

LEARNER GUIDE

Slewing Crane



RII COMPETENCY

Training support material for:
RIIAN304E –
Conduct slewing crane
operations

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Introduction to slewing crane operations

What is a slewing mobile crane

A slewing mobile crane is a powered crane which features a boom or jib that can slew from front to back. The crane is mounted on a vehicle.

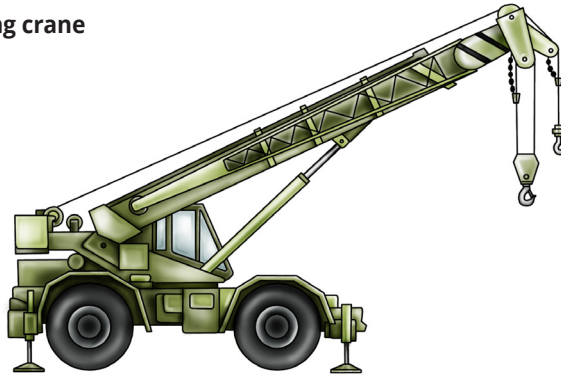
Slewing mobile crane



Crawler crane

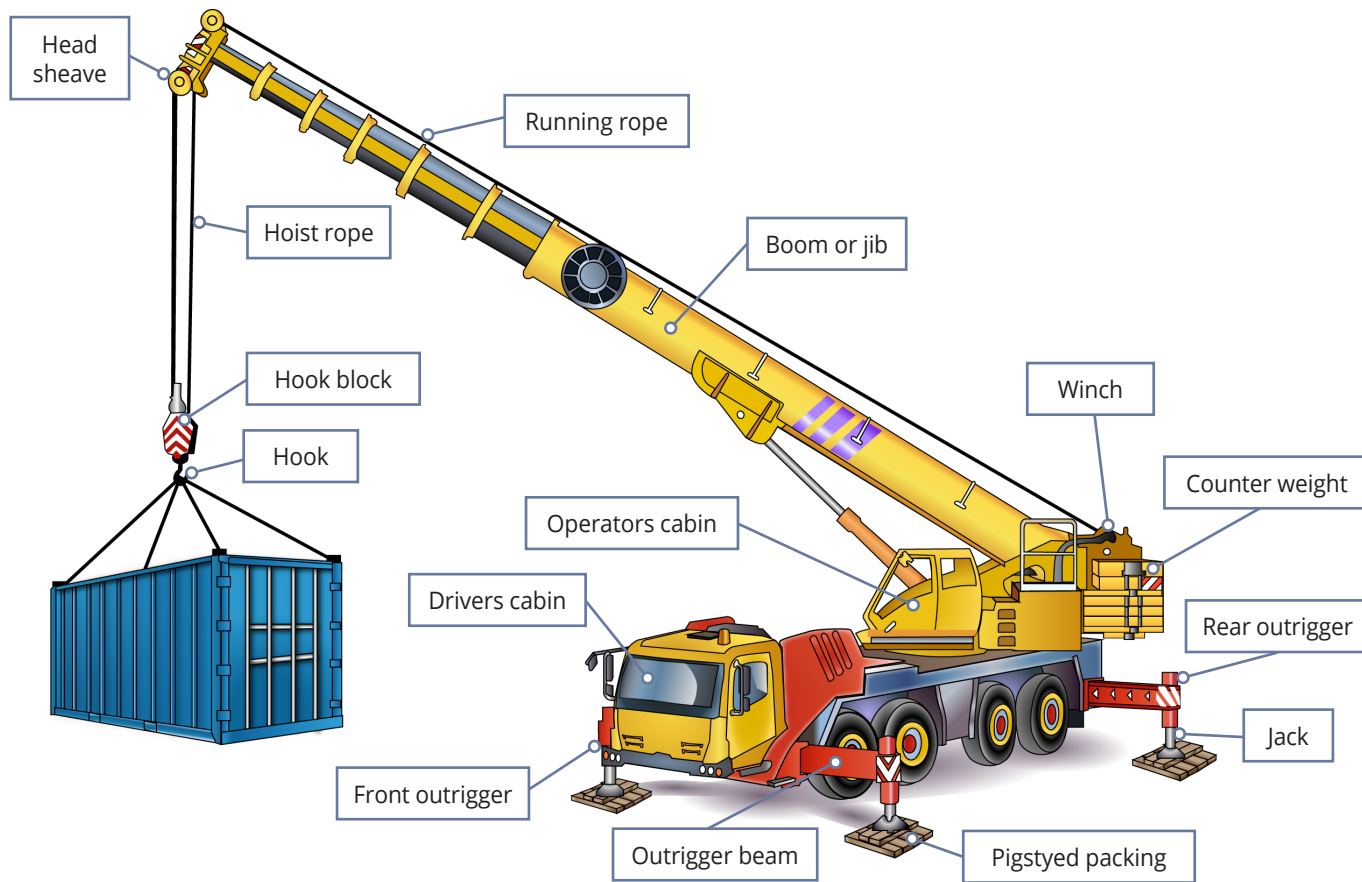


Rough terrain slewing crane



This learner resource does not cover front-end loader, backhoe, excavator or similar equipment when configured (arranged or set up) for crane operations.

Parts of a slewing crane

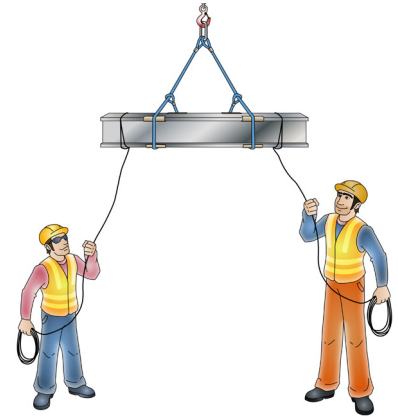


What is a dogger/dogman?

The crane operator must work closely with a dogman (dogger).

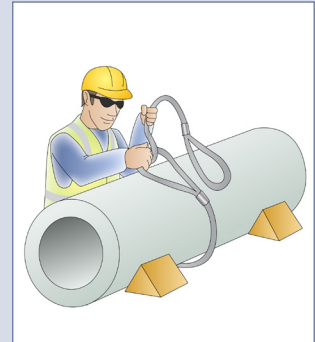
The dogman is responsible for:

- Selecting and inspecting lifting gear/equipment
- Slings loads
- Guiding/directing a crane operator in the movement of a load
- Working out the weight of a load
- Working out the best ways to sling a load
- Working with the crane operator to make sure the crane is right for the job.



You must hold the correct licence or be enrolled in a course with an RTO and under the supervision of a licenced dogman to perform any of the tasks listed above.

In this book the term **dogger** or **dogman** also means **rigger**.



Element 1 – Prepare for slewing crane operations

Choosing the right crane

- Make sure the crane is the right size for the work area
- Check the crane's lifting capacity to make sure it can lift the load
- Make sure the crane is appropriate for the site and weather conditions
- The crane is the correct type for the job. For example a slewing or non-slewing crane.



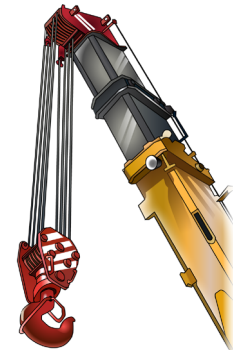
Booms

A slewing mobile crane has a telescopic boom that can:

Extend out

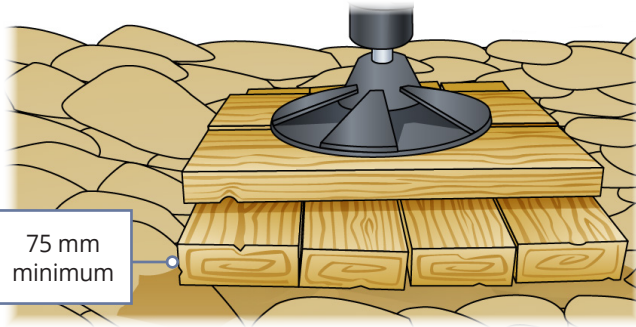


Retract in

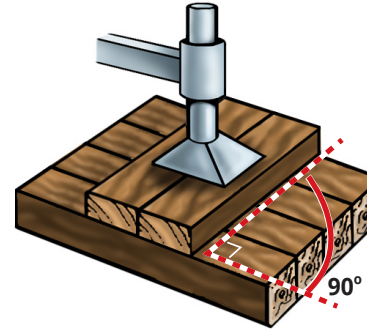


Outriggers and packing (continued)

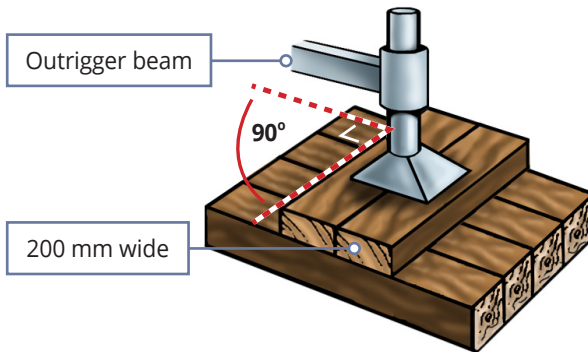
The base layer of packing should be closely laid and at least 75 mm thick



The packing should be pigstyed. This means each layer is at right angles (90° degrees) to the next.



The top layer of packing must be at right angles to the direction of the outrigger beam and at least 200 mm wide.



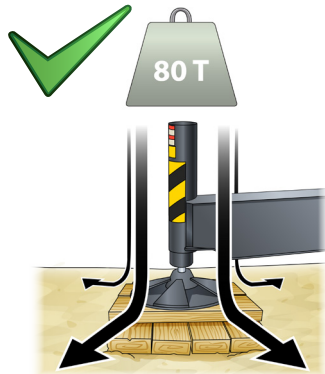
Packing, outriggers and jacks should be checked regularly during an operation.



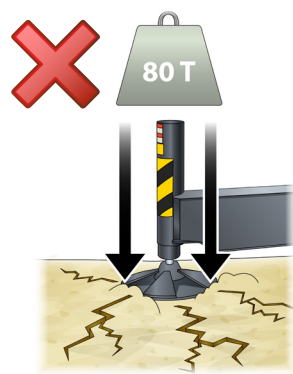
Why you need packing

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 crane stable.

Packing spreads the weight



No packing



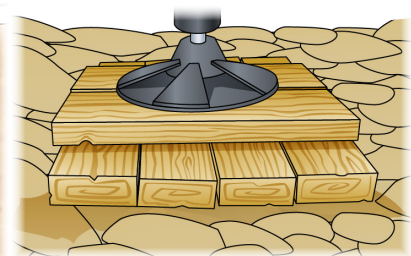
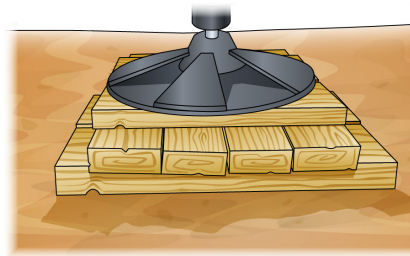
If you **do not** use packing the outriggers could sink and the crane could tip over.



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.



Packing formula

To calculate the area of packing needed in square metres you must know:

- The cranes mass (Cm)
- The loads mass (L)
- The bearing pressure of the soil (P_{MAX}).

$$\text{Area} = \frac{(\text{Cm} + \text{L}) \times 0.65}{\text{P}_{\text{MAX}}}$$

OR

$$\text{Area} = (\text{Cm} + \text{L}) \times 0.65 \div \text{P}_{\text{MAX}}$$

In this formula:

Cm = Crane mass

L = Load

P_{MAX} = Soil bearing pressure

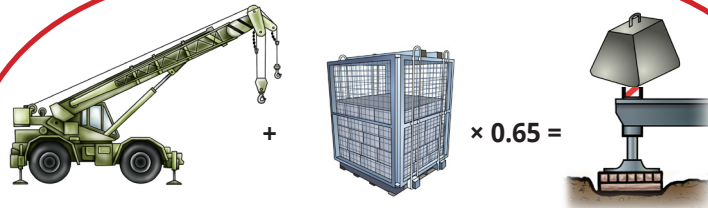
Remembering this formula

It is much easier to understand this formula if you know what each part of the formula does.

Find the load on each outrigger

You should start by working out the top section. This part works out how much weight each outrigger will support. This is calculated on 65% of the total load.

$$\text{Area} = \frac{(\text{Cm} + \text{L}) \times 0.65}{\text{P}_{\text{MAX}} \text{ (Soil bearing pressure)}}$$



(Crane mass + Load weight) × 0.65 = Amount of weight on 1 outrigger

For example, if the crane weights 8 tonnes
and the load weighs 2 tonnes:

$$8 \text{ t} + 2 \text{ t} = 10 \text{ t}$$

$$10 \times 0.65 = 6.5 \text{ t}$$

Each outrigger will support 6.5 tonnes

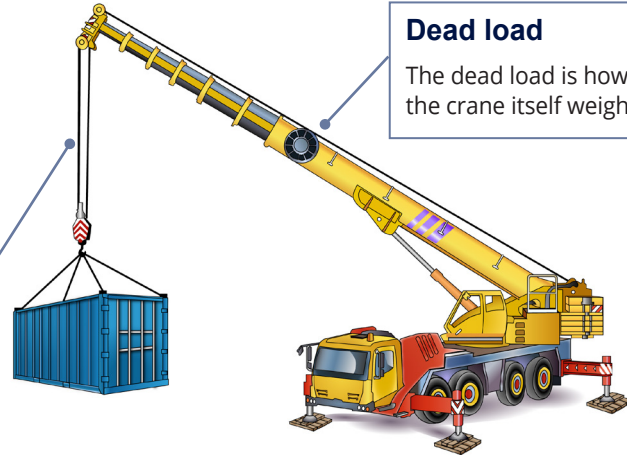
Types of loads

Types of loads to think about when you plan a job are:

- Dead load
- Live load
- Static load
- Dynamic load
- Wind load.

Live load

Live load includes anything hanging from the boom, including the load, the hook, hook block and slings.



Static load

Static load is the weight of the crane and load on the bearing surface.



Dynamic load

The dynamic load changes when the crane and load moves.



Wind load

Wind load is when wind puts extra force on the crane and load, making it seem heavier.



Hazard versus risk

What is the difference?

Different hazards and risks emerge constantly—sometimes instantly.

Hazard

A hazard is any thing or any situation which could injure or harm you.

In other words, it is anything that can hurt you.



Risk

A risk is the chance of a hazard causing harm such as injury, illness or even death.

In other words, how likely it is that somebody or something may be harmed by the hazard.

