Trainer Value Pack

VEHICLE LOADING CRANE
SAFETY AND LICENCE GUIDE

Training support material for:

TLILIC0024
Licence to operate a vehicle loading crane
(capacity 10 metre tonnes and above)

Produced by:

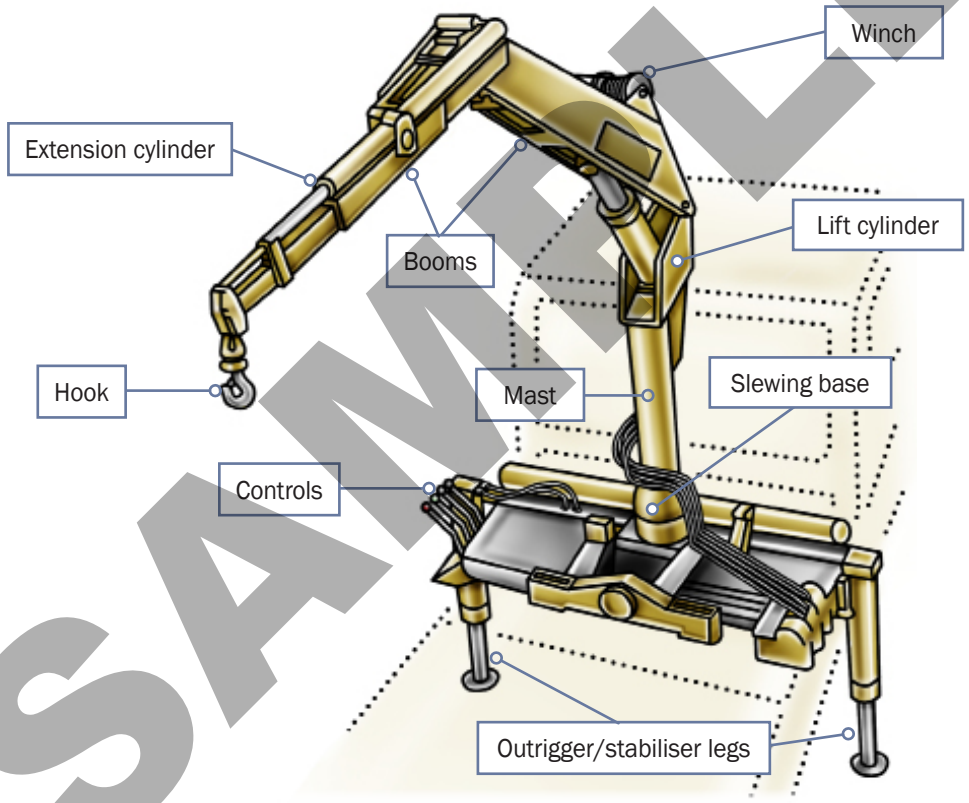
EASY GUIDES
Australia Pty Ltd

CONTENTS

INTRODUCTION TO VEHICLE LOADING CRANE

What is a vehicle loading crane?

A vehicle loading crane is a crane which is mounted to a vehicle for loading and unloading. Vehicle loading cranes have hydraulic booms with power supplied from the vehicles engine through a PTO (power take off).



10 metre tonnes

A High Risk Work licence is needed when the vehicle loading crane has a capacity of 10 metre tonnes or more. The metre tonnage of a vehicle loading crane is a number which is worked out by multiplying the lifting capacity by the working radius of the boom for that lifting capacity.

To calculate 10 metre tonnes

MULTIPLY THE SWL × THE WORKING RADIUS FOR THAT SWL = METRE TONNES

from the centre line of slew to the centre line of hook. This calculation must be done for each Safe working load (SWL) on the load chart.

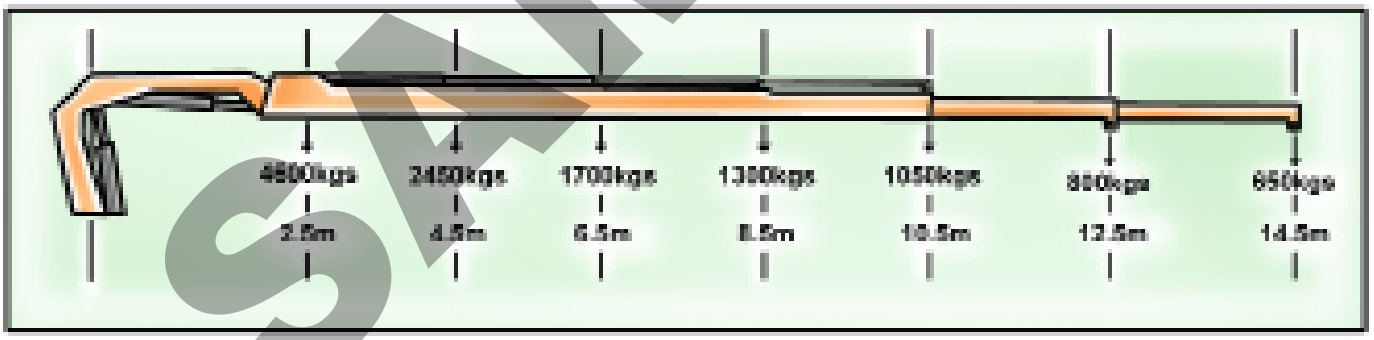
If any one calculation amounts to 10 metre tonnes lifting capacity or greater, the crane operator will require the appropriate High Risk Work Licence.

For example

The load chart below indicates the crane can lift 1300 kilograms at 8.5 metres.

1300 kg × 8.5 m = 11,050

— as this is greater than 10,000 a HRW Licence is required to operate the crane.



Does the operator of a VLC need a dogging licence?

A dogging HRW Licence or one of the three rigging HRW Licences is required by:

- Any person, other than a licenced VLC operator, who **exercises judgment** in the estimation of a load or selection of the slinging method and lifting gear when slinging a load on any VLC, or
- Any person who directs any VLC operator in the movement of the load when the load is out of view of the crane operator.

To exercise judgment means:

- Selecting the slinging method by considering the shape of the load
- Selecting the lifting gear by determining the weight (its mass) and centre of gravity of the load, and
- Inspecting the lifting gear to ensure it is not defective by considering its condition.

The vehicle loading crane HRW licence includes the application of load estimation and slinging techniques to move a load competently. **Holders of a vehicle loading crane HRW licence can exercise judgment on the load and slinging method and select and inspect the lifting equipment when operating a vehicle loading crane.**

The holder of a vehicle loading crane HRW licence **cannot**:

- Exercise judgement or inspect lifting gear for any other class of crane unless they hold the relevant HRW licence
- Operate the VLC if the load is out of view
- Direct another VLC operator in the movement of a load when the load is out of the operators view.

For further information see the Safe Work Australia website – www.swa.gov.au

PLAN WORK

Element 1

QUESTION 4

Who might you talk to about site hazards before you start the job?

Supervisor, manager and team leaders

Workmates

Workplace health and safety representatives

Site engineers.

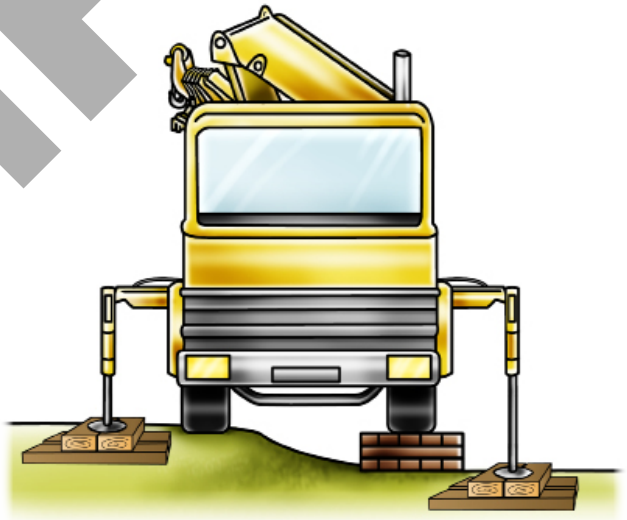
Ground conditions

Choosing the set-up location

It is important to check the ground stability before starting to work. Check the ground to see if it is firm enough to support the crane and equipment. Check the ground is firm and level to keep the crane stable while you move or drive the load.

You should check the ground for recently filled trenches as the ground may be soft and the crane may sink when you use it.

Check that the crane can be set up level. Don't use the crane unless it is level. Also check that the boom can move through its full range of movement without hitting overhead electric power lines or other obstacles.



QUESTION 21

You are retracting/folding a staged boom on a vehicle loading crane.

What is the **hazard**, and how can you **control** it?

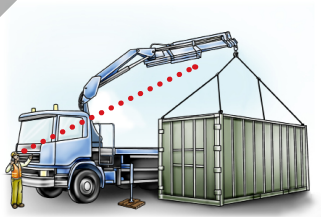
Hazard:

a) You could get trapped in the boom.

b) You could be struck by the boom or load.

Control:

Watch the boom, look out for other people. Set up an exclusion zone and stay out of the area.



QUESTION 22

When is the right time to set up hazard (risk) controls?

Before starting work.

If you spot a hazard after you have started the job.

Angle factors

Greater angle = greater tension

Tension develops in each sling at different included angles. The greater the sling angle the greater the WLL of the slings you will need to use.

For general work

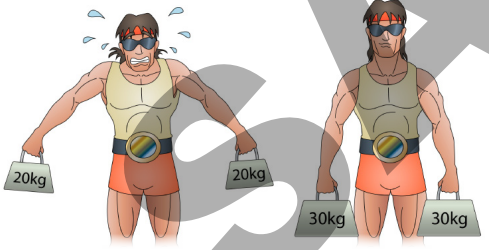
90 degrees is the recommended maximum angle between two legs of a sling for general work.

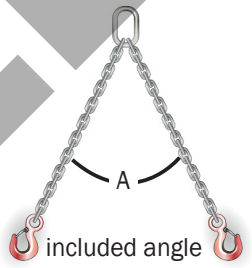
To work out the SWL, you multiply the WLL of the sling by the angle factor.

Formula:

Safe Working Load (SWL) = WLL × Angle Factor

So, the greater the angle, the less you can lift.



Alloy Grade T or 80 Chain Sling			
2, 3 or 4 Leg Slings			
			
Chain size (mm)	**Included Angle**		
	60	**90**	**120**
6.0	1.9	1.6	1.1
7.0	2.6	2.1	1.5
8.0	3.5	2.8	2.0
10.0	5.5	4.5	3.2

PREPARE FOR WORK / TASK

Element 2

QUESTION 61

Whose job is it to inspect the lifting equipment associated with the crane before use?

Someone who holds a High Risk Work licence for:

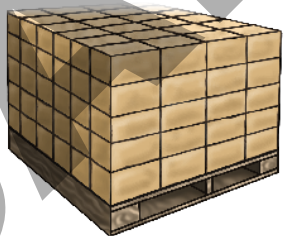
- Vehicle Loading Crane
- Dogging
- Rigging work

must inspect the equipment.

QUESTION 62

Why is it important to check the crane and equipment before you start work?

The crane and equipment must be safe to use.
The crane must be in good condition for the job.



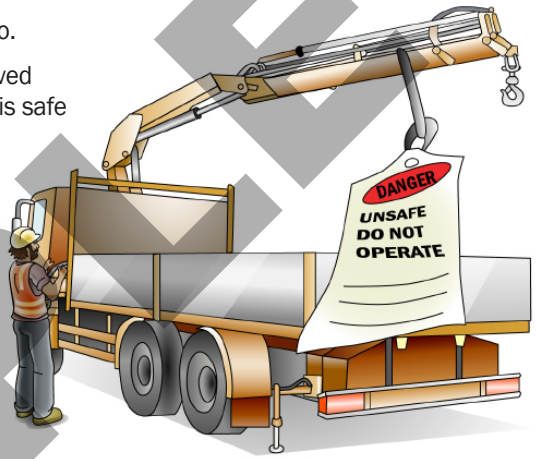
QUESTION 64

You are doing pre-operational checks and see that someone has placed a danger tag on the crane.

Is it OK to take the tag off and use the crane?

No, unless you have authorisation to do so.

The 'Out of Service' tag can only be removed when a competent person has decided it is safe to use.

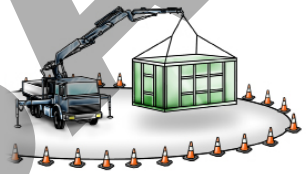


QUESTION 65

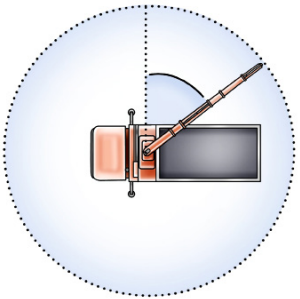
You are putting a crane in place. It has not been levelled and packed.

Name some checks you must do.

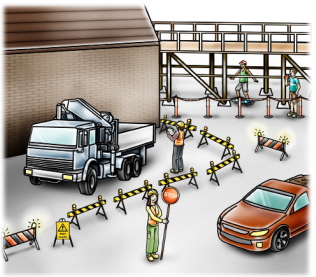
1. There is enough space to work safely.



2. The working circle (radius) is safe.



3. The crane is in a good position for the job.



QUESTION 66

When must lifting gear be inspected?

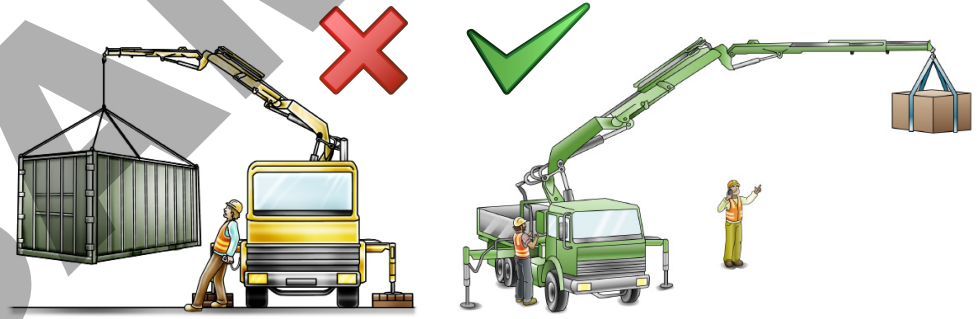
Lifting gear must be inspected before and after every use. Always refer to manufacturers specifications.

QUESTION 67

You are using a vehicle loading crane with two sets of controls, one set on each side. The boom is extended and holding a load over one set of controls.

Which controls do you use?

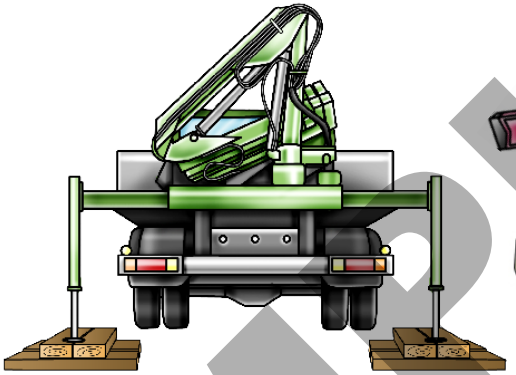
The controls furthest away (opposite side) from the load are the safest to use. If you use the controls in the path of the boom or the load, you could be hit, or crushed and killed.

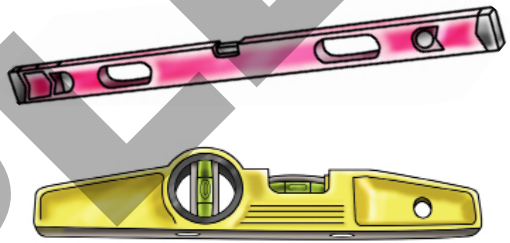


QUESTION 90

How can you find out if the crane is sitting flat and level?

The crane should have a bubble level indicator fitted.

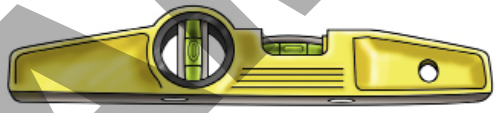


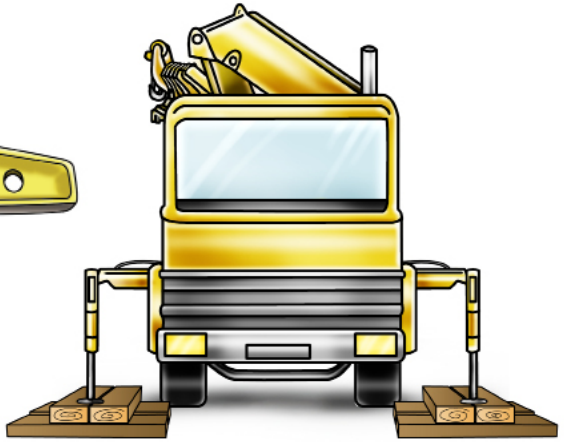


QUESTION 91

Why does the crane need to be level before you start lifting?

Because it's safer to use the crane when it's stable and well-balanced.





PERFORM WORK / TASK

Element 3

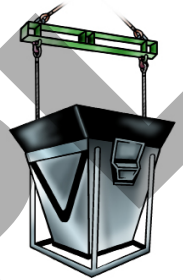
QUESTION 158

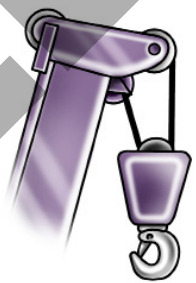
You are looking at the load chart and working out how much the crane can lift. You need to subtract some weights from the rated capacity of the crane.

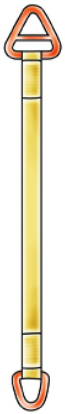
What do you subtract to find out how much the crane can lift?

The weight of any lifting gear like:

- The hook block
- Spreader beams
- Ladles
- Kibbles
- Lifting slings







QUESTION 159

You must find out if your crane can lift the weight of a load. You want to use an operating radius of 9 metres. But you find that 9 metres is not on the load chart.

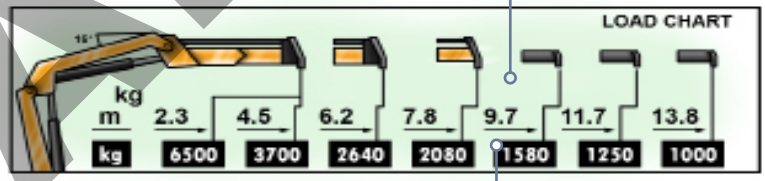
Should you go by the operating radius on the chart that is higher than 9 metres or lower than 9 metres?

Why would you choose what you did?

You would choose the operating radius that is higher than 9 metres.

The higher radius makes the rated capacity (the weight the crane can lift) lower. This means you are less likely to lift a load that is too heavy for the crane.

9 metres is not on the chart. Choose 9.7 metres not 7.8 metres

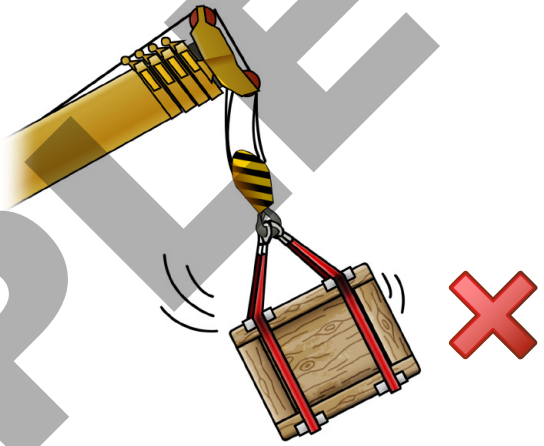


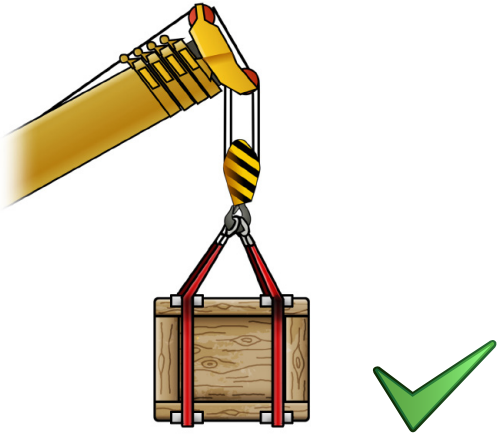
Rated capacity for 9.7 metres is smaller than for 7.8 metres

QUESTION 162

Why does the lifting hook need to be right above the load (above its centre of gravity)?

This will prevent the load from swinging, dragging or snigging as it is lifted.





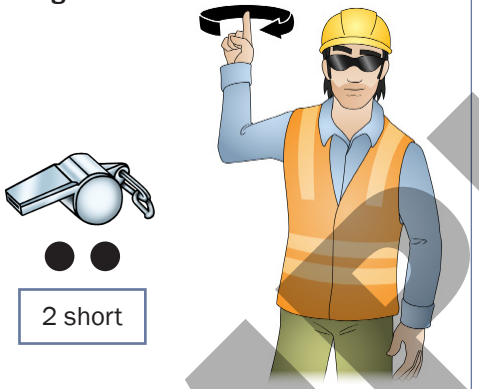
Gently accelerate and brake on slew / boom to minimise load swing.

QUESTION 174

Some of the Australian standard signals used in dogging are shown here.

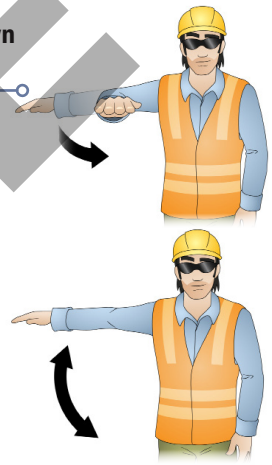
What does each of these signals mean?

Hoisting raise



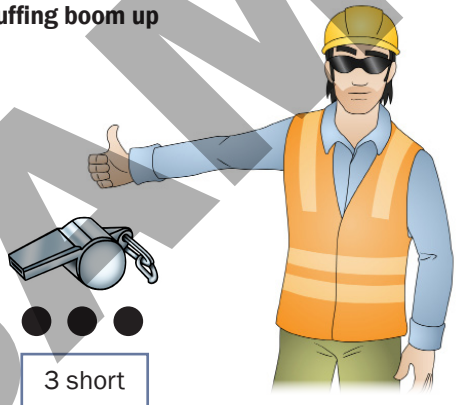
2 short

Hoisting lower/down



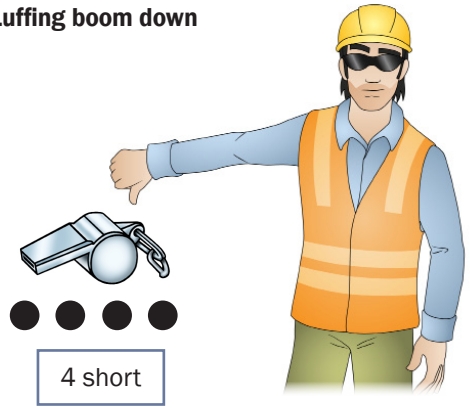
1 long

Luffing boom up



3 short

Luffing boom down



4 short

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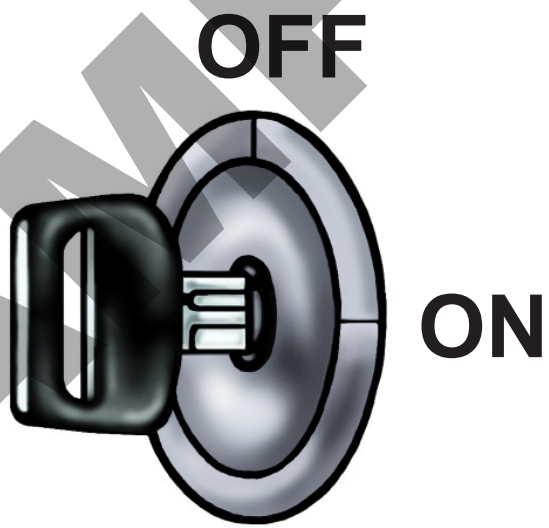
PACK UP

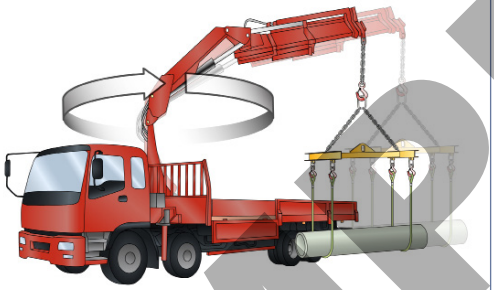
Element 4



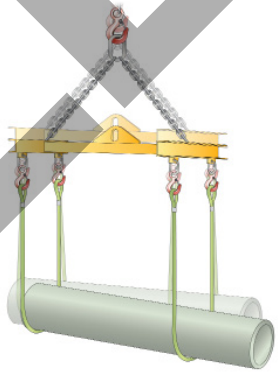
QUESTION 198

Is it okay to leave a load hanging from the hook when the crane is unattended or after you've shut down the crane?

It's **not** okay to leave a load hanging. The load could swing or become unstable. It could cause mechanical failure.



The winch or boom could creep (the load might drop down slowly).

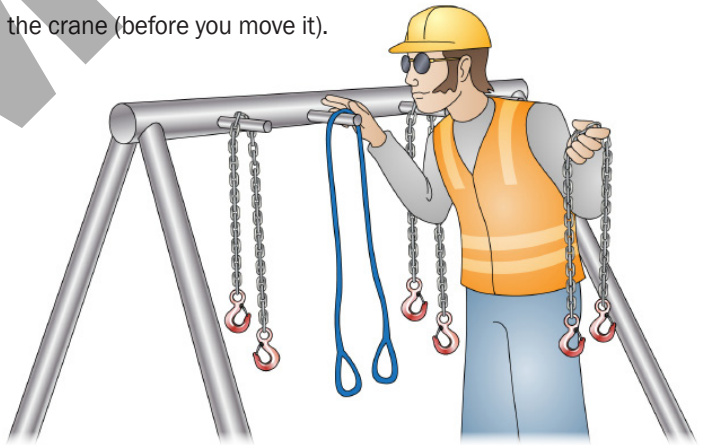


QUESTION 199

You must put away (stow) the boom and other equipment.

When must you do this?

When you are shutting down the crane (before you move it).



QUESTION 200

When do you use motion locks and the park brake?

These should be used when you:

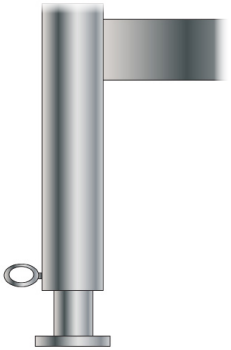
- Shut down the crane
- Leave the crane
- Stop operations.

QUESTION 201

What are the steps for stowing outriggers/stabilisers?

1. Raise up the footplate's and retract (bring in) the outrigger beams.

2. Lock with the pin.



3. Clean the steel plates.

VEHICLE LOADING CRANE
LEARNER WORKBOOK

TLILIC0024
Licence to operate a vehicle loading crane
(capacity 10 metre tonnes and above)

EASY GUIDES
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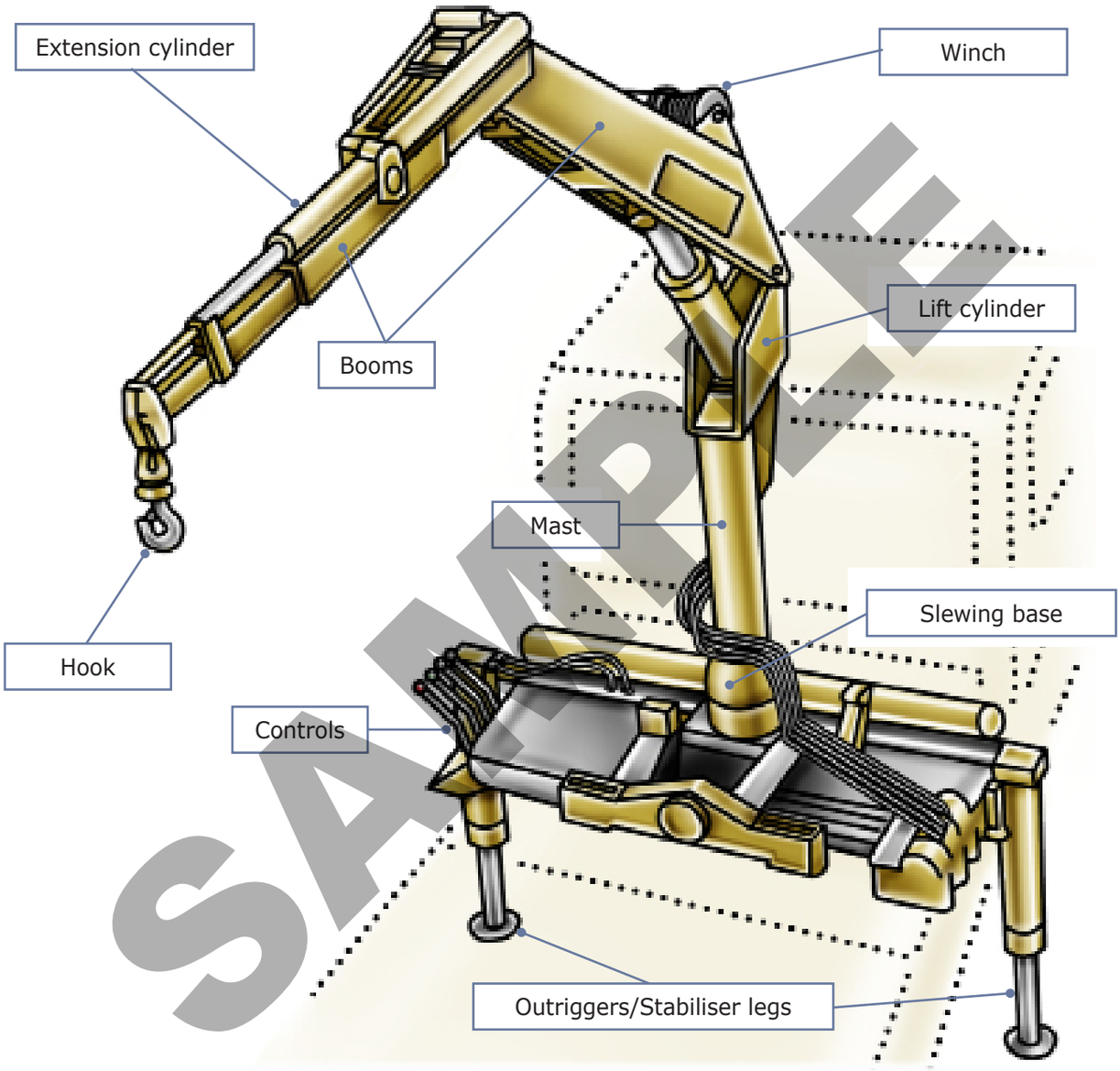
National Licence
RTO-VET Learning Materials

Contents

What is a vehicle loading crane?

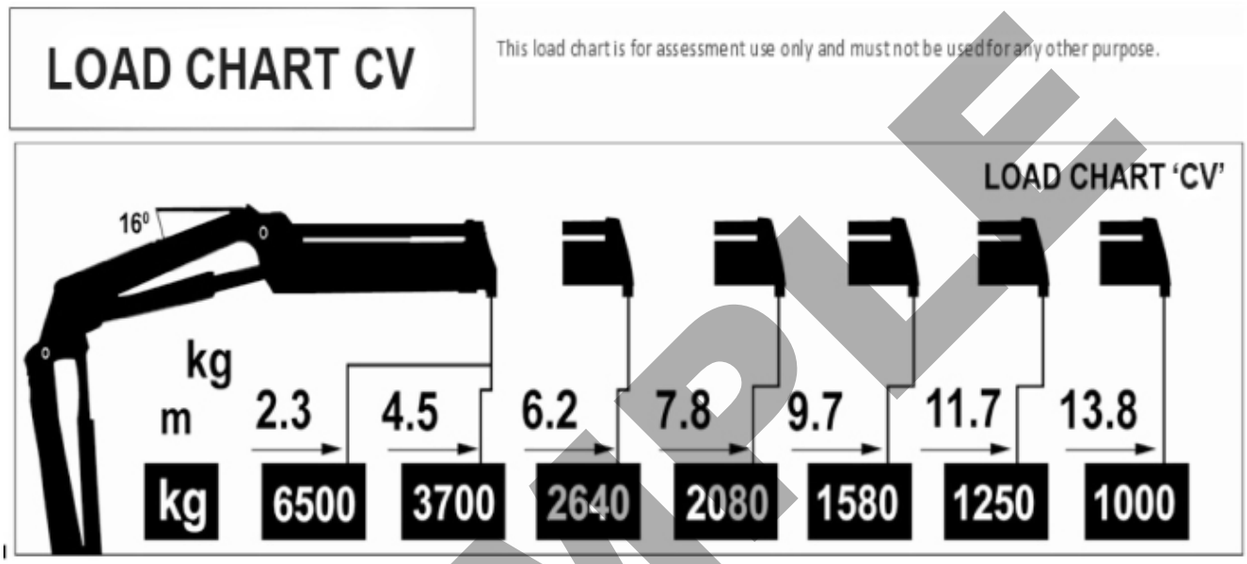
A vehicle loading crane is a crane which is mounted to a vehicle for loading and unloading. Vehicle loading cranes have hydraulic booms with power supplied from the vehicles engine through a PTO (power take off).



Vehicle loading crane charts
(capacity10 metre tonnes and above)

Answer these questions if you are studying the **TLILIC0002 Licence to operate a vehicle loading crane (capacity 10 metre tonnes and above).**
If you are studying for a different licence, skip to that section.

Note: For the following crane exercises use the Calculations- CV load chart. This is located in the 'Trainer's Resource' of the Easy Guides training material. Your trainer will provide you with this crane chart.



EXAMPLE OF CALCULATIONS

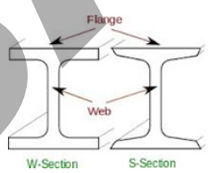
Question 1

Method used to calculate the approximate weight of a steel universal beam.

You need to calculate the cubic meter of steel for the two components that make up the beam. These are the "Flange" and the "Web" (See diagram 1b)

This done by using the following formula; Width x Depth x Length (W x D x L)

(Diagram 1a)



(Diagram 1b)

Example: Top and Bottom Flanges:
- Width – 250 millimetres
- Depth – 12 millimetres
- Length – 12.5 metres

Web:
- Width – 350 millimetres
- Depth – 35 millimetres
- Length – 12.5 millimetres

Calculation:

Make sure to convert all measurements to metres because volume is measured in cubic metres (m3).

Note: Structural steel weighs 7840kg/m3.

Remember to calculate what is in the brackets first.

Continued on next page

For top and Bottom Flanges

= 2 (W x D x L) x weight of steel 7840kg/cu mtr

2 (0.250m x 0.012m x 12.5m) x 7840kg/m3

2 (0.0375m3) x 7840kg/m3

= 0.075m3 x 7840kg/m3 (m3 cancel out)

= 588 kgs

Weight of Web = W x D x L x weight of steel 7840kg/cu mtr

(0.350m x 0.035m x 12.5m) x 7840kg/m3

(0.153125m3) x 7840kg/m3 (m3 cancel out)

= 1200.5 kgs

Total weight of Beam

= 588kg + 1200.5kg = 1788.5 kgs

Question (a) What is the weight of 6 of these beams, answer to the nearest whole tonne?

Answer: = ...

Question Using the load chart CV provided are you permitted to lift 6 beams at once?

Answer: = ...

Question Using the load chart CV provided at what radius is the crane permitted to lift 2 beams?

Answer: = ...

Performance Criteria: 1.4

Check path of load

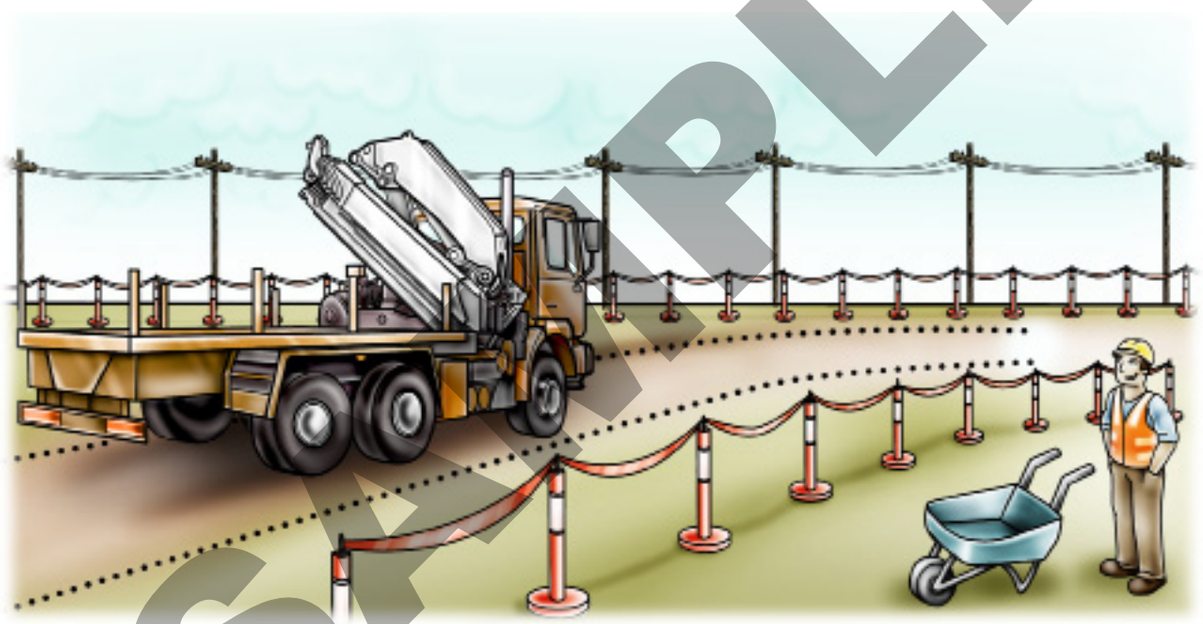
Check the route you will take to move the load. Look out for hazards to avoid.

Theory Training Task 19

Performance Criteria: 1.4

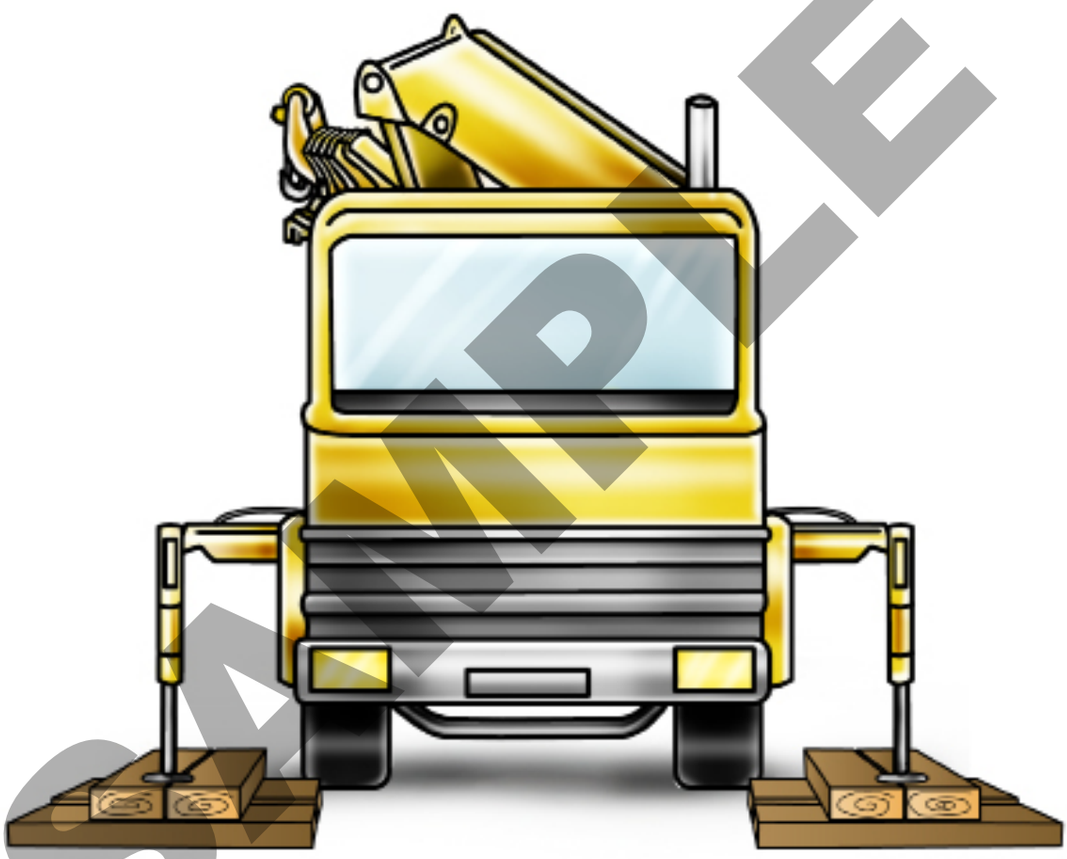
Check the path of movement of loads to avoid hazards.

In this picture below, circle two (2) hazards you should look out for when moving a load.



Chapter 3

Set Up Crane



Performance Criteria: 1.2

Check ground conditions

Check the ground is okay to use the vehicle loading crane **before** you set up. Ground conditions affect the use of outriggers and the need for packing.

Theory Training Task 41

Performance Criteria: 1.2

Do you think the following **ground conditions** are **safe** to set up a vehicle loading crane or need further checking to make sure they are stable?

Circle the correct answer.

Recently flooded ground	**Safe**	**Needs further checking**
Hard compact soil	**Safe**	**Needs further checking**
Bitumen road	**Safe**	**Needs further checking**
Swamp area	**Safe**	**Needs further checking**
Soft soil	**Safe**	**Needs further checking**
Uneven ground	**Safe**	**Needs further checking**

Theory Training Task 42

Performance Criteria: 3.1

What might happen if you set up the vehicle loading crane over underground services?

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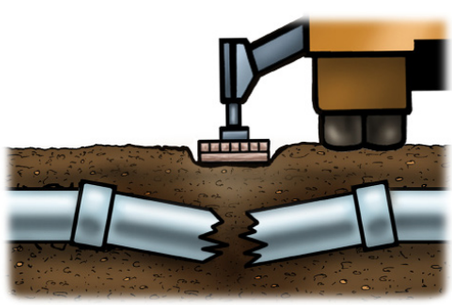


Theory Training Task 43

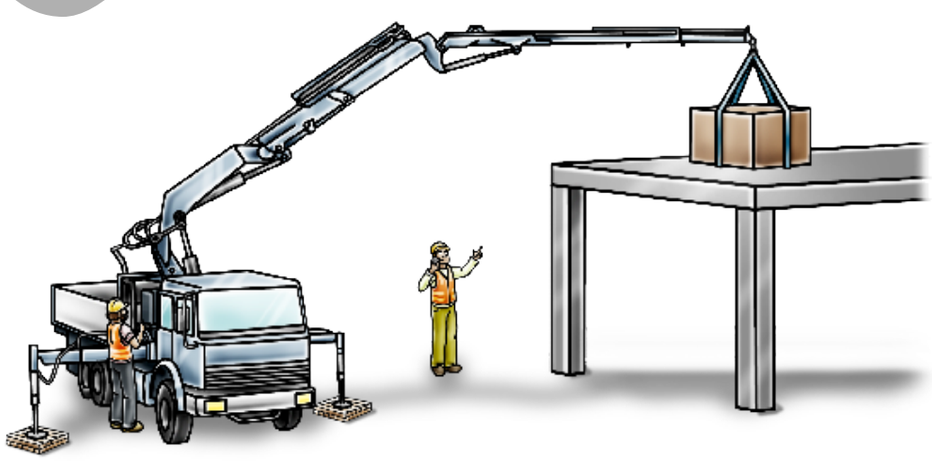
Performance Criteria: 1.2

List the ways you can find out where underground services are:

Theory Training Task 44

Performance Criteria: 1.2

List the things you need to think about when you set up a crane on a suspended floor or temporary formwork.



Chapter 4

Transfer Loads

Performance Criteria: 1.3

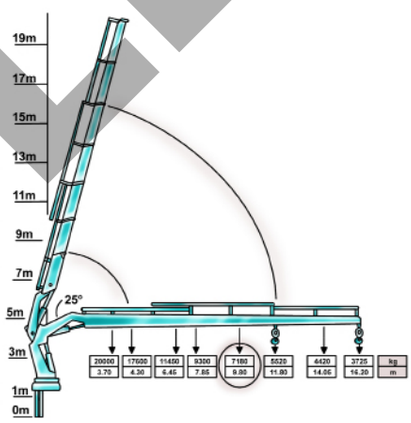
Check crane's load capacity

Always stay within the safe working load (SWL) of the crane. For example, you may change the boom radius during a lift. Ensure the **whole** lift stays inside the boom's limits and **never** exceeds the SWL.

Theory Training Task 60

Performance Criteria: 1.3

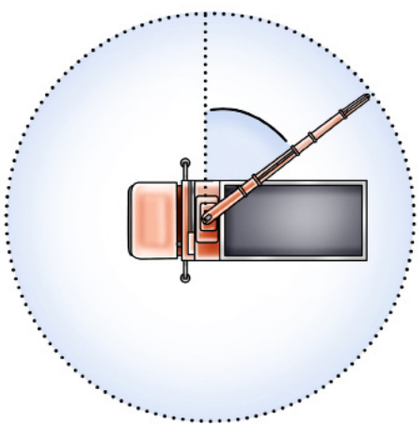
What is the load chart and what does it tell you?



Theory Training Task 61

Performance Criteria: 1.3

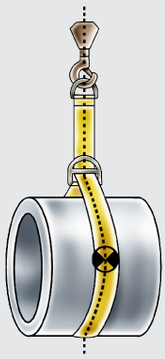
Can you exceed the safe working load (SWL) at a given radius of the crane?



Performance Criteria: 2.6

Position boom/jib and hoist block over load

You need to position the boom/jib and hoist block over the load.
This means you put the lifting hook over the load's centre of gravity.



Theory Training Task 62

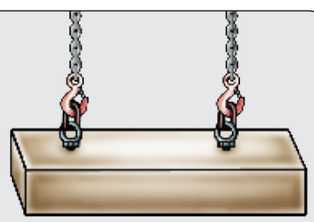
Performance Criteria: 2.6

Why is it important to put the lifting hook over the load's centre of gravity?

Performance Criteria: 2.6

Attach and secure lifting equipment

Make sure you use the correct fixed lifting points.



Theory Training Task 63

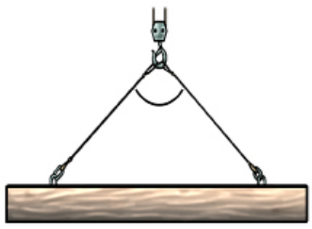
Performance Criteria: 2.6

What is the load factor for a straight lift?

Theory Training Task 64

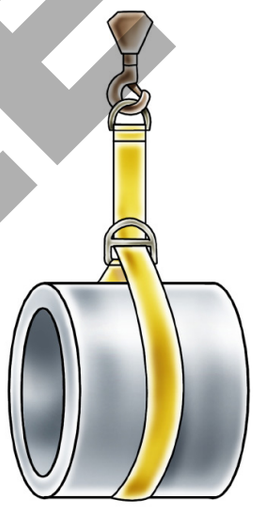
Performance Criteria: 3.3

a) What is the recommended safe angle between two legs of a sling?



b) What load factor should you use when using two leg slings attached with an angle of 90 degrees?

c) What load factor should you use when using two leg slings attached with an angle of 120 degrees?



d) How much reduction is there in the sling capacity when you use a choker hitch around a round load?

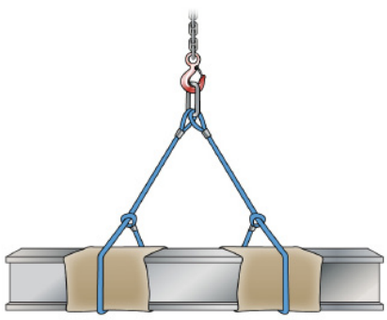
e) How much increase is there in the sling capacity when you use a basket hitch around a round load?

Theory Training Task 65

Performance Criteria: 3.3

a) Why should you use packing, padding, lagging, corner pads or edge protection when you sling a load with sharp edges?

b) What type of shackle do you use to support more than one sling?



Mapping

TLILIC0024 Licence to operate a vehicle loading crane

(capacity 10 metre tonnes and above)

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 TLILIC0024 Licence to operate a vehicle loading crane (capacity 10 metre tonnes and above)

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Elements and performance criteria

Element 1	**Performance Criteria**	**Learner guide and PowerPoint**	**Learner Workbook / Marking Guide**
Plan work / task	1.1 Task requirements are identified from work orders or equivalent and a lift plan is confirmed with associated personnel and a site inspection is conducted in accordance with workplace procedures	• Question 1, 2, 12, 13, 69 • OHS/WHS Guidelines • What is a lift plan?	• Practical training task 1 • Theory Training Task 21 b
	1.2 Work area operating surface is confirmed to determine the quality of ground suitability for operational use of vehicle loading crane in accordance with workplace procedures	• Bearing capacity of different types of ground • Ground types • Types of packing • Ground conditions • Underground services • Suspended floors / slabs • Question 5, 6, 7, 8, 9	• Theory Training Task 41 • Theory Training Task 43 • Theory Training Task 44 • Practical training task 1 • Theory Training Task 3
	1.3 Vehicle loading crane rated capacity (RC) and the lifting gear Working Load Limit (WLL) are established for the load/s and work/task requirements in accordance with manufacturer requirements and workplace procedures	• 10 metre tonnes • Work out weight of web • Angle factors • Methods of attachment • Question 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 75	• Theory Training Task 6 • Theory Training Task 7 • Theory Training Task 8 • Theory Training Task 9 • Theory Training Task 51 • Theory Training Task 60 • Theory Training Task 61 • Practical training task 1

	1.4 Appropriate paths for operating the vehicle loading crane and moving and placing load/s in work area are assessed and determined in accordance with workplace procedures	• Question 40, 41 • The risk to people working near the operating radius of your crane	• Theory Training Task 19 • Theory Training Task 45 • Theory Training Task 46 • Practical training task 1
	1.5 Relevant hazard identification and risk elimination/control measures are applied and advised to associated personnel in accordance with workplace procedures	• Overhead powerlines on poles (National Standard) • Overhead powerlines on towers (National Standard) • Hazard versus risk • Underground services • What is the hierarchy of hazard control? • Finding out the voltage of overhead powerlines • Question 3, 4, 10, 11, 13, 14, 15, 17, 19, 20	• Theory Training Task 1 • Theory Training Task 4 • Theory Training Task 13 • Theory Training Task 18 • Theory Training Task 47 • Theory Training Task 52 • Theory Training Task 53 • Theory Training Task 54 • Practical training task 2 • Theory Training Task 5 • Practical training task 1
	1.6 Traffic management plan implementation is confirmed and followed in accordance with workplace procedures	• Question 18, 19, 20	• Practical training task 1 • Theory Training Task 52
	1.7 Appropriate communication procedures are identified and tested with associated personnel in accordance with workplace procedures	• Communicate clearly • Question 42, 43, 44, 45	• Theory Training Task 20 • Theory Training Task 21 • Theory Training Task 33 • Theory Training Task 55 • Practical training task 1
	1.8 All tasks are confirmed to ensure requirements for the relevant work area in accordance with workplace procedures	• Question 46	• Practical training task 1
	1.9 Information required to ensure that lifting equipment and gear inspection, use, maintenance and storage complies with manufacturer requirements is obtained and interpreted	• What type of information is	• Theory Training Task 22

Element 2	Performance Criteria	Learner guide and PowerPoint	Learner Workbook / Marking Guide
Prepare for work / task	2.1 Consultation with workplace personnel is established and maintained to ensure all crane and lifting operations are clear and consistent with site requirements in accordance with a lift plan and workplace with a lift plan and workplace procedures	• Question 69	• Practical training task 3
	2.2 Risk control measures for hazards identified are checked for implementation in accordance with the lift plan and safe work procedures	• Overhead powerlines on poles (National Standard) • Overhead powerlines on towers (National Standard) • Tiger tails • PPE • Question 4, 13, 14, 15, 16	• Theory Training Task 2 • Theory Training Task 18 • Theory Training Task 54 • Practical training task 2.
	2.3 Vehicle loading crane controls are accessed safely in accordance with manufacturer requirements and safe work procedures	• Question 57, 58	• Theory Training Task 26 • Theory Training Task 28 • Practical training task 3
	2.4 Pre-start vehicle loading crane checks are carried out and any damage and defects are reported, recorded and appropriate action is taken in accordance with manufacturer requirements and safe work procedures	• Question 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59	• Theory Training Task 22 • Theory Training Task 23 • Theory Training Task 24 • Theory Training Task 25 • Theory Training Task 27 • Theory Training Task 34 • Practical training task 3
	2.5 Vehicle loading crane is set up correctly with any lifting gear as per the lift plan in accordance with relevant manufacturer requirements including load chart/s and safe work procedures	• Lifting gear • Question 29, 64, 69, 70, 71, 72, 75	• Theory Training Task 15 • Theory Training Task 16 • Theory Training Task 17 • Theory Training Task 56 • Theory Training Task 57 • Theory Training Task 58 •

			• Theory Training Task 51 • Practical training task 3
	2.6 Boom jib and lifting gear are set up as required in accordance with specific manufacturer requirements and safe work procedures	• Question 85, 86, 87, 88, 89, 127	• Theory Training Task 51 • Theory Training Task 62 • Theory Training Task 63 • Practical training task 3
	2.7 Vehicle loading crane is stabilised appropriately in accordance with the lift plan, relevant manufacturer requirements and safe work procedures	• Types of packing • Question 70, 71, 72, 73, 74	• Theory Training Task 48 • Theory Training Task 49 • Theory Training Task 50 • Practical training task 3
	2.8 Operational checks are carried out and any damage and defects are reported, recorded and appropriate in accordance with manufacturer requirements and safe work procedures	• Question 64, 65, 66, 76, 77, 78	• Theory Training Task 30 • Theory Training Task 31 • Theory Training Task 32 • Theory Training Task 34 • Theory Training Task 72 • Theory Training Task 75 • Practical training task 3
	2.9 Vehicle loading crane logbook is inspected and is correct for the crane type, is completed and signed and required rectifications have been signed off in accordance with manufacturer requirements and safe work procedures	• Question 59, 60, 61	• Theory Training Task 29 • Practical training task 3
	2.10 Weather and work environment conditions are assessed to determine any impact on vehicle loading crane operations in accordance with manufacturer requirements and safe work procedures	• Question 39, 40	• Theory Training Task 18 • Practical training task 3
	2.11 Weight of load is identified, calculated or estimated	• Question 14, 15, 21, 22, 23, 24, 26, 27, 28, 62, 63 • Calculating the weight of a load • Table of common weights • Work out flange weight	• Theory Training Task 6 • Theory Training Task 7 • Theory Training Task 8 • Theory Training Task 9 • Theory Training Task 14 • Theory Training Task 10 • Theory Training Task 35 • Practical training task 3