PRO-LIFT
Training & Assessment Services

CPCCLDG3001 Licence to perform dogging

Student Guide

Contents

Welcome

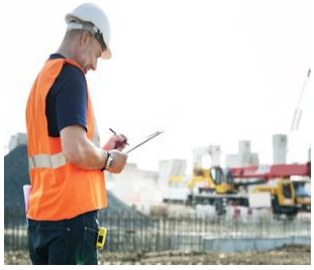
Welcome to **CPCCLDG3001 Licence to perform dogging.**
Information provided may help to ensure your safety.

This unit

This unit specifies the skills and knowledge required to safely perform dogging work. Dogging consists of the application of slinging techniques to move a load, including the selection and inspection of lifting gear, and the directing of a plant operator in the movement of a load when the load is out of sight of the operator.
Dogging work is conducted in the construction industry and other industries where loads are lifted and moved using cranes or hoists.
Completion of the general construction induction training program, specified in the Safe Work Australia model Code of Practice: Construction Work, is required by anyone carrying out construction work. Achievement of CPCWHS1001 Prepare to work safely in the construction industry meets this requirement.
Competence in this unit does not in itself result in a licence. A licence is obtained after competence is assessed under applicable Commonwealth, state or territory work health and safety (WHS) regulations.

Elements covered in this unit are:

1. Plan task
2. Select and inspect equipment
3. Set up task
4. Perform task
5. Pack up and clean up



WHS Law

Legislation is law passed by Parliament.
It governs many areas, including health and safety at work.
It can be national, or relevant to individual states and territories.
You need to know the WHS legislation that covers your job and workplace.
You are required by law to comply with them.
You need to understand how WHS Acts, regulations, codes and standards affect your work, job and workplace.

Acts & Regulations

Acts - Are law. They describe how to provide health and safety in the workplace

The *Work Health and Safety Act*

2011 QLD / NT / WA / NSW

2004 –Victoria

The Act is the cornerstone of legislative and administrative measures to improve occupational health and safety

Regulations - are made under the Act. They set out the practical steps to follow to comply with the Act

Codes of practice & Australian Standards

Codes of practice - Give practical guidance on how to legally comply with regulations and Acts

Australian Standards - Developed to provide minimum levels of performance or quality. Cover hazards, work processes and products.

The safest way to carry out the work activity is to read, understand and follow your

- Safe work method statements
- Codes of practice

Hazards

Talk to others about workplace hazards prior to working

- Safety officer
- Supervisor
- Engineer
- Health and safety representative
- Other personnel

Consulting about workplace hazards

Speaking with other persons about workplace hazards before working will help you to

- Identify any workplace-specific hazards or ground conditions
- Ensure workplace policies and or procedures are followed
- Identify hazards and controls

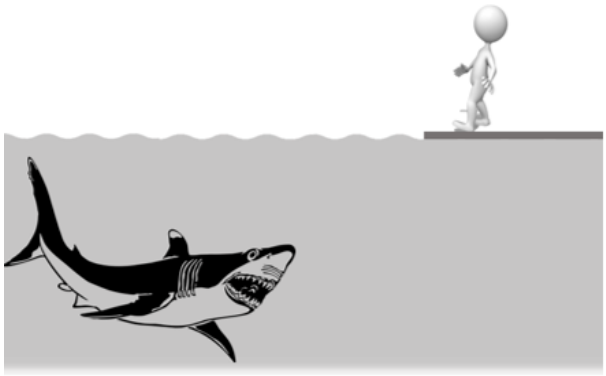
Plan and prepare

Other than hazards you should plan for

- Permits and Licences
- Location of task
- Characteristics of load
- Access & Egress
- Communications
- Equipment required and availability

Hazard vs Risk

A **Hazard** is *something that has the potential to harm you*



A **Risk** is *the possibility of harm (death, injury or illness) from exposure to a hazard*

Dogging work

Types of work that a licensed dogger can perform

- Application of slinging techniques
- Load estimation
- Selection of lifting gear
- Inspection of lifting gear
- Directing the plant operator when the load is out of view

New or unknown dogging activities

An employer must provide ***training, supervision, instruction and or information*** before you can perform new or unknown dogging activities.

Duty of Care requirements

Duty of care examples

- Take reasonable care for own health and safety
- Take reasonable care for the health and safety of others who may be affected by your actions
- Cooperate with OHS/WHS requirements
- Do not interfere or misuse anything provided in a workplace for WHS/OHS

Work health and safety regulator

If a person is not conducting high-risk work safely the regulator can

- Suspend the licence
- Cancel the licence
- Refuse to renew the licence
- Order to undergo re-assessment

Health and safety

Employers have an obligation to ensure the health and safety of all workers by

- Providing and maintaining safe plant and equipment
- Providing and maintaining a work environment without risks to health and safety
- Providing adequate facilities
- Providing and maintaining safe work systems and or procedures

Obtain workplace safety information

Use documents to obtain workplace safety information

- Legislation and regulations
- Relevant Australian standards
- OHS/WHS policy
- Codes of practice
- Safe Work Method Statements (SWMS) or Job Safety Analysis (JSA)

Details on the safe use of slings

Information that will supply details on the safe use and care of slings

- Australian standards
- Manufacturer specifications

Consider and plan for hazards

Structure or environment

- Buildings, bridge, or other structure
- Scaffold
- Wind, poor weather, or lighting

Movement

- Plant and equipment
- Vehicle traffic
- Personnel or pedestrian

Underground and overhead

Electric lines

- Underground services

Fall prevention & fall arrest equipment

Fall prevention and fall arrest equipment is required at ***2m or higher.***

Risk controls and equipment

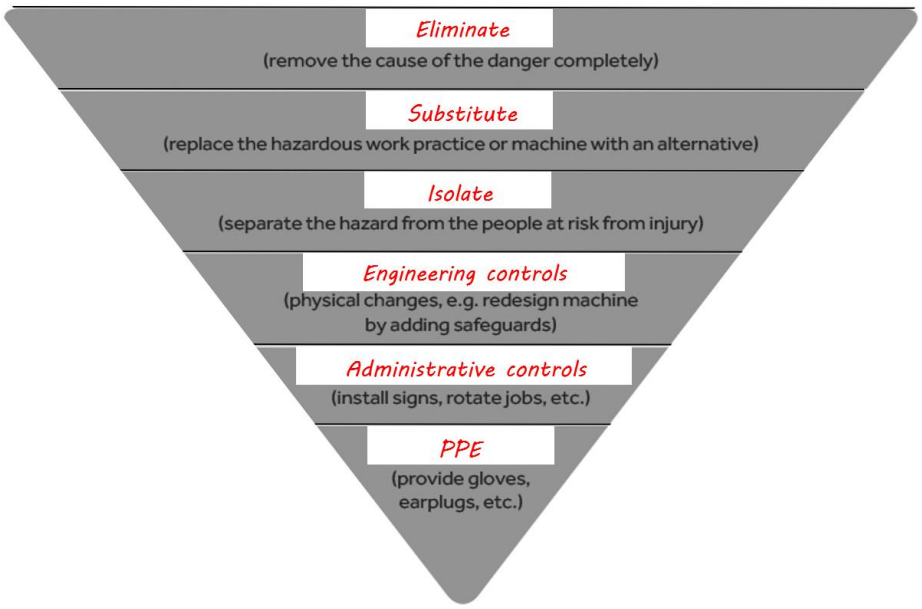
Use risk controls and equipment to prevent access to vehicles or pedestrians to the work area

- Exclusion zones / traffic control
- Traffic or pedestrian barriers
- Signs / lights
- Traffic management plan

Respond to unsafe incident or event

- Stop work
- Assess the situation
- Resolve issue if possible
- Get advice and assistance where required
- Report the incident to relevant authority and according to workplace procedures

Hierarchy of hazard controls



Minimum safe operating distances

Minimum safe distances you must maintain when working near electric lines.

QLD / NSW

Up to 132KV = 3m

132kv to 330kv = 6m

More than 330kv = 8m

NT

50v to 1000v = ...3m

1000v to 33000v = ……3m

33000v to 66000v = ….4m

66000v to 132000v =...5m

WA

Less than 33KV = 3m

Over 33kv = 6m

Over 133kv = 8m

VIC / SA/ ACT / TAS

<u>Distribution lines(poles)</u>

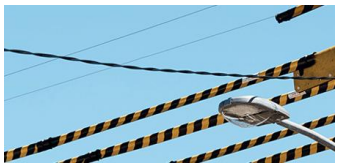
- *No closer than* **3m** with a qualified/registered spotter
- Without spotter 6.4m

<u>Transmission Lines (Towers)</u>

- *No closer than* 8m with a qualified/registered spotter
- Without spotter 10m

Identify the location of power lines

Visual signs can help you to identify the location of power lines on your worksite



- Power line marker balls
- Safety warning/danger signs
- Tiger tails

Power lines

If you need to work closer than the prescribed safe operating distances for power lines

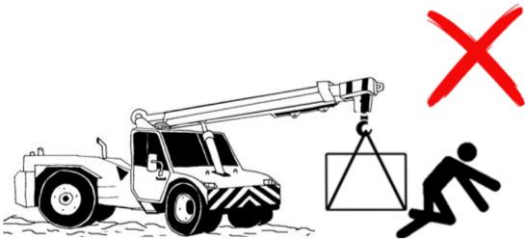
- Contact the relevant authority for an access permit
- Ask to have the power disconnected or appropriately insulated by contacting the relevant supply authority
- Use a qualified safety observer (spotter) and observe legislation within your state or territory

Risk and control

Person near the structure of a crane during operations

Risk

Person may be *struck or crushed by load or crane during movement*



Control

Exclusion zones to ensure personnel are clear of hazardous zones

Safe operations

Never raise or lower the load over people.

It may cause an ***unsafe serious risk, injury, or death if load falls.***

Operating in low light

Before performing dogging activities in a low light environment, you must have ***adequate lighting*** over the whole work area to ensure safety.

Check your risk controls

Always apply risk control measures *before starting any work and as soon as a hazard is identified during a task.*

Inspect safety equipment

Always inspect safety equipment including personal protective equipment ***before and after any work.***

Planning the load path

When planning the load path for a stationary slewing crane, consider

- Boom radius
- Boom length
- Obstructions
- Overhead electric lines
- Preventing persons from accessing load pathway
- Spotter

Responsibility

The dogger is responsible for ***determining load weight*** and ***informing the crane operator of the load weight***

Determine load weight

Methods to determine load weight

- Weighbridge notes
- Estimate by calculation
- Weigh the load
- Marked on load

Planning to lift a live load

A changing centre of gravity is the primary consideration when planning to lift a live load.

Calculating load weight

Load Material	Approximate Weight per m^3	Load Material	Approximate Weight per m^3
Aluminium	2700kg / m^3	Granite	2600kg / m^3
Bricks	4000kg / 1000	Gypsum	2300kg / m^3
Bronze	8500kg / m^3	Iron, ore	5400kg / m^3
Cast Iron	7200kg / m^3	Lead	11200kg / m^3
Cement (25 bags)	1000kg	Steel	7850kg / m^3
Clay	1900kg / m^3	Poly Pipe	970kg / m^3
Coal	864kg / m^3	Timber (hardwood)	1100kg / m^3
Concrete	2400kg / m^3	Timber (soft)	600kg / m^3
Copper	9000kg / m^3	Water	1000kg / m^3
Earth	1900kg / m^3		1L = 1kg

Drum lift

A drum must be lifted using two vertical flexible steel wire ropes (FSWR) connected to a spreader bar

- The weight of the load is 1500kg evenly distributed between the lifting points

What is the minimum Working Load Limit necessary for each directly loaded sling leg?

1500kg ÷ 2 = 750kg

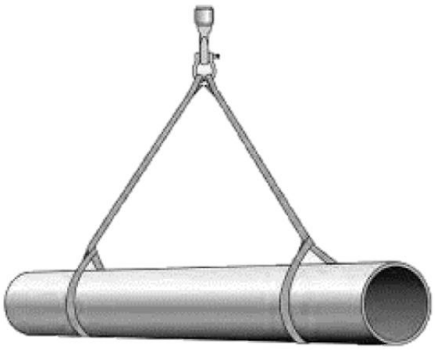
Working Load Limit for each sling is 750kg or 0·75 tonne

Using the load chart provided, what is the minimum diameter sling required when the slings are directly loaded?

- *Working Load Limit for each sling is 750kg or 0·75 tonne*
- *Closest tonne 0·85 tonne*
- *The minimum diameter sling needed is 10mm*

WIRE ROPE DIA. mm	DIRECT LOAD	CHOKE HITCH		DIRECT LOAD			CHOKE HITCH				BASKET HITCH							
		ROUND LOAD	RECTANGULAR LOAD				ROUND LOAD		OTHER THAN ROUND LOAD		ROUND LOAD				OTHER THAN ROUND LOAD			
							SINGLE WRAP	DOUBLE WRAP	SINGLE WRAP	DOUBLE WRAP								
				0°- 60°	90°	120°	0° - 45°	0° - 60°	0° - 45°	0° - 60°	0°	60°	90°	120°	0°	60°	90°	120°
MAXIMUM WORKING LOAD LIMITS IN TONNES OF 1000kg for **1570 GRADE FIBRE CORE** - GALVANISED																		
8	0.55	0.41	0.27	0.94	0.77	0.55	0.71		0.48		1.09	0.94	0.77	0.55	0.55	0.48	0.39	0.27
9	0.69	0.52	0.34	1.19	0.97	0.69	0.90		0.60		1.38	1.19	0.97	0.69	0.69	0.60	0.49	0.34
10	0.85	0.64	0.43	1.47	1.20	0.85	1.11		0.74		1.70	1.47	1.20	0.85	0.85	0.74	0.61	0.43
11	1.03	0.77	0.52	1.78	1.45	1.03	1.34		0.90		2.1	1.78	1.45	1.03	1.03	0.90	0.73	0.52
12	1.23	0.92	0.61	2.1	1.73	1.23	1.59		1.07		2.5	2.1	1.73	1.23	1.23	1.07	0.87	0.61
13	1.44	1.08	0.72	2.5	2.0	1.44	1.87		1.25		2.9	2.5	2.0	1.44	1.44	1.25	1.02	0.72
14	1.67	1.25	0.83	2.9	2.4	1.67	2.2		1.45		3.3	2.9	2.4	1.67	1.67	1.45	1.19	0.83

Lift a cast iron pipe



- Two synthetic slings are used to lift cast iron pipe
- The angle between slings is 60 degrees
- Pipe weight is 104kg per lineal metre
- The pipe length is 6.5m

What is the total pipe weight?

6·5 X 104kg = 676kg or 0·676tonne

Using the pipe weight, what sling is the minimum required?

- Choked at 60 degrees
- Pipe weight of 676kg or 0·676tonne
- Closest tonne 1·3 tonne
- The minimum sling size needed is 1 tonne

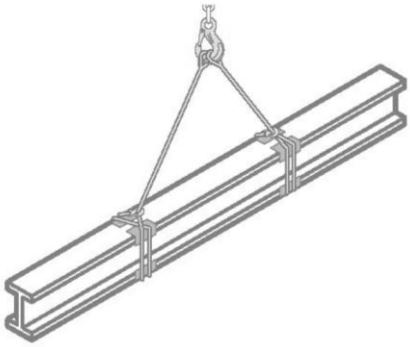
For educational purposes only

L = LOAD FACTOR		L = 1.0	L = 0.8	L = 2.0	L = 1.7	L = 1.4	L = 1.0	L = 1.7	L = 1.38
Colour	W.L.L Tonnes	VERTICAL W.L.L Tonnes	CHOKE W.L.L Tonnes	BASKET W.L.L Tonnes	60° W.L.L Tonnes	90° W.L.L Tonnes	120° W.L.L Tonnes	60° W.L.L Tonnes	60° CHOKE W.L.L Tonnes
Violet	1.0	1.0	0.8	2.0	1.7	1.4	1.0	1.7	1.3
Green	2.0	2.0	1.6	4.0	3.4	2.8	2.0	3.4	2.7
Yellow	3.0	3.0	2.4	6.0	5.1	4.2	3.0	5.1	4.1

Lift steel beam

Two flexible steel wire ropes (FSWR) are to be used and reeved as displayed in picture

- The sling angle is 60 degrees
- The beam is 105 kg per lineal metre
- The beam is double wrapped
- The length of the beam is 7m



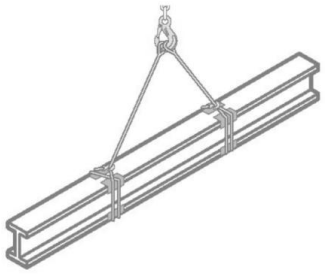
What is the weight of the 7m beam?

7 X 105 = 735kg

Lift steel beam cont.

Using the sling chart below, what is the minimum diameter size sling required to safely lift the load?

- *Reeved slings 60 degrees*
- *Beam weight 735kg*
- *Closest tonne 0·74t*
- *Answer 10mm diameter rope*



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10	0.85	0.64	0.43	1.47	1.20	0.85	1.11		0.74		1.70	1.47	1.20	0.85	0.85	0.74	0.61	0.43
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14	1.67	1.25	0.83	2.9	2.4	1.67	2.2		1.45		3.3	2.9	2.4	1.67	1.67	1.45	1.19	0.83
16	2.2	1.64	1.09	3.8	3.1	2.2	2.8		1.90		4.4	3.8	3.1	2.2	2.2	1.90	1.55	1.09
18	2.8	2.1	1.38	4.8	3.9	2.8	3.6		2.4		5.5	4.8	3.9	2.8	2.8	2.4	1.97	1.38
20	3.4	2.6	1.70	5.9	4.8	3.4	4.4		3.0		6.8	5.9	4.8	3.4	3.4	3.0	2.4	1.70
22	4.1	3.1	2.1	7.1	5.8	4.1	5.4		3.6		8.3	7.1	5.8	4.1	4.1	3.6	2.9	2.1
24	4.9	3.7	2.5	8.5	6.9	4.9	6.4		4.3		9.8	8.5	6.9	4.9	4.9	4.3	3.5	2.5
26	5.8	4.3	2.9	10.0	8.1	5.8	7.5		5.0		11.5	10.0	8.1	5.8	5.8	5.0	4.1	2.9
28	6.7	5.0	3.3	11.6	9.4	6.7	8.7		5.8		13.4	11.6	9.4	6.7	6.7	5.8	4.7	3.3
32	8.7	6.5	4.4	15.1	12.3	8.7	11.3		7.6		17.4	15.1	12.3	8.7	8.7	7.6	6.2	4.4

The big boot

A tourist attraction requires an oversized prop boot to be lifted into the display position which will be visible from the Highway

- The oversized prop boot will be lifted with a four-leg sling arrangement as shown in the picture below
- The boot has defined engineered lifting points (lugs)
- The slings used are 20mm 80 grade chain with non-derating shorteners
- The position of the lifting lugs and an uneven load will require that 2 legs of the sling are shortened
- Shortened legs are at 30 degrees to the vertical, the other two legs are at 45 degrees to the vertical

a) Using 20mm slings in this configuration, what is the maximum allowable weight the oversized boot can be?

- *Chains connected straight, Grade T (80)*
- *Greater angle from vertical is 45 degrees, therefore included angle is 90 degrees*
- *17·6 tonnes is the maximum weight the oversized boot could be*

b) Could you use 16mm chain for the lift if the oversized prop boot weighed 15,000kg (15 tonne)?

- *No, chain capacity 11·3t with load weight 15t*

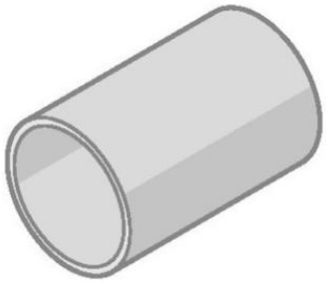
WLL in (tonnes) – Alloy Grade T (80) Chain Slings, Single & Multi Leg Assemblies

SINGLE LEG SLINGS				2, 3, OR 4 LEG SLINGS				BASKET SLINGS	
									
CHAIN SIZE (mm)	STRAIGHT SLING	*ADJUSTABLE SLING	REEVED SLING	STRAIGHT SLING 60º	STRAIGHT SLING 90º	STRAIGHT SLING 120º	REEVED SLING Max 60º	1 LEG Max 60º	2 LEG Max 60º
6	1.1	1.1	0.8	1.9	1.6	1.1	1.4	1.4	2.5
7	1.5	1.5	1.1	2.6	2.1	1.5	2.0	2.0	3.4
8	2.0	2.0	1.5	3.5	2.8	2.0	2.6	2.6	4.5
10	3.2	3.2	2.4	5.5	4.5	3.2	4.2	4.2	7.2
13	5.3	5.3	4.0	9.2	7.5	5.3	6.9	6.9	11.9
16	8.0	8.0	6.0	13.8	11.3	8.0	10.4	10.4	18.0
20	12.5	12.5	9.4	21.6	17.6	12.5	16.3	16.3	28.1
22	15.0	15.0	11.3	26.0	21.2	15.0	19.5	19.5	33.8
26	21.2	21.2	15.9	36.7	29.9	21.2	27.6	27.6	47.7
32	31.5	31.5	23.6	54.5	44.4	31.5	41.0	41.0	70.9

Calculate weight of pipe

A hollow section of HDPE - high-density polyethylene pipe requires lifting

- Wall thickness 100mm
- Length 3.5m
- Outer diameter 2.6m
- Inside diameter 2.4m
- Solid polyethylene has a mass of 970 kg per cubic metre



What is the total weight of the pipe in tonnes?

<u>Answer must be rounded up to nearest tonne</u>

·79 x 2·6 x 2·6 x 3·5 = 18·691

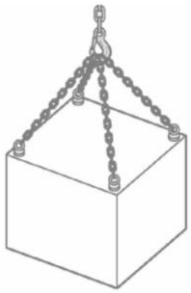
·79 x 2·4 x 2·4 x 3·5 = 15·926

18·691 - 15·926 = 2·765

2·765 x 970 = 2,682·05 kg

Answer 2·7 tonnes

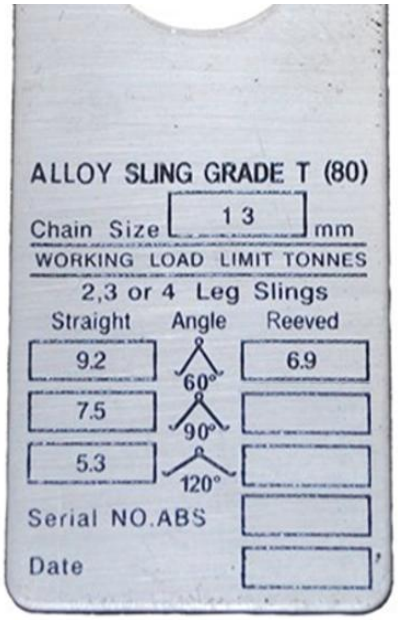
Relocate a container with lifting lugs



- The angle between diagonally opposite sling legs is 60 degrees
- Grade T (80) chain slings will be used
- The chain diameter is 13mm

Using the sling tag provided, what is the maximum load weight that can be lifted?

- 9·2t or 9200kg



Calculate total container load weight

Use the following consignment note to calculate the total container load weight that needs to be lifted

CONSIGNMENT INFORMATION			DIMENSIONS			WEIGHT (KG'S)	
MARKS / UNIT No's Include Seal Number if applicable	TYPE OF UNIT / ISO	DESCRIPTION OF GOODS	LENGTH	WIDTH	HEIGHT	GROSS	NETT
44668 2	CTU	SHIPPING CONTAINER	40FT				3450kg
	1	5 x universal beams (119kg/m)	9m				
	2	17 x timber beams (9kg/m)	5.5m				
	3	1 x steel plates (143kg/sqm)	3m	0.5m			

Weight of universal beam 5 x 9 x 119 = 5355kg

Weight of timber beam 17 x 9 x 5·5 = 841·5kg

Weight of steel plate 1 x 3 x 0·5 x 143 = 214·5kg

Container weight = 3450kg

Total weight 5355 + 841·5 + 214·5 + 3450 = 9861kg

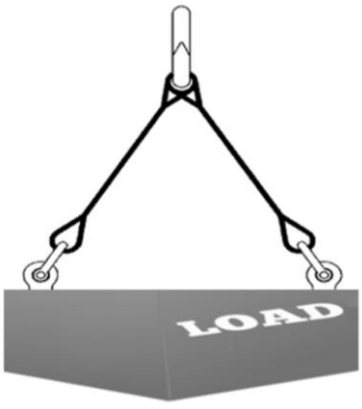
Determine lifting or slinging points

Determine the safe lifting or slinging points

- Check lift plan
- Lifting points marked on or constructed on the load
- Calculation by measuring the distance from the center out to slinging points, ensuring
- weight evenly distributed

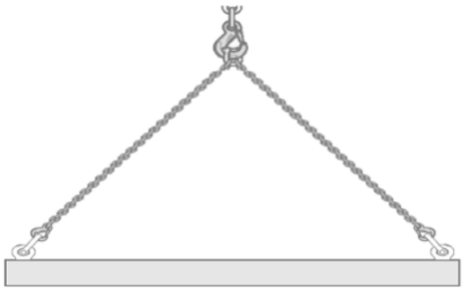
Using eyebolts with a two-legged sling

Correct method of use when using eyebolts with a two-legged sling.



Load factors

1.41 is the load factor for an included sling angle of 90°.



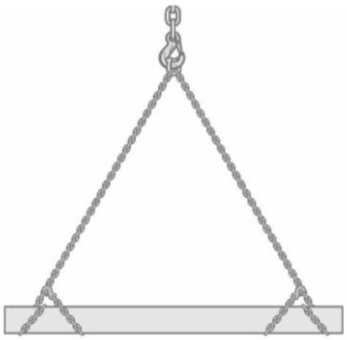
Calculate the load factor

Calculate the load factor for an included sling angle of 60°

Note: remember to account for choke factor.

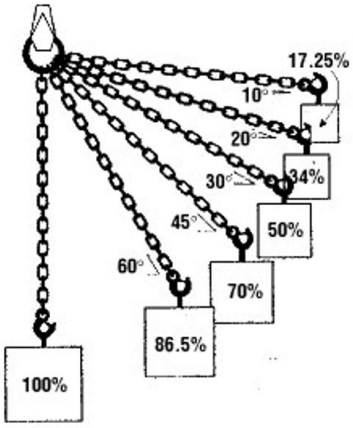
1·73 x 0·75

= 1·29



Sling angle

An increase of sling angle will ***decrease the rated capacity*** of the sling.



Communication methods

Communication methods a dogger / spotter uses to direct the crane operator

- Hand signals
- Whistle, bells or buzzer signals
- Two-way radio

Communication methods cont.

Hand signals when crane operator is in direct view of the dogger

Whistle signal when the load is in sight of the dogger or out of sight of the crane operator

Two-way radio – When the dogger is not always in view of the crane operator.

When whistle signals cannot be heard or confused with other signals (multiple cranes operating).

When more efficient to use.

Emergency procedures

Ensure you understand the emergency procedures for the equipment and site you are operating on

- Attend site induction
- Identify the site emergency procedures and locations of emergency assembly areas
- Identify the site procedure for incident reporting
- Identify emergency shutdown procedures relative to the machine or equipment you are operating

Fall prevention and fall arrest

Types of fall prevention and fall arrest equipment that can be used for work at height

- Static line
- Safety harness
- Safety nets
- Lanyard

Lanyard

A Lanyard must be *as short as possible but long enough to allow you to do the work.*

Check for suitability or defects

Risk controls, fall prevention and fall arrest equipment must be checked for suitability or defect

- Before use
- After use
- According to manufacturer

Personal protective equipment

PPE that could be required for dogging activities

- Safety helmet
- Safety boots
- Safety gloves
- High-visibility clothing
- Safety glasses
- Hearing protection
- Dust / fume mask

High UV exposure

Control the risk associated with high UV exposure

- Wear appropriate clothing for sun protection
- Drink plenty of water
- Take breaks
- Plan to work in lower UV rated times or days if possible

Lifting equipment

- A brick or block cage is used to lift a pallet of bricks
- Plate or lifting clamps are used to lift steel plates
- To lift a gas bottle, use a bottle cage fitted with restraints

Synthetic sling tag information

Types of information displayed on a synthetic sling tag

- Working load limit (WLL)
- Reeve factors
- Angle factors
- Manufacturer
- Conditions of use

Spreader-lifting beam Information

Information must be displayed on a spreader beam

- Tare weight of the beam when greater than 50kg
- Working Load Limit
- Identification of manufacturer
- Serial number

Inspect lifting lugs

Before lifting any loads fitted with lugs

- Visual inspection
- Check Working load Limit is sufficient
- Check engineering certificate

Bow shackle

A ***Bow shackle*** can be used to lift a load using multiple slings.

Chain grades

Meaning of letters stamped on chain slings

- **T =** Grade 80
- **V =** Grade 100

Missing or unreadable sling tag

If the tag on a chain sling is missing or unreadable, ***tag out of service as per safe work procedures.***

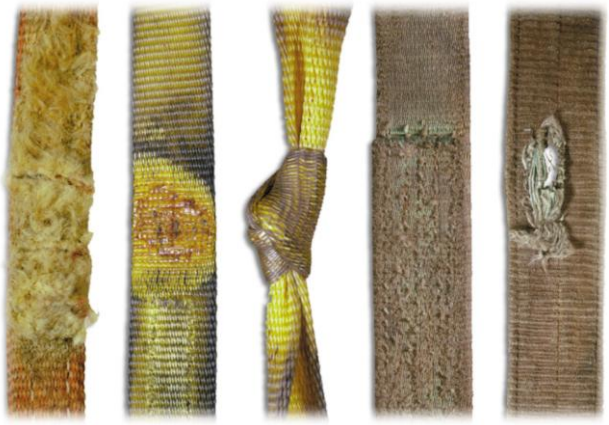
Twisted synthetic sling

A twisted synthetic web sling should not be used to lift loads. A twisted sling will reduce the Working Load Limit (WLL), decrease the rated capacity.

Synthetic slings defects

Inspecting synthetic slings for defects

- Damage to stitching
- Damage to sleeve
- Chemical damage
- Cuts or tears
- No label
- Wear and tear
- Burns



Flexible steel-wire rope defects

- Kinks
- Stretching
- Abrasion
- Crushed
- Knotting
- Corrosion
- Damage to eye

Checking and inspecting equipment

The ***person licenced to perform the dogging work*** is held responsible for inspecting lifting equipment prior to use.

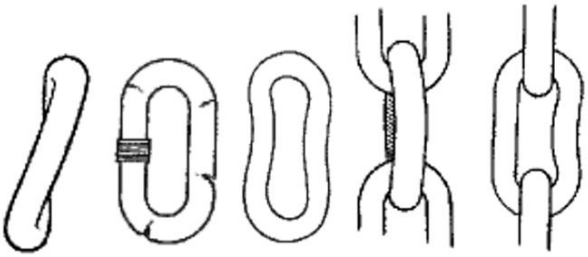
Inspecting lifting equipment prior to commencing tasks will help to ***ensure all equipment is safe to use and suitable for the task.***

Shackle defects

- Cracked
- Stretch
- Bent or distorted
- Wrong pin or damaged pin

Chains unsafe for lifting

- Twisted
- Cracked
- Stretch
- Kinked
- Knotted
- No rated capacity tags
- Gouged or cut more than 10% of original diameter



Chain shortener

WARNING

Shortening clutches MUST be used correctly with the load bearing chain always leading out from the bottom of the clutch.

Communication equipment

Checks should be made on a two-way radio before use

- Visual defects
- Battery charged
- Channel setting
- Volume setting

Communication

Ensure the lift plan, risk controls and impact on other workplace activities are communicated to relevant personnel by

- Involving them in the planning
- Involving them in the risk assessment process
- Establishing and maintain communication throughout the entire lifting operations

Risk controls and safety equipment

Always ensure risk controls, safety equipment and measures have been applied by

- Checking SWMS
- Visually check the operating area

Shackle markings

Information must be clearly and permanently marked on a shackle body

Examples include

- WLL
- Manufacturer's identification
- Quality Grade, as M or 4, or S or 6
- Identification marking to correlate the shackle to the test certificate

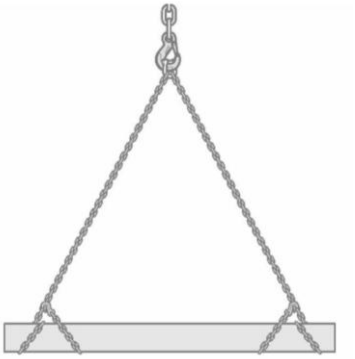
Considerations prior to lifting

Considerations prior to using two slings to lift a load

- Weight of load
- Slinging method
- Reeve factors
- Angle factors
- Size of the load

Ensure the reeves will not slip

Double wrap the reeve or choke to ensure the reeves will not slip, when choking a chain sling around a steel beam at an angle of 60°.



Cantilever crane loading platform

Determine if a cantilever crane loading platform (CCLP) can support the load weight

- Check rated capacity (marked on platform)
- Consult relevant person or authority e.g., engineer or platform manufacturer

Suspended floor

Consult with an engineer before landing a load on a suspended floor ***to ensure the floor will be able to support the load.***

Releasing a round load

Chocks on either side should be placed against concrete pipe at the landing area to prevent it from rolling away.

Check the load landing area

Checks should be made to the load landing area

- Ground suitability to ensure stability
- Safe access for removal of lifting gear
- Exclusion zones for pedestrian and or vehicle

Planning for travelling/mobiling

Planning for travelling/mobiling with a load, consider

- Use of a tag line
- Remain in view of the operator during travel
- Ground conditions
- Clear pathway
- Method of communication with crane driver

Secure lifting equipment

Use a Shackle to the Bull ring to secure FSWR slings to the hook of the crane.

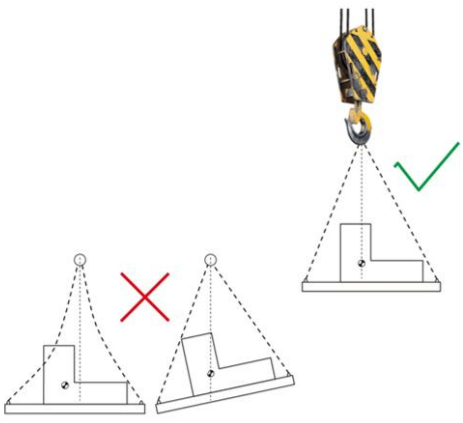
Crane hook

A ***safety latch (catch)*** should be fitted to a crane hook to stop the slings from coming off.

Position the lifting hook

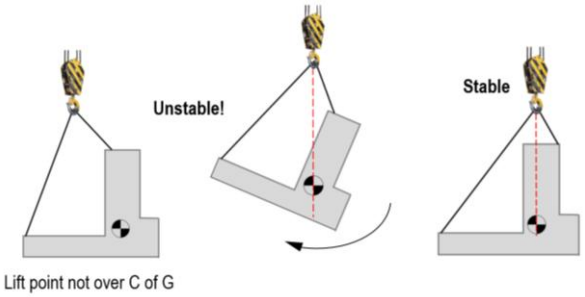
Always position the hook over the load centre of gravity

- To avoid load swing
- To stop the load from being dragged or snigged
- To prevent instability to load and crane



Centre of gravity

Always ensure a load with an irregular centre of gravity has been slung correctly by performing a ***test lift.***



Load or reeve factor – Choke hitch

0.75 is the load or reeve factor used when working with flexible steel-wire rope or chain slings reeved around a round load with a choke hitch.

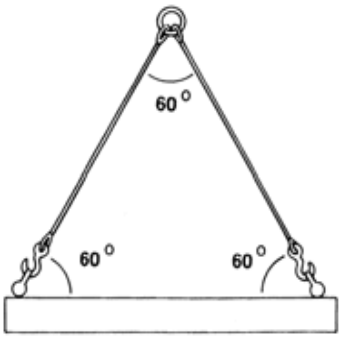
Load or reeve factor - Basket hitch

Use a load or reeve factor of ***two*** when slinging a round load with flexible steel-wire rope and using a basket hitch

Note: the load has a diameter 10 times the diameter of the sling in this case.

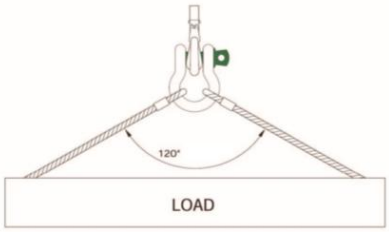
Two leg slings at an angle of 60°

Use an angle factor of ***1.73*** if directly attaching a load using two leg slings at an angle of 60°.



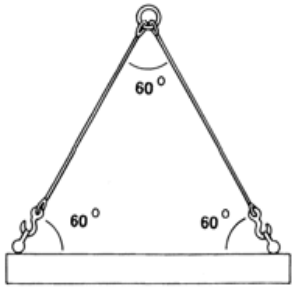
Two leg slings at an angle of 120°

Use an angle factor of ***one*** if directly attaching a load using two leg slings at an angle of 120°.



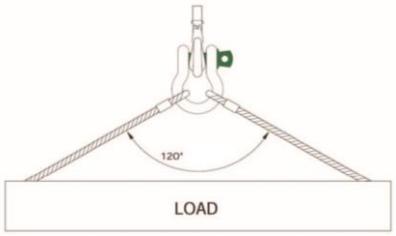
Recommended safe angle

60 degrees is the recommended safe angle between two legs of a sling.



Maximum allowable angle

The maximum allowable angle between two legs of a straight sling lift is ***120 degrees, or according to manufacturer specifications.***

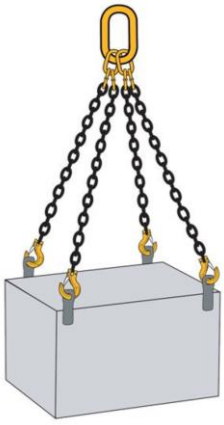


Choked multi-legged chain sling

60 degrees is the maximum allowable angle you can use on a choked multi-legged chain sling

Four-legged sling

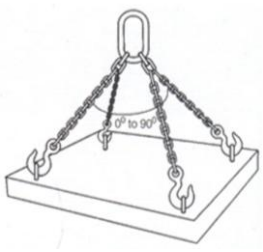
Two legs are calculated to take the weight when a four-legged sling is used to lift a rigid load.



Maximum angle of four-legged sling

Determine the maximum included angle when using a four-legged sling.

The two legs that create the greatest angle, normally the diagonally opposite legs.



Tagline

- A tagline is used to assist in the safe landing and control of a load
- Used when working near overhead powerlines, or at any time where the load may become easier to control during landing

Tagline requirement

A tagline should be made of ***dry non-conductive rope or dry natural rope*** and be a minimum of ***16mm in diameter.***

Temporary rope connections

Temporary rope connections when connecting a tagline to a load.

- Clove hitch
- Rolling hitch
- Single sheet bend
- Bowline

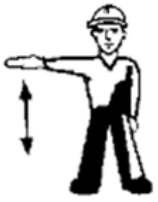
Clove hitch

Rolling hitch

Single sheet bend

Bowline

Hand and whistle signals

	Stop	1 short
	Hoist up	2-short
	Boom up	3-short
	Boom down	4-short
	Hoist down	1 long
	Slew left	1 long 1 short
	Slew right	1 long 2-short
	Telescope out	1 long 3-short
	Telescope in	1 long 4-short

Signals

If you fail to understand a hand or radio signal during a lift

- Stop all crane movements
- Ask for clarification of the last signal

Test lift

Checks should be made during a test lift and prior to moving a load

- Load stability
- Load security
- Crane stability
- Confirm load weight

Crane workbox

A worker can access something by being suspended from a crane at height when using a ***workbox that complies with the Australian standards*** and when no other reasonable way is possible. When using a crane workbox, the person communicating with the crane operator should be ***in the workbox*** at all times.

Lift plan

Directing and moving the load in accordance with lift plan will help to *ensure the crane will not exceed the rated capacity while positioning, moving, or travelling with the load.*

Dunnage

The purpose of placing a load on dunnage or blocks when landing a load

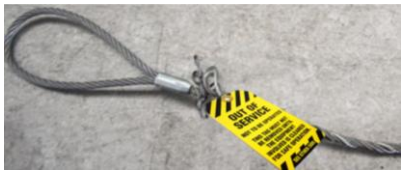
- To assist safe removal of lifting gear
- Prevent damage to lifting gear
- Protect load

Remove excess materials

Additional or unwanted materials should be removed from the work area as soon as possible

- Hazard prevention
- Safety

Lifting gear or equipment defect



Follow procedure where defects are found with lifting gear or equipment

- Isolate defective equipment
- Label defective equipment
- Report defective equipment

Storage lifting equipment

- Away from direct sunlight
- Away from chemicals
- Away from machinery
- Clean
- Dry
- Well ventilated
- According to manufacturer specifications

Hazard control measures

Hazard control measures such as barriers, signs or safety nets should be removed from the work area, inspected for defect, and stored correctly when no longer needed.

THE END.