

This General Guide provides information on how to manage formwork and falsework risks at a workplace. It is supported by specific guides on [formwork](#), [falsework](#), [slip, jump and travelling forms](#) and a formwork and falsework [Information Sheet](#) for small business.



What is formwork and falsework?

Formwork means the surface of the form and framing used to contain and shape wet concrete until it is self-supporting.

Formwork includes the forms on or within which the concrete is poured and the frames and bracing which provide stability. Although commonly referred to as part of the formwork assembly, the joists, bearers, bracing, foundations and footings are technically referred to as falsework.



Further information is in the [Guide to formwork](#).

Falsework means the temporary structure used to support a permanent structure, material, plant, equipment and people until the construction of the permanent structure has advanced to the stage where it is self-supporting.

Falsework includes the foundations, footings and all structural members supporting the permanent structural elements. Falsework can be used to support formwork for in-situ concrete, prefabricated concrete elements, steel sections or stone arches, for example during bridge construction.



Further information is in the [Guide to falsework](#).



Who should use this Guide?

You should use this Guide if you design, construct, erect, alter, maintain, dismantle or remove formwork and falsework.



You should read this code in conjunction with the [Code of Practice: Construction work](#).

Supporting guidance material

This General Guide is supported by specific guidance material on:

- falsework
- formwork, and
- slip, jump and travelling formwork systems.



Who has duties under the law?

Everyone in the workplace has a work health and safety duty. A range of people have specific responsibilities for formwork and falsework including the:

- designers of formwork and falsework
- formwork and falsework contractors and workers who carry out formwork and falsework activities, and
- principal contractors for a 'construction project' where the cost of construction work is \$250 000 or more.

The main duties are set out in Table 1.

Table 1 Duty holders and their obligations

Who	Duties
A person conducting a business or undertaking	<p>A person conducting a business or undertaking has the primary duty to ensure, so far as is reasonably practicable, workers and other people are not exposed to health and safety risks arising from the business or undertaking.</p> <p>This duty requires the person to manage risks by eliminating health and safety risks, so far as is reasonably practicable and if it is not reasonably practicable to eliminate the risks, by minimising those risks, so far as is reasonably practicable. It also includes ensuring, so far as is reasonably practicable the:</p> <ul style="list-style-type: none"> ■ design, provision and maintenance of safe formwork and falsework plant and structures ■ safe erection, alteration, dismantling and use of formwork and falsework, and ■ safe use, handling, storage and transport of formwork and falsework plant. <p>The Work Health and Safety (WHS) Regulations include specific duties for a person conducting a business or undertaking with management or control of a construction workplace, plant, powered mobile plant and plant that lifts or suspends loads.</p>
Designers, manufacturers, suppliers and importers	<p>Designers, manufacturers, suppliers and importers of plant or structures must ensure, so far as is reasonably practicable, the plant or structure is without risks to health and safety. This duty includes providing information to manufacturers so that plant can be manufactured and erected to the design specifications. Designers must give the person who commissioned the design of the temporary structure a written safety report.</p>
People installing, constructing or commissioning plant or structures	<p>People installing, constructing or commissioning plant or structures must ensure, so far as is reasonably practicable, all workplace activity relating to the plant or structure including its decommissioning or dismantling is without risks to health or safety.</p> <p>In this General Guide the ‘formwork and falsework contractor’ is the person responsible for installing, constructing and commissioning formwork and falsework.</p>
Officers	<p>Officers, such as company directors, have a duty to exercise due diligence to ensure the business or undertaking complies with the WHS Act and Regulations. This includes taking reasonable steps to ensure the business or undertaking has and uses appropriate resources and processes to eliminate or minimise risks from formwork and falsework activity.</p>
Workers and others	<p>Workers and other people at the workplace must take reasonable care for their own health and safety, co-operate with reasonable policies, procedures and instructions and not adversely affect other people’s health and safety.</p>



For more information on the duties relating to formwork and falsework see the [Code of Practice: Construction work](#).



How can formwork and falsework risks be managed?

Use the following steps to ensure, so far as is reasonably practicable, that workers and other people are not exposed to health and safety risks:

#1 Identify hazards



1. Find out what could cause harm. The following can help you identify potential hazards:

- Observe the workplace where the formwork and falsework will be constructed and where there is interaction with other work, vehicles, pedestrians and fixed structures like overhead electric lines.
- Look at the environment in which the formwork and falsework is to be used—check the ground conditions.
- Identify the major functional requirements of the formwork and falsework like the height, maximum live and dead loads and access and fall protection requirements.
- Ask workers about any problems they encounter or anticipate at the workplace when constructing or interacting with formwork and falsework—consider operation, inspection, maintenance, repair, transport and storage requirements.
- Review your inspection, maintenance, incident and injury records including near misses.

#2 Assess risks



2. Assess the risk. In many cases the risks and related control measures will be well known. In other cases you may need to carry out a risk assessment to identify the likelihood of somebody being harmed by the hazard and how serious the harm could be. A risk assessment can help you determine what action you should take to control the risk and how urgently the action needs to be taken.

#3 Control risks



3. Take action to control the risk. The WHS laws require a business or undertaking do all that is reasonably practicable to eliminate or minimise risks.

The ways of controlling risks are ranked from the highest level of protection and reliability to the lowest. This ranking is known as the hierarchy of risk control. You must work through this hierarchy to manage risks.

The first thing to consider is whether hazards can be completely removed from the workplace. For example, risks associated with formwork and falsework can be eliminated by using an alternative construction method that does not require the use of formwork or falsework.

If it is not reasonably practicable to completely eliminate the risk then consider one or more of the following options in the order they appear below to minimise risks, so far as is reasonably practicable:

- substitute the hazard for something safer e.g. using precast columns and beams instead of constructing formwork and pouring concrete on site
- isolate the hazard from people e.g. by using barricades and signs to create an exclusion zone in the area where formwork is to be erected and stripped to prevent other workers entering
- use engineering controls e.g. handrails and edge protection to prevent falls from heights.

If after implementing the above control measures a risk still remains, consider the following controls in the order below to minimise the remaining risk, so far as is reasonably practicable:

- use administrative controls e.g. schedule delivery times so loads are not lifted onto incomplete or unsecured temporary structures or decks
- use personal protective equipment (PPE) e.g. high visibility clothing, protective hand and footwear and hard hats.

A combination of the controls set out above may be used if a single control is not enough to minimise the risks.

#4
Review
control
measures



You need to consider all possible control measures and make a decision about which are reasonably practicable for your workplace. Deciding what is reasonably practicable includes the availability and suitability of control measures, with a preference for using substitution, isolation or engineering controls to minimise risks before using administrative controls or PPE. Cost may also be relevant, but you can only consider this after all other factors have been taken into account.

4. Check your control measures regularly to ensure they are working as planned. Control measures need to be regularly reviewed to make sure they remain effective, taking into consideration any changes, the nature and duration of work and that the system is working as planned.



Further information on the risk management process is in the [*Code of Practice: How to manage work health and safety risks.*](#)



Who is involved?

You must consult your workers and their health and safety representatives (if any) when deciding how to manage the risks of formwork and falsework activities.

If there is more than one business involved at your workplace you must consult them to find out who is doing what and work together so risks are eliminated or minimised, so far as is reasonably practicable.

This may involve discussing site-specific requirements including entering and exiting the site, scheduling suitable times for loading and unloading and site specific training on procedures for working at height.



Further information on consultation requirements is in the [*Code of Practice: Work health and safety consultation, co-operation and co-ordination.*](#)

BEFORE STARTING FORMWORK AND FALSEWORK

Formwork and falsework generally include temporary structures that are used during construction and then removed when the structure is self-supporting. Some formwork and falsework systems are not removed and are designed to remain with the permanent structure.



Designing formwork and falsework

The first step in controlling the identified risks is at the design stage where the focus is on eliminating risks through good design of:

- individual formwork and falsework components (the WHS Act classifies these as “plant”)
- the formwork and falsework assembly (the WHS Act classifies this as a “structure”), and
- work systems and process for the safe erection, alteration and dismantling of the formwork and falsework.

Formwork and falsework design involves both the design of the items of plant—the formwork and falsework components—and the structure formed from the components.

The design process may be simple or complex depending on the size and complexity of the structure involved. However, it is important the designer is competent to undertake the design work. A competent designer may include, for example a civil engineer experienced in temporary structure design to ensure it is capable of carrying the loads that will be applied to it.

Plant design

Formwork and falsework component designers are responsible for designing components that are safe to manufacture, assemble and use for the purpose they were designed for.

The formwork and falsework components are plant and may be purchased, hired in or supplied, for example by a formwork and falsework contractor.

The formwork and falsework designer will be responsible for selecting the appropriate components and preparing a design for the job. Different types of formwork and falsework should not be mixed unless they are identified as compatible in the manufacturer's instructions.

An importer of prefabricated formwork and falsework who is unable to source the necessary information from the original designer assumes the designer responsibility to demonstrate the plant satisfies health and safety requirements. This can be achieved by having a competent person develop the information for the supplier.



Further information about the safe design of plant is in the *Guide for safe design of plant*.

Structure design

Anything constructed to support a load including formwork and falsework, can be referred to as a structure. Structural designers may be responsible for the permanent structure design and/or the design of formwork, formwork decks, falsework, supporting structures, integrated access and work platforms and component and structural connections.

To simplify formwork and falsework design and minimise risk, designers of the permanent structure can:

- consider alternative designs e.g. prefabricated concrete elements—columns, beams and floor panels
- minimise the number of columns and cantilevered floor sections
- reduce variations in the floor depth, and
- allow sufficient clearance to adjacent structures and safe methods for moving large and heavy components, materials and equipment i.e. making allowances for a crane and other mechanical lifting devices to be used.

The formwork and falsework designer should identify the effect of loads on formwork and falsework:

- Dead loads—including the mass of falsework, structural elements to be supported, formwork, wet concrete, concrete reinforcement and other embedded material.
- Live loads—including the mass of workers, plant, equipment and runways, stacked material and an impact allowance in addition to the imposed weight of mechanically operated plant acting on the formwork and falsework and the weight of wet concrete including point loading. This is also dependent on the delivery method for the concrete – whether pump or skip.
- Environmental loads e.g. wind acting on the exposed area of formwork and falsework including any attached to or supported objects like signs.
- Any other loads—including special conditions likely to occur during construction like the redistribution of the load due to the effects of prestressing or early application of prestress, construction stages and staged removal of falsework.

Lifting and placing loads is a common formwork and falsework activity. Designers should consider the work systems that may be used so formwork and falsework structures are designed to be capable of carrying temporary loads during construction and dismantling as well as the load of the permanent structure.

Formwork and falsework designers should also:

- determine the vertical pour rates for walls, columns and other vertical concrete elements before completing the formwork and falsework installation design
- take into account the method and sequence of erecting and dismantling the designed formwork and falsework and the related risks e.g. manual tasks and working at height
- allow for perimeter containment screens, guardrail systems including toeboards, scaffolding or other risk engineering controls for working at height, and

- allow for fall arrest systems including safety lines to be installed if required.

A formwork and falsework designer includes anyone who modifies the design. For example, if the capacity of formwork and falsework is to be increased by adding more components, a designer should complete additional calculations to ensure the modified structure is capable of supporting the extra load. The person designing the addition has designer duties and if they are not the original designer, they should consult the original designer to ensure the new configuration does not compromise the existing design specifications or safety factors.

If changes are made to a construction procedure, the designer should be consulted and the relevant drawing or other documents should be updated to clearly show the revisions. Provisional updating by marking up or preparing hand drawn detail and signing and dating the mark-up or new detail should be countersigned by the designer and where applicable, the design verifier.



Designers should always consider the life-cycle of the designed item and seek to eliminate or minimise health and safety risks through design. Further information on safe design is in the:

- *Code of Practice: Safe design of structures*, and
- *Guide for safe design of plant*.

The system of work

Systems of work should be clear but flexible to meet changing circumstances as the work progresses. The system of work should provide for the assessment and control of any new risks arising from proposed changes to the work before they are implemented.

A documented safe system of work is an administrative control. For formwork and falsework this could include consideration of:

- worker competency and licensing requirements
- consultation and coordination of the work with others
- access and egress
- exclusion zones
- permit-to-work systems
- fall arrest systems
- inspection and maintenance
- emergency arrangements, and
- changes to the work arrangements.



Competency and licensing

A person who erects, alters or dismantles formwork and falsework must be competent to do the work safely. Suitable training must be provided.

Where a person undertakes construction work they must have successfully completed general construction induction training.

In some cases a person will need to hold the appropriate high risk work licence, for example when undertaking scaffolding work or operating cranes, hoists, forklifts or elevating work platforms to construct formwork and falsework.

A licensed scaffolder is required to erect, alter or dismantle a scaffold where a person or object can fall more than 4 metres from the platform or structure.

The high risk work licensing classes are listed in Schedule 3 of the WHS Regulations.



Further information is in the *General guide for scaffolds and scaffolding work*.



Documentation

Plant design registration

Some plant is subject to plant design and item registration requirements under Parts 1 and 2 of Schedule 5 of the WHS Regulations including:

- cranes
- crane work boxes
- hoists
- boom-type elevating work platforms, and
- prefabricated scaffolding.

The person with management or control of design registrable plant must ensure the design registration number is kept where it is readily accessible. If you are hiring prefabricated scaffolding, for example the supplier must provide the design registration number, usually on the supply docket or agreement.



Further information on plant registration is in the [*Code of Practice: Managing the risks of plant in the workplace.*](#)

Designer's safety report for construction work

A designer must prepare a safety report for a specific or unusual formwork and falsework design but not for common designs where the risks are already known. For example, a design specifying an unusual structure to support a bridge arch over a river may introduce unique hazards and risk controls.

A written safety report may include proprietary documentation setting out how to use the formwork and falsework components or component system safely. Where there is a principal contractor, the person who commissioned the formwork and falsework design must give a copy of the relevant designer's safety report to the principal contractor.

The person commissioning the construction work must consult with the designer of the whole or any part of the structure about eliminating and controlling risks. The general duty to provide information under the WHS Act may be met through the designer's safety report prepared under Chapter 6 of the WHS Regulations for construction work.



Further information on designer's safety reports is in the [*Code of Practice: Construction work.*](#)

Safe work method statement (SWMS)

The construction of formwork and falsework or working on the resulting structure may involve activities defined as 'high risk construction work' under the WHS Regulations.

High risk construction work includes work which:

- involves a risk of a person falling more than two metres
- involves structural alterations or repairs that require temporary support to prevent collapse
- is carried out on or near energised electrical installations or services, and
- is carried out in an area at a workplace in which there is movement of powered mobile plant.

A SWMS must be prepared for high risk construction work before the work starts. The SWMS must:

- identify the type of high risk construction work being done
- specify the health and safety hazards and risks arising from the work
- describe how the risks will be controlled, and

- describe how the control measures are to be implemented, monitored and reviewed.

The SWMS must be developed in consultation with workers and their representatives who are carrying out the high risk construction work.



Further information on high risk construction work, SWMS and a SWMS template is in the [Code of Practice: Construction work](#).

Work health and safety management plans

Where the cost of the construction work is \$250,000 or more a principal contractor for a construction project must:

- take all reasonable steps to obtain a copy of the SWMS relating to the work, from each person conducting a business or undertaking carrying out the high risk construction work, before the work starts, and
- prepare a written WHS management plan for the workplace before work on the construction project starts.

A WHS management plan must include:

- a list of people who have health and safety responsibilities, and
- arrangements for consulting workers, managing incidents that occur and any site specific health and safety rules.



Further information on WHS management plans is in the [Code of Practice: Construction work](#).

Emergency plan

An emergency plan must be prepared and maintained so it remains effective for the workplace. The emergency plan should provide for emergency response, evacuation procedures, medical treatment and assistance, and communication with emergency service organisations and others at the workplace. For example, emergency contact numbers should be displayed where they can be easily seen.

Workers must be provided with information and training on the emergency procedures for the workplace and the procedures must be tested.

Responses to an emergency should be coordinated. The formwork and falsework contractor should consult with the principal contractor who prepares the broader workplace emergency plan, so that unexpected incidents, for example formwork collapse or people falling from height are included in the broader emergency plan.

Emergency arrangements for evacuating an injured worker from, for example a formwork 'cell' should consider how to safely remove an immobilised or unconscious person. This may include creating emergency entry holes and doorways through decks and screens.



For further information see the:

- [Fact Sheet: Emergency Plans](#), and
- [Code of Practice: Managing the work environment and facilities](#).



Inspection and maintenance

Regular inspection and maintenance of the formwork and falsework during its use will help keep it functional and safe. Inspection and maintenance should be conducted by a competent person such as an engineer.

A person with management or control of formwork and falsework at a workplace has a responsibility to have formwork and falsework inspected and maintained so that it is safe. This includes inspections before the formwork and falsework is loaded, after loading and after any repairs, alterations or additions to formwork and falsework are made. Where scaffolds are used, they should be regularly inspected and maintained at hand-over and post-handover and after scaffold repairs, modifications or additions.

For registered plant like prefabricated scaffolding, concrete placing booms and cranes, a record of all commissioning, decommissioning, inspection, maintenance, alterations and dismantling must be kept.



Further information on plant inspection, maintenance and record keeping is in the:

- *Code of Practice: Managing the risks of plant in the workplace*, and
- *Guide to scaffold inspection and maintenance*.

ERECTING, ALTERING AND DISMANTLING FORMWORK AND FALSEWORK

Formwork and falsework should be systematically erected and dismantled by competent persons and tied in progressively to stabilise the structure in accordance with the designer's or manufacturer's instructions. Prefabricated formwork and falsework should be erected and used in accordance with the manufacturer's instructions.

Where scaffolding is used to construct formwork and falsework it must comply with the requirements for scaffolding including using licensed scaffolders.

Safe systems of work should be developed depending on the type and complexity of the formwork and falsework design. The system of work should seek to eliminate or minimise risks, for example to:

- minimise working at height by assembling components on the ground
- provide safe temporary work platforms where work at height is required
- provide for the safe handling and operating of plant and equipment—large structures may require scaffolding or mobile plant to be located on suspended floors
- provide suitable plant and material handling, placement and storage arrangements to minimise manual tasks, and
- include regular inspection and maintenance.



Erecting formwork and falsework safely

Erecting formwork and falsework safely will include preparing the foundations and footings where required, and erecting, altering and dismantling the formwork and falsework including for adequate access and work platforms in a way that minimises risk to workers and people who may work on or near the formwork and falsework.

Foundations and footings

Foundations and footings should be designed and constructed to carry and distribute the full weight of the formwork and falsework including dead and live loads. Ground conditions and weather effects—particularly wind and rain—should be considered when designing and preparing the foundation.

Soleboards and base plates should be provided under all props and standards on formwork and falsework frames unless the prop or standard has an integral foot or a competent person documents a base plate is unnecessary.

Check whether suspended floors will safely support formwork and falsework loads including live loads that may vary due to concrete pours, changing numbers of workers, different crane lifted loads and other plant and equipment being used for particular tasks.

Erection

A safe system of work should be followed including:

- a methodical work sequence where all component connections are secured and tightened as required before progressing

- implementing all required fall and falling object risk control measures e.g. install edge protection and work platforms are constructed
- using completed permanent access points wherever possible
- working from fully completed permanent or temporary work platforms e.g. not climbing on handrails or guardrails to gain extra height
- checking fittings and other connections are in accordance with the manufacturer's or designer's specifications and the formwork and falsework drawings
- checking all required supports, bracing and ties are installed as the erection progresses
- checking live loads arising from the erection work are within the design specification for the stage of completion—the number of workers and plant items on the structure at any one time may need to be limited
- tying props and frames laterally to prevent movement
- providing adequate bracing between falsework frames to keep the structure rigid, and
- having all props and frames bearing fully and evenly on their foundations.



Further information on the safe erection of scaffolding is in the *General guide for scaffolds and scaffolding work*.



Inspecting, certifying and monitoring

A competent person like an engineer, with experience in structural design should inspect and confirm installed formwork and falsework meets the design specification and is structurally sound before it is loaded. The scope of any certification work should be documented so there is no confusion or doubt about what has been inspected and certified.



Generally certification will not be required for formwork and falsework in housing construction work. For more information on housing construction work see the *Code of Practice: Construction work*.

Further information on inspection and certification and an example of a Formwork Structural Certificate is in the *Guide to formwork*.

Loads should not exceed the design loading specified by the designer. Formwork and falsework should be monitored by a designated competent observer as it is loaded to check vertical and horizontal movements do not exceed specifications and the structure remains stable.

The observer should continuously monitor the formwork and falsework assembly during loading and be provided with an appropriate communication system to alert others in case an emergency arises. Competent persons should be available to carry out any emergency adjustments or repairs. The observer should not stand directly under an area where loading is occurring, for example where wet concrete is being placed onto formwork.



Altering formwork and falsework

When altering formwork and falsework you should:

- consult the designer before making alterations
- complete the alterations in accordance with the designer's instructions and any safe system of work
- ensure alterations do not compromise the structural integrity of the formwork and falsework, and
- ensure systems are in place to identify unauthorised interference with the formwork and falsework e.g. regular inspections.



Dismantling formwork and falsework safely

When dismantling the formwork and falsework:

- follow the designer's or manufacturer's instructions
- provide suitable component handling, either manual or mechanical—components should never be dropped in an uncontrolled way
- maintain working platforms at least 450 mm wide at the level of dismantling, where possible
- maintain a full working platform below the dismantling level, and
- remove any fall protection components e.g. edge protection and access provisions like ladders, at the last possible stage as the dismantling progresses.



Drop stripping should not be used. Further information on stripping formwork is in the *Guide to formwork*.

COMMON HAZARDS AND RISK CONTROLS



Adjacent buildings or structures

Where the formwork and falsework activity is likely to reduce the security or stability of part of an adjacent structure, the work must not start or continue unless steps are taken to control the risk to a person from the:

- collapse of the formwork and falsework and the permanent structure it supports onto the adjacent building or structure, and
- collapse of the adjacent building or structure, or a part of the building or structure.



Collapse

Formwork and falsework collapse can occur before, during and after loading, for example when placing the concrete or the structural members to be supported. The risk of collapse can be minimised by:

- designing the formwork and falsework to suit the specific workplace requirements including loads and environment
- constructing the formwork and falsework as designed
- not adding to or altering the formwork and falsework unless authorised by the designer
- inspecting and certifying the formwork and falsework is complete before loading
- regularly inspecting and maintaining the formwork and falsework during its life
- avoiding 'point' loading on any part of the formwork including by placing concrete evenly
- having sound and level foundations under props and frames and not placing props or frames close to the edges of excavations
- not exceeding the working load limit (WLL) of props, and
- using proprietary pins in props not improvised bolts or reinforcing steel.



Further information on inspection and certification is in the *Guide to formwork*.



Electric lines

Electrical lines whether overhead or underground can be a significant hazard. Construction work carried out on or near energised electrical installations or services is high risk construction work and a SWMS must be prepared before this work starts.



Further information on managing risks associated with electricity is in the:

- [Information Sheet: *Scaffolding work near overhead electric lines*](#)
- [General guide for working in the vicinity of overhead and underground electric lines](#), and
- [Code of Practice: *Managing electrical risks in the workplace*](#).



Entry and exit

Workers must, so far as is reasonably practicable, be provided with safe entry to and exit from the formwork and falsework during erection, use and dismantling. This includes for people slinging or unslinging loads.

Common ways of providing safe entry and exit for large or complex formwork and falsework structures include:

- installing permanent stairs, platforms or ramps
- using the existing floor level of a building, where entry is safe
- installing temporary stairs or portable ladder access systems for use when erecting the formwork and falsework, and
- personnel hoists—non-mechanical forms of exit e.g. a ladder or stair tower should also be provided in case of power failure or other emergency.

Stair towers secured to scaffold bays provide suitable and flexible entry. Fixed industrial single ladders, not extension ladders may be used for entry to and exit from a scaffold. Ladders should not be used as a work platform.



Falls

The risk of a fall by a person from one level to another that is reasonably likely to cause injury to the person or any other person, must be managed. Hazards that may increase the risk of a fall when erecting or using formwork and falsework include:

- poor environmental conditions e.g. strong winds or rain
- materials, equipment or protruding objects below, or in adjoining work areas e.g. tools, reinforcing steel, loose materials
- penetrations and void areas not identified or protected e.g. ladder access voids
- incomplete work platforms, scaffolds or loose components where work is being done, or is likely to be done, and
- inadequate training, instruction and supervision of workers.

Engineering controls like handrails, edge protection and perimeter containment screens can minimise the risk of a fall during work at height. Perimeter containment screens are protective structures fixed to the perimeter of a building, structure or working platform to prevent objects and people from falling.

Catch platforms or nets can be used to minimise the distance a person could fall during work at height and also to catch falling objects.

Fall arrest systems should only be used where other risk controls are not reasonably practicable.



Further information on falls is in the [Code of Practice: *Managing the risk of falls at workplaces*](#).



Falling objects

Falling object risk control measures include overhead protective structures, perimeter containment screens, catch platforms and exclusion zones to eliminate or minimise the risk of a falling object.

Perimeter containment screens can be made of mesh, a high quality shade cloth, timber, plywood, metal sheeting or other material suitable for the purpose. Before using perimeter containment screens, consider other risks like conductivity of electricity and additional dead and live loads. For example, the extra wind loading on the formwork and falsework should be considered when selecting a screening material and the framework supporting a screen must be able to support loads from the screen.

Note: Shade cloth will be significantly heavier and less permeable to wind when wet, so both dead and wind load will increase.

Perimeter containment screens should be located inside the standards on working platforms or in accordance with the manufacturer's specifications. Where used, the lining should be attached to the inside of the mesh.



Ground conditions

Ground conditions should be stable and installers should be aware of any factors that may affect ground stability before the formwork and falsework is erected or during its use.

Ground conditions should be assessed by a competent person to check the ground is stable and able to bear the most adverse combination of dead, live and environmental loads that can reasonably be expected during the period the formwork and falsework or scaffold is to be erected and dismantled and while it is in use.

Water and nearby excavations may lead to ground subsidence and the collapse of formwork and falsework. Any likely watercourse, for example stormwater run-off that has the potential to create a wash out under the structure should be diverted away from the formwork and falsework.

Where foundations and footings are located on batters, these should be protected against scour by directing drainage away from the base of any supports and frames.



Loading

Formwork and falsework should be designed for the most adverse combination of dead and live loads that can reasonably be expected during the period it is in use.

Dead loads relate to the self-weight of the structure and components including working, catch or access platforms, stairways, ladders, screens, sheeting, tie assemblies, scaffolding hoists or electrical cables.

Live loads include:

- the weight of people, materials, debris, plant, tools and equipment
- environmental loads e.g. wind, rain, and
- impact forces.

Dead and live loads should be calculated during the design stage to ensure the supporting structure is capable of supporting the loads that will be applied at the workplace. Loads should then be assessed during formwork and falsework erection, use, alteration and dismantling to make sure the design loads specified by the designer, manufacturer or supplier are not exceeded.

If the formwork and falsework is to be altered at the workplace, consider any new loads that may apply and consult the designer. For example, wind and rain loads may increase if perimeter containment, shade cloth or signs are attached to the formwork and falsework.

Scaffolds should not be used to support formwork and plant unless the scaffold is specifically designed for this purpose.



Lifting plant and materials

Crane-lifted loads should be slung and secured so the load or any part of it cannot fall. The following should be considered when carrying out formwork and falsework:

- Tare mass of wall, lift or column forms should be provided with formwork and falsework documentation and made available for inspection.
- Formwork and falsework frames should either be tied together or lifting slings should be wrapped around the load.
- Loads of joists or bearers should be strapped together before lifting.
- Formply loads should be strapped together and lifted in a flat position.



Loading materials during construction

Plant and materials including propping members, stacks of plywood, forms, bearers and joists are sometimes lifted onto a deck during formwork and falsework erection and before the deck is completed. Stacked materials create point loadings that the formwork and falsework structure may not be designed to bear.

Plant and materials should only be stored on formwork and falsework where allowed for by the design specifications and when the structure or deck has been completed to the point that it is able to bear the load.

Formwork is not suitable for full loading until it is fully secured—that is, when the deck is in place with tie-ins and back-propping is complete. In practice, some loading often occurs before the deck is completed, for example unloading pallets of plywood and joists used to construct the deck.

To minimise the risk of collapse and other hazards:

- Formwork and falsework design drawings should clearly identify the maximum point loadings for the temporary structure or deck—pre-pour for concrete formwork.
- Point loadings should not exceed the maximum weight specified by a designer. Particular care should be taken with very heavy materials like packs of reinforcing steel and post-tensioning coil and frame.
- Avoid placing loads on the temporary structure or deck if the designer's documentation prohibits loading.
- Crane crews should be notified when an area of the temporary structure or deck is ready to take a plant or material load and where the load can be placed safely—lifting zone.
- Crane crews should not lift plant or materials onto the temporary structure or deck until there is a clearly identified designated landing zone.
- Loads including people should only be placed in the areas designated as safe.
- Delivery of materials to the workplace should be planned so loads are not lifted onto an incomplete or unsecured temporary structure or deck.
- Before people leave the workplace, plant and materials should be secured to prevent them being moved by wind loads.



Lifting points

Slings attached to lugs or holes cut into part of the load are often used to lift formwork and falsework components instead of wrapping the lifting slings around the load. Where lugs or holes are used, designer information verifying the structural adequacy of the lifting points should be available including:

- the structural adequacy of the lifting lug or hole, and
- any instructions on its use.



Mixing components

Plant components from different manufacturers or suppliers, while sometimes looking compatible, are often of different dimensions and tolerances.

Mixing incompatible formwork and falsework components can significantly affect the structural integrity of the formwork and falsework. This could result in the collapse of the structure. It can also lead to increased wear on components resulting in more difficult assembly, which in turn may increase the risk of injury to workers.

Do not mix components from different manufacturers unless a competent person, for example an engineer has determined that:

- components are of compatible size and strength
- components have compatible deflection characteristics
- fixing devices are compatible, and
- mixing does not lessen the strength, stability, rigidity or suitability of the structure.



Further information on mixing components is in the [*General guide for scaffolds and scaffolding work*](#).



Powered mobile plant and traffic

Powered mobile plant and vehicular traffic are hazards which can potentially affect worker safety and the safe use and structural integrity of formwork and falsework.

Control measures to minimise the risks associated with moving plant and traffic include:

- re-routing vehicles and mobile plant away from where the formwork and falsework is located e.g. by using traffic controllers to redirect traffic
- using barricades, signs, posts, buffer rails, guards, concrete or timber kerbs to prevent mobile plant and traffic from coming into contact with the formwork and falsework, and
- ensuring the formwork and falsework does not have unnecessary protrusions e.g. over-length standards or props.



Further information on managing traffic risks is in the [*General guide for workplace traffic management*](#).



Unauthorised access

A person with management or control of construction work including formwork and falsework activity, must prevent unauthorised access to the construction workplace. Entry to formwork and falsework area should be restricted to those carrying out the work while the formwork and falsework is being erected, altered, repaired and dismantled. Where a scaffold is being used there are specific requirements to control entry to the scaffold and for inspection and certification prior to use. Further information is in the [*General guide for scaffolds and scaffolding work*](#).

Control measures, for example barriers and warning signs should be used to prevent unauthorised access when the formwork and falsework is left unattended.



Further information

- AS3610: *Formwork for concrete*
- AS3610.1: *Formwork Part 1-Documentation and surface finish*