



Duties of Drivers,
Firemen and Engine
Cleaners

FORWARD

This booklet was put together to give a basic insight into the duties of Engine cleaners, Firemen and Drivers.

It is in no way designed as a comprehensive list of duties as these vary with the different types of locomotives used. plus changes in the Operating Department / Loco depot.

It is hoped that this booklet will give new entrants to the Operating department a base to work on with a view to eventually becoming a Locomotive Driver. It is also hoped it will assist in some way all the footplate grades already employed on the K&ESR

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SAFETY ON AND AROUND STEAM LOCOMOTIVES

The most important consideration for all staff is that of safety

All new entrants to the footplate grades should make themselves familiar with the rules and regulations relating to safety at the earliest opportunity.

You have a basic responsibility under the Health and Safety at Work Act for your own safety at all times.

This booklet is designed to supplement the publications issued to you regarding safety on and about the track.

The site at Rolvenden is administered by two departments, the Locomotive Department Manager is responsible for the shed and the site generally while the yard and operational areas are the responsibility of the Operating Manager, a Running Foreman is usually rostered to administer the operational staff and functions. Always report your arrival and departure to him, he will arrange any extra work required and will arrange for you to ride out on locomotives to gain experience.

The Locomotive Department Manager has procedures for engineering work and his staff will advise you with any problems.

A Health and Safety Notice board is displayed in the Workshop. Please examine this notice board regularly for new information.

The role of the Engine Cleaner is an important one, use the time to learn the workings of the railway and the mechanics of the steam locomotive. Ask questions of Drivers, Fireman and Fitters and attend M.I.C classes run for your benefit.

PLEASE FOLLOW THESE SIMPLE SAFETY INSTRUCTIONS.

1. Always sign on and off duty in the signing on book in the mess room.
2. Never run - always walk, walkways may be slippery.
3. Always wear Personal Protective Equipment. Safety Goggles and Protective gloves are provided in the Cleaners cabinet alongside the disposal pit marked "Safety Equipment".
4. Always ensure that the Locomotive you are cleaning displays a "Not to be Moved" board and that the appropriate tag is attached to it. Remember that the person who placed the board on the locomotive should remove it when work is complete. Do not leave a "Not to be Moved" board on a locomotive and go off home or do something else. "Not to be Moved" boards chocks and red flags are stored in the Cleaners cabinet next to the disposal pit marked "Safety Equipment". Never "Assume" that the loco you are working on is protected - always make sure.
5. Ensure ladders and mobile steps are used correctly; see guidance notes on notice boards as to how to use them. Ladders and mobile steps are examined regularly and marked with a colour to denote if they have been examined. Always ensure that any ladder or mobile step is correctly colour coded. The current colour code is displayed on the notice board.
Never leave ladders or mobile steps blocking walkways or where road or rail vehicles can strike them.
6. Do not horse play with water or air systems, hoses etc. This is a dangerous practice that can easily kill.
7. Only use substances e.g. paraffin, oil etc in accordance with instructions. Always use gloves when handling oils and chemicals.
8. Clear up any spills that occur e.g. coal, oils and paraffin etc. These can cause slipping hazards.

9. Always use Authorised Walking Routes, these are posted on the notice board.
10. When climbing on structures and locomotives, always take care to keep a firm hold with both hands on handrails.
11. Never walk alongside moving vehicles when shunting is being carried out and try not to block the Shunter's or Driver's line of vision.
12. Steam locomotive injector overflow pipes can blow holes in the ground, if you find holes fill them in with ash as soon as possible.
13. Never leave rags, buckets and other cleaning materials lying around, always return them to the Cleaners store. Do not leave hoses lying around, always coil them up.
14. Never jump across inspection pits - always walk around them.
15. Watch out when locomotives are being disposed, clinker and ashes can be thrown out without warning. Wear goggles to protect your eyes from flying ashes.
16. Steam locomotives have their boilers blown down at regular intervals. Beware when a locomotive is being blown down, do not wander in to the steam cloud as you could lose your way easily and trip or fall.
17. Beware when locomotives are being coaled. Lumps of coal can fall from the forklift or bunker. Keep well clear of the forklift when it is working, the driver may not always be able to see you.
18. Many parts of steam locomotives can be very hot, take care when climbing on and around them that you are not burned.
19. When you are riding out on steam locomotives obey the instructions given to you by the loco crew.
20. Never attempt to carry out any other duty unless you been passed as competent to do so.

21. Report any breakages or shortages to the Running Foreman.

22. Rolvenden Locomotive depot is not open to the public, if you are asked by a member of the public if they can visit the yard, politely decline but explain that it is for safety reasons and direct them to the viewing gallery. You may escort members of the public around the yard but make sure you get permission from the Running Foreman to do so. If they wish to visit the Workshop seek permission first, it may not always be convenient.

Remember always be polite and considerate to the public they are our bread and butter.

DUTIES OF DRIVERS, FIREMEN & ENGINE CLEANERS

A. ENGINE CLEANERS' DUTIES

Cleaners, having signed on duty, come under the authority of the Steam raiser and / or the Running Foreman who is responsible for the allocating of jobs to be done, locomotives to be cleaned, etc.

The first duty is to assist to light up the day's allocated locomotives. Locomotives are then cleaned as instructed.

After locomotives have left the depot, jobs are allocated as needed i.e. pits cleaned, yard tidied, mess room / wash room cleaned, and assisting fitting staff. Engine cleaners should make good use of the period they spend in the shed. They should acquire knowledge of constructional details of the locomotive, taking note of methods adopted for minor major repairs.

Engine cleaners on the K&ESR are also booked out with engine crew to observe/learn about the handling of the locomotive and signals.

B. FIREMAN'S DUTIES

The Driver is in charge of the engine and the Fireman's duties should be carried out under the control and supervision of the Driver.

ENGINE PREPARATION

After reporting for duty at the instructed location, first obtain the necessary instructions concerning work to be performed, read current notices and then join the engine allocated to your particular turn of duty. Your first duty should be to examine and test the water gauge, i.e. open and close blow through cock and check boiler water levels, check hand brake is on, regulator is closed, cylinder cocks are open and the engine is in mid-gear. Satisfy yourself that lead plugs, tubes and stays are watertight and that there are no signs of leaks, also that the brick arch is in good condition.

If the state of the fire is extremely unsatisfactory, or the steam pressure and water level excessively low, the Driver should be notified immediately so that the latter may take suitable action to enable the engine to get off depot with the minimum of delay.

Before making up the fire, satisfy yourself that the ashpan is properly cleared of ashes and that the ashpan dampers are in working order. Next open and inspect the smoke box and see that it is cleared of ashes and that the spark arrester is in position and properly secured. After examination, take care to brush or wipe the faces of the smoke box door clean before closing it as securely as possible with the smoke box door key.

NOTE: - Tightening of the smoke box door is very important: this is to prevent air leaking anywhere around the door faces. if the door is not fitted airtight, correct draughting is impaired while the engine is under power, resulting in poor maintenance of steam pressure.

After completing the foregoing, be particularly careful also to sweep the front platform and footplating clear of all loose ashes and sands which would present an untidy appearance and which, if not removed, would blow about and get into the various motion parts of the locomotive, in turn accelerating wear to the brass and white metal bearings etc. This

would cause unnecessarily heavy maintenance expenditure (needless to say, sand and ash dust, mixed with oil, is an ideal metal abrasive).

Next satisfy yourself that the correct type of deflector plate (smoke plate) is fitted and in good order and that when in position it allows the fire - hole door to open and shut easily.

If the boiler is found to be well up with steam and water, do not make up the fire too soon. If there is insufficient steam pressure proceed to level the fire and start building it up in order to raise steam without delay so that the injectors and vacuum can be tested as early as possible. The Fireman must have on the engine a complete set of lamps (comprising two headlamps with red shades), gauge lamp, a sealed can of detonators and two red flags (if seal is broken the can must be returned to the Running Foreman for a replacement), a bucket when necessary and such tools as may be ordered by the Locomotive Inspector. It is his duty to clean, fill and trim the headlamps and keep them in readiness as and when required. Also he must arrange the headlamps in accordance with instructions, viz: one lamp centre front and rear of buffers when running light engine. To be lit after dark or when there is fog or falling snow, with white light at front and red at rear. When attached to train, lamps at front and no lamps between engine and train.

You should also keep the footplate, toolboxes, tools and oilcans clean. The sand gear should be tested: the sandboxes should be filled. Any excess sand should be swept off the running board from around the filler to avoid sand blowing into the motion causing wear of bearings. Pay special attention to the positioning of the fire irons and make sure that they are safely stowed and will not fall from the engine when in motion, thus endangering P. Way personnel or people on platforms.

Also trim and make safe coal in the bunkers or the tender. When filling water tanks or tender, take extreme care not to overflow, particularly on tank engines as overflow is liable to get into the axle boxes and siphon cup causing damage and loss of lubrication (oil, being lighter than water, will float away). On a side tank engine, it is advisable to open both tank lids in order to allow air to escape more freely. Also, one can check that there is water in both sides and that the tank levelling pipe is not blocked. After water has been taken, close and secure filler lids to prevent spillage, and most important, to prevent dirt, or even coal on

tenders, falling into tanks, thereby causing injector failures. See that the water gauge and glass are clean and in good working order: you must always examine the gauge glass protector to ensure that it is in good condition and properly secured in its correct position on the frame.

If it is necessary to clean the water gauge glass, it is most important to shut off steam pressure from the glass by means of the dual shut-off cocks and release the water and pressure out of the glass by means of the blow through cock before removal of the gauge glass protector. Next, rag soaked in warm water can be used to clean off the outside of the dirty gauge glass, cold water must not be used as it will probably crack the glass. Pressure must not be re-applied before the protector has been correctly replaced. When opening the gauge frame cocks to apply pressure after cleaning the glass, they should be opened very slightly and gradually at first, keeping the blow-through cock still open, so that only a small quantity of steam is passed through the glass and warms it. If pressure is applied suddenly the rapid heating and pressure may fracture the glass. It is also a good practice on GWR locomotives, to test both test cocks on the gauge frame pillar at the rear of the gauge glass, ensuring that they are not blocked and are in working order. They are required to shut off steam in the case of a broken gauge glass in such circumstances as time not allowing for replacement, or even when a replacement glass is not readily to hand. To use these standby test cocks, tap open carefully until steam and water is blowing out. The top and bottom cocks will provide a clue of the balance of water in the boiler: never continue working the engine in steam if you fail to get water through the bottom test cock. Get the injectors working as soon as possible until water does appear. To ignore this test with the bottom test cock indication would be indifference to the expected footplateman's knowledge and craft, as it is possible that tremendous damage would be caused to the fire box crown plates following the fusing of the protective lead plugs.

MAKING UP THE FIRE

To prepare the fire, spread it evenly over the entire grate, sprinkle a few shovels of lump coal over the fire to start it burning vigorously, open the dampers and apply the blower sufficiently to promote proper combustion. Freshly added coal should be left to burn up before more is added. Break the lumps of coal so that the largest you put on the grate is about the size of a man's fist. This exposes a greater surface to the action of the fire than if much larger lumps were used. The fire should now be built up by adding a small quantity of coal at a time, any holes that may form being carefully filled. If a large quantity of coal is fired to the centre of the grate, dense volumes of smoke will be produced, this must be avoided at all times. Firing should continue at intervals, giving each charge of coal time to ignite properly before introducing more, until a bed of fire, well alight and suitable for the class of train to be worked, is obtained - naturally experience will show you that to take a light engine from Rolvenden to Tenterden is not so steam demanding as it would be to haul a train. We will talk about combustion and steaming rates in a later section.

ON THE ROAD

The art of firing is to regulate the fire and the height of water in the boiler according to the work to be performed and to have full boiler pressure when it is required, without unnecessary blowing-off at the safety valves. The Fireman should realise that his aim must always be to obtain the maximum amount of heat from every pound of coal fired. He should anticipate the requirements of the road and the load being hauled by his loco and manage the fire and injectors accordingly, so that steam is available for gradients, but not wasted when standing or running down gradients. For example: in practice, a Fireman needs to exercise his methods and skills in a different manner when working a train from Tenterden to Rolvenden than he would when working the same train from Rolvenden to Tenterden. The law of gravity will help you to get from Tenterden to Rolvenden and will not be in your favour when returning. No coal should be added to the fire when the regulator is closed, if this is necessary, it is probably due to lack of foresight and incorrect management of the firing sequence. When starting from a dead stop, firing should not recommence until the Driver has notched up (pulled the reversing lever from full gear to a position suitable for

weight of train and speed required).

Blowing-off from the safety valves causes a serious waste of water and fuel: when an engine is under power and is showing just a wisp of escaping steam from the safety valves, this is a sign of a very capable and expert Fireman, who is firing to the requirements of the road etc. At other times when full pressure is not necessary, blowing off steam via safety valves is a sign of bad judgement in firing techniques. When you know that you have to hand your engine over to another Fireman, you should leave it in a condition such as you would wish to find it in. Towards the end of your duties, prior to disposal of the engine at your depot, the fire should be levelled in the fire box and worked down as low as possible to avoid coming on the disposal shed with a large amount of unburned coal in the fire box. Experience will soon teach a Fireman the best and correct time to commence working the fire down, but the aim should be to run on to the depot with the fire as low as possible. Warning: - to avoid accidents, use the fire-irons where there are no over-bridges and in all cases great care should be taken to see that no contact is made with bridges and other structures.

ENGINE DISPOSAL

On arrival at depot over the area of the fire-dropping pit, close the dampers, obtain the firedropping tools (i.e. long-handled fire shovel, pricker, dart and rake): proceed to shovel out all ash and clinker, next go to the smoke box and empty all smoke box ashes, then open front and back dampers, enter the fire-pit and rake out all ashes from the ashpan. Afterwards, close both dampers and firehole doors to ensure that an unnecessary amount of cold air does not enter the firebox, thus causing rapid contraction of boilerplates, stays and tubes. Omission to follow this practice will accelerate external and internal boiler leakage's (i.e. tubes and stays). Before leaving the engine, you should fill the boiler with water to a height of at least three-quarters of the gauge glass. This will enable the next lighting-up period to be executed without necessity for the Firelighter to replenish the boiler water by hosepipe. Finally, after stabling the engine, place a chimney cap over chimney to minimise heat loss overnight.

C. DRIVER'S DUTIES ENGINE PREPARATION

After reporting for duty, read your current notices, sign for those which may require proof of issue and obtain any special instructions affecting your working for the day, including P. Way engineering work. Upon reaching your engine, satisfy yourself that the fireman has tested the boiler water gauge as described under "Fireman's Duties" and is carrying out his duties satisfactorily.

If there is any doubt about the Fireman's ability to execute any part of his preparation duties, you should advise him and offer him your guidance based on your own knowledge and vast experience. You should now obtain from the stores the necessary quantity of cylinder and engine lubricating oil, returning to your engine. If fitted, drain the water out of the hydrostatic lubricator after removing the filler plug. After the water has drained out, shut the bottom drain tap and fill with cylinder oil, replace the filler plug and then open the condenser cock ready for use when cylinder lubrication is required when running via the sight feed glasses.

Next you must attend to lubricating all moving parts of the engine: oiling up and examination of the engine is the Driver's sole responsibility, and in all cases, before attending to these duties, safety is a priority. Therefore, see that the regulator is properly closed, the hand-brake hard on, the reversing lever or screw is in mid gear, the cylinder cocks open and that the Fireman is informed of your intended movements.

Oiling up and examination should be done methodically: a definite system will save much time and ensure that nothing is overlooked. A good method is as follows: - start the examination and oiling by passing underneath front to rear. Now proceed along the outside of the engine on the Driver's side to the leading end, across the front and return along the Fireman's side. When dealing with the motion, all slide bar bolts, big end and little end cotters and set bolts should be examined. Axle boxes should be tested for water content: If necessary, remove the water by means of a syringe or drain plug. If the axle boxes are of the type which are oil fed by overhead auxiliary oil feed box and require trimmings, see that these worsted tail trimmings are a good fit and in a clean condition. The brake shaft bearings and steam brake

piston and cylinder trimmings should also be oiled. In addition to the foregoing, it is necessary and very important to inspect and fill if required the following bearings etc. - R & L H big end, R & L H fore and back gear eccentric straps, fore and back gear eccentric rod fork ends, top and bottom of expansion links, quadrant block, R & L H small end bearings, oil cups to supply oil to slide bars, oil cups to lubricate R & L H piston glands and valve spindles. On the outside of the engine, lubricate all coupling rod crank pins and fill vacuum pump lubricator and pump ram rod syphon cup if fitted. When working a train, particularly a passenger train, it is a good practice to put a drop of oil over the buffer faces, as this prevents chafing of the buffers and lessens the jolts that may be transmitted from the engine or tender into the first coach of the train. Whilst oiling, the competent driver will 'take pains to become acquainted with the difference in lay-out of the various classes of locos employed by the K&ESR on which he will work from time to time in the course of his driving duties.

As soon as there is sufficient steam pressure, test the vacuum brake system, so that if any defects are discovered, they can be attended to in good time, thus avoiding a late start. When making the test, the ejector should be opened slowly and gently to avoid dislodging the soot in the smoke box and tubes and prevent a mixture of soot and water being thrown violently out of the chimney onto the clothing of people standing near your engine. You must satisfy yourself that coal and fire irons are properly and safely stored on the bunker or tender, also that there are on the engine such tools etc. as are necessary for the work to be performed. Before starting, see that the prescribed lamps are exhibited and in good order, also that the lamps are lit in accordance with the Rulebook. If the steam heating of trains is authorised or necessary, you should satisfy yourself that the flexible hosepipes and connections are in good and safe working order. The steam heating apparatus should be tested as follows:- First open the cocks on the tender (or those at each end of a tank engine): then open the steam valve and blow out all water which has condensed in the steam heating system. Finally, close the cocks and observe if the correct steam heating pressure can be obtained, by suitably adjusting the main steam supply valve.

Before leaving the depot, the Driver should test the sanding equipment to make sure it is working correctly, test the hydrostatic lubricator if fitted and start it working and see that the cylinder cocks are open. Cylinder cocks are provided in order to drain away any water which may have condensed in the cylinders or steam chest, thus preventing possible damage to cylinder or valve chest castings, or possible damage to the connecting and valve rods. As water cannot be compressed, it is a "Must" that the Driver should open the cylinder drain cocks after the engine comes to a stand or has been standing and they must then be left open for a short time after commencing to move. You should also satisfy yourself that tender or tank is full of water whenever possible, even though you may know that you have sufficient for a particular trip. One must be prepared for unseen or unexpected delay due to the failure of any item or part of the engine or of the railway system over which you are going to operate.

ON THE ROAD

You should at all times endeavour to operate the engine in your charge in the most efficient and economical manner by using the earliest "cut-off" consistent with the work required, so taking advantage of the expansive properties of steam. You should learn by experience the most suitable "cut off" in which to work an engine to obtain the best results from the point of view of both fuel economy and the comfort of passengers.

The opening of the cylinder relief valves is an indication of the presence of water in the cylinders. You should at all times avoid rough handling when starting or stopping trains as in addition to causing discomfort to passengers, this can also cause undue drawbar stresses and even damage and possible fractures. Fuel can be saved by good judgement in operating the train brakes, unnecessary brake applications cause a wasteful consumption of fuel and subsequent release causes a further waste of fuel. If the air pump is maintained efficiently and is working properly (if fitted, GWR engines); fuel is saved by this pump, as it will keep off all small leaks of air occurring in the train vacuum system: this will avoid the necessity of using the steam ejector, which is again an effective saver of fuel.

ENGINE DISPOSAL

On arriving at your depot, the engine should be left with the regulator properly closed, the hand brake hard on, the reversing lever or screw placed into mid gear position, cylinder drain cocks open and lubricator condensing cock shut off. You should report in writing in the official repair book all defects found during final disposal examination, including such defects as were found or observed during the working period: be particular to report all escapes of steam, ascertaining by test, if necessary, where they originate from. By reporting all defects promptly, many delays to the engine will be saved, as will a progressive build-up of defects that would surely put the engine out of service for many days. We could say that "A stitch in time saves nine". When booking defects, they should be fully and clearly defined in your report and as much detail as possible should be given concerning the part of the engine about which you are making your report. Remember that the Fitter who will attend to your reported defect may find the engine out of steam and be unable to make any steam test. Your report should therefore convey to him as far as possible what is wrong so that he can go straight to the defective parts.

D. GENERAL - ON THE DEPOT

After the fire has been dropped, the damper and firehole doors should be kept closed, otherwise cold air will enter the very hot firebox and will set up severe contraction stresses in the plates, stays and tubes, which would thus be liable to damage and leakage's. For the same reason, the blower must not be used after the fire has been dropped, and when it is necessary to move the engine under its own power with the fire out, it must be worked as lightly as possible to reduce the quantity of cold air drawn through the empty firebox and tubes. When the engine is stabled, the chimney cap should be placed on the chimney to minimise heat loss overnight.

COALING OF ENGINES

During coaling, footplate and all other personnel should stand well clear of the tender or bunker during coaling operations, thus avoiding personal injury which might be caused by lumps of coal bouncing off tender or bunker side plates. Over-coaling must be avoided as this leads to excessive spillage: coal falling off an over loaded tender or bunker could cause serious injury to staff working alongside the P Way.

A worthwhile consideration, whilst on the subject of coaling, is the wetting of the coal as this minimises the dust which causes waste and discomfort on the footplate whilst working under power. There is a possibility of injury to sight and the question of personal cleanliness and the condition of paintwork etc.

FINAL ADVICE

A Driver has the responsibility for the engine in his charge. The Fireman is responsible to his Driver and must carry out any instructions given to him, and he must not move or leave the locomotive without instructions or reaching a proper understanding with his mate. Neither must leave the footplate to walk along the footplating, or get into the bunker or on to the tender while the engine is in motion.