

Unit 14 Monitoring reinstatement in bituminous materials

This unit covers the requirements that you must meet when monitoring reinstatement in bituminous materials. **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 of Openings in Highways*.**

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

- 14.1 Monitor selection of bituminous materials for use in flexible carriageway and footway reinstatement
- 14.2 Monitor selection of plant for use in the compaction of bituminous materials
- 14.3 Monitor the construction of flexible base (roadbase) and surface layers
- 14.4 Monitor site safety

In element 14.1, you will monitor the selection and storage of bituminous materials for use in reinstatement. You must ensure that appropriate materials are selected for use, and that the on-site storage arrangements for materials are appropriate and safe. You must also ensure that sufficient quantities of materials are obtained for the prescribed operation, and you must show that you know the remedial action to take where you identify any deficiencies in the selection and storage of the materials.

In element 14.2, you will need to monitor the selection of the compaction plant for bituminous materials, ensuring that the appropriate considerations are taken into account, including its efficiency, its suitability to the location, materials and site dimensions and access provisions, and that it is the most suitable plant to use when compared with other permitted options. You must also ensure that the necessary safety checks have been carried out to ensure that the equipment is fit for purpose. Where you identify any problems with the selection of the plant, you must show that you know the appropriate remedial action to take.

In element 14.3, you will monitor the construction of flexible base (roadbase) and surface layers, checking that the layers are constructed according to the specification, and that appropriate equipment and materials are used for the operation. You must also check that materials are correctly used, the appropriate degree of compaction is carried out, that the layers are of the required thickness and within permitted tolerances. You must ensure that the texture depth and finished surface level is correct, that the profile of the surface is within permitted tolerances and that you inspect the surface for visual defects. You will need to show that you know the remedial action to take where any problems are identified with the construction of the layers.

In element 14.4, you will monitor site safety throughout reinstatement in bituminous materials, ensuring that health and safety requirements are met in respect of site operations and site conditions. You will need to ensure that the appropriate equipment is available on site, in sound working condition, and that safe working practices are followed throughout the operation. You must show that you know what action must be taken to remedy any risks to site safety.

Please note: You must use the following measurements when undertaking this unit:

- linear metric
- volume (cubic metres)
- percentage density (tonnes (Mg) per cubic metres)
- rate of spread
- crushing strength (Newtons per square millimetres)

Unit 14 Monitoring reinstatement in bituminous materials

Element 14.1 Monitor selection of bituminous materials for use in flexible carriageway and footway reinstatement

Performance criteria	
<p>You must show that:</p> <ol style="list-style-type: none"> you ensure that the bituminous materials selected for use are correctly identified and checked against the range of permitted materials you ensure that the quantities of materials selected for use are sufficient to meet the requirements of the reinstatement operation you ensure that safe on-site storage arrangements are made for the materials selected you ensure that safe working practices are followed for the selection and storage of bituminous materials that are in accordance with current relevant specifications and procedures you identify any problems with the selection and storage of bituminous materials and demonstrate that you know the appropriate remedial action to be taken 	
Knowledge requirements	Related performance criteria
<p>You need to know:</p> <ol style="list-style-type: none"> the range of bituminous materials permitted in the specification the factors influencing the selection of bituminous materials (including constituent mix for hot rolled asphalts, temperature limits for hot bituminous materials, polished stone values, aggregate abrasion values, penetration grade of binders, constituent mix for hot dense bituminous materials to BS 4987) and the consequences of using unsuitable bituminous materials how to ensure that the correct quantities of materials are selected for use appropriate and safe on-site storage procedures for bituminous materials safe working practices for the selection and storage of bituminous materials problems which occur when selecting and storing bituminous materials and the appropriate remedial action to be taken 	<p>a</p> <p>a</p> <p>b</p> <p>c</p> <p>all</p> <p>e</p>
Range to be covered	
<ol style="list-style-type: none"> You must show that the materials include: <ol style="list-style-type: none"> deferred set materials to BS 4987 for interim reinstatement permanent cold-lay surfacing material for interim/permanent reinstatement dense binder course materials to BS 4987 (20 mm stone size) (for permanent reinstatement) hot rolled asphalt (for permanent reinstatement) close graded surface course materials to BS 4987 (10 mm stone size) (for permanent reinstatement) hot rolled asphalt 30/14 surface course <p><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></p> 	

Unit 14 Monitoring reinstatement in bituminous materials

Element 14.1 Monitor selection of bituminous materials for use in flexible carriageway and footway reinstatement

Range to be covered (contd.)

- II. You must show that **safe working practices** include:
- i. safe use of tools and equipment
 - ii. 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
 - iii. use of risk assessment methods to identify and control any 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
 - vii. safe working practices for working with molten bitumen
 - viii. personal hygiene measures in connection with skin contamination
- III. You must show that **specification 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 an actual or simulated site situation:
 - A. Monitor the selection of bituminous materials for use in carriageway/footway reinstatement.
 - B. Monitor the on-site storage arrangements for bituminous materials.

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 monitoring the selection of bituminous materials for use in flexible carriageway and footway reinstatement.
- 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.
- It is recognised that candidates for this unit are sometimes observed monitoring reinstatement activities as shown on videotape. Where this takes place, the videotape used must meet the following requirements:
 - a) the reinstatement activities shown must conform to the specification detailed above
 - b) the activities shown must allow candidates to carry out all the tasks specified above, and must cover the performance standards for this element in full.
- If you are observed monitoring the reinstatement of sub-base and base (roadbase) as shown on a videotape, you must provide supplementary evidence of competence from the workplace. Where this includes a documented observation report, a qualified Street Works 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 sections of the Specification provide particular guidance on various items within the performance criteria:
 - i. S5.3.1 Frost heave susceptibility criterion of bituminous material
 - ii. S6.4 Surface reinstatement materials, including HRA, SMA and other materials (also see NG6.4)
 - iii. S10.2.3 Compaction requirements of bituminous materials
 - iv. A2 Key to different bituminous materials (and their selection)
 - v. A9 Alternative reinstatement materials (ARMs)
 - vi. A10 Permanent cold-lay surfacing materials – (PCSMs)
 - vii. A11 Bitumen binder equivalence

Unit 14 Monitoring reinstatement in bituminous materials

Element 14.2 Monitor selection of plant for use in the compaction of bituminous materials

Performance criteria	
<p>You must show that:</p> <ul style="list-style-type: none"> a) you ensure that the efficiency of the compaction plant selected is checked for suitability to the location and materials b) you ensure that the selected compaction plant is checked for suitability to the dimensions and access provisions of the site c) you ensure that the selected compaction plant is the most suitable one to use when compared to the other permitted options d) you ensure that safety checks have been carried out to ensure that the selected compaction plant is fit for purpose e) you ensure that safe working practices for the selection and use of plant are followed, that are in accordance with the current relevant specifications and procedures f) you identify any problems with the selection of the compaction plant and demonstrate that you know the appropriate remedial action to be taken 	
Knowledge requirements	Related performance criteria
<p>You need to know:</p>	
1 the factors to consider in selecting a compaction plant that is suitable to the location and materials	a
2 how to check the suitability of a compaction plant to the dimensions and access provisions of the site	b
3 how to select the most suitable compaction plant from several permitted options	c
4 how to ensure that the compaction plant is fit for purpose	d
5 safe working practices for the selection and use of compaction plant	all
6 problems which occur when selecting compaction plant and the appropriate remedial action to be taken	f
Range to be covered	
<p>I. You must show that the compaction plant includes:</p> <ul style="list-style-type: none"> i. vibrotamper ii. vibrating plate iii. vibrating roller iv. percussive rammer <p>II. You must show that safe working practices include:</p> <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 any 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 vii. safe working practices for working with molten bitumen viii. personal hygiene measures in connection with skin contamination 	

Unit 14 Monitoring reinstatement in bituminous materials

Element 14.2 Monitor selection of plant for use in the compaction of bituminous 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 an actual or simulated site situation:
 - Monitor the selection of compaction plant for the compaction of bituminous 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.

Assessment conditions

- The assessment will be undertaken by a qualified assessor, who will observe you monitoring the selection of a plant for use in the compaction of bituminous material.
- 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.
- It is recognised that candidates for this unit are sometimes observed monitoring reinstatement activities as shown on videotape. Where this takes place, the videotape used must meet the following requirements:
 - the reinstatement activities shown must conform to the specification detailed above
 - the activities shown must allow candidates to carry out all the tasks specified above, and must cover the performance standards for this element in full.
- If you are observed monitoring the reinstatement of sub-base and base (roadbase) as shown on a videotape, you must provide supplementary evidence of competence from the workplace. Where this includes a documented observation report, a qualified Street Works 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 sections of the Specification provide particular guidance on various items within the performance criteria:
 - S10 (Compaction Requirements)* gives a detailed account of the range and limitations of the use of different compaction plants, including:
 - S10.3 (Equipment Operation and Restrictions)* requires all compaction equipment to be used in accordance with the requirements of Appendix A8.
 - NG10.3.6 (Other Compaction Equipment)* permits the use of other compaction plants not referenced in Appendix A8. Machine-mounted, modified and other alternative compaction equipment may be permitted for the compaction of reinstatement materials, in accordance with the relevant requirements.
 - NG1.6 (Alternative Compaction Equipment)* allows the use of alternative compaction equipment, including any compaction devices not specifically permitted within Section S10 and Appendix A8, providing it has been proven to be capable of achieving the same degree of compaction as any other option permitted in Appendix A8.
 - Appendix A8 (*Compaction Requirements*) provides details regarding the amount of compaction necessary for various compaction plants.

Unit 14 Monitoring reinstatement in bituminous materials

Element 14.3 Monitor the construction of flexible base (roadbase) and surface layers

Performance criteria	
You must show that:	
<ul style="list-style-type: none"> a) you ensure that the construction of the base (roadbase) and flexible surface layers is carried out in accordance with the specification, the existing pavement structure and road type, using the appropriate materials and equipment b) you check the construction of the layers, using the appropriate equipment, with regard to the use of materials, layer thickness, degree of compaction and permitted tolerances c) you check that the texture depth and the finished level of the surface reinstatement is correct d) you ensure that the profile of the finished surface is within permitted tolerances e) you inspect the surface for visual defects f) you ensure that safe working practices are followed for the construction of flexible base (roadbase) and surface layers, that are in accordance with current relevant specifications and procedures g) you identify any problems with the construction of the base (roadbase) and surface layers and demonstrate that you know the appropriate remedial action to be taken 	
Knowledge requirements	Related performance criteria
You need to know:	
1 how to interpret the specification accurately with regard to the construction of the base (roadbase) and flexible surface layers for different pavement structures and road types	a
2 how to check the construction of the layers for the correct use of materials, layer thickness, degree of compaction and permitted tolerances	a
3 the appropriate equipment to use for constructing the base (roadbase) and flexible surface layers and for carrying out checks on the construction	a, b
4 how to check that the texture depth and finished level of the surface reinstatement is correct	c
5 how to check that the profile of the finished surface is within permitted tolerances	d
6 potential visual defects that could be identified in the surface, and how to check for them	e
7 safe working practices for the construction of flexible base (roadbase) and surface layers	f
8 problems which occur when constructing flexible base (roadbase) and surface layers and the appropriate remedial action to be taken	g
Range to be covered	
<ul style="list-style-type: none"> I. You must show that materials include: <ul style="list-style-type: none"> i. permanent cold surface course and binder course ii. deferred set materials to BS 4987 iii. close graded bituminous materials to BS 4987 iv. hot rolled asphalt surface course and binder course v. edge sealant vi. tack coat vii. pre-coated chippings II. You must show that equipment includes: <ul style="list-style-type: none"> i. appropriate hand tools - including forks, rakes, shovels, measuring devices, tool heater and hand tamper ii. appropriate powered equipment - including bitumen boiler, pneumatic and hydraulic breaking-out equipment and road saw, vibrating plate, vibrating roller and percussive rammer 	

Unit 14 Monitoring reinstatement in bituminous materials

Element 14.3 Monitor the construction of flexible base (roadbase) and surface layers

Range to be covered (contd.)

- III. You must show that **safe working practices** include:
- i. safe use of tools and equipment
 - ii. 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
 - iii. use of risk assessment methods to identify and control any 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
 - vii. safe working practices for working with molten bitumen
 - viii. personal hygiene measures in connection with skin contamination
- 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
 - iii. manufacturer's operating instructions 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 an actual or simulated site situation:
 - A. Monitor the construction of flexible base (roadbase) and surface layers in bituminous materials.

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 monitoring the construction of flexible roadbase and surface layers.
- 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.
- It is recognised that candidates for this unit are sometimes observed monitoring reinstatement activities as shown on videotape. Where this takes place, the videotape used must meet the following requirements:
 - a) the reinstatement activities shown must conform to the specification detailed above
 - b) the activities shown must allow candidates to carry out all the tasks specified above, and must cover the performance standards for this element in full.
- If you are observed monitoring the reinstatement of sub-base and base (roadbase) as shown on a videotape, you must provide supplementary evidence of competence from the workplace. Where this includes a documented observation report, a qualified Street Works 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 sections of the Specification provide particular guidance on various items within the performance criteria:
 - i. S1.10.3 (*Precautions during reinstatement*)
 - ii. S6.1 (*Reinstatement methods*) in flexible roads
 - iii. S6.3 (*Base (roadbase) reinstatement*)
 - iv. S8.1 (*Reinstatement methods*) in footways, footpaths and cycle tracks
 - v. S8.3 (*Surface reinstatement*) in footways, footpaths and cycle tracks
 - vi. A2.8 (*Identification of structural layers*)
 - vii. A3 (*Compaction requirements*) in bituminous materials

Unit 14 Monitoring reinstatement in bituminous materials

Element 14.4 Monitor site safety

Performance criteria	
You must show that:	
a) you monitor site operations in accordance with health and safety requirements b) you assess site conditions in accordance with health and safety requirements c) you ensure that checks have been carried out to ensure that appropriate safety equipment is available and is fit for purpose d) you ensure that the site is left in a clean and safe condition e) you ensure that safe working practices are followed on site throughout the reinstatement operation, that are in accordance with health and safety requirements and current relevant specifications and procedures f) where you identify risks to site safety, you demonstrate that you know the appropriate remedial action to be taken	
Knowledge requirements	Related performance criteria
You need to know:	
1 health and safety requirements for site operations	a
2 health and safety requirements for particular site conditions	b
3 the appropriate safety equipment to use during site operations, and how to ensure that it is fit for purpose	c
4 the action that should be taken to leave the site in a clean and safe condition	d
5 safe working practices on site and for reinstatement in bituminous materials	e
6 potential risks to site safety, and the appropriate remedial action to take	f
Range to be covered	
I. You must show that the following safety equipment is used on site as necessary: <ol style="list-style-type: none"> i. adequate range of signing, lighting and guarding equipment, including: <ul style="list-style-type: none"> • signs • cones • signals • lamps • barriers ii. high visibility safety equipment iii. suitable materials to construct ramps 	
II. You must show that safe working practices include: <ol 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 any 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 iv. safe working practices for working with molten bitumen vii. personal hygiene measures in connection with skin contamination 	
III. You must show that specifications and procedures are: <ol style="list-style-type: none"> i. Health and Safety Executive Guidelines (<i>HSG 185: Health and Safety in Excavations</i>) ii. Specification for the Reinstatement of Openings in Highways iii. Safety at Street Works and Road Works – A Code of Practice 	

Unit 14 Monitoring reinstatement in bituminous materials

Element 14.4 Monitor site safety

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 provide evidence of monitoring safety on site *throughout* an actual or simulated site situation.

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 monitoring site safety during reinstatement in 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.
- It is recognised that candidates for this unit are sometimes observed monitoring reinstatement activities as shown on videotape. Where this takes place, the videotape used must meet the following requirements:
 - a) the reinstatement activities shown must conform to the specification detailed above
 - b) the activities shown must allow candidates to carry out all the tasks specified above, and must cover the performance standards for this element in full.
- If you are observed monitoring the reinstatement of sub-base and base (roadbase) as shown on a videotape, you must provide supplementary evidence of competence from the workplace. Where this includes a documented observation report, a qualified Street Works 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, Safety at Street Works and Road Works – A Code of Practice* under the New Roads and Street Works Act 1991 and safe working practices for working with molten bitumen, to include tool heating procedures and personal hygiene measures in connection with skin contamination. S12.2 (*Safety Requirements*) states that "should a reinstatement fail any safety requirements of the Specification, the surface shall be restored to comply with such requirements, in accordance with section 71 (for England and Wales) or section 130 (for Scotland) of the New Roads and Street Works Act 1991."