Road Emulsion Association Limited

CODE OF GOOD PRACTICE FOR THE USE AND SAFETY OF MOBILE STORAGE TANKS

2014

ROAD EMULSION ASSOCIATION LIMITED

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1. INTRODUCTION

Mobile storage tanks (MSTs), generally have a capacity of between 4,500 litres to 55,000 litres that are towed or transported to construction sites. After installation they are periodically filled with bitumen emulsion binder, which is drawn off for use in local highway construction and maintenance work. The binder is usually warm or hot and as a result most tanks have a self contained heating and pumping system.

1.1 Reasons for this Code of Good Practice

The Members of the Road Emulsion Association (REA) produced the original "Code of Good Practice" in 1996, which was revised in 2011 then in 2014, to provide guidance in the use and safe operation of MSTs. The REA Council decided periodically to update the Code as it continues to be concerned for the safety of the public and highway authorities' and contractors' staff, when in close proximity to MSTs that are in use for storing and heating bitumen emulsions. The safety aspects are of particular concern when MSTs are sited outside the confines of depots and are therefore potentially accessible by the public, including children.

1.2 Scope

Although REA promotes the safe and correct use of bitumen emulsions, it considers that this Code must include changes to or from other forms of road binders and have therefore prepared and issued this Code of Practice in conjunction with other advisory bodies including the Refined Bitumen Association (RBA), the Road Surface Treatments Association (RSTA), the Environment Agency and the Health & Safety Executive. **Because MSTs are variable in age and type, and also because designs change, this is a generalised Code of Good Practice and details may not always apply. Ultimate reference should always be made to the individual MST Manual.**

Please note MSTs are sometimes used for the storage of Bitumen, as opposed to Bitumen Emulsions - when that occurs it is vital to refer to the guidance given by the Refined Bitumen Association.

Generally it is assumed that this Code will be used and studied by Owners and Hirers managers to aid the safe management of MSTs

1.3 Glossary of Terms

Owner – the organisation or its representative providing the MST for hire (usually also the emulsion supplier).

Buyer – the organisation hiring the MST from the Owner for use in the temporary storage of a road emulsion.

Bitumen – a black semi-solid substance, refined from petroleum that is used as a binder in road surfacing compositions and is valued for its adhesive, durability and waterproofing properties.

Bitumen Emulsions – a fine dispersion of bitumen or modified bitumen droplets in a water/emulsifier solution. These are produced to suit various applications and are used cold or heated.

Binder – the adhesive film deposited from an emulsion which is composed mainly of bitumen, but may also contain additives to give improved adhesion.

1.4 Types of MST Available

MSTs vary in age and sophistication. The tank itself is usually insulated. In the simplest designs, for use with cold emulsion, they may have no heating or pumping equipment. A top inspection hole may be present, but for safety reasons the cover is usually bolted down. A tank overflow/vent is always fitted. Where pumps are present, centrifugal types with flexible or rigid impellers are preferable for use with emulsions since impinging surfaces will progressively coarsen emulsion particles and result in a loss of emulsion viscosity (the binder viscosity is unaffected). Of the positive pump types, vane is preferable to lobe or gear pumps. The pipe-work system may be designed to allow the pump to load, unload, circulate, drain and purge with cleaning solvent. If there is provision for heating, this is usually atomised oil burning, provided by an electrical supply that runs the fuel pump or pressuriser, air fan, ignition and controls, this electrical supply may be from mains or from a mobile generator. Heaters may alternatively be of gas burning or electric resistance type. The heat transfer method is usually direct, from immersed heating tubes, or less frequently, indirect, heated by thermal exchange from hot oil. Heaters are normally used for temperature maintenance. Heating from cold is to be avoided but may sometimes be necessary (see Section 4.4). For movement only when empty MSTs may be fitted with retractable road wheels, or have permanent wheels (a tanker). If they are transported and then lifted on to site, they may only be skid mounted.

2. CONTRACTUAL

2.1 Arrangements between Client, Contractor and Supplier

Terms and arrangements vary, but for simplicity in this document, the organisation that owns the MST is termed the Owner (usually also the emulsion supplier), even if an agent, employee or representative. The Buyer is similarly an organisation or its representative hiring and using the MST. The usual practice is to put a contract for supplying the emulsion to tender. The supplier winning this usually provides the MSTs for hire. Depending on the size of the contract, the terms of hire include responsibility and liability for the MST during the hire period. At a later stage, the approximate required quantity, temperature and time of daily emulsion deliveries, are notified to, and formally agreed with, the supplier. Details of the process of the date of delivery, commissioning, filling and expected removal of the MST can then be agreed, the MST hire contract has to be arranged and signed by both parties before delivery. This must be done in good time as MSTs are consecutively used at a number of sites during each surfacing season, and cleaning, maintenance and transport between hiring have to be provisionally scheduled. The combined delivery plus MST reserve capacity must provide sufficient emulsion for the maximum daily usage so that delays can be minimised. It is strongly recommended that all parties keep an MST Log, so that all these and other operational details are noted at the time and are available for later reference as required. If a Log is kept then its location will need to be agreed between the MST owner and the user. Insurance cover for the MST must also be arranged well in advance.

REA draws attention to the Acts of Parliament and Regulations that affect the use of MSTs – these are shown in Section 5 of this Code document. Specific note is needed to comply with the **Control of Pollution (Oil Storage) (England) Regulations 2001, in Scotland, The Water Environment (Oil Storage) (Scotland) Regulations 2006, and in Northern Ireland The Control of Pollution (Oil Storage) Regulations (Northern Ireland) 2010.**

Compliant bunding protection around the MST is the responsibility of the Buyer. See 3.2 for guidance.

2.2 MST Hire, Use and Maintenance Agreement

Use of the MST must be within its design capabilities and also the hire agreement procedures and insurance cover. These are aimed to protect public, employees, environment, emulsion and machinery. Routine maintenance by the Buyer is normally part of the conditions of hire. Daily maintenance is important to achieve safe and trouble free running. Long term maintenance is provided by the Owner. General maintenance guidelines are provided in Section 4.7 and in more detail in the individual MST manual pack.

3 SITE MOVEMENTS OF MSTS

3.1 Movement on to site

It may be necessary for the Owner to provide an escort for the movement of the largest MSTs, mainly for the supervision of cornering. The recommended sequence of events upon arrival on site is as follows:

The Buyer meets the delivery vehicle on site and checks:

1. the details on the delivery note match the original order;
2. the equipment presented matches the inventory;
3. the safety equipment, including thermostats and level gauges, carries an inspection date not more than a year old;
4. the Instructions in Writing.

These checks must not be postponed; the MST must be checked before siting. The delivery note and the inventory are then signed. The MST is located in the planned position which is reassessed for possible operational problems. The Owner also verifies that the site is suitable before location, applying the MST handbrake, placing the weight distribution plates and timber pads under all leg positions, winding down the front legs and removing the tractor unit. Any remaining legs are then wound down, the whole MST levelled and the pressure distributed evenly. Finally the wheels are protected and the air brake connections covered.

3.2 Siting and Bunding

Please note this item is very important for environment especially where the MST may be sited near drainage gullies, manhole covers, water courses etc.)

All necessary permissions and licences to use the site must be obtained. The siting of the MST should be within a lockable compound. The Health and Safety at Work Act requires that precautions are taken against interference by unauthorised persons. This means that permanent and watchful attendance on a non-secured site is essential. The extra cost of this can usually be offset by the travelling time saved between applicator machine refills, especially if the site also includes the aggregate dump and living facilities for the contracting gang. These latter facilities must be placed away from the MST and not where they might obstruct the access of tankers or emergency services.

The Control of Pollution (Oil Storage) (England) Regulations 2001 and the Scottish and Northern Ireland equivalent of these regulations apply to containers of bitumen emulsion having a capacity greater than 200 litres, and to mobile bowsers. The Environment Agency is aware that many self - bunded bowsers are now available. Those that are not bunded will need to be kept in a bunded area or a drip tray when in use. The main provisions contained in the Regulations are outlined below:

- Tanks, drums or other containers must be strong enough to hold the bitumen emulsion without leaking or bursting.
- The bitumen emulsion container must be positioned to avoid damage (e.g. by impact from any vehicular traffic).
- The secondary containment system (e.g. a bund, which is an outer wall or enclosure designed to contain the contents of an inner tank, or drip tray) must be provided to catch any bitumen emulsion leaking from the container or its ancillary pipework and equipment.
- The secondary containment system must have sufficient capacity to contain 110% of the maximum contents of the bitumen emulsion container. Where more than one container is stored, the secondary containment system should be capable of storing not less than 110% of the largest container's storage capacity or 25% of their aggregate storage capacity, whichever is the greater. In the case of drums, the secondary containment system should have a capacity of not less than 25% of the drum's storage capacity or, if more than one drum, not less than 25% of the aggregate storage capacity of the drums.

- The base and walls of any bund must be impermeable to liquid and be regularly checked for leaks. In addition, the walls must be sufficiently strong to withstand the hydraulic pressure generated by the collection of rainwater or the contents of the tank.
- The base and walls must not be penetrated by any valve, pipe or other opening which is used for draining the system.

It is important to refer to Appendix E of this Code of Good Practice, the Environment Agency's "Pollution Prevention Guidelines". The close proximity of residential and industrial areas, public roads, railways, power lines, water courses, drains, inspection chambers, gullies, other activities (such as washing down) should be avoided. It must be understood that early morning activity around an MST will generate noise and fumes. The site for the MST needs to be reasonably level, capable of supporting weight of the full MST over an extended period of time, well compacted, well drained and, if possible, sheltered from high winds. An area measuring 15 metres x 7 metres with 7 metres overhead clearance is normally required, but this should be checked with the supplier. A space allowance for vehicle manoeuvring, safe access to ladders, fuel tanks and attached equipment is needed. Attendant vehicles must also be able to park on a level area beside the MST. Mains electricity supply is ideally provided by an 110v 15 amp Residual Current Circuit Breaker (RCCD) protected socket placed as close as possible to the MST. It must have an earth leakage/power breaker device. Some Units have 240v operation and where these are used, a Residual Circuit Breaker (RCB) protection device must be installed between the plug and the mains supply. Connection to the MST is by a flexible, armoured linking cable and all external sockets and plugs should be of a suitable outdoor type.

3.2.1. Commissioning

Before emulsion is put into the tank, the Owner should recheck that the MST is level and the legs properly supported. The erection of ladders and handrails, filling of the burner fuel tank (typically 35s, Redwood 1, gas oil), checking of oil levels and other pre-use checks on the pump engine and setting of valves, all according to the MST manufacturer's instructions, must all be carried out beforehand. The vent/overflow pipe is lowered, secured and a condensate receptacle placed underneath. The electrics must be connected to the designated point by a competent electrician. Only then may loading proceed (see Section 4.3). The Owner then checks that all operational parts of the plant are working correctly, especially the safety controls and cut-outs. Occasionally, it may be decided to check the burner settings by means of a combustion test upon the exhaust gases. The Owner must instruct the Buyer on operation of the MST. Compliance to safety requirements requires that this training session be carried out correctly, to both parties' satisfaction. Signed documentation for the final handing over of the MST should record that this has been completed and this should also be entered into the MST Log.

3.2.2 MST Manual Pack and Inventory

The Owner has a responsibility to provide an MST Manual that is easily understandable. Its purpose is to repeat instructions given during training (Item 3.2.1) and to provide a source of reference for further details should problems arise. If instructions for component installation in the original MST assembly are included they may include confusing and unnecessary information. If possible, they should be edited or their purpose clearly stated. More details of the pack are given in Section 4.3.2 and an MST inventory example is given in Appendix C.

3.3 Movement between Sites

It is illegal to transport binders in MSTs. They are not designed to transport binders and therefore must be fully drained before lowering onto the road wheels. Although empty, they must carry both hazard warning panels relating to the last binder held and an 'Instructions in Writing' document. Before movement, all services must be disconnected, all equipment safely stowed in its travelling position and the legs retracted.

3.4 Return to Supplier

An approximate completion date will have been agreed with the Owner. Normally, prompt removal is desirable so that hire can be terminated, the MST serviced and made available to the next user. The Owner must be informed immediately if delays, such as those caused by

breakdowns, or bad weather, make it likely that the period of MST hire will need to be extended. This is because subsequent hirers will need to be informed or other arrangements made for them. The Owner should also be pre-warned that imminent removal is required and then the final date confirmed as soon as it is known. The MST must be empty before removal and so provision must be made to remove and accommodate the final drained binder. The Buyer will need to be present when the Owner checks the equipment against the MST inventory and this and the collection note signifying the termination of hire are signed.

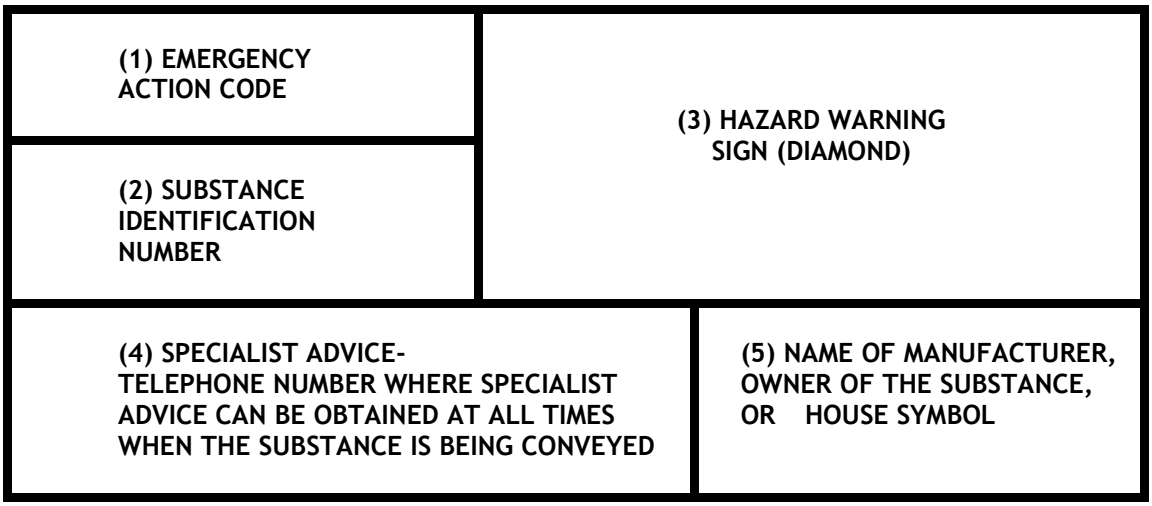
4. SITE OPERATIONS

4.1 Administrative

Before the contract starts, a detailed programme of work for the contract is drawn up. With this as a basis, arrangements are made with the emulsion supplier for the proposed daily emulsion requirements, plus standby provision for any delays to the programme caused by weather, plant breakdowns or other unforeseen events. An example arrangement might be for the application machines to be filled at a specific time with emulsion delivered within a specified temperature range, the remaining emulsion being put into the MST. It is normal to agree a final daily confirmation time for emulsion quantities required for the next day's delivery, because the Owner will need to arrange transport from a haulier. Handling of emulsion binders should follow the Code of Practice given in REA Data Sheets (see Section 5) and BS 434:Pt.2 2006. Handling of specific products should follow the Product Health and Safety and Data Sheets supplied by the respective emulsion manufacturer.

4.1.1 Health and Safety

Where an MST has contained hazardous material, it must carry **three statutory Hazard Warning panels** and **Instructions in Writing** are to be available. The panels have to be changed if the tank contents are changed. Safety markings on the MST must not be obscured at any time. An example of a Hazard Warning panel is shown below but reference must be made to current regulations.



(1) Instructions for emergency services are in the form of codes:
2 means use water fog or a fine spray.
W means full protective clothing required, there is danger of violent reaction or explosion and spillages should be contained.
X means full protective clothing is required, there is no danger of violent reaction or explosion but spillages should be contained.

(2) Substance identification number:
1999 means tar and liquids, including bitumen cutbacks, with flashpoints equal to or below 61ºC.
3256 means Cut-back bitumen and elevated temperature liquid at, or above 100ºC & below its flash point.

(3) Hazard warning sign – split diamond (top half hatched)

(4) & (5) contain the MST Owner's details.

An example for Bitumen Emulsion on a White Board is shown below

<table>
<tr><td>2X</td><td rowspan="2">LOW HAZARD</td></tr>
<tr><td>BITUMEN WATER EMULSION</td></tr>
<tr><td>SPECIALIST ADVICE-
TELEPHONE NUMBER WHERE SPECIALIST ADVICE CAN BE OBTAINED AT ALL TIMES WHEN THE SUBSTANCE IS BEING CONVEYED</td><td>NAME OF MANUFACTURER, OWNER OF THE SUBSTANCE, OR HOUSE SYMBOL</td></tr>
</table>

In addition, for bitumen at elevated temperatures, the display of the elevated temperature 'thermometer' symbol is required.

Bitumen Emulsion does not come under ADR regulations; MSTs should be labelled according to the UK Voluntary Marking Scheme. This uses the Hazard Warning panel format with panel sections having a white background.
Sections (1), (4) & (5) remain the same.
Section (2): Tank contents - **BITUMEN EMULSION** - if bitumen emulsion is being used.
Section (3): Contents description – **HOT LIQUID** - if the contents are hot.

Particularly for bitumen emulsions, all MST moves will be under the control of the Owner. **It is illegal to transport binders in MST's.** The MST must only be moved when empty.

Due consideration should be given when transporting an MST which has contained a hazardous product e.g. UN3256 / UN3257 as the last load and should only be undertaken after consulting the bitumen supplier or a qualified Dangerous Goods Safety Advisor. Any such movement of an MST in a 'notionally' empty state must be accompanied by an "Empty Vehicle Document" in lieu of "Instructions in Writing" as prescribed under ADR.

4.1.2 Records of MST Use

During any contracting period, it is possible that points of contention will arise. These may relate to quantities, quality, accounts, safety, etc. For all these points, date, time, person present and activity details will be wanted. It is strongly advised that both the Owner and the Buyer record these events in an MST Log. The Buyer's copy needs to be kept in a convenient place or else it will not be used. A numbered loose-leaf folder is suggested, so that completed pages can regularly be removed and placed in a master file in a secure office.

4.1.3 Access to the top of MSTs

Site staff should be made aware of the **Work at Height Regulations 2005** and potential safety issues arising from working at height and activities on the top of an MST and around manholes or apertures or dipsticks. Access should be limited or precluded depending upon the design and age of the MST. Fixed ladders and safety railings should always be used if fitted. A safe system of work accompanied by a suitable and sufficient risk assessment, should be in place, and communicated to any person accessing the top of an MST.

4.2 Operatives

Training must include directions on how to use (Section 4) and maintain the MST (Section 4.7), safety (Section 4.2.3) and emergency procedures (Section 4.2.4.), details of the conditions of hire and where to find advice (MST Owner/emulsion supplier) or further information (MST manual pack).

4.2.1 Operations and Authorisation

A rota should be compiled so that operatives know who is authorised to use the MST, who does the maintenance, at what time they are on duty and how supervisory staff can be located at any time.

4.2.2 Supervision and Responsibilities

Under the Sale of Goods Act, the hire of equipment is regarded as sale for a limited period of time. The Owner has a responsibility to provide a safe, fully functional and complete MST; easily readable, understandable and unambiguous supporting documentation, provide adequate training so that the MST will be used correctly and safely and to ensure that all this has been understood. Similarly, while on hire, the Buyer is the temporary Owner of the MST and, in the event of an incident or accident, would have to prove that it was not as a result of poor operation, maintenance, supervision, or failure to follow the Owner's instructions. The Buyer must supervise and should check regularly that the operation is proceeding according to plan and should inspect and countersign the MST log entries.

4.2.3 Health and Safety Precautions

It is recommended that a daily MST check list is completed. An important part of this is the checking of all safety and cut-off devices – note only the MST owners competent personnel should service these devices but their operation has to be covered in training and instructions given to the site operators. (See Appendix A). An ample safe zone around the MST should be identified and signed as a 'PPE (personal protective equipment)/no smoking/beware of reversing vehicles' area. There must be no unauthorised access into this safety zone.

Additionally, consideration must be paid to any substance heated to or above its flashpoint to prevent any possibility of fire and explosion. Detailed information on this is shown on the Safety Data Sheet for the product.

4.2.3.1 Safety Rules

It is suggested that the following preamble and general rules on the use of the MST be issued to the operator and to the team of contractors.

"These rules are issued to ensure your safety and the safety of the general public and should be read in conjunction with your employer's safety policy/procedure and the site safety rules. You have a duty under the Health and Safety at Work Act, to take reasonable care for your own safety and the safety of others who may be affected by your acts or omissions. Read these rules carefully and be sure that you fully understand them in order to prevent accidents and ensure that you know what action to take in the event of an accident."

(1) You must be authorised to operate this equipment, be fully trained in its use and be wearing the recommended personal protective equipment. If in doubt, ask for instruction. Do not take risks.

(2) You must know what emulsion is being used, have studied its product information sheet and product health and material safety data sheet (MSDS) and undertaken/be aware of the Control of Substances Hazardous to Health (CoSHH) assessment. Always observe safe handling instructions for emulsion, cleaning oils, lubricants, and other substances. Make sure that safety equipment such as a fire extinguisher and first aid box are in position and serviceable.

(3) Never operate the pump without making sure that the valves are in their correct positions and the guards in place. Obey the instructions on all warning labels and never use the equipment for unauthorised purposes.

(4) Be aware that emulsion is a liquid and, even when cold, will flow by gravity or siphoning without being pumped.

(5) Never try to free pipes that might be pressurised or that might release hot liquids. Never try to release trapped objects from jammed machinery that is active or under stress.

(6) Never continue to use dirty, leaky, defective or partially jammed equipment but report problems immediately. Keep equipment clean. Fill in the daily check list form and enter operational details into the MST Log.

(7) Never light the burners without making sure that the heater tubes are covered with emulsion (checked by viewing the sight plate, exposed tubes or warning mark on dip stick/level indicator). Check that heater and tank vents are open. In the case of manually lit burners, always insert the torch before starting the burner. If the burner blows out, open the heating tube shutter and leave for at least five minutes before attempting to re-light.

(8) Keep clear of hot, moving or electrical parts. Do not inhale concentrated engine exhaust or emulsion fumes. Keep oil/solvents off your skin and non-protective clothing.

(9) Observe safety procedures when starting engines (Section 4.2.3.4), pump (Section 4.3.5), generator or burners (Section 4.2.3.5). Never refuel an appliance while it is running, all powered equipment must be turned off during refuelling operations.

(10) Never add any additive, such as water, solvents or chemicals, to the emulsion.

(Should further guidance be required regarding safety and legislation, refer to the Consultative Documents listed in Section 5).

4.2.3.2 Personal Protective Equipment

MST operators should be fully protected using personal protective equipment to protect them with a view to preventing injury against the possibility of emulsion or binder coming into contact with their skin. This includes protection to the eyes and face as well as the hands and feet.

The following PPE must be worn when loading or discharging vehicles carrying products in the following circumstances:-

For Bulk Bitumen Emulsion Products (Maximum Safe Handling and Storage Temperatures 85ºC -95ºC)

a) **where Pressurised deliveries are made**

Equipment should include safety boots (non-slip soles without metal studs), gloves (soft leather or heavy duty PVC), overalls (natural fibre, without a belt, the trousers should fit over the top of boots and the sleeves over the base of gloves) (wear a shirt underneath overalls), balaclava (disposable paper preferable), safety helmet with full face visor (polycarbonate), and mask (carbon impregnated and covering nose and mouth). A neck apron should also be considered

b) **for pumped deliveries and draw off**

1. Overalls must be worn
2. Safety Helmet and Safety Eye Protection
3. Safety Gloves
4. Safety Boots
5. Hi-Vis wear

For Bulk Bitumen Products (Maximum Safe Handling and Storage Temperatures 160ºC -190ºC)

1. Single Piece Cotton Boiler Suit
2. Safety Helmet fitted with Full Face Visor and Neck Guard
3. Protective Gauntlets
4. Protective Boots
5. Hi-Vis wear

4.2.3.3 Personal Hygiene

The first objective must be to prevent emulsion, binder, solvent or oil from reaching the skin either directly or indirectly via clothing. If there is any danger of this, protect the skin with a water dispersible barrier cream. If contamination has occurred, remove the adhering binder using a purpose designed hand cleaner or olive oil (in no circumstances use gas oil or similar

solvent) and finally, clean with soap and water. Never continue to wear contaminated clothing.

4.2.3.4 Starting Diesel Engines

Please note the MST owner has a responsibility for Instruction and Training when using the MST and there are a range of starting methods so the operator must be given instruction to avoid accidents. Ensure that the operator has a copy of the Handover document pertaining to the tank.

To start the MST engine, follow the instructions in the MST Manual. Starting may be by electric starter or rope/handle hand starting. Hand starting a diesel engine can be dangerous without training. The following rules give general advice but need to be checked for each specific engine. Before starting, ensure that the air cleaner, fan inlet and all ventilation/exhaust openings are clear of obstructions and that the guards are in position. Check that there is sufficient lubricating oil and fuel and any supply valve is on.

a. Disengage the engine from the pump by de-clutching.
b. If a rope start, ensure the rope is not tangled or frayed. Do not wind the rope around the wrist or hand.
c. Use the correct handle designed for the engine which will safely rotate on the shaft.
d. Ensure the handle and shaft are clean and that the shaft is lightly oiled.
e. Fit the handle onto the shaft and check that it disengages easily.
f. Hold the handle firmly with the thumb on the same side of the handle as the grip.
g. Engage the decompression lever and rotate the engine until sufficient speed has been reached.
h. Release the decompression lever and be prepared for any handle kick-back.
i. Replace the shaft guide, remove the rope or handle and put in a safe place.

To stop the engine, disengage the pump and move the speed control to “stop”.

4.2.3.5 Burner Precautions

After switching on at the main fuse switch, be aware that most burners are fully automatic and may start or stop without warning. They may be operating through a time-clock and thermostat. The burners may also be set to ignite in sequence so that the electric supply is not overloaded. Safety interlocks must not be made inoperative. The settings must only be altered by an engineer familiar with the controls. Similarly, any electrical work should only be carried out by a qualified electrician, and then only after the electrics have been totally isolated and checked that no feedback from other equipment can occur. To make sure that unauthorised adjustments are not made, the control cabinet should be kept locked and the key given to an authorised and trained operative. The cabinet must not be opened without isolating from the electrical supply.

The burners should not be operated if, there is no supervision on the site, (the time-clock can be set to operate at convenient times), the emulsion level is below the recommended minimum stated level in the MST Manual, there are any loose or vibrating parts or if there are any fuel leaks at any point in the system. The fuel must be clean and of the correct grade. The fuel pipe and joints must be in perfect condition. Spilled fuel presents a fire and environmental hazard and must be removed. If the burners are gas fuelled, any defect in the system must be regarded as an explosion risk. Clear the area and shut down the system. Most MSTs have a safety device that cuts out the burners if the liquid level falls too low. If the burners are not being used to maintain the temperature but are to be occasionally switched on to bring the emulsion up to temperature, and then to protect the emulsion, it is recommended that it is circulated during the main period of continuous heating.

If a burner fails to operate, check that there is an operational electric supply (circuit breaker, fuses, switches, time-switch setting, thermostats engaged, sockets, supply). Check that the low level float control has not tripped and that the low level temperature control setting has not been changed. The burners may have cut out because the emulsion is at temperature. The high temperature trip must not be reset without finding out why it has cut out (a hot

delivery can sometimes do this). If the motor started, but the burner did not light, check the fuel supply pipes, control valves, pump, burner nozzle and ignition equipment. If it lit, but then reverted to a lock-out position, the flame sensor may be dirty or faulty. Consult the MST Manual for details or the Owner for help and advice. If the burner doesn't light after 2-3 attempts, consult the manual and then the owner/renter of the tank.

4.2.3.6 Freeing of Blocked Pipes

The normal way to free a blockage, caused by separated binder, is to heat the pipe with a gas burner flame. If not done carefully, this can be a dangerous procedure. The safest way to do this is to check that all valves are closed, disconnect the pipework and heat and drain the pipes well away from the MST or any other facility or people. Be aware that emulsions contain water and trapped water will turn to pressurised steam under such conditions. Always apply heat from the open end of the pipe. Under no circumstances flame heat equipment containing gas oil/solvent or the possibility of its vapour. Finally, note that sudden severe heat on cast steel pump or valve casings may crack them and that heating above 100ºC may damage sealing rings, rubber fittings, etc.

4.2.3.7 Spillage Precautions

Advice on bund construction is given in Section 3.2. Care must be taken to prevent spillages when receiving deliveries of emulsion into the MST from a road tanker, or from the MST to a sprayer, particularly with delivery hoses which are outside of the bunded area. Whilst spilled bitumen emulsion is not flammable, and while solid bitumen is not harmful, it is mobile when cold and able to mix into water courses. In such circumstances bitumen emulsion may harm animal and plant life. This situation is immediately notifiable to the Environment Agency (see Section 4.2.4 and Appendix E).

4.2.3.8 Fault Finding

A fault finding chart can be found in most MST manuals. Do not attempt to rectify a problem unless you are sure that a dangerous condition is not present, that you understand the problem and are qualified to treat it. It may be better to isolate the MST for a period to allow pipes to cool and if necessary contact the MST owners.

4.2.4 Emergency Procedures

It is recommended that additional information be attached to the hazard warning panels (Section 4.1.1.) giving names and telephone numbers (EMERGENCIES 999 or 112 – not local numbers), for possible eventualities of fire/hazardous spillage (fire services), injury (ambulance), theft or vandalism (police), spillage into water courses, (Environment Agency – Hot-line 0800 807060). Also give 24 hours notification/instruction contacts (site manager or deputy).

Check that the following statements in 4.2.4.1 and 4.2.4.2 do not conflict with the site safety instructions/employment regulations.

4.2.4.1 First Aid

The most significant short term hazards are heat burns or splashes in the eyes. In such cases, prompt action in cooling and washing off emulsion under running water can greatly reduce the damage. Adhering binder must not be pulled off the skin, but medical treatment sought. The medical technician will want to see the product's CoSHH Assessment Sheet and the material safety data sheet (MSDS) and should be warned that it is usual not to attempt to remove the binder. Oil based cleaners or ointments should not be added to the burn, but a small piece of lint may be used as a parting layer to keep the bandage from adhering. When healing has progressed, if necessary, clean gently with a vegetable oil. Accidents must be entered into the employer's Accident Report Book, in accordance with legal requirements and may have to be reported to the Health and Safety Executive (HSE) in accordance with Reporting of Injuries, Diseases and Dangerous Occurrences Regulations (RIDDOR)) 2013 (with regard to the percentage of burns to the body)

4.2.4.2 Fire/Spillage

Only attempt to control minor fires with fire extinguishers and, before doing so, assess the hazard from unburnt binder/solvent other combustible material and the MST pressurised tyres. Do not inhale the smoke – it is toxic. Do not use water as an extinguisher. Refer to the relevant material safety data sheets for definitive fire fighting advice. **Call for help.** Most MSTs have a fire valve that shuts off the fuel supply to the burners when a fusible link melts.

4.3 Emulsion Reception on to Site

4.3.1 Product Data

The first legal, and moral requirement, before taking any product on to site, is to make sure that it will be stored and handled safely (see Section 4.4). For this, the starting point is the material safety data sheet (MSDS) and CoSHH Assessment. The product is then entered on to the Site Chemicals Register, and if a hazard is present, then the risk of exposure and the means of controlling this, will need to be assessed together with the fire and explosion hazards as required by the Dangerous Substances and Explosive Atmospheres Regulations (DSEAR) 2002. While this sounds formidable, in practice, it will have been done before with the MST. The best procedure is to become familiar with the MST operating instructions, then ask the Owner to confirm what risk or exposure, if any, will result if they are followed. The final action is to record this in the Site and MST Logs, notify employees, in writing, and train them in the necessary procedures. Continue to monitor the use of the MST, to make sure that circumstances do not change.

4.3.2 MST Manual Pack

The MST manual pack should consist of the MST operating instructions, including the MST manufacturer's address and telephone number, a general description of the plant components and capabilities, instructions for MST siting, assembly or dismantling, instructions for the operation and maintenance of the tank and pump instructions for The commissioning, operation, servicing and fault finding of the heater system is the responsibility of the owners.

4.3.3 Ordering Emulsion

Order emulsion before the previously agreed latest time, on the day preceding delivery, so that there is time for filling and transportation to be organised. An extra two days warning is advisable if a changed grade is required. The order is communicated by telephone, fax or e-mail. Details required are delivery grade, quantity, destination, time, supply contract number and person ordering. In order to provide this information, this person must contact the contractor/supervisor, to find out what quantity of emulsion is about to be drawn from the MST. The MST level indicator (make sure it is free running) is then consulted to find the stock. The recommended calculation could be:

Quantity required = (0.9 x full capacity) – (stock – immediate requirement)

Complications can arise when the intention is to reduce the stock, say at the end of the contract, or changing grade. The plan may also be to fill a contracting machine and put the remaining emulsion into the MST. Normally, the MST is kept full, (allowing a 10% safe margin). With the best of planning, sometimes things will go wrong, in which case quick action will save money and effort. Notify changed plans promptly to the Owner, who may be able to halt or modify a delivery.

4.3.4 Discharge Authorisation

The Buyer must first check that the binder advice note details agree with the order and the binder type and grade already in the tank. Next, verify that the MST has sufficient empty space, (the driver may also check this), and only then sign the authorisation to load the MST. If there is insufficient room to take the whole tanker load and still leave at least a 10% safety margin, the unloading must stop at a safe level (i.e. 90% of maximum tank volume – gauges should be clearly marked NOT to exceed this fill level) and the delivery note endorsed with the calculated delivery volume.

4.3.5 Off-Loading from Road Tankers

The Buyer should show the tank and filling point to the driver, and supervise the vehicle manoeuvring and off-loading. The driver will have a safe delivery procedure to follow, relating to the tanker and the product in it. The tanker is then positioned in a convenient position by the MST. All heaters must be switched off. All operatives must wear protective clothing. The driver should check that the hoses and joints are in good condition and are the correct type. The flange and hose blanking caps are then removed and the hose connected to the tanker and the MST. (The hose must not be bent severely and the MST inlet flange should be clearly marked as such). Do not attempt to fill through the MST top access hole. With two people present, delivery may then proceed, using the tanker discharge equipment or the MST pump. (In some cases, the tanker and MST pumps will have to be run in series).

Please note that some MSTs are fitted with High Level Alarms (HLA). In the event of HLA activation the driver must cease the product transfer immediately and seek instruction from the Buyer.

The procedure for any liquid transfer operation is to firstly follow the pumping route to be taken (see diagram on page 14, Filling MSTs). Make sure that valves on undesired binder routes are closed. Secondly, repeat this, opening valves on the required route (the MST Manual will contain full details of the required valve settings for any designed operation). Thirdly, check that venting on the tanks is such that no pressure or vacuum build-up can occur. Finally, make sure that no person is in line with the hose flanges and that unauthorised persons are not in the pumping zone.

Before starting the MST pump engine, carry out any checks recommended in the engine manual, and check that the clutch is disengaged. Start the MST engine (according to the advice given in Section 4.2.3.4), engage the pump and monitor the liquid level changes and any pressure indicators. Open the MST top inspection cover only if it is essential to view the liquid (caution – there may be fumes and/or pressure hazards) but close this, before completion.

The procedure for discharge from pressure tankers is somewhat different, as it is normal to build up pressure before cautiously opening the foot valve on the tanker. Completion of load transfer can be indicated by a change in the sound of the pump, by the hose shaking and by the discharge of vapour from the vent. Turn off the main valve on the tanker and release any pressure. Open the air relief valve to allow the pump to purge the pipe free of liquid. Stop the pump, immediately turn off the MST valve and check that the expected volume of liquid has been transferred. Place a container under the MST flange and slowly undo the coupling, allowing residual liquid to drain into the container. Repack all hoses etc.

The Buyer should not sign the delivery note unless the delivery was satisfactory and the site left as it was found. Similarly, the driver should not leave the site without a signed receipt of satisfactory delivery. The Buyer should supervise the tanker while it is manoeuvring off the site.

In the case of deliveries that are to be split between sprayer and MST, the procedure is the same for pumped discharge, except that dip and Gauge readings of the split delivery should be noted on the delivery note and in the MST Log. It must be noted that some Owners may wish to carry out random site visits to ensure that their safe delivery procedures are being followed.

4.3.6 Off-Loading from Sprayers/Applicators

No material other than binder of the same type and grade and of usable quality should be pumped back into the MST. Should quality problems arise, it is most important that detailed records of such transfers are kept in the MST or site records. In all other respects, the procedure in Section 4.3.5 should be followed.

4.4 Emulsion Care in MSTs

4.4.1 During Operational Time

Keep the MST well filled and the emulsion circulated for 30 minutes to one hour each day (halve this time if the tank is only half full). The emulsion must not be mishandled if it is to meet performance and specification requirements. Contamination, including gas oil or diesel, will harm performance. Similarly, long periods of storage at spraying temperature will cause the loss of volatile ingredients by evaporation. Equipment malfunctions, or wrong adjustment, pose more severe threats. Overheating may cause emulsion to generate steam and boil over. Over-pumping, failure to circulate in settlement, or freezing, will also damage emulsion.

4.4.2 During Down-time

For long down-times, empty the MST. Drain the pipes if there is any chance of the emulsion freezing. For shorter down-times, consult the Owner, as it may be preferable to return it to the factory and supply fresh and re-tested product when required. For weekends, the MST can just be shut down. For down-time of up to 2 weeks, the emulsion can be maintained in good condition by observing the following practice. Keep the MST well filled. In order to pump, the emulsion viscosity must be reasonably low and heat is needed to reduce this. The thermostat setting should be 40ºC below normal setting. If the emulsion has become totally cold (which should be avoided), switch the heaters on for 10 minutes in every 30 minutes, until 45ºC has been reached and it is warm enough to pump and circulate. Emulsion grades designed to be used cold, also need regular circulation, and all pipework containing emulsion must be protected from frost. If, by any chance, it is suspected that the emulsion has frozen, it is best to leave it to thaw slowly without disturbance. However, be aware that lumps of binder may have separated from the water phase. Similarly, emulsion that has been neglected may have sedimented to the extent that separation of binder has taken place. If the emulsion has become unfit for use, the Owner will have to be consulted. Do not delay this, as the longer the problem is left, the worse it will become.

4.4.3 Circulation

An example of MST Valve Settings is shown on page 14 please note reference must be made to Owners/Hirers Agreement for the specific tank being used. Circulation for 30 minutes to one hour in any 24 hour period is recommended. Before circulating, ensure that the valves are in the correct position, as typically shown in the page 14 diagram, systematically follow the route to be taken by the liquid, close valves on unwanted routes and then repeat this check, opening valves on the desired route. Start the engine (Section 4.2.3.4) and engage the pump. After use, clean the pump (see Section 4.7.1).

4.4.4 Heating & prevention of overheating

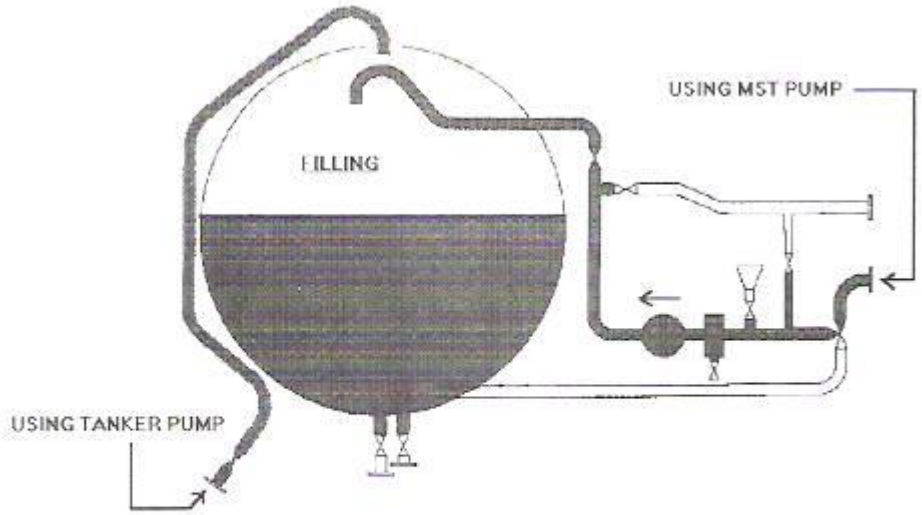
Recommended temperature control settings for hot emulsions are, lower limit 75ºC, upper limit 85ºC, fail safe limit 95ºC. Turning the thermostat up above these settings is dangerous and will not heat the emulsion quicker. Emulsions will boil if heated above 100ºC and there is a serious risk of a major spillage from the venting pipe due to emulsion expansion from the reaction of the breaking binder and the residual emulsion product. Additionally the emulsion may block safety vents (allow a safety margin of 3ºC gauge error). If this happens, dangerous pressure may develop.

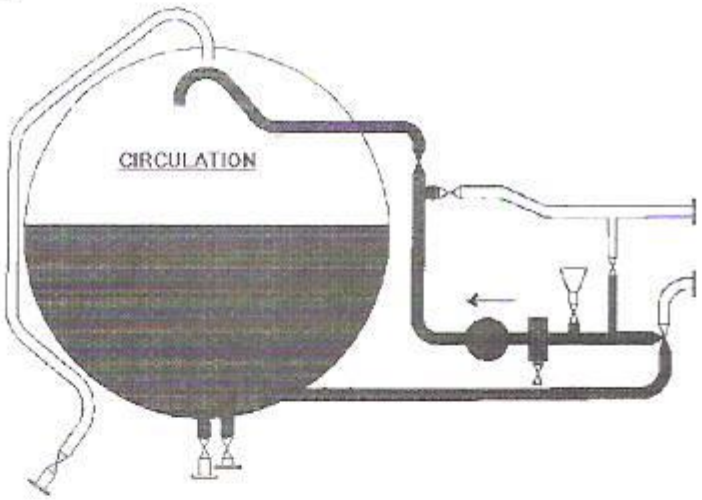
For operational reasons, MST heaters can be quite fierce. Localised boiling of emulsion may occur on the heating tubes and this inevitably leads to some separation of demulsified binder. Too much of this can affect the spraying properties of the emulsion. If the time-clock is controlling the burners, it is preferable to circulate during the heating time. Heating settings must not be above the emulsion manufacturer's recommended maximum spraying temperature. Observe the above down-time advice (Section 4.4.2). Observe the rules relating to safe burner operation (Sections 4.2.3.1 and 4.2.3.5).

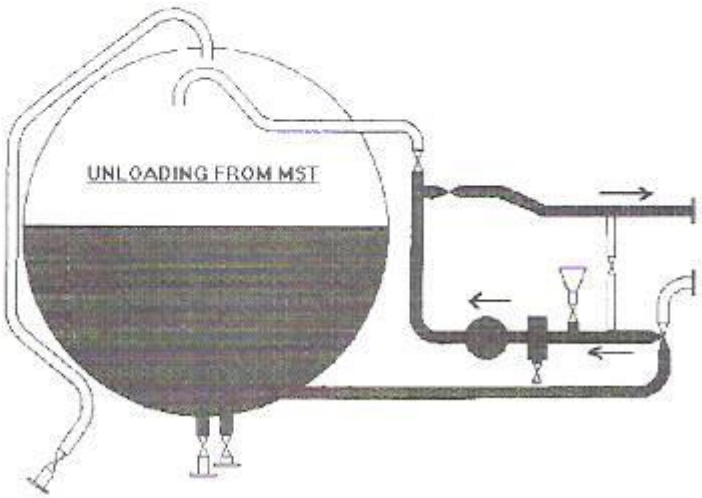
4.4.5 Temperature Measurement

This is carried out by means of the gauge provided. A correct reading will not be obtained if the gauge is inaccurate or it is not immersed in liquid. (See Calibration Appendix B).

MST VALVE SETTINGS - EXAMPLES.







4.4.6 Sampling

BS EN 58:2012, gives the main requirements for sampling emulsion. Additional guidance is found in BS 434:Part1: 2011 Appendix A. Some Buyers have specific methods in their annual tenders which should be observed. Failing this, the principle of taking a representative sample from the pipeline, after adequate circulation, should be followed. However, the sample cocks are seldom purpose designed. It may be necessary to use a drain cock on the pump or strainer. In the case of sampling deliveries, this should be done from the inlet pipeline, halfway through the delivery. If required, the Owner will usually supply a flanged link incorporating a sample cock designed to sample from the centre of the flow in the pipe. In either case, some emulsion should be allowed to flow into a waste container, so that an uncontaminated sample can be contained. Typically, a one or two litre plastic bottle or a sample pot is filled. A label should be securely fixed to the bottle or sample pot and have details of sample grade, date, time, MST reference number, site and person sampling. Any other details required should be recoverable from the MST Log if required. In the case of hot emulsions, if plastic bottles are used, it is good practice to store the sample in an insulated container, so that it cools slowly and so that some residual heat may still remain in the sample when tested.

4.5 Emulsion Despatch from Site

4.5.1 Loading Authorisation and Supervision

To avoid vandalism, or unauthorised removal of emulsion, the drainage/unloading valves are kept padlocked or, at least, the valve wheels are removed while the MST is on site and not in use. Blanking caps must also be in place. The MST Log should contain all details of times of loading, vehicle identification, dip measurements, gauge readings. Preferably loading should not be an unsupervised one person operation. However if the loading is unsupervised, a loading form should be provided for drivers to use. Keeping good records goes a long way to ensuring smooth site operation and resolution of problems.

4.5.2 Loading Sprayers/Applicators

Position the vehicle beside the MST and adjacent to the drain/unloading coupling, and remove hose and coupling caps. Check the sealing washers and connect the hose to the coupling and then to the suction end of the sprayer. The hose must not have a sharp bend. Loading may be done using the MST pump and/or the sprayer pump. Check that valves on undesired binder routes are closed and then open valves on the required route (see diagram on page 14 – Unloading MSTs). Open the drain/unloading valve on the MST, engage the pump on the sprayer, and follow its loading procedure. Upon completion of loading, shut the MST drain valve, open the MST air vent and allow air to be sucked into the pipe for half a minute. Close the air vent, immediately disengage the pump and shut the sprayer valve. Disconnect the hose from the sprayer, drain into a container and replace the hose and coupling caps. Record all dip and gauge readings in the MST Log.

4.5.3 Loading Tankers

In the event of returning emulsion to the Owner at the end of the contract, the Buyer should, as far as is known, assure the Owner that it is of usable quality and has not been contaminated. This should be stipulated on the Owner's material returns documentation. The MST should be circulated for a while (time depends on volume), sampled (see Section 4.4.6) and samples kept by Buyer and Owner for use in resolving any possible quality problems. (Note that damaged emulsion may deteriorate markedly during a loading-transport-unloading regime). Unloading the MST then proceeds according to Section 4.5.2.

4.6 Changing Emulsion Grade

Change of grade rarely presents problems, although the Owner should be given at least two days notice. The ideal situation is to use or remove the entire previous grade before filling with a new one. Occasionally, for operational reasons, it may not be possible to completely empty the MST before changing grade. In this case, the proportion of the blended materials becomes important and the Owner should be presented with the expected blend proportions, and approval obtained before carrying out such an operation. In any event, it is essential to

circulate well, for example, turn over the tank contents once. (The time is calculated from the volume in the MST, divided by the pump output.)

4.7 MST Maintenance

MSTs require regular servicing and the Owner has the responsibility for this and should keep a log of the details of this in order to avoid missing service dates, to record replacements, to detect repeated failures and for general financial and quality control. Under a quality system, the examination of such records could be required. The MST Manual normally contains details of agreed daily checks that have to be covered in the instructions and training of site operators. Typical daily maintenance should at least include the checks given in Appendix A. (instruction and training)

4.7.1 Pump Cleaning

Clean the pump after circulation/loading, circulation or at the end of a working day. Cleaning must only be done with clean binder solvents of high flash point (such as gas oil or diesel). Self dispersible, proprietary cleaning liquids must never be used as they are likely to de-stabilise emulsions. Close all valves except the funnel inlet and pump outlet drain valves. Make sure that a container is still under the drain valve. Start the engine, engage the pump, run for one minute and disengage again. Fill the funnel with one litre of solvent, engage the pump and close the drain when the solvent has been drawn into the pump. Circulate within the pump for two minutes only, open the drain until the liquid flow ceases. It is a dangerous practice, and also harmful to the strainer, to clean it by burning and wire brushing. Disengage the clutch, close all valves and stop the engine. Dispose of the waste solvent according to Section 4.7.4.

If the pump seems to be slow in output, it may be because the strainer is blocked or the pump vanes are sticking. The strainer is there to protect the pump and must not be permanently removed. It should be regularly inspected, closing adjacent valves before opening it. It may have to be cleaned by soaking overnight in solvent. Occasionally, deposition from polymer modified binders can cause pumping problems. This is unusual, and the Owner must be consulted because other cleaning solvents may be required.

4.7.2 Tank Drainage

Drainage is more effective if the product is hot. This should be done immediately after loading the last load. If this is not possible, it may be necessary to deliver a cleaning load to the MST, circulate and then follow the drainage procedure. The initial requirement of this is that the burner system is shut down and all valves are closed. Thereafter, procedures with different MSTs vary but are to be carried out by the Owner's trained personnel, as part of the removal procedure. Some MSTs cannot be emptied below the burner tubes without transfer of a hose to the bottom drain valve. This must be done carefully, as the hose may be full of liquid.

4.7.3 Tank Cleaning

Inspection will reveal if this is necessary but it is normally carried out in the Owner's depot before each season. MSTs containing emulsion residues are usually steamed out in the presence of kerosene, and then totally drained.

4.7.4 Disposal of Waste

Waste material must not be put into domestic disposal systems or back into the MST. Liquid waste is put into sealable drums (usually the Owner will have spare ones). Solid waste and absorbed spillage, which should be negligible, is put into open top drums and sealed. Both must be regularly removed from site by licensed waste disposal contractors. On no account may waste be left easily accessible to the public, especially children. In particular, bitumen dissolved in solvent is both flammable and harmful by skin, absorption and must be safely contained. The Contractor will need to be aware of the nature of the contents of the drums. Waste leaving site should be accompanied by either a Waste Transfer Note (if non-hazardous) or a Consignment Note (if hazardous).

5. CONSULTATIVE DOCUMENTS

The following are correct at the time of going to press, but it should not be assumed that they are the latest issues.

Acts of Parliament & Regulations that must be taken into account in the use of MSTs

Dangerous Substances (Notification and Marking of Sites) Regulations 1990

Environment Protection Act 1990

Health and Safety at Work Act etc 1974

Dangerous Substances and Explosive Atmosphere Regulations 2002 (DSEAR)

Control of Substances Hazardous to Health Regulations 2002 (CoSHH)

Control of Pollution (Oil Storage) (England) Regulations 2001

The Water Environment (Oil Storage) (Scotland) Regulations 2006

The Control of Pollution (Oil Storage) Regulations (Northern Ireland) 2010

Provision of Work Equipment Regulations 1992

BS 434-Part 2 2006 Code of practice for use of bitumen road emulsions

BS 434-Part 1 2011 Specification for Anionic Bitumen Emulsions

BS EN 58 2012 Sampling Bituminous Binders

The Carriage of Dangerous Goods and Use of Transportable Pressure Equipment Regulations 2009.

Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 2013

REA Technical Sheets
On the REA website www.rea.org.uk the "Technical Datasheets" page provides 12 Technical Data sheets to assist users with information and advice on a range of bitumen emulsion uses.

6. ACKNOWLEDGEMENTS

This revised code was drafted with the assistance of the Council and Technical Committee of the Road Emulsion Association together with a specialist group that represented each member of the Association together with the Association's Secretary & Consultant John Keayes.

Members of the specialist group were:-

Tony Hipperson from Ayton Products
Dave Howie from Bituchem Holdings Limited
Sommerville Wright from Colas Limited
Brian Gilbert from Jobling Purser Limited
Paul Lamb from Nynas UK AB
Iain Fair from Total Bitumen

Further help and advice was sought from The Environment Agency; and the Health & Safety Executive

APPENDIX A

Daily Check List Example

1. Check bunding for breaches
2. Check level of burner fuel
3. Check level of pump engine fuel
4. Check level of pump engine lubricating oil
5. Check level of generator engine fuel
6. Check level of generator engine oil
7. Check emulsion temperature (75ºC-90ºC)
8. Check and record emulsion volume
9. Visually check MST for leaks
10. Check for any damage due to tampering or vibration
11. Check position of valves
12. Check for MST stability (subsidence)
13. Check support infrastructure (Fire extinguishers, spill kit)

APPENDIX B

Temperature Checking and Gauge Calibration Methods

The calibration of the thermometer and temperature control is vital to the safe running of the MST. It is the responsibility of the Owner to do this, at least annually, and to record all details in the MST Log. The Buyer should check the details and confirm that the calibration is valid and correct. If the thermometer is not adjustable, then a small, waterproof, dated notice should be attached to it giving a correction factor. The calibration method is given below but if the Buyer wishes to carry out a rough check without removing the dial thermometer from its pocket, a glass thermometer can be used to take the temperature of an emulsion sample for comparison (see Section 4.4.6).

(1) Dial Thermometers

Frequency of calibration	:	At least annually or if suspect
Primary Standard(s)	:	Platinum resistance probe or certified glass thermometer
Working Standard(s)	:	Laboratory electronic or calibrated glass thermometer
Tolerance	:	$\pm$ 3.0ºC

Method

Compare with the reading of a calibrated thermometer at the temperature of use.

Procedure

Ensure that the thermometer is clean and sound. Immerse in a water or oil bath to its design depth. Immerse the reference probe beside it. Heat to the normal operational temperature(s), stir until the readings are stable and record them.

Calculation

$$\text{Error \%} = \frac{100 \times (\text{temperature} - \text{reading})}{\text{temperature}}$$

Correction = temperature – reading

Verification

The thermometer is verified if the error is within the permitted tolerance. Thermometers must not be used without a current verification/calibration certificate. This is void after one year or in the event of possible damage or demonstrated inaccuracy. All data is recorded on a test certificate and in any attached plant log. A durable and prominent label is to be placed beside the thermometer display giving the next recalibration deadline together with the correction if required in order to obtain the correct temperature.

Recording

The certificate and/or MST Log entry, shall, at least, record the test date, test operator's name and signature, the working standard, the equipment reference number, the calibration method number and all the test details and observations.

(2) Temperature Control

This is set against the calibrated dial thermometer reading during a period of circulation. If the reading does not correspond to the actual temperature, then a durable and prominent label, giving a correction factor, is to be displayed beside the control. Recording is as above.

APPENDIX C

An example of an Inventory Check List

The detail is fixed by the MST owner and may vary on different tank types

Note that the ownership some items including the padlocks & the fire extinguishers will be agreed by the Owner and the Hirer before detail of this Checklist is finalised.

The following is a full list of equipment on, and comprising, Mobile Storage Tank No ……
The recipient is required to examine the MST and confirm that the listed parts are present and in good condition. Any qualification of this must be agreed and countersigned by the relinquisher.

ITEM	PRESENT ( )	COMMENTS
Storage Tank		
Steel barrel tank (lagged)	( )	……
Contents gauge (calibrated)	( )	……
Temperature gauge (calibrated)	( )	……
Inspection cover lid	( )	……
Guard rail for front platform	( )	……
Guard rail for top of tank	( )	……
Tool box (contents see below)	( )	……
Ladder (folding) for front	( )	……
Landing legs (6 of)	( )	……
Weight distribution plates (6 of)	( )	……
Control panel	( )	……
Padlocks and keys (3 of)	( )	……
Discharge hoses, 3”diam (owner to specify lengths)	( )	……
Hazard warning panel	( )	……
Running gear		
Single axle chassis	( )	……
Air operated brake equipment	( )	……
Hand brake assembly	( )	……
Wheels and tyres (4 of)	( )	……
Mudguards (2 of)	( )	……
Lighting		
Front valve light	( )	……
Foot valve light	( )	……
Cabinet light	( )	……
Rear light assemblies (2 of)	( )	……
Indicator repeater lights (8 of)	( )	……
Front marker lights (2 of)	( )	……
Rear marker lights (2 of)	( )	……
Rear number plate light	( )	……
Heating Equipment		
Lockable cabinet	( )	……
Control unit	( )	……
Flame tube assemblies (2 of)	( )	……
Thermostat unit	( )	……
Thermostat unit (overheat)	( )	……
Fusible link	( )	……
Fuel control unit	( )	……
Fuel tank	( )	……
Fuel taps with water traps (2 of)	( )	……
Fire extinguishers (2 of) (serviced)	( )	……

Pumping Equipment

Diesel Engine	( ) ……
Batteries 12 volt (2 of)	( ) ……
Starting handle (stand-by)	( ) ……
Pump	( ) ……
Generator Assembly Diesel engine	( ) ……
Alternator (240 volt)	( ) ……
Electric starter	( ) ……
Battery (12 volt)	( ) ……
Starting handle (stand-by)	( ) ……

Manuals

MST Log Book	( ) ……
MST Manual Pack	( ) ……
REA Code of Practice for use & safety of MST	( ) ……
Additional Items	( ) ……
Training Received	( ) ……

I confirm that the above is a correct inventory of the items as received.

Signed ……

Full Name (Print) ……..

APPENDIX D

Suggested Instruction and Training Checklist (from the Owner to Buyer and User)

Please note this should be regarded as a minimum standard and whilst the Road Emulsion Association suggests this checklist, it will be for the individual MST owner to specify the detail of this list

Carefully inspect the proposed location of the MST, give advice if you feel there will be a problem with that location – it is important to check:-

- The ground layout.
- For any drains, manholes and water courses.
- If it is possible to build the bunding without obstructions?
- If there are there any overhead cables/obstructions
- The access for the Tankers and Sprayers
- The security of the site

Documentation

- MST Operating Manual
- Complete the Weekly/Daily MST Inspection Log Booklet as described in paragraph 4.2.3. of this Code of Practice.

Instruction in valve positioning and operation

- Awareness of circulation, tank discharge, loading and unloading sprayers.
- Overnight shutdown after use.
- Instruction in the operation of oil fired burners and the sequence that must be followed every time burners are used. Never alter any temperature settings on burners or Danfoss (that shuts the burners down if the high temperature cut-out fails) cut off.
- Instruction in the operation of Hydro/Pak or other attached operating fitted systems.
- How to use the hydraulic control or other systems that operate the pump.
- Understanding that burners must not be operated if there is NO SUPERVISION ON SITE. Please see paragraph 4.2.3.5 of this Code of Practice
- Instruction in how to check engine and hydraulic oil levels and that fuel tank level has to be checked daily. (Note: Only use clean fuel & clean fuel containers)
- Instruction in the valve operations on the MST being used
- Instruction in the draining down procedure for the MST
- Instruction in fitting the appropriate product grade boards in holder.
- Confirm that at end of contract or if the MST is to be re-sited the MST must be empty before moving.
- Check all equipment is accounted for and secure, plus road tyres are roadworthy.

Safety

- Recommended Personal Protective Equipment must be used. As shown in paragraph 4.2.3.2. of this Code of Practice
- Confirm operatives never fill fuel while burners are running. All powered equipment must be turned off during refuelling operations.
- Check valve security to prevent environmental spillages through trespass or criminal activity

APPENDIX E

Pollution Prevention Guidelines

The Environment Agency (EA) with the Scottish Environment Protection Agency (SEPA) and the Environment and Heritage Service in Northern Ireland produce of a range of Pollution Prevention Guidance Notes (PPGs) that are intended to provide guidance for the prevention of pollution and its consequences. The most directly related publications are:-

PPG1 Understanding your Environmental Responsibilities.
PPG2 Above Ground Oil Storage Tanks.
PPG3 The Use and Design of Oil Separators in Surface Water Drainage Systems.
PPG5 Works and maintenance near water.
PPG6 Working at Construction and Demolition Sites.
PPG8 Safe Storage and Disposal of Used Oils.
PPG10 Highway Depots.
PPG18 Managing Fire Water and Major Spillages

See **http://www.environment-agency.gov.uk/business/topics/pollution/39083.aspx**

The Environment Agency is responsible for enforcing the Oil Storage Regulations regulations throughout England (not Northern Ireland, Wales or Scotland). If your oil storage facilities are inadequate, the Environment Agency will provide advice and guidance to assist you with compliance.

Some particularly relevant excerpts from these are as follows:

PPG1 General Guide to the Prevention of Pollution

1. General

The EA is responsible for the protection of "controlled waters" from pollution under the Water Resources Act of 1991, and it is an offence under the Act to cause such pollution, either deliberately or accidentally. "Controlled waters" include all watercourses and water contained in underground strata (ground water). The formal consent of the Environment Agency is required for any discharge to controlled waters. This includes both direct discharges and discharges to soakaways. Such consents are not granted automatically.

2. Surface Water Disposal – Car Parks and Yards

Due to the risk of pollution from oil, petrol or chemical spills, surface water systems serving these areas may require oil separation. Covered areas should drain to the foul sewer if possible. Under some circumstances a cut off valve may be required to prevent polluting discharges reaching controlled waters.

PPG2 Above Ground Oil Storage Tanks

The storage tank … must be provided with sound foundations to avoid settling … every part of the tank should be within the bund including all valves, filters, filling point and the vent pipe.

The bund should consist of a base and surrounding walls which must be constructed or lined with a material impermeable to the oil stored. Pipework should not pass through the bund … The capacity of the bund should be at least 10% greater than the capacity of the tank … Normally, rainwater evaporates from within the bund. Should there be a need to remove accumulated rainwater, it can be removed by a manually operated pump discharging through an oil separator…

Gauges should be regularly checked for accuracy.

Valves … should have lockable or removable hand wheels … and be fitted with a notice saying that they are to be kept locked when not in use … and marked to show whether they are open or closed. When not in use, they should be fitted with a blanking cap.

PPG6 Working at Construction and Demolition Sites

Oil and chemicals … any tanks or drums should be stored in a secure container or compound, which should be kept locked when not in use.

PPG10 Highway Depots - Protection from the Surface Water System

All highway depots should be served by an oil separator on the surface water drainage system. Separators must be regularly inspected and cleaned as required. Guidance notes on oil separators are available from the EA. Surface water drains should be colour coded or otherwise clearly identified by the use of notices. Roof water downpipes should be sealed into the ground rather than discharging into open grates. Staff should be informed of pollution risks and trained in how to deal with pollution incidents on site. It may be appropriate to maintain a stock of absorbent materials and drain covers or bungs for use in the event of a spillage.

Further advice can be obtained from the Environment Agency.

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