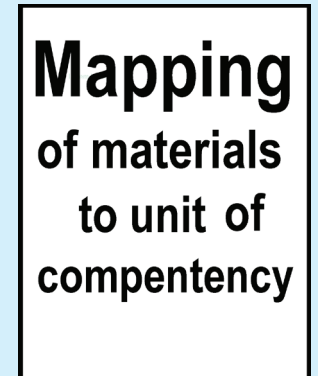
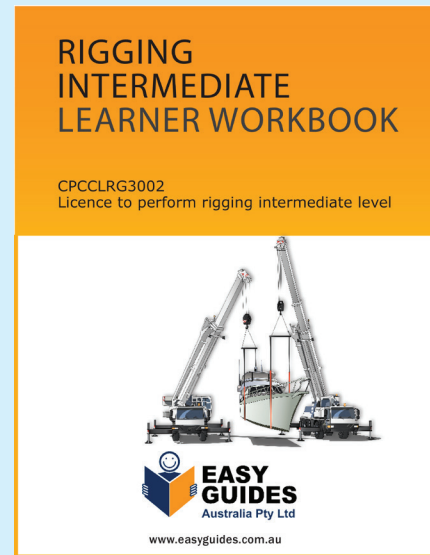


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LEARNER GUIDE



Excavator

TICKET

RIIMP0320F

Conduct civil construction
excavator operations

EQUIVALENT TO — RIIMP0320E



**EASY
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Industry Training Resources



Contents

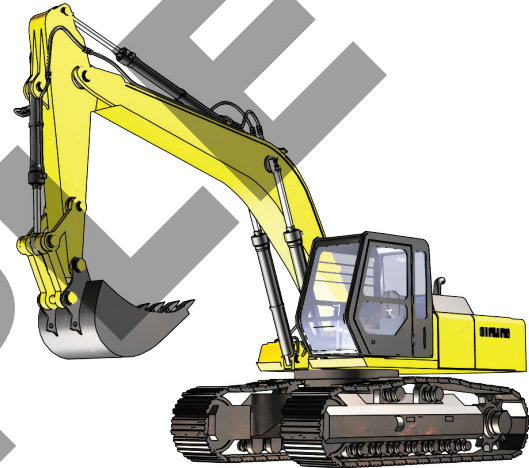
How to use this guide	4
Acknowledgements	6
Introduction to excavator	7
General information	13
Chapter 1 Plan and prepare for work	57
Chapter 2 Identify and control hazards	79
Chapter 3 Check and monitor equipment	115
Chapter 4 Operate/use equipment	139
Chapter 5 Shut down and store equipment	183
Chapter 6 Maintain equipment	195
Chapter 7 Housekeeping	205
Chapter 8 Record keeping	211
Chapter 9 Relocate equipment	215
Chapter 10 Attachments	225

Introduction to Excavator



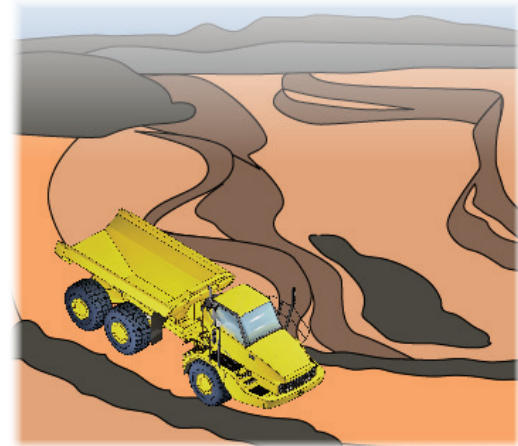
Introduction to excavator

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



Calculations (continued)

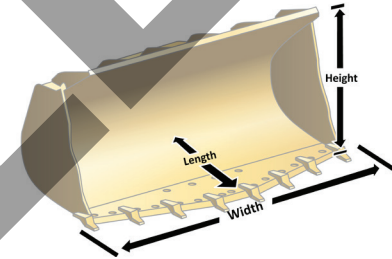
Loading a truck to capacity

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:

$$L \times W \times H \div 2$$

$$1 \times 2 \times 1 \div 2$$

$$= 1 \text{ cubic metre}$$

Capacity of the bucket

$$= 1 \text{ cubic metre}$$

Answer:

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

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)

$$1 \times 2 = 2 \text{ tonnes}$$

Each full bucket of dry beach sand weighs 2 tonnes.

Step 4:

Truck load capacity is 8 tonnes.

$$\begin{aligned} &8 \text{ tonnes (truck)} \\ &\div 2 \text{ tonnes (per bucket)} \\ &= 4 \text{ buckets} \end{aligned}$$

Identify and control hazards

Chapter 2



QUESTION 30

...CONTINUED FROM PREVIOUS PAGE

What does the safety plan tell you?

How to use tools, plant and equipment safely



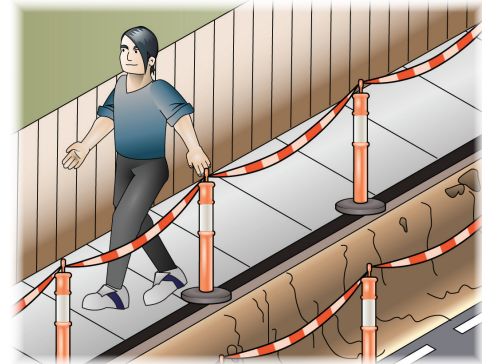
Emergency procedures and exits



How to park safely and where to park



Control hazards and risks

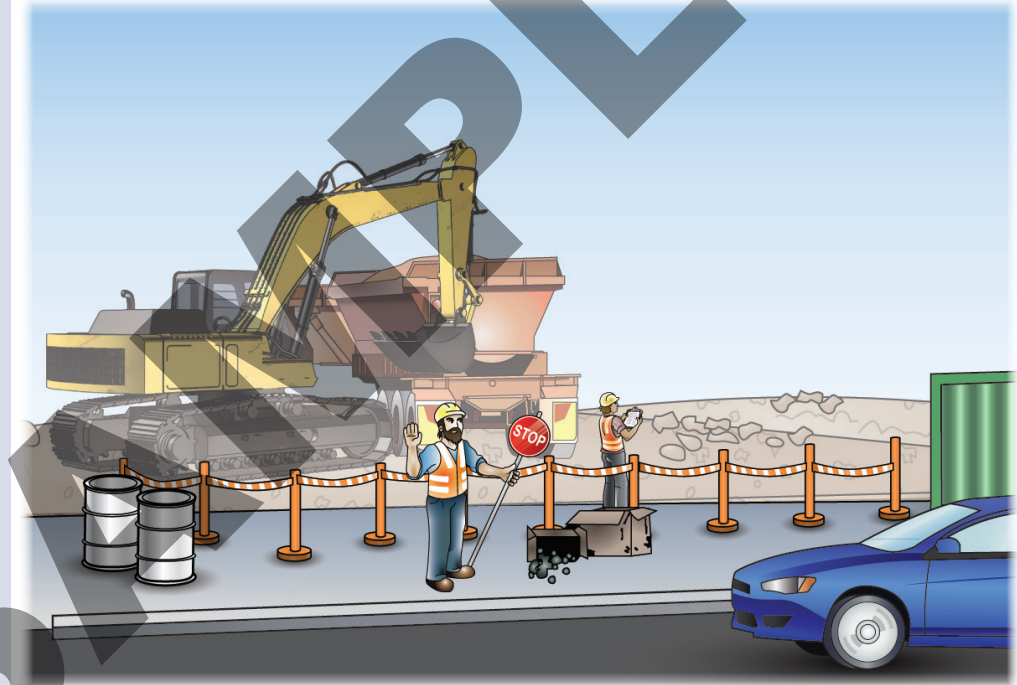


QUESTION 37

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.

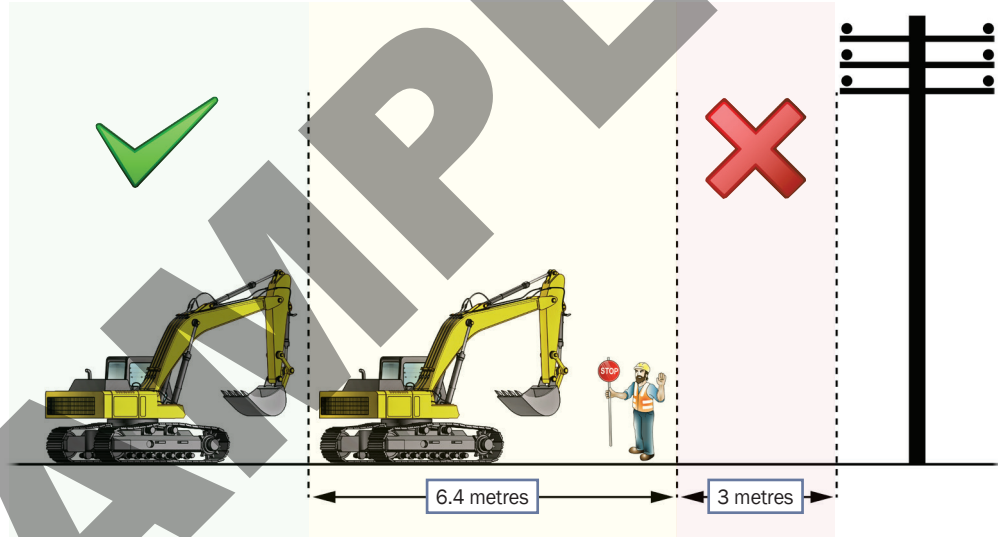
You may require a traffic control licence in your state or territory.



QUESTION 43

What is the minimum safe distance from powerlines?

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



EXCAVATOR

Learner Workbook



STUDENT COPY

RIIMPO320F –

Conduct civil construction excavator operations



This resource was developed by:



Version 2.1 – June 2022



Learner Name: _____

Student Number: _____ Date: _____

Contents

Contact Details	2
Application / Context of Assessment	4
Assessment Conditions.....	4
Assessor’s qualifications and assessment conditions	6
Assessment Guidelines.....	6
Knowledge Assessment.....	9
Knowledge Assessment Instructions.....	9
Score for knowledge assessment	54
Practical Assessment	55
Practical assessment instructions.....	55
Summary of practical assessment task.	56
Description of work order / Job (requirements).....	57
Practical Assessment – Check List	58
Practical Assessment Summary – Competency Sign Off.....	74

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.



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?



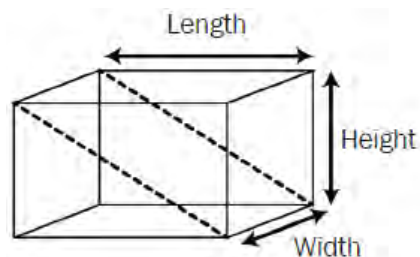
Question 12

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.

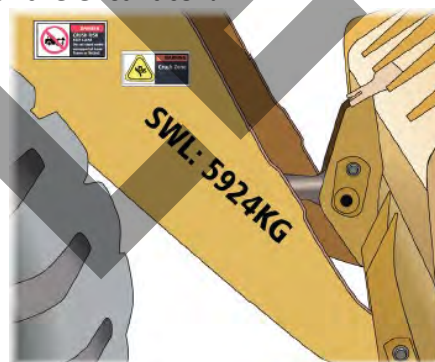
Question 13

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, 1m ³ 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.

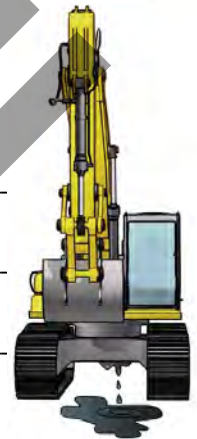
Question 62

When do you test and inspect the excavator?



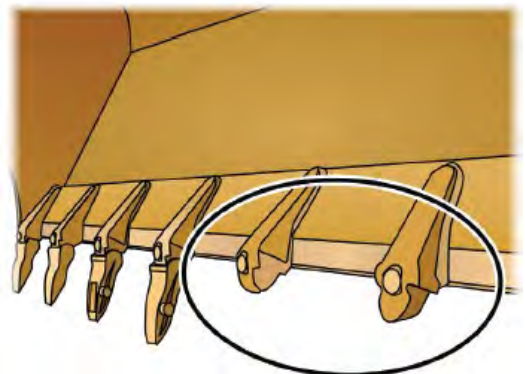
Question 63

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



Question 64

What attachment checks do you do?

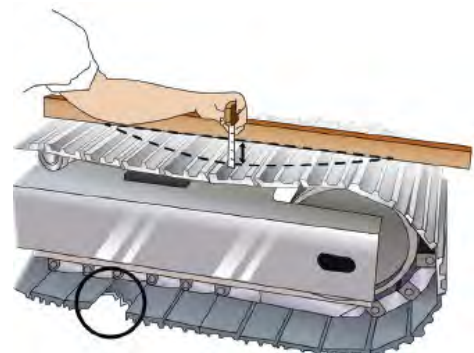


Question 65

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



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, they may be done as one continual task, a simple example of this may be to:



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.

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)	Yes	No	N/A	Job 1	Job 2
Candidate:					
Located and apply relevant documentation, policies and procedures.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
<input type="checkbox"/> Locates operator's manual for excavator and finds requirements for pre-start and start-up checks.				<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Locates site policies and procedures for personal protective equipment requirements when operating excavator.				<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Candidate displays preparedness for emergency situations by outlining the steps to be taken in the case of a fire or accident.				<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Interrupt work order or requirements before performing work task.				<input type="checkbox"/>	<input type="checkbox"/>
Selected and wear personal protective equipment.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
<input type="checkbox"/> 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.				<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> PPE must be checked for serviceability and correctly fitted.				<input type="checkbox"/>	<input type="checkbox"/>
Conducted pre-start inspection of excavator.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
<input type="checkbox"/> 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.				<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> During inspection the candidate must identify and/or verbalise any common faults they are looking for.				<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> 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.				<input type="checkbox"/>	<input type="checkbox"/>
Carried out vehicle refuelling requirements and procedures where applicable.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
<input type="checkbox"/> Candidate must refuel the excavator when necessary. The candidate must refer to workplace policies and procedures for refuelling.				<input type="checkbox"/>	<input type="checkbox"/>

Excavator

Record of Training Logbook / Verification of competency (VOC)



RIIMP0320F
Conduct civil construction excavator operations



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Contents

Operator, employer, supervisor and training details	(i)
Purpose of this logbook	1
How to use this logbook	2
Sample pages	3
Plan and prepare for excavator operations	6
Operate excavator in line with established requirements	24
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

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.



Element/Work tasks	Description of work/training performed
<p>PC 1.3</p> <p>Hazards and environmental issues</p> <p>Identify hazards and environmental issues, assess the risks and implement control measures in line with workplace policies</p>	<p><i>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></p>
	<p><i>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.</i></p>
	<p><i>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.</i></p>

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

Notes



SAMPLE

Element 1

Plan and prepare for excavator operations



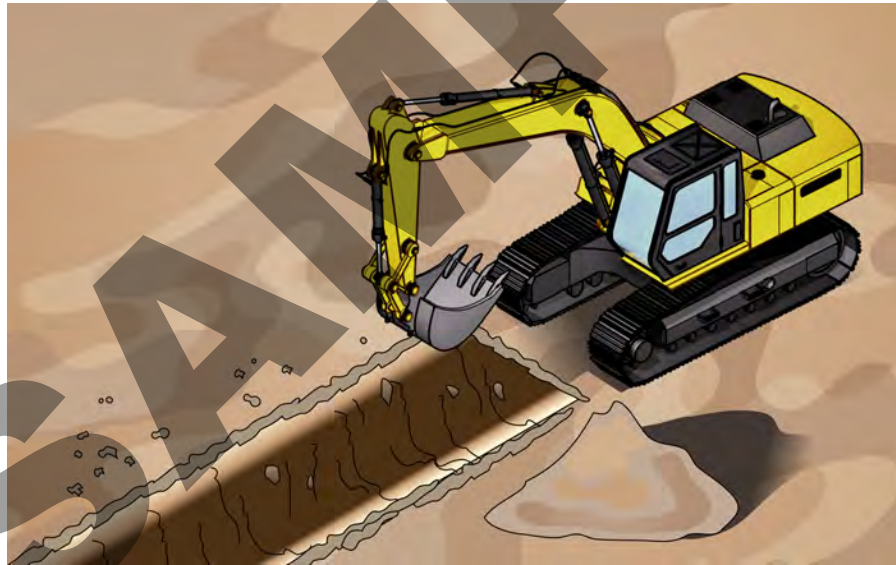
Element/Work tasks	Description of work/training performed
PC 1.1 Access, interpret and apply excavator operations documentation	

SAMPLE

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:

Element 2

Operate excavator in line with established requirements to complete



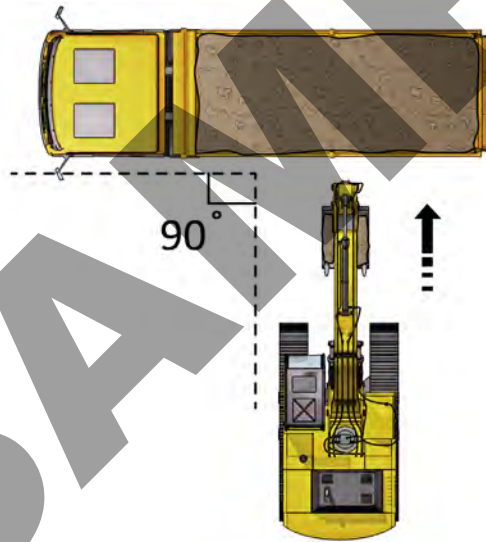
Element/Work tasks	Description of work/training performed
<p>PC 2.1</p> <p>Carry out prestart and start-up checks in line with workplace procedures</p>	

SAMPLE

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:

Element 3

Lift, carry and place materials to complete work activity



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

SAMPLE

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:

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

SAMPLE

Excavator

Mapping Document

RIIMPO320F

Conduct civil construction excavator operations



Industry Training Resources

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	<ul style="list-style-type: none"> 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 <p>Question 1, 2, 3, 4, 5, 6, 7, 12</p>	Question 1, 2, 3, 4, 5, 6, 7, 8, 9, 14, 15, 16	Task 1-A	<p>Knowledge assessment 1</p> <p>Practical assessment 1. Pre-start.</p>
1.2 Obtain, interpret, clarify and confirm work requirements	<ul style="list-style-type: none"> Worksite requirements Calculations <p>Question 7, 8, 9, 30, 51</p>	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	<p>Knowledge assessment 2, 64</p> <p>Practical assessment 3. Complete operations to specifications.</p>
1.3 Identify hazards and environmental issues, assess the risks and implement control measures in line with workplace policies	<ul style="list-style-type: none"> 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	<p>Knowledge assessment 3, 7, 9, 38, 57, 58</p> <p>Practical assessment 2. Drive and operate excavator.</p>

	<ul style="list-style-type: none"> Clean up Job safety and environment analysis (JSEA) or Safe work method statement (SWMS) <p>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</p>			
1.4 Select and wear personal protective equipment required for work activities	<ul style="list-style-type: none"> Tools and equipment <p>Question 30, 31, 36</p>	Question 31, 36	Task 1-D	<p>Knowledge assessment 4, 16</p> <p>Practical assessment 1. Pre-start.</p>
1.5 Obtain, identify and implement traffic signage requirements according to standard operating procedures and safe work practices	<p>Question 35, 37, 38, 39, 52</p>	Question 37, 38	Task 1-H	<p>Knowledge assessment 5, 43, 44</p> <p>Practical assessment 2. Drive and operate excavator 5. Load, unload and relocate excavator.</p>
1.6 Select required excavator equipment and/or attachments and confirm suitability for work activities	<ul style="list-style-type: none"> Tools and equipment <p>Question 14, 59, 60, 61, 80</p>	Question 104	Task 1-I Task 4-A	<p>Knowledge assessment 6</p> <p>Practical assessment 4. Attachments</p>
1.7 Obtain and interpret emergency procedures for excavators, and be prepared for fires, accidents and emergencies	<ul style="list-style-type: none"> Worksite requirements Emergency evacuation plan First aid and emergencies Safety plan <p>Question 10, 30</p>	Question 10, 27, 28, 29, 30, 44	Task 1-K	<p>Knowledge assessment 8</p> <p>Practical assessment 1. Pre-start</p>
1.8 Coordinate and communicate planned activities with others at the	<ul style="list-style-type: none"> Communication Communication - shift handovers 	Question 17, 93	Task 1-J	<p>Knowledge assessment</p>

site prior to commencement of work activity	<ul style="list-style-type: none"> • Choosing the right communication method • Communicating with people <p>Question 17, 23, 29, 53, 54, 93</p>			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	<p>Question 62, 63, 64, 65, 66, 68, 69, 70, 71, 72, 73, 75, 76, 95, 122</p>	Question 59, 60, 61, 62, 64, 66, 68, 69, 76, 76, 77	Task 2-A	<p>Knowledge assessment 10, 11, 12, 13, 38, 39</p> <p>Practical assessment 1. Pre-start</p>
	2.2 Identify faults or defects and rectify or report within scope of own responsibility and according to workplace procedures	<ul style="list-style-type: none"> • Defective parts <p>Question 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 95, 136, 137</p>	Question 62, 63, 65, 66, 69, 70, 71, 72, 73, 74, 75, 99, 100		<p>Knowledge assessment 12, 13, 39, 50, 51</p> <p>Practical assessment 1. Pre-start</p>
	2.3 Drive and operate excavator using techniques suited to equipment capabilities and site work conditions, and according to workplace procedures	<p>Question 55, 56, 80, 81, 82, 88, 89, 92, 103</p>	Question 80, 89, 90	Task 2-B Task 2-C	<p>Knowledge assessment 17, 18, 20, 21, 24, 63</p> <p>Practical assessment 2. Drive and operate excavator</p>
	2.4 Monitor hazards and risks during operations, and ensure safety of self, other personnel,	<ul style="list-style-type: none"> • 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	<p>Knowledge assessment 14, 15, 18, 20, 22, 23, 30, 32, 38</p>