SERIES 600

BACKFILLING, COMPACTION AND REINSTATEMENT

Contents

NOTE 1: New European Standards

It is recognised that the BSI withdrew several British Standards relating to Reinstatements on 1st January 2004, in favour of new European Standards. These British Standards are repeatedly quoted in the Specification for the Reinstatements of Openings in Highways (3rd Edition) [hereafter SROH - see Note 2 below].

The HAUC (UK) Working Party intends to provide guidance as to the new European Standards in due course. Until such amendments are made to the SROH, Series 600 of the Specification continues to use the old British Standards, and has not generally been updated to reflect these Standards. References to products and properties may remain in accordance with the withdrawn British Standards.

Amendments to the SROH will be communicated by the Engineer, and may take the form of any one of the following:

1. A formal amendment to the SROH, issued by the Department for Transport, or any other Overseeing Organisations as referred in Note 1 below;
2. Reference to an update note contained in the HUAC (UK) Website;
3. Any other form of update provided by the Engineer.

Note 2: Reinstatement Specifications in Domestic Countries: The following versions of the SROH exist in the domestic countries, and should be the Specifications adopted in the relevant countries:

England – The Specification for the Reinstatements of Openings in Highways (3rd Edition) October 2010
Wales – The Specification for the Reinstatements of Openings in Highways (2nd Edition) January 2007
Scotland – The Specification for the Reinstatements of Openings in Roads (2nd Edition) October 2003
Northern Ireland – The Specification for the Reinstatement of Openings in Roads (2nd Edition) July 2006.

Reference to the term 'SROH' in this document shall be deemed to be the foregoing current version applicable in the relevant domestic country. Section references included in Series 600 of the Specification, refer to the English version of the SROH. Where the Contractor has any doubt as to the correct equivalent section reference in any of the other domestic country Reinstatement Specifications, he shall raise it to the Engineer, who will confirm the relevant section.

601 General Requirements

1 Backfilling, compaction and reinstatement shall be carried out in accordance with NRSWA 1991, and shall comply specifically with the Code of Practice for the Specification for the Reinstatement of Openings in Highways [SROH] – see Contents Page 1 of this document.

2 As the majority of carriageway reinstatements tend to be in flexible surfacing, Table 6/1 has been prepared to confirm the minimum compacted layer thicknesses for permanent reinstatements, necessary to achieve the depth of cover to apparatus for different Road Categories.

	Type 1	Type 2	Type 3	Type 4
Surface Course	40	40	40	40
Binder Course	280	245	150	60
Sub-Base	230	265	210	300
Finefill Surround	50	50	50	50
Total	600	600	450	450

Table 6/1: Flexible Road Reinstatement – Compacted Layer Thicknesses

3 Where the Contractor is permitted to reuse excavated material, this material should be stored, handled and laid so as to avoid contamination and loss of fines.

4 All excavated acceptable materials that are to reused shall be protected from excessive wetting or drying during storage.

5 The Contractor shall make his own arrangements for the stockpiling of both imported acceptable material and of excavated acceptable material for reuse. The Contractor shall ensure that he does not adversely affect stability of excavations or fills by his methods of stockpiling or use of Plant.

6 The Contractor shall keep all excavations free of water including:

(i) Arranging for the rapid removal of water:

(a) Shed on the excavation;
(b) Entering the excavation for any other source.

(ii) Lowering and maintaining by appropriate measures, the water levels in excavations, sufficiently to enable the Works to be completed.

7 Backfilling shall be undertaken immediately after the required operations preceding it have been completed.

8 Backfilling may proceed in parallel with duct laying, but shall not approach closer than 1 metre from the open end of any duct.

602 Backfilling and Surround Material to Ducts

1 Backfill materials, whether imported to site or derived from excavated materials, shall be classified in accordance with Section S5.1 of the SROH.

2 All backfill materials shall be deposited and compacted in accordance with Section S10 and Appendix A1-A12 of the SROH.

3 Materials shall be deposited in even layers and should **not** be heaped in the trench before being spread. Spreading and compaction shall be carried out evenly without dislodging, distorting or damaging ducts.

4 Class E materials, as defined in Section S5.1 of the SROH, and materials that contain particles greater than 37.5mm nominal diameter shall not be used as surround to apparatus.

5 Fine fill materials may be laid to a maximum of 50mm above the crown of the uppermost duct(s), and shall be adequately compacted in accordance with the SROH and the Engineer's requirements

6 A foamed Concrete mixture may be used for the entire finefill layer, or any part thereof, in accordance with Section S5.2 of the SROH.

7 Pre-formed modules or other protective measures maybe placed within the finefill or backfill, according to design requirements, or the requirements of the Engineer.

8 Overbanding of trench edges shall be agreed with the Engineer and the street authority. Overbanding must not exceed 40mm in width or 3mm in thickness.

603 Time Period to Achieve Permanent Reinstatement

1 Any trench not fully reinstated requires to be protected in accordance with the Code of Practice for "Safety at Street Works and Road Works" published February 2002 and, where appropriate, Chapter 8 of the Traffic Signs Manual published by the Stationery Office. The Code of Practice for "Safety at Street Works and Road Works" applies in England, Wales, Scotland and Northern Ireland.

2 Unless the Contractor shall have received a notice pursuant to Clause 7.3 if any part of a street or controlled land is opened or broken up by the Contractor he shall procure that permanent Reinstatement begins as soon after completion of any part of such works (in accordance with the Coverage Rules of Class K [Section B - Preamble to the Bill of Quantities]) as is reasonably practicable without hindering the execution or other parts of those works or of other works to be undertaken immediately or shortly thereafter. Notwithstanding the generality of the foregoing the Contractor, shall procure that Permanent Reinstatement is completed as follows:-

i) Footway within four weeks of completion of backfilling and compaction;
ii) Carriageway - Method 1 - Foam concrete within 3 working days;
iii) Carriageway - Method 2 -Permanent reinstatement using Type 1 sub-base within eight weeks.

3 The maximum length in any one day of incomplete trench per excavation gang is 10m, i.e. the maximum length of incomplete trench requiring full signing and guarding overnight.

4 Interim reinstatement must include the dressing (or trimming) of the reinstatement material to form a smooth and level joint with the surrounding surfaces, box covers, footway boxes, kerbs, other street furniture and the like. Interim reinstatement shall be to the full depth of bituminous material expected of a permanent reinstatement for the classification of road, e.g. 100mm depth on a type 4 carriageway.

604 Backfilling and Compaction Performance Tests

General

1 The Contractor should carry out the tests on the backfill at sufficient intervals and intermediate levels to ensure that the compaction requirements are being achieved on the works.

2 The Contractor is responsible for recording all tests on a form approved by the Engineer, which should be issued to the Engineer's site staff on a regular basis.

2 The representatives of the Engineer and the street authority will carry out random testing to ensure performance compliance in respect of all interim and permanent reinstatement material compaction.

Field Tests for Moisture Contents

4 Simple field tests allow quick assessments of the suitability of imported materials for compaction:-

Sand A sample of sand should be squeezed gently in the palm of the hand. The sand is at Optimum Moisture Content (OMC) when the sample shows a slight lustre and the particles bind together. The sand is too dry if the sample collapses, and too wet if free water is squeezed out of the sample.

Stone Examine a large particle. The stone is at OMC it exhibits a dull sheen with smaller fines adhering. The sample is too dry if there is no sheen and fines are free from the larger particles, and too wet when free moisture and fines amalgamate in clusters.

Compaction Performance Testing

5 The Contractor shall carry out tests on the backfill using an agreed method approved in advance by the Engineer. This Testing shall be undertaken at least once per 50 linear metres of track and, as a minimum in all cases, at least once per reinstatement gang per day.

Core Testing

5 In addition to Nuclear Density Testing, the Contractor shall undertake independent core sampling of his work.

6 For the purposes of Layer Thicknesses, the core-sampling frequency shall be a minimum of one core per 20 footway openings and one core per 20 carriageway openings, unless required otherwise by the Engineer. These cores may be 50mm diameter cores. The Engineer may instruct through variation on the proportion of cores to be taken in different surfaces, such as carriageway, or footway. Where any Works package contains a length of track in excess of 50 metres but less than 200 metres then one core shall be taken in that length of track. For track length in excess of 200 metres, cores shall thereafter be taken at a further minimum rate of one per 200 (additional) linear metres of track.

7 For the purposes of Void Compliance, the core-sampling frequency shall be a minimum of one core per 40 footway openings and one core per 40 carriageway openings, unless required otherwise by the Engineer. To complete the laboratory testing of cores for Void Compliance, 100mm diameter cores are necessary. The Engineer may instruct through variation on the proportion of cores to be taken in different surfaces, such as carriageway, or footway. Where any Works package contains a length of track in excess of 50 metres but less than 400 metres then one core shall be taken in that length of track. For track length in excess of 400 metres, cores shall thereafter be taken at a further minimum rate of one per 800 (additional) linear metres of track.

8 Void Compliance testing is necessary due to significant changes in respect of reinstatement compliance, which have been introduced in the Specification for the Reinstatements of Openings in Highways (3rd Edition – England) October 2010. Specifically, these include a move to a end-compliance methodology, as the only method of compaction compliance, rather than the historical method specification (Number of Passes.

9 With particular regard to reinstatements of flexible bound materials, such as Hot Rolled Asphalts (HRAs), Stone Mastic Asphalts (SMAs) and Bituminous Materials (to BS4987) such as Close Grained (CG) and Dense (D) materials (now commonly referred to as Asphalt Concretes) , limitations on maximum Air Void content have been introduced. Table S10.1 of Chapter S10 of the SROH indicates these limitations, which vary with material and location, such as footway or carriageway. In effect, this is an end-compliance specification (sometimes referred to as an end-product specification).

10 Except in England, for trenches less than 250mm wide, a method specification for compaction has been retained in the SROH, which relies on a set number of compaction passes over a trench for different types of bound flexible material and different items of compaction plant.