

# PRE-CAST ELEMENTS, CONCRETE POURS AND TEMPORARY WORKS

## SAFELY CONTROLLING WORK CRITICAL RISK CONTROL DOCUMENT



We are always licenced and competent when operating plant



We come to work free from impairment, alcohol and drugs



We ensure plant and equipment is safe to use



We work safely at height



We always observe walkways, safe zones and exclusion zones















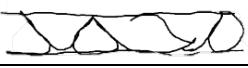

We always make sure loads are secure and within safe working load limits before moving them



We always follow the Permit process when a Permit is required



Our temporary works are appropriately designed, engineered and installed

DOCUMENT CONTROL			
Document Name	Precast Elements, Concrete Pours and Temporary Works		
Issue Date	01-June-2022		
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## Pre-cast elements, concrete pours and temporary works

Pre-cast elements include pre-cast concrete and its components such as pre-cast concrete panels, ribs, beams, slabs and double tees/T slab. Pre-cast concrete consists of concrete that is prepared and cured offsite or in-situ and then transported to the construction site.

Concrete pour is the process of Cast-in concrete on site via a fixed or mobile pump and pipelines. The liquid concrete is transported by a concrete truck.

Temporary works are structures that provides temporary support for different construction elements to maintain structural integrity until construction is completed. Temporary works include shore loading, propping, temporary retaining walls, formwork and falsework which will either be removed or integrated into the final structure after completing construction work.

Some activities on our construction sites that involve pre-cast elements, concrete pours and temporary works include:

- Lifting and installing pre-cast elements e.g. rib, infill, concrete panels, double tees, beams or slabs
- Transportation and unloading of pre-cast elements
- Temporary support for concrete elements e.g. propping, falsework, formwork and shore loading
- Installing reo fixing
- Post tensioned/prestressing slabs
- Storing, stacking and securing
- Concrete pouring using mobile pumps (e.g. pouring slab, column, stiches etc..)
- Removing temporary works structure

Related safely controlling work documents:

- [Work at height, dropped objects and temporary work platform](#)
- [Cranes, hoists and other lifting activities](#)
- [Mobile plant](#)
- [Scaffold and mobile scaffold](#)
- [Underground and overhead services](#)

### Risks - What could go wrong?

- Lifting Failure by crane or other lifting device due to structural failure (e.g. lifting eye failure), incorrect erection, incorrect rigging, untrained operator, miscommunication causing fatality or major injury such as dislocation, crushing, strains/sprains, bruising/lacerations, fractures or serious head injuries (See 'Cranes, Hoists and Other Lifting Activities if you work poses a risk of lifting failure)
- Structure collapse (e.g. inadequate shore loading, incorrect propping height, inadequate propping, toaster rack failure, temporary support failure, temporary support modification, temporary support removal, overloading, unauthorized modifications) causing fatality/s or a potentially major injury such as dislocation, crushing, strains/sprains, bruising/lacerations, fractures or serious head injuries
- Crushing between precast and/or components (e.g. between pre-cast and toaster racks due to incorrect placing/lifting error etc..) causing fatality/s or a potentially major injury such as dislocation, crushing, strains/sprains, bruising/lacerations, fractures or serious head injuries

- Propping failure due to incorrect design or incorrect installation causing structure collapse resulting in fatality or major injury such as dislocation, crushing, strains/sprains, bruising/lacerations, fractures or serious head injuries
- Striking people/mobile plant overturn during concrete pour using mobile pump/cement mixer causing a fatality or a major injury such as crushing, dislocation, fractures or serious injuries (see 'Mobile Plant' if your work poses a risk of work around mobile plant)
- Concrete burns or other hazardous substances risks resulting in fatality or major injury from damaged nerve endings, skin irritation, burns or eye injuries
- Operator fatigue/stress, illness, impairment or complacency causing, operator error or medical event
- Pre-cast panel or components/infills/ribs/tools/materials/other objects falling onto one or more workers causing serious injury such as fractures, head injury, crushing or bruising/lacerations (see 'Working at height, dropped objects and temporary work platforms' if your work poses a risk of dropped objects)
- Crushing due to incorrect placing, lifting error, wind, or release of stored energy (e.g. release of energy from coiled strands in PT slab) causing serious injury such as fractures, head injury, crushing or bruising/lacerations
- Fall from height (e.g. plant cab, truck bed, through infill, rigging/derigging panel, rigging/derigging double tees) causing injury (see 'Work at Height' if your work poses a risk of falling from height)
- Contact with underground/overhead services during concrete pours, precast erection causing a fatality or a major injury (see 'Underground and Overhead Services' if your work poses a risk of contact)
- Manual Handling causing musculoskeletal health conditions (Manual Handling Sheet/Guideline will be available in the 3<sup>rd</sup> quarter of 2022)
- Adverse weather conditions causing structure movement (e.g. block wall movement) or damage to structural integrity resulting in fatality or major injuries

### Controls – How do I keep safe?


The identification of risks associated with Pre-cast elements, concrete pours and temporary works and appropriate control measures are to be fully detailed in a Safe Work Method Statement (SWMS) or similar risk-assessment document prior to commencing any work involving pre-cast elements, concrete pours and temporary works. The SWMS will be reviewed by the Work Manager (e.g. Foreman or Site Manager) with support for the Health and Safety team member.

#### Can I eliminate the risk?

Wherever work can be completed without the need to install pre-cast elements, cast-in concrete pours or temporary works, this should be the first consideration in eliminating risk.

The SWMS must be reviewed by an appropriate Ryman representative prior to any work commencing and following any changes to the task or environment

**Pre-cast elements and temporary works controls include but are not limited to: (the controls below are recommendations and not mandatory)**

Control Type	Control Measure	Control Level
<b>Elimination</b>	Remove risk by not requiring to erect pre-cast elements or temporary work structures (e.g. consider safety in design for designing building without pre-cast elements or temporary works)	Most Effective Control    Least Effective Control
<b>Substitution</b>	Substitute pre-cast elements for other form of pre-cast elements that present less risk (where applicable) – e.g. design build with Double Tees instead of ribs and infills	
<b>Isolation</b>	Isolate the working area when installing pre-cast elements or installing temporary structures. Isolate with hard barriers where practicable, or cones, barriers, tapes, bunting etc..	
↑ <b>WORK ABOVE THE LINE WHERE POSSIBLE TO CONTROL RISK</b> ↑		
<b>Engineering</b>	Use of outriggers/stabilizers with pads (e.g. when using a mobile crane) An emergency-stop control to stop all movement or the engine when pressed	
<b>Administrative</b>	Communication and planning such as pre-start meetings and delivery schedules Schedule work to limit workers in the work area during pre-cast panel installation and temporary structure installation Tagline and radio used by Dogmen to steady pre-cast element loads and communicate load movements. Spotters/Dogmen which may include spotting, ground operation of controls	
<b>PPE</b>	This includes the use of PPE, task specific gloves, full body harnesses complying with AS/NZS 1891.1:2007, lanyards with integral shock absorbers complying with AS/NZS 1891.4:2009 and anchor point	

Minimization

**NOTE:** Where the risk cannot be eliminated, a combination of control measures may be appropriate.

## Pre-cast Elements Operation

### Planning and transportation

- Documentation available on site (e.g. lift plans, propping/bracing design, pre-cast panel drawings, concrete panel statement of compliance (Template Example – Page 138 in [Safe Work with Pre-cast Concrete Good Practice Guidelines](#))
- A qualified/competent transportation company and Pre-cast erection/Structural company with competent crane operator and dogman (See 'Cranes, Hoists and Other Lifting Activities for training and competency requirements)
- Prior to use on any mobile plant operations with outriggers, the operations shall be subject to geotechnical assessment and approval before commencing work. Detailed information can be found in the Mobile Plant SCW document
- Ensure no work is carried out in adverse weather conditions (e.g. storm or high winds)
- Certified and undamaged toaster racks are available for storing concrete pre-cast panels. It is the preferred option not to store pre-cast panels on site but should the site require it, then certified toaster racks are to be used
- Ensure adequate site access, space and cranes are available for site offloading and erection

### Site Offloading and Erection

- Ensure an adequate unloading sequence to avoid causing instability
- Traffic Management Plan (TMP) in place with spotters if required, driver to remain in vehicle or ensure all traffic movement are aware of work plan
- Isolated unloading zone that is isolated from other work areas (e.g. barriers, coned off)
- Ensure safe access/egress and adequate controls are available for the dogman who is rigging the pre-cast elements to minimize working at height risks. Ensure risk assessment in place prior to rigging operations. Recommend the use of hook/panel ladders and inertia reels onto the crane hook to minimize falling from height risk
- Ensure adequate controls in place if the pre-cast elements are stacked too high on the transportation vehicle
- All lifting eyes are adequately sized and rated and as per design
- Dogman to use the correct hitch (rig and lift as per lifting design), tagline and lifting techniques prior to lifting the load
- Pre-cast elements to be restrained until the crane can safely take the weight
- Ensure safe access/egress and adequate controls are available for the dogman who is de-rigging the precast elements to minimize working at height risks. Consider using hook/panel ladders with fall restraint when derigging pre-cast panels
- Ensure adequate temporary supports as per design (e.g. shore loading, propping/bracing) to ensure pre-cast element stability

## Temporary Works

### Planning

- All structural support systems (including formwork, falsework, shoring, panel propping/bracing, and other temporary structural support system) must be designed by a qualified designer/engineer and placed in detailed drawings/plans. The temporary works structure must support the load (taking into account the wind and seismic design loads). Any changes to the plan must be signed off by the qualified designer/engineer

- Ensure safe access (See ‘Scaffold and Mobile Scaffold’ and ‘Working at Height, Dropped Objects and Temporary Work Platforms’ SCW documents)
- Ensure no work is carried out in adverse weather conditions (e.g. storm or high winds). All temporary works must be checked after adverse weather conditions for structural integrity
- Ensure that ground conditions, structures and materials have been assessed prior to commencing the construction of temporary works

**Temporary Works Construction**


- All temporary works to be placed by a competent person (as deemed by Contractor company) as per the designs (e.g. have suitable number of ties, clamps, pins etc..)
- Safe and secure access provided into all lift shafts. Fall protection (e.g. edge protection) to be installed to prevent falls into lift shaft pits. Lift shaft are to be locked and keys controlled by the Lift Supervisor/Technician
- Protective caps to be placed on to all protruding bars
- Traffic Management Plan (TMP) in place with spotters if required
- Use PPE (e.g. hearing protection and eye protection) when operating power tools such as skill saws, nail guns, circular saw, angle grinder or drop saw). No 9 inch grinder accepted in Ryman sites. Power tools to have adequate certification and used by trained operators
- Place plant and materials on temporary works structures that are designed to carry the load


**Stripping temporary works**

- Ensure written confirmation in place by Engineer (Project or temp works Eng) if deviating from structural documents prior to commencement of stripping operations
- Planning to have systematic sequence of stripping activities, partial stripping and checks for special requirements involved in the building/stripping process. Adequate controls are required to ensure stripping operations are safe and don’t cause structure collapse
- Isolate stripping operations areas with cones, barriers, tapes or bunting and signage

**Concrete Pour**

**Concrete pour controls include but are not limited to: (the controls below are recommendations and not mandatory)**

	Control Type	Control Measure	Control Level
Minimization	<b>Elimination</b>	Remove risk by not requiring to pour concrete (e.g. pre-cast concrete)	Most Effective Control 
	<b>Substitution</b>	Substitute concrete pours for other form of pre-cast elements that present less risk (where applicable)	
	<b>Isolation</b>	Isolate the working area when during concrete pour operations. Isolate with hard barriers where practicable, or cones, barriers, tapes, bunting etc..	

Control Type	Control Measure	Control Level
<b>↑ WORK ABOVE THE LINE WHERE POSSIBLE TO CONTROL RISK ↑</b>		 Least Effective Control
<b>Engineering</b>	Use of outriggers/stabilizers with pads (e.g. concrete pouring with mobile pump) An emergency-stop control to stop all movement or the engine when pressed	
<b>Administrative</b>	Communication and planning such as pre-start meetings and delivery schedules Schedule work to limit workers in the work area during concrete pours Spotters/Dogmen use (e.g. include spotting underneath concrete pours to ensure no unauthorized access)	
<b>PPE</b>	This includes the use of PPE, task specific gloves, goggles, and long pants/sleeves	
<b>NOTE:</b> Where the risk cannot be eliminated, a combination of control measures may be appropriate.		

**Planning**

- **No KCP pumps** are permitted on Ryman sites due to previously identified health and safety concerns
- Documentation available on site (e.g. mobile pump documentation such as concrete pour checklist, minimum wall thickness checklist, manuals, concrete specification checklist/QA)

**PT Slabs**

No Post tension will be carried out until sufficient concrete strength gain as per specification. A stop sleeve is placed over the strand tail to secure and provide permanent mechanical anchorage of the strand once tensioning has taken place. To apply the tension to the strand a hydraulic jack is clamped on the cable. Pressure is then applied to the jack which in turn applies a tension to the strand. Grout is then pumped into the sleeves to protect the strands.

**Pre-cast elements, concrete pours and temporary works**

**Minimum control requirements** (as per and in addition to [Safe Work with Pre-cast Concrete Good Practice Guidelines](#) and [Health and Safety During Concrete Pumping](#)):

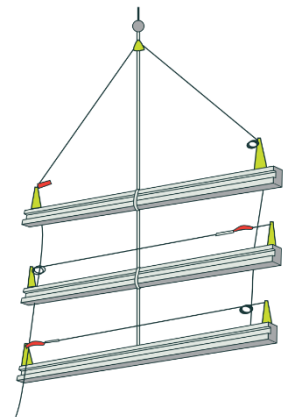
**Pre-cast elements recommendation**

- Existing services should be identified prior to commencing mobile plant lifting operations on site (see Underground and Overhead Safely Controlling Work Document for all the information)



**Pre-cast elements minimum control requirements**

- Prior to any lifting using plant with outriggers (e.g. mobile cranes, truck-mounted cranes and concrete pumps), the operations shall be subject to geotechnical assessment and approval before commencing work (see Mobile Plant Safely Controlling Work Document for all the information)
- Maintain a minimum approach distance (MAD) from any powerlines and/or transmission lines (see Underground and Overhead Safely Controlling Work Document for all the information)
- Laydown area/s for trucks delivering panels that is segregated from other works
- Ensure no kids/pets are present in the trucks delivering pre-cast elements to site
- Sequence of panel/precast elements installation to be determined prior to deliveries
- Emergency Rescue Plan in place for structural collapse and safe egress from working area (e.g. due to panel collapse)
- Concrete panel Statement of compliance provided by the precast concrete manufacturer
- Any panel or components to be inspected for damage prior to lifting from delivery truck.
- Risk assessment in place when lifting multiple objects (Christmas tree lifting). Example including Christmas tree lifting ribs (image on right). Lifting multiple objects reduce the number of loads slewed over the work site. The risk assessment must ensure that:
  - The loads/objects lifted are uniform
  - The combined load does not exceed the crane capacity
  - Each load/object is rigged independently of the others
  - Each load/object is spaced 0.5m from the other load/object
  - The load/object must be landed in a sequence such that the load/object on the top are not suspended above the workers placing the bottom load/objects
- Certified and undamaged toaster racks
- Installation of precast panel and elements must be verified by a competent person (from Contractor company) to ensure compliance with design documents
- Check grout sleeve (e.g. Drossbach) is in the right position as per the plans and align with starters on positioning. Ensure they are not blocked from concrete or other materials.
- If lifting eye is absent, sign off is required by an Engineer if required to use a lifting plate that is not pre-determined as per design

**Panels casted on-site minimum control requirements**

- Complete visual inspection. Check for damage, cracks or defects
- Measure panel to ensure correct dimensions
- Confirm lifting anchors are correctly placed and installed as per manufacturers instruction
- Ensure appropriate concrete strength is achieved before demoulding
- Ensure all moulding components are removed during demoulding

**Propping/bracing minimum control requirements**

- Follow the propping design for the number of props and loads per panel. The prop design to include bracing and propping details available for each precast concrete element including type, angle, configuration and size of bracing and propping

- Brace should have a safety factor of a minimum of 2.5 against connection failure as per prop design
- Bracing is to be threaded, drilled in, or cast into the concrete panel at approximately two thirds the height of the panel as per prop design
- Load capacity (e.g. sticker/label/plate) marked on each prop
- Bracing/propping pins locked and secured (including adjustable/extension propping/bracing)
- Bracing and its components inspected by competent person regularly and after significant events (e.g. storm, extreme wind or earthquake)
- Propping/bracing have torque requirements verified immediately after install and after significant event (e.g. earthquake, high winds, storm etc..)
- Propping/bracing/shore loading/temp structures to have engineering approval/sign-off prior to removal if deviating from concrete curing timeframes
- Floor and panel fixing detailed in propping design and fixings to be clear of dirt

#### **Concrete pour operations minimum control requirements**

- Concrete pours using mobile concrete pumps must comply with the minimum control requirements specified in the Mobile Plant SCW document
- Prior to any lifting using plant with outriggers (e.g. mobile cranes, truck-mounted cranes and concrete pumps), the operations shall be subject to geotechnical assessment and approval before commencing work
- Consider work carried out in adverse weather conditions (e.g. high winds) and ensure controls are in place to minimize the risk
- Traffic Management Plan (TMP) in place with spotters if required
- Structure integrity checks as part of the QA prior to commencing concrete pours (e.g. check shore loading, props, temporary structures)
- Isolate areas underneath a concrete pour with cones, barriers, tapes or bunting. Use spotter to watch pour from underneath in a safe area
- Use of additional PPE (recommend long pants/sleeve and glasses/goggles)

#### **PT Slabs minimum control requirements**

- Notify the Ryman Site Management Team about stressing operations. Segregate work activities and ensure isolation/exclusion zone when strand is being driven. Keep area isolated for 30mins after stressing/pressure
- Complete pre-use check for jack, hydraulic pump, hoses and fittings
- Trained workers must be used for all PT preparations and operations
- Use calibrated gauges for the prestressing jack that has a calibration certificate provided by the stressing Contractor
- Place a steel plate/stressing barrier/timber barrier 500mm from the panel during stressing operations
- Place steel tubes/ducts so strands are restricted from uncontrolled release
- Push the strand from building exterior to interior if possible. The strand must comply with the design
- Ensure adequate communication in place for the person pushing the strand and the person at the dead end. Maintain visual contact with operator

- When connecting the pushing tubes, ensure all connections are correctly installed and camlock arms are secured with tie wire/duct tape. When pushing the strand, ensure the area surrounding the coil is taped off or the dispenser is covered to minimize the risk of the coil tangling
- Keep fingers and hands away if there is a jam between the jack and other objects
- Follow the angle grinder guideline document when needing to cut strand

#### **General work activities minimum control requirements**

- Crane lift require lift plans to ensure a lift is not outside the normal operating conditions of the lifting appliance to be used. In addition, controls (e.g. spotter, barriers, exclusion zone) is required for workers working around precast panels. Detailed information can be found in the Cranes, Hoists and Other Lifting Activities SCW document
- Ensure clear escape/egress path for dogman/workers
- Rib and infill constructed with the preferred methodology as per the [Rib and Infill Construction Preferred Methodology For Tender Risk Assessment](#)

#### **Considerations**

- Consider scaffold edge protection (steel/scaffold) instead of timber/other alternatives. Where it is not practical to use scaffold edge protection (e.g. due to floor/ground that cannot be bolted into), the edge protection must be engineered as suitable to protect from falls and installed 1.0m or more from the edge if possible

#### **Training and Competency**

All operatives in pre-cast elements, concrete pours and temporary works shall be trained and competent to the requirements set out by Approved Codes of Practice, best practice guidelines issued by WorkSafe NZ and any additional requirements specified by Ryman Healthcare.

Copies of training records (e.g. Contractor training matrix) from the must be held on site for all operatives in pre-cast elements, concrete pours and temporary works. Contractors must supply a current competency matrix or training register and update where changes are made to personnel and their records. Contractors must comply with applicable training and competency requirements in related safely controlling work documents (mobile plant, work at height, scaffold and cranes, hoists and other lifting activities).

#### **Supervision**

A trainee, even where all equipment subcategory requirements have been met, would continue under supervision until attainment of competence.

Persons training, or supervising inexperienced workers, must be competent and be deemed able to train and supervise others by their company.

When assessing the level of supervision required by a trainee, the supervisor or trainer must assess several factors, including but not limited to;

- The worker's experience and competency
- The nature of the work
- The nature of the risks associated with the work including the worksite

- The control measures in place while the worker being supervised is carrying out the work

Inexperienced workers require 'close supervision', this means there must be direct and constant one-on-one management in place.

Approval must be sought from the Project Manager or delegated authority prior to any inexperienced workers working with pre-cast elements, concrete pours and temporary works

**Notifiable Work:**

Notify WorkSafe when using a lifting appliance where the appliance has to lift a mass of 500 kilogrammes or more a vertical distance of 5 metres or more. Notifications can be made via the [WorkSafe website](#). Exclusions include:

- work using an excavator
- work using a forklift, or
- work using a self-propelled mobile crane

Notify WorkSafe where height work is 5 metres or higher notify WorkSafe if there is a risk of falling. Notifications can be made via the [WorkSafe website](#). Exclusions include:

- Work in connection with a residential building up to and including 2 full storeys;
- Work on overhead telecommunication or electric lines;
- Work carried out from a ladder only; or
- Maintenance and repair work of a minor or routine nature

**References and Resources:**

- [Safe Work with Pre-cast Concrete Good Practice Guidelines](#)
- [Approved Code of Practice for Cranes](#)
- [Health and Safety During Concrete Pumping](#)