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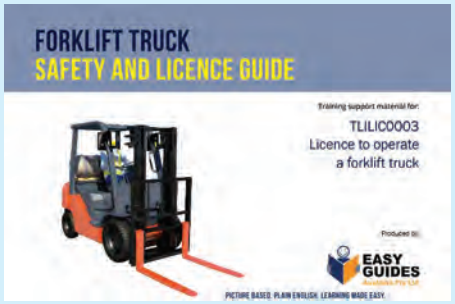

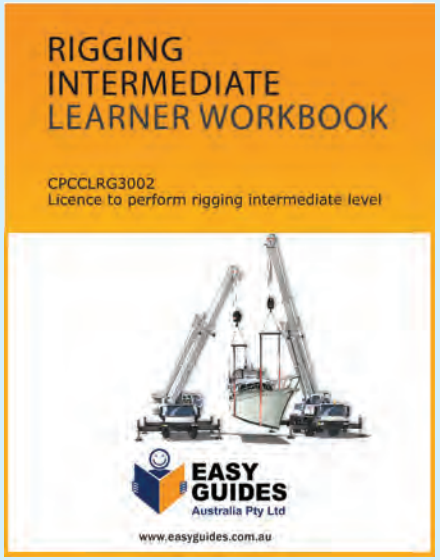

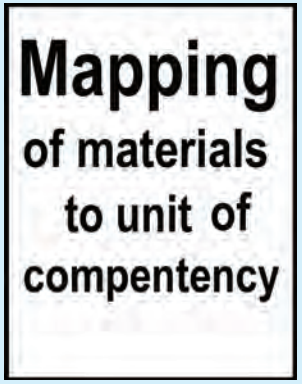

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RIIMPO320F
Conduct civil construction excavator operations

EQUIVALENT TO — RIIMPO320E

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Introduction to Excavator

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Introduction to excavator

An excavator is a machine that moves on tracks or tyres. The body can slew a full 360° without changing the position of the wheels/tracks. You use an excavator to excavate (dig), lift and carry materials. If you are planning to drive an excavator on public roads, it must be registered.

What industries do you use an excavator in?

- Civil construction

- Mining

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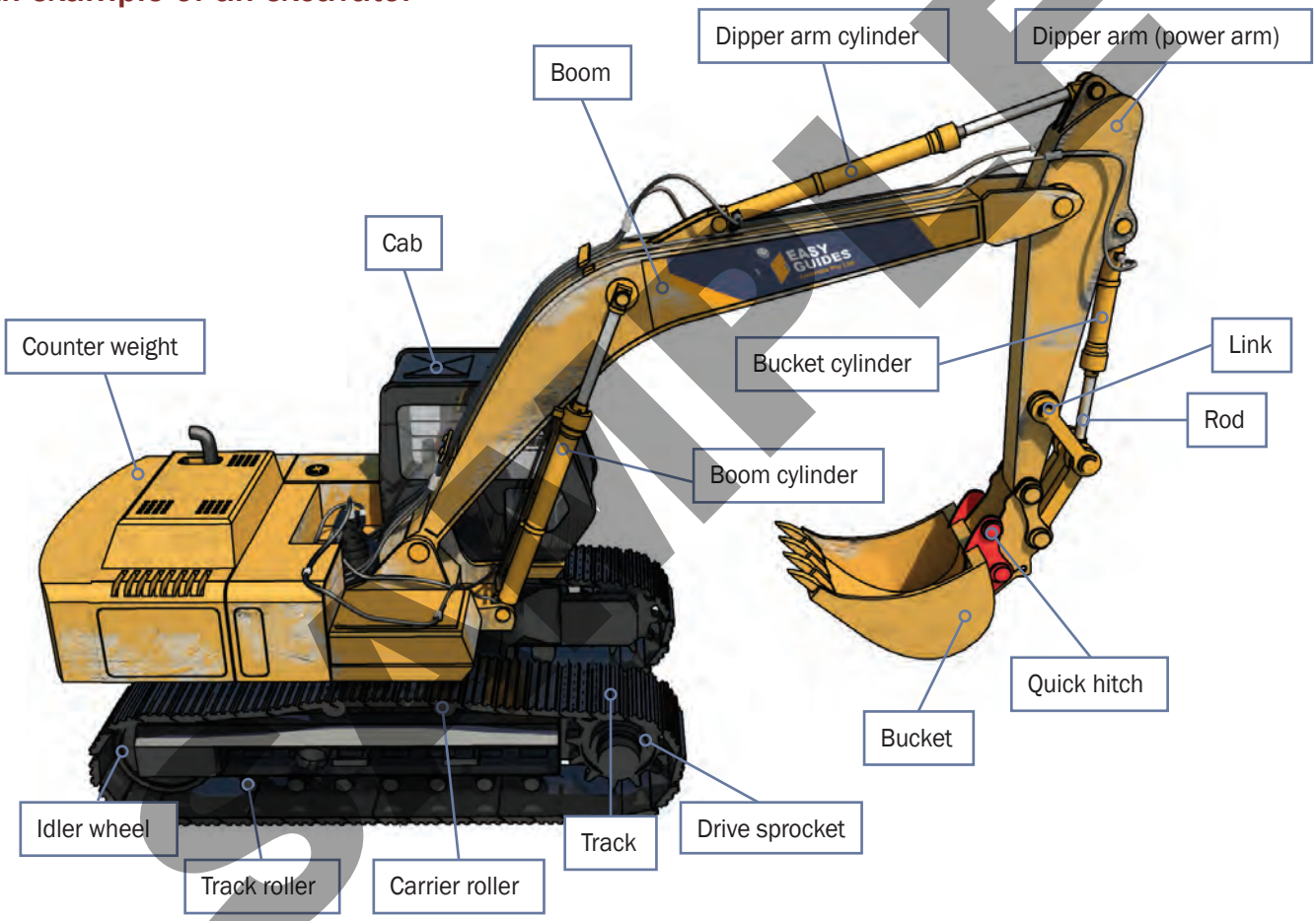
An example of an excavator



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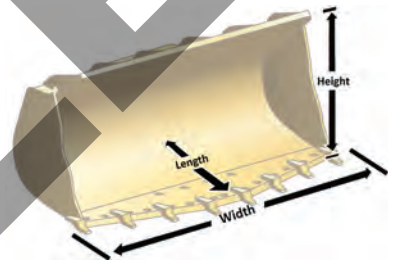
Calculations (continued)

Loading a truck to capacity

This truck has an 8 tonne load capacity. Dry beach sand weighs 2 tonnes per cubic metre.

How many buckets will it take to fill the truck to capacity using a bucket with these dimensions?



Bucket dimensions:

- Length = 1 metre
- Width = 2 metres
- Height = 1 metre

Step 1:

To calculate the capacity of the bucket, use the formula:

L × W × H ÷ 2

1 × 2 × 1 ÷ 2

= 1 cubic metre

Capacity of the bucket

= 1 cubic metre

Step 2:

The weight of dry sand is known (see Table of Common Weights).

Dry sand weighs 2 tonnes per cubic metre

Weight of material

= 2 tonnes (per cubic metre)

Step 3:

The bucket has a capacity of 1 cubic metre. So a full bucket of dry sand will weigh 2 tonnes.

Bucket capacity

× Weight of material

(per cubic metre)

1 × 2 = 2 tonnes

Each full bucket of dry beach sand weighs 2 tonnes.

Step 4:

Truck load capacity is 8 tonnes.

8 tonnes (truck)

÷ 2 tonnes (per bucket)

= 4 buckets

Answer:

It will take 4 buckets of sand to fill the truck to capacity.

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Identify and control hazards

Chapter 2

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QUESTION 30

...CONTINUED FROM PREVIOUS PAGE

What does the safety plan tell you?

How to use tools, plant and equipment safely

Emergency procedures and exits

How to park safely and where to park

Control hazards and risks

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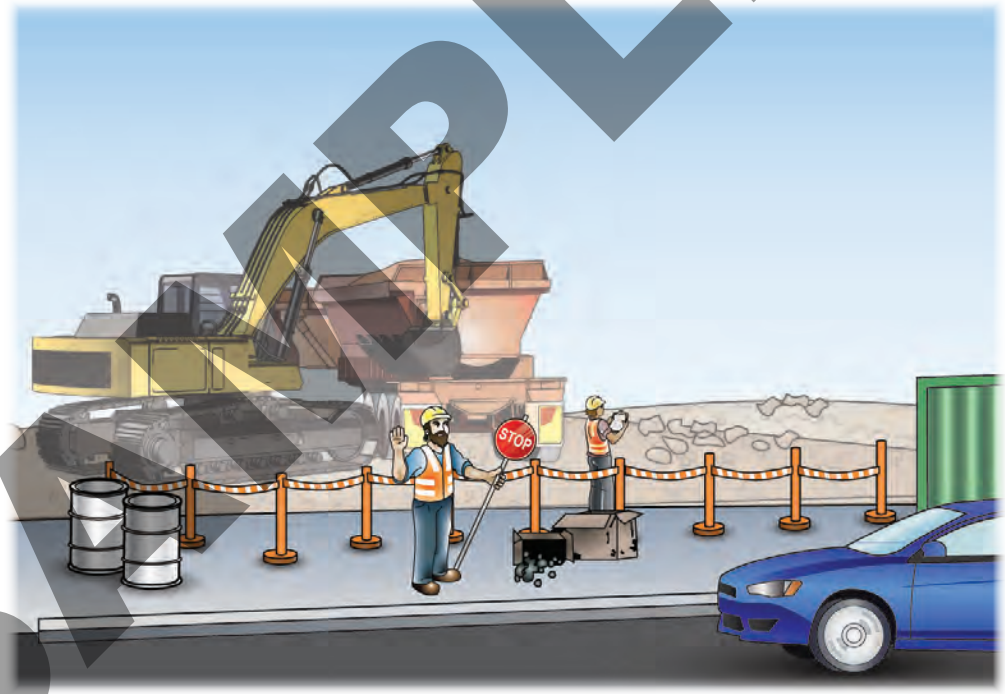
QUESTION 37

What does the traffic management plan (TMP) tell you?

It tells you how to control vehicles in and around the worksite. It helps keep the site safe for you and others.

You may require a traffic control licence in your state or territory.



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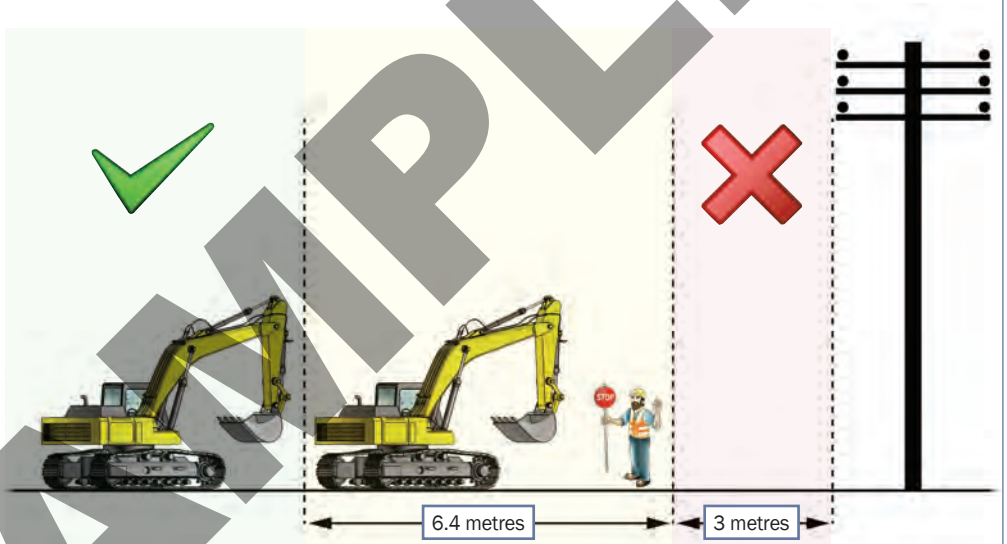
QUESTION 43

What is the minimum safe distance from powerlines?

Check the Australian Standards or distances in your state/territory.



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EXCAVATOR

Learner Workbook

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RIIMPO320F –
Conduct civil construction excavator operations

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This resource was developed by:

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Version 2.1 – June 2022

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Learner Name: _____

Student Number: _____ Date: _____

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SAMPLE

Knowledge Assessment

The assessor must be satisfied the candidate has successfully demonstrated each element and performance criteria contained in the Unit of Competency.

Knowledge Assessment Instructions

1. This assessment should be completed in writing (pen not pencil). However, where necessary it may be undertaken verbally. If verbal assessment is undertaken the candidates' responses must be clearly recorded by the assessor. The assessor must clearly note on the assessment that it was undertaken verbally.

2. Candidates should be allowed 10 minutes reading time before commencing the assessment and a further 180 minutes to complete the assessment.

3. The assessment should be completed in a quiet area free from distraction.

4. The assessment is to be completed without the assistance of learning resources. Students may ask the assessor for assistance to clarify questions they do not understand.

5. A pass mark of 90% (135/156) must be achieved for a satisfactory result. The assessor must provide feedback to the candidate to clarify any answers deemed to be incorrect.

6. Reasonable adjustment to the assessment is to be made by the assessor where deemed necessary.

SAMPLE

Question 10

If a fire starts what are four (4) steps that should be taken?

_____

_____

_____

Question 11

How do you choose and set up a location for a stockpile?

_____

_____

_____

Question 12

How can you find out the specifications and limits of the machine you will use?
Specifications include thing like:

- **Load capacity**
- **Bucket height, volume and width**
- **Lift height**
- **Dump clearance.**

_____

_____

_____

SAMPLE

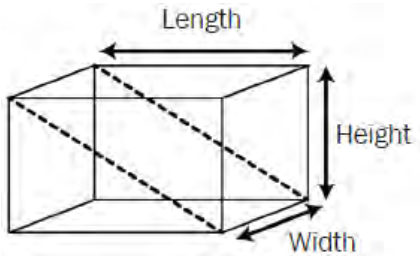
Question 13

How do you find the cubic capacity of an excavator bucket?

_____

_____

_____



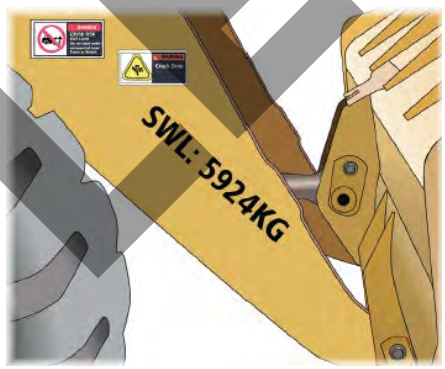
Question 14

How can you find out the maximum safe working load (SWL) of the excavator?

_____

_____

_____



Question 15

Using the information provided on the load chart below, determine how much can the excavator lift in the following configuration?

- **Radius = 4.6 m**
- **Hook height = 1.5 m over side.**

Excavator load Chart										
22 tonne excavator fitted with a 3.05m long arm, 1m³ bucket and 600mm slides										
Radius	**Max reach**		**7.6m**		**6.1m**		**4.6m**		**3.0m**	
Hook height	**Front**	**Side**	**Front**	**Side**	**Front**	**Side**	**Front**	**Side**	**Front**	**Side**
6.1 m	*3100	*3100	*3450	*3250						
4.6 m	*3150	2650	*3950	3250	*4100	*4100				
3.0 m	*3300	2400	*4450	3050	*5050	4500	*6450	*6450	*10750	*10750
1.5 m	3550	2300	4550	2950	*6050	4200	*8300	*6450	8450	*5450
0 m	3600	2300	4450	2850	6200	4000	*9650	6050	*6900	*6900
-1.5 m	3900	2500	4350	2750	6100	3850	*9650	6050	*10200	*10200
-3.0 m	4654	2950			6100	3900	9650	6000	*14900	12300
-4.6 m	6650	4250					9200	6100	*13800	12700

The ratings are based on 75% tipping load, stationary on firm level ground as per AS 1418.5.
* The ratings do not exceed 87% of hydraulic lifting capacity of 75% of tipping load.
For 'pick and carry loads' on firm level ground the load shall not be greater than 66.7% of tipping load as per AS1418.5 OR 89.9% of the SWL.
Where ground is sloping, rough or not firm, the load must be dramatically reduced.

SAMPLE

Question 62

When do you test and inspect the excavator?

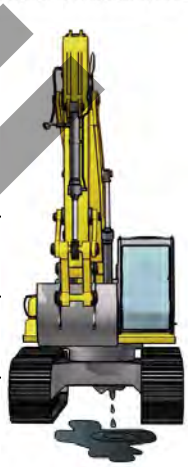
_____

_____

_____

Question 63

What pre-operational checks do you do before using the excavator?



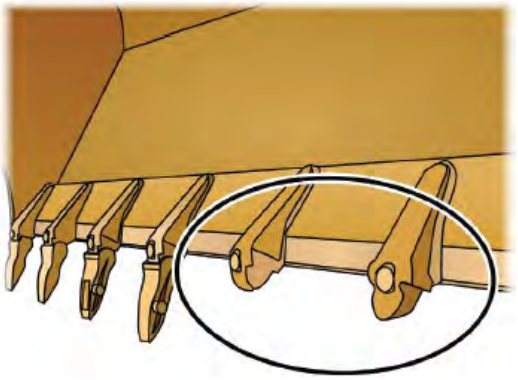
_____

_____

_____

Question 64

What attachment checks do you do?



_____

_____

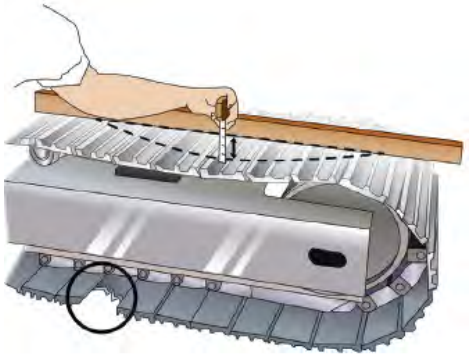
_____

Question 65

What are some common parts that wear or get damaged on an excavator?

Answer may include but is not limited to:

- Teeth on the bucket or attachment
- Track wear and damage
- Drive belts
- Hoses



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Practical Assessment

The assessor must be satisfied the candidate has successfully demonstrated each element and performance criteria contained in the Unit of Competency.

It is the assessor's responsibility to decide if the candidate has competently demonstrated a skill. The assessor may question a candidate further if their demonstration needs clarification.

Practical assessment instructions

Practical assessment should be performed in a normal working environment where possible. However, under some circumstances may occur in a simulated work environment (refer to assessment conditions for further information).

The Assessor must:

- Clearly explain to the candidate what is expected of them
- Check that the candidate has been provided with the necessary tools and equipment
- Complete checklists as the candidate goes through the tasks
- Only question a candidate during a practical task if it is safe to do so
- Stop the assessment immediately if the candidate is doing something dangerous
- Stop the assessment immediately if the machine or objects are likely to be damaged
- Inform the candidate of the result of the assessment

If an assessor needs to stop the assessment because of danger or possible damage, the candidate must be marked as not yet competent. If the assessment is stopped, further training would need to take place before a re-assessment can be undertaken.

Tasks in the assessment do not have to be assessed in isolation, the may be done as one continual task, a simple example of this may be to:

SAMPLE

Summary of practical assessment task.

The candidate is to demonstrate the ability to:

- Operate an excavator,
- Distribute and
- Place Materials,
- Safely, effectively and efficiently following workplace procedures to carry out work activity on at least two occasions using at least two attachments on each occasion.

The assessor is to submit 2 work orders to candidate to follow which outlines work to be performed for at least 2 different material types such as the following:

- mixing materials
- stripping/spreading materials
- trench excavation
- backfilling
- lifting and carry materials
- loading dump trucks, wagons, hoppers or chutes
- cutting/boxing

Attachments that can be used are the following:

- ❑ extending devices
- ❑ tilt bucket
- ❑ buckets
- ❑ compaction wheel
- ❑ ripper, ❑ plate compactor
- ❑ rock breaker
- ❑ auger
- ❑ broom
- ❑ mower/slasher
- ❑ forklift
- ❑ 4 in 1 bucket and free/rock grab

Examples of a work order / job (requirements), might be the following;

Example 1 / Work Order 1. Dig a trench so that concrete sewerage pipe can be laid and place concrete pipe into trench then back fill in trench. Use rock breaker to break up concrete of foot path and drive way to place sewerage pipe.

Example 2 / Work Order 2. Move a large amount of gravel from front of a house to the back of a house to form a flat drive way. Then move any excess dirt from site into a dump truck.

Note: Performing the actual practical task must be filmed and noted of where the video file is stored.

SAMPLE

Practical Assessment – Check List

The skills and knowledge required to operate an excavator to load, distribute and place materials, work must be performed on at least two occasions and carrying out the actual practical task must be filmed and noted of where the video file is stored.

Practical Assessment 1 – Pre-Start

Observation performed when performing Practical Task 1 from work order provided (Job 1, Job 2) Candidate:	**Yes**	**No**	**N/A**	**Job 1**	**Job 2**
Located and apply relevant documentation, policies and procedures.	❑	❑	❑		
❑ Locates operator's manual for excavator and finds requirements for pre-start and start-up checks.				❑	❑
❑ Locates site policies and procedures for personal protective equipment requirements when operating excavator.				❑	❑
❑ Candidate displays preparedness for emergency situations by outlining the steps to be taken in the case of a fire or accident.				❑	❑
❑ Interrupt work order or requirements before performing work task.				❑	❑
Selected and wear personal protective equipment.	❑	❑	❑		
❑ PPE selected must be as per site policies and relevant to the task. As a minimum MUST include appropriate footwear, Hi-visibility workwear and hard hat.				❑	❑
❑ PPE must be checked for serviceability and correctly fitted.				❑	❑
Conducted pre-start inspection of excavator.	❑	❑	❑		
❑ Pre-start check is carried out as per operators manual and workplace policies and procedures. Where possible a completed pre-start checklist should be provided as supporting evidence.				❑	❑
❑ During inspection the candidate must identify and/or verbalise any common faults they are looking for.				❑	❑
❑ Faults and/or damage found during inspection must be managed as per workplace policies and procedures. This should include, tagging out faulty equipment, isolating faulty equipment, reporting to the appropriate person and recording in a logbook. If no faults or damage are found the candidate must verbalise the procedure for the worksite to the assessor.				❑	❑
Carried out vehicle refuelling requirements and procedures where applicable.	❑	❑	❑		
❑ Candidate must refuel the excavator when necessary. The candidate must refer to workplace policies and procedures for refuelling.				❑	❑

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Excavator

Record of Training Logbook / Verification of competency (VOC)

RIIMPO320F
Conduct civil construction excavator operations

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Contents

Operator, employer, supervisor and training details ..... (i)

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Lift, carry and place materials to complete work activity 36

Select, remove, fit and use attachments for a excavator 48

Prepare to relocate the excavator 60

Conduct housekeeping activities 68

SAMPLE

How to use this logbook

1. Fill out the details at the start of this logbook — operator's name, address etc.
2. Wear the personal protective equipment (PPE) you need to wear.
3. After you have finished working, you can start filling out your logbook. Start by writing down the work you have done.
4. Make sure you fill in each section of your logbook. Your supervisor will sign the supervisor section if s/he believes the details are correct and the tasks have been completed in a satisfactory way.

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Element/Work tasks	Description of work/training performed
PC 1.3 **Hazards and environmental issues** Identify hazards and environmental issues, assess the risks and implement control measures in line with workplace policies	*I looked around the site and found that a busy footpath was near my working area. My excavator had a slasher attachment for cutting grass. People walking by might be at risk. I put up signs to warn people of the danger nearby.*
	I had to use the excavator near a trench. The trench was about 2 metres deep. No one had put up any warning signs or barriers. I put up a row of barricades 3 metres away from the trench. This would give me a safe working distance and also keep other people away from the trench.
	The job I had to do was to cut grass using a slasher. I backed the excavator up to the slasher. I turned the excavator off and put the hand brake on. I connected the slasher to the power take off. I got back on the excavator and started work.

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Date/time	No. of hours	Machine details	Supervisor/competent person
Date: 21 / 03 / 2016 Start time: 8.00 am pm	15 minutes	Make: Komatsu Model: PC300-7 Serial No: 26800741	Name: Nathan Deeman Signed: Nathan D Experience/qualifications: 20 years on the job experience and Cert IV
Date: 22 / 03 / 2016 Start time: 10.30 am pm	5 minutes	Make: Komatsu Model: PC300-7 Serial No: 26800741	Name: Nathan Deeman Signed: Nathan D Experience/qualifications: 20 years on the job experience and Cert IV
Date: 23 / 03 / 2016 Start time: am 2.30 pm	20 minutes	Make: Komatsu Model: PC300-7 Serial No: 26800741	Name: Sam Hasseron Signed: S.H. Experience/qualifications: Cert IV in Training & Assessing and RII RTO Statement of Attainment in excavator

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Notes

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Element 1

Plan and prepare for excavator operations

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Element/Work tasks	Description of work/training performed
PC 1.1 Access, interpret and apply excavator operations documentation	

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Date/time	No. of hours	Machine details	Supervisor/competent person
Date: ..... Start time: ..... am ..... pm		Make: ..... Model: ..... Serial No:	Name: ..... Signed: ..... Experience/qualifications: ....
Date: ..... Start time: ..... am ..... pm		Make: ..... Model: ..... Serial No:	Name: ..... Signed: ..... Experience/qualifications: ....
Date: ..... Start time: ..... am ..... pm		Make: ..... Model: ..... Serial No:	Name: ..... Signed: ..... Experience/qualifications: ....

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Element 2

Operate excavator in line with established requirements to complete

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Element/Work tasks	Description of work/training performed
PC 2.1 **Carry out prestart and start-up checks** in line with workplace procedures	

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Date: ..... Start time: ..... am ..... pm		Make: ..... Model: ..... Serial No:	Name: ..... Signed: ..... Experience/qualifications: ....
Date: ..... Start time: ..... am ..... pm		Make: ..... Model: ..... Serial No:	Name: ..... Signed: ..... Experience/qualifications: ....
Date: ..... Start time: ..... am ..... pm		Make: ..... Model: ..... Serial No:	Name: ..... Signed: ..... Experience/qualifications: ....

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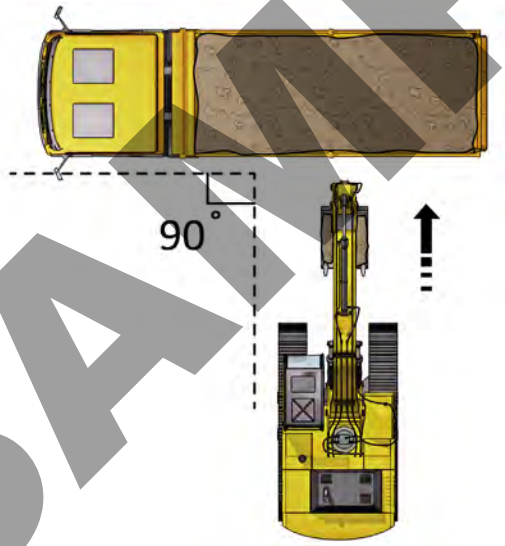
Element 3

Lift, carry and place materials to complete work activity



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Element/Work tasks	Description of work/training performed
PC 3.1 **Establish weight of load** and ensure it is within safe operational limits of the machine	

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Date/time	No. of hours	Machine details	Supervisor/competent person
Date: ..... Start time: ..... am ..... pm		Make: ..... Model: ..... Serial No:	Name: ..... Signed: ..... Experience/qualifications: ....
Date: ..... Start time: ..... am ..... pm		Make: ..... Model: ..... Serial No:	Name: ..... Signed: ..... Experience/qualifications: ....
Date: ..... Start time: ..... am ..... pm		Make: ..... Model: ..... Serial No:	Name: ..... Signed: ..... Experience/qualifications: ....

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Element/Work tasks	Description of work/training performed
PC 3.2 **Use lifting gear within safe working load** requirements and in line with workplace requirements	

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Excavator

Mapping Document

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Conduct civil construction excavator operations

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The information and questions contained in the Learner Guide and PowerPoint presentation have been mapped to the elements, performance criteria, and knowledge evidence for the unit of competency RIIMPO320F Conduct civil construction excavator operations.

Elements and Performance Criteria

Element 1 - Plan and prepare for excavator operations

Performance Criteria	Learner Guide/PowerPoint	Formative Assessment		Summative Assessment
		Knowledge	Performance	
1.1 Access, interpret and apply excavator operations documentation	• Who has duty of care? • Worker's duty of care • PCBU/Employer's duty of care • Work health and safety legislative requirements • Where to find Health and Safety information **Question** 1, 2, 3, 4, 5, 6, 7, 12	Question 1, 2, 3, 4, 5, 6, 7, 8, 9, 14, 15, 16	Task 1-A	**Knowledge assessment** 1 **Practical assessment** 1. Pre-start.
1.2 Obtain, interpret, clarify and confirm work requirements	• Worksite requirements • Calculations **Question** 7, 8, 9, 30, 51	Question 1, 2, 3, 4, 5, 6, 7, 8, 9, 13, 14, 15, 16, 32, 52, 59	Task 1-A Task 1-B Task 1-F Task 1-G	**Knowledge assessment** 2, 64 **Practical assessment** 3. Complete operations to specifications.
1.3 Identify hazards and environmental issues, assess the risks and implement control measures in line with workplace policies	• Earthmoving site hazards • Environmental management plan (EMP) • Earthmoving hazards and risks • Decibel levels of common sounds • Chemicals and solvents • Fatigue • Safety around trenches • Confined space • Disposing of environmentally sensitive fluid	Question 11, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 33, 34, 35, 39, 40, 41, 42, 43, 49, 50, 134	Task 1-C Task 1-E Task 1-G Task 1-J	**Knowledge assessment** 3, 7, 9, 38, 57, 58 **Practical assessment** 2. Drive and operate excavator.

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	• Clean up • Job safety and environment analysis (JSEA) or Safe work method statement (SWMS) **Question** 11, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 30, 32, 33, 34, 35, 42, 43, 49, 50, 52, 53, 54, 92, 152			
1.4 Select and wear personal protective equipment required for work activities	• Tools and equipment **Question** 30, 31, 36	Question 31, 36	Task 1-D	**Knowledge assessment** 4, 16 **Practical assessment** 1. Pre-start.
1.5 Obtain, identify and implement traffic signage requirements according to standard operating procedures and safe work practices	**Question** 35, 37, 38, 39, 52	Question 37, 38	Task 1-H	**Knowledge assessment** 5, 43, 44 **Practical assessment** 2. Drive and operate excavator 5. Load, unload and relocate excavator.
1.6 Select required excavator equipment and/or attachments and confirm suitability for work activities	• Tools and equipment **Question** 14, 59, 60, 61, 80	Question 104	Task 1-I Task 4-A	**Knowledge assessment** 6 **Practical assessment** 4. Attachments
1.7 Obtain and interpret emergency procedures for excavators, and be prepared for fires, accidents and emergencies	• Worksite requirements • Emergency evacuation plan • First aid and emergencies • Safety plan **Question** 10, 30	Question 10, 27, 28, 29, 30, 44	Task 1-K	**Knowledge assessment** 8 **Practical assessment** 1. Pre-start
1.8 Coordinate and communicate planned activities with others at the	• Communication • Communication - shift handovers	Question 17, 93	Task 1-J	**Knowledge assessment**

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site prior to commencement of work activity	• Choosing the right communication method • Communicating with people **Question** 17, 23, 29, 53, 54, 93			19, 25, 34 **Practical assessment** 3. Complete operations to specification

Element 2 - Operate excavator in line with established requirements

	Performance Criteria	Learner Guide/PowerPoint	Formative Assessment		Summative Assessment
			Knowledge	Performance	
	2.1 Carry out pre-start and start-up checks in line with workplace procedures	**Question** 62, 63, 64, 65, 66, 68, 69, 70, 71, 72, 73, 75, 76, 95, 122	Question 59, 60, 61, 62, 64, 66, 68, 69, 76, 76, 77	Task 2-A	**Knowledge assessment** 10, 11, 12, 13, 38, 39 **Practical assessment** 1. Pre-start
	2.2 Identify faults or defects and rectify or report within scope of own responsibility and according to workplace procedures	• Defective parts **Question** 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 95, 136, 137	Question 62, 63, 65, 66, 69, 70, 71, 72, 73, 74, 75, 99, 100		**Knowledge assessment** 12, 13, 39, 50, 51 **Practical assessment** 1. Pre-start
	2.3 Drive and operate excavator using techniques suited to equipment capabilities and site work conditions, and according to workplace procedures	**Question** 55, 56, 80, 81, 82, 88, 89, 92, 103	Question 80, 89, 90	Task 2-B Task 2-C	**Knowledge assessment** 17, 18, 20, 21, 24, 63 **Practical assessment** 2. Drive and operate excavator
	2.4 Monitor hazards and risks during operations, and ensure safety of self, other personnel,	• Safety around trenches • Overhead powerlines on poles (National Standard)	Question 25, 40, 45, 46, 47, 48, 53,	Task 1-C Task 1-G Task 2-B	**Knowledge assessment** 14, 15, 18, 20, 22, 23, 30, 32, 38

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