CODE OF PRACTICE FOR SLURRY SURFACING
INCORPORATING MICROSURFACING

Machine applied microsurfacing
Hand applied Slurry surfacing
Foreword

This second edition of the Code of Practice has been produced by the RSTA Slurry surfacing Committee. It has been reviewed in the context of the European Standard for Slurry surfacing BSEN 12273 published in 2008 along with the national guidance document PD6689.

Throughout the document the term 'Slurry surfacing' also includes Microsurfacing and Microasphalt.

This document has been peer reviewed by ADEPT Soils, Materials, Design and Specifications Committee.

The information contained herein is intended to represent industry best practice. No liability is accepted by RSTA or ADEPT for any damages caused to property or personal injury resulting from using the guidance contained within this document.

RSTA is the Road Surface Treatments Association  www.rsta-uk.org

ADEPT is the Association of Directors of Environment, Economy, Planning and Transport  www.adepnet.org.UK
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1  PREAMBLE

1.1  General

To the highway engineer, Slurry surfacing offers a quick, efficient and cost effective way of maintaining skid resistance and protecting roads against the damaging effects of water and air. To obtain the best results it is necessary to give careful consideration to a wide range of detail and to plan and design the work carefully. The speed of the Slurry surfacing operation and the short duration of time during which motorists are inconvenienced is also an important issue.

The purpose of Slurry surfacing is to re-profile the road surface, to provide texture, skid resistance and prevent the ingress of water and air and therefore helping to maximise the service life of the asset.

A useful way of comparing the effectiveness of a Slurry surfacing, or other maintenance work, is to express it in terms of a ‘cost life index’. This is the cost per square metre of the work divided by the satisfactory life in years. It provides a measure of the “value for money” which the highway authority is achieving. A low ‘cost life index’ and “high value for money” is the result of high-quality work. Slurry Surfacings provide a low cost life index compared to conventional surfacings.

The purpose of this Code is to identify the important aspects of the process, and to refer to other documents relating to good Slurry surfacing practice and so give practical guidance on achieving high quality.

1.2  Health, Safety and Environment

All those involved in preparing and executing Slurry surfacing operations have a legal duty of care for the health and safety both of the operatives carrying out the works, and those who come into contact with the operation whilst in progress and during aftercare.

The planning and organising for health, safety and environmental issues must commence as soon as a Slurry surfacing programme is envisaged. The Construction Design and Management Regulations will apply to most Slurry surfacing operations and therefore clients are urged to follow closely the advice in the relevant Approved Code of Practice as they have the responsibility under the new version of the Regulations for initiating the framework for safe working practices. This will enable the CDM Co-ordinator and Principal Contractor to plan and prepare the information and documentation necessary to ensure the specific hazards are identified on the various sites and the level of risk that is envisaged. This must take into account the nature of the site, the materials to be used, the traffic management requirements and any special health, safety and environment issues that have become evident during the pre-tender stage. (ensure the right information is provided to the right people at the right time).

The client should employ a competent contractor. It is recommended that the simplest way for a client to achieve this is to select at tender stage contractors registered to National Highways Sector Scheme 13. Once the contractors have been selected, the pre-construction information contained in the tender document should be detailed enough for the prospective contractors to take account of the health, safety and environment issues in their tender submission.
On the appointment of the Principal Contractor to carry out the Slurry surfacing operations, it will be his duty to prepare a detailed Health and Safety Plan for that particular contract or works from the Pre-construction information supplied by the Client, Designers and CDM-Coordinator. This must itemise the methods to be employed to overcome the specifically identified hazards and risk reduction measures that will be in force on this contract. They must also ensure adequate welfare is provided from the start of the contract.

Once the works commence the Principal Contractor has the control of health, safety and environment matters but liaison with the client, police and the general public on issues of congestion, diversions or closures must be ongoing throughout the contract.

The Principal Contractor has additional duties under other legislation to look after the health and safety not only of his own employees but of other persons who work alongside them and also of the passing public. Written specific risk assessments must be prepared which can be used to identify control measures for both physical and chemical hazards. The measures must form the Contractor’s safe systems of work which enhance the safe behaviour of the workforce as well as protect the general public during the various stages of the works. These measures must be communicated to all involved in the project.

Account must also be taken of environmental factors with pollution from fumes, noise and dust being the main concern during the work phase. Disposal of waste and protection from spillage and contamination are other considerations when looking at the overall Slurry surfacing activity.

1.3 Training

The design of Slurry surfacing and its execution is dependent on a wide range of factors and close attention to detail.

The National Highway Sector Scheme 13 now defines the minimum qualifications required for all personnel involved in the design, supervision and installation of Slurry surfacing. It is the Association’s view that a competent qualified workforce makes a fundamental contribution to achieving high quality durable Slurry surfacing. The RSTA runs regular training courses, details of which can be obtained from the RSTA website www.rsta-uk.org/calendar.

Operatives should hold NVQ level 2 and Supervisors NVQ level 3 qualifications plus CSCS cards. Supervisors shall attend the RSTA Training course on Slurry surfacing every 5 years and obtain a silver certificate as evidence of maintained competency.

1.4 Quality Assurance.

Contractors should be certificated to ISO 9001 and be registered to National Highway Sector Scheme 13. The Sector Scheme Document, which was first published in 2003, is available on the UKAS website. www.ukas.com.

EN 12273 contains Performance Categories and PD 6689 provides examples of end performance requirements relating to road categories.
1.5 Planning and Co-ordination

Careful and detailed planning before work commences is an essential element of successful Slurry surfacing. There should be close co-ordination between contractors and their clients at every stage, commencing with a pre-works meeting, the purpose of which is to ensure total understanding of the way that the programme will proceed.

It is in the interests of both contractors and clients that the programme of works flows smoothly from site to site without the need to travel many miles for the purpose of treating small areas of road.

2 DEFINING THE SITE AND ITS CHARACTERISTICS

Before any design, planning or Slurry surfacing is undertaken, it is important to identify the lengths of road to be treated and to draw up a schedule. A clearly understandable system such as a line, arrow and job number on the road surface is recommended.

Having identified the sections of road for treatment, the Client or his representative should determine the need for weed killing or raising ironwork and also determine whether the existing road markings/studs are appropriate for reinstatement after the surfacing or whether any revised layouts are necessary. This should reduce the potential for delays once the Contractor has been appointed.

If weed killing is required then sufficient time must be allowed for die back of the weeds to occur (typically 10 days) otherwise they may reappear through the slurry surfacing. Existing road markings may need to be removed if more than 3mm thickness because the process doesn’t adhere very well onto thermoplastic materials.

3 DETERMINING THE SPECIFICATION

3.1 The selection of the right type of Slurry surfacing, nominal layer thickness and rate of spread of material is as important as the design of other engineering works. Each site must be considered in the light of its unique characteristics, including the nature of surface, geography, volume and speed of commercial and other traffic using the section of road. The contractor will select the rate of spread and thickness based on his Type Approval Installation Trial (TAIT) and experience in accordance with the guidance in PD6689.

3.2 Particular attention to the design is important to ensure the right treatment is applied according to the site parameters.

3.3 In recent years, there has been a move towards "End Performance Specifications". End Performance Specifications transfer the responsibility for the design of the Slurry surfacing to the selected contractor who is also responsible for the execution of the treatment and generally guarantees the treatment for a specified period of time. With CE Marking now mandatory it is envisaged that end performance specifications will increasingly become prevalent.

3.4 Guidance on Slurry surfacing can be found within Clause NG918 in MCHW Vol.2, available on line at;
4 SITE INFORMATION

It is important that the person in charge of Slurry surfacing operations on site fully understands the type and extent of the work required. One way of achieving this is the preparation of a schedule and map indicating the sections of road to be treated, the length and average width of each section, the area to be treated, target rate of spread of material, nominal layer thickness, any bond coat requirements and location of material storage area. The Information Sheet is usually provided following an assessment by either the client or the contractor. This information can also be provided by specifiers in Appendix 7/7 (MCHW Vol 2 NG700 Sample Appendix 7/7; http://www.standardsforhighways.co.uk/ha/standards/mchw/vol2/pdfs/MCHW_NG700.pdf).

It is recommended that the client and contractor undertake a joint walk over of the site to agree what is to be done in detail. This ensures all parties know exactly what should happen and when. This is the contractors opportunity to agree or not to carry out the work as specified. Issues that may arise are illustrated below:

- The contractor cannot do the works as planned
  - The planned TM is not safe/inappropriate
  - The timescale is too short
  - Access is impossible
  - If the site gradient is too steep
  - If trees along the site interfere with the operations
- The contractor cannot achieve the specification
  - The weather forecast is too poor e.g. >80% Relative Humidity
  - The substrate is inadequate e.g. too badly deteriorated
  - The substrate is too poor a profile without planing
  - The specified layer thickness cannot be achieved
  - The existing kerb height is too low
- The contractor cannot offer the guarantee required
  - The design is obviously not adequate for the site condition
    » e.g. a single layer of surfacing on a cracked base

The client’s representative and contractor should also consider whether the site has the potential for the occurrence for prolonged periods of standing water (submersion) which may affect the suitability of the treatment for the site and product durability.

The rate of spread in kg/m² (in accordance with BS EN 12274-6) and applied thickness is determined by the contractor.
5 PLANNING THE EXECUTION OF THE WORK

In addition to compiling the site information, the contractor’s representative supervising the treatment may need to decide which size of Slurry surfacing machine to use and where longitudinal joints are to be located.

Unless they are made with proper care, joints can become weak points on any treatment. For that reason, the number of joints made should be kept to a minimum and located to minimise water retention on the finished surface.

5.1 Site access and egress for plant and equipment should be considered during the planning stage. The authority may need to consider the removal of parked vehicles on the adjacent area to gain access into the works area.

5.2 Temporary diversions will involve consultations between contractors and the highway authority. Legal processes often need to be followed to arrange closures or diversions and these can take up to 13 weeks.


5.4 Poor planning can result in low daily output, increased costs and public criticism. Supervisory staff will give proper consideration to the order in which various sections are treated, the number of vehicle movements transporting materials to the site. Leafleting the public and street notification/signing in advance will help to inform the public of intended works and hopefully reduce public complaints.

6 CONTROLLING MATERIAL INSTALLATION

The contractor uses his experience of mix design and machine application to achieve the desired layer thickness by identifying the nominal aggregate size required in the mix design.

Slurry surfacing machines are calibrated for aggregate and binder flow rates and admixture addition to ensure material blend consistency as stipulated in Factory Production Control (FPC). The control of layer thickness and surface finish is achieved by using an adjustable screed box.

The areas to which Slurry surfacing is to be applied shall be clearly defined by the Customer’s Engineer (the Purchaser) prior to commencement of the installation work on-site.

The surface to be treated should be swept and in a clean condition prior to Slurry surfacing installation work commencing. The contractor will use his experience to use whatever means deemed necessary to ensure adequate surface preparation prior to installation to ensure good adhesion. The contractor may also consider the need for a bond coat if deemed necessary e.g. concrete roads on a housing estate.
In advance of Slurry surfacing on carriageways and footways all temporary materials must be removed and replaced with appropriate materials as specified by the Customer's Engineer (the Purchaser).

Existing extruded/screed thermoplastic road marking thickness should be checked. Significant extruded/screed thermoplastic thickness >3mm will be reflected in the finished surface profile and could be a hazard to road users. Mechanical removal is recommended to ensure even thickness and ride quality of the Slurry surfacing. In addition Slurry surfacing do not adhere well to thermoplastic road marking materials and as time goes by the thermoplastic will reappear. Removal of road markings/lines is recommended. Road studs must be removed.

Ironwork in the carriageway should be masked and the location noted. Ironwork should be raised after the new Slurry surfacing has been installed on carriageways as this avoids damaging the strike plate of the laying box. However ironwork is raised in advance of Slurry surfacing on footways. A joint inspection may be required to identify the items that require adjustment. The client’s representative determines the extent to which iron work is raised.

Where the site to be treated is showing surface irregularities Slurry surfacing can be used to regulate where necessary. Transverse regulating and carriageway shaping can be carried out over the length of the site as directed or agreed by the Customer’s Engineer (the Purchaser). Depths in excess of 10-20mm should be removed by regulating/shaping with a layer of Slurry Surfacing before placing the final Slurry surfacing surface course. This final Slurry surfacing surface course work shall not be overlaid until the contractor is satisfied that sufficient cohesive strength of the regulating/shaping layer has occurred.

The finished surface texture and appearance of Slurry surfacing is largely dependent on the mixture design and in particular the aggregate gradation and method of installation. Immediately after laying it is unlikely to have the same appearance as hot mix asphalt or surface dressing but this is not a defect. The appearance will also change over time with trafficking. Guidance on what constitutes a defect is given in BS EN 12774-8. However this has occasionally led to a difference of opinion between client and installer. If the customer is inexperienced with Slurry surfacing a site visit to a previous installation may prove beneficial.

Weather Conditions

The contractors quality plan will outline the range of weather conditions under which his Slurry Surfacing can be installed satisfactorily. There is also guidance given in the MCHW Specification for Highway Works Clause 918.

Ambient road and surface temperatures together with relative humidity are recorded daily and per individual Slurry surfacing site and if the weather is variable during the installation process. The ambient and road surface temperatures together with relative humidity are used to ensure the appropriate chemical retarding agent and water doses are applied for the prevailing conditions to ensure effective break of the bitumen emulsion. The ambient weather conditions are recorded on the Laying Record.
Installation of the Slurry surfacing is not carried out during continuously heavy rain. The Slurry surfacing can be installed on a damp substrate subject to the appropriate ambient and road surface temperatures together with relative humidity criteria being met.

If a section of the Slurry surfacing is affected by inclement weather conditions during installation then the Customer’s Engineer (the Purchaser) is notified of the estimated time period required for the affected section to harden sufficiently before trafficking in the prevailing weather conditions. A joint inspection may be required to assess the affected area.

**Installation on Carriageways**

Slurry surfacing is manufactured on site using a dedicated and purpose built applicator, which mixes and lays the material in a continuous controlled operation.

All the materials required to produce the Slurry surfacing system are delivered and stored in appropriate transport at a convenient location close to the site.

**System Installation Procedure:**

- a) The mixing of the materials is carried out in the pug mill on the dedicated and Slurry surfacing applicator.
- b) The mix constituents are added in a controlled manner to the pug mill mixer via a conveyor belt in the following sequence:
  1. Slurry surfacing conforming coarse and fine aggregates
  2. Ordinary Portland Cement filler or Lime
  3. Polymer Modified Bitumen Emulsion
  4. Potable Water
  5. Other additives

Note: Conventional Slurry surfacings without a polymer modified binder are occasionally used on carriageways.

The Slurry surfacing applicator has a control system that permits the following:

- a) Aggregate to be calibrated at the start of each season in accordance with the applicator manufacturers recommendations.
- b) The flow rate of the machine depends on the product and the process being installed. Generally most machines are calibrated at one tonne per minute.
- c) Water is added dependent upon the moisture content of the aggregate and prevailing weather and temperature conditions, i.e. the colder the temperature, the less water is added.
- d) Cement or Lime and fibres are calibrated at the start of each Slurry surfacing installation season to check that the correct amounts are being discharged in accordance with the contractors mixture design. Mixing time is approximately 30 seconds to 1 minute.

Note: BSEN12273 provides information on equipment calibration frequency.

The Slurry surfacing mix is then discharged into the Spreader Box. The Slurry surfacing mix is applied to the road as the applicator moves forward. The flow rate stays constant, however the laying speed at which the machine lays the material will depend upon the condition of the existing substrate pavement. If the existing substrate is in poor condition and open
textured, then the speed at which the Slurry surfacing applicator lays the material will be reduced to ensure the Slurry surfacing material fills the texture voids in the substrate. A single layer application for microsurfacing is usually 10 to 15 kg/m², dependent upon substrate however a slurry mixture can be from 6-10Kg/m². Two layers of Slurry surfacing may also be used if necessary.

In normal daytime weather conditions in the UK, the Slurry surfacing tends to be laid between Mid-February through to Mid-November. The Slurry surfacing site should be opened to normal trafficking in approximately 30mins, depending upon the prevailing weather conditions.

System Installation Checks by the Installer

Document PD6689 (categories for defects determined by visual assessment), table 8, provides guidance with respect to acceptable surface finish.

Maintenance and Repair

In the event that damage occurs during the installation or during service, the system shall be assessed for defects in accordance with BS EN 12274-8 and PD6689 Table 8.

7 JOINTS

Joints, both longitudinal and transverse, are potential points of weakness. Longitudinal joints should not therefore be located where they will coincide with the wheel tracks of vehicles. Consequently, the best position for a joint is on the centre line of a road or on the line separating adjacent traffic lanes. Refer to requirements in Clause 918.18 and 918.19 and BS EN 12274-8 which shows joint faults.

8 TRAFFIC MANAGEMENT

It is the responsibility of the contractor and highway authority to determine the traffic management required on site based on undertaking a site risk assessment following the guidance in Chapter 8 Traffic Signs Manual and the new RSTA ADEPT Guidance document on Temporary Traffic Management at Slurry Surfacing sites (2018)

In undertaking Slurry surfacing the needs of road users must be considered at all stages. The safety of operatives and the public whether on foot or in motor vehicles is paramount.

It must always be remembered that the needs of any site should be considered as unique and each Slurry surfacing crew should contain properly trained personnel. All sites require a site specific risk assessment undertaken by an appropriately trained and qualified person and acted upon before Slurry surfacing equipment and operatives are dispatched to the site. At some sites, this will require discussion between the contractor and representatives of the highway authority at the pre-contract stage. Where this is the case, the agreement reached between the parties should be passed on to the person controlling site operations. The National Highway Sector Scheme 12D document details these requirements.
The correct selection of traffic management system to be adopted is important. The public should not be unduly inconvenienced by detours or long delays, or the reputation of Slurry surfacing as an efficient and economic process is put at risk.

9 ROAD SURFACE PREPARATION

The Quality Plan describes the acceptable substrate conditions for application of Slurry surfacing in accordance with BSEN 12273. Any necessary remedial works to the road surface and structure shall be carried out and completed either prior to the commencement of works, or as part of the Contract, as agreed by the Overseeing Organisation, to enable the surface to conform with these requirements. Sweeping/ cleaning, pre-patching and removal of organic matter from the road surface will need to be considered pre-works.

10 BINDERS

Binders used for Slurry surfacing are cationic bituminous emulsions in nature and comply with the requirements of BS EN 13808. Polymer modified binders are now used in Microsurfacings on Carriageways particularly if the contractor feels he needs extra toughness to cope with traffic stresses.

All emulsion binders that are placed on the market for use in Slurry Surfacings must be CE marked.

11 AGGREGATES

The designer of the Slurry surfacing shall select suitable aggregate sources and sizes to ensure installed product meets the requirements of the contract for the site with respect to defects as demonstrated by the TAIT and of the required polished stone value.

12 ROLLERS AND ROLLING

Rolling is not normally necessary. The Contractors Quality Plan should state whether rolling is required and the type of roller required for that product laid on that particular class of road to ensure a durable product.

13 SURFACE PREPARATION SWEEPERS AND SWEEPING

Road preparation is important to minimise early life failures. Mechanical sweepers are used to clean the road before slurry surfacing is carried out. In extreme conditions such as heavy soiling additional measures may be required such as machine pressure washing. Specialist contractors will use their expertise to determine if any other measures need to be taken to ensure good adhesion of the Slurry Surfacing to the prepared substrate e.g. use of a bond coat.
14 ALL PLANT

The noise levels of all plant should be ascertained from manufacturers or suppliers. If they are not available, the user must take measurements themselves and ensure that all operators are provided with the correct hearing protection, where necessary. All plant and vehicles should be adequately maintained with regular inspection reports available.

15 METHOD OF WORKING

Slurry surfacing falls into the category of “mobile works”. Under this type of working, traffic will be controlled following the guidance in Chapter 8.

Additional advice is given in the RSTA/ADEPT Code of Practice – Temporary Traffic Management of Slurry surfacing. [www.rsta-uk.org/publications.htm](http://www.rsta-uk.org/publications.htm)

16 AFTERCARE

Before dealing specifically with the protection of Slurry surfacing and with aftercare and sweeping, it is worth noting a few elements of good housekeeping, which contribute to the creation of a successful treatment.

1. All masking material should be removed as soon as possible after completion and before the road is opened to uncontrolled traffic. Once lifted, the masking material should be removed from the site for disposal.

2. Any material unintentionally placed on parts of the carriageway which are not being treated or onto the kerb face, should be dealt with immediately. The longer they are left the more difficult it is to remove them.

Any post sweeping would normally be undertaken the following day or subsequently if required by the authority. Care should be taken not to disturb new treatments, although the risk of disturbance is, in practice, limited to a period of a few hours after the work has been completed.

Traffic control is also a vital element of aftercare. On main road sites and points of particular stress, it is essential that traffic control should remain in place to keep vehicle speeds low until such time as the treatment has developed adequate cohesive strength.

17 HAND APPLICATION OF SLURRY SURFACING

Footways, cycle ways, small residential estate roads, car parking areas and other areas that are not readily accessible by machine can be successfully treated by the hand application of these materials.

In many instances, the criteria and principles for machine application, set out within this document are applicable.
Typically, small, self-propelled mixer units, capable of batch mixing up to 250 kg are utilised to facilitate these works. As these mixer units do not have metered feed capabilities for the various material constituents, it is imperative that trained operatives are utilised to ensure that the material ingredients are correctly proportioned, thereby ensuring consistency of the Slurry surfacing material leaving the mixer unit.

In many instances, particularly on rural footpaths, the degree of preparatory work necessary prior to the application of the Slurry surfacing, is greater than for machine applied applications. Weed spraying, cutting back of overgrown verges, pressure washing to remove ingrained detritus and the masking of kerbs, back edgings, private driveways and all ironwork located within the footpath are all operations typically carried out.

Generally, the bitumen emulsion, aggregates, fillers and chemical additives used are the same as those utilised for machine applications. However, the Polished Stone Value (PSV) of the aggregate is not as critical for footway works and therefore there is an opportunity to use less expensive aggregates. Coloured aggregates and pigmented bitumen emulsions can be used for delineation or aesthetic purposes.

Because of the greater interface with pedestrians when working on footways and cycle ways, pedestrian management takes on greater significance and it is essential that all affected residents be given sufficient advance notification of the works and that provision be made to ensure that access problems can be overcome until such time as the material has sufficiently hardened. Safe pedestrian movement throughout the work area is of paramount importance.

It is worth noting that the drying time (i.e. the time before pedestrians or vehicular traffic can be allowed to use the new surface without causing damage to it), can be longer than for machine applications. This is due to the need to slow down the chemical reaction to ensure that operatives have sufficient time to spread and lay the material, neatly, by hand. The surface finish is agreed between the engineer and installer. Slurry surfacing material brush finished perpendicular to the kerb provides a more consistent finish and minimises the risk of retaining water.

18 TRAINING AND QUALITY ASSURANCE

It is strongly recommended that Slurry surfacing should only be installed by operatives who have an appropriate CSCS skill card underpinned by NVQ in accordance with requirements in National Highways sector Scheme 13 available from www.ukas.com. In addition supervisors should demonstrate they are maintaining competency by attending an appropriate industry accredited training course every 5 years. The RSTA run training courses throughout the year on Slurry surfacing, details of all courses at www.rsta-uk.org/calendar.htm.

Membership of the Road Surface Treatment Association is available to contractors who have third party quality assurance (BSEN ISO 9001) for the type of Slurry surfacing work they undertake.

It is now a legal requirement for contractors to have a CE mark for their Slurry Surfacing products. CE marking requires contractors to carry out a Type Approval Installation Trial (TAIT) and operate a Factory Production Control system in accordance with the
requirements contained with BS EN 12273. Public bodies are now required to purchase products carrying a CE mark.

19 END-PRODUCT SPECIFICATION CONTRACTS

In contracts using the Specification for Highway Works Clause 918 (End Performance Specification), similarly to BS EN 12273, the design of the Slurry surfacing is the responsibility of the contractor. The client will provide details of road categories and PSV/AAV requirements.

Clause 918 restricts Slurry Surfacings to use on roads carrying less than 250 cvd. If the client requires heavier trafficked sites to be treated the contractor must provide evidence of performance through third party product approvals. Local authorities may adopt different site criteria for the use of Slurry Surfacings and may choose to use such treatments on more heavily trafficked sites.

The guarantee period under Clause 918 for Microsurfacing is normally 2 years for trunk roads including motorways, heavily trafficked or high stress roads and one year for other roads. Local highway Authorities normally adopt similar requirements.
APPENDIX A

CHECK LISTS

Pre-Contract Checklist

1. Has the contractor all relevant site information i.e. location of schools, bus route, market days, events etc?

2. Have all the required notifications for Traffic Management been put in place?

3. Have TM drawings been drafted?

4. What type of traffic control is to be operated and is there enough labour to carry out the works in a safe and proper manner?

5. Have all labour received the appropriate training?

6. Has the correct and adequate plant been allocated as required under the contract?

7. Are the materials specified under the contract available when required?

8. Has the patching works been procured?

9. Has weedkilling been procured?

Site Checklist

1. Has the road been swept?

2. Is the pre-patching complete and satisfactory?

3. Has weedkilling been completed?

4. Is the road clear of parked vehicles or any other obstructions?

5. Has the works been publicised?

6. Are the correct signs in place?

7. Has all necessary street furniture been masked and locations marked?

8. Have all Thermoplastic materials (above 3mm) and cats eyes been removed?

9. Are the operatives all present and correct and wearing the relevant Personal Protection Equipment?

10. Is all the plant calibrated and in safe working order?

11. Are there enough materials available, in good condition, at the correct storage area?
12 Is the required rate of spread of Slurry surfacing known?

13 Are the weather conditions appropriate to commence work i.e. check forecast daily for high humidity levels, air temperatures and rain?

14 Is the planned method of operation safe, both to the operatives and the public?

15 What type of traffic control is to be implemented and does everybody understand the method of operation?

16 Have you planned the work with the minimum number of longitudinal joints in the correct place relative to the wheel tracks?

17 Has the ironwork been identified that requires adjustment? Has any appropriate aftercare been arranged i.e. trafficking under restricted conditions and sweeping?

18 Have samples been taken for determination of binder content in accordance with BS EN 12274-2?

Post Contract Checklist.

1 Have arrangements been made for post-contract inspections and any required further sweeping?

2 Are all temporary signs being maintained in a satisfactory condition and placement and removed when required?

3 Is the required contract information being collected and documented?

4 Have arrangements been made for line and stud replacement?

5 Are re-inspection arrangements clear and agreed?

6 Has all ironwork been treated accordingly?
APPENDIX B

GLOSSARY OF TERMS

ADEPT
Association of Directors of Environment, Economy, Planning and Transport, previously known as the County Surveyors Society (CSS).

ADHESION
The property by means of which a binder sticks to the surface of a solid body, e.g. the road or chippings.

AGGREGATES
Aggregate from mineral sources which has been subjected to nothing more than mechanical processing and which has a particular grading.

AGGREGATES STORAGE AREA
A suitable hard standing for storing graded aggregate.

AGGREGATE ABRASION VALUE
A measure of an aggregates resistance to abrasion under traffic.

APPLICATOR
A purpose built Slurry or Microsurfacing machine.

BINDER
Material serving to coat the particles of an aggregate and to assure its cohesion. The binder component of Slurry surfacing is a bituminous emulsion which may be modified with polymer or other additives.

BITUMEN
Virtually in-volatile, adhesive and waterproofing material derived from crude petroleum, or present in natural asphalt, which is completely or nearly completely soluble in toluene, and very viscous or nearly solid at ambient temperatures.

BITUMEN - MODIFIED
Bituminous binder whose rheological properties have been modified during manufacture by the use of one or more chemical agents. In this context, "chemical agent" includes natural rubber and synthetic polymers but not sulphur and certain organo-metallic compounds, oxygen or oxidation "catalysts" such as ferric chloride, phosphoric acid and phosphorus pentoxide. Fibres and inorganic powders ("fillers") are not considered to be bitumen modifiers. In Slurry surfacings modified bitumens are employed in the form of emulsions.
BITUMEN – PAVING GRADE

Bitumen used to coat mineral aggregate mainly used in the construction and maintenance of paved surfaces and hydraulic works.

BITUMEN– POLYMER MODIFIED

Modified bitumen in which the modifier used is one or more organic polymers.

BITUMEN – EMULSION

Liquid product in which a substantial amount of bitumen is suspended in a finely divided condition in an aqueous medium by means of one or more suitable emulsifying agents.

BOND

The adhesion between the Slurry surfacing material and the underlying substrate.

BREAK (EMULSION)

The coagulation of the dispersed bituminous phase of an emulsion when in contact with mineral aggregate.

BSI

British Standards Institution.

BSEN 13808

A Framework product standard for specifying cationic road emulsions.

BSEN 13043

European Product Standard for Aggregates for bituminous mixtures and surface treatments for roads, airfields and other trafficked areas.

BSEN 12273

The European Product Standard for Slurry surfacing Requirements.

ICATIONIC BITUMEN EMULSION

Emulsion in which the cation of the emulsifier is at the interface with the bitumen particle that is positively charged and in which the aqueous phase is normally acid.

CDM

The Construction (Design and Management) Regulations 2007 which place duties on clients, designers and contractors in relation to management arrangements and practical measures for construction projects.
CE MARKING

The CE marking (also known as CE mark) is a mandatory conformance mark on many products placed on the single market in the European Economic Area (EEA). The CE marking certifies that a product has met EU consumer safety, health or environmental requirements.

C E N

The European Committee for Standardization or Comité Européen de Normalisation (CEN), is a non-profit organisation whose mission is to foster the European economy in global trading, the welfare of European citizens and the environment by providing an efficient infrastructure to interested parties for the development, maintenance and distribution of coherent sets of standards and specifications.

CLAUSE 918

A clause within the MANUAL OF CONTRACT DOCUMENTS FOR HIGHWAY WORKS VOLUME 1 SPECIFICATION FOR HIGHWAY WORKS SERIES 900, Road pavements – bituminous bound materials, that specifies the use of Slurry surfacing incorporating Microsurfacing.

COST LIFE INDEX

The cost (in this case of a Slurry surfacing) expressed as the cost per square metre divided by the service life.

CPR

Construction Products Regulations.

DfT

Department for Transport.

DOPE

A liquid chemical additive, usually an emulsifier or surfactant, which is added to the Slurry material during mixing on site to retard the rate at which the mixture sets to aid workability and ease of material placement.

DURABILITY

Ability of a product to maintain its required performance, under the influence of foreseeable actions, for a reasonable economic working life.

END PERFORMANCE SPECIFICATION

A level of in service performance specified by the contract document based on the performance categories contained within BSEN 12273 and PD6689.

FACTORY PRODUCTION CONTROL (FPC)
Permanent internal control of production exercised by the producer when all the elements, requirements and provisions adopted by the producer are documented in a systematic manner in the form of written policies and procedures.

**FIBRES**

Fibres usually manufactured from polypropylene which are added into the Slurry surfacing or Micro asphalt mixture during mixing on site to reinforce the product when fully cured for enhanced flexural strength.

**HARDENED**

A term used to describe a Slurry surfacing where the surface has stabilised to a hard condition ready for overlay or trafficking.

**JOINTS**

Longitudinal or horizontal lengths along or across the pavement surface where individual layers of Slurry surfacing or Microsurfacing meet or overlap.

**LAYING RECORD**

A documented record providing details of the Slurry surfacing material laid.

**MASK**

An adhesive barrier tape or other similar material used to cover ironwork, etc to prevent contact with the Slurry surfacing during installation such that after removal these objects remain free from Slurry surfacing or binder and in full working order.

**MICRO-ASPHALT**

Alternative term often used to describe Microsurfacing.

**MIX DESIGN**

A laboratory process for determining the optimum combination of Slurry surfacing and Microsurfacing mixture components necessary to achieve the desired level of in service performance.

**NVQ**

National Vocational Qualifications (NVQ's) are work based awards in England, Wales and N.Ireland that are achieved through assessment and training. In Scotland they are known as Scottish Vocational Qualification (SVQ).

To achieve an NVQ, candidates must prove that they have the ability (competence) to carry out their job to the required standard. NVQs are based on National Occupational Standards that describe the 'competencies' expected in any given job role. Typically, candidates will work towards an NVQ that reflects their role in a paid or voluntary position. For example
someone working in an admin office role may take an NVQ in Business and Administration. There are five levels of NVQ ranging from Level 1, which focuses on basic work activities, to Level 5 for senior management.

PAVING MACHINE

Purpose built vehicle used for laying Microsurfacing with in-built mixer and able to carry all mixture components.

PD6689

Public Document 6689 provides guidance on how to use BS EN 12273 to specify Slurry surfacings and Microsurfacings in the UK.

POLISHED STONE VALUE (PSV)

A relative measure of the extent to which different types of aggregate in the surface course will polish under traffic.

PTR

An abbreviation for pneumatic-tyred roller sometimes required to compact Microsurfacings to achieve a denser more durable finish.

PUG MILL

Purpose built mixing equipment for preparing a mixture of Slurry surfacing and Micro Surfacing.

QA

An abbreviation for Quality Assurance.

QUALITY ASSURANCE

Quality assurance, or QA for short, is the systematic monitoring and evaluation of the various aspects of a Slurry surfacing operation to maximize the probability that minimum standards of quality are being attained by the production process.

Registration to BSEN ISO 9001 given to a contractor by a certification body indicates minimum standards are being attained

REGULATING

Re-profiling the existing road surface prior to treating with Slurry surfacing to remove any unacceptable defects such as ruts or potholes.

ROLLER

Mobile plant/equipment used to compact layers of Micro-asphalt.
RSTA

The Road Surface Treatments Association is the trade body representing the road surface treatments industry. www.rsta-uk.org.

SCREED MIXTURE

A Slurry mixture of aggregates, bituminous emulsion, water and additives, which is mixed and laid in-place by flowing through a levelling screed.

SECTOR SCHEME

National Highway Sector Schemes are bespoke management schemes within an ISO 9001 framework. Each scheme is managed by a separate technical advisory committee made up of representatives from across the sector, regulated by UKAS.

SLURRY SURFACING

A mixed material comprising graded aggregates, water, emulsion binder, dope and cement.

SRV

Skid Resistance Value.

TAIT

Type Approval Installation Trial (TAIT) - synonymous with Initial Type Test (ITT) which demonstrates that the characteristics of the Slurry surfaces complies with the declared characteristics according to the European Standard BS EN12273. The TAIT consists of a defined section where Slurry surfacing has been installed using Factory Production Control (FPC) and which has been submitted to performance tests after a period of one year. Detailed information is recorded to clearly identify the product, its performance and the intended uses. Also a requirement within BS.

THERMOPLASTIC

A term used to describe road markings.

TRAFFIC SIGNS MANUAL

Regulatory guidance on the use of traffic signs at mobile works. Traffic Signs Manual Chapter 8: Traffic Safety Measures and Signs for Road Works and Temporary Situations.

UKAS

United Kingdom Accreditation Service.

VOLUMETRIC PATCH

A standard test, BS EN 13036 Part 1, for measuring the texture depth of road surfaces (previously known as the sand patch test).
APPENDIX C

REFERENCES

- HD 24/06 Traffic assessment (DMRB 7.2.1).
- HD 28/04 Skidding resistance (DMRB 7.3.1).
- HD36/06 Surfacing material for new and maintenance construction (DMRB 7.5.1).
- HD 37/99 Bituminous surfacing materials and techniques (DMRB 7.5.2).

- Volume 1: Specification for Highway Works (MCHW 1) www.dft.gov.uk/ha/standards/mchw/vol1/


BRITISH STANDARDS INSTITUTION. Aggregates for bituminous mixtures and surface dressings for roads, airfields and other trafficked areas. BS EN 13043. British Standards Institution, London.


HOUSE OF COMMONS.  Control of Substances Hazardous to Health (COSHH) Regulations. Her Majesty’s Stationery Office, London.

APPENDIX D

FEEDBACK ON THIS DOCUMENT
Any observations, feedback or complaints relating to the content of this document or the process described herein should be addressed (using the form below) to:

Chief Executive  
The Road Surface Treatments Association Ltd  
Technology Centre, Science Park  
Glaisher Drive, Wolverhampton WV10 9RU

Email: enquiries@rsta-uk.org  
Tel: 01902 824325

Issue Identified:

Suggested Action:

Name:

Organization:

Address:

Contact details:

Date:
APPENDIX E

DOCUMENT CONTROL

Issue Statement

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REVISION LIST – AMENDMENTS MADE IN THIS ISSUE

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<tr>
<td>Publication dates for standards have been removed throughout.</td>
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<tr>
<td>1.1 reference to CE Marking becoming mandatory from July 2013 removed.</td>
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<td>1.4 Quality Assurance – reduced to focus mainly on NHSS13 and PD 6689.</td>
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<td>3.3 removed local authorities wanting to use locally sourced materials.</td>
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<td>4. Site information section updated.</td>
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<tr>
<td>Section 5 updated and now refers to new Guidance on Temporary Traffic</td>
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<tr>
<td>Management (TTM) for Slurry Surfacing sites.</td>
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<td>Section 6 updated in particular the section on weather conditions and</td>
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<td>installation on carriageways. System installation and maintenance and</td>
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<td>repair paragraphs reduced.</td>
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<td>Section 8 on Traffic Management mainly removed as now covered by the</td>
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<td>new Guidance on TTM.</td>
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<td>Section 10 Binders updated.</td>
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<td>Section 15 largely deleted as now covered by the TTM Guidance.</td>
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<td>Section 16 on Aftercare updated.</td>
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<td>Section 19 End Product Specification Contracts updated.</td>
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<td>Section 20 – TAIT – removed as this was relevant back in 2012 and is</td>
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