

Unit ID 1135

Domain

**ROAD CONSTRUCTION AND  
MAINTENANCE – MACHINE  
OPERATIONS**

Title:

**Process layer materials in road  
construction using a grader**

Level: 3

Credits: 30

**Purpose**

This unit standard is intended for grader operators in road construction in particular. The unit standard reflects the competencies associated with the preparation of sub-base and sub-grade layers for new roading. People credited with this unit standard are able to: plan and prepare for work; demonstrate knowledge of soil stabilisation; carry out pre and post-start checks on the grader; process layer and wearing course materials; shut down the grader at finish of work; complete work-related documents; and clean up work area.

Being credited with this unit standard does not enable a person to drive the grader on an open, public road. In order to do so, a person must be in possession of a valid and current driving licence for this vehicle type.

**Special Notes**

1. Entry information:

Prerequisite

- Unit 712 - *Comply with health, safety and environmental rules and regulations in road construction and maintenance work operations* or demonstrated equivalent skills and knowledge.

2. This unit standard is to be assessed on the basis of evidence from demonstrated performance on a worksite or worksites. Assessment parameters will depend on company and site specific equipment, procedures, and practices. Practices must reflect industry best practice and comply with legislative requirements. Expected worksite production target are to be met.

3. This unit standard requires the use of a motor grader. Levelling of layers can be achieved with the use of peg lines and/or laser controls.

4. Glossary

- For the purposes of this unit standard, *processing* refers to the mixing, spreading and shaping of stabilised and un-stabilised sub-base, sub-grade and wearing course pavement materials as specified in the contract or project documentation. The material may be in-situ, brought in from borrow pits or from commercial sources. The term also includes giving instructions to others

relating to watering and compaction. The term includes the creation of a final layer (or wearing course) of a gravel road.

This unit standard excludes any work on creating the base or final layer that will receive the final seal. People who wish to obtain credit for this competence are referred to Unit 1136 *Grade and cut base material to final levels using a grader* in this Domain.

- *Drainage facilities* could include features such as cut-out drain, interceptor drain, vee (V) drain, and swale drain.
  - *Industry best practices* may be indicated in (but not limited to) manufacturer's guidelines, contract documents, and relevant unit standards registered in this Subfield or other, relevant Subfields of the NQF.
  - *Maintenance* may include but is not limited to cleaning, authorised servicing and the monitoring, recording and reporting of faults. It may also include the conduct of authorised minor replacements and the provision of assistance to maintenance and repair activities.
  - *Manufacturer's guidelines* refers to information provided in such documents as an operating manual and/or maintenance manual relevant to the type of grader being used.
  - *Materials* refers to relevant soils (such as sands, gravels, crushed aggregates), water, fuels and lubricants, bitumen products, and concrete products and stabilising agents needed to undertake the actions required to achieve expected work outcomes.
  - *Quality* in this unit standard means adherence to work instructions. It is assumed that the work instructions are informed by contract requirements.
  - *Safe working practices* include but are not limited to day-to-day observation of safety policies and procedures, and compliance with emergency procedures.
5. Regulations and legislation relevant to this unit standard may include but are not limited to the following:
- Labour Act, No. 11 of 2007
  - Regulations relating to the Health and Safety of employees at work, 1997
  - Road Traffic and Transport Regulations No. 52, 1999 and Government Notice No 53 Road Traffic and Transport Regulations
  - Road Ordinance 30 of 1960 and 17 of 1972 and other similar legislation and all subsequent amendments.

## **Quality Assurance Requirements**

This unit standard and others within this subfield may be awarded by institutions which meet the accreditation requirements set by the Namibia Qualifications Authority and the Namibia Training Authority and which comply with the relevant national assessment and moderation requirements. Details of specific accreditation requirements and the national assessment arrangements are available from the Namibia Qualifications Authority and the Namibia Training Authority. All approved unit standards, qualifications and national assessment arrangements are available on the Namibia Training Authority website [www.nta.com.na](http://www.nta.com.na).

## **Elements and Performance Criteria**

### **Element 1: Plan and prepare for work**

#### **Performance Criteria**

- 1.1 Work instructions, including plans, specifications, quality requirements and operational details are obtained, explained, clarified and applied to the allocated task.
- 1.2 Safety requirements, including personal protective clothing and equipment are obtained from the site safety plan, workplace policies and procedures, and applied to the allocated task.
- 1.3 Traffic control requirements are obtained and implemented according to workplace requirements.
- 1.4 Plant, tools, fuel, lubricants, equipment, attachments and accessories selected to carry out tasks are checked for consistency with the requirements of the job, their usability and any faults rectified or reported prior to commencement of work.
- 1.5 Environmental protection requirements are identified from the project environmental management plan and applied to the allocated task.
- 1.6 Purpose of intended actions is explained in terms of desired outcomes and potential consequences for future actions and maintenance if actions are not performed to expected standards.

### **Element 2: Demonstrate knowledge of soil stabilisation**

#### **Performance Criteria**

- 2.1 Reasons for using stabilising materials with subgrade, sub base and base courses are explained in terms of pavement layer improvement, bearing capacity and durability of roads.

- 2.2 The choice of stabilising materials is explained in terms of moisture, plasticity and cementation and the effects of climatic conditions and temperature.
- 2.3 Methods for stabilising soils are described in terms of mix-in-place and pre-mix in accordance with technical instructions.
- 2.4 Equipment used for the stabilisation of soils is described in terms of the timing of their use and their effectiveness.
- 2.5 Procedures for the construction of joints are described in accordance with organisational procedures.
- 2.6 Tests associated with determining bearing capacity and density of soils and traffic loads are explained in accordance with technical instructions.
- 2.7 Processes and actions for strengthening of each layer and the need for preconditioning are explained in accordance with technical instructions.

### **Element 3: Carry out pre and post-start checks on the grader**

#### **Performance Criteria**

- 3.1 Walk-around is completed in accordance with industry best practice, company procedures and/or manufacturer's instructions.
- 3.2 Pre-start safety and operational checks are carried out in accordance with industry best practice, company procedures and/or manufacturer's instructions.
- 3.3 Start-up checks and procedures are followed in accordance with industry best practice, company procedures and/or manufacturer's instructions.
- 3.4 Faults and maintenance requirements are identified, recorded and reported in accordance with industry best practice, company procedures and/or manufacturer's instructions. Authorised minor replacements and replenishment is carried out in accordance with manufacturers' instructions and company procedures.
- 3.5 Mould board and cutting edges are checked for wear and corrected if worn in accordance with company procedures.
- 3.6 Health and safety hazards are identified and evaluated in terms of severity in accordance with company procedures.
- 3.7 Mounting and dismounting is undertaken safely in accordance with industry best practice and manufacturer's guidelines.
- 3.8 Post start safety and operational checks are carried out in accordance with industry best practice, company procedures and manufacturer's guidelines.

## **Element 4: Process layer and wearing course materials**

### **Range**

Processing is required on straight and curved stretches of road, and includes bridge approaches. Edges and shoulders are also to be processed.

### **Performance Criteria**

- 4.1 Operation of grader engine, gears, blade controls, wheel lean and, if necessary, grader articulation, ensures the effective and efficient mixing and layering of materials and demonstrates a controlled flow of material.
- 4.2 Any foundation material is prepared in accordance with contract specifications.
- 4.3 Problems associated with any material are reported to the Supervisor or Foreman in accordance with organisational procedures.
- 4.4 Layer depths, levels and widths are created to comply with contract specifications.
- 4.5 Cross-falls and grades are created to comply with contract specifications.
- 4.6 Communications with other members of the 'levelling team' on site is maintained to ensure effective and accurate blading actions as required by the construction conditions.
- 4.7 Oversized material(s) are cut out for future disposal in accordance with industry best practice and contract specifications.
- 4.8 Drainage facilities are created to comply with contract specifications.
- 4.9 Clear requests and/or instructions are given to complementary operators (such as those involved in watering and compaction) to prompt quality work outcomes and the attainment of optimal water content of the materials.
- 4.10 Grader operations are co-ordinated with other operators and workers and ensures enhanced team work in undertaking required tasks.
- 4.11 Sequence of work operations contributes to the production of quality work outcomes and the achievement of daily production targets.
- 4.12 Grader performance, hazards and product defects are monitored throughout operations and remedial actions are taken, recorded and reported in accordance with company procedures.
- 4.13 The grader is manoeuvred on site with adequate clearances and protection of survey and other construction infrastructure, nearby services, other road users and other workers and operations on the worksite.

- 4.14 Environmental and/or health elements are monitored, reported and/or dealt with in accordance with legislative requirements and company procedures.
- 4.15 Liaison is maintained with the Layerwork Foreman and/or others with supervisory responsibilities in accordance with worksite and company procedures to ensure the optimal completion of all work activities to required quality standards.
- 4.16 Readiness of processed materials and surfaces for next action is reported in accordance with organisational procedures.

#### **Element 5: Shut down the grader at finish of work**

##### **Performance Criteria**

- 5.1 Parking-up of the grader complies with manufacturer's guidelines and company procedures.
- 5.2 Shutdown procedures are followed in accordance with industry best practice, company procedures and manufacturer's guidelines.
- 5.3 Making the grader secure is carryout in accordance with company procedures.

#### **Element 6: Complete work-related documents**

##### **Performance Criteria**

- 6.1 Work related documents are completed in accordance with contract and workplace requirements.
- 6.2 Maintenance and service related documents are completed in accordance with manufacturer and workplace requirements.
- 6.3 Documents related to accidents or other incidents are completed in accordance with workplace requirements.

#### **Element 7: Clean up work area**

##### **Performance Criteria**

- 7.1 Work area is cleared and materials disposed of or recycled in accordance with project environment management plan.
- 7.2 Grader, tools and equipment are cleaned, checked, maintained, serviced and stored in accordance with manufacturers' recommendations and industry best practices.
- 7.3 Any unused materials are safely stored and stacked for future use.

## **Registration Data**

<b>Subfield:</b>	Road Construction and Maintenance
<b>Date first registered:</b>	27 March 2013
<b>Date this version registered:</b>	27 March 2013
<b>Anticipated review:</b>	2017
<b>Body responsible for review:</b>	Namibia Training Authority