

Unit 7 Reinstatement in hot-lay bituminous materials

This unit covers the requirements that you must meet when reinstating hot-lay bituminous materials in the highway. **You must ensure that you act in accordance with all current specifications and procedures and that you follow safe working practices at all times when carrying out the activities covered in this unit. The Code of Practice specified in this unit is *Specification for the Reinstatement in Openings in Highways*.**

The unit contains the following four elements, which you must cover:

- 7.1 Prepare layer of pavement structure to receive hot-lay surfacing materials
- 7.2 Construct bituminous base (roadbase) and binder course
- 7.3 Construct asphalt surface course
- 7.4 Dispose of surplus materials

In element 7.1, you will need to prepare the layer of pavement to receive hot-lay surfacing materials. This will include removing interim reinstatement material and loose matter from the area to be reinstated, and making good any defects in the pavement layer. You must also re-position displaced ironwork, kerbs and edge restraints and check that the pavement layer construction is correct.

In element 7.2, you will construct the hot-lay bituminous base (roadbase) and/or binder course, selecting the appropriate equipment to use for the prescribed operation. You will need to ensure that you handle and store hot bituminous material appropriately, and that you check the temperature of the bituminous material before you lay it. When you have laid the material, you complete the compaction of the layer correctly. You must also ensure that you maintain specialist tools at the correct temperature for working with hot bituminous material.

In element 7.3, you will construct an asphalt surface course, applying a tack coat as necessary. You will need to ensure that you use appropriate hand tools and compaction equipment for the operation, that you handle and store hot bituminous material appropriately, and that you check the temperature of the material before laying it. You must complete the compaction of the material correctly. You must ensure that specialist tools are maintained at the correct temperature for working with hot bituminous material, and that you make provision for the appropriate level of skid resistance in the surface course.

In element 7.4, you will dispose of surplus material. You will need to identify materials that are unsuitable for re-use or are surplus to requirements, and ensure that safe temporary storage is provided for them on site. You must load all materials for disposal safely for transportation, using the appropriate equipment, and you must leave the site in a clean and safe condition.

Please note: *You must use metric units of linear measurement when undertaking this unit.*

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Element 7.1 Prepare layers of pavement structures to receive hot-lay surfacing materials

Performance criteria	
<p>You must show that:</p> <ul style="list-style-type: none"> a) you select appropriate equipment to remove interim reinstatement material b) you remove interim reinstatement material to the correct depth c) you remove loose and deleterious matter from the area to be reinstated using the appropriate equipment d) you identify and rectify any pavement layer surface contamination e) where edge damage has occurred or where undercut is evident, you prepare the area to be surfaced by trimming back correctly, using the appropriate equipment f) you re-position displaced ironwork, kerbs and edge restraints in accordance with established levels, using the appropriate equipment g) you confirm that the pavement layer construction is correct h) you follow safe working practices for preparing the pavement structure to receive hot-lay surfacing materials, that are in accordance with current relevant specifications and procedures 	
Knowledge requirements	Related performance criteria
<p>You need to know:</p> <ul style="list-style-type: none"> 1 the appropriate equipment to use for removing interim reinstatement material 2 the correct depth for removal of interim reinstatement material, and how to check for this 3 how to remove loose matter from the area to be reinstated 4 the implications of pavement layer surface contamination, and how to identify and rectify contamination 5 how to identify edge damage and undercut, and correct procedures for trimming back 6 how and where to re-position displaced ironwork, kerbs and edge restraints 7 how to confirm that the pavement layer construction is correct, the checks to make to ensure this and the implications of incorrect pavement layer construction 8 safe working practices for preparing the pavement structure to receive hot-lay surfacing materials 	<ul style="list-style-type: none"> a b c d e f g all
Range to be covered	
<ul style="list-style-type: none"> I. You must show that appropriate equipment includes: <ul style="list-style-type: none"> i. appropriate hand tools - including square and round-mouth shovels, hand pick, hard bristle broom, profile boards and measuring tape ii. appropriate powered equipment – including breakout equipment and pavement saw II. You must show that <ul style="list-style-type: none"> i. safe use of tools and equipment ii. use of appropriate personal protective equipment, including as necessary: <ul style="list-style-type: none"> • high visibility jacket or waistcoat • hard hat • ear defenders • eye protection visor/goggles • dust mask • gloves • protective footwear • waterproof clothing iii. use of risk assessment methods to identify and control and hazards on site iv. precautions to minimise danger or inconvenience to road users v. precautions to minimise danger or inconvenience to site personnel vi. precautions to minimise damage to equipment or apparatus 	

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Element 7.1 Prepare layers of pavement structures to receive hot-lay surfacing materials

Range to be covered (contd.)

- III. You must show that **specifications and procedures** are:
- Health and Safety Executive Guidelines (HSG 185: Health and Safety in Excavations)
 - Specification for the Reinstatement of Openings in Highways
 - manufacturer's operating procedures for powered equipment

Evidence requirements

- Your evidence must cover all the performance criteria, all the knowledge requirements and all the range items listed in this element.
- You must complete the following tasks for a previously reinstated or interim surfaced excavation in a Type 2 actual or simulated carriageway:
 - Remove interim reinstatement material and loose and deleterious matter.
 - Confirm correct cavity depth.
 - Make good sub-base defects.
 - Trim trench edges, eliminating undercutting.
 - Re-position the highway ironwork, kerbs and edge restraints.

Specification of works

- The assessment must take place at a site with physical characteristics that conform to the definition of 'street' at section 48 or 'road' at section 107 of the New Roads and Street Works Act 1991 and with the requirements for a Type 2 carriageway.
- The interim surfaced excavation must have a minimum surface area of 1.2 metres.

Assessment conditions

- The assessment will be undertaken by a qualified assessor, who will observe you preparing layers of pavement structures to receive hot-lay surfacing materials.
- The site at which you are assessed must conform to the specifications listed above. Real equipment must be used, that complies with the requirements of the Code of Practice.
- Where you provide supplementary evidence of competence from your workplace, which includes a documented observation report, a qualified Street Works operative, supervisor or assessor must provide this.

Additional information for candidates and assessors

- The adopted specification for the works should correspond to *Specification for the Reinstatement of Openings in Highways* and *Safety at Street Works and Road Works A Code of Practice* under the New Roads and Street Works Act 1991. The following sections of the Specification provide particular guidance on various items within the performance criteria:

- S6.4.1 Hot Rolled Asphalt (HRA) Surface materials
- NG6.4.1 Hot Rolled Asphalt Surfaces
- S8.3.4 Other asphalt footways, footpaths or cycle tracks
- A2.1 Hot Rolled Asphalt (HRA) Materials
- A10.1 Requirements for a bituminous material transporter
- A11.3 Surface course materials specification
- S6.4.5.3 Edge and base preparation in porous asphalt
- viii. S6.5 Base and edge preparation, including:
 - S6.5.2.3 Proximity to road edges, ironwork, etc.
 - S6.5.2.4 Undercutting and trim back
- NG6.5 Notes for guidance on base and edge preparation
- ix. S8.3.7 Edge requirements in footways and cycle tracks
- x. S9.2 Adjacent road structures, including kerbs and edge restraints.

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Element 7.2 Construct bituminous base (roadbase) and binder course

Performance criteria	
You must show that:	
a) you select, spread and level hot bituminous material in base (roadbase) and/or binder course using the appropriate equipment	
b) you select the appropriate equipment for compaction, ensure that it is fit for purpose and use it correctly	
c) you handle and store hot bituminous material appropriately	
d) you check the temperature of the bituminous material before laying it	
e) you complete the compaction of the bituminous material correctly using the appropriate equipment	
f) you maintain specialist tools at the correct temperature for working with hot bituminous material	
g) you seal the edges correctly	
h) you follow safe working practices for constructing a bituminous base (roadbase) and a binder course, that are in accordance with current relevant specifications and procedures	
Knowledge requirements	Related performance criteria
You need to know:	
1 how to ensure that the selected material is of suitable quality	a
2 the correct procedures for spreading and levelling bituminous material in base (roadbase) and/or binder course layers	a
3 how to select appropriate hand tools and compaction equipment for constructing a bituminous base (roadbase) and/or binder course and how to ensure that they are fit for purpose	b
4 appropriate handling and storage procedures for hot-lay bituminous material	c
5 the correct procedures for checking the temperature of hot-lay bituminous material prior to laying	d
6 the correct procedures for the compaction of hot bituminous material and how to confirm that compaction is complete	e
7 the correct operating temperatures for specialist tools used for working with hot-lay bituminous material, and how to maintain them	f
8 correct procedures for sealing edges	g
9 safe working practices for constructing a bituminous base (roadbase) and/or binder course	all
Range to be covered	
I. You must show that material includes:	
i. dense binder course materials to BS 4987 (20 mm nominal stone size), hot rolled asphalt 50/20 binder course	
ii. close graded surface course materials to BS 4987 (10 mm stone size), hot rolled asphalt 30/14 surface course	
<i>(NOTE: In small excavations and narrow trenches, the preferred binder course mixture may be replaced by any surface course mixture given in the Specification, for the respective road Type, provided the same mixture is used as the surface course.)</i>	

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Element 7.2 Construct bituminous base (roadbase) and binder course

Range to be covered (contd.)

- II. You must show that **appropriate equipment** includes:
- appropriate hand tools - including square mouth shovel, rake, hot hand tamper, tool heater, wheelbarrow, hard bristle broom, water butt, probe thermometer and profile board
 - appropriate powered equipment - including vibrotamper, vibrating roller or vibrating plate
- III. You must show that **safe working practices** include:
- safe use of tools and equipment
 - use of appropriate personal protective equipment, including as necessary:
 - high visibility jacket or waistcoat
 - hard hat
 - ear defenders
 - eye protection visor/goggles
 - dust mask
 - gloves
 - protective footwear
 - waterproof clothing
 - use of risk assessment methods to identify and control any hazards on site
 - precautions to minimise danger or inconvenience to road users
 - precautions to minimise danger or inconvenience to site personnel
 - precautions to minimise damage to equipment or apparatus
 - safe working practices for working with molten bitumen
 - personal hygiene measures in connection with skin contamination
- IV. You must show that **specifications and procedures** are:
- Health and Safety Executive Guidelines (HSG 185: Health and Safety in Excavations)
 - Specification for the Reinstatement of Openings in Highways
 - manufacturer's operating procedures for compaction equipment

Evidence requirements

- Your evidence must cover all the performance criteria, all the knowledge requirements and all the range items listed in this element.
- You must complete the following tasks for a previously reinstated or interim surfaced excavation in a Type 2 actual or simulated carriageway:
 - Assemble, position and use tool heater.
 - Maintain material temperature.
 - Check quality of material visually.
 - Apply tack coat as necessary to base (roadbase).
 - Place and compact material.

Specification of works

- The assessment must take place at a site with physical characteristics that conform to the definition of 'street' at section 48 or 'road' at section 107 of the New Roads and Street Works Act 1991 and with the requirements for a Type 2 carriageway.
- The interim surfaced excavation must have a minimum surface area of 1.2 metres.

Assessment conditions

- The assessment will be undertaken by a qualified assessor who will observe you constructing a bituminous base (roadbase) and binder course.
- The site at which you are assessed must conform to the specifications listed above. Real equipment must be used, that complies with the requirements of the Code of Practice.
- Where you provide supplementary evidence of competence from your workplace, which includes a documented observation report, a qualified Street Works operative, supervisor or assessor must provide this.

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Element 7.2 Construct bituminous base (roadbase) and binder course

Evidence requirements (contd.)

Additional information for candidates and assessors

- The adopted specification for the works should correspond to *Specification for the Reinstatement of Openings in Highways* and Health and Safety Executive Guidelines. Other related specifications include safe working practices for working with molten bitumen, tool-heating procedures and personal hygiene measures in connection with skin contamination. The following sections of the Specification provide particular guidance on various items within the performance criteria. You should also check the Notes for Guidance on the selected items for any further advice.
 - i. S6.1.3 Permanent binder course reinstatement
 - ii. S6.1.4 Permanent base (roadbase) reinstatement
 - iii. S6.3.3 Base (roadbase) equivalence
 - iv. S6.4 Surface reinstatement, including:
 - S6.4.5.3 Reinstatement of porous asphalt and edge sealing requirements
 - S6.4.9 Single course construction
 - v. S6.5.2.2 Edge sealing
 - vi. S6.5.2.5 Overbanding
 - vii. S8.1.3 Permanent binder course reinstatement
 - viii. S8.2.2 Small reinstatements
 - ix. S8.3.7 Edge sealing and overbanding in footways and cycle tracks
 - x. S10 Compaction requirements for various bituminous layers within the road structures
 - xi. A2.1-2.3 Requirements for hot-lay binder course and base (roadbase) materials, including HRA, SMA and coated materials.

Unit 7 Reinstatement in hot-lay bituminous materials

Element 7.3 Construct asphalt surface course

Performance criteria	
You must show that:	
<ul style="list-style-type: none"> a) you apply tack coat as necessary b) you select, spread and level hot bituminous material in a surface course layer using the appropriate equipment c) you select the appropriate equipment for compaction, ensure that it is fit for purpose and use it correctly d) you handle and store hot bituminous material appropriately e) you check the temperature of hot bituminous material before laying it f) you complete the compaction of the bituminous material correctly using the appropriate equipment g) you make adequate provision for skid resistance in the surface course h) you maintain specialist tools at the correct temperature for working with bituminous material i) you follow safe working practices for constructing an asphalt surface course that are in accordance with current relevant specifications and procedures 	
Knowledge requirements	Related performance criteria
You need to know:	
1 the correct procedures and requirements for applying tack coat	a
2 how to ensure that the selected material is of suitable quality	b
3 correct procedures for spreading and levelling bituminous material in surface course layer	b
4 how to select appropriate hand tools and compaction equipment appropriate for the construction of an asphalt surface course and how to ensure that they are fit for purpose	b, c
5 appropriate handling and storage procedures for hot-lay bituminous material	d
6 the correct procedures for checking the temperature of hot lay bituminous material prior to laying	e
7 the correct procedures for the compaction of hot bituminous materials and how to confirm that compaction is complete	f
8 the correct procedures for making the surface course skid resistant	g
9 the correct operating temperatures for specialist tools used for working with hot-lay bituminous material, and how to maintain them	h
10 safe working practices for constructing an asphalt surface course	all
Range to be covered	
<ul style="list-style-type: none"> I. You must show that material includes: <ul style="list-style-type: none"> i. hot rolled asphalt 30/14 surface course, 50 penetration binder bitumen ii. Close graded surface course materials to BS 4987 (10 mm stone size) iii. pre-coated 20 mm chippings iv. edge sealants v. tack coat 	

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Element 7.3 Construct asphalt surface course

Range to be covered (contd.)

- II. You must show that **appropriate equipment** includes:
- appropriate hand tools - including square mouth shovel, rake, hot hand tamper, tool heater, wheelbarrow, hard bristle broom, bitumen bucket, edge seal applicator, Turk's head brush, water butt, probe thermometer and profile board
 - appropriate powered equipment: vibrating roller or vibrating plate
- III. You must show that **safe working practices** include:
- safe use of tools and equipment
 - use of appropriate personal protective equipment, including as necessary:
 - high visibility jacket or waistcoat
 - hard hat
 - ear defenders
 - eye protection visor/goggles
 - dust mask
 - gloves
 - protective footwear
 - waterproof clothing
 - use of risk assessment methods to identify and control any hazards on site
 - precautions to minimise danger or inconvenience to road users
 - precautions to minimise danger or inconvenience to site personnel
 - precautions to minimise damage to equipment or apparatus
 - safe working practices for working with molten bitumen
 - personal hygiene measures in connection with skin contamination
- IV. You must show that **specifications and procedures** are:
- Health and Safety Executive Guidelines (HSG 185: Health and Safety in Excavations)
 - Specification for the Reinstatement of Openings in Highways
 - manufacturer's operating procedures for compaction equipment

Evidence requirements

- Your evidence must cover all the performance criteria, all the knowledge requirements and all the range items listed in this element.
- You must complete the following tasks for a prepared excavation in an actual or simulated carriageway:
 - Apply tack coat to binder course.
 - Seal edges.
 - Spread material.
 - Achieve surcharge of uncompacted layer.
 - Compact layers.
 - Apply pre-coated chippings to asphalt surface and roll in.

Specification of works

- The assessment must take place at a site with physical characteristics that conform to the definition of 'street' at section 48 or 'road' at section 107 of the New Roads and Street Works Act 1991.
- The interim surfaced excavation must have a minimum surface area of 1.2 metres.

Assessment conditions

- The assessment will be undertaken by a qualified assessor, who will observe you constructing an asphalt surface course.
- The site at which you are assessed must conform to the specifications listed above. Real equipment must be used, that complies with the requirements of the Code of Practice.
- Where you provide supplementary evidence of competence from your workplace, which includes a documented observation report, a qualified Street Works operative, supervisor or assessor must provide this.

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Element 7.3 Construct asphalt surface course

Evidence requirements (contd.)

Additional information for candidates and assessors

- The adopted specification for the works should correspond to *Specification for the Reinstatement of Openings in Highways* and Health and Safety Executive Guidelines. Other related specifications include safe working practices for working with molten bitumen, tool-heating procedures and personal hygiene measures in connection with skin contamination. The following sections of the Specification provide particular guidance on various items within the performance criteria. You should also check the Notes for Guidance on the selected items for any further advice.

- i. S2.6 Skid resistance of the surface course (see NG2.6)
- ii. S6.1.4 Interim surface course reinstatement
- iii. S6.4.1 Reinstatement of HRA surface course
- iv. S6.4.3 Reinstatement of surface course materials to BS 4987 on (previously known as 'macadam')
- v. S6.4.5.3 Reinstatement of porous asphalt and edge sealing requirements
- vi. S6.4.9 Single course construction
- vii. S6.5.2.2 Edge sealing
- viii. S6.5.2.5 Overbanding
- ix. S8.1.4 Permanent surface course reinstatement
- x. S8.2.2 Small reinstatements
- xi. S8.3.3 Reinstatement of footways and cycle tracks with other material to BS 4987
- xii. S8.3.7 Edge sealing and overbanding in footways and cycle tracks
- xiii. S10 Compaction requirements for various bituminous layers, including surface course, within the road structures
- xiv. A2.1-2.3 Requirements for hot-lay surface course materials, including HRA, SMA and Coated materials

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Element 7.4 Dispose of surplus materials

Performance criteria									
<p>You must show that:</p> <ol style="list-style-type: none"> you identify materials that are unsuitable for re-use or surplus to requirements and provide safe temporary storage for them on site you load all types of materials for disposal safely for transportation to the designated disposal area, using the appropriate equipment and at the appropriate time you leave the site in a clean and safe condition you follow safe working practices for disposing of surplus materials that are in accordance with current relevant specifications and procedures 									
Knowledge requirements	Related performance criteria								
<p>You need to know:</p> <ol style="list-style-type: none"> how to determine whether materials are unsuitable for re-use or surplus to requirements how to store unsuitable materials away from re-usable materials on site, and the distance required between them to ensure re-usable or imported materials are not contaminated how to load materials safely for transportation the time limit to impose in removing surplus materials the action to take to leave the site in a clean and safe condition at the conclusion of works safe working practices for disposing of surplus materials 	<p>a</p> <p>a</p> <p>b</p> <p>b</p> <p>c, d</p> <p>all</p>								
Range to be covered									
<ol style="list-style-type: none"> You must show that materials are: <ol style="list-style-type: none"> Unsuitable surplus materials Surplus materials that are suitable for re-use You must show that the appropriate equipment for disposing of surplus materials includes: <ol style="list-style-type: none"> Square mouth shovel Hard bristle broom You must show that safe working practices are: <ol style="list-style-type: none"> Safe use of tools and equipment Use of appropriate personal protective equipment, including as necessary: <table border="0"> <tr> <td>• high visibility jacket or waistcoat</td> <td>• dust mask</td> </tr> <tr> <td>• hard hat</td> <td>• gloves</td> </tr> <tr> <td>• ear defenders</td> <td>• protective footwear</td> </tr> <tr> <td>• eye protection visor/goggles</td> <td>• waterproof clothing</td> </tr> </table> use of risk assessment methods to identify and control any hazards on site precautions to minimise danger or inconvenience to road users precautions to minimise danger or inconvenience to site personnel precautions to minimise damage to equipment or apparatus safe working practices for working with molten bitumen personal hygiene measures in connection with skin contamination 		• high visibility jacket or waistcoat	• dust mask	• hard hat	• gloves	• ear defenders	• protective footwear	• eye protection visor/goggles	• waterproof clothing
• high visibility jacket or waistcoat	• dust mask								
• hard hat	• gloves								
• ear defenders	• protective footwear								
• eye protection visor/goggles	• waterproof clothing								

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Element 7.4 Dispose of surplus materials

Range to be covered (contd.)

- IV. You must show that **specifications and procedures** are:
- i. Health and Safety Executive Guidelines (HSG 185: Health and Safety in Excavations)
 - ii. Specification for the Reinstatement of Openings in Highways

Evidence requirements

- Your evidence must cover all the performance criteria, all the knowledge requirements and all the range items listed in this element.
- You must complete the following tasks for a surfaced area of an actual or simulated carriageway following reinstatement in hot-lay bituminous materials:
 - A. Identify, provide safe temporary storage for and load surplus materials for disposal.
 - B. Clean the site.

Specification of works

- The assessment must take place at a site with physical characteristics that conform to the definition of 'street' at section 48 or 'road' at section 107 of the New Roads and Street Works Act 1991.

Assessment conditions

- The assessment will be undertaken by a qualified assessor, who will observe you disposing of surplus materials following reinstatement in hot-lay bituminous materials.
- The site at which you are assessed must conform to the specifications listed above. Real equipment must be used, that complies with the requirements of the Code of Practice.
- Where you provide supplementary evidence of competence from your workplace, which includes a documented observation report, a qualified Street Works operative, supervisor or assessor must provide this.

Additional information for candidates and assessors

- The adopted specification for the works should correspond to *Specification for the Reinstatement of Openings in Highways*. The following section of the Specification refers particularly to re-usable materials:
 - i. S3.3.2 indicates that any "excavated material which is unsuitable for re-use should be removed from site as soon as practicable."