



NATIONAL TRACTION ENGINE TRUST
Preserving our heritage with steam on the road



ENGINE OWNER'S CODES OF PRACTICE

PART 3

TRANSPORT, LAYING- UP AND STORAGE

PART 3 TRANSPORT, LAYING-UP AND STORAGE of Traction Engines and other Steam Driven Vehicles

3.1 TRANSPORT

3.1.1 The safe transport of an *engine* on a low load lorry or trailer, requires proper recognition of the high out of balance forces that can easily occur due to the high centre of gravity of the load.

3.1.2 In the United Kingdom and most other countries, the driver of a vehicle is legally responsible for the security of the load and he must have sufficient knowledge of the relevant regulations and codes of practice. Detailed advice is to be found in the publication '**Safety of Loads on Vehicles Code of Practice**' ISBN 0115525475 (2002), obtainable from The Stationary Office or bookshops, currently (2005) £10.50 plus p&p.

3.1.3 Although this Code does not specifically cover traction engines, etc., the advice given for securing road rollers and some types of construction equipment applies equally well. Periodically the NTET sponsors demonstrations relating to the loading, securing and unloading of traction engines onto low loaders or transporters.

3.2 LAYING-UP

3.2.1 At the end of a season's use, every *engine* should be carefully prepared to give the best possible protection from deterioration during its period in storage. Preparation should, however, be done in such a way as to leave the *engine* in a convenient condition for: -

- (a) the annual mechanical inspection (which may not coincide with laying-up);
- (b) the thorough *examination* of the *pressure system* by the *Boiler Inspector* (if due) and
- (c) convenient access for any repairs, which are to be carried out.

The following advice is designed to achieve these aims.

3.2.2 At the end of the last steaming period, turn the *engine* over slowly and work the mechanical lubricator by hand to get a good coating of oil onto the valve(s) piston(s) and cylinder bore(s).

3.2.3 Once the steam pressure has fallen to 20 - 30 lbs p.s.i., the *boiler* should be blown right down so as nearly as possible to empty it. Make sure that the fire is completely out before doing this. This final blow down should preferably be done while the *boiler* is still hot and much of the sludge will be in suspension in the water. Attach the hose to a *blowdown valve* and secure its free end to prevent it snaking (see paragraph 1.5.6.); this will get the hot water and sludge well away from the *engine*. It is not essential to blow the *boiler* down hot; it just means that there will be less sludge to wash out later.

3.2.4 DO NOT 'knock in' a mud door whilst there is still pressure in the *boiler*. At any pressure the water is still well above boiling temperature and can cause very serious scalding. The *boiler* should be depressurised and vented before any doors or *fittings* are loosened or removed.

3.2.5 If the *boiler* has been blown down hot, allow it to cool with the *blowdown valve* open, then remove the manhole and mudhole doors, being careful not to damage the joints and any wash-out plugs; check that they are marked to identify the openings to which they belong and then set them aside. Loose scale and sludge may be scraped out from the bottom of the firebox water space but use either a hardwood or non-ferrous metal scraper to avoid scratching the surface of the plates and exposing bare metal to corrosion. Remove any accessible scale from the tubes and plates. Thoroughly wash out the water space using a high volume hose, if available.

SAFETY NOTE: Any joints or gaskets which are to be discarded and are made of, or contain asbestos, should be thoroughly soaked with water before removal and then placed in a strong plastic bag, sealed, marked and disposed of in a safe manner.

3.2.6 Drain the tender and any other water tanks, wash out any sludge and loose scale, and then allow the interior to dry out. If there are large enough access covers, a coat of whitewash on the inner surfaces will give a measure of corrosion protection. **Do not use oil or any other greasy coatings.** Alternatively, if the *engine* is to be stored in a frost proof building, the tanks may be completely filled with treated water. To completely empty the water round the foundation ring drape pieces of wet absorbent cloth through the mudhole door on to the top of the foundation ring making sure that the outer length of cloth hangs below the level of the foundation ring.

3.2.7 Once the *boiler* has dried out and the water drained away, remove the ash pan and fire bars (this may be done before the *boiler* is washed out if preferred) sweep the tubes, wire brush the inside of the firebox to remove all soot and scale, and thoroughly clean out the smokebox.

SAFETY NOTE: When brushing off soot, etc. in a confined space, always wear a suitable dust mask. Disposable masks of the micro filter type and approved for use with toxic dusts are now readily available, at modest cost, from agricultural suppliers, safety equipment dealers, etc.

3.2.8 After cleaning the fire side of the *boiler*, the tubes should be swabbed through with a rag dipped in oil and pulled through with a strong cord or wire; brush the inside of the firebox and smokebox with oil. This may be deferred until after the *Boiler Inspector* has carried out the thorough *examination*, if one is due, and if it will be done within a reasonably short time. Serious corrosion will, however, occur if the tubes and plates are left unprotected through any part of the mid-winter months.

3.2.9 Used automobile *engine* oil contains acids and other corrosive substances and should not be used to protect steel. Special proprietary compounds, which may be sprayed on, are readily obtainable from motor accessories stores. Grease diluted with white spirit gives a good protective coating and chain saw chain oil is 'clingly' and works

well. In the end, any heavy mineral oil or light grease will give reasonable protection provided it is not subject to the direct action of the weather. After surplus oil has drained off, remove any newspapers, etc., which may have been placed under the *engine*, and dispose of them so that they will not be a fire hazard.

3.2.10 If an *engine* is to be laid-up for longer than a few months, it is best to use a proprietary protective compound, which will stay, in place much longer than oil or light grease.

3.2.11 When the *Boiler Inspector* has completed the thorough *examination* and any necessary work has been carried out, and, if preferred, the fire bars and ash pan may be replaced. A brush over with oil will protect the ashpan from damp. The dampers should be left slightly open to allow free circulation of air. If a chimney cap is fitted, it should be designed so that there is a small air gap to permit air circulation through the fire side of the *boiler*.

3.2.12 Various methods may be used to minimise corrosion in the water space of the *boiler*. In Britain and other maritime climates, alternating periods of cold dry weather are followed by periods when it is warmer and humid, virtually guaranteeing that there will be a number of occasions when warm humid air will come into contact with cold metal and cause condensation, which may stay on the metal surface for several days. Boilers stored for any length of time with the manholes and mudholes left open can suffer serious deterioration through repeated periods when the internal surfaces are wetted by condensation.

3.2.13 Oily compounds must never be used to protect the metal surfaces in the water space of a *boiler* (see Part 1.4.7).

3.2.14 Tannin based water treatment compounds usually leave a coating, which provides a fair degree of protection, on the surfaces of the *boiler* but the general objective should be to eliminate the presence of water and reduce the oxygen content of the air within the *boiler* during the storage period. A cheap and reasonably effective method, once the *boiler* has thoroughly dried after washout, is to replace the mud doors and any washout plugs, then place a small dehumidifier (obtainable, with refills, from hardware stores) on top of the tubes, together with a small metal tray on which are placed 3 or 4 nightlights. Be careful to place both where they will not be displaced when the manhole door is replaced and subsequently removed. Once they are in position, light the nightlights; replace the manhole door and nip it up sufficiently to stop air movement. The nightlights inside will burn-up most of the oxygen and the dehumidifier will absorb any stray moisture, giving a very good degree of corrosion protection at very little cost. If the *Boiler Inspector* is due during the storage period, the *boiler* may easily be opened up and the process repeated after the *examination* has been completed. If it is found that the nightlights have completely burnt out, use one or two more next time. If the dehumidifier has not used up all its silica gel crystals, the water may be tipped out of the lower container and the whole thing stored in a closed polythene bag until the next storage period.

3.2.15 The wet lay up method, with the *boiler* completely filled with treated water, is not recommended. Although this method is used for some marine and industrial boilers, traction *engine* boilers do not have *boiler* mounted stop valves and air vents so there is a

risk of water getting up in to the cylinder and steam chest where severe corrosion would occur. There is also the risk of freezing.

3.2.16 The outside of the *boiler* requires protection as much, if not more, than the inside. Painted surfaces should be well maintained and any chips or scratches should be touched-in before moisture gets in and starts spreading corrosion between the paint and the metal. Unpainted areas of the *boiler* can be given quite a good protective coating by painting on a thin film of cylinder oil whilst the *boiler* is still hot. The oil is much easier to apply if it is slightly warmed first.

3.2.17 Various proprietary compounds are available for protecting burnished steel and other bright work but a thin coating of light grease is usually satisfactory, provided that it is protected from the direct action of the weather.

3.2.18 Coal dust tends to retain moisture and is generally acidic, which will corrode the plates with which it is in contact, so it is worthwhile to empty the bunker and give the inside a coat of paint.

3.3 STORAGE

3.3.1 Whenever possible, engines should always be stored under cover in a dry but well ventilated building. Corrugated iron or, to a lesser extent, asbestos cement sheet clad structures are very prone to condensation on the inner surfaces and therefore should, if possible, be lined with timber or similar material. A good concrete floor, laid over a damp proof membrane is best. Dirt floors tend to 'give up damp' and also create dust which gets into bearings, etc., so should therefore be avoided. If an inspection pit 2-3ft deep can be provided below the firebox, it makes access easier and working inside the firebox much less unpleasant.

3.3.2 Even when stored in a suitable building, and certainly in all other cases, it is a wise precaution to cover the top of the *boiler*, cylinder and motion work with a light tarpaulin. This should be supported by poles or a light timber frame, to keep it clear of surfaces that have been coated with protective grease.

3.3.3 If it is not possible to store the *engine* in a suitable building, it should be prepared as described above and then securely sheeted to provide the best possible weather protection. The sheeting should be arranged so as to provide sufficient ventilation to prevent the accumulation of moisture inside the enclosed area. Proofed cotton tarpaulins are best as they can 'breathe' and are less prone to condensation on the inner surface than reinforced plastic sheeting.

3.3.4 In order to avoid localised corrosion and pitting in the cylinder bores and on valve rods and bearings during the storage period, it is advisable, after providing due lubrication, to pull the flywheel round by hand at about monthly intervals. This will spread residual lubricant, which has gravitated to the bottom of the cylinder, and re-distribute it over bearing surfaces. After turning the *engine* over, leave the crankshaft in a different position to that which it was in when you started.

3.3.5 At the same time it is a wise precaution to check that none of the surfaces, which have been given protective coatings, have been missed. This will show up, as a

discoloration on bright work, etc. and a quick dab of grease will stop it turning into more serious corrosion.

3.3.6 At the end of the storage period, protective grease coatings can be cleaned-off with paraffin or gas oil. Be careful not to let surplus paraffin, etc. run down into the *boiler* lagging.

SAFETY NOTE: Never use petrol, 'thinners' or other industrial solvents. Most of these are a serious fire risk and give off toxic vapour (particularly in an enclosed engine shed) and all can cause problems if they come into contact with the skin.

3.3.7 Oil or grease applied to the fire side of the *boiler* and smokebox may be left - it will simply burn off - but do not forget to remove the nightlights and dehumidifier from inside the *boiler*, if these have been used.