

Domain

**ROAD CONSTRUCTION AND
MAINTENANCE – MACHINE
OPERATIONS**

Title:

**Grade and cut base material to final
levels using a grader**

Level: 4

Credits: 50

Purpose

This unit standard recognises advanced competence as a motor grader operator in road construction. People credited with this unit standard are able to: plan and prepare for work; demonstrate knowledge of soil stabilisation for final level cutting; carry out pre and post start checks on the grader; lead a final levels operations team; grade to final levels; 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 the final base layer can be achieved with the use of peg lines and/or laser controls but will also likely require considerable expertise by the operator in 'eyeing' defects or inconsistencies in slopes and grades in the prepared surface and finesse in operating controls.
 4. The credit value for this unit standard is based on the assumption that people seeking recognition as a Final Level Cutter have regularly demonstrated

competence in the use of a grader, perhaps by holding credits for the following unit standards:

- Unit 1022 *Carry out activities in road construction and maintenance using a grader*
- Unit 1135 *Process layer materials in road construction using a grader*

Training and assessment related to this unit standard could coincide with or contribute to the attainment of credits for the above unit standards as well as the following unit standard:

- Unit 828 *Lead a team to achieve the required project outcome in road construction and maintenance operations.*

5. Glossary

- For the purposes of this unit standard, *processing* refers to the mixing, spreading and shaping of stabilised and un-stabilised base course pavement materials as specified in the contract or project documentation in preparing the road base for final seal. The term also includes the giving of instructions to others relating to watering and compaction.
- *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 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.

6. 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.

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 The availability of sufficient stocks of and/or supply processes for base materials as specified for the project and water is confirmed in accordance with workplace requirements with the Layerwork Foreman or other relevant supervisor.
- 1.6 Environmental protection requirements are identified from the project environmental management plan and applied to the allocated task.

- 1.7 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 for final level cutting

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 roading.
- 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 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: Lead a final levels operations team

Performance Criteria

- 4.1 Leadership of the team ensures materials are prepared and/or mixed to achieve desired outcomes according to contract specifications.
- 4.2 Leadership of the team ensures materials and surface are mixed and watered sufficiently to achieve optimum moisture content to achieve desired outcomes according to contract specifications.
- 4.3 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.
- 4.4 Leadership of the team ensures compaction achieves desired outcomes according to contract specifications.

Element 5: Grade to final levels

Range

Grading to final level is required on straight and curved stretches of road, and includes bridge approaches. Edges and shoulders are also to be finished.

Performance Criteria

- 5.1 Checks by self and/or in consultation with others confirms that the sub-grade and sub-base is ready to receive base course and for final level operations to commence.
- 5.2 Operation of grader engine, gears, blade controls, wheel lean and, if necessary, grader articulation, ensures the effective and efficient mixing and layering of material and demonstrates an adept controlled flow of material.

- 5.3 Base course is spread to accord with required tolerances and contract specifications. Layer depth, levels and width are created to comply with contract specifications.
- 5.4 Cross-falls and grades are created to comply with contract specifications. Any defects or inconsistencies identified by the eye are rectified through cutting or filling with adept settings and use of the blade.
- 5.5 Problems associated with any material are reported to the Supervisor or Foreman in accordance with organisational procedures.
- 5.6 Any oversized material(s) are cut out for future disposal in accordance with industry best practice and contract specifications.
- 5.7 Required tests are requested in accordance with contract specifications and company procedures.
- 5.8 Grader operations are co-ordinated with other operators and workers, and ensures enhanced team work in undertaking required tasks.
- 5.9 Coordination and sequencing of work operations contributes to the production of quality work outcomes and the efficient use of manpower, machinery and materials.
- 5.10 Daily production targets are met.
- 5.11 Final level of base conforms to contract specifications and is handed over as ready to accept first seal coats in accordance with workplace requirements.
- 5.12 Grader performance and any hazards are monitored throughout operations and remedial actions are taken, recorded and reported in accordance with company procedures.
- 5.13 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.
- 5.14 Environmental and/or health elements are monitored, reported and/or dealt with in accordance with legislative requirements and company procedures.
- 5.15 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.

Element 6: Shut down the grader at finish of work

Performance Criteria

- 6.1 Parking-up of the grader complies with manufacturer's guidelines and company procedures.

- 6.2 Shutdown procedures are followed in accordance with industry best practice, company procedures and manufacturer’s guidelines.
- 6.3 Making the grader secure is carried out in accordance with company procedures.

Element 7: Complete work-related documents

Performance Criteria

- 7.1 Work related documents are completed in accordance with contract and workplace requirements.
- 7.2 Maintenance and service related documents are completed in accordance with manufacturer and workplace requirements.
- 7.3 Documents related to accidents or other incidents are completed in accordance with workplace requirements.

Element 8: Clean up work area

Performance Criteria

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

Registration Data

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