

Props

DESCRIPTION

Reid™ props are lightweight high capacity braces for hire, suitable for positioning and stabilizing precast elements, retaining walls, tilt-up panels block walls and formwork. The braces conform to NZS3404:1997 design standards and are able to meet the requirements of the approved code of practice for “The Safe Handling and Erection of pre-cast Concrete”

FEATURES

- Easy to install
- Robust
- Screw adjustable up to 500mm
- Slotted holes to accommodate bolts with safety stop for erection
- Props come in a range of sizes, from 1.8 to 10 metres

Reid™ Swiftlift Props are high capacity steel props suitable for the positioning and temporarily stabilizing of:

- Precast elements
- Retaining walls
- Tiltup panels
- Block walls
- Formwork

The props conform to NZS3404: 1997 design standard and meet the requirements of the “Approved Code of Practice for The Safe Handling and Erection of pre-cast Concrete.”

Nominal prop sizes:

Fixed Length: 3.5m, 5m, 6.5m, 8m and 10m

Telescopic: 5m to 8m with 500mm adjustment stops.

All props have a screw thread fine adjustment length of approximately 500mm.



Props attached prior to lift

PROP WORKING LOAD LIMITS

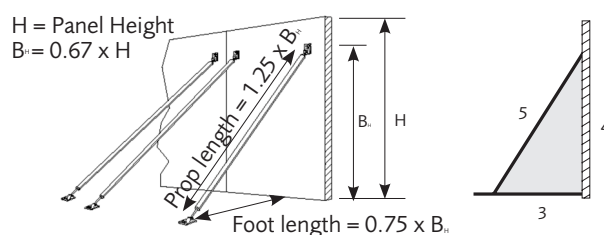
The following tables are used as a quick guide to help select props for most common tiltup and precast applications.

Working Load Limits ⁽¹⁾			
Nom Prop Length (m)	Max Size (m)	W.L.L (Tonnes)	Type
3.5	3.7	1.6	Light Duty
3.5	3.9	5.0	Heavy Duty
5.0	5.5	2.7	
6.5	6.9	1.7	
8.0	8.5	1.2	
10.0	10.5	1.8	
5.0 – 8.0	8.0	0.7 @ 8.0m 3.1 @ 5.0m	Telescopic Prop

(1). Based on 50% of the characteristic capacity of the steel section used to manufacture the prop.

RECOMMENDED PROP CONFIGURATION

The selection of prop length is made taking into account the panel height, the load the prop must carry, and the position of the anchoring point on the ground. Ideally the arrangement should be as shown in Diagram below.



Recommended Prop Configuration

Example: If the panel is 7m high.

$H = 7$ $B_s = 0.67 \times 7 = 4.7\text{m}$

Foot Length = $0.75 \times 4.7 = 3.5\text{m}$

Prop Length = $1.25 \times 4.7 = 5.9\text{m}$

Therefore a 6m prop is the ideal length however longer or shorter props may be used providing a safe configuration is achieved. Pay attention to attaching the prop high enough up the panel while keeping the prop angle at a maximum of 60°.

As a rule of thumb a 3/4/5 triangle shown in Diagram above is a good installation configuration guide.

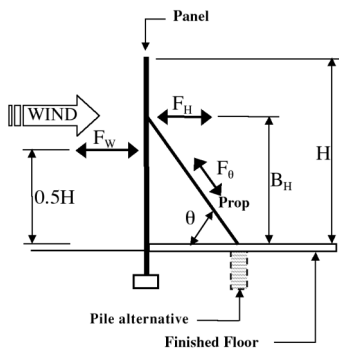
NB: Every panel must have at least two support props.

Maximum Panel Width Supported by 2 Props ⁽¹⁾ (No knee bracing)							
Panel Height	Nominal prop length (m)						
	3.5*	3.5**	5	6.5	8	10	Telescopic
3	12.0	12.0					
4	12.0	12.0	12.0				12.0
5	8.6	12.0	12.0	12.0			12.0
6	6.0	12.0	12.0	11.8			12.0
7			10.6	8.7	7.5		12.0
8			8.1	6.6	5.8	10.8	8.3
9				5.2	4.6	8.5	6.5
10				4.2	3.7	6.9	4.0
11				3.3	3.0	5.7	1.8
12					2.5	4.8	
13						4.1	

* Light Duty ** Heavy Duty

(1). Additional panel width can be achieved by using 3 or more props per panel.

WIND FORCE CALCULATION FOR PROP DESIGN



- F_w = Wind load on panel from NZS 4203.
- F_ϕ = Actual load in Prop.
- F_{ϕ} = Horizontal component of total load in Prop (F_ϕ) actually resisting wind F_w .
- n = Number of props per panel.
- H = Panel height.
- B_{ϕ} = Bracing height. (0.67 x H ideally)
- ϕ = Brace angle (45° to 60°)

$$F_\phi = \frac{F_{\phi}}{\cos \phi} \quad F_{\phi} = \frac{F_w}{n} \times \frac{0.5}{B_{\phi}}$$

F_ϕ must be less than the W.L.L. of the Prop

Wind force Calculation for Prop Design

To calculate the prop strength required you will need a copy of NZS4203 and follow the following steps.

- 1: Calculate the Wind Force (F_w) on the panel using NZS4203.
- 2: Use the equations shown in Diagram 5.2.1 to calculate the resulting horizontal force (F_{ϕ}) on the prop at the height at which it is fixed to the panel (B_{ϕ}), and the actual force (F_{ϕ}) in the prop.

The strength of the prop (refer to Table 5.4.1) must be greater than the load force (F_{ϕ}).

CONCRETE STRENGTH AND EDGE DISTANCES

Any concrete to which the props are fixed must have a minimum of 15MPa compressive strength at time of fixing.

Free edges must be treated with care to avoid edge break and loss of support. It is recommended that the distance to any free edge be at least 3 times the bolting depth.

FURTHER INFORMATION REGARDING PROPS AND PROP DESIGN

For further information on props including common modes of failure, installation process, retaining walls and specific design information please refer to the Reid Construction Systems Guide to Safe Lifting and Propping of Precast/ Tilt-up Panels and Pipes. **Free engineered prop designs are available for customers using Reids props.**

BOLTING REQUIREMENTS

Table 5.5.1 gives the minimum required bolt sizes for panel heights, for safe connection of the prop plates to the panel and support.

Prop Bolting ⁽¹⁾							
Panel Height (m)	Panel Width (m)						
	2	4	6	8	10	12	14
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							

1. Based on NZS4203 for temporary structures.

Key

- Liebig Safety Bolts AS15/15 or B15/45/105
- Liebig Safety Bolts AS20/15 or B20/50
- Specific Design

Example:

A 5m high panel 10m wide requires Liebig AS20/15 or B20/50 Safety Bolts.

(For further information see clause 2.3.4 of the "Approved code of Practice for Handling Transportation and Erection of Precast Concrete".)

It is very important that bolts be tightened to correct torque levels to ensure the bolt is correctly set. Recheck bolts after strong winds.