

Unit 13 Monitoring reinstatement of sub-base and base (roadbase) in non-bituminous materials

This unit covers the requirements that you must meet when monitoring the reinstatement of sub-base and base (roadbase) in non-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:

- 13.1 Monitor selection of non-bituminous materials for use in carriageway and footway reinstatement
- 13.2 Monitor selection of plant used for the compaction of sub-base and base (roadbase) material
- 13.3 Monitor construction of sub-base and base (roadbase) materials
- 13.4 Monitor site safety

In element 13.1, you will monitor the selection and storage of non-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 will also need to check that sufficient quantities of materials are obtained for the prescribed operation, and to demonstrate that you know the remedial action to take where you identify any deficiencies in the selection and storage of the materials.

In element 13.2, you will need to monitor the selection of the compaction plant for the sub-base and base (roadbase) 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 13.3, you will monitor the construction of the sub-base and base (roadbase) materials, checking that the layer is constructed according to the specification, and that appropriate equipment and materials are used for the operation. You must also check that the layers are constructed with the appropriate compaction level, and that they are of the required thickness and degree of compaction. 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 13.4, you will monitor site safety throughout the reinstatement operation, 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)
- crushing strength (Newtons per square millimetres)

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Element 13.1 Monitor selection of non-bituminous materials for use in carriageway and footway reinstatement

Performance criteria	
<p>You must show that:</p> <ul style="list-style-type: none"> a) you ensure that excavated and imported materials selected for use are correctly identified and checked against the range of permitted sub-base and base (roadbase) materials b) you ensure that the quantities of materials selected for use are sufficient to meet the requirements of the reinstatement operation c) you ensure that appropriate and safe storage arrangements are made for the re-usable and imported materials that meet the requirements of current specifications and procedures d) you ensure that safe working practices are followed for the selection and storage of materials for reinstatement of sub-base and base that are in accordance with current relevant specifications and procedures e) you identify any problems with the selection and storage of materials for use as sub-base and base (roadbase) and demonstrate that you know the appropriate remedial action to be taken 	
Knowledge requirements	Related performance criteria
<p>You need to know:</p> <ul style="list-style-type: none"> 1 the range of materials permitted in the specification for use in sub-base and base (roadbase) 2 the factors influencing the selection of materials for use in sub-base and base (roadbase), and the consequences of using unsuitable materials for sub-base and base (roadbase) 3 how to ensure that the correct quantities of materials are selected for use 4 appropriate and safe on-site storage procedures for re-usable and imported materials 5 safe working practices for the selection and storage of materials for use as sub-base and base (roadbase) 6 problems which occur when selecting and storing materials for use as sub-base and base (roadbase) and the appropriate remedial action to be taken 	<ul style="list-style-type: none"> a a b c all e
Range to be covered	
<ul style="list-style-type: none"> I. You must show that materials include: <ul style="list-style-type: none"> i. granular Type 1 sub-base materials ii. excavated granular sub-base materials iii. category 3 cement bound material iv. alternative reinstatement materials (ARMs) II. You must show that specifications and procedures are: <ul 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 	

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Element 13.1 Monitor selection of non-bituminous materials for use in carriageway and footway reinstatement

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

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 reinstated excavation in an actual or simulated footway or carriageway:
 - A. Monitor the selection of excavated and imported sub-base and base (roadbase) materials.
 - B. Monitor the on-site storage arrangements made for materials to be used.

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 non-bituminous materials for use in 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 video. Where this takes place, the video 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.

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Element 13.1 Monitor selection of non-bituminous materials for use in carriageway and footway reinstatement

Evidence requirements (contd.)

Additional information for candidates and assessors

- The adopted specification for the works should correspond to the *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. S1.6.3 allows alternative options such as stabilised materials to be used as surround to apparatus, and at backfill and sub-base layers, provided they meet the relevant performance requirements of this Specification.
 - ii. S5 deals with classification of backfill material, whether imported to site or derived on-site from excavated materials, including alternative reinstatement materials (ARMs) and those used as surround to apparatus.
 - iii. S6.2 and S6.3: Sub-base and base (roadbase) materials respectively.
 - iv. NG5.1 and NG5.3: Requirements of conventional and alternative backfill materials, respectively.
 - v. A1: Necessary properties of backfill materials.
 - vi. A9: Properties of the alternative reinstatement materials.
 - vii. A11.2 and A11.3: Material specifications for base (roadbase) and surface course materials.

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Element 13.2 Monitor selection of plant used for the compaction of sub-base and base (roadbase) material

Performance criteria			
<p>You must show that:</p> <ol style="list-style-type: none"> you ensure that the efficiency of the compaction plant selected is checked for suitability to the location and materials you ensure that the selected compaction plant is checked for suitability to the dimensions and access provisions of the site you ensure that the selected compaction plant is the most suitable one to use when compared to the other permitted options you ensure that safety checks have been carried out to ensure that the selected compaction plant is fit for purpose 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 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> <ol style="list-style-type: none"> the factors to consider in selecting a compaction plant that is suitable to the location and materials how to check the suitability of a compaction plant to the dimensions and access provisions of the site how to select the most suitable compaction plant from several permitted options how to ensure that the compaction plant is fit for purpose safe working practices for the selection and use of compaction plant problems which occur when selecting plant for the compaction of sub-base and base material and the appropriate remedial action to take 			
	<p>a</p> <p>b</p> <p>c</p> <p>d</p> <p>all</p> <p>f</p>		
Range to be covered			
<ol style="list-style-type: none"> You must show that compaction plant includes: <ol style="list-style-type: none"> vibrotamper vibrating plate vibrating roller percussive rammer You must show that safe working practices include: <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> <ul style="list-style-type: none"> • high visibility jacket or waistcoat • hard hat • ear defenders • eye protection visor/goggles </td> <td> <ul style="list-style-type: none"> • dust mask • gloves • protective footwear • 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 		<ul style="list-style-type: none"> • high visibility jacket or waistcoat • hard hat • ear defenders • eye protection visor/goggles 	<ul style="list-style-type: none"> • dust mask • gloves • protective footwear • waterproof clothing
<ul style="list-style-type: none"> • high visibility jacket or waistcoat • hard hat • ear defenders • eye protection visor/goggles 	<ul style="list-style-type: none"> • dust mask • gloves • protective footwear • waterproof clothing 		

Unit 13 Monitoring reinstatement of sub-base and base (roadbase) in non-bituminous materials

Element 13.2 Monitor selection of plant used for the compaction of sub-base and base (roadbase) material

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 task for an actual or simulated site situation:
 - Monitor the selection of compaction plant for the compaction of sub-base and base (roadbase) 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 compaction of sub-base and base (roadbase) 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 video. Where this takes place, the video 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 13 Monitoring reinstatement of sub-base and base (roadbase) in non-bituminous materials

Element 13.3 Monitor construction of sub-base and base (roadbase) materials

Performance criteria	
<p>You must show that:</p> <ol style="list-style-type: none"> you ensure that the backfill or surround has been adequately prepared to receive subsequent layers you ensure that the non-bituminous layer is constructed in accordance with the specification, the existing pavement structure and road type and using appropriate materials and powered equipment you check that the layers are constructed correctly using the appropriate measuring equipment, with regard to the use of materials and appropriate powered equipment, layer thickness and degree of compaction you check for correct construction of sub-base and base (roadbase) in sensitive areas you ensure that safe working practices are followed for the reinstatement and compaction of sub-base and base (roadbase) that are in accordance with current relevant specifications and procedures you identify any problems with the construction of the layers 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"> how to identify when the backfill or surround is adequately prepared to receive subsequent layers how to interpret the specification accurately with regard to the construction of the non-bituminous layer for different pavement structures and road types how to check the construction of the layers for the correct use of materials, achieved compaction level, layer thickness and degree of compaction the appropriate equipment to use for carrying out checks on the construction of the sub-base and base (roadbase) how to check the construction of sub-base and base (roadbase) in sensitive areas safe working practices for reinstatement of sub-base and base (roadbase) in non-bituminous materials problems which occur during construction of sub-base and base (roadbase) and the appropriate remedial action to take 	<p>a</p> <p>b</p> <p>c</p> <p>b, c</p> <p>d</p> <p>all</p> <p>f</p>
Range to be covered	
<ol style="list-style-type: none"> You must show that the materials include: <ol style="list-style-type: none"> granular Type 1 sub-base material excavated granular sub-base materials category 3 cement-bound material alternative reinstatement materials (ARMs) You must show that measuring equipment used includes: <ol style="list-style-type: none"> measuring equipment – including measuring devices, rule and tape You must show that the powered equipment used includes: <ol style="list-style-type: none"> powered equipment – including vibrotamper, vibrating plate, vibrating roller and percussive rammer 	

Unit 13 Monitoring reinstatement of sub-base and base (roadbase) in non-bituminous materials

Element 13.3 Monitor construction of sub-base and base (roadbase) materials

Range to be covered (contd.)

- IV. 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
- V. 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 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 task for an actual or simulated site situation:
 - A. Monitor the construction of sub-base and base (roadbase) using non-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 sub-base and base (roadbase) 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 video. Where this takes place, the video 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.

Unit 13 Monitoring reinstatement of sub-base and base (roadbase) in non-bituminous materials

Element 13.3 Monitor construction of sub-base and base (roadbase) materials

Evidence requirements (contd.)

Additional information for candidates and assessors

- The adopted specification for the works should conform to *Specification for the Reinstatement of Openings in Highways*. The sections of the Specification that provide particular guidance on various items within the performance criteria are listed below:
 - i. S1.10.3 (*Precautions during reinstatement*)
 - ii. S5.3.4 (*Protective measures*)
 - iii. S7.1 (*Reinstatement methods*) in modular roads
 - iv. S7.2 (*Sub-base reinstatement*)
 - v. S7.7 and NG7.7 (*Modular roads*) reinstatement
 - vi. S8.1 (*Reinstatement methods*) in footways, footpaths and cycle tracks
 - vii. S10 and NG10 (*Compaction requirements*)
 - viii. Appendix A9 (*Alternative reinstatement materials*) (ARMs)

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Element 13.4 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) you identify risks to site safety, and 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 of sub-base and base (roadbase) in non-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:	
i. adequate range of signing, lighting and guarding equipment, including:	
<ul style="list-style-type: none"> • signs • cones • signals • lamps 	<ul style="list-style-type: none"> • footway boards • barriers • portable traffic signals
ii. high visibility safety equipment	
iii. suitable materials to construct ramps	
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:	
<ul style="list-style-type: none"> • high visibility jacket or waistcoat • hard hat • ear defenders • eye protection visor/goggles 	<ul style="list-style-type: none"> • 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	
III. You must show that specifications and procedures are:	
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 13 Monitoring reinstatement of sub-base and base (roadbase) in non-bituminous materials

Element 13.4 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.

Assessment conditions

- The assessment will be undertaken by a qualified assessor, who will observe you monitoring site safety during the reinstatement of sub-base and base (roadbase) in non-bituminous materials.
- The site at which you are assessed must conform to the specifications listed for this unit. 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 video. Where this takes place, the video 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* and *Safety At Street Works and Road Works – A Code of Practice* under the New Roads and Street Works Act 1991. 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.*”