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OPERATING INSTRUCTIONS

7/8ths" SCALE KERR STUART 'SIRDAR' CLASS DIANA

SAFETY FIRST

All our locomotives are safe to run, and will give many hours of pleasure, providing the following safety procedures are followed: -

- 1. Please read the instructions thoroughly before running for the first time.**
- 2. Always do a complete refill of gas, oil and water. Never refill just the gas to prolong the run.**
- 3. Never let the engine run out of water.**
- 4. When refilling the gas, do not have any naked flame present, and NO SMOKING!**
- 5. Do not pick up the engine by the bodywork, chimney or boiler, especially when hot.**
- 6. Only pick up the engine by the buffer beams and, when hot, use old gloves or a cloth.**
- 7. Do not stand over the chimney. Ejected boiling water or steam may cause serious injury.**
- 8. Do not open the smoke box door while the engine is alight.**

General Hints

As with all operating machinery, whether model or full size, wear will occur. In the model steam locomotive much can be done to help prolong its life and decrease the amount of time required in the workshop for servicing.

Keep the engine as clean as possible, and the motion free from dirt and garden debris. The valve gear, axles and crank pins should be oiled sparingly with light oil, e.g. "3-in-1 Oil". Over-oiling attracts dirt and grit, which will increase wear.

Regularly check that all screws and motion bolts are firm. Do not over-tighten, as this strips threads and shears bolts. **When filling the lubricator, always use a high temperature steam oil such as 460 grade; this is available from our retailers. FAILURE TO USE THE CORRECT GRADE OF OIL CAN LEAD TO BLOCKED STEAM PIPES AND WILL INVALIDATE THE GUARANTEE.**

When running your engine avoid excessive speed and acceleration, both will cause premature wear in the valve gear. Prototypically, narrow gauge locomotives ran at a speed of between 10 and 20 M.P.H., and rarely exceeded 25 M.P.H.

Positions of Fillers and Drains etc.

The gas inlet valve is in the nearside side tank, hidden by the dummy coal load. The gas control valve, disguised as a brake stand, is in the offside of the cab and can be operated through the doorway.

The lubricator is on the footplate under the smokebox door. The filler cap is removed using a screwdriver. To drain, remove condensate using the small syringe and extension tube provided.

The boiler water filler/Goodall valve is hidden in the sandpot on top of the boiler. Undo the cap to fill with water. The boiler can also be

replenished while the locomotive is in steam via the Goodall valve using a pump bottle.

The regulator is in the centre of the boiler backhead.

The boiler blow down valve is under the footplate, just behind of the nearside cab step. To open the valve, turn it through about one turn.

The reverser is the lever in the offside cab door. To operate push gently inwards and move to the desired direction. The control is gated and will therefore hold itself in the full forward or reverse position.

Preparation for Running

Always service the engine in the following order; first gas, oil then water.

To fill the gas tank: invert the gas can and apply the nipple to the gas inlet valve on the top of the tank turret. It is advisable to support the loco under the gas tank whilst filling, to prevent the engine tipping over. You will know when the tank is full; gas will blow back from the inlet valve in a strong jet. A small amount of gas and air will escape during filling, but the difference between this and when the tank is full is always clear. Always keep the gas can vertical when filling the gas tank. We recommend that Butane gas is used whenever possible, but the gas tank is manufactured to accept the extra pressures generated by Butane/Propane mix gases, and the burner system will also perform using this gas.

Filling the lubricator: as you will read in the instructions for the end of the run, the lubricator should be empty of oil and water. Remove the lubricator filler cap. Fill up the lubricator with steam oil to about $\frac{1}{4}$ of an inch below the top. Leave the filler cap off for the present, so that any trapped air can escape. It can be refitted after you have filled up the boiler.

To fill the boiler: remove the filler cap and also open the water level check valve. Leave the boiler blow down valve open whilst raising steam. Fill up the boiler completely – ideally use filtered rainwater or distilled water using the large syringe provided. Replace the boiler filler cap, check that the lubricator does not need topping up, and then replace its filler cap also. Filler caps should be firm finger tight. They are sealed with a trapped ‘O’ ring and, therefore should not be over-tightened.

Lighting Up

Open the smoke box door. Light your lighter/match etc. and gently open the gas control valve until a gentle hiss is heard in the burner. Apply your light into the smoke box and the flame should ‘pop’ down the fire tube and ignite the burner inside the fire tube.

If the gas valve is opened too much the flame will not pop back; it will either fail to ignite, will roar in flame out of the smoke box, or there will be a ball of flame around the front of the engine, which will then blow the whole fire out (after giving the driver a fright)! When the fire sound has stabilised, after about 30 seconds the gas can be turned up gently. Do not turn the gas up high as the flame could damage the paint on the smoke box door. The smoke box door may be shut after about two minutes. Now leave the locomotive to raise steam.

When pressure starts to rise, water will be seen running out of the boiler blow down valve. When the water reaches its correct level steam will be seen. Now screw shut the check valve and let the locomotive raise at least 40 p.s.i.

Running

When the engine has raised about 40 psi, you are ready to start running. It is advisable to run the engine in reverse first; it clears the condensed water from the cylinders best this way. Before commencing your first run of the day, it is advisable to put a cloth loosely over the chimney for a few minutes, as condensed water will

be ejected from the chimney. This is quite normal; the motion of the engine will be jerky until all condensate has been ejected. **DO NOT stand over the chimney as ejected boiling water/steam could cause serious scalding.**

Place the direction lever into the reverse position, and then open the main steam valve. The engine should start to move off in the reverse direction. When starting from cold it will be jerky, this is normal, as it has to clear the condensate from the system. The more the main steam valve is opened, the faster the engine will go; our advice is to start slowly and learn the road with your engine.

After a minute or so, remove the cloth and continue running. In running it is correct practice to balance the boiler pressure against the load being pulled and the track conditions. With a light load and level track the pressure may need to be only 25-30 p.s.i. therefore, turn the gas control down to keep this pressure. When running a heavy train with steep gradients, increase the pressure by turning up the gas.

The ideal running pressure can be learnt by experience and is one of the pleasures of running a live steam engine. There is no need to have the safety valve constantly blowing off (it is what its name implies – a safety vent for excess steam pressure). In all our designs, the gas has been programmed to run out just before the water, thus it is important not to refill with gas alone in order to lengthen the run by a few minutes. When the gas runs out a complete gas, oil and water service must be done (remember GOW, also remember to shut the gas regulator before refilling and **DO NOT** refill with gas near any other live steam loco. When the locomotive slows as the pressure falls at the end of a run, stop the engine. Open the lubricator valve and remove any condensed water using the small syringe and tube supplied. If you intend to continue running carry out a general refill.

End of Run

As previously mentioned, the locomotive will slow (due to pressure dropping) when the fire has gone out, stop at a convenient place. The boiler drain valve can be opened to allow all the remaining steam to

blow out. The locomotive should be allowed to cool. When cool, clean the engine, check the motion and oil if necessary. The locomotive should always be put away in a clean condition as it attracts less dust and is always ready for the next run (or to be shown to an admiring friend). Always leave the boiler blow down valve open so that the boiler will not be strained if subject to any temperature change. It is advisable to store the locomotive where any residual drips of oil or water do not matter.

Blocked Gas Jets

If the gas jet becomes blocked with particles of dirt within the gas, the jet will have to be removed and cleaned. To facilitate this the cab back has a pair of sliding doors. With a spanner or pliers carefully undo the pipe union on the gas control valve. Remove the pipe and jet holder assembly from the burner.

Holding the jet holder gently in a vice, unscrew the jet. To clear, place the jet nozzle against the inverted gas can nozzle and clear the jet with a blast of gas. Under no circumstances use a pricker wire, this will damage the jet hole. Replace the jet in the holder, ideally using a thread sealant sparingly on the threads. Ensure it is tightened up firmly. Replace the assembly into the burner and re-connect the pipe to the control valve. Ensure this is done up tightly, test **CAREFULLY** for gas leaks, first with a 50/50 mixture of washing up liquid and water, and then if no bubbles are showing, with a flame and the gas “just on”. Tighten if required.

Gauge Changing

The locomotive is supplied set to 45mm gauge, but a “gauge change” kit is supplied with each engine. This will allow you to run on either 32mm or 45mm gauge track. To change the gauge, lie the engine gently on its side, on a thick cloth, loosen all the grub screws in the boss on the back of the wheels using the Allen key provided. The axles are dimpled for each gauge, so you do not have to measure for the right gauge. Slide the wheels to the gauge required and tighten up the grub screws. **These should be checked as a routine at the start of each running session. HAPPY STEAMING!**

A bit of history

Diana was built in 1909 by Kerr Stuart as part of an order for six 2' 5 1/2" gauge locomotives for Mauritius. Although several of the locomotives in the order were sent to Mauritius, *Diana* wasn't delivered and stayed at Kerr Stuart's factory in Stoke on Trent. In 1917, the locomotive was purchased by the Home Grown Timber Committee of the Board of Trade for use on the Kerry Tramway, near Newtown, Powys in Mid Wales. It was rebuilt to 2' gauge and delivered to Kerry, Powys.

The Kerry Tramway closed in 1922, though a short length was retained and worked by an unknown locomotive. In 1925, *Diana* was sold to the Oakeley Quarry in Blaenau Ffestiniog, where it worked for the next twenty years. In 1945, it was sold on to the Pen-yr-Orsedd Quarry in the Nantlle Valley, where it and worked until its boiler was condemned in 1950.

Diana was purchased for preservation in 1964 and passed through the hands of a variety of owners and moved to a number of different locations including the Llanberis Lake Railway, the Brecon Mountain Railway and Alan Keef's in Ross on Wye although its restoration was never fully completed until it passed into the hands of Phil Mason, a Tallylyn Railway volunteer, who finished the work at the Vale of Rheidol Railway before setting the engine to work on the Bala Lake Railway.

