

Solpod Guide to Cranes

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Solpod Pty Ltd, ABN 47 623 269 947

Introduction

Solpod solar frames (Solpods or pods) are lifted to the roof using a mobile crane. The crane is also used to lift pallets of pods off the delivery truck. This document provides guidance on specifying a crane and the required accessories.



Mobile crane lifting a Solpod to a roof

Safety

Safe Work Australia has published a [guide to mobile cranes](#), pointing out that [every year there are injuries and deaths from work involving cranes](#):

GUIDE TO MOBILE CRANES

i This Guide provides information on mobile cranes and supports the [General guide for cranes](#).

This Guide also forms part of a series of guides and information sheets for cranes that includes information on:

- tower cranes
- inspecting and maintaining cranes
- bridge and gantry cranes
- vehicle loading cranes
- vessel-mounted cranes
- crane-lifted workboxes
- using other powered mobile plant as a crane, and
- quick-hitches for earth moving machinery.

Note: vehicle loading cranes are technically mobile cranes for the purposes of design registration but are not covered in this Guide.

! **What are mobile cranes?**

A mobile crane is a crane capable of travelling over a supporting surface without the need for fixed runways and relying only on gravity for stability.

They include three general types of mobile crane operating in Australia:

- hydraulic boom cranes
- lattice boom cranes including crawler cranes, and
- non-slewing (pick-and-carry) cranes.

A slewing mobile crane is a mobile crane incorporating a boom or jib that can be slewed, but does not include earth moving equipment such as a front-end loader, backhoe, or excavator configured for crane operation.

A non-slewing mobile crane - also known as a pick up and carry crane - is a mobile crane incorporating a boom or jib that cannot be slewed and includes:

- an articulated mobile crane, or
- a locomotive crane.

A vehicle tow truck is not considered to be a non-slewing mobile crane.

A mobile crane can be set up in a range of locations and environmental conditions. Some mobile cranes, for example a non-slewing mobile crane can also carry a load while moving (known as mobiling).

! **High risk work licensing**

A person who operates a mobile crane (other than non-slewing mobile cranes with a capacity of less than 3 tonnes) must hold the relevant high risk work licence to operate the crane. More information on high risk work licensing requirements is in the [General guide for cranes](#).

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 **safe work australia**
Safe Work Australia Contact Information
Phone 1300 551 832 | Email info@swa.gov.au | Web www.swa.gov.au

 978-1-76028-492-3 [Multi-Vol. Set]
978-1-76028-470-1 [PDF]
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Guide to mobile cranes, from Safe Work Australia

The applicable Australian Standard is AS 1418.5.

Setup area

Cranes require a flat open area from which to operate, e.g. 12 x 8 metres.



Crane being set up on site, at a supermarket

Wind

When lifting Solpods, which have a large area and a light weight, the wind speed should be less than 25 km/h. Cranes will have a wind speed sensor located at the top of the boom, and wind forecasts can be checked in advance: <https://wind.willyweather.com.au>.



Example wind speed forecast from Willy Weather

Equipment required

The crane is used to:

- Lift the pallet of Solpods from the truck to the ground
- Lift individual Solpods from the ground to the roof

The following equipment is recommended to be hired with the crane:

- 3 metre long spreader bar, rated to 10 tonne
- Three chain sets
 - One used from the crane hook to the spreader
 - Two used from the spreader to the pallet
- Set of lifting lugs to suit container corner castings



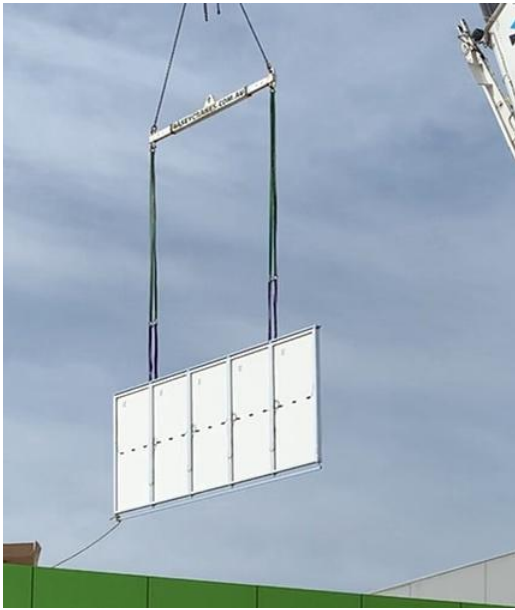
Pallet of Solpods being lifted off truck using a crane, spreader bar, chains, and lugs that connect to the corner castings of the container base.



Lifting lugs to suit corner castings of container base.



If lifting lugs aren't available, chains can be fed through the tyne pocks.



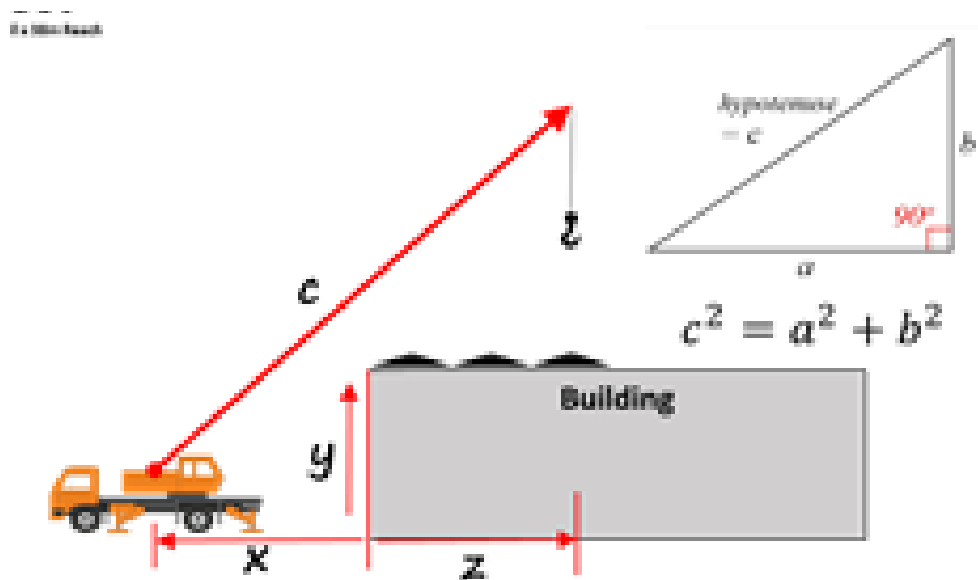
Solpod being lifted to the roof and unfolded using a 3 metre spreader bar and 3 metre chains (or slings) with hooks at the end, to connect to the 1 metre slings that are fixed to the Solpod.



Solpod being lifted and unfolded without a spreader bar. Ideally, use longer chains e.g. 5 metres.

Crane size

Cranes are rated by weight, e.g. 80 tonne, but for Solpod the important value is lifting distance. Larger cranes can lift the relatively lightweight (310 kg) Solpod a greater distance. If cranes are located closer to a building, then a longer boom is required, to reach to the far side of the roof.



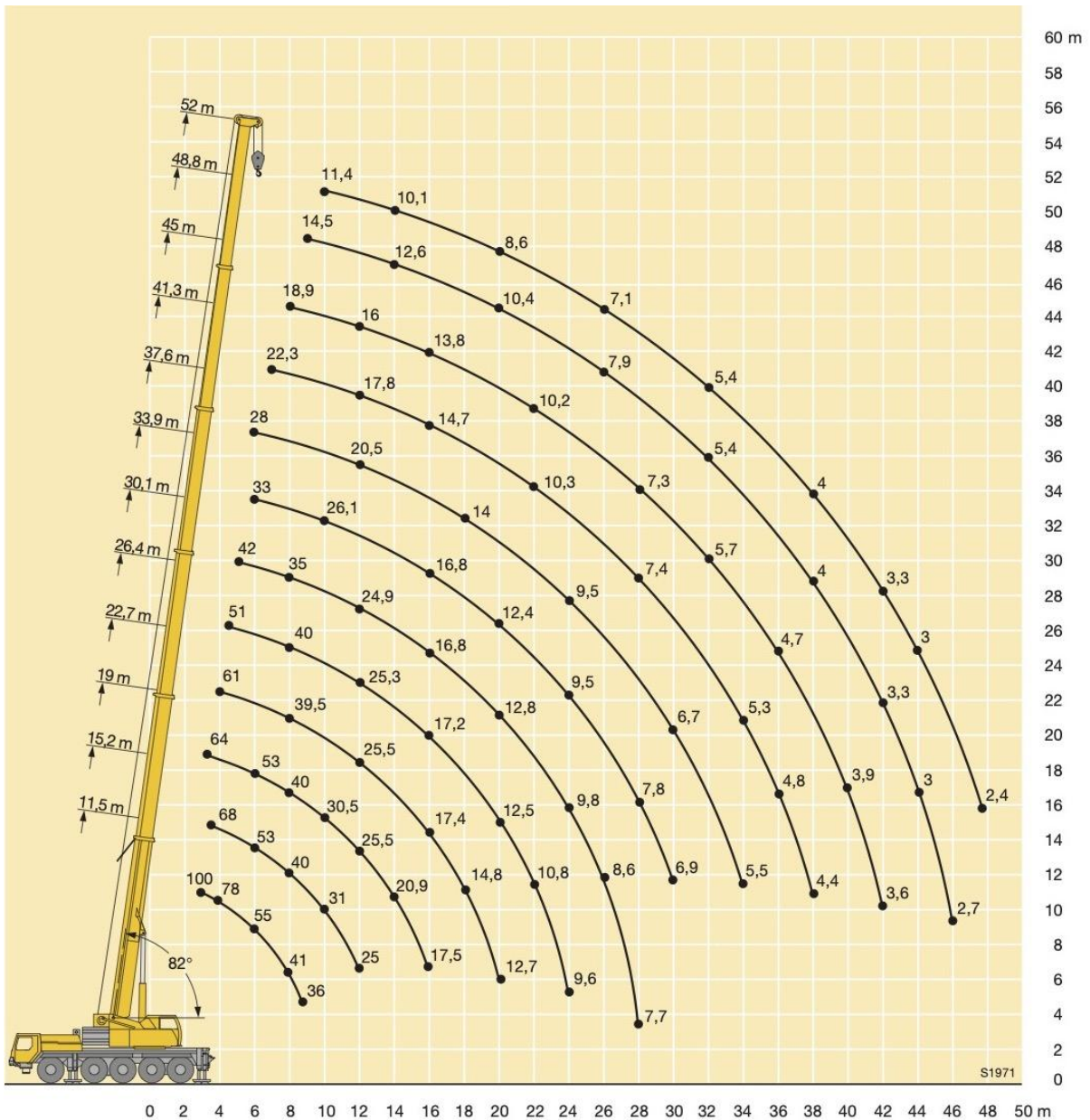
Crane boom length (c) requirements as a function of crane location and building dimensions.

On small sites, e.g. lifting four Solpods onto a single-storey roof, it is possible to use a crane truck instead of a mobile crane.



Crane truck lifting Solpods onto a roof.

On large sites a large 100 tonne crane may be required, with a boom length of 50 metres.



Example chart of lifting heights and distances for a 100 tonne crane. Results can be affected by outrigger placement, counterweights and site wind speed. This crane can support a 310 kg Solpod at any position.

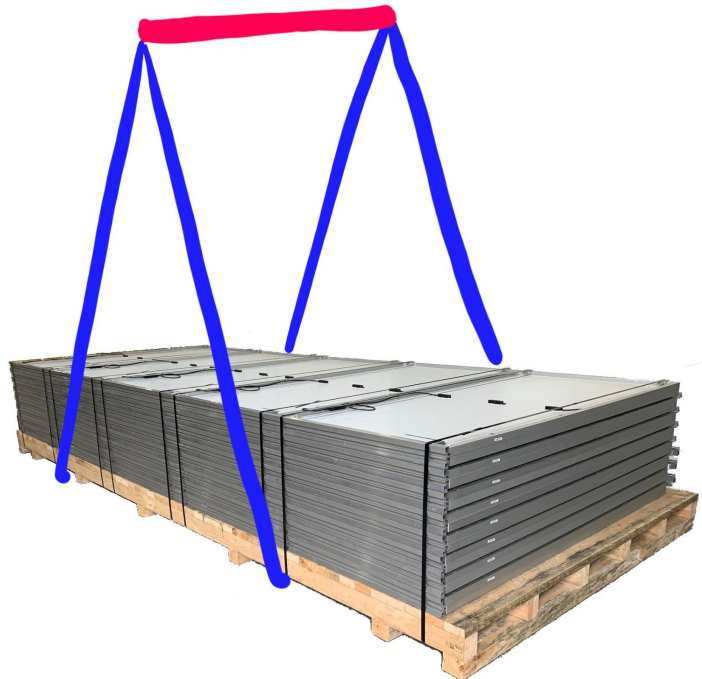
Lifting a timber pallet

For small jobs, Solpods can be delivered on a timber pallet.



Eight Solpods on a timber pallet

The timber pallet can be lifted down from the truck using a 3 metre spreader and slings that loop underneath the pallet.



Lifting a timber pallet using slings looped underneath

Selection

The table below provides guidance on crane sizes and costs.

Crane	Lifting distance (metres)	Hourly cost (1x operator, 2x riggers) (typically four hour minimum)
Crane truck	10	\$135 (only requires 1x operator)
50 tonne	30	\$500
80 tonne	45	\$800
100 tonne	50 (with jib)	\$1,000
200 tonne	80 (with jib)	\$2,000

Cycle time

Cycle time is the time required to lift a pod to the roof and then return to pick up the next. Cycle time is affected by:

- Time required to attach a pod to the spreader bar
- Time require to slew, or travel, from the pallet to the roof
- Time to position and unfold the pod
- Time to disconnect the sling brackets and place them in a bag on one hook
- Time to slew back to the pallet

Thus, the slewing speed of the crane (and the skill of the operator) is an important criteria. Solpod's experience is that a cycle time of less than 10 minutes can be achieved.

When obtaining quotes, consider for the slew speed of the crane.

Considerations

Cranes need time to set up at the start of the day, and to pack up at the end of the day.

Cranes require a firm surface, e.g. a ground level asphalt car park.

Cranes are heavy and can't drive onto a suspended concrete floor (e.g. where a car is OK).

Crew requirements

Each crane will require a crew of three:

- Crane operator
- Rigger on the ground, to connect pods
- Rigger (or dogman) on the roof to guide the crane operator

The solar installation team will require a crew of three or four:

- One on the ground to assist the rigger to connect the pods
- Two or three on the roof to position, unfold and then fix the pod

Cancellations

Consider cancelling the crane (or changing the install date) if the wind forecast is above 25 km/h.

Conclusion

For further information please refer to the Solpod Installation Manual, or contact Solpod directly at info@solpod.com.au.