NON-SLEWING MOBILE CRANE SAFETY AND LICENCE GUIDE

Training support material for:

TLILIC0040
Licence to operate a non-slewing mobile crane
(Greater than 3 tonnes capacity)

Produced by:

EASY GUIDES
Australia Pty Ltd

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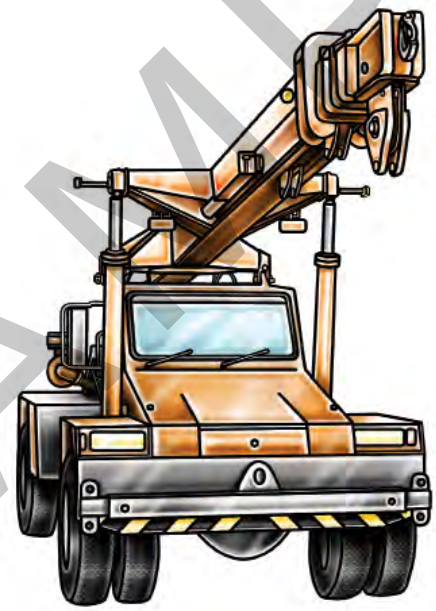
INTRODUCTION TO NON-SLEWING MOBILE

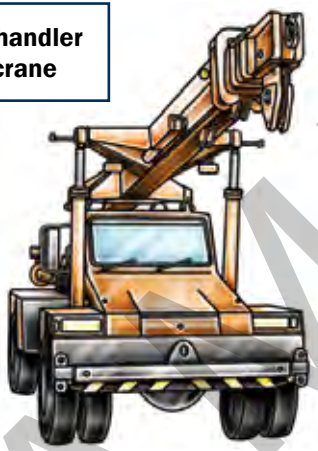


What is a non-slewing mobile crane?

A non-slewing mobile crane is a powered crane which features a boom or jib that does not slew.

The boom can only luff up and down and telescope in and out. The crane is mounted on a vehicle.

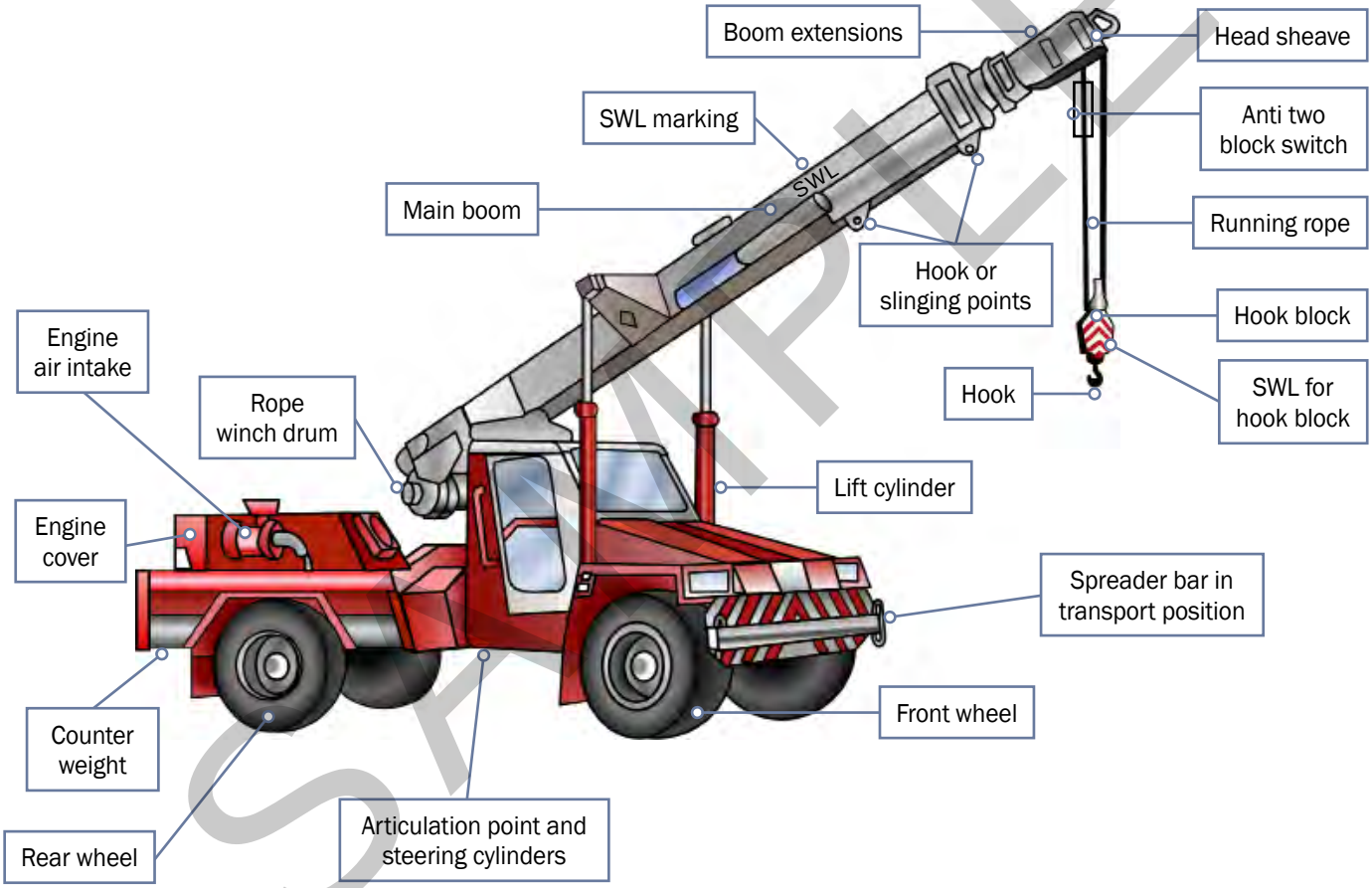
In some states a telescopic handler is classed as a non-slewing crane



A non-slewing mobile crane is a type of crane that can lift and move loads but does not rotate or “slew” around a vertical axis. Instead, it typically has a fixed boom that can extend or retract, and it moves by rolling on wheels or tracks.

Articulated non-slewing mobile cranes have joints that allow the boom to bend, which enhances their versatility and maneuverability.

Parts of a non-slewing mobile crane



PLAN WORK / TASK

Element 1

QUESTION 11. What are some common workplace hazards?

Workplace hazards need to be identified **before** you start work.

Take a good look at your workplace and decide if anything could possibly cause injury to you or anyone else in the area.

Zones/areas to check for hazards:

Above eye level

You should check above eye level for:

- powerlines
- other overhead services
- buildings
- trees
- surrounding structures and facilities
- other obstructions

Ground to eye level

You should check around eye height for:

- other equipment
- machinery/plant
- people
- pedestrians
- things in the path of travel
- insufficient lighting
- weather conditions
- dangerous materials
- surrounding structures
- facilities

Ground level (and below)

You should check the ground to see if:

- the surface is stable and level
- there is debris or rubbish in the way
- the surface is strong enough to support the weight of any equipment or materials
- if there are any open trenches or recently filled trenches/excavations
- unstable ground
- underground services

QUESTION 15

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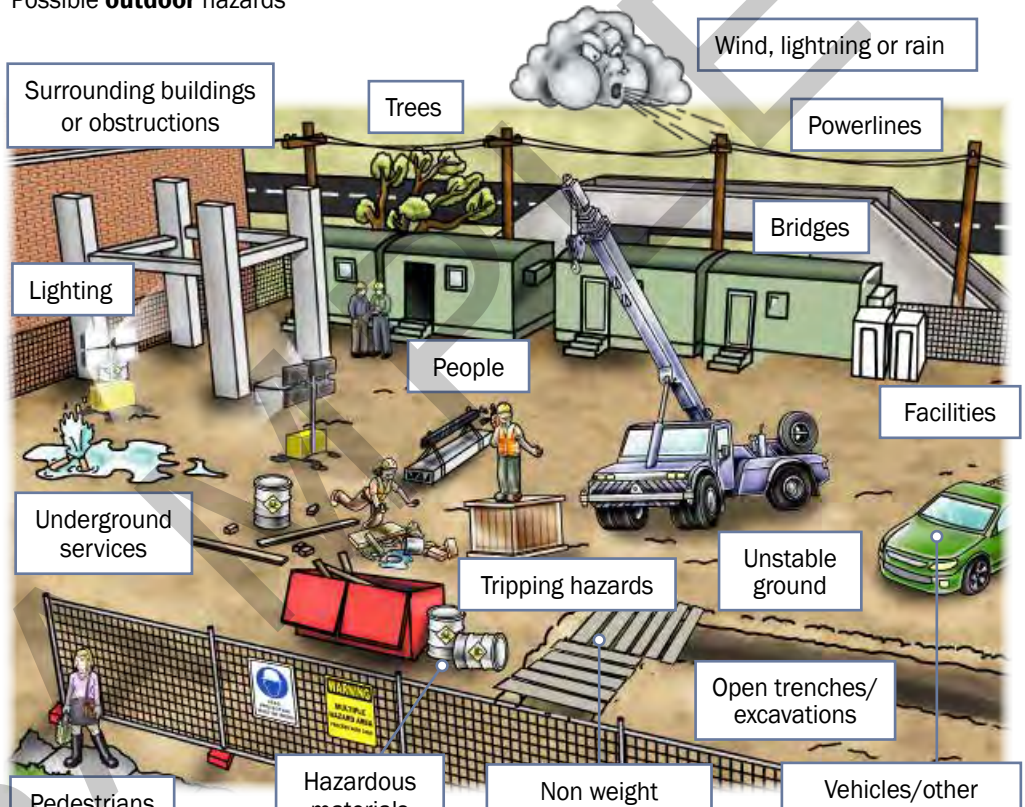
You have arrived on site and you are about to start using the crane. There are hazards (dangers) you might run into when using the crane.

What are some examples of hazards that you must plan for?

Possible **outdoor** hazards



QUESTION 19. Name some common items of Personal Protective Equipment (PPE)

PPE is clothing or equipment worn on the body to protect you from hazards.

PPE will not take away the risk of harm altogether, but it will helpkeep you safe.

Safety helmet or **hard hat**

Safety glasses or **goggles**

Ear muffs or **ear plugs**

Respiratory equipment
Dust mask, half face respirator or full face respirator

High visibility clothing
Safety vest, hi-vis shirt or hi-vis jumpsuit

Long sleeved shirt

Lanyard

Safety gloves
Insulated

Safety harness

Long pants

Safety shoes
Rubber soled, fully enclosed foot, may be steel capped to protect the toes

QUESTION 23. What are some ways of showing there are powerlines overhead?

Tiger tails

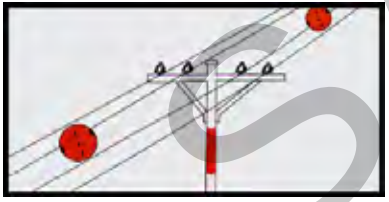
Tiger tails are **black and yellow pipes** that hang off powerlines. They are a **warning device** to make the powerlines easier to see.

Be aware that tiger tails are very different to insulated powerlines.

Tiger tails:

- **DO NOT** insulate wires
- **DO NOT** protect you from the risk of electrocution or electric shock
- **DO NOT** allow you to work closer to powerlines

Power line marker



Markers

Markers of different colors such as white and orange.

Poles

Poles with the lower section painted up to 3m above ground.

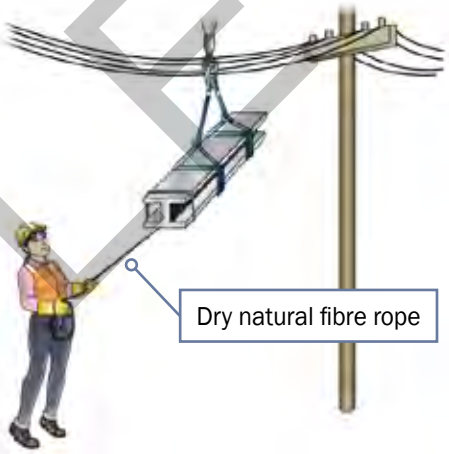
Warning / danger signs

QUESTION 25

You are working near powerlines.

What kind of tagline should you use?

You need to use a dry, non-conductive rope. Dry non-conductive rope does not conduct electricity. Keep the rope dry so that electricity cannot travel through the water in the rope.



QUESTION 26

What is the minimum diameter (thinnest) non-conductive rope you can use as a tagline?

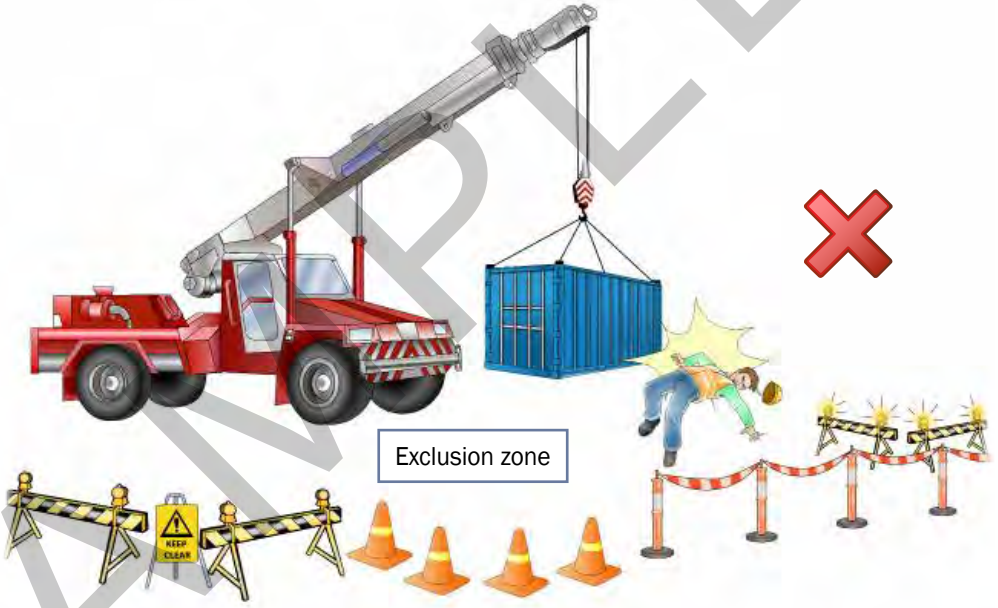
What does it need to be made of?

It needs to be dry non-conductive rope, dry natural fibre rope or dry natural rope that is at least 16 mm thick.

QUESTION 27

What hazards (dangers) are there if you work near (the radius) of the outriggers or chassis of a non-slewing crane?

The crane or load could hit or crush you. You should stay outside the exclusion zone.



QUESTION 41

You need to plan the path for the crane and load.

What do you need to plan for?

Some things to plan for are:

Crane articulation

Keeping people out of the path. Travel as slowly as possible.

Do you need any permits?

How will you communicate with the dogger?

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QUESTION 43

When should you test communications equipment to make sure it is functioning correctly?

Before starting crane operations.

QUESTION 46. Why might you need to use packing?

You **must** use packing under the outriggers. Each outrigger takes some of the weight of the crane and the load. Packing spreads that weight over a larger area. You must work out the minimum area of packing needed under each outrigger. This will keep the

Packing spreads the weight

No packing

If you **do not** use packing the outriggers could sink and the crane could tip over.

How soil types affect packing

The type of ground you are working on changes how much packing you need.

For example, if you need to set up on soft clay you will need more packing than if you are setting up on shale or rock. The three best ground types are hard rock, shale or sandstone, and compacted gravel with up to 20% sand.

PREPARE FOR WORK / TASK

Element 2

QUESTION 64. What is a lift plan?

A crane lift plan is a document that outlines the specifics of how a crane will be used on a project. This includes everything from the type of crane being used, to the weight and dimensions of the load being lifted, distances that need to be covered, and the environment in which the lifting will occur It includes:

Lift Details: Load weight, dimensions, and handling needs.

Equipment: Crane specs, capacity, and rigging.

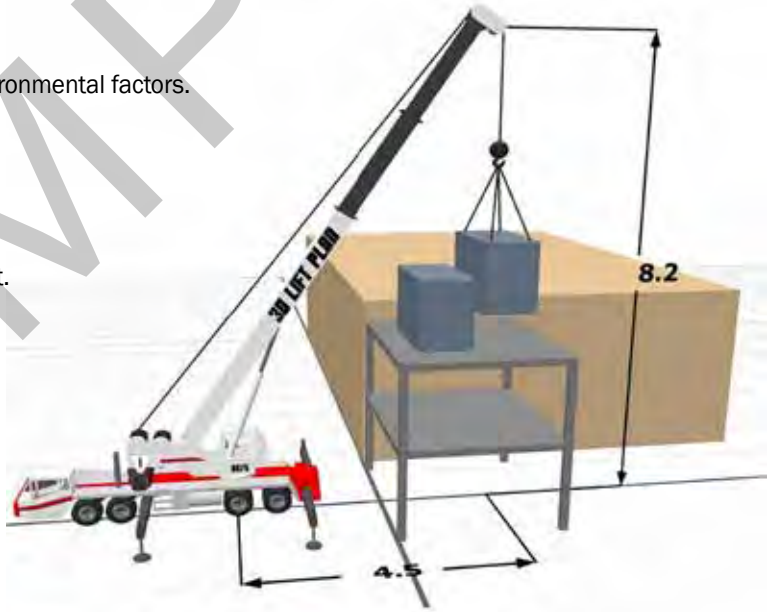
Site Conditions: Site layout, ground conditions, and environmental factors.

Personnel: Roles and responsibilities of the team.

Safety Measures: Safety procedures and precautions.

Lift Procedure: Step-by-step process for the lift.

Communication: How team members will stay in contact.



QUESTION 72

How do you climb into the crane's cabin safely?

When you are climbing into the cabin, Three (3) body parts should be touching at once (3 points of contact).

You can use two feet and one hand, or two hands and one foot.

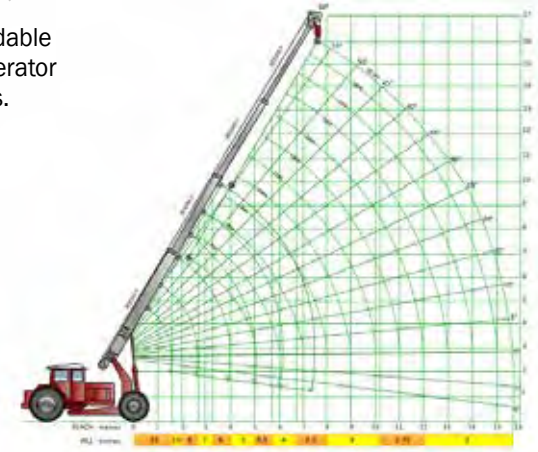
Using three body parts at the same time will keep you stable while you are climbing in or out.

QUESTION 73

Why must all labels, signs and load charts be readable and in the correct place on the crane?

Labels, signs and load charts must be readable and in the correct place as they tell the operator about the crane's capacity and capabilities.

- Capacity is how much weight the crane can support (SWL)
- Capability is what the crane can do.

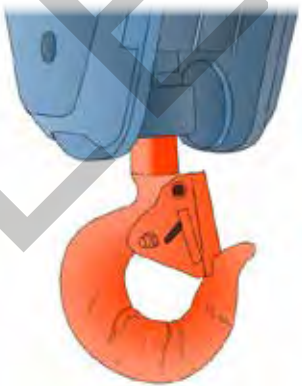


QUESTION 80

What are some defects that would make a hook unsafe to use?

Bill stretched (more than 5%)

Gouges and cuts (more than 10% wear)



Cracked or twisted hook

Has been exposed to high heat. For example 280 degrees Celsius.

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QUESTION 85

You are looking at the load chart. The chart has a thick black line near the middle.

What do the numbers **above** and **below** the line mean?

The numbers **above the line** tell you the structural strength of the crane. The numbers **below the line** tell you how stable the crane is.

CRANE LOAD CHART

Showing Rated Lifting Capacity (in tonnes) on Fully Extended Outriggers

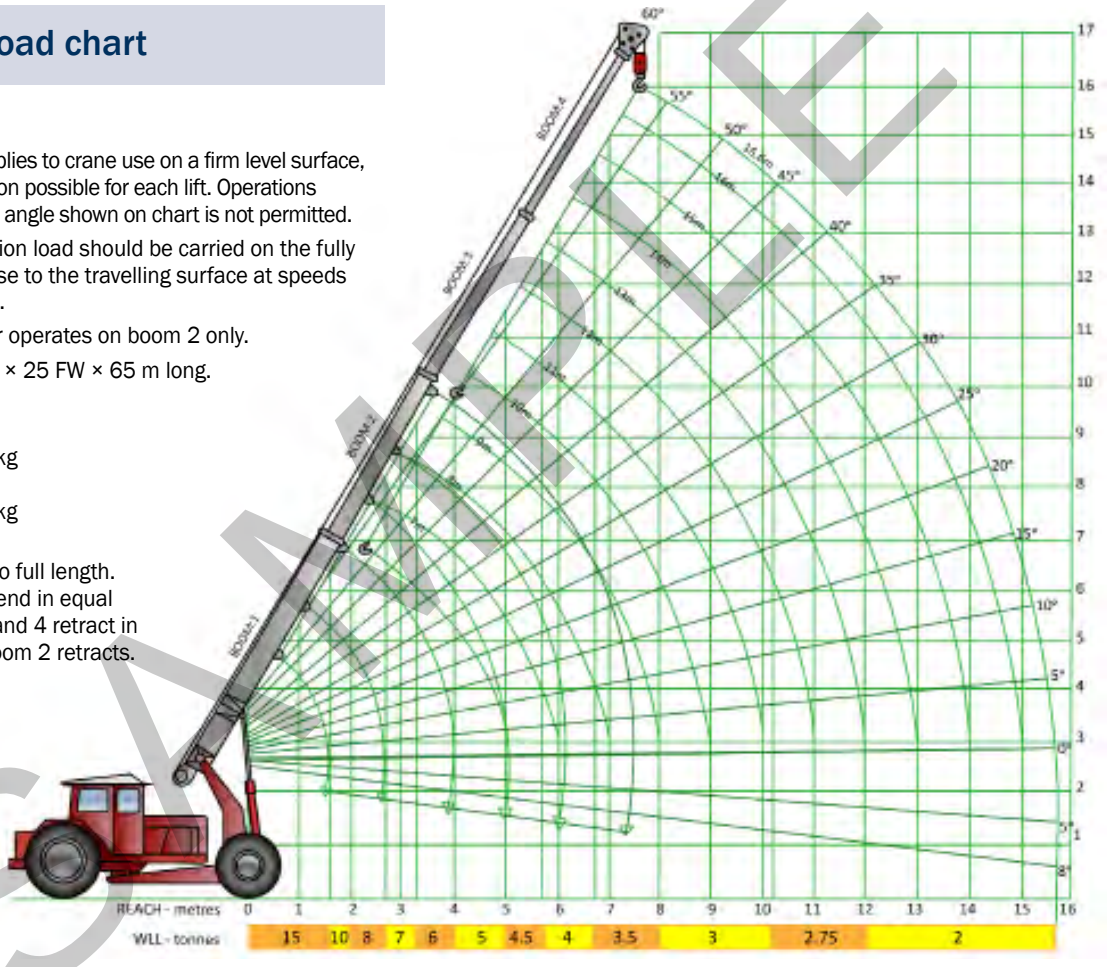
Radius	10.1m Boom		18.1m Boom		26.0m Boom	
(m)	Over Rear	Over Side	Over Rear	Over Side	Over Rear	Over Side
3.0	25.00	25.00	14.00	14.00		
3.5	21.70	21.70	13.40	13.40		
4.0	18.50	18.50	12.75	12.75		
4.5	15.50	15.50	12.15	12.15		
5.0	12.80	12.80	11.60	11.60	7.40	7.40
5.5	10.50	10.50	10.00	10.00	7.10	7.10
6.0	8.80	8.80	8.70	8.70	6.65	6.65
6.5	7.70	7.55	7.70	7.70	6.40	6.40
7.0	6.85	6.60	6.85	6.60	6.10	6.10
7.5	6.20	5.70	6.20	5.70	5.75	5.75
8.0	5.60	4.95	5.60	4.95	5.40	5.40
8.5	5.05	4.36	5.05	4.35	5.00	4.80
9.0			4.60	3.85	4.60	4.35
10.0			3.90	3.10	3.90	3.50
11.0			3.30	2.65	3.30	2.95
12.0			2.80	2.25	2.80	2.50
13.0			2.40	1.95	2.40	2.15
14.0			2.10	1.55	2.10	1.80
16.0					1.55	1.30
18.0					1.20	0.95
20.0					0.90	0.60
22.0					0.70	0.40
24.0					0.55	0.25

Structural strength **above** line

Instability **below** line

Example of a load chart

1. This load rating chart applies to crane use on a firm level surface, using largest boom section possible for each lift. Operations outside limits of reach or angle shown on chart is not permitted.
2. For lift and carry operation load should be carried on the fully retracted boom and close to the travelling surface at speeds not in excess of 3 km/h.
3. Hoist rope compensator operates on boom 2 only.
4. Rope fitted is 13 mm, 6 × 25 FW × 65 m long.
5. Hook block capacities
   2 falls – 4000 kg
   Hook block mass – 65 kg
   4 falls – 6000 kg
   Hook block mass – 85 kg
6. Boom operating mode
   Out – boom 2 extends to full length. Then boom 3 and 4 extend in equal amounts. In – boom 3 and 4 retract in equal amounts, then boom 2 retracts.
7. Tyre pressure
   Front – 690 kpa
   Rear – 220 kpa
8. Rear tyres
   water ballasted.
   Maintain
   correct level.



Test the safety devices

Before you start the crane, test the safety devices to make sure they work.

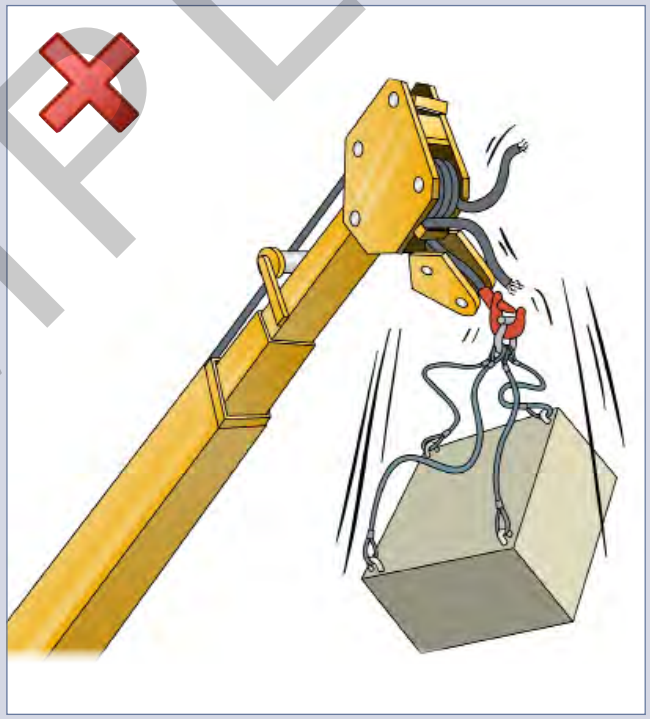
Safety devices include:

Horns and sirens

Warning lights inside on the control panel and on the outside of the crane. Warning lights will help you find out if the crane has any faults.

Hoist limit

Check that the hoist limit switch/cut-out is operational. This safety device prevents double blocking which occurs if the hook/block is dragged into the head sheave.



QUESTION 157

Calculate the maximum load of a sling when a 2 Leg angle sling configuration is used with the following specifications given?

Specifications

if load is 1000 kg

7m = L = Length of sling leg

5m = H = Height distance from pick point.

Formula:

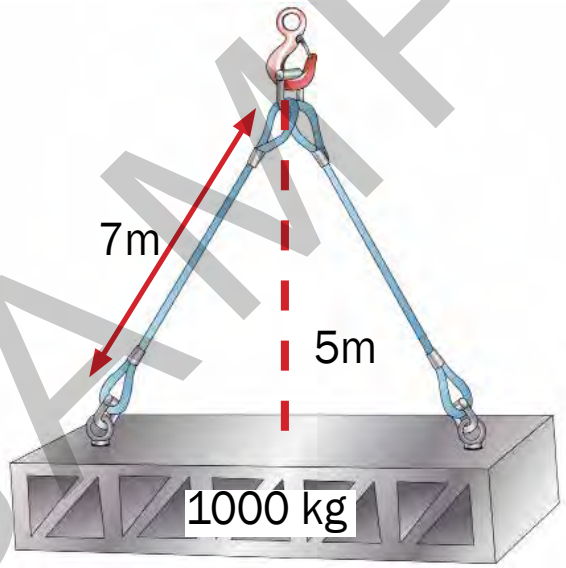
=(Load Weight / No sling Legs) x (L / H)

Calculation is:

=(1000 kg / 2) x (7/5)

=500 kg x 1.4

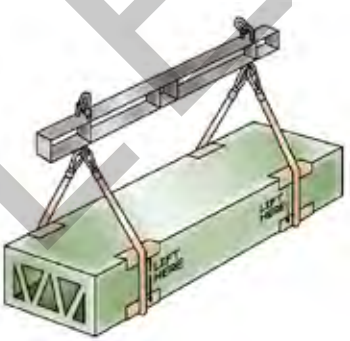
= 700 kg per sling



QUESTION 158. What are the slinging points on a load?

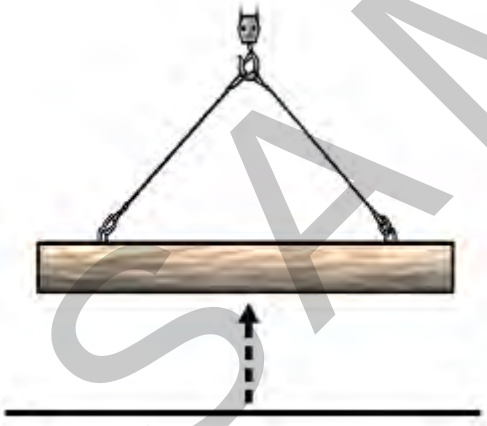
Some loads have specific areas they must be lifted by. These areas may be re-enforced to help distribute the weight evenly when it is being lifted.

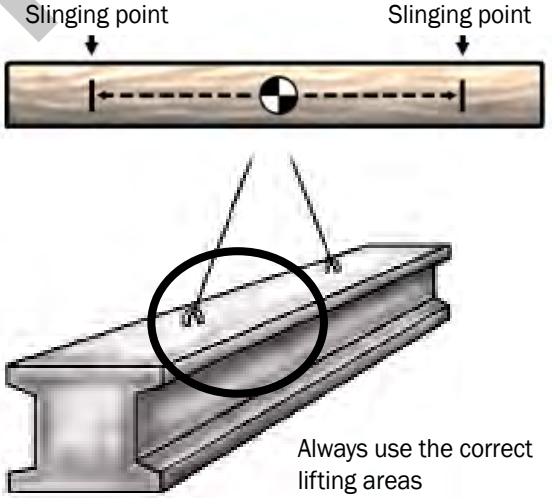
Check for manufacturer's specifications/markings on the load. If the load has set points for lifting gear they will be marked by decals (symbols) or writing.



To work out the safe lifting/sling points you can:

1. Measure the distance from the centre out to the sling points. Make sure the weight is evenly distributed.





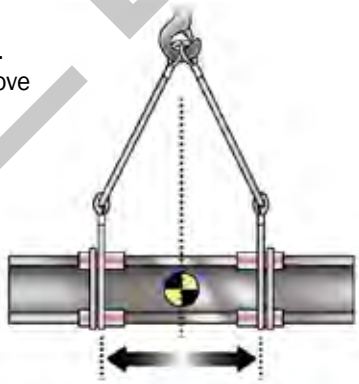
Always use the correct lifting areas

QUESTION 159. How can you find the centre of gravity on a load?

Finding the **centre of gravity** is simple with a regular shaped load. If it is not marked on the load you can measure and/or calculate to find it.

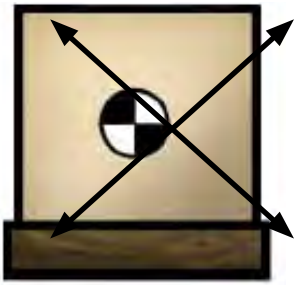
Measure the length of the beam and halve the measurement to find the centre

Place the slings equal distances from the centre. Make sure the hook is above the centre of gravity.



You can also measure from corner to corner.

The point where the two measurements cross will be the centre.



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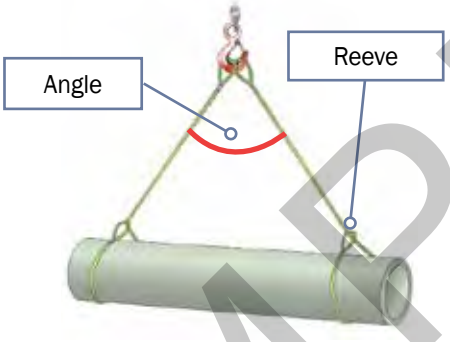
QUESTION 169

You will be using two FSWR slings to lift a load. There are factors that change the capacity and length of the slings needed to lift the load.

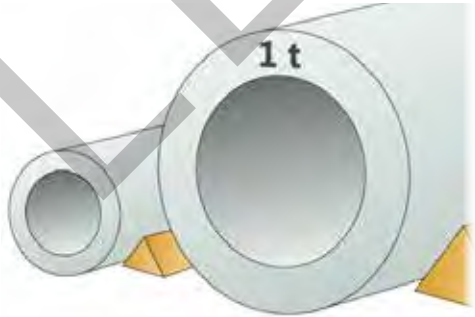
What are they?

There are several factors which affect how much you can lift:

The angle and reeve used



Size of the load



How much clearance you need for the lift

Load weight

How the load is slung.

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Chocks

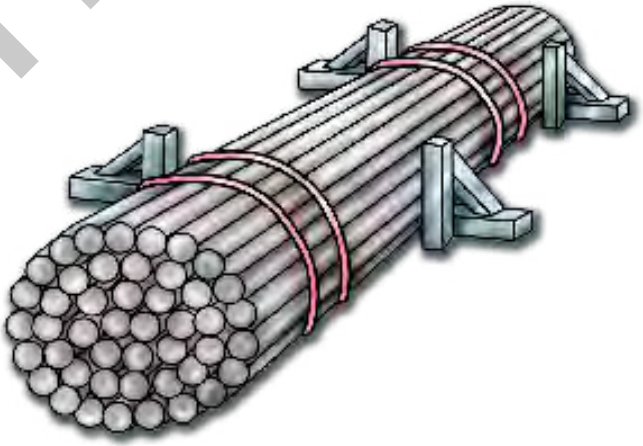
If the load is round you may need to set up chocks to hold the load in place when you remove the lifting gear.

Dunnage

You may need to lay down dunnage (timber supports) to:

- protect the load,
- make it easier to attach or remove the slings,
- help stop damage to the lifting gear,

and stabilise the load..



PERFORM WORK / TASK

Element 3

QUESTION 180

What are some ways that you can make sure the crane's hook is safely positioned over the load?

Communicate with other personnel, to make sure that the hook is directly under the load.

Make sure that the chain hoist of the hook is not swinging when you place it over the load.

Make sure that the hook shank and lower hook are in line with each other.

QUESTION 194

Some of the Australian standard signals used are shown here.

What does each of these signals mean?

Hoisting raise

2 short

Hoisting lower/down

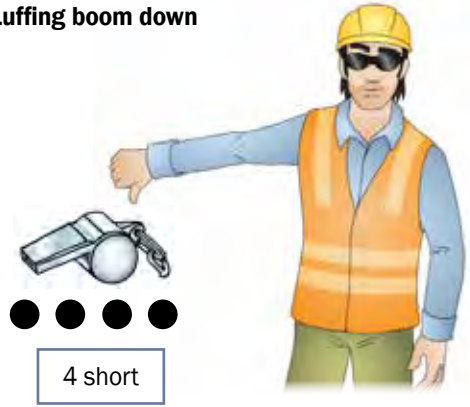
Commonly used signal (not Australian Standard)

1 long

Luffing boom up

3 short

Luffing boom down



4 short

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QUESTION 205

You are operating a crane. One of the outriggers is sinking.

What should you do?

You should:

1. **Stop** working

2. Lower the load if safe to do so.

3. See if you can fix the problem and ask for help if you need it.

PREPARE TO DRIVE AN ARTICULATED MOBILE CRANE

Element 4

QUESTION 219

What should you do with any items on the cranes body?

You should make sure the items are safely restrained. Make sure any loose items are stored in storage areas.

6. Restrain the boom and hook to keep the boom and hook in place.

7. Bring the boom in following manufacturer's instructions..

QUESTION 221

What checks should you make before driving an articulated mobile crane on a public road?

You should any registrations and approvals needed. Follows guidelines from the crane's manufacturer.

Before driving an articulated mobile crane on the road, you typically need to check:

Vehicle Registration: Check that annual inspection and registration are up to date.

The emergency steering system (check according to manufacturer's specifications)..

Lifting gear is stowed and made secure.

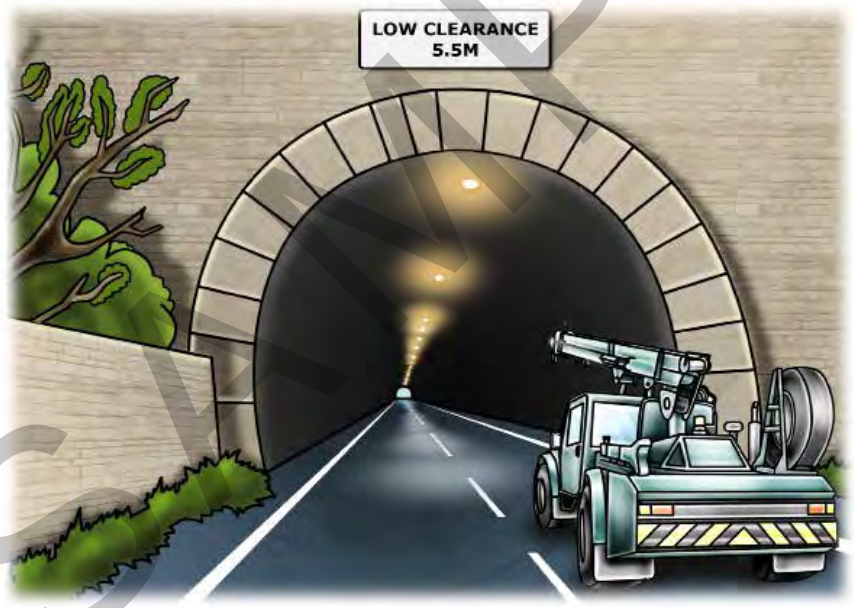
Boom and fall block are in position for road driving.

Hook is removed from the block.

Counterweights are in position or removed (according to manufacturer's specifications).

Check tyre pressure and condition.

DRIVE AN ARTICULATED MOBILE CRANE



Element 5

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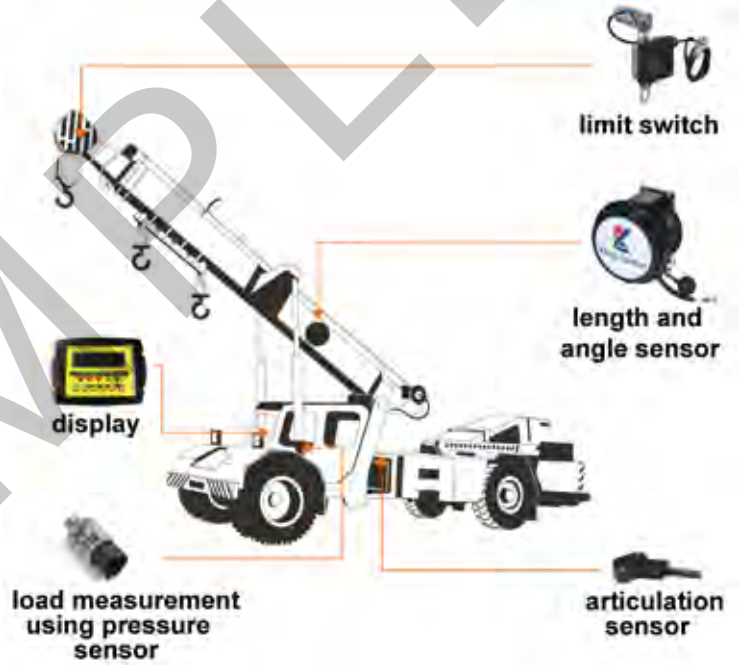
INSTRUMENTS

Load Indicator: Displays the weight of the load being lifted, ensuring it doesn't exceed the crane's rated capacity.

Boom Angle Indicator: Shows the angle of the boom relative to the ground, helping operators maintain proper lifting angles.

Leveling Indicators: Indicates whether the crane is level, crucial for safe operation, especially when extending outriggers.

Telematics System: Provides real-time data on crane performance, usage, and diagnostics, helping with maintenance and efficiency.



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QUESTION 227

How should you drive your articulated mobile crane on the road?

Drive to conditions on the road.

Keep your hand on the steering wheel.

Use lower gear.

Go slower on hills and corners

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QUESTION 227

How should you drive your articulated mobile crane on the road?

Use engine braking.

Allow for a longer braking distance.

You should start, steer, move and stop by following regulations and manufacturer's instructions.

PACK UP

Element 6

QUESTION 237

How should the crane boom/jib and other equipment be stowed and secured?

You should follow the manufacture's specifications on how to do this.

QUESTION 242

if you find a problem with the crane while you are doing post-operational checks.

What should you do?

Put a danger tag on the crane

Record the problem in the logbook

Report the problem to a supervisor

Do not use the crane until it is repaired.

QUESTION 246

Why should you secure (lock down) the crane when you shut it down?

To make sure people without permission do not use it.

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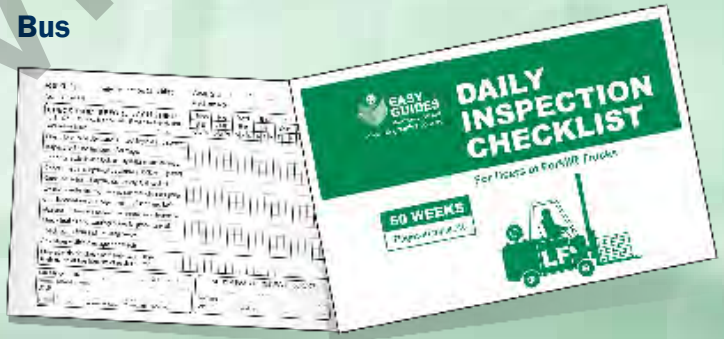
- Bus



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