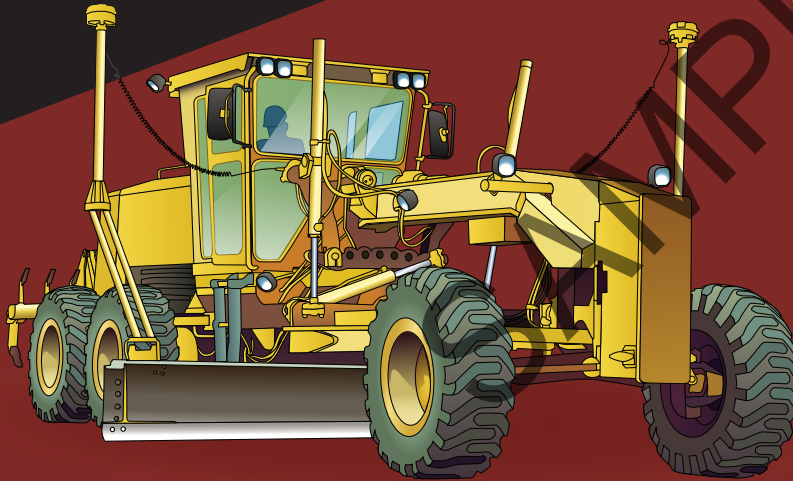


# LEARNER GUIDE



# Grader TICKET



RIIMP0324F

Conduct civil construction  
grader operations



**EASY  
GUIDES**

Australia Pty Ltd

Industry Training Resources

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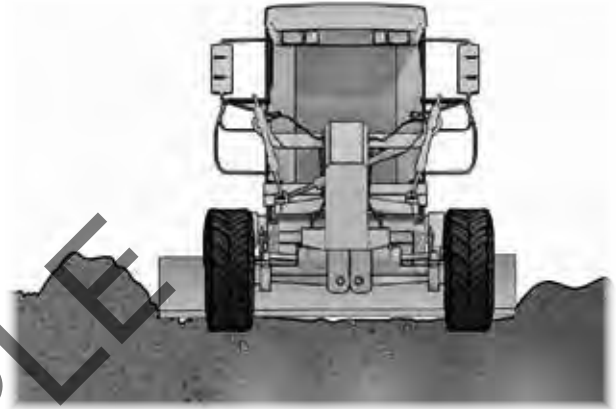
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# Introduction to Grader



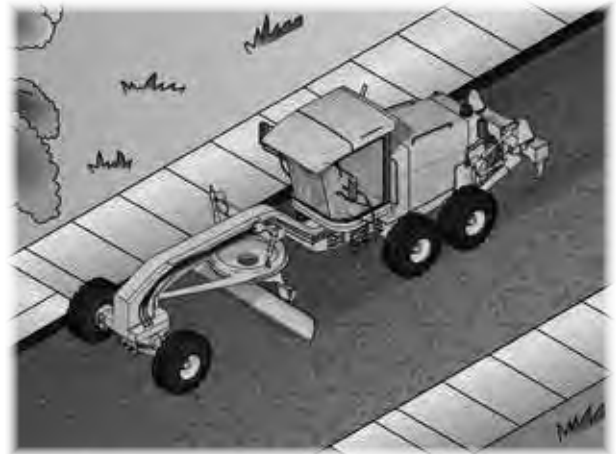
## Introduction to grader

- A grader is a self-propelled articulating or rigid framed wheeled machine, designed to cut, move and place construction materials using a centrally mounted blade and may include forward and/or rear mounted rippers/scarifiers.
- The blade and attachment controls are normally hydraulic; however, they may be mechanical.

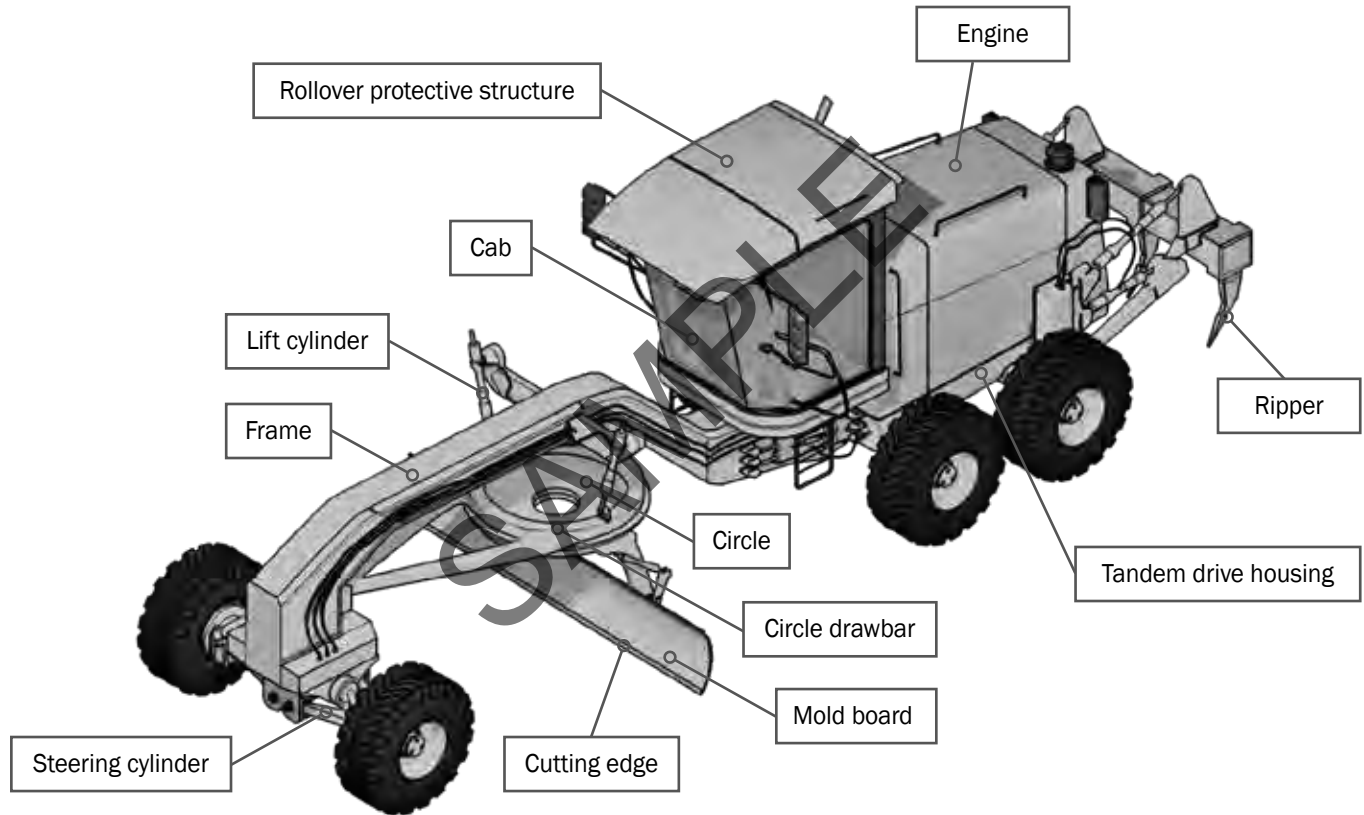


## What industries do you use a grader in?

- Civil construction



## An example of a grader



# General information



## The basics of road construction

A surveyor will stake out the site according to the site plan. The stakes mark where the road will go and any drains or pits, which will help to drain water away from the road area.



An excavator or dozer removes the trees, shrubs and other plants and levels the area. Some trees may be protected with padding or fencing.



Sometimes contractors may use a borrow pit (also called a sand box). A borrow pit is an area where soil, sand or gravel (material) is dug out to be used in another area. Sometimes the borrow pit will become the drains, or water catchment areas at the end of the work.



The excavator or dozer may use material from the borrow pit to build up low areas in the road. They may also build up diversion blocks. Diversion blocks divert water away from the road and into drains.



*The basics of road construction (continued)*

As the operator shapes the ground, they will usually create drainage at the sides of the road area. They will also make sure there is enough fall (slope) on the road so that water drains away from the road.



Drains are installed to help take water away from the worksite.



A front end loader or dozer shapes the road base. This helps smooth out the surface ready for grading.



A water truck may wet down the ground. This helps the soil to bond.





*The basics of road construction (continued)*

The grader grades the road to produce a much smoother surface.



A roller or compactor then compacts the road. This breaks up lumps and smooths the surface out.



A site supervisor or roller operator tests the compaction. Sometimes they will use a deflectometer or penetrometer. Some rollers/compactors can test the compaction as they drive.



Many layers of the ground material are built up. This is called the subgrade. Each layer is compacted and tested.



# Plan and prepare for work

## Chapter 1



## Calculations

### Working out how much material you need

The work plan has an area which is 4 metres × 20 metres that must be covered by a layer of road base of 150 mm depth.

**How many square metres of road base are to be laid?**

**How many cubic metres of road base will you need?**



#### Step 1: Work out the square metres

To work out the square metres, multiply the Length (L) by the Width (W).

$$L \times W = \text{Square metres}$$

$$4 \text{ m} \times 20 \text{ m} = 80 \text{ square metres}$$

This can also be written as:  
80 m<sup>2</sup> or 80 square metres

#### Step 2: Convert millimetre thickness to metres

Convert the layer thickness from millimetres to metres.

To do this divide the layer thickness by 1000

$$150 \text{ mm} \div 1000 = 0.15 \text{ m}$$

#### Step 3: Work out the square metres

Multiply the square metres by the layer thickness to get the cubic metres.

$$80 \text{ square metres} \times 0.15 \text{ metres} \\ = 12 \text{ cubic metres}$$

This can also be written as:  
12 m<sup>3</sup> or 12 cubic metres

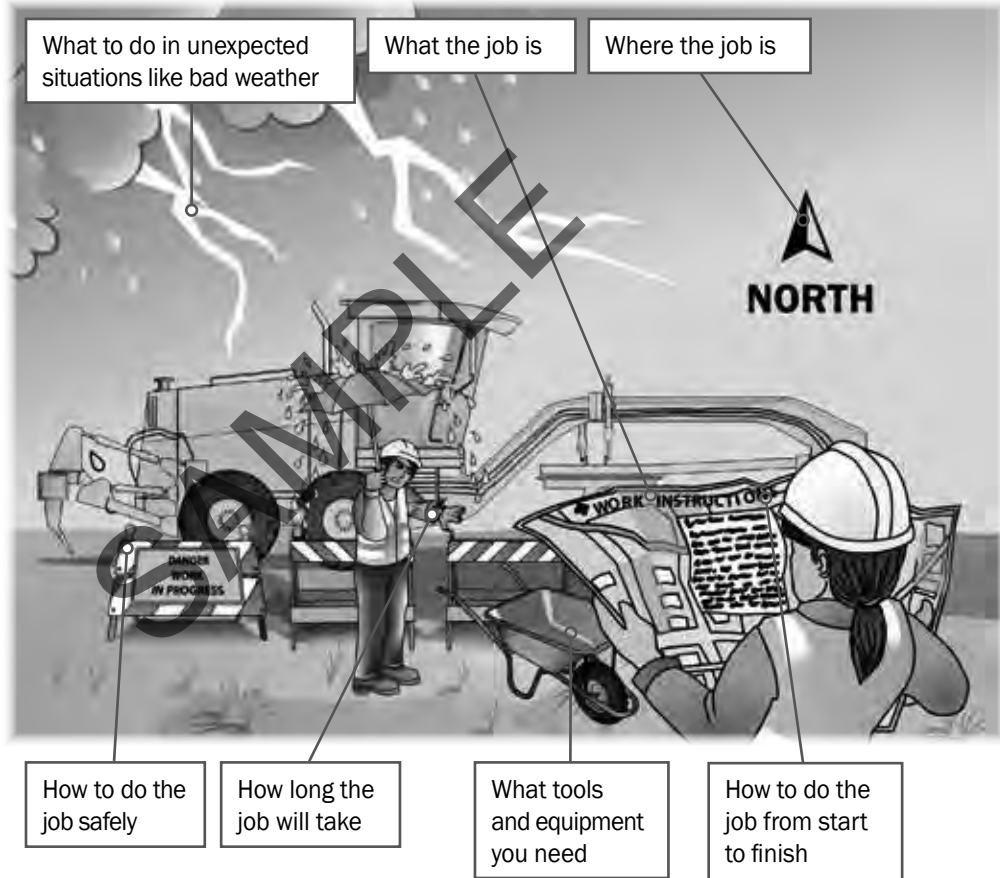
#### Answer:

There are 80 square metres of road base to be laid.  
You will need 12 cubic metres to cover the area to 150 mm depth.

**QUESTION 10**

What do the job's work instructions explain?

Work instructions explain:



**QUESTION 11**

What equipment may be used in a traffic control plan?

Stop/slow bats



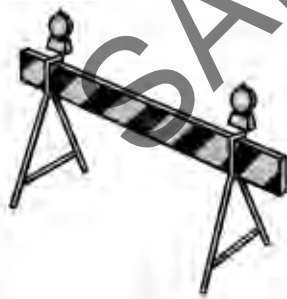
High visibility vests



Radios



Barricades



Cones



Bollards



# Identify and control hazards

## Chapter 2



## Earthmoving site hazards

### Checking for underground services

You should always check where services are before you start work. You may phone '**Dial before you dig on 1100**'. You may look at the site plan or talk to your supervisor. You may need to look at the location of pits and meters to get an idea of where the services run. You may need to check with the local council or service company. You may even need to get underground detection equipment.

If you hit a service line, contact the provider immediately. You may need to organise to get the service disconnected while a qualified person fixes the problem.

You can sometimes tell there are services below by the types of ground. Some services are surrounded by a different type of soil, rock or sand. You may notice that the soil is looser, or does not match the soil around where you are digging. There may be a line of tape alerting you to the services.

If you suspect there are services underground, stop working. Check the ground. You may need to excavate the area by hand, or dig in another area.



## Decibel levels of common sounds

You must wear hearing protection when operating earthmoving equipment.

This is important because 8 hours of noise at 85 db (decibels), or noise levels of 140 db even briefly can permanently damage your hearing.

Hearing loss is:

- slow
- painless
- irreversible.

Here are some examples of levels of noise in different environments.

- A forest has about 20 db of noise
- In an office there might be around 60 db
- Standing outside a truck generates about 80 db
- A jackhammer generates around 100 db
- A jet taking off generates about 120 db

