

Preparing Roads for Surface Dressing

1 INTRODUCTION

Surface dressing consists of preparation, design, execution and aftercare, and lack of attention to any one of these four elements can lead to premature failure. The purpose of this Guidance Note is to give advice on preparation as this is the element which, in many cases, is given the least attention.

The preparation of roads for surface dressing involves five principal operations:

- 1 Siding or edging.
- 2 Pre-patching.
- 3 Masking of ironwork and cats eyes.
- 4 Pre-sweeping.
- 5 Recording locations of road markings, covers, etc.

2 SIDING OR EDGING

- 2.1 One of the principal purposes of surface dressing is to seal the road surface against the ingress of water and, as the main concentration of water flows are in the channel of the carriageway, it is most important that they are adequately waterproofed.
- 2.2 The requirement for siding or edging can be assessed by visual inspection. Usually siding is no longer carried out as a routine maintenance operation and frequently routine sweeping of unkerbed roads has also been discontinued. Under these circumstances, debris in the road channel becomes compacted to such an extent that normal sweeping operations will not dislodge it. On lightly trafficked roads, roadside vegetation also tends to encroach onto the road itself and if both vegetation and debris are not removed it is likely that the channels will not be surface dressed and that water will, for this reason, find its way into the road foundations, leading to structural damage.
- 2.3 The quickest and easiest method of edging roads is to use a light tractor-mounted loading shovel fitted with a purpose-made rear-mounted siding plough. The plough quickly dislodges both compacted material and vegetation which can then be picked up by the loading shovel and disposed of. This operation should immediately be followed by mechanical sweeping, which should be continued until the carriageway surface is thoroughly clean. An additional Heavy Duty Brush attachment is also available from one sweeper manufacturer to assist with removing compacted edge debris. Repairs to any damage to the edge of the road should also be carried out before dressing (see section 3 of this note) to ensure the road haunches are sound.

- 2.4 Consideration should also be given at this stage to whether or not it would be necessary to carry out any hedge or tree trimming to enable surface dressing equipment to pass down the road without obstruction. This is particularly important in the case of lorries which are tipping into chipping machines and chipping machines themselves with cab mounted structures, where contact with branches or other obstructions could represent a danger to both operatives and the public.

3 PRE-PATCHING

Background

Surface Dressing seals the pavement surface, prevents water ingress and therefore stops freeze thaw action and resultant pot holing. Hence the objective should be to surface dress roads before major patching becomes necessary! Significant costs every year result from surface dressing not being applied soon enough thus allowing the ingress of water into the pavement structure, resulting in extensive damage.

Rationale

- 3.1 It is important to remember that surface dressing alone neither restores the riding quality nor directly strengthens a road surface. The purpose of pre-patching is to repair, before the dressing is carried out, any areas where there has been a loss of aggregate from the surface course, structural failure, damaged joints, potholes, unsatisfactory trench reinstatements, wheel track rutting or edge damage.
- 3.2 Consideration should be given to patching repairs/restoration and levels of iron works.

Sometimes, traffic over-runs the carriageway edge and because these areas have little or no structural foundation and lack lateral support, it will often be necessary to repair them. Pre-patching will not resolve structural weakness towards the pavement edge.

The County Surveyors Society (now ADEPT) published a Practical guide to Haunching in 1991; www.adeptnet.org.uk/assets/userfiles/documents/000109.pdf

- 3.3 Where rutting of the wheeltracks is evident, extensive patching or surface re-profiling of the rutting will be necessary. The surface dressing of roads which have ruts in the wheeltracks will seal them against the ingress of water but result in standing water during periods of wet weather, consequently resulting in icy conditions during winter and standing water the rest of the year.
- 3.4 Patching prior to surface dressing is usually limited to localised small areas, but there are occasions where extensive machine-laid patching, re-shaping and strengthening, followed by surface dressing can prove to be a very cost-effective alternative to overall resurfacing. The extent of patching works will depend very much on the character of the road and the volume and type of traffic it carries.

3.5 Choice of Materials

Wherever possible, pre-patching material should be selected to match and perform the same as the existing road surface in terms of **texture, hardness and porosity**. This will provide a uniform surface to receive the subsequent designed surface dressing. This is because it is impractical to attempt to vary the rate of application of binder over small patches which would be necessary to ensure that the correct amount of binder is applied to hold the chipping size selected for the overall general design of the road surface, based on road hardness and number of commercial vehicles per day.

The importance of ensuring a uniform surface after patching and more overly prior to surface dressing is paramount. This is a problem which can arise if a heavily trafficked road is patched with a 0/10 mm open grade surface course which is subsequently surface dressed with a raked-in 14 mm/6 mm dressing, resulting from the patches being porous and the surface dressing binder passing into the patching material, leaving the 14 mm chippings with insufficient binder to hold them in place against the traffic, and both these and the 6 mm racking material are quickly lost from the patch. In this instance, it is recommended that the patches are sealed by the means of a pad coat spray or slurry seal. The use of cementitious material for sealing is not recommended.

- 3.6 Normally it is desirable to use patching materials that match the existing road surface so that the final texture and porosity are as near as possible to the original surface. The choice of materials for patching roads which have previously been surface dressed is more difficult, but experience suggests that the use of close graded (10 and 14 mm) surface course to BS-EN 13108-1 Asphalt Concrete of similar nominal size to the existing surface dressing will give a reasonably good match in terms of texture and porosity. However, the hardness may not be exactly the same as the existing surface, but nevertheless a good compromise.
- 3.7 Fluxed materials used for pre-patching should only be used as temporary repair material and should be replaced with permanent (non-fluxed) materials prior to Surface Dressing.
- 3.8 Most highway depots maintain a small stock of patching materials retained for emergency works where, for example, a pothole or trench reinstatement requires urgent attention in the interests of safety. These materials are known as “deferred set” or “depot stock” materials and may be even softer than material manufactured for hand laying.

These materials are totally unsuitable for patching prior to surface dressing.

It is important to ensure that the materials chosen for pre-patching will perform satisfactorily for at least the designed period of time, and considerable care should be exercised in their choice having regard to the circumstances. The RSTA website www.rsta-uk.org provides further information from Association members on the range of patching and/or pot hole repair materials and processes available.

3.9 Organisation and Timing of Works

Pre-patching is an important operation, and requires planning and organisation to ensure that it is properly executed and to a high standard. This is unlikely to be the case if work is being rushed just days ahead of the surface dressing programme. **Ideally inlay patching prior to surface dressing should be carried out in the calendar year prior to the season in which the road is to be dressed.**

Where, for whatever reason, patching has not been carried out well in advance of the surface dressing operation, efforts should be made to ensure that the patched areas are sealed as far as is practicable to prevent subsequently applied surface dressing binder sinking into the patch and leaving insufficient binder at the surface to hold the surface dressing chippings pending embedment under traffic.

Several techniques have been used successfully e.g. patch spraying with bitumen binder and application of suitable type and size of aggregate. This will need to be swept prior to the dressing works; Slurry sealing to patches; application of a bituminous sealing grit to name a few, however a cement based slurry should not be used.

Some processes are now available that allow patching works to be completed just prior to the surface dressing operation.

3.10 Method of Patching

Patching is an operation which, to describe adequately, would require a guidance note of its own. Advice on patching is given in the Design Manual for Roads and Bridges Volume 7 HD 31/94 www.dft.gov.uk/ha/standards/dmrb/vol7/index.htm and Clause 946 of the Specification for Highway Works www.dft.gov.uk/ha/standards/mchw/vol1/.

- 3.11 Overband sealing with bituminous materials of any type of surface dressing patching should not be carried out as these bands of bitumen tend to leech through the dressing and form binder rich strips on the surface..

4 MASKING OF IRONWORK AND CATS EYES

- 4.1 The purpose of masking is to ensure that ironwork, reflective road studs and cat's eyes are returned to peak operational condition immediately the dressing has been completed. If manhole covers are not masked, they become fixed to their frames and the keyways are filled with binder and chippings. Similarly, if gully gratings are not properly masked, binder and chippings pass through the grating to block the gully chamber and the covers are sealed to their frames, making it very difficult to carry out the first gully emptying after dressing. If cat's eyes are not satisfactorily masked, the pads are damaged by the chippings and the action of traffic and the lenses become partly or totally obscured by binder. It is, therefore, necessary both in the interests of safety and economy that they should be adequately masked.

- 4.2 The most satisfactory material for masking is undoubtedly the use of masking tape, which is available in varying widths, is strong enough to stay in place under the action of traffic and relatively easily removed on completion of the dressing. Masking with sand is not recommended. Masking materials which have been used to cover manholes, gullies, reflective road studs and cats eyes should in all cases be removed immediately after completion of the dressing, collected and disposed of in an approved manner. Under no circumstances should they be left on the adjoining roadside verge.
- 4.3 The efficiency of reflective road studs and cats eyes following surface dressing must be maintained. Where 14 mm chippings have been used on a hard road surface, it is likely that the cat's eyes will need raising if they are to perform satisfactorily. This operation is best done after the surface dressing has been laid, taking into account the relevant regulations. In such circumstances, the cat's eyes should be removed before the dressing is done and adequately patched. Once the dressing is complete the cat's eyes should be reinstated.

5 PRE-SWEEPING

- 5.1 If there is to be good adhesion between a surface dressing binder and the existing road surface, it is essential that the existing road surface is clean and free from dust and debris. For this reason, it is important that the whole width of the carriageway is swept. One pass of the sweeper will normally be sufficient but in locations such as site entrances, bends and junctions, where vehicles brake and change direction, higher concentrations of detritus can accumulate and at such sites an additional pass of the sweeper is often necessary.
- 5.2 The most suitable piece of plant for this is a full width lorry-mounted brush or suction sweeper. Pre-sweeping will normally require two distinct operations: the first as a follow-up to a siding plough or other operations undertaken to ensure the removal of debris from the road channels described in section 2.3 of this Note, and carried out well before the dressing is undertaken, and the second is to ensure that the whole carriageway width is swept an hour or so before the dressing is commenced.
- 5.3 Remember that there is little point in paying for surface dressing chippings with less than 1% dust content if the dressing is to be applied to a road which is sufficiently dusty to prevent a good bond between the surface dressing binder and the existing road surface where the detritus material has become ingrained within the existing road surface, a sweeper fitted with power wash facilities should be used to ensure it's removal.

6 RECORDING LOCATION OF ROAD MARKINGS

- 6.1 Before surface dressing commences, a detailed and careful record should be made of the location and change points of all road markings and ironwork, that is to say lane lines, hazard lines, arrows, double line systems, "slow" road markings, "stop" and "give way" markings, manholes, hydrant covers, valves and the metal studs used to mark the node points of United Kingdom Pavement Management System (UKPMS) accredited surveys etc.

6.2 The establishment of double white line systems to the required national standards is a time consuming operation and it is essential that the position of these markings is not lost. On roads which are kerbed, discreet markings on the kerb face indicating changes in the line pattern or arrows can be neatly recorded. On unkerbed roads, records should relate to permanent features which will not be affected by the dressing. Where side roads meet main roads, it is essential that “stop” and “give way” markings and lines should be replaced as quickly as possible after the dressing and additional signs provided during the time that these markings are covered. Some authorities adopt the practice of masking “give way” and “stop” markings in order that they can be immediately reinstated after the dressing, but this is very much a matter of local policy which should be clearly established before surface dressing works are undertaken.

References

Design Manual for Roads and Bridges Volume 7 HD 31/94

www.dft.gov.uk/ha/standards/dmrb/vol7/index.htm

Clause 946 of the Specification for Highway Works

www.dft.gov.uk/ha/standards/mchw/vol1/

ADEPT - Potholes and Repair Techniques for Local Highways

<http://www.adeptnet.org.uk/assets/userfiles/documents/000079.pdf>

ADEPT / CSS Practical guide to Haunching

<http://www.adeptnet.org.uk/assets/userfiles/documents/000109.pdf>