NATIONAL TRACTION ENGINE TRUST

Preserving our heritage with steam on the road

ENGINE OWNER'S CODES OF PRACTICE

PART 2

DRIVING AND CONDUCT ON THE ROAD AND IN PUBLIC PLACES

Registered Charity Number 291578

DRIVING AND CONDUCT ON THE ROAD AND IN PUBLIC PLACES

2.1 INTRODUCTION

In this Section the phrase 'traction engine' is used to cover many physical forms of road going steam propelled vehicle, tractor, general purpose engine, road locomotive, showman's engine, road roller, wagon etc.

In their heyday steam propelled vehicles were a common sight on the roads and other road users took them in their stride. In the 21st century the ponderous road roller or the fast-moving traction engine or even a road train hauled by a road locomotive is a fairly rare sight on the roads and despite being held in awe when on the rally field by their very nature they are an anachronism to the modern road user. The steam propelled vehicle may have the right to be on the road, but it is a very tenuous right that could be easily removed as a consequence of inappropriate actions or cavalier attitudes of drivers and crews. The NTET believes strongly that it is incumbent on owners and their crews to conduct themselves in a manner that helps to protect the right of the steam propelled vehicle to travel the highways in an unfettered manner. This section of the Code of Practice contains guidance designed to help drivers and crew enjoy their experiences when out and about on the highway whilst ensuring that we protect our right to be there.

In order to become fully competent in the skills of engine driving and management it is not sufficient just to have a driving licence for a car or commercial vehicle and to be filled with enthusiasm; this approach is only for the foolhardy. As part of "Preserving Our Heritage in Steam on the Road" the NTET is committed to providing all traction engine drivers with the opportunities to learn and develop the necessary skills and techniques that today's modern roads demand. The voluntary Engine Driver Competency Scheme is designed to ensure that all of the necessary skills are known, understood and practised in a routine manner.

This Section 2 of the NTET Code of Practice covers the many aspects of driving on the road in a practical manner and draws upon the guidance and long experience of drivers of all types of steam traction engines.

For additional information reference should also be made to Part 1 of the Code of Practice, Sections 1.1. - General, 1.5. - Boiler Operation, 1.6. - Daily Operation and 1.7. - Action in an Emergency. Please note that for the purpose of continuity a limited amount of replication of other Sections of the COP will be found in this Section.

Vehicles and their drivers using the public highways are subject to a number of Regulations and Acts of Parliament predominantly the Road Traffic Acts, the Construction and Use Regulations and the Motor Vehicles (Lighting) Regulations, all of which are varied from time to time. It is not the intention of this Code of Practice to quote such regulations verbatim. Therefore, in all cases where clarification as to the precise wording and interpretation of the regulations is required, the reader is advised to obtain personal copies and to consult the relevant sections.

Some Regulations do not apply to vehicles over a certain age; July 1947 is a significant date for Steam Traction Vehicles but again the reader is urged to seek personal clarification on specific points as required.

There are a small number of publications, which provide good, additional background reading, these include.

- **"Traction Engines and the Law"** by David Tew and published by the NTET (*now out of print*).
- **"Modern Manual for Drivers of Steam Road Vehicles"** by W. Michael Salmon and published by Model Aeronautical Press Ltd (*now out of print*)
- **"Steam Road Vehicles"** by L. M. Meyrick-Jones and originally published by G.Iliffe and Sons Ltd., and reprinted in 1978 by the NTET.
- **"Steam Wagon Manual"** first published in 1918 and republished in 1994 by TEE Publishing
- **"Driving and Operating Traction Engines"** by Mike Dyson, published in 2007 by Haven Publishing. ISBN 978-0-9556147-0-5
- **"Modern interpretation of Traction Engines & the Law"** by Nick Allen, on the NTET website.

2.2 GETTING STARTED

2.2.1 THE LEGAL REQUIREMENTS

2.2.1.1 **Driving Licences** – For the drivers of road going steam propelled vehicles the Category 'B' licence, as applied to motor cars, underpins the various requirements for driving licences.

Drivers of a traction engine which is not a Road Roller should be the holder of a Category B licence. Under current UK law this rule applies to all vehicle weights and physical sizes. The steersperson need not hold a licence but the NTET strongly recommends that the steersman holds at least a provisional licence, thus indicating that there is an intent to act responsibly.

Road rollers propelled by any fuel are classed as 'specialist vehicles' for which a Category 'G' licence is required. Where the driver does not hold a Category 'G' licence a Category 'B' licence must he held, this acts as a provisional licence, in which case 'L' plates must be displayed on the vehicle when on the road.

Where the roller is of a 'two man' design a learner driver must be supervised by a Category 'G' licence holder.

If the road roller driver holds a Category 'G' licence, the steersman need not hold a licence, but the NTET's recommendations apply.

For a graphical explanation see Appendix A – Driving Licences

2.2.1.2 **Roadworthiness** – on 20th May 2018 new roadworthiness rules came into force which at a stroke removed blanket exemption for testing for 'All Steam Propelled Vehicles'. However derogation can be applied for most steam propelled vehicles by following the following guidelines.

Note 1: If your vehicle is already registered as ' Historic Vehicle' you may find that exemption from MOT Testing has been automatically applied; you will know this if you successfully attempt to re-tax the vehicle using the DVLA's on-line service, i.e. your request is not challenged and dismissed. If the attempt to re-tax is dismissed then follow these guidelines below;

1. If the vehicle weighs **less than 3.5 tonne**, was **first registered over 40 years ago**, and has **not been substantially modified in the past 30 years** (no definition has yet been given to 'substantially modified' for steam vehicles) then exemption can be claimed at the Post Office using **DVLA Form V112** 'Declaration of Exemption from MOT' and ticking **Category 'r'** - A Vehicle of Historic Interest - VHI.
2. If your vehicle weighs **less than 3.5 tonnes** and is **not a VHI** but is **not capable of exceeding 15.5 mph by design**, exemption should be claimed using **Category 'o'** on **DVLA Form V112**
3. If your vehicle weighs **more than 3.5 tonne** and **is a Road Roller** exemption should be claimed using **Category '2'** on **DVLA Form V112G**.
4. If your steam vehicle weighs **more than 3.5 tonne** and is **any other form of Steam propelled vehicle** exemption should be claimed using **Category '26'** -

'Steam Propelled Vehicle', on **DVLA Form V112G** - this form assumes everything above 3.5 tonnes weight is a goods vehicle. Don't challenge it, the DVLA appear to have accepted this blurred edge approach.

Note 2: At the time of writing exemption does not apply to any [steam propelled] vehicle weighing less than 3.5 tonnes which is not a VHI and which can exceed 15.5 mph by design.

Owners and Drivers of all vehicles used on a road or other public places are reminded that although older steam powered vehicles are also generally exempted from many of the conditions imposed by the Road Vehicles (Construction and Use) Regulations 1986, they are nevertheless responsible to ensure that no vehicle is used, caused to be used or permitted to be used by another if that vehicle is in a dangerous condition, i.e. involving danger or injury to any person whether present or not. (Sec 40A Road Traffic Act 1988)

This relates to:

1. the condition of the vehicle or trailer drawn thereby, accessories or equipment
2. the purpose to which it is used
3. the number of passengers carried or the manner in which they are carried
4. the weight, position or distribution of any load and the manner in which it is secured

Furthermore, to knowingly use a vehicle in a dangerous condition as above may constitute a further offence of Dangerous Driving.

2.2.1.3 **Minimum Age Limits.** The minimum age to drive a traction engine varies depending on the type of vehicle and its weight.

For all types of Road Roller and Traction Engines over 7.5 tonnes weight the minimum age is 21years. For traction engines up to 7.5 tonnes weight the minimum ages is 18. (See also 2.5.1.2).

The NTET recommends the same rules are applied as guidelines for steersmen. (See also 2.2.2.3)

Separate explanation is made for the Steam Apprentice Section: Appendix A (explanation of requirements).

See also COP Section 1.1.5 relating to Insurance

2.2.1.4 **Driving Lights** – Regulations related to age and construction are outdated therefore do not suit driving in today's conditions. Current regulations require that lights on any vehicle using the highway are in operation ***half an hour after sunset until half an hour before sunrise***.

This COP recommends, on today's roads with fast moving traffic it makes very good sense not to be out with a steam traction engine after dark if it can be avoided. Whilst most journeys will be planned to be undertaken in the daylight it is good

practice to carry lamps (in good working order and with paraffin if appropriate) at all times to cover for the unscheduled "night out".

Where the *owner* chooses to fit modern lighting equipment it must conform to the current Road Traffic Act and Motor Vehicle (Lighting) Regulations - pre 1947 exemptions therefore do not apply. The minimum requirement of the Motor Vehicle (Lighting) Regulations (as related to steam traction vehicles) is for two white lights to be shown at the front and one red lamp at the rear. In addition two reflectors, (triangular on trailers) a minimum of 3' 6" apart, must be attached to the rear of the *engine* and every trailer on the road in the hours of darkness.

2.2.1.5 **Flashing Amber Beacons** – Under the heading '*Obligatory Warning Beacons'* of The Road Vehicles Lighting Regulations 1989 Paragraph 17 (2) exempts vehicles built before 1st January 1946 from using a flashing amber beacon when travelling on a dual carriageway,

However: **The NTET strongly recommends that flashing beacons and other forms of warning signs be used on all road runs irrespective of the road type, with special attention being paid to visibility to the rear.**

For practical examples of the NTET's recommendations see Appendix C - See and Be Seen.

2.2.1.6 **Towing Trailers** - The number and types of trailers that can be towed legally generally depends upon the type of *engine,* up to a maximum of 3, where in this case, no trailer is to exceed 23 feet. As a general rule water or bunkering trailers **(i.e. a trailer carrying water and/or coal alone),** are not counted in the total number, as long as the train does not exceed the permitted maximum length of 85 feet (25.9 mtrs)

Today's road conditions require due consideration for the number of trailers, and particularly where long train length is concerned. If more than 1 trailer is towed then the NTET recommends that 1 additional crew member should accompany the road train for each trailer in excess of 1.

Note: A licensed vehicle may only be towed if it is immobile and is being moved to safety or being recovered.

According to the DfT-information-sheet "A Frames and 'Dollies" the use of "A" frames to tow cars behind other vehicles is legal provided the braking and lighting requirements are met. The information sheet goes on to say, "while this is our understanding of the Regulations, it is only the Courts which can reach a definitive interpretation of the law. "

Any one intending to use an "A" frame to tow a vehicle would be well advised to consult:-
http://webarchive.nationalarchives.gov.uk/20120606172804/http://assets.dft.gov.uk/publications/dft-information-sheets/a-frames-and-dollies.pdf

Other provisions from Regulation 15 and Regulation 86A of C&U Regulations require the fitting and use of a secondary coupling system in which the trailer is stopped automatically if the main coupling separates whilst the combination is in motion.

The NTET recommends that secondary safety chains are used between all towed implements/vehicles/trailers.

Agricultural trailers manufactured after July 1947 or having a gross laden weight of 4 tonnes or over must be fitted with effective brakes that are capable of being applied by the driver.

Where reasonably practicable (and trailer design permitting) the NTET recommends that mechanical brakes be fitted to all trailers.

2.2.1.7 **Warning Signs** - Steam engines on the road are nearly always slower than other traffic. The law does not specifically mention requirements for warning signs on traction engines but the following recommendations are made by the NTET;

a distinctive and reflective **SLOW MOVING** sign should be displayed at the rear of the *engine* or train.

a distinctive and reflective **LONG VEHICLE** sign should be displayed at the rear of trains exceeding 59ft overall length

consideration should be given to displaying a Keep Right sign in the rear of trailers or living vans and where practical the sign should be illuminated or be of a reflective material.

2.2.1.8 **Passengers** - If passengers are carried on the footplate of an *engine* there must be properly constructed, safe seating arrangements. In the case of traction engines this can generally be achieved by building some accommodation in the coalbunker. Steam lorries sometimes have space for a passenger but are generally limited with regards to providing additional seating.

Open Trailers must be fitted with sideboards and passengers must sit below the top of sideboards. No one riding as passenger should stand, or lean over any side or cause any material to protrude into the road or pathway or throw materials off the trailer into the road. The NTET recommends that passenger seating is fixed down, and no persons to ride on *engine* steps or trailer drawbars.

Attention is drawn to HSE AGRICULTURAL INFORMATION SHEET No 36, Carriage of passengers on farm trailers.

It is important to ensure that your insurance cover includes the carrying of passengers.

2.2.1.9 **Crew** - It is generally accepted that two able bodied people must man a road locomotive or heavy agricultural *engine* (threshing or ploughing *engine*) whilst light agricultural, general purpose tractors and road rollers may require only one. ***However the NTET strongly recommends that a minimum crew of two always man an engine on the road (unless construction prohibits this). See also COP Sections 1.1.6. and 1.1.7.*** Long journeys can be very tiring and therefore sufficient additional crew should be considered to take turns at the driving and steering.

Unless the Driver is suitably experienced, NTET recommends a minimum crew of two

There should always be sufficient numbers of crew to handle any trailers making up a train. ***See also COP Section 1.1.7.***

2.2.2 ENGINE FAMILIARISATION

2.2.2.1 **Controls layout -** The layout of controls varies from maker to maker and between *engine* types. In particular the controls and layout of steam lorries varies considerably from other traction *engine* types. It is very important before assuming the role of *engine* driver that the position of all controls are located and then fully understood and tested.

In particular the working of the regulator should be studied as the direction of movement for opening and closing may be reversed for different engines, manufacturers and types of *engine*.

2.2.2.2 **Lines of Sight** - It is good practice for the driver and steersman to establish their lines of sight around the entire circumference of the *engine* from the footplate positions and to make a mental note of any blind spots or special stances that need to be adopted. Engines with canopies or cabs pose a particular problem with limited views and numerous blind spots. One or more rear-view mirrors are a good investment on larger or canopied or cabbed engines and particularly when towing trailers.

2.2.2.3 **Steersman -** Although not required to hold a driving licence if the Driver is fully licensed it is strongly recommended that the steersman has sufficient understanding of the controls to allow him at least to bring the *engine* to a safe stop and to inject or pump water into the *boiler* in the event of an incident which incapacitates the driver. (See also 2.2.1.9)

2.2.3 PLANNING THE JOURNEY

2.2.3.1 **Choosing the right route** - The choice of route can influence the journey in many ways, and a bad choice can turn an otherwise straightforward run into a hectic nightmare. Whilst obviously trying to minimise on distance and time it is important to look carefully at routes that include travelling along 'fast' roads and to check for safer alternatives. In addition the number of turns onto or across major roads should be limited if at all possible. Beware of low or narrow bridges where there is a danger of striking the arch or a parapet and the increasing number of weight limits on country roads and bridges. Awkward junctions should be identified and an early plan devised as to the safest way to negotiate a way through. Hills should be noted and an indication of length and severity estimated. If you are travelling far from home in uncharted territory consider carrying out a recce' if at all practical. In particular try to find out where the watering points are and if there are any road works on the route or signed diversions that might interfere with progress. Avoid single-track lanes unless absolutely necessary and if there is no alternative route, plan to put someone on the ground to get well ahead of the *engine* to act as lookout. Finally try to avoid busy town or city centres on Market days and weekends unless a good ring road is evident. Attention should also be paid to the road camber and the possibility of coming into contact with a roadside obstruction.

2.2.3.2 **Watering points** - When planning a run that is considerably longer than that catered for by the tender or water tank capacity, it's a good idea to undertake a recce' of the route or failing that get local advice on the location of watering points, hydrants, ponds and free running water. Mark the route map accordingly. Unless in dire straits don't plan on taking ***green or brackish*** water.

There are no ‘Carte Blanche’ formal arrangements allowing users of steam vehicles to take water from fire hydrants, although they are provided for fire fighting & public hygiene purposes. The NTET advises that use of a hydrant should be in an emergency/last resort situation only. Licenses for each water utility area can be obtained following payment of a fee to the local water supply company. In some Water Company Areas it is possible to hire the fire hydrant with the necessary valves and gauges. Check with your local Water Company as to their particular requirements. (**see note under 2.2.4.5**) Beware of broken glass and discarded needles in hydrant chambers.

2.2.3.3 **Laying over** - In times gone by the traveller and his steam *engine* could stop and take an overnight break almost anywhere but today it is not so easy. Careful planning is required to find places where bylaws are not broken and nuisance not created. Nowadays the larger lay-byes created by road diversions offer the better recluse, but these are few and far between; therefore alternative places need to be considered such as pub car-parks, public and common land and other suitable options. Try to include watering points if at all possible and don’t park on private land unless full permission is received.

2.2.3.4 **The timetable** - Journeys on the road are a most enjoyable experience if planned and undertaken wisely. Estimating journey times is not an exact science and requires some experience to achieve consistency. Under-estimation is generally the beginner’s problem and there is nothing more likely to spoil a journey’s enjoyment than when urgency starts to creep in. Ask others for their advice and be willing to modify your own estimates at any time along the journey.

2.2.4 WHAT TO TAKE ALONG

2.2.4.1 **Tools, oils, and spares -** The golden rule when embarking on a journey is to try to remain as self-sufficient as possible as the chances of meeting any one with the tools, oils and spares that you require are very remote indeed. However, a balance needs to be struck if you don’t want to cart the entire contents of the workshop about the country. Generally the needs will be dictated by the rate at which oil is consumed and the general state and reliability of the *engine*. ***COP Section 1.7.7. gives a list of essential items recommended to be carried. Don’t forget the spark arrestor and authorised fire hydrant equipment and an adequately proportioned wooden chock block that will not be run over by the vehicle!***

2.2.4.2 **Food and Drink** - If long, or overnight, journeys are being planned be sure to carry sufficient food to cater for emergencies (e.g. no shops, cafe’s, pubs or service stations) on the route. Also carry plenty of soft drinks, drinking water or fruit juices. Be careful if taking alcoholic beverage along, remember the drink driving laws apply also to traction engine drivers and steersmen.

2.2.4.3 **Clothing** - When working on an *engine* wear at least one layer of cotton-based clothing that affords reasonable body protection against brief contact with hot water or steam. Wear approved safety footwear. Have gloves or gauntlets available to turn off gauge glass taps and for handling hot objects. If you are driving an *engine* without a canopy fitted then, whatever the weather, it is always a good idea to wear a hat and a neckerchief; hot sparks from the chimney can be an irritation that causes distraction at the wrong moment. In inclement weather rainwear should be packed into the ‘jolly’ bag.

The inclusion of High Visibility [Hi Viz] yellow jackets or over-vests is strongly recommended. These can be worn if the need arises to control traffic or to carry out work or manoeuvres at the roadside.

2.2.4.4 **First Aid Kit** - A first aid kit capable of dealing with cuts, burns and scalds and eye injuries should be carried and always kept in good order.

2.2.4.5 **Fire Hydrant Kit -** The fire hydrants used in this country are mainly of the 'hydrant chamber' type and access is gained by lifting a heavy cast cover plate set in a frame in the ground. Attachment to the water main is via a coarse screwed boss set on or adjacent to the isolating valve body. The direction of opening is shown on the underside of the lid, or on the valve spindle bonnet. The isolating valve is operated via a detachable 1¼" drive square (these are now being re-sized to 1½" in some areas). The appropriate tools to carry are a combination cover lifter/hydrant key lever, square ended hydrant key (1¼") and the correct standpipe is 1" BSP pipework, with double check-valve and a meter contained in line. ***See note under 2.2.3.2***

2.2.5 BACK-UP ARRANGEMENTS

2.2.5.1 **Say where you're going** - It is a good idea to leave details of your journey with a member of the family or friend so that you could be located should the need arise. Where practical let the folk at your destination know when you plan to arrive.

2.2.5.2 **Retrieval arrangements** - Almost all road journeys are completed with little or no problems but occasionally things do go wrong and in very rare situations a recovery of the *engine* and its tackle has to be undertaken. However few the occasions may be it should always be considered a possibility and some form of contingency plans made. The NTET offers a 'Breakdown Recovery' Insurance Scheme for both engines on the road and low loaders. For more information contact the Trust's Insurance Officer.

2.2.6 PRE-START ROUTINES

2.2.6.1 **Gauge glasses** - Each gauge glass should be examined for signs of leaking at the sealing ends (and in the case of reflex types, along the body joints). ***Take extreme care if tightening of these fittings is required under steam pressure***.

2.2.6.2 **Water levels** - Before moving onto the road determine working water levels whilst the *engine* is standing on level ground and then try to imagine what the effects might be of an uphill and downhill position; this won't be an accurate method, but at least there should be no surprises in store. ***See also EO COP Sections 1.6.4.***

2.2.6.3 **Injectors** - The working arrangements of injector steam feed valves and water inlet taps should be tested and the efficiency of the injector established.

2.2.6.4 **Feed Pumps** - The feed pump priming arrangements (where fitted) should be established and pump efficiency should be tested.

2.2.6.5 **Brakes and reversing lever effectiveness** - The efficiency of mechanical brakes and of retarding the *engine* with the reversing lever should be established. The operation of trailer brakes should be tested especially any quick release mechanisms.

2.2.6.6 **Lubrication** (**See also 2.3.3.1 Oil Ups)** - Before oiling up, adjusting bearings or working on any part of the *engine* motion always make sure that the regulator is fully closed; the reversing lever is centred (Mid-Gear) and cylinder drain cocks opened. Devise an oiling up routine that allows you to move systematically around the *engine*, e.g. by starting at the footplate, move to the motion and finally to the road wheels and pump(s). Once the routine is established as OK then follow it faithfully. ***See also EO COP Section 1.6.2.***

2.2.6.7 **Towing gear** - Check all towing pins and drawbar pins for signs of necking and fatigue and if in any doubt, change or repair them. Determine that sufficient clearance is evident to allow proper working without binding or excess movement. Ensure that all towing pins have lynch pins ('R' spring or 'D' type) in place and adequate for the job - replace any that show signs of stress or distortion. Towing eyes should be checked for cracking and thinning at the leading edge, any spring loaded damper gear or travel limiters should be also examined for signs of stressing and stiffness in operation.

2.2.6.8 **Safety chains and stop ropes** - The consequences of a towed train breaking on the move could be devastating and therefore the NTET strongly recommends that safety chains or wire stop ropes manufactured from good quality material are fitted between the *engine* and its trailers.

Each chain should be examined to ensure that there are no weakened or broken links and wire ropes should be examined to ensure there are no broken strands. Shackles and 'D' links should be free in operation and without signs of distortion or stress.

2.2.6.9 **Steering chains** - Check that steering chains are securely attached and have adequate, but not excessive free play. Examine regularly for signs of weld failure, thinning, stretching or cracking. Lubricate worm and bevel gears regularly and adjust tensioners as necessary.

2.2.6.10 **Driving Pins** - On engines without differentials ensure that drive pins are fitted in the hind wheels to suit the road conditions, and that locking arrangements are adequate and secure

2.2.6.11 **Spark Arrestor** – It is a legal requirement to prevent the emission of sparks from an engine.

2.2.7 INTRODUCING THE NOVICE

2.2.7.1 At some point the steersman or enthusiastic crewmember or ~~the~~ even the new *owner* will want to have a go at driving, and eventually, on the road. How to gain the competency sufficient to be in control of the regulator handle on the road and all that goes with it is the subject of much debate. Despite many wise words being written on the subject there can be no real substitute for experience so a good plan is to locate an experienced driver, one who comes recommended and is acknowledged as being good by his peers, and asking to spend some considerable time in his company being taught the practicalities of the driver's job.

Don't think that it can all be achieved in a weekend or so, progress will depend on many factors including: -

- type of *engine* and layout
- tuition time available and the ‘tutors’ own ability to relate his skill to you
- weather conditions
- lengths and types of journeys
- your own ability to understand the theory, to translate it into practice and to remember
- degree of confidence

The choice of ‘tutor’ is critical. ***Remember; bad habits are easy to pick up and very difficult to modify!***

2.2.7.2 Driving Licence laws prevent anyone under the age of 21 from driving a traction engine on the road. However there is no minimum age for the steersman who does not need to hold any form of licence. (**see also 2.5.1.2**)

The NTET Steam Apprentice Club caters for young folk up to the age of 21. It is a valuable tool for hands on experience and theory which can be gained at various events/centres nationwide. The Mentoring/Training and Logbook Record Keeping provide a natural progression for young people coming into the engine driving fraternity.

2.2.7.3 The NTET Driving Course spans 3 years and is held annually over a weekend. It is tailored to providing hands-on access to driving steam vehicles which is complimented by classroom lectures.

2.2.8 NTET COMPETENCY SCHEME

A Voluntary 'Traction Engine Driver Competency Scheme' is operated by the NTET. This scheme examines the skills of individual drivers of all types of steam-propelled vehicles. A 'Certificate of Competency' is awarded to those drivers gaining a pass mark above a minimum threshold. Whilst this certificate has no bearing in law it does reflect the driver's commitment to safety demonstrated through an ability to manage and control an *engine* in a highly skilled manner. The outline of the scheme and the syllabus can downloaded from the NTET Website (or obtained from the address given in the front of the NTET’s magazine, ‘Steaming’.

2.3 ROADCRAFT

2.3.1 Driving Techniques

2.3.1.1 **Reading the road ahead** - The new and inexperienced driver will spend much time ‘fretting’ about the road immediately in front of the *engine* and this tends to lead to short-sightedness, i.e., not being prepared for whatever is around the next bend or over the next hill. Looking ahead and reading the road are very useful techniques to develop; try to be at least 5 minutes ahead in your thought processes thus minimising last minute decisions. Get to know the nature of the road surface, is there a strong camber, are there potholes or raised grates or cats-eyes, are the verges soft and are there kerbstones, how far is it to and what type is the next road junction.

In wet weather extra caution is required on all engines and on engines without a differential, extra care is needed on tar surfaces during spells of hot weather. The removal of a drive pin may be necessary when turning tight corners particularly with a heavy road roller or *engine* without a differential. **NEVER GO UP OR DOWN HILL WITHOUT PINS IN BOTH HIND WHEELS. THIS CANNOT BE OVER EMPHASISED!**

2.3.1.2 **Managing the Fire** - The amount of useful steam generated by burning coal can vary considerably and to the novice driver appears to be influenced by some complex issues. This is not so but adds to the mystique of engine driving. However, it will take a number of journeys over different terrain before the driver is able to exercise proper control over the fire and to begin to feel confident.

When coal is added to a fire, energy is released in two distinct phases. The first phase, releases volatile gases, which is evident by the blackness of the smoke. This requires high amounts of oxygen to aid the combustion process and also help disperse the large amounts of unburnt carbon that can choke the tubes and dampen the fire. But, a balance needs to be found as the volatile gases also provide a significant amount of the heat, which could be wasted if exhausted to early. The second phase, evident by the vastly reduced smoke emissions, requires less oxygen to clear the unburnt carbon and also excess amounts of oxygen can create a blast furnace effect with possible overheating of firebars and firebox tube ends. Opening or closing the ash pan damper during the burn phases will regulate the fire burn rate by varying the amount of oxygen admitted.

Simply stated the following elements form a ***firing cycle*** that is repeatedly undertaken along the journey;

- *read the road*
- *clean and build the fire accordingly*
- *burn the coal*
- *generate steam*
- *do the work*
- *replace the steam with water accordingly*

Each element links to the others in a balanced manner but the time taken to complete one cycle is influenced mainly by the type and size of *engine*, quality and amount of coal and the terrain being travelled.

A mistake that nearly all newcomers make is to over-fire. It is best to build up the fire in stages adding new layers only onto established, well burning coals, until the required depth is reached for the job in hand. Until confidence is well established and the working of a particular *engine* better understood a good rule to adopt is to keep the fire deep and bright; keep the damper in mid-position; load fresh coal a little at a time but often; keep the water level as high as practical in the glass - also adding water to the boiler (injector or pump) a little and often, but remember too much water may induce priming when travelling downhill.

Always avoid excessive blowing off from the safety valves, as it is wasteful of both coal and water. Use the feed pump and/or injectors and damper to assist in controlling steam pressure by putting water into the *boiler*.

With some types of coal ‘clinker’ may form, especially after a rest period or after a long hard run. It will lie over the grate area like a semi-liquid blanket and stop the *engine*

making steam properly. Check for clinker from time to time and remove it by raking aggressively through the fire. In hopeless circumstances when steam can't be generated, the whole fire should be thrown out and re-laid afresh.

The sign of a good engine man is to have little or no smoke from the chimney, the boiler pressure near operating limit without blowing off.

2.3.1.3 **Smoke** - Black smoke from burning coal consists mostly of unburnt carbon (mainly bituminous compounds). Whilst the results look very spectacular it is technically an offence to cause emissions of smoke ***that can't be consumed by the engine*** - in other words; sufficiently burnt off. This rule is not only aimed at the environment it is also made to protect the rights of individuals and their property, be it bricks and mortar, livestock or items of clothing. The use of rubber tyres, inner tubes and plastics to raise black smoke for photographic effect can lead to the emission of noxious substances, which is an infringement of the Clean Air Act.

The NTET advises that the better quality less smokey ***coals*** should be burnt where at all possible but in any case the simple rule of firing sufficiently early to burn off the carbons, particularly when approaching built-up areas, should be followed.

2.3.1.4 **Firing on the move** - Before firing on the move, the driver should advise the steersman of the intent, in order that they can both change stance if necessary, and for the steersman to indicate that he has taken full charge of the *engine*.

Do not let cold air onto hot firebox plates more than absolutely necessary. Charge the shovel with coal before opening the firehole door - Never feed the fire when the *engine* is pulling really hard. Do not allow coals to fall off the moving *engine*; it is an offence under the Road Traffic Act, as is throwing of stone or battings out of the bunker into the hedgerow.

Note - Where an engine is being driven single handed it is illegal to fire on the move!

2.3.1.5 **Footplate drill** - To ensure that proper attention is paid to the more important components of the moving *engine*, it is good practice to organise running checks into a single footplate routine that can be memorised and carried out semi-automatically as confidence is gained. Such a routine should be very simple and carried out continuously. Typically it will consist of;

- checking water levels, both sight-glasses and tender
- determining the rate of rise or fall of the pressure gauge
- checking the damper setting
- listening for unusual changes to the *engine* and exhaust beats
- listening for changes in familiar gear train and road wheel rhythms
- keeping an eye open for signs of overheating (blue smoke) around glands and bearing areas and temperature rise in bearing oil reservoirs
- checking the fire door against "sneaking open"
- checking drain cock settings
- checking for signs of unusual movement particularly on cylinder oil lubricator linkages, motion links and crosshead oilers and keys
- checking the operation of mechanical cylinder lubricators
- looking for steam or water leaks - try to snatch a quick look at the road behind for telltale signs of leakage

- and, where trailers are drawn, taking the odd glance at the train and link pins is a good idea

2.3.1.6 **Other road users** - Always show the greatest consideration to all road users and the environment, with particular reference to horses and livestock and the dangers of fire. When performing exacting manoeuvres especially when other people are involved, move slowly, remember that engines may run on. Avoid steam build up in cylinders. This can be dangerous. Be ready to take avoiding action as onlookers, particularly children, rarely behave predictably.

If a long line of vehicles is forming up behind the *engine* try and find a suitable spot where the *engine* can be eased into a lay-by or gate way so that they can be let by thus reducing the frustration and ensuing antagonism that might arise.

There are two references in the Highway Code, which directly concern slow moving vehicles

a. Rule 169 – Slow Moving Vehicles – 'Do not hold up a long queue of traffic, if you are driving a large or slow moving vehicle. Check behind frequently, and if necessary, pull in where it is safe and let traffic pass.'

b. Rule 129 – Double White Lines – (this applies more to the traffic building up behind you) – 'You may cross the line if necessary, provided the road is clear, to pass a stationary vehicle, or overtake a pedal cycle, or horse or road maintenance vehicle, if they are travelling at 10mph or less.'

The Golden Rule is - 'Courtesy and Consideration to other road users at all times'.

2.3.2 CHANGING GEAR

2.3.2.1 **Choose the right place** - Don't leave it too late to safely change gear. Think ahead and look for an appropriate point to stop, preferably on the level.

NEVER ATTEMPT TO CHANGE GEAR ON THE MOVE and BEFORE CHANGING GEAR OR TAKING THE ENGINE OUT OF GEAR MAKE SURE THAT THE WHEELS ARE ADEQUATELY CHOCKED SO AS TO PREVENT MOVEMENT IN EITHER DIRECTION

2.3.2.2 **Technique** - The following routine should ensure a smooth and uneventful gear change;

a) Set chocks and brakes - always use scotch blocks of adequate proportions and do not rely solely on brakes especially on hard surfaces where a slide might be induced.

b) ensure that the regulator is fully closed and the drain cocks are open to relieve the cylinder(s) of steam before releasing any locking pin arrangement and sliding the engaged gear out of engagement.

c) change gear

NB: *It is essential to check that the brake and chocks are holding the engine, particularly if it has been stopped on a gradient.*

There is always backlash in the train of driving gears on an engine. By rotating the flywheel by hand in both the forward and reverse direction the backlash can be taken up.

Turn the flywheel to the mid-point of the backlash and pause for a few seconds to ensure that the engine does not move down the gradient and take up the backlash.

At this point it safe to remove the gear locking pins.

Slide the engaged gear out of engagement and engage the required gear. It may be necessary to rotate the flywheel in order to align the teeth of the gears.

d) replace and tighten locking pins

e) collect chocks and release the brakes slowly

When pulling away from stationary up hill leave the chock in place on the ground until the *engine* is positively underway thus eliminating any danger of run back should a stall or steam lock be experienced.

2.3.3 RUNNING ROUTINES

2.3.3.1 **Oil ups** - After about an hour of running time most engines will require a replenishment of bearing oil particularly the crankshaft, eccentrics and crosshead or slide bars and cylinder lubricator. Before oiling up, adjusting bearings or working on any part of the *engine* motion always make sure that the regulator is fully closed, the reversing lever is centred (Mid-Gear) and open cylinder drain cocks. ***Do not leave an engine unattended when in steam***.

2.3.3.2 **Bunkering** - When replenishing the coalbunker choose a lay-by or other appropriate stopping point. Never bunker on the move! Always take great care not to walk into the path of other traffic and also to prevent loose material falling into the road. When bags of coal are being retrieved from under slung boxes (belly boxes) always try to unload on the near (pavement) side of the road. ***Take empty sacks and bags with you***.

2.3.3.3 **Ashing out** - As the distance travelled increases the level of ash in the ash pan will rise and start to interfere with the efficiency of the firing cycle. In particular be careful of ash building up to the underside of firebars as this may cause melting or sagging of the bars.

It follows that periodically the ash pan should be examined for content and eventually cleaned out. It is a good idea to plan this to coincide with a bunker or food stop so as not to waste time on several individual stops. Before raking out the ash pan fill a large bucket or buckets with water in order to dampen down the ash and to extinguish any live coals. Be especially cautious when pouring water onto hot ashes; this might flash to steam and spit and scald anyone standing close by. Be careful not to permanently mark the road or to burn off the tar. **When the ash is sufficiently cool transfer it into empty coal bags and take it home for disposal.**

2.3.3.4 **Taking on water** – Plan your route so that you do not leave the refilling of water tanks until it becomes an urgent requirement.

a) Locate your water source, stream, river, pond or hydrant, etc., and ensure the engine is parked/braked to cause the minimum disruption to other road users. If necessary appoint a traffic monitor.
b) Avoid running lift hoses, or pipes across roadways. If needs must, then the traffic monitor will need to slow the passing traffic.
c) If your need requires the use of a hydrant, open up hydrant cover carefully and determine if serviceable by checking for lack of debris and the existence of a drive square of appropriate size.
   - fit the standpipe tightly, ensuring that the seal rubbers are in place and in good order
   - fit hose and point open end into the gutter or hedge- bottom
   - turn on hydrant very ***slowly*** and flush the sediments out of the pipes until the hose runs clear.
   - fill the tender/water tanks as required trying not to cause undue spillage into the roadway- turn off the hydrant very ***slowly*** to eliminate water hammer.
   - dismantle the equipment and carefully replace hydrant covers
   - **Note - Do not flood a hydrant chamber - it is illegal!**
d) If using a hydrant and the length of hose is too short to reach directly to the *engine* it may be possible to allow water to flow into a bucket and to take it from the bucket using the water lifter hose. (see 2.2.3.2)

2.3.4 CLIMBING AND DESCENDING HILLS

2.3.4.1 **Never let the *engine* have an opportunity to get out of control; it is very difficult to recover from excess speed. Always be capable of stopping in case of an emergency.**

2.3.4.2 **Preparing the fire** - When preparing for a hill climb, or descent, the fire should be conditioned well before the event. In the case of a climb take special care to clean the fire grate area of clinkers and loose ashes and then lay a suitably thick fire designed to last the entire climb, whenever possible.

Should the need arise to rebuild the fire during the climb then only do so if you are practised at the rapid firing 'open-door-close-door' technique. ***If in doubt STOP and build***

2.3.4.3 **Where's that water level?**

Going Uphill - It is important **not** to arrive at the top of a hill with a combination of low water and no fire, as it will take a long time to get it right.

On a climb constantly measure the water consumption rate of the *engine* and inject or pump in water to compensate. **BUT**, take care not overwhelm the fire's ability to make sufficient steam and therefore a balance must be found between road speed, firing rate and water consumption rate.

Going Downhill - Always ensure that there is sufficient water in the *boiler* to keep the firebox crown covered with water. (If you are caught out by events consider the option of going down short exceptionally steep hills backwards - this is only practical if there is room to manoeuvre and you don't have trailers attached). However, excessive water in the *boiler* will inevitably lead to priming, i.e. water being drawn into the cylinder with the steam, especially when pulling hard. As water cannot be compressed it has the effect of reducing cylinder end-clearances, which in the worst case can blow the end covers off the

cylinders. The cylinder drain cocks should be opened as far as is practical to reduce the risk of priming. **Remember**: *A good driver never risks dropping the plug.*

2.3.4.4 **Choosing the right gear** - A good simple rule seems to be to 'go down a hill in the same gear as you would use to go up the hill' and another is 'plan to arrive at the bottom of the hill at the same speed as you went over the top'. Always select a suitably **low gear** before attempting a descent or climb -

REMEMBER - NEVER ATTEMPT TO CHANGE GEAR ON THE MOVE

AND,

BEFORE CHANGING GEAR OR TAKING THE ENGINE OUT OF GEAR MAKE SURE THAT THE WHEELS ARE ADEQUATELY CHOCKED SO AS TO PREVENT MOVEMENT IN EITHER DIRECTION (see 2.3.2.2)

2.3.4.5 **Driving pins** - On engines without a differential both driving pins should normally be engaged and locked in but especially so before attempting a hill climb or a descent. It is advisable to fit the second drive pin except when turning tight corners. Before attempting to relocate a pin determine how closely the nearest drive hole aligns with the wheel hole and in which direction the drive drum should be rotated to bring the holes into alignment. From this point there are two alternative methods to choose from depending upon the amount of space available for manoeuvring

1. ***Unlimited manoeuvring space*** - set the steering wheel hard left or right (opposite direction to the side in which the pin is to be fitted) and drive slowly until the holes in the hind wheel and driving drum come into alignment.
2. ***Limited manoeuvring space*** - Place a good sized chock on the ground a distance away from the hind wheel on the side where the pin is to be relocated. The distance should be estimated to be sufficient to ***urge the drive drum to slip into line with the hole in the wheel*** when the hind wheel runs onto the chock at low speed. The chock should be set against the direction, which the drive drum will travel to achieve alignment. It may take several attempts to achieve alignment by repositioning the chock. ***On no account should the process be rushed as this may cause the engine to rear at the front and slew to one side***.

When the drive pin is located ensure that a retaining clip or pin is fitted.

2.3.4.6 Trailers - Apply hand brakes fitted to all trailers under tow sufficiently to hold the train 'off the pin' thus reducing the pushing effect of the load. **NEVER LET THE ENGINE HAVE AN OPPORTUNITY TO GET OUT OF CONTROL; IT IS VERY DIFFICULT TO RECOVER FROM EXCESS SPEED.**

2.3.4.7 **Speed control (descents)** – The speed of descent should be such that the engine and load can be stopped in case of an emergency. The basic control of descent speed is obtained by

a) being in bottom gear,

b) using the main wheel brake(s) where fitted, but the effectiveness of this method depends greatly on the condition of the brake blocks and upon the absence of oil on the faces.

c) Using the flywheel brake if fitted. Be especially cautious of applying the flywheel brake at high speed or for long periods; the heat generated can expand the flywheel rim, which under very severe conditions, could burst; whilst on other occasions the strain on the shaft keys and bearing caps can also lead to failure of components in the power train.

d) Start the descent with the regulator just cracked open (as soon as the hill starts to take over close the regulator), move the reversing lever back towards the middle notch and control the speed by moving it forward or back to ensure control. Exceptionally it may be necessary to move into one of the reverse notches to apply reverse (retarding) pressure. If this technique is undertaken on some of the larger road locomotive and agricultural engines take particular care to keep an eye on the gland packings for signs of blowing out or overheating ***Caution*** In the case of a slide valve *engine* at low regulator openings the subsequent backpressure caused by the reversing action may lift the valve plate off its face with subsequent and sudden loss of any control effect. Also note that during periods in mid – gear, the mechanical lubricator will cease to pump due to the reduced movement of its operating arm, and combined with priming, this can result in a lack of cylinder lubrication.

REMEMBER – ALWAYS DRIVE THE ENGINE AT A SPEED THAT YOU CAN STOP IN AN EMERGENCY. TRY TO BE IN FULL CONTROL AT ALL TIMES.

2.3.4.8 **Walking the chock** - In the case of gradients which are very severe or have wet surfaces or are crowded streets, it is good practice to have the 'third man' on the roadside carefully towing a chock just in front of (descending) or behind (ascending) a hind wheel whilst being in constant visual and hearing contact with the driver. If required, it is a simple matter to let go the tow and allow the *engine* to run onto the chock. The chock should be of such material and dimension that the wheel does not crush or ride over it. This technique is quite safe but requires a little practice and extreme care must be exercised when walking close to the *engine*.

2.3.4.9 **Stopping on a hill** - If it becomes necessary to stop whilst descending an incline make sure that the *engine* and its load is safe, close the damper and inject or pump in water to cover the firebox crown as quickly as possible. In an extreme case rock the *engine* back and forth so that the water surge cools the firebox whilst water builds up in the *boiler*. If on a steep climb ensure that ample water is injected to cover the front of the tubes.

2.3.4.10 **Setting a fire watch** - In dry summer weather the danger of causing fire is greatest, despite the use of spark arrestors. When climbing a steep hill it is good practice to have members of the crew walking some short distance behind the *engine*, equipped with beaters or brooms and buckets of water, acting as firewatchers. **See Section 2.5.7 below**.

2.3.5 GENERAL CONDUCT

2.3.5.1 **Traffic Control** - Due to the size, speed and nature of steam traction engines there will be numerous occasions when, in order to keep traffic moving, or to hold traffic during a manoeuvre or to reduce antagonism, control of the traffic has to be considered. However, as the law stands, no unauthorised person can hinder free movement of traffic on the public highway. The practical interpretation of the law should be that ***control is exercised in order that traffic can move freely, overall***.

Before dashing out into the road and raising a hand in the air some careful thought should be given to the consequences;

- instructions, by hand or spoken word, should be positively given and be unambiguous.

- if the situation requires two persons to give instructions; e.g. traffic passing by a long train, then a good understanding of 'who is doing what and when' should be reached.

- remember, the onus is in you to get it right. This could mean that if an accident occurs as a result of your endeavours the police may question you.

Overall, it may be better to consider, initially at least, whether the traffic can ***cope for itself*** before taking any action, but don't take too long to think about it. (see 2.3.1.6)

2.3.5.2 **Road junctions**. - When approaching a road junction, where a turning or a slow manoeuvre is required, put a member of the crew on the ground to determine the type of junction and the speed and density of traffic and to exercise control of the traffic, including your *engine*, if necessary. Visibility due to poor weather conditions should be a special consideration, set distant warnings if at all possible. When it is safe to proceed do so as speedily as conditions permit in order to minimise interference with other traffic.

2.3.5.3 **Traffic Lights** - When approaching traffic lights judgement is required to estimate how much of the junction can be travelled in the time taken to change from green to red. In addition as you approach the stop line, you will have to tolerate being 'cut-up' by other road users in apparent ignorance of your own braking efficiency. The answer is simple - **be doubly alert and always remain polite to other road users.**

2.3.5.4 **Horses and other hazards** - The law requires that when a horse is encountered on the public highway the traction *engine* must be stopped and also made quiet; if possible put some water into the *boiler* to avoid the risk of the safety valve blowing off just as the horse goes by. When these activities have been achieved signal to the rider to 'come on by'. If necessary be prepared to put a crew member on the ground to control traffic or to help the horse get by. If the horse is skitty or the *engine* difficult to quieten, then advise the rider to seek a safe refuge or consider going round another way or offer to lead the horse by.

2.3.5.5 **Whistles** - It is illegal to sound the whistle when in the open countryside or in the vicinity of animals unless in the course of carrying out work.

2.3.5.6 **Emergency Stops** - Normally, the need to execute an emergency stop tends not to announce itself but in order to limit any consequential damage of stopping rapidly there are a number of points to be considered, for example;

- is stopping quickly the only option?
- is there an escape route?
- what's the best way of stopping under the circumstances?
- what will be the consequences of stopping quickly?
- where are the crew and other folk around the *engine*?

In the event, if stopping quickly is the only option, then the most effective way is to put the reversing lever into full reverse, at the same time open the drain cocks and then open the regulator fully for a split second and then to close and open it in quick succession. The main wheel brake should be applied positively if there is time and if the operating handle can be reached safely. Be ready to counter any effects of towed trailers pushing on or moving sideways. ***But most of all, don't forget to shout your intentions to the steersman or crew!***

Be aware with steel wheels on a gradient sudden changes in speed can cause the vehicle to start sliding.

2.4 LAYING OVER

2.4.1 PARKING UP

2.4.1.1 **Making safe -** When parking up always use a scotch block and do not rely solely on brakes especially on hard surfaces. Take the *engine* out of gear and leave the reversing lever in the middle position with the drain cocks open. Leave plenty of water in the *boiler* and slow down the fire by shutting the damper and covering the chimney. If necessary run the *engine* onto blocks to achieve a sensible level of water in the glass

2.4.1.2 **Preventing surface damage** - If necessary put bagging down underneath the *engine* to prevent oils dropping onto the road surface. If the surface is soft or easily marked, consider running the *engine* onto blocks.

2.4.1.3 **Lighting -** Always put down sufficient amber/red warning lights set at 8-10ft intervals on the offside, to cover the full length of the train and the front and rear. Ensure that lamps are sufficiently filled to remain lit for the whole period of darkness.

2.4.1.4 **Leaving the fire in** - If the need arises to leave the fire 'banked up' for the night some thought is required about the nature and size of fire and length of 'banking' time in order to prevent the safety valves blowing off due to excess heat or the plug dropping through lack of water. Start by cleaning out the fire, then make a hole in the fire by pushing it up to the front and finally blanket the fire bed with slack coal to a depth of about 2-3 inches. If a chimney cover is used make sure some air can circulate to reduce condensation and corrosion. In order to make life in the dark a little easier, have clothing and means of illumination nearby for any occasion when you need to get out of bed and attend to the *engine*.

2.4.1.5 **Sheeting up -** If the *engine* does not have a canopy and is still very hot, wait until the temperature has fallen sufficiently to remove the danger of igniting any covers or

sheets. When sheeting up cover sharp edges and gears with rags or old sheets to protect the main sheet. Take special care not to lay the sheets over the whistle pull chain; it's a very quick way to lose friends.

2.4.2 PROTECTING THE ENVIRONMENT

2.4.2.1 **Rubbish disposal** - It is quite amazing the amount of rubbish that can be generated by a single night away from home. The message is quite simple; if there is no receptacle available - take it with you. Do not attempt to bury it, this is illegal today. Always take your ashes away.

2.4.2.2 **Toilets** - If you don't have the good fortune to park near a Public Toilet or a Pub or if you haven't a portable loo, then using nature's own bathroom may have to be considered. If this is the case then the most hygienic method to consider is to dig an earth-pit into which to dispose of the waste. Do not pour waste into running waterways or down roadside gullies or into hedgerows - this is illegal.

2.5 EVENTS AT PUBLIC PLACES

2.5.1 LEGAL REQUIREMENTS

2.5.1.1 **Insurance** – The Motor Vehicles (Compulsory Insurance) Regulations 2000 made significant changes affecting self-propelled vehicles attending any event where the public are present, or likely to be present. It is now compulsory that an insurance policy is in place providing a minimum of Public Liability insurance cover against injury to Third Parties including persons and property.

The full requirements are detailed in sections 2.3. of the Event Organisers Code of Practice "for the better organisation of Steam Traction Engine Events".

2.5.1.2 **Drivers** – Unlike those relating to Insurance the driving licence laws do not follow the driver 'off road'.

Where a vehicle is driven 'off the road' by an un-licenced or under-age driver the NTET advocates that the driver is always under the supervision of a licensed person and that the event organiser sanctions under-age or un-licenced driving.

It is important to ensure that the vehicle's RTA insurance policy accommodates un-licenced and under-age drivers.

2.5.1.3 **Consumption of Alcohol** - Engines lined up around the beer or entertainment's tent and surrounded by members of the public are a familiar sight at rallies and other events. **However, it is important to remember that the drink driving laws apply on the event field and on the public highway.**

2.5.2 CLOTHING

2.5.2.1 **Safety** – It is essential that the correct clothing is worn, preferably cotton overalls (Nylon will stick to the skin if it melts or burns) that cover the maximum amount of skin possible. Under no circumstances must shorts be worn and ideally sleeves must not be rolled up. The lesson to be learnt from most scalding or burns incidents is that the parts

of the body covered by correct clothing are rarely the sites of severe injury. Injuries normally only extend to parts not properly covered, hands, arms etc. Exposure to hot water at 155 degrees F or 68.3 degree C will take only 1 second to produce a scalding effect on skin.

Should for instance a gauge glass fracture the people on the *engine* may not only be exposed to the effect of scalding by steam at temperatures up to 460 degrees F, but also from the effects of ejected pieces of glass. It should also be remembered that the bronze ball fitted to the gauge glass water cock should normally restrict the flow of boiling water, however the steam cock has no such device and will be able to discharge full boiler pressure through the broken glass.
Burns and scalds should be cooled as quickly as possible.

2.5.3 CONDUCT

2.5.3.1 **Movement** - If movement is allowed at the event keep speed to an absolute minimum. Despite the size of some traction engines they are relatively quiet when running on grass and pedestrians may not be aware of the *engine*; ***do not sound the whistle to announce your presence***. If possible have a steward clear the public from your path and always obey his/her instructions

2.5.3.2 **Smutting and Priming** - Take extra care to limit the creation of smoke smuts and dirty water when opening the regulator particularly if surrounded by members of the public. Whilst insurance cover may adequately pay for any damage caused, nothing can repair the antagonism caused.

2.5.3.3 **Liaison with organisers** - Where the event is under the control of official organisers it is important that any reasonable instruction should be followed as soon as possible. Always ensure that any special requirements are fully understood and complied with.

2.5.3.4 **Repairs** - Think carefully before attempting adjustments or repairs to equipment on the live steam side. Where a repair is imperative then, if possible move the *engine* away from the general access area or better still wait until the public have left the site. Always reduce the pressure to a safe limit before removing components.

2.5.3.5 **Operating belt driven equipment** - Working demonstrations are a particular draw at events but it is very important to ensure that members of the public or crew-members cannot accidentally contact moving parts. Remember, depending on the type of event, that the Health and Safety at Work Act may apply, even when not operating for gain. Also see the Rally Code of Practice.

No inexperienced driver should drive an *engine* coupled by belt to an external machine without being under the supervision of a competent driver. Driving when belt coupled requires a completely different level of understanding by the operator and places greater responsibilities on his shoulders.

The driver must remain on the footplate whilst the belt is under power.

NB: A Risk Assessment should be carried out by the *owner*/operator prior to commencing any working demonstration. A simple Risk Assessment template is included in Appendix 1 of this section

2.5.3.6 **Ploughing or winching demonstrations -** these activities are generally a good draw to the public and enthusiast but working with ropes and tackle requires yet another level of understanding both by the crew on the ground and the *engine* driver/operator. The ability to remain alert for long periods and to react quickly and positively are important parts of the 'job description'. It is also important that proper tuition is obtained before attempting to undertake this work unsupervised. Guidance can be found on the Steam Plough Club website. www.steamploughclub.org.uk

See Risk Assessment above

EMERGENCY ACTION

2.5.4 FAILURES IN STEAM /WATER COMPONENTS

2.5.4.1 **Remedies** - For detailed remedies to pump or injector problems, *fusible plug* failure, leaking tubes, broken stays, broken gauge glasses, and mud holes or manlid joint failure ***see COP Section 1.7.***

2.5.4.2 **Control** - It is important that any serious issues of steam or hot water are quickly smothered at worst or stopped at best. Do not take undue risks and if all else fails be prepared to pull out the fire as quickly and as safely as possible. Try not to create an air of panic; it is highly contagious. Give instructions in a clear and authoritative manner. **If there is an uncontrolled release of steam the incident must be reported to the Inspecting Authority.**

2.6.2 BEARING OVERHEATING

2.5.4.3 Symptoms **-** If a bearing overheats usually the telltale signs are blue smoke or the brasses change to a dark colour, but not always; occasionally a fire may start! In any event, stop the *engine* and if at all possible, bathe the bearing with copious amounts of oil to effect cooling down; - *never use water!* If a fire has started use a heavy dampened cloth to smother the flames. Resist the temptation to over loosen any caps or keeps; this will avoid distortion during cooling.

2.5.4.4 Repairs **-** If the shaft and bearing surface have not scored badly it may be possible to affect a repair by using fine wet and dry paper lubricated with oil to remove any blemishes. Where deep scoring is evident a scraper may be used on the brasses but severe damage to a journal is more difficult to repair when away from a workshop. Removing any burrs with a file and cleaning up the journal with fine wet and dry paper may affect a simple repair. It may be necessary to modify bearing gap clearances by inserting or removing shims; this should only be undertaken if an understanding of the desired results is appreciated; a general rule is 2-3 thousands of an inch clearance per 1 inch shaft diameter. Do not over tighten bearing cap holding down nuts. Refill the reservoir with fresh oil.

2.5.5 GLANDS OVERHEATING

2.5.5.1 **Symptoms** - Smell of burning, grabbing action, shaft discoloration, blue smoke, flames

2.5.5.2 **Repairs** - Slacken gland follower(s), pour on copious amounts of oil, remove damaged packing if necessary, cut new pieces and repack as required. Do not over tighten the gland follower.

2.5.6 LOOSE CROSSHEAD KEYS

2.5.6.1 The vagaries of design **-** Where piston rod to crosshead connections are of the tapered rod design usually a flat, tapered, keeper key is driven into a locating groove, in the crosshead, to hold the piston rod in its tapered socket. Some *engine* designs (particularly Piston valve types) are prone to loosening of crosshead keeper keys - *especially after severe priming*.

2.5.6.2 Symptoms **-** This condition is evidenced by a metallic knock of varying loudness (sometimes severe) emanating from around the cylinder block area. This knocking sound will appear at the end of each piston stroke at the time of opening or closing the regulator. Stop the *engine*, centre the reversing lever, apply the brakes and chocks, open the drain cocks and move the piston to a position where the offending key may be examined.

2.5.6.3 Remedies **-** In simple cases where the key has suffered little or no damage it may be driven back into location using a hammer and suitable drift, using sharp, heavy driving blows. However, where severe damage to the key is evident there is danger of it shearing with consequent detachment of the piston rod and resultant ejection through the cylinder covers. In these circumstances the key must be replaced but with an *engine* in steam this is a precarious operation. However, if it is important to continue the journey, and a spare key is to hand, it can be safely achieved but only if sufficient hard wood packing strips are to hand that will enable the crosshead to be held firmly in a position that will afford working access to the key groove. If this is not the case then the fire must be thrown out and the pressure made to fall before attempting any work.

When fitting the new key it is imperative that it makes proper contact along its tapered side with the appropriate and corresponding points in the crosshead groove. Trial fittings and filing will achieve this. Finally drive the key in a positive manner into location and fit a retaining split pin in the hole provided or tighten up any locking pins that may be fitted. Remove any packing blocks and carefully test by rotating the crank by hand before applying steam to the cylinder.

2.5.7 FIRE-FIGHTING

2.5.7.1 Quick Action **-** In the event of fire the flames should be tackled immediately by beating with bags or shovels, dousing with water (buckets or fire hydrants) or smothering with earth or sand.

2.5.7.2 Call the Fire Brigade? **-** If there is any doubt that the fire cannot be contained in this manner and there is no fire hydrant in the vicinity a call to the fire brigade should be made earlier rather than later. When the fire is extinguished damp down with water to ensure that is cannot re-ignite.

2.5.7.3 Damage to property **-** If damage is caused to property it is essential that the *owner* is found and informed and that insurance details are exchanged. If there is no personal injury or loss of life then the police need not be informed. If a camera is to hand

photographs will assist in assessing damage and blame. Take any measurements that may assist the insurance assessor.

2.5.8 CONDUCT AT A ROAD ACCIDENT

2.5.8.1 Make the engine safe **-** Whether you are actually involved in the accident or arrive at the scene of one, it is important that the *engine* is made safe as early as possible and if necessary the fire thrown out. If necessary deploy crew to control the traffic.

2.5.8.2 Assess the situation **-** Remain calm and give clear instructions to crewmembers. It is better if someone takes control; but it need not be you! If there is danger to life or of a fire ensure that the ambulance or fire service is called. Ensure that any witnesses are located and their opinions of the event are noted along with personal details. If a camera is to hand photographs will assist in assessing damage and blame. Take any measurements that may assist the insurance assessor.

Injury to Persons – Basic First Aid. If someone is injured in an incident, first check that you and the casualty are not in any danger. If you are, make the situation safe. When it's safe to do so, assess the casualty and dial 999 or 112 for an ambulance (if necessary). You can then carry out basic first aid.

Assessing a casualty - The priorities when dealing with a casualty can be remembered as ABC:

- **A**irway
- **B**reathing
- **C**irculation

Airway - If the casualty appears unresponsive, ask them loudly if they are OK and if they can open their eyes. If they respond, you can leave the casualty in the position they are in until help arrives. While you wait, keep checking their breathing, pulse and level of response:

- Are they alert?
- Do they respond to your voice?
- Do they respond to pain?
- Is there no response to any stimulus (they're unconscious)?

If there is no response, leave the casualty in the position they are in and open their airway. If this is not possible in the position they are in, gently lay them on their back and open the airway.

You open the airway by placing one hand on the casualty’s forehead and gently tilting the head back, then lifting the tip of the chin using two fingers. This is to move the tongue away from the back of the mouth. Do not push on the floor of the mouth as this will cause the tongue to obstruct the airway.

If you think they may have a spinal injury, place your hands on either side of their face and use your fingertips to gently lift the angle of the jaw to open the airway. Take care not to move the casualty’s neck. This is known as the jaw thrust technique.

Breathing - To check if a person is still breathing:

- Look to see if their chest is rising and falling.
- Listen over their mouth and nose for breathing.
- Feel their breath against your cheek for 10 seconds.

If they are breathing, place them in the recovery position so the airway remains clear of obstructions (for further details see http://www.nhs.uk/Conditions/Accidents-and-first-aid/Pages/The-recovery-position.aspx).

If the casualty is not breathing, call 999 or 112 for an ambulance, then begin CPR. (For further details see http://www.nhs.uk/Conditions/Accidents-and-first-aid/Pages/CPR.aspx)

Circulation - If the heart stops beating, you can help maintain their circulation by performing chest compressions. This is cardiopulmonary resuscitation (CPR) when combined with rescue breaths.

If you are not trained or feel unable to give rescue breaths, you can perform compression-only CPR.

Agonal breathing is common in the first few minutes after a sudden cardiac arrest (when the heart stops beating). Agonal breathing is sudden, irregular gasps of breath. This should not be mistaken for normal breathing and CPR should be given straight away.

Provide emergency care - Remember the letters D R A B C:

D **Danger** Check that you are not in danger.

R **Response** Try to get a response by asking questions and gently shaking their shoulders.

A **Airway** If the person is not talking and the airway may be blocked, then place one hand under the chin and lift the chin up and forward. If they are still having difficulty with breathing then gently tilt the head back.

B **Breathing** Normal breathing should be established. Once the airway is open check breathing for up to 10 seconds.

C **Compressions** If they have no signs of life and there is no pulse, then chest compressions should be administered. Place two hands in the centre of the chest and press down hard and fast – 5–6 cm at a rate of 100/minute. You may only need one hand for a child and shouldn't press down as far. For infants, use two fingers in the middle of the chest when delivering compressions and don't press down too far.

Bleeding - First, check for anything that may be in the wound, such as glass. Taking care not to press on the object, build up padding on either side of the object. If there's nothing embedded, apply firm pressure over the wound to stem the flow of blood. As soon as practical, fasten a pad to the wound with a bandage or length of cloth. Use the cleanest material available. If a limb is bleeding but not broken, raise it above the level of the heart

to reduce the flow of blood. Any restriction of blood circulation for more than a short time could cause long-term injuries.

Burns - Check the casualty for shock, and if possible, try to cool the burn for at least 10 minutes with plenty of clean, cold water or other non-toxic liquid. Don't try to remove anything that's sticking to the burn.

Be prepared - Always carry a first aid kit – you might never need it, but it could save a life. Learn first aid – you can get first aid training from a qualified organisation such as St John Ambulance and Brigade, St Andrew's First Aid, British Red Cross Society, or any suitable qualified body.

2.5.8.3 Damage to property **-** If the *engine* or towed equipment is involved in the accident and damage is caused to another party's property it is essential that its *owner* is found and informed and that insurance details are exchanged. If there is no personal injury or loss of life then the police need not be informed unless dangerous or inconsiderate driving is suspected. (See also 2.5.7.3

2.5.8.4 Inform your Insurer **–** In the event that a claim against an insurance policy has to be made it is important that all of the relevant details are written down in as detailed manner as possible. Most 'insurance claims forms' are designed to assist in this process but if there is insufficient space or the headings aren't entirely relevant then use additional pieces of paper and photographs to ensure that as complete a picture as possible is presented. If you believe that you were at fault you need not say so but do not lie or prevaricate, as your insurer will not be enamoured by this type of conduct.

2.5.8.5 **List of items useful at the occasion of an accident.**

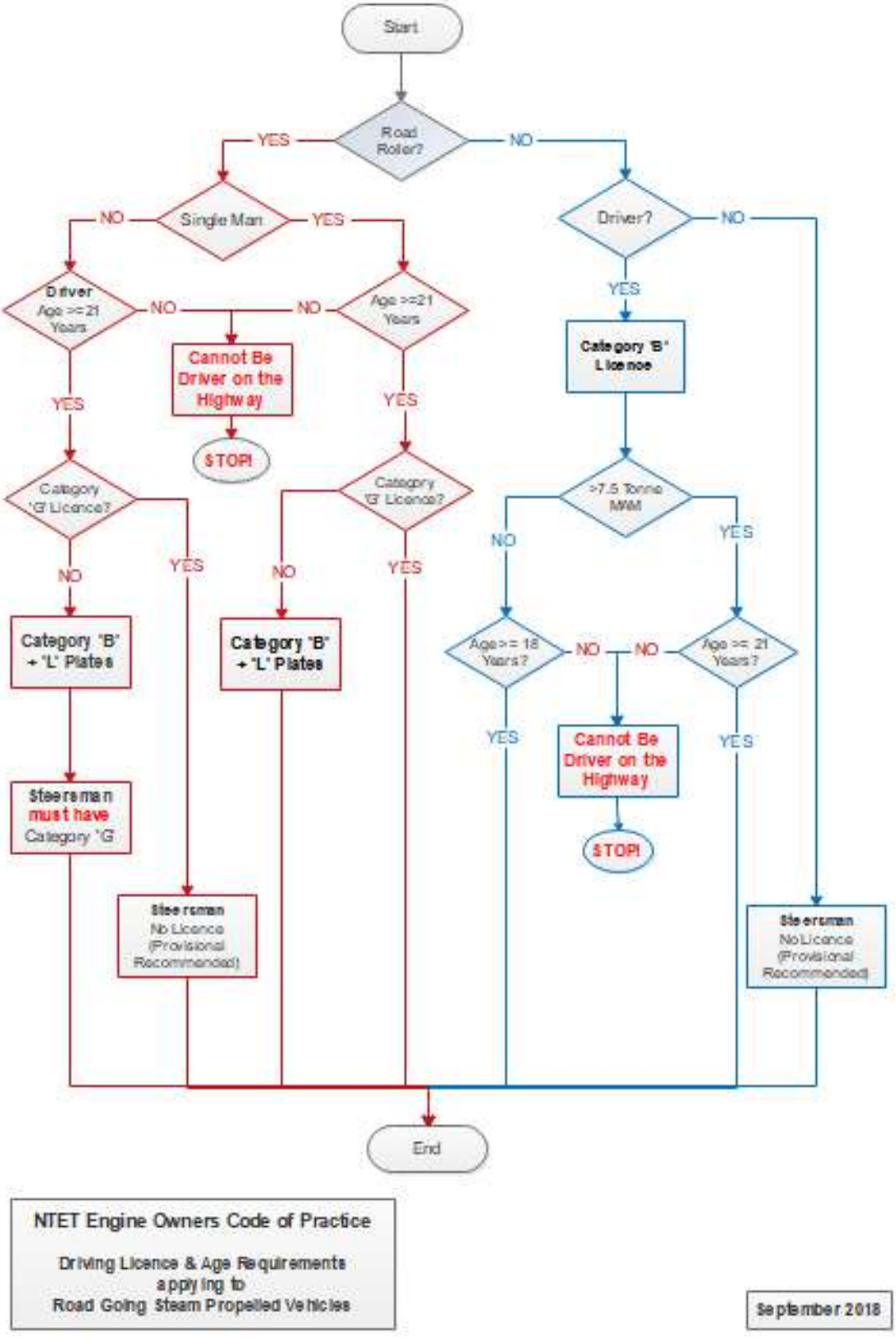
a. Camera
b. Mobile Phone
c. Fire dropping shovel and bin
d. Thick heat resistant gauntlets
e. Stirrup pump and bucket
f. Tape measure
g. Hi – Viz clothing
h. First Aid Kit
i. Fire extinguisher suitable for fuel and electrical
j. Wire cutters (to cut earth battery lead on motor vehicles where the imminent danger of fire may be due to electrical short)

ENGINE OWNERS CODES OF PRACTICE

PART 2

APPENDIX A

DRIVING LICENCE REQUIREMENTS FOR HISTORIC STEAM VEHICLES



ENGINE OWNERS CODES OF PRACTICE

PART 2

APPENDIX B

SAMPLE RISK ASSESSMENT TEMPLATE

Working Demonstrations - Risk Assessment Summary

This statement of risk assessment is a summary of the elements included in a more detailed *examination* of the risks associated with the presentation of a working demonstration incorporating a belt driven or remote driven equipment.

The following questionnaire is to be completed, signed and communicated to the section leader/safety officer on each day of the event, prior to entry of the general public.

Item	Statement	Yes/No
1.	Are all members of the demonstration team competent in their allocated tasks?	_____
2.	Are there sufficient and adequate fences, barriers and notices erected to deter unauthorised access by members of the public?	_____
3.	Are sufficient and adequate guards, barriers and other safety devices in place to protect the demonstration team?	_____
4.	Are all members of the demonstration team aware of the emergency procedures?	_____
5.	Is there adequate First Aid and Fire Fighting apparatus ready to hand?	_____
6.	Is all equipment used in the demonstration 'fit for purpose and, where required, sanctioned for use by a current certificate of *examination* by a *competent person*?'	_____
7.	Is appropriate and adequate Public Liability and, where appropriate, specialist insurance in place?	_____

Signed: _____Date: _____

Role: _____

Acknowledged _____ Date: _____

*Section Leader/Safety Officer/Other (state position: _____)
(*Mark or complete as appropriate)

ENGINE OWNERS CODES OF PRACTICE

PART 2

APPENDIX C

SEE AND BE SEEN

RECOMMENDATIONS FOR IMPROVING ENGINE VISIBILITY

Section A - LEGISLATION GOVERNING VEHICLE LIGHTING

Road Vehicles (Construction and Use) Regulations 1986
Not Prescriptive about Lighting

Road Vehicles Lighting Regulations 1989
Defines Requirement, Location and Use of Lights & Markers
Requirement for flashing 'Beacons' introduced

Road Vehicles Lighting Regulations 2005
Amended the 1989 Regulations to allow 'Flashing Lights' on Bicycles

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ROAD VEHICLES LIGHTING REGULATIONS 1989 - Lights & Markers Table

FRONT MARKER LIGHTS - WHITE
All vehicles

HEADLIGHTS - WHITE
Main beam if vehicle can exceed 25mph
Dipped beam if vehicle can exceed 15mph

INDICATORS or HAZARD LIGHTS - ORANGE
Not required if registered before 01/01/1936

SIDE MARKER LIGHTS – WHITE/ORANGE
Not required if registered before 01/04/1991

REAR MARKER LIGHTS - RED
All vehicles

REAR FOG LAMP- RED
Not required if registered before 01/04/1980

BRAKE/STOP LIGHTS - RED
Not required if registered before 01/01/1936

REAR REFLECTOR - RED
All vehicles

REAR MARKER BOARD – ORANGE & RED
Not required if registered before 01/01/1940

Section B – SAMPLES of MODERN LIGHT FITTINGS

The NTET fully advocates a ‘See and Be Seen’ strategy. There are no standards that directly apply to Traction Engines, in fact exemptions can be claimed, but the good practice recommendations should be adhered to wherever possible

BEACONS must be used

On Dual Carriageways with unrestricted speed limits, and
On a vehicle with 4 or more wheels, and
Where vehicle is not capable of achieving 25mph and
On vehicle or trailer or both

Examples of High Mounted Beacons

Examples of MINI Beacons

HEADLIGHTS

Must not dazzle other road users

Must not be mounted outside of width of vehicle

Cannot be flashing

Must not interfere with operation of vehicle

Cannot be high mounted work lights

Examples of LED Headlights

Examples of LED Marker Lights

Vehicle Marker Boards

Use BS AU 152 signs and material where possible

Do It Yourself designs should be clear and not be open to misinterpretation

Do not use fancy fonts

Must not be positioned outside of the perimeter of the vehicle

Examples

Working Examples of Rear Guards

NTET Issued Rear Guard Graphic

1 metre x 1 metre square