

NEW ZEALAND RAILWAYS ENGINEDRIVERS CORRESPONDENCE COURSE
AB CLASS STEAM LOCOMOTIVES

LESSON NO.6

PREPARATION FOR THE ROAD

After the Enginedriver had read, signed for and obtained his train advices, examined the notice cases for special instructions regarding the running of his train and other matters, signed the attendance book and checked the Loco. 54 Repair Journal to see that repairs booked to his locomotive have been completed, he will attend to the lubrication and other work connected with the preparation of his locomotive. He will also satisfy himself that the water level in the boiler has been properly tested and that the Locomotive Assistant has taken the necessary steps to prepare the fire, lubricate the Westinghouse compressor and fill the Detroit Lubricator.

INSPECTION OF THE LOCOMOTIVE

An Enginedriver's confidence in his locomotive largely depends on how much he knows about it. This entails close inspection of it, with a thorough search for defects. Special attention must be given to split pins, keys, bolts, checknuts, set screws, big and little ends, side rod brasses, motion pins, axle box wedges, spring hangers, springs, tyres, glands, rods, ashpan, smokebox and appliances, guide bars and injectors, while a thorough examination and testing of the Westinghouse brake gear and equipment must be carried out.

It is important that the Enginedriver should have a full appreciation of the importance of reducing to a minimum the heat losses caused by the various conditions of operating superheated locomotives. (This matter was dealt with in Lesson 2). It is an advantage therefore if the locomotive cylinders are thoroughly warmed before leaving the depot. The Enginedriver by placing the reverse lever in full forward, or full backward gear and with the cylinder cocks open, should admit a small amount of steam through the regulator. The procedure heats the cylinder metals and greatly reduces the initial condensation losses and allows the immediate economical use of the superheater to be brought into use.

In addition to raising the temperature of the cylinder metal "blowing through" in this manner will ensure the removal of dirty deposits in the steam chests or the carbonised remains of lubricant that may be adhering to the piston valve faces and cylinder walls.

Before leaving the depot the Enginedriver must examine the engine and tender axleboxes to make sure that the journals are receiving lubrication. Any water should be syringed out to ensure that the oil will be in contact with the journal and not floating on water.

The oiling and examination of the locomotive must be carried out systematically and in order that this can be done, the Enginedriver must adopt a system when preparing his locomotive for service.

Start at a given point and work around the locomotive oiling, greasing and checking, and finish up at the starting point. He must make sure that all spring and compensating gear, axlebox, wedges, etc., and brake gear is examined and oiled. If necessary the brake gear must be adjusted so that the brake cylinder pistons have their minimum allowable travel.

INSPECTION OF THE LOCOMOTIVE AND REPORTING OF DEFECTS AT THE COMPLETION OF A RUN

In making an inspection, it must be ascertained whether there are any loose joints, bolts or nuts; whether any of the parts are defective through wear and tear and should be renewed, whether any of the parts are missing and whether the bearings are in such condition as will ensure their running cool during the next trip. By feeling the bearings immediately on arrival at the terminal and before they have had time to cool, their condition in this respect can be determined.

To inspect the locomotive, begin at the back bogie as you come down from the cab. Make a careful examination of the wheels for broken or cracked flanges, cracked spokes or loose tyres. The springs, spring hangers, and equalisers and pins should be examined as they sometimes break or the pins work out. The axlebox wedges, keep plates, and the axleboxes should be closely examined, as also should the side-rod, connecting-rod, eccentric-rod and motion oil cups to ensure that all are in place. Oil trimmings should also be withdrawn from the syphon-pipes and placed in the oil cups to avoid waste of lubricant. The Westinghouse brake equipment should be examined for possible defects, and if found necessary, the brake travel should be taken up in readiness for the next trip. The drawbar between engine and tender should be checked over to see that it is in good order. The tender wheels, springs, spring hangers and brake rigging should next be carefully examined to ascertain whether they are in good order. The firebox should also be checked for leaky tubes and fusible plugs, misplaced or missing firebars and for leaky stays. The injectors should both be worked to ensure there are no defects. Steam or air blows or knocks noted while on the road or during examination should be adjusted where possible or booked for attention by the repair staff.

REPORTING DEFECTS:

Next in importance to a careful inspection of the locomotive is the proper booking of any defect requiring attention by the repair staff. Care should be taken to ensure that all entries are in plain and concise language in order that the fitters may be able to locate the defects immediately and effect repairs without loss of time. In many instances Enginedrivers, through a lack of complete knowledge of the parts of their locomotive, make entries in the repair journal which entail more time by the repair staff in locating the actual defect than is taken to make the necessary repair once it has been located. For example, "engine not steaming" is frequently entered in the repair book. With a vague entry no one is able to determine where the possible defect is or what the probable cause of the "engine not steaming" may be. If the locomotive is "dead" it is more difficult still as there are

no means of even making a test. If the Enginedriver who has been running the locomotive all day made an entry after carrying out tests and from his own personal observation made such entries as "tubes blocked" "brick arch defective", "superheater elements blowing, to be tested", "piston or valve rings to examine" (stating which side), "exhaust to line up" or any other apparent defect, then it is a simple matter for the repair staff to deal with the trouble. Similarly, instead of booking "air compressor not working", book "reversing rod bent", if that is the cause of the compressor failing to work.

The following are further examples of the way to report defects:-

"Left hand injector to change, obstructed steam nozzle". "R.H. front cylinder cock to change, valve broken". "Line down wedges of R.H. main driving box". "L.H. piston packing blowing". "Brake pipe connection to triple valve broken". The above examples should be sufficient to enable the student to fully realise the importance of making specific reference to the type of defect noted and thus enable the fitter to proceed with despatch in the repair of the broken or defective part.

TOOLS AND EQUIPMENT

A tool box containing general tools, etc., for use by the Enginedriver is allocated to each Ab locomotive.

Any shortage or replacements required should be promptly reported to the Locomotive Supervisor and the deficiencies made up by the Trust Store. This equipment should be carried on the locomotive at all times.

EQUIPMENT IN ENGINEDRIVERS' TOOLBOXES:

1 spanner 3/8" x 1/2") Old British	1 chisel cross cut
1 spanner 5/8" x 3/4") Standard	1 chisel flat
1 spanner 7/8" x 1")	1 chisel round nose
	1 oil syringe
1 spanner 3/8" x 1/2") New British	1 12" file (304.8 mm)
1 spanner 5/8" x 3/4") Standard	1 split pin drawer
	1 gauge glass 10" (254 mm)
1 spanner crocodile jaw	6 I.R. washers 3/4"
1 spanner shifting 15" (381 mm)	6096 mm Marline
1 spanner shifting 8" (203.2 mm)	914.4 mm Worsted
1 hand hammer	3657.6 mm 18 gauge copper
3 pin punches	wire
1 cylinder cock blind	

The following is a list of the tools and equipment carried on an "Ab" locomotive:-

4 engine axlebox chocks	2 sets piston chocks and clips
2 ldg. bogie axlebox chocks	1 plugging iron (S.I. only)
2 big end brass clips	2 firebox tube plugs
12 assorted bolts, nuts and washers	3 smokebox tube plugs
2 spare assorted cotters	1 pricker
2 coupling hooks, pins and securing chains	2 sets wood quadrant blocks
12 detonators in containers	1 rake
1 set handsignal flags	1 set assorted set screws
1 grease container	1 valve centring set screw
1 coal hammer	1 coal shovel
1 heavy hammer 18" (457.2 mm) handle	1 snifting valve stop
1 set hardwood packing	1 set service spanners
1 bottle jack	1 set breakdown spanners
2 traversing jacks	1 set split pins and taper pins
2 jack bars	1 steam heat hose
2 jack traversing ratchets	1 tommy bar
1 extra red tail lamp	1 tablet fork and plug
1 one gallon oil can	1 W.H.B. coupling hose 558.8 mm x 25.4 mm
1 oil kettle	1 W.H.B. engine tender coupling hose 762 mm x 25.4 mm
1 pinch bar	1 wheel lifting wedge
1 spare crosshead slipper (used)	1 wheel gauge
	1 drop grate extension lever
	1 transition coupler head

KNOWLEDGE OF THE ROAD

Next to having a complete knowledge of signals, a knowledge of the road is important. An Enginedriver is required to certify that he has a knowledge of the road before he is allowed to take charge of a train on any section of the line.

Unless the Enginedriver has a good knowledge of the gradients, curves, and general topography of the country he will not have the confidence to handle his train, with the result that at places where he ought to be gathering speed to help him up a steep bank, probably he would be trying nervously to steady his train by making heavy brake applications. On the other hand, he might have his train travelling at an excessive speed on a down gradient with many sharp curves to negotiate with the result signals might be missed or overrun.

ECONOMICAL USE OF STEAM

To use steam economically, it must be used expansively and in the locomotive this is accomplished by notching up the reverse lever thereby cutting off the steam before the piston completes its stroke. The point at which the steam may be expanded to obtain the greatest economy will vary on different classes of locomotives and as already indicated, it will depend on the speed, the weight of the train and the characteristics of the country being traversed.

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As the train gathers speed the reversing lever should be notched up to its most economical position. This will be governed by the weight and the class of the train and the necessity for maintaining timetable speed.

When an assisting locomotive is employed at the head of the train the driver of the second locomotive should not commence steaming until the entire train has been started by the leading locomotive.

Once the train is well under way, open the regulator wide and control the speed of the train by notching up the reverse lever to the most economical position.

Although the Enginedriver must of necessity be guided by the gradients and the load of his engine, it will usually be found that the most economical results will be obtained with the regulator fully opened and the reverse lever notched up to about 25 percent cut off.

If the train is comparatively light and the track conditions are easy, it may be necessary to ease the regulator down to keep the speed from becoming too high.

It may be found that the 25 percent cut off will produce pounding in the rods, boxes or journals in which case drop the reverse lever out to give a longer cut off and ease the regulator down.

With heavy loads or up a stiff grade, the best results would be obtained with the regulator fully opened and the reverse lever notched up to the point that is consistent with running the train to time. When stopping at stations and signals, or to commence drifting periods, the reversing lever must be put slowly to full gear immediately after closing the regulator. This gives the piston valves maximum travel to ensure complete lubrication and at the same time prevents ashes from the smokebox being sucked down the blast pipe into the steam chest.

Working a locomotive with a low boiler pressure must be avoided. As near as possible at all times keep the boiler pressure to its maximum to conserve fuel and water.

The use of the drifting valve as explained in lesson 2 must be observed.

BRAKE OPERATION

It is not proposed to cover the method of braking trains using the No.4 brake valve as this has already been dealt with in the ordinary Air Brake Lessons and Assignments. Section "H" of the Air Brake Handbook is also available to assist Enginedrivers in the method of braking passenger trains.

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It must be remembered that power or stretched braking is not a recommended procedure with a steam locomotive fitted only with the ordinary No. 4 brake valve. Secondly maintaining braking cannot be used so that there is only the serial braking method left to be used.

On the Ab class locomotives a retaining valve is fitted to both engine and tender brake arrangements so that when an automatic brake application has been made, the retaining valve handle can be placed in the vertical or closed position and when the automatic brake valve handle is placed in the release position a pressure of 105 kpa can be maintained in the engine and tender brake cylinders. These valves, therefore, can be used to help retard a goods train whilst the release of brakes and the recharge of the train is being effected. In the open position the retaining valve handle is placed horizontally.

There is also a release valve fitted to both the engine and tender brake arrangements to provide for an independent release of either the engine or tender brakes while the train brakes are held applied with the automatic brake valve handle in the lap position.

Refer to the description and operation of these valves on pages 32, 33 and 34, Figs. 37 and 38, Air Brake Handbook.

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AB CLASS STEAM LOCOMOTIVES

List of Questions

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1. Fully explain the Enginedriver's duties covering the preparing and inspection of the locomotive prior to leaving the Locomotive Depot and running a train.
2. Fully explain the Enginedriver's duties covering the putting away and inspection of the locomotive at the completion of a run.
3. Describe the proper procedure to report defects in the repair journal.
4. What should be done if an Enginedriver notes or is advised by his Fireman that articles of tools or equipment are missing from the locomotive?
5. What is meant by the economical use of steam?
6. As the Enginedriver of the second locomotive assisting at the head of a train, when should you start steaming when the train is being started?
7. Why must the reversing lever be put slowly to full gear immediately after closing the regulator when stopping and during drifting periods?
8. When and for what purpose are the following valves used on an Ab class locomotive?
 - (a) Retaining Valve.
 - (b) Release Valve.