

RIIMPO325E

Conduct Civil Construction Scraper Operations

Learner Guide Instructions

Who is this document for?

The learner.

What is in this document?

- Course information that matches the PowerPoint presentation.
- Review questions.
- Practical assessment instructions for learners.

What do you need to do before you use it for the first time?

1. Rebrand the document.
2. Review the document as part of your validation process.
3. Set the reading and test time limits that are highlighted in pink at the end of the document.

See the 'Read Me First' document for a complete set of instructions on how to use these resources.

LEARNER GUIDE

RIIMPO325E Conduct Civil Construction Scraper Operations

Learner Name:	
Learner ID:	
Learner Contact Number:	
Learner Email Address:	
Date Training Commenced:	

This Book Contains:

- Course Information.
- Review Questions.
- Practical Assessment overview and instructions.

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1.1 Introduction

These training materials are based on the unit of competency **RIIMPO325E Conduct Civil Construction Scraper Operations.**

You will learn about:

- ◆ Planning and preparing for work.
- ◆ Conducting routine checks.
- ◆ Operating scrapers.
- ◆ Coupling scrapers.
- ◆ Relocating the scraper.
- ◆ Maintenance and other housekeeping tasks.



1.1.1 What is a Scraper?

A scraper is a piece of heavy equipment used for earthmoving. There are two main types of scrapers – elevated scrapers and open bowl scrapers.



Elevated Scrapers

Elevated scrapers are self-propelled, articulated wheeled vehicles. They have a prime mover for control and a sliding floor bowl. The bowl has an elevator shaft which helps to load and unload the scraper.

On most scrapers the elevator is hydraulically driven but some models have a separate power source.

Open Bowl Scrapers

Open bowl scrapers are self-propelled, articulated wheeled vehicles. They have a prime mover for power and control and a sliding floor bowl.

Standard open bowl scrapers require the assistance of a push dozer or a tandem motor (one engine drives the front wheels, while the other drives the rear wheels) to give additional power for the scraper operations. On dual powered scrapers the tractor engine should be started first.

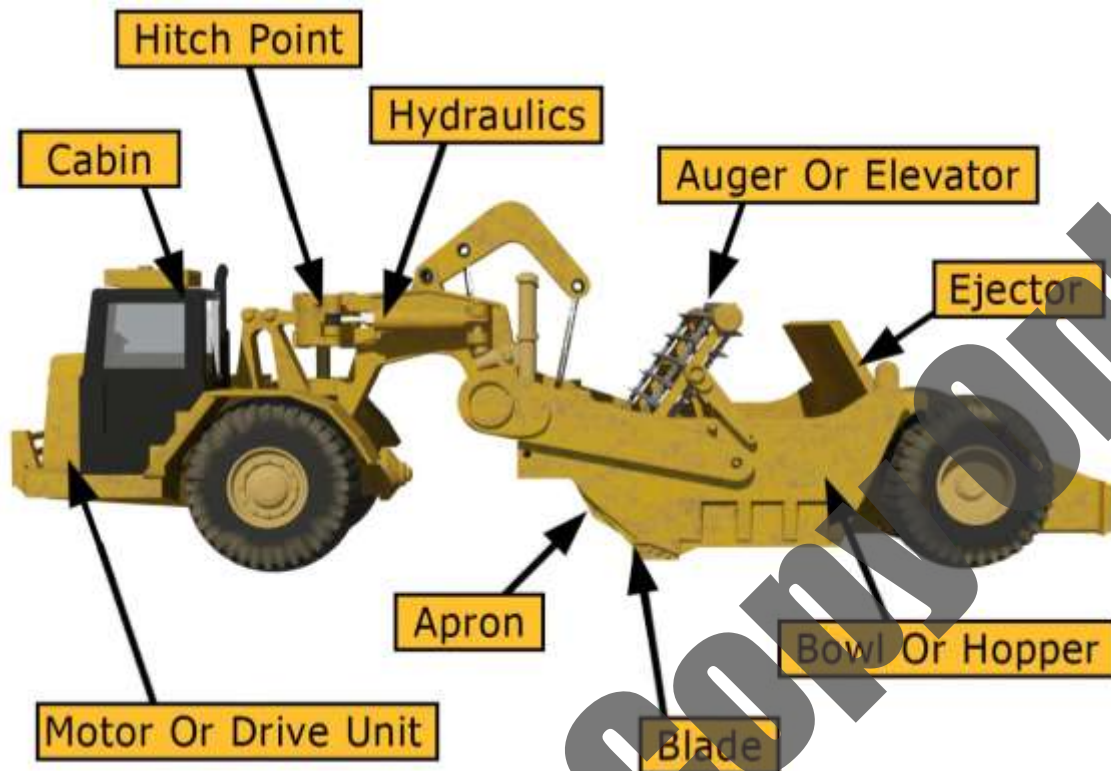
Standard open bowl scrapers are regularly used in a 'push-pull' arrangement. This is where two (or more) scrapers are attached together to provide additional power. Operators may need to be familiar with tasks such as coupling, disengaging, and operating in conjunction with another unit.

Some open bowl scrapers are fitted with an auger attachment in the bowl to provide self-loading capability.



1.1.2 Scraper Components

The following diagram and table shows the basic components of a scraper.



Component	Explanation
Motor or Drive Unit	Engine of the machine. Dual power scrapers will have a secondary engine at the back of the machine.
Cabin	Part where operator sits and operates the machine. Controls include: steering wheel or joystick, transmission controls, brakes, emergency stop controls.
Hitch Point	Point where linkage between different parts occurs. Most modern scrapers have a cushion hitch that makes for a more comfortable, safer drive. Older vehicles will have a straight hitch. This is a very dangerous point for crush injuries because of the limited visibility of the operator.
Hydraulics	Generic name given to all hydro-static drive units including hoses and rams.
Apron	Closes once material has been loaded to keep it in the bowl.
Blade	Points, tips, boots, or blades designed to tear or break hard materials. These may need replacing regularly. In hard material areas the operator may need to be changing these attachments daily. Refer to the operator's manual for the particular machine for detailed instructions on how to change attachments.
Auger or Elevator	Depending on the type of scraper. The auger helps move the material into the bowl once it has been cut by the blade.
Ejector	Ejects the soil from the bowl.
Bowl or Hopper	Where the materials land after scraping and before dumping. Scrapers can be either open bowl or elevated.

1.2 Site Policies and Procedures

You must follow all safety rules and instructions when performing any work. If you are not sure about what you should do, ask your boss or supervisor. They will tell you what you need to do and how to do it in a safe way.

Before starting your work you need to make sure you have access to all operations documentation for the job. This will help you to do your work in the safest way and make sure all work is compliant.



Operations documentation includes:

Site Details	The information and safety requirements of the workplace environment (where you will be working).
Hazard Details	Any hazards in the work area or related to the work. This could also include instructions on how to handle dangerous or hazardous materials.
Task Details	Instructions of what the work is or what you will be doing (this can include diagrams or plans). Also instructions on how to safely do the job.
Faulty Equipment Procedures	Isolation procedures to follow or forms to fill out.
Signage	Site signage tells you what equipment you need to have, or areas that are not safe to be in.
Emergency Procedures	Instructions on what to do in emergency situations, for example if there is a fire, accident or emergency where evacuation or first aid is needed.
Equipment and Work Instructions	Details of how to operate plant and equipment and the sequence of work to be done.



Your worksite will also have instructions for working safely including:

- ◆ Emergency procedures, including using fire fighting equipment, first aid and evacuation.
- ◆ Handling hazardous materials.
- ◆ Safe operating procedures.
- ◆ Personal protective clothing and equipment.
- ◆ Safe use of tools and equipment.

Review Questions

1.	List 3 things that may be included in 'operations documentation'.	<input type="checkbox"/>
1.		
2.		
3.		

1.3 Work Instructions

You need to be clear about what work you will be doing. Make sure you have everything about the job written down before you start. This includes what you will be doing, how you will be doing it and what equipment you will be using.

Make sure you have all of the details about where you will be working. For example:



- ◆ **The Site** – Is there clear access for all equipment? Are there buildings, structures, facilities or trees in the way? What are the ground conditions like?
- ◆ **The Weather** – Is there wind, rain or other bad weather? Is it too dark?
- ◆ **Facilities and Services** – Are there power lines or other overhead or underground services to think about?
- ◆ **Traffic** – Are there people, vehicles or other equipment in the area that you need to think about? Do you need to get them moved out of the area? Do you need to set up barriers or signs?
- ◆ **Hazards** – Are there dangerous materials to work around or think about? Will you be working close to power lines or other people?

You also need to make sure you have all of the details about the kind of work you will be doing:

- ◆ **The Task** – What kind of material is being moved? How much is there to move? How long do you have to complete the work? Where will the load be discharged?
- ◆ **Plant** – What type of plant will be used? How big is it? How much room does it need?
- ◆ **Communications** – How are you going to communicate with other workers?
- ◆ **Procedures and Rules** – Do you need any special permits or licences? Are there site rules that affect the way you will do the work?



1.3.1 Reading and Checking Your Work Instructions



All work needs to follow worksite, environment and company safety procedures.

Procedures help to make sure that all work is done in a safe way, without damaging equipment or putting people in unsafe situations. They also help to make sure that work is done in the correct order and doesn't interrupt or get in the way of other work that is happening on the site.

Your work instructions will tell you the safest way to do the job, and the equipment that you will need to use. It is a good idea to check your work instructions with your boss or supervisor to make sure you know exactly what you need to do.

If you don't know where to get your instructions or you can't understand them, you can ask your boss or supervisor. They will tell you where to find your work instructions and explain what they mean.

1.3.1.1 Scraper Operations

The tasks performed by a scraper include:

- ◆ Stripping materials to a specified depth.
- ◆ Spreading materials.
- ◆ Cutting and filling materials to line and level.
- ◆ Cutting drains and batters.
- ◆ Rough grading and backfilling.
- ◆ Cutting and boxing.
- ◆ Stockpiling.
- ◆ Site clean-up.
- ◆ Coupling and operating in tandem (for push-pull scrapers).



1.3.2 Work Method Statements



Many worksites require a work method statement before any work can start. A work method statement is a list of steps that outlines how a job will be done. It also includes any hazards that occur at each step, and what you need to do about them.

These statements can also be known as Safe Work Method Statement (SWMS), Job Safety Analysis (JSA) or Safe Operating Procedure (SOP).

Work method statements are a great tool for organising your work activities. They help to make sure you have completed everything and will also outline the details of all tools, equipment and coordination needed with other workers relating to your job. Make sure all of these are available and ready before you start.

1.3.3 Project Quality Requirements

Every civil construction project will have quality requirements. These outline when tasks need to be completed and the required standard of the work.

Your work instructions and plans or drawings will guide you, and help you to make sure you are achieving the quality standard for the project.

They can include:

- ◆ Project dimensions.
- ◆ Project tolerances.
- ◆ Standards of work.
- ◆ Material standards.



1.3.3.1 Plans, Drawings and Sketches

Some of your work instructions might be given to you in drawings and sketches. You will need to get the information out of these and use it to do your job.



Project plans and drawings give you an overview of the site, for example:

- ◆ Location of the site and earthworks in relation to the surrounding area.
- ◆ The position of structures, roads, access areas.
- ◆ Layout of drainage lines.
- ◆ Foundation details and landscaping features.

Depending on the project, drawings may be very detailed or they could be simple sketches.

You should learn about the conventions and symbols used in the plans and drawings so you can understand what the information means.

1.3.4 Civil Construction Sequences

Civil construction projects are made up of a range of smaller tasks or activities. It is important that these are done in the right order for the project to go smoothly.

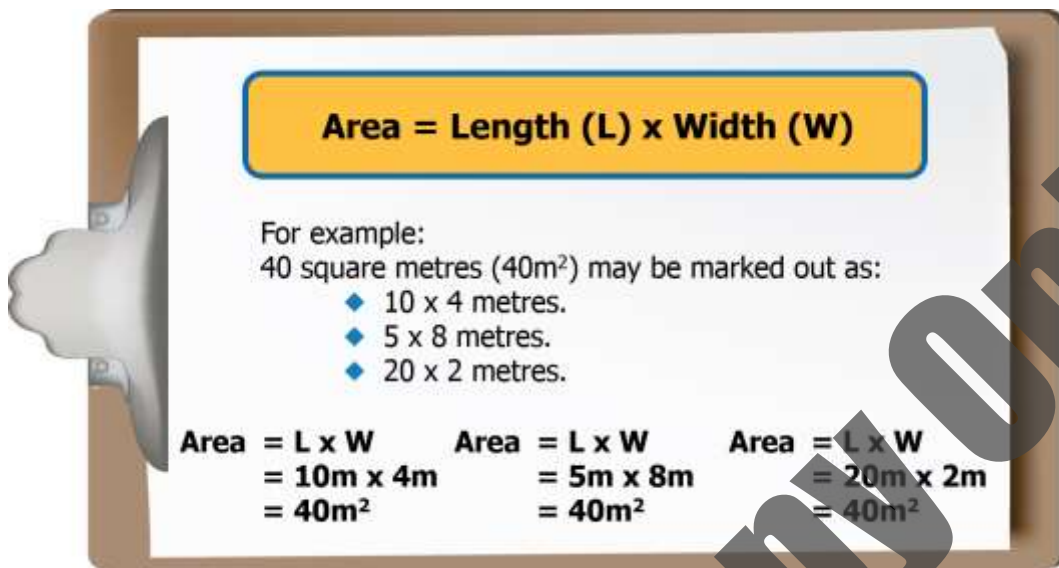
Here is a basic civil construction sequence from clearing the area through to preparing for road construction:



1.3.5 Basic Earthworks Calculations

As a scraper operator, the 2 main calculations you will need to be able to apply are for Area and Volume.

Area can be calculated using the following formula:



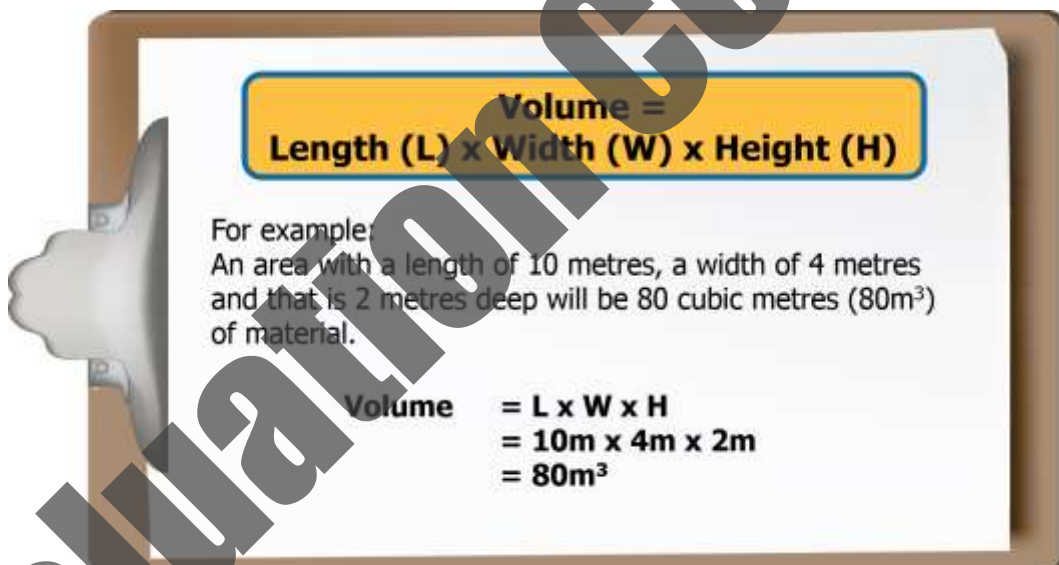
Area = Length (L) x Width (W)

For example:
40 square metres (40m²) may be marked out as:

- ◆ 10 x 4 metres.
- ◆ 5 x 8 metres.
- ◆ 20 x 2 metres.

Area = L x W	Area = L x W	Area = L x W
= 10m x 4m	= 5m x 8m	= 20m x 2m
= 40m²	= 40m²	= 40m²

Volume can be calculated using the following formula:



Volume = Length (L) x Width (W) x Height (H)

For example:
An area with a length of 10 metres, a width of 4 metres and that is 2 metres deep will be 80 cubic metres (80m³) of material.

Volume	= L x W x H
	= 10m x 4m x 2m
	= 80m³

Review Questions

2.

What details about the work area can you get from your work instructions?

3.

What is a Work Method Statement?

4.

What should you do if you don't understand the language or civil construction terminology used on your worksite?

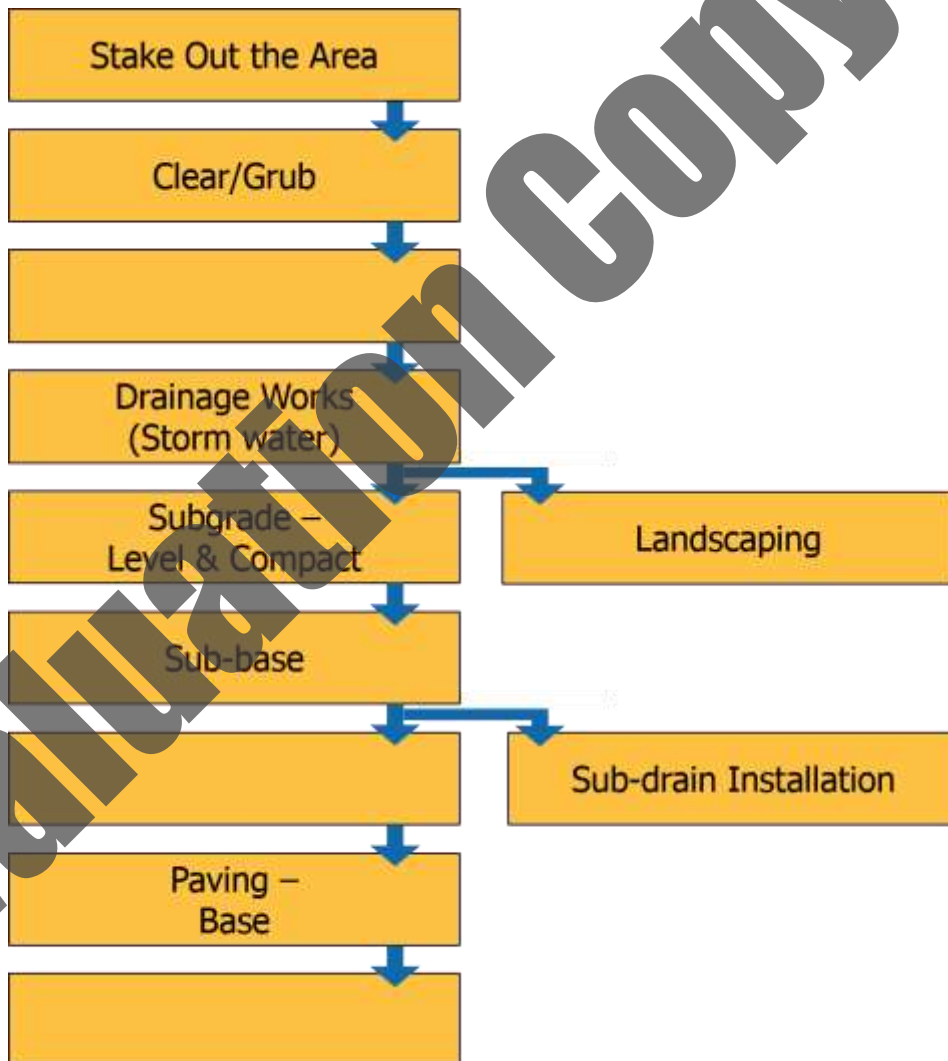
5.

What details are outlined in project quality requirements?



6.

Fill in the blank steps in the civil construction sequence.



7.

What is the area of a space that is 8.5m wide and 12m long? Show all working.

8.

What is the area of a space 15.3m long and 7.8m wide? Show all working.

9.

What is the volume of a space 3m long, 2m wide and 1m deep? Show all working.