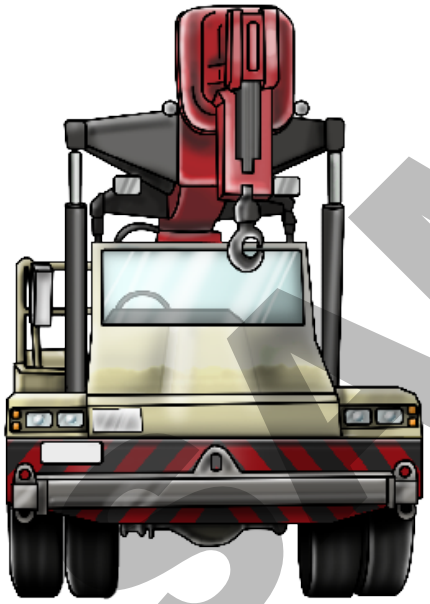
NON-SLEWING MOBILE CRANE INFORMATION BOOK

LLN READY

Training support material for:



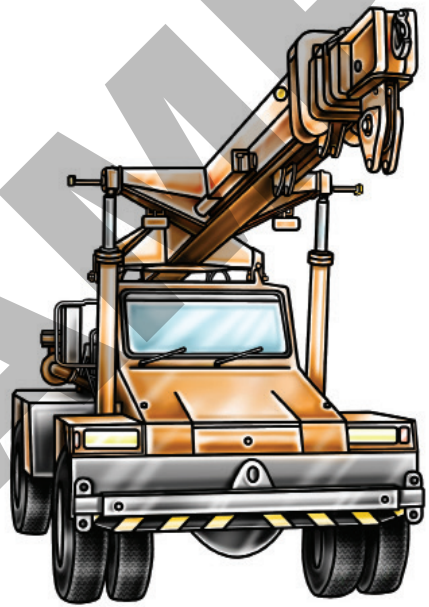
Licence to operate a non-slewing mobile crane

(Greater than 3 tonnes capacity)

Produced by:

EASY GUIDES
Australia Pty Ltd

INTRODUCTION TO NON-SLEWING MOBILE CRANE

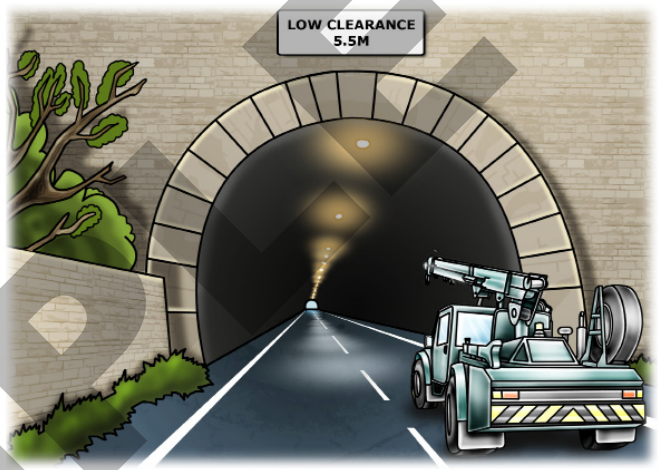


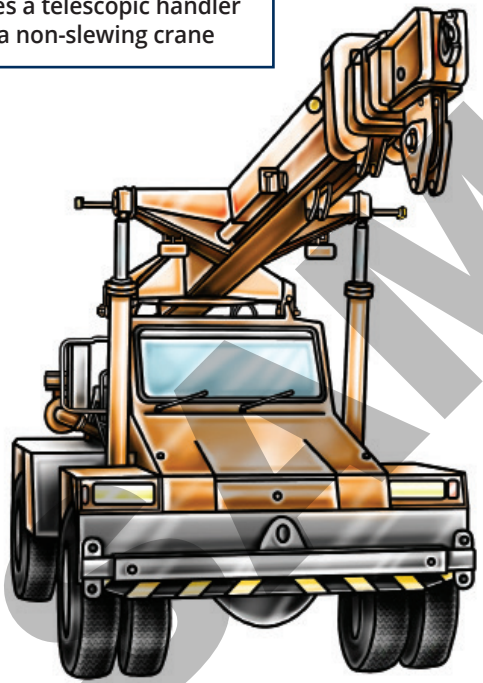
What is a non-slewing mobile crane?

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

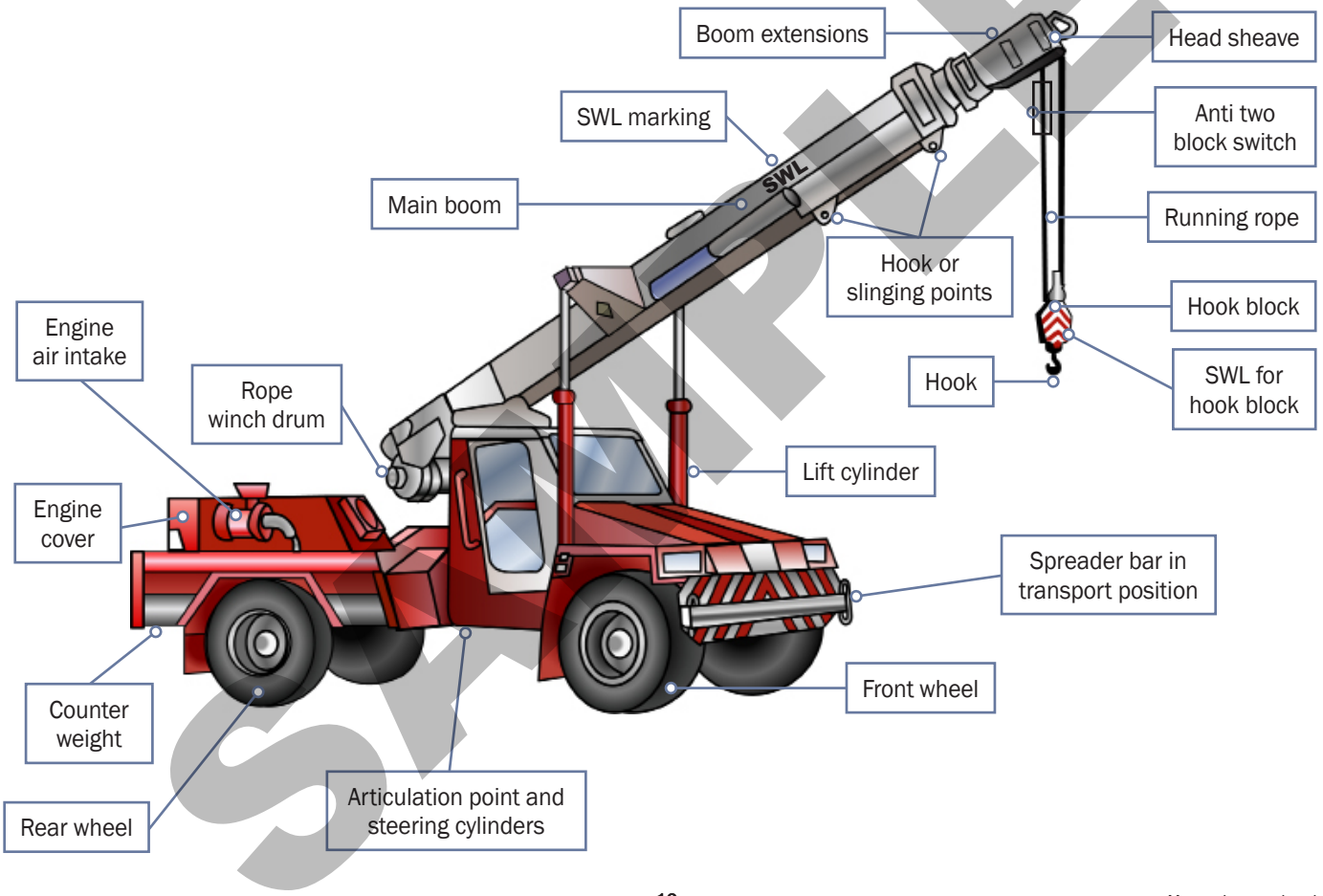
The boom can only luff up and down and telescope in and out. The crane is mounted on a vehicle.

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

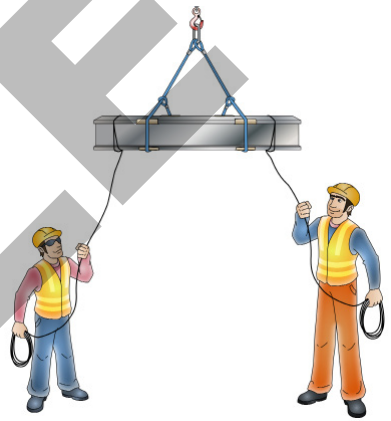




Parts of a non-slewing crane



What is a dogger/dogman?



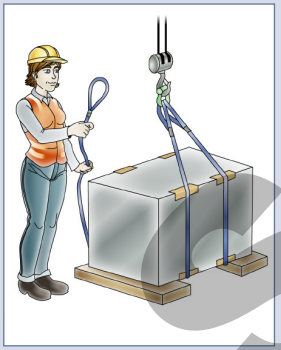
The dogman is responsible for:

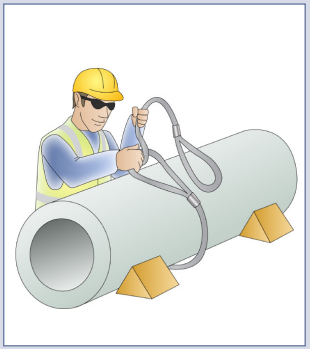
- Selecting and inspecting lifting gear
- Slinging loads
- Guiding/directing a crane operator in the movement of a load
- Working out the weight of a load
- Working out the best ways to sling a load
- Working with the crane operator to make sure the crane is right for the job.

The dogman is responsible for inspecting the lifting equipment.

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.





PREPARE FOR HAZARDS

Part 1

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 help keep 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

People

Hazard

There will always be other people on your worksite. Sometimes you might be working close to pedestrians. There is a risk that someone could be injured or killed on the work site.

Control

You can keep other people safe and out of the work area by using exclusion zones on gantries. Never move a load when there are people in the work area. Never raise or lower a load near people.

Buildings and windows

Hazard

If you are working close to buildings or windows, the plant could damage them.

Control

Keep the boom away from buildings and put screens over windows to protect them.

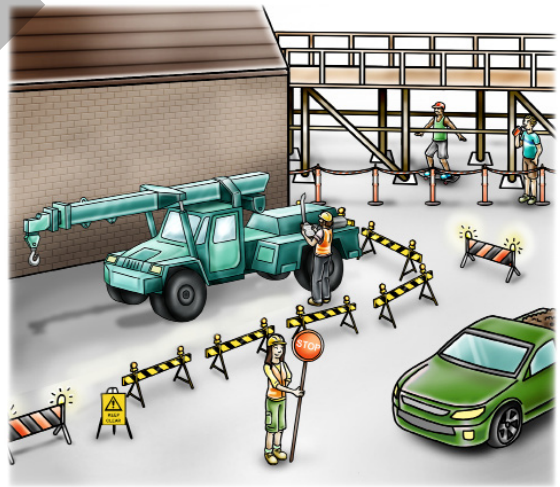
Vehicles

Hazard

Sometimes you will work near other vehicles such as cars, trucks or plant. Other vehicles can get in your way and cause accidents.

Control

You can control vehicles by using exclusion zones, signs, barricades or a workmate directing traffic to keep vehicles out of the work area.



Hazardous material

Hazard

Hazardous materials are things that can harm or kill you. Hazardous materials include things like chemicals and gasses.

Control

Read the Safety Data Sheets (SDS) previously known as the Material Safety Data Sheets (MSDS), before you work with hazardous materials.

The SDS tells you what the hazardous materials are, about safe handling and storage, and what to do if there's a spill. Your employer must give you an SDS and must train you to work safely with hazardous materials.

Working from heights

Hazard

There is a chance you could fall from plant while working.

Control

Use safety gear such as a safety harness or safety nets to improve your safety.

Obstructions

Hazard

You might be working near obstructions that could get in your way.

Obstructions are things such as trees, bridges, things on the ground or other structures. There is a risk of damaging plant, equipment or the obstruction.

Control

Clear or move obstructions out of your way. Keep plant clear of obstructions that you can't move. A workmate or spotter can help you.

COMMUNICATE CLEARLY

Part 2

Communication

You can communicate many different ways. Sometimes the type of communication method depends on the non-slewing mobile crane that you will be working with and the worksite. You must choose the best communication method for the job.

Make sure you **listen** to information and **ask questions** if you do not understand what you have been told.

You can communicate in many different ways. Examples of types of communication:

Speaking, listening, asking questions

This is very important because it helps you understand how to do your job safely.

Toolbox meetings

Toolbox meetings are like small staff meetings that provide important information.

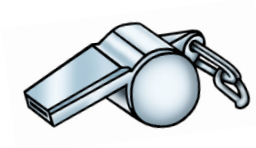
Two-way radios

These are common on worksites. If you are using them, always make sure they are working properly before you start the job.

Check the batteries have enough charge and check you have the right channel to communicate with your workmates.

Whistle

Whistles can be used when the operator and other workers are both in and out of sight.



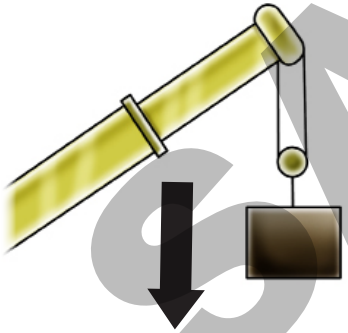
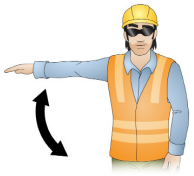
Hand and whistle signals

Here is a series of hand and whistle signals that fall under AS. 2550.1 (Australian Standard). The dogger and the crane operator need to check that they understand the signals that are going to be used. **Signals can vary on different sites.** All hand signals indicate the direction the crane should move when viewed from the drivers seat.

Stop

Motion	Hand signal	Whistle
		 ● 1 short

Hoisting lower/down

Motion	Hand signal	Whistle
	Commonly used signal (not Australian Standard)  	 ▬ 1 long

CHECK THE CRANE

Part 3

Check signs and labels

You should know the non-slewing mobile crane's load limits and what it can and cannot do.

All signs and labels on the non-slewing mobile crane must be clear and readable.

Check the **load charts** are clear and readable

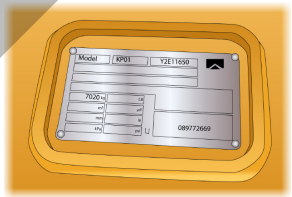
BOOM PIVOT TO HEAD SHEAVES—MA

	Boom Len								
	5.67	6.00	6.50	7.00	7.50	8.00	8.50	9.00	9.50
60°			12600	12600	12600	12600	12600	12600	11850
			12600	12600	12600	12600	12600	12600	11850
			1.04	1.29	1.54	1.79	2.04	2.29	2.54
50°	12600	12600	12600	12600	12600	11150	9950	9000	8200
	12600	12600	12600	12600	11500	10150	9050	8150	7400
	1.45	1.66	1.98	2.30	2.62	2.95	3.27	3.59	3.91
40°	12600	12600	11800	10300	9100	8100	7300	6650	6100
	12600	12600	10750	9350	8250	7350	6600	6000	5500
	2.16	2.42	2.80	3.18	3.56	3.95	4.33	4.71	5.10
30°	12050	10850	9350	8250	7300	6550	5950	5400	4950
	10950	9850	8500	7450	6600	5950	5350	4900	4450
	2.75	3.03	3.47	3.90	4.33	4.77	5.20	5.63	6.07
20°	10300	9300	8100	7150	6350	5700	5200	4750	4350
	9350	8400	7300	6450	5750	5150	4650	4250	3900
	3.19	3.50	3.97	4.44	4.91	5.38	5.85	6.32	6.79
10°	9400	8500	7400	6550	5850	5300	4800	4350	4000
	8500	7700	6700	5900	5300	4750	4300	3950	3600
	3.46	3.79	4.28	4.77	5.27	5.76	6.25	6.74	7.24
0°	9050	8200	7150	6350	5700	5100	4650	4250	3900
	8200	7450	6500	5750	5100	4600	4200	3800	3500
	3.57	3.90	4.40	4.90	5.40	5.90	6.40	6.90	7.40

Load chart

Check all control levers and cabin instruments are clearly labeled and readable.

Check the crane's **data plates** are clear and readable



Check the crane's **decals** are clear and readable

Conduct pre-operational checks

Once you have done a visual check of the non-slewing mobile crane you should do a thorough pre-operational check.

The purpose of a pre-operational check is to make sure the crane is safe to use. You may find a simple problem such as a low water level in the radiator or a more serious problem such as a leak in a hydraulic hose.

Different workplaces may use different forms or systems to check a non-slewing mobile crane.

Shown here is an example of a typical daily inspection checklist.

It clearly lists what you must check on the crane before you use it.

The checklist has space to report faults and to note what the repairer did to fix the problem.

MOBILE CRANE - Daily Inspection Checklist Week Starting ___/___/___

Company/Site _____ Machine Type _____

Machine Hour Meter _____ / / Machine Number _____

CHECK DAILY BEFORE EACH SHIFT: [✓] = OK [x] = Action needed [N/A] = Not applicable	Mon	Tue	Wed	Thur	Frid	Sat	Sun
STRUCTURE: Frame, damage, wear, unclean, leaks, slew ring							
ATTACHMENTS: Hooks, block, sheaves, winch, pulleys, hoist, rope drums, stabilisers/outriggers, counterweight							
BOOM: Angle, length indicator, welds, fly extension, mounting							
WHEELS & TYRES: Nuts, pressure, damage, wear, tracks							
HYDRAULICS: Steering rams, lifting rams, hoses, leaks, wear							
GUARDS: In place, secure, alarms, warning signs, warning lights							
LOAD CAPACITY PLATE: Present, legible, clean, correct							
ENGINE: Engine oil, coolant, hydraulic oil, brake fluid, fuel, belts, air filter, power steering, wiper water, grease, battery, leaks, hoses							
CABIN: Access, seat belt, seat, loose objects							
LIGHTS: Indicators, head lights, brake lights, warning devices							
VISIBILITY: Windscreen, wipers, washer, demister, mirrors, windows							
COMPUTER: Angle, length indicator, radius indicator							
CRANE FUNCTIONS & CONTROLS: Slew, boom raising & lowering, boom extension & retraction, steering, limit switch or cut outs, brakes, park brake, slew brake, horn, beeper, outrigger extension & retraction							
MISCELLANEOUS: Fire extinguisher, radio, door locks, decals, operators manual, warning signs, load chart, guages							
Operator doing check to clearly write/sign their name at the bottom of each column.							

FAULT REPORTED BY _____ Date: ___/___/___

[DANGER] Description of fault _____

DO NOT OPERATE

NOTE: Operator to TAG OUT machine if needed.

ACTION TAKEN TO RETURN TO SERVICE

Print Name _____

Date ___/___/___ Signature _____

PLAN THE LIFT

Part 4

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

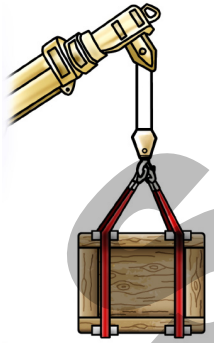
Live load includes anything hanging from the boom, including the load, the hook, hook block and slings.

Dead load

The dead load is how much the crane itself weighs.

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 moves (see AS 2550).

Wind load

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

Calculate the weight of a load

Check the weight of the load when you plan the job, **before** lifting the load.

To find the weight of a load you can:

Weigh the load

Look at the load itself or the packing it comes in

Read the weighbridge certificate, consignment note or other paperwork.

Calculate the weight of the load.

For example:

20 kg × 10

= 200 kg + 15 kg pallet

= 215 kg

How to calculate the weight of a load

Following are two examples of how to calculate loads.

Example 1 – Pallet of cement bags

Job:

Lift a pallet with 10 bags of cement on it.

Specifications:

Bag weight – 20 kg

Pallet* weight – 30 kg

* The weight of a wooden pallet may vary. If you are unsure you should allow up to 50 kg as this will cover a wet pallet which weighs more.

Answer:

10 × 20 kg bags of cement = 200 kg + 30 kg (pallet) = **230 kg**

Read a crane load chart

A load chart has drawings and tables that show you the heaviest load the non-slewing mobile crane can move. You need to be able to read a load chart to operate a crane.

A crane's load chart shows:

- Mass of hook block
- Rated capacity for different types of cranes
- The winch pull line (tonnes or kilograms)
- Multiple rope-fall capacities.

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

Example of a load chart

Understand a load chart (continued)

Rated capacity

The **rated capacity** is the maximum load weight a crane can lift in different boom configurations.

Rope fall capacities (parts of line)

The load chart will tell you the rope fall capacities (number of parts of line) needed to lift loads at different boom lengths.

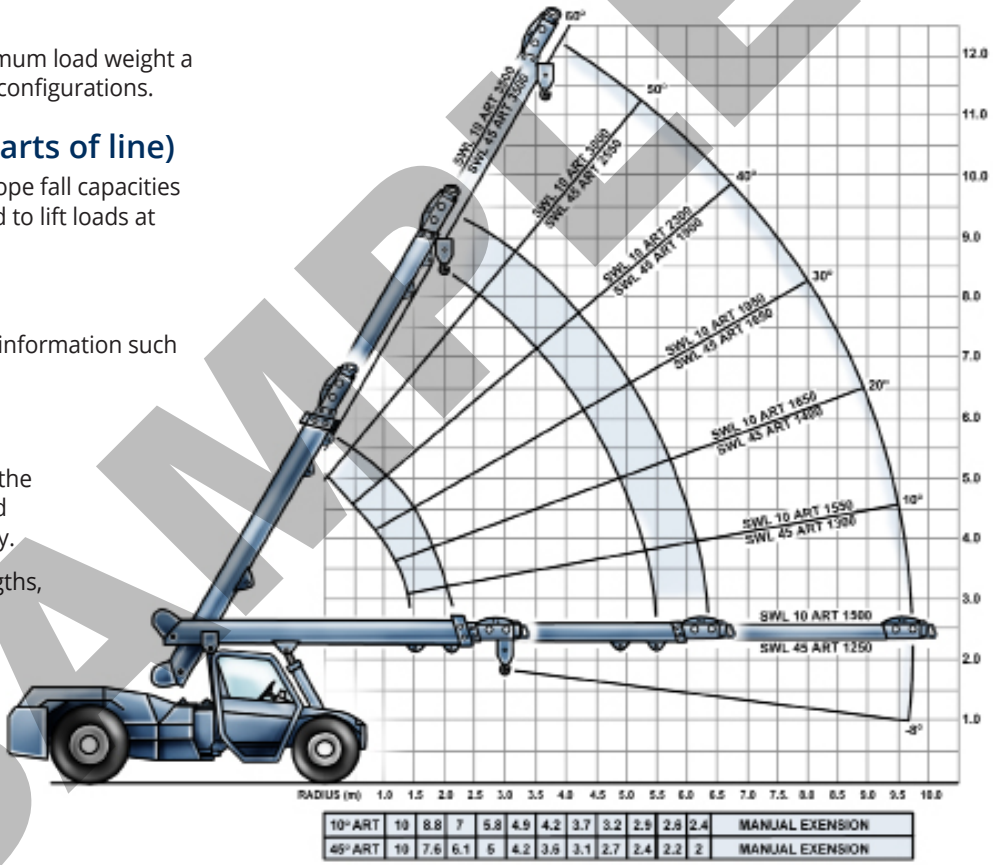
Hook blocks

The load chart may show other information such as the weight of hook blocks.

Range diagram

The **range diagram** shows you the crane's lifting configurations and how to set up the crane properly.

It shows the range of boom lengths, boom radius and hook heights.



10° ART	10	8.8	7	5.8	4.9	4.2	3.7	3.2	2.9	2.6	2.4	MANUAL EXENSION
45° ART	10	7.6	6.1	5	4.2	3.6	3.1	2.7	2.4	2.2	2	MANUAL EXENSION

Example of a range diagram

Understand a load chart (continued)

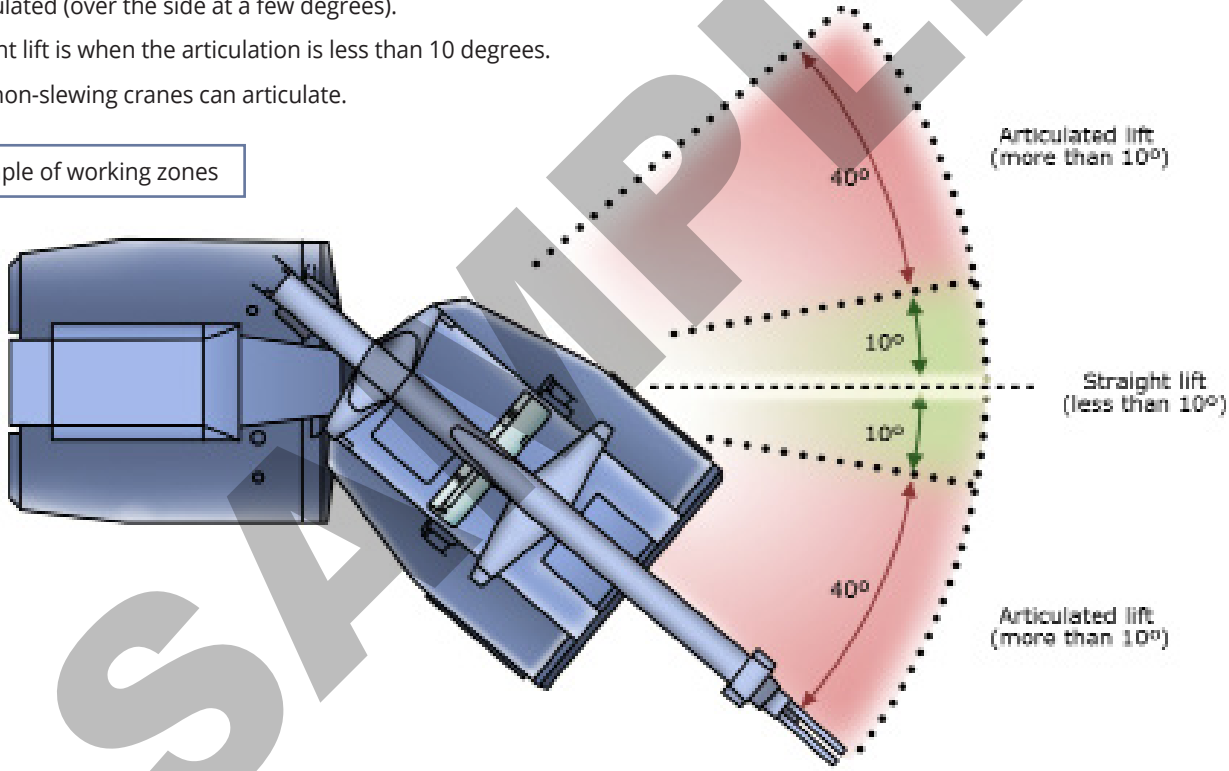
Working zones

The **working zone** for a non-slewing crane is either straight (over the front) or articulated (over the side at a few degrees).

A straight lift is when the articulation is less than 10 degrees.

Not all non-slewing cranes can articulate.

Example of working zones



SET UP THE CRANE

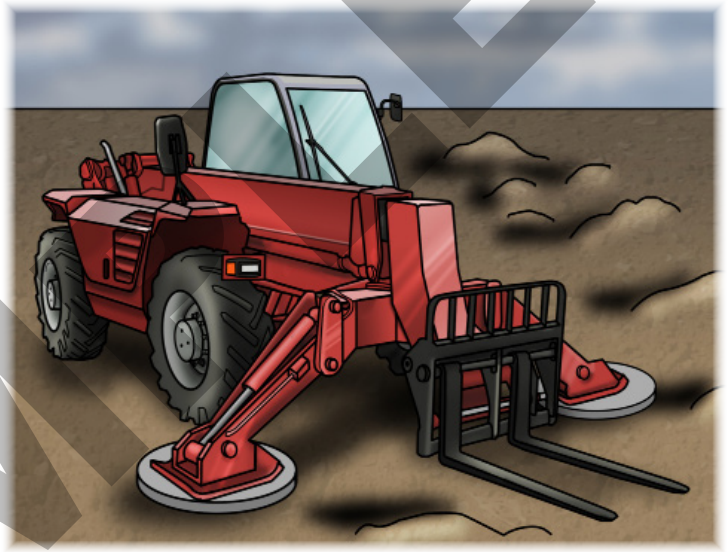
Part 5

Position crane safely for the job (continued)

Make sure the crane is level

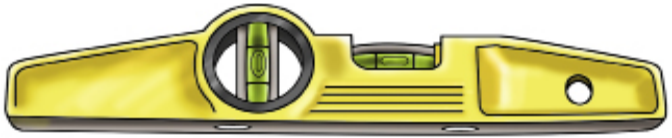
Make sure the crane is level **before** you use it to lift loads. This will help keep the crane stable and maintain safety.

Make sure the hoist brake and luff brake are **on** (where applicable).



Spirit level

Use a spirit level or bubble-level indicator to check the crane is level.



Working on sloping ground

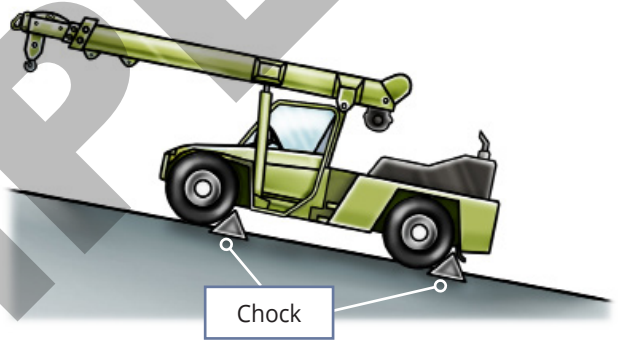
Try to work on a level surface when using a non-slewing mobile crane.

If you must set up a crane on a sloping surface:

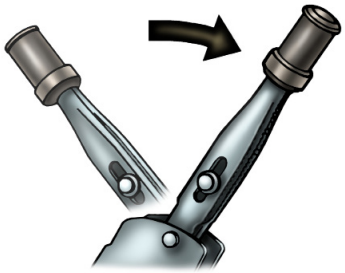
- First set up the outriggers on the **lowest** side to level the truck.

Chocking the wheels of your non-slewing mobile crane is safe practice and essential if you work on a slope.

Failure to chock the wheels could lead to loss of control of the brakes or steering if the parking brake fails.



Always **apply** the parking brake when parking on sloping ground.



Outriggers and packing

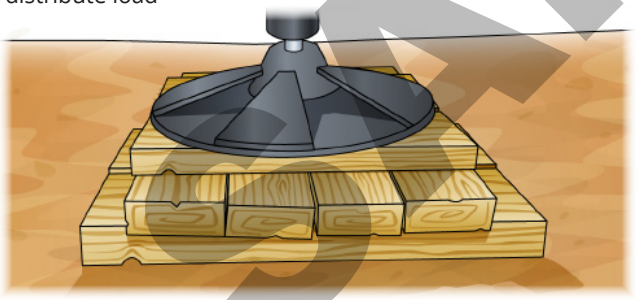
Outriggers (which can also be called **stabilisers**) are beams or legs that extend out from a crane, helping to keep it stable. **Packing** is placed under the outriggers to distribute the weight of the crane and load. Outriggers should always be used in accordance with the manufacturers instructions.

Some important things to remember when setting up and packing outriggers are:

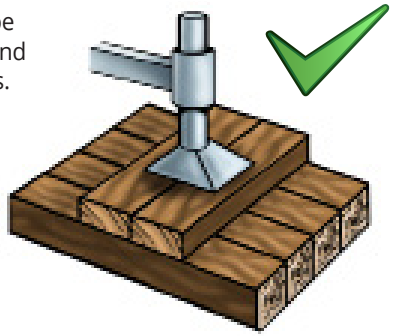
Outriggers should be fully extended (if possible)

Make sure the ground is firm and can bear the load

Packing must cover as much area as possible to distribute load



The packing should be made of hardwood and free from any defects.



DO THE LIFT

Part 6

Do the lift

This part of the book is about how to do a lift.

It covers:

- Positioning the hoist block and boom/jib
- Test lifts
- Moving and watching the load
- Safe crane operation
- Responding to unsafe situations
- Checking the planned route.

Access the crane safely

You need to get in and out of the crane safely.

When climbing in or out of the crane's cabin, three of your body parts should **always** be touching the crane at once.

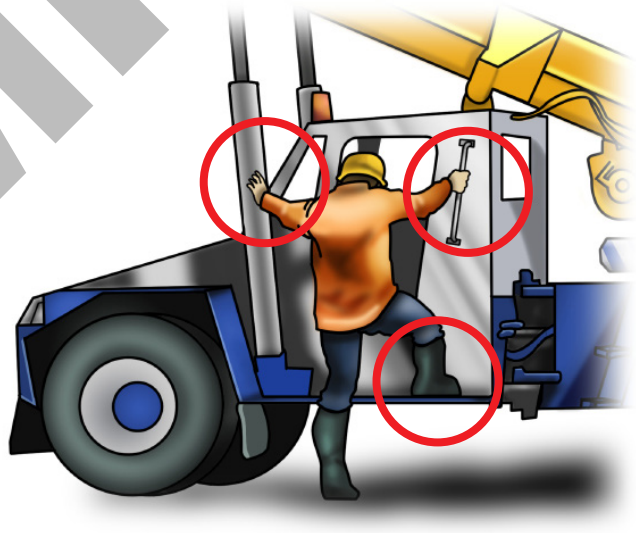
You can use

- two feet and one hand

or

- two hands and one foot to climb into the cabin.

Using three body parts will keep your body stable while accessing the crane.



Do the lift (continued)

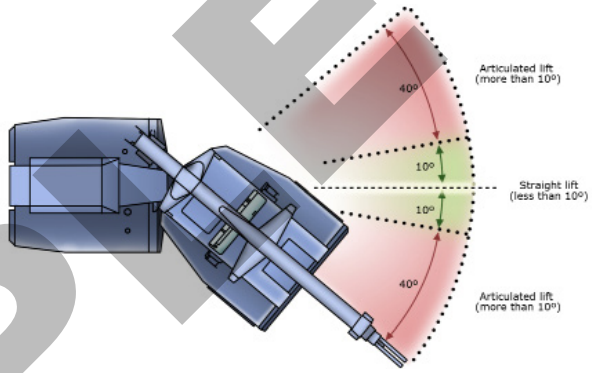
Check crane's load capacity

Always stay within the Working load limit (WLL) of the crane.

For example, you may lift up the boom and the load will change. Ensure the whole lift stays inside the boom's limits and never exceeds the WLL.

Use the load meter/crane computer, load chart and the boom radius to stay within the WLL.

There is more information on load charts in **Part 4: Plan the lift – Read a load chart**.



Position boom/jib and hoist block over load

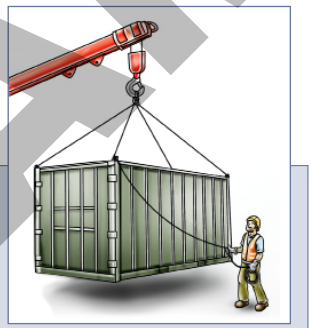
Put the lifting hook over the load's **centre of gravity**.

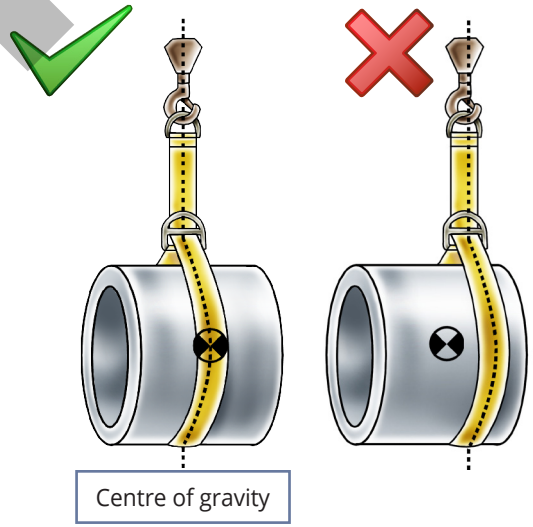
This reduces the risk of:

- Damaging the crane
- Overloading the crane
- Load swing
- Load damage.

Note:

The dogman will give you directions to position the boom/jib and hoist block over the load.





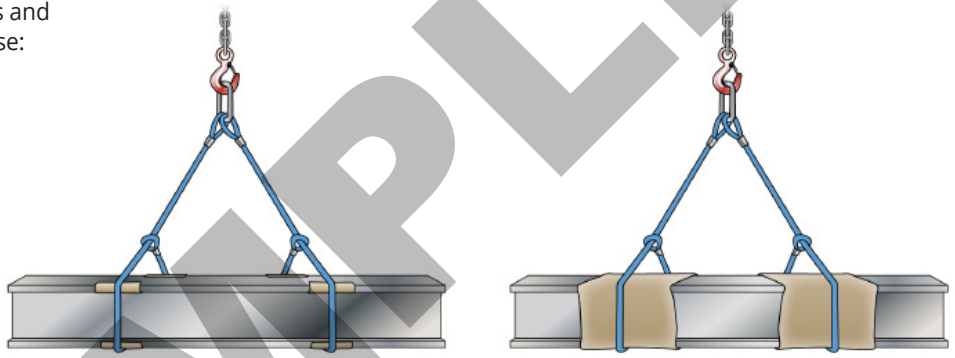
Attaching the lifting equipment

Be careful the lifting gear does not **damage** the load or the load does not **damage** the lifting gear.

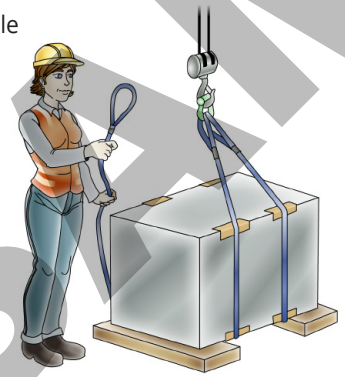
Sometimes you need to:

Protect the slings from sharp edges and to prevent damage to lifting gear use:

- Packing
- Lagging
- Padding
- Edge protection or corner pads.



Position the hook at a suitable height to connect the lifting gear safely



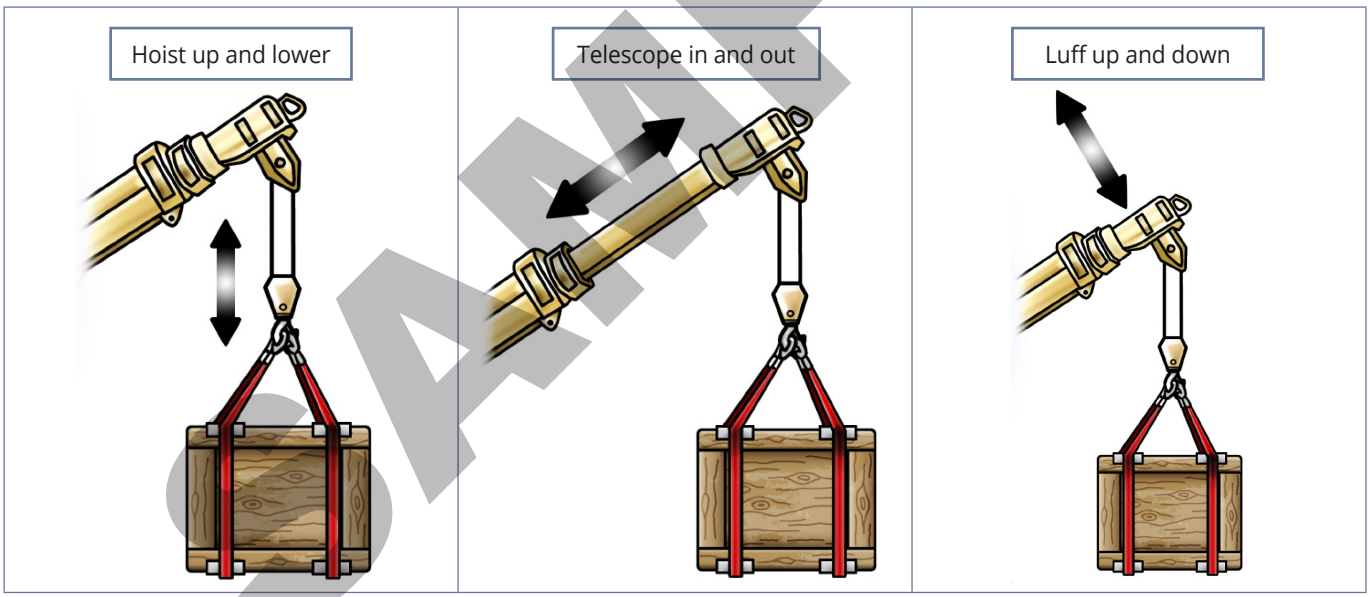
Use a bow shackle to support multiple slings

Crane movements

You can use different crane/boom movements to move a load.

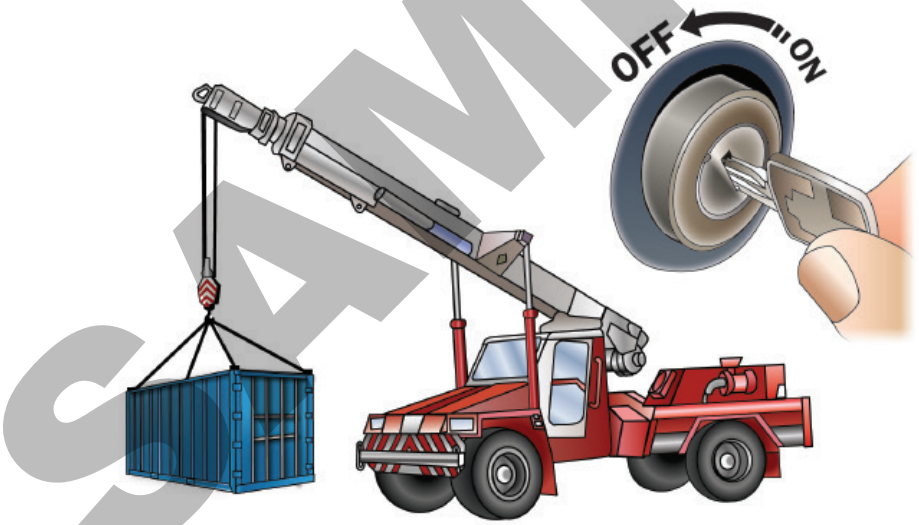
Make the moves smoothly

- Hoist up and lower
- Luff up and down
- Slew left and right
- Telescope in and out
- Travel with load.



SHUT DOWN AND PACK UP

Part 7



Shut down and pack up

This part of the book is about how to shut down, pack up and put away equipment.

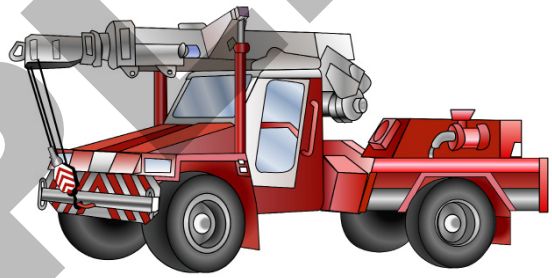
It covers:

- Stowing and securing equipment
- Using motion locks
- Shutting down the crane
- Post-operational checks.

Stow boom/jib and equipment

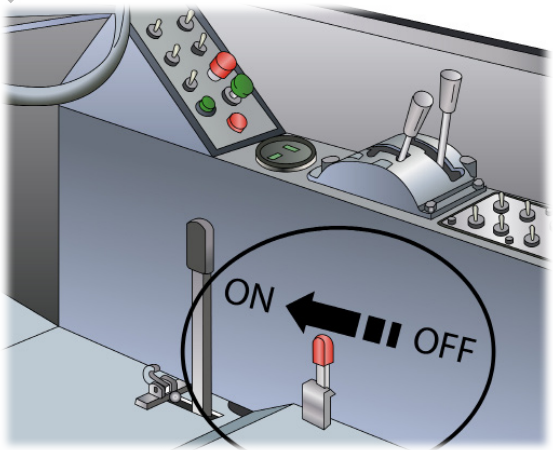
Stow your boom as shown in the manufacturer's instructions or the specifications.

Remove any lifting parts from the boom and securely attach them to the correct position on the vehicle.



Apply motion locks and brakes

Check that you have turned on all motion locks and brakes.



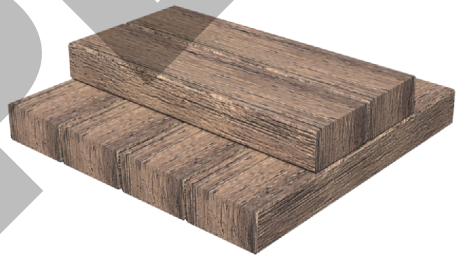
Stow and secure outriggers and packing

Most non-slewing mobile cranes **do not use** outriggers and packing. Sometimes when using a telehandler you **will use** outriggers. When you have finished with the crane, stow and secure the outriggers and packing safely for travel.

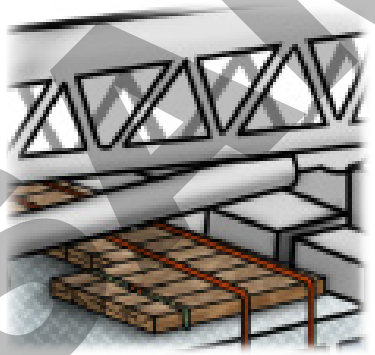
To stow and secure outriggers and packing you should:

1. Retract the outriggers using the controls in the cabin.

2. Pack up the packing timbers.



3. Stow and tie down the packing in its place on the crane.



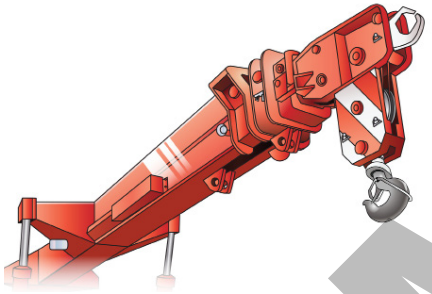
If unsure, check the operator's manual or ask your supervisor to find out where you stow the packing.

Shut down procedures

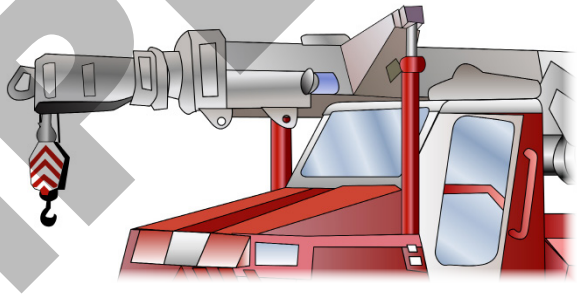
Different cranes have different shut down procedures. The non-slewing mobile crane's manufacturer's instructions show you the shut down procedure in detail.

Shut down

Raise the hook block/hoist rope/lifting assembly so they are clear of anything else



Lower, retract, fold and raise, extend or unfold the crane jib according to the manufacturer's instructions.



Retract/fold/lower the boom for travel

Apply motion locks and brakes