positioned for each crew member. Keep in mind locomotive will be moving both directions in operation and seat may need to rotate.
- b) Verify all windows open, close and latch properly and have no breakage.
- c) Verify all mirrors have no breakage and can be positioned flat against the cab through 90 degrees of outward operation.
- d) Clean windows and mirrors, if needed.

**32. Main Reservoir HP**

- a) This is the pressure at which the locomotive's air compressor cuts out. Per rule 1522, this must occur no higher than 140 PSI.
- b) Repetitive set and release of the brake will lower the pressure until the air compressor cuts in.
- c) Record the main reservoir gauge reading the moment the air compressor cuts out.

**33. Main Reservoir LP**

- a) This is the pressure at which the locomotive's air compressor cuts in. This should occur no lower than 120 PSI.
- b) Repetitive set and release of the brake will lower the pressure until the air compressor cuts in.
- c) Record the main reservoir gauge reading the moment the air compressor cuts in.

**34. Independent PSI**

- a) Fully apply independent brake.
- b) Record independent pressure gauge reading.

**35. Brake Pipe PSI**

- a) Brake pipe should be set at 90 PSI, per rule 1530.
- b) Slowly adjust feed valve, as needed, until brake pipe gauge indicates 90 PSI.
- c) Record brake pipe gauge reading.