



FORMWORK

CODE OF PRACTICE 1998

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This publication may contain occupational health and safety and workers compensation information. It may include some of your obligations under the various legislations that WorkCover NSW administers. To ensure you comply with your legal obligations you must refer to the appropriate legislation.

Information on the latest laws can be checked by visiting the NSW legislation website (www.legislation.nsw.gov.au) or by contacting the free hotline service on 02 9321 3333.

This publication does not represent a comprehensive statement of the law as it applies to particular problems or to individuals or as a substitute for legal advice. You should seek independent legal advice if you need assistance on the application of the law to your situation.

What is an INDUSTRY CODE OF PRACTICE?

An approved industry code of practice is a practical guide to achieving the standard of health, safety and welfare required by the *Occupational Health and Safety Act, 1983* and Regulations for a particular area of work.

An approved industry code of practice should be followed, unless there is an alternative course of action which achieves the same or a better standard of health and safety in the workplace.

An industry code of practice is approved by the Minister for Industrial Relations. It comes into effect on the day the notice of this approval is published in the NSW Government Gazette or on the day specified in the Gazette notice.

An approved industry code of practice is designed to be used in conjunction with the Act or Regulations but does not have the same legal force. A person or Company cannot be prosecuted for failing to comply with an approved industry code of practice.

However, in proceedings under the Act or Regulations, failure to observe a relevant approved industry code of practice can be used as evidence that a person or Company has contravened or failed to comply with the provisions of the Act or Regulations.

A WorkCover Inspector may cite an approved industry code of practice in a direction in an Improvement Notice or Prohibition Notice, indicating the measures that should be taken to remedy an alleged contravention or non compliance. Failure to comply with a requirement in an Improvement or Prohibition Notice is an offence.

In summary an approved INDUSTRY CODE OF PRACTICE:

- ✓ Gives practical guidance on how the required standard of health, safety and welfare can be achieved in the workplace.
- ✓ Should be followed, unless there is an alternative course of action which achieves the same or a better standard of health, safety and welfare in the workplace.
- ✓ Can be used in support of the preventive enforcement provisions of the *Occupational Health and Safety Act 1983*.
- ✓ Can be used to support prosecution for failing to comply with or contravening the Act or Regulations.

Foreword

This Industry Code of Practice has been produced by WorkCover NSW to provide employers, self employed and employees with practical advice on preventing injury to persons engaged in erecting and dismantling formwork and associated equipment.

This code has been developed by a tri partite industry working party and has involved extensive consultation with industry and other special interest groups.

General Manager
WorkCover NSW

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1. Introduction

1.1 Title

This code of practice is the *Code of practice – Formwork, 1998*

1.2 Purpose

This code of practice provides guidance to prevent injury to persons engaged in erecting and dismantling formwork and associated equipment.

1.3 Scope

This code of practice covers the design, planning, preparation and conduct of work for the erecting and dismantling of formwork and associated equipment.

1.4 Commencement

This code of practice commences on 22 June 1998.

This code does not apply to the erection and dismantling of formwork for:

- (i) construction projects where formwork has commenced prior to 22 June 1998, or
- (ii) contracts for formwork signed prior to 22 June 1998.

1.5 Authority

This code of practice is approved as an industry code of practice pursuant to Section 44A of the *Occupational Health and Safety Act 1983* by the Minister of Industrial Relations on the recommendation of WorkCover New South Wales.

2. Consultation

The principal contractor, formwork contractor, self-employed persons, employers, employees and their representatives should consult with each other when observing the recommendations of the code and determining the provision of safeguards. The consultation process should be used during the planning and preparation stage to determine safe systems of work based on the assessment of the risk. The designers (may include developers, architects and structural engineers) should be involved in the consultation process when appropriate (see section 3.1).

The consultation process should consider at least the following:

- nature of the work
- the type of form to be used
- the height of the formwork to be erected
- the size of the formwork deck
- availability of equipment
- interaction with other trades
- workplace access
- public safety
- location of intermediate working decks.

2.1 Occupational health and safety (OHS) committees

Workplace OHS committees can be very useful to both employees and employers to encourage better communication and relations between persons carrying out the work and management when identifying and resolving occupational health and safety matters. OHS committees may also assist during the consultation process when employers are determining what safeguards will be provided for persons carrying out the work.

The *Occupational Health and Safety Act 1983* requires that a committee must be established at a place of work where there are 20 or more employees and the majority of employees request it or if WorkCover NSW requires it. A committee may:

- review the measures taken to ensure health and safety at the workplace. This may include assisting in the development of safe systems of work and recommending appropriate training and education
- investigate health and safety matters at the place of work and make recommendations to the employer
- carry out inspections and obtain relevant information
- request a WorkCover NSW inspection.

Committee members must be provided with training that assists them to exercise their functions.

An employer may not dismiss an employee because they make a complaint about a matter they consider to be a health and safety risk or because they are a member of an OHS committee or carry out any functions as a member of that committee.

3. Planning and preparation

Careful planning and preparation is the first essential step in ensuring that work is done safely. Planning and preparation should involve consultation (see 2.) with all those engaged in the work and include the risk assessment and control process.

The Construction Safety Regulations require that all formwork must comply with AS 3610 *Formwork for Concrete*. It also requires that the adequacy of the components of the formwork for a suspended slab or beam is inspected and certified in writing for compliance with clause 5.3.4 of AS 3610 *Formwork for Concrete* by the formwork engineer prior to pouring concrete. This certificate is not required if:

- the deck of the formwork is less than 3 metres above the lowest surrounding ground level or,
- if the area of the discrete formwork deck is less than 16 square metres and is designed to hold not more than 2.5 cubic metres or 6 tonnes of wet concrete (whichever measure is appropriate to the circumstances).

3.1 Planning by designer

The designers (may include developers, architects and structural engineers) should consider the safety of the work practices necessary to carry out the erection and dismantling of the formwork. Matters to be considered should include at least the following:

- a. the possibility of using designs that do not require insitu formwork, such as structures that may be constructed at ground level and lifted into position
- b. the method and sequence of erecting and dismantling formwork
- c. minimising the working heights for persons erecting and dismantling formwork
- d. that guardrail systems (including toeboards), perimeter safety screens, scaffolding or other means are able to be installed when working at heights
- e. that fall arrest systems including safety lines are able to be installed if required
- f. advice and information (such as drawings, scope of work instructions and bills of quantity) provided to the formwork contractor and the principal contractor regarding the use of multiple level frames or high strutting where additional safety precautions may be required
- g. that sloping surfaces on formwork are slip hazards and appropriate control measures are identified to prevent injury
- h. the manual handling risks associated with the erection and dismantling of the formwork required by the design
- i. the formwork design must comply with AS 3610.

3.2 Planning by principal contractor (often referred to as the head or main contractor)

The principal contractor, as an employer or as the person in control of the workplace, has a statutory duty imposed by the *Occupational Health and Safety Act*. This duty is to provide and maintain, in relation to those matters over which they have control, a workplace that is safe and without risks to health for their employees and other persons present at the workplace or affected by the work. To fulfill these obligations the principal contractor should plan for the work to be done safely.

When planning the site layout and sequence of work the principal contractor should prepare and document a health and safety management plan. This plan should be based on the consultation with the contractors and their employees or representatives and should include a documented work method statement provided by the contractor describing how the work is to be done safely.

Before formwork operations start, the principal contractor in consultation with the contractor carrying out the work should carry out at least the following:

- a. an assessment of the risks involved in carrying out the work (see 3.4)
- b. identifying the most appropriate methods to control any risk of injury. These include safeguards such as guardrail systems (including toeboards), perimeter safety screens and barriers, and fall arrest systems
- c. providing suitable and safe access to and from the construction site including each place of work (see 4.5)
- d. ensuring that all persons carrying out the work have received appropriate training and instruction (see 6)
- e. ensuring electrical safety including providing systems of work for the safe use of electrical equipment which comply with the recommendations of the *Code of Practice: Electrical Practices for Construction Work*
- f. ensuring that the base on which formwork is placed is adequate to support the weight of the formwork and concrete and any additional live loads such as pumps, workers, mixers, pouring of concrete and so on
- g. ensuring that unauthorised persons are prevented from entering the work area. This should include physical barriers and hazard warning signs clearly displayed around formwork activities to warn other persons/trades on site
- h. the formwork must comply with AS 3610.

3.3 Planning by contractor (often referred to as the sub contractor)

The contractor carrying out the work has an obligation under the *Occupational Health and Safety Act* to provide and maintain a workplace that is safe and without risks to health for their employees in relation to those matters over which they have control.

In addition to consultation with the principal contractor in the overall job planning, the contractor erecting and dismantling the formwork should carry out at least the following:

- a. an assessment of the risk in carrying out the work (see 3.4)
- b. identifying the most appropriate methods of preventing the risk of injury including falls, slips and trips
- c. providing a documented work method statement describing the sequence of work tasks and activities and how the work is to be done safely. This work method statement should take into account an assessment of the risk involved in carrying out the work
- d. ensuring that the sequence of work tasks is designed to increase safety.
- e. an assessment of manual handling tasks which could cause back strains and other injuries and providing systems of work which comply with the requirements of the *OHS (Manual Handling) Regulation 1991* and the *Code of Practice for Manual Handling*, such as the selection of the proper size and weight of materials to be manually handled and the method of storage/stacking to reduce the amount of handling
- f. considering the level of experience of persons when allocating tasks to minimise the risks

- g. minimising the working heights for persons erecting and dismantling formwork
- h. the formwork must comply with AS 3610. Single props must be secured to prevent accidental dislodgement. See AS 3610 for details of compliance
- i. components of formwork equipment should not be mixed as they may be unsafe and lead to collapse of the formwork (eg mixing pins and braces)
- j. ensuring all formwork materials such as joists, bearers, plywood, support frames, jacks and U heads comply with the specification and relevant codes and standards and used in accordance with manufacturer's specification
- k. ensuring the adequacy of the formwork for a suspended slab or beam is inspected and certified in writing for compliance with clause 5.3.4 AS 3610 by the formwork engineer prior to pouring concrete, as required by the Construction Safety Regulations
- l. stripping of formwork must be undertaken in accordance with clauses 5.3.4 and 2.3 of AS 3610 or when certified by the formwork and structural engineers
- m. dismantling the formwork in a safe manner that is controlled and planned in accordance with AS 3610. It should generally be a reverse of the erection procedure and follow the work method statement and any site specific instructions. Drop stripping is an unsafe practice and must not be carried out. Partially erected or dismantled formwork should be secured against overturning during high winds
- n. suitable and safe access must be provided to and from the construction site including each area of work (see 4.5). This should include planning the position of frames to ensure safe access such as persons walking between frames
- o. ensuring electrical safety including providing systems of work for the safe use of electrical equipment which comply with the recommendations of the *Code of Practice: Electrical Practices for Construction Work*
- p. ensuring that all persons carrying out the work are provided with appropriate training and instruction (see 6.) which also covers the work method statements
- q. ensuring compliance with noise management provisions of the OHS (Noise) Regulation 1996 (see 4.9) and the provisions of the OHS (*Hazardous Substances*) Regulation 1996 (see 4.8)
- r. ensuring all areas are kept free of projecting nails. The Construction Safety Regulations require that all formwork materials must be free of projecting nails. All nails should be removed from the formwork material during the process of dismantling. High tensile nails, for example explosive power tool nails, should be removed with an appropriate tool to prevent nails becoming projectiles when being removed.

3.4 Risk assessment and control

A hazard identification and risk assessment process should be carried out at the planning and preparation stage by the contractor doing the work in consultation with the principal contractor to determine if persons are at risk. Safe systems of work must then be put in place to control the risk.

The process of risk assessment and control is made up of the following steps:

1. Identify the hazards
2. Assess the risk(s) arising from the hazards
3. Use appropriate control measures to eliminate or reduce the risk
4. Monitor and review the control measures to ensure continual safety.

3.5 Hierarchy of control measures

The following hierarchy of control measures is listed in terms of levels. Select from the highest level possible:

Level 1. Eliminate the hazard (for example, discontinue the activity or not use the plant).

Level 2. Minimise the risk, by:

- substituting the system of work or plant (with something safer)
- modifying the system of work or plant (to make it safer)
- isolating the hazard (eg introduce restricted work area)
- introducing engineering control (eg guarding, fencing, safety screens, intermediate working decks).

Level 3. Other controls:

- adopting administrative controls and safe work practices (eg specific training and work instructions)
- using personal protective equipment (eg safety lines, eye protection, safety helmets).

The control measures at Level 1 give the best result and should be adopted. The measures at the lower levels are less effective and they require more frequent reviews of the hazards and systems of work. In some situations a combination of control measures may need to be used. However, the control measures recommended by the contractor doing the work should be considered by the principal contractor as part of the health and safety management plan. Any new control measures should be evaluated to ensure that they are effective and safe and that no new hazards are created by them (See Appendix 1 for a typical risk assessment checklist).

3.6 Preparation

When preparing for the commencement of work the principal contractor and the contractor doing the work should ensure that the workplace is safe, based on the health and safety management plan. They should also check to ensure that all controls identified by the risk assessment have been put in place and that no new hazards exist.

Preparation should also include at least the following:

- a. an assessment of climatic/environmental conditions including lighting levels.
- b. access to and from the workplace.
- c. personal protective equipment on site (eg safety harnesses, lanyards, safety helmets, eye protection etc.)
- d. specific instructions for employees
- e. formwork drawings are certified by the formwork engineer
- f. plant and tackle required for lifting materials is available and suitable
- g. residual current devices (safety switches) protecting the user of portable electric powered tools
- h. emergency and rescue procedures in the event of an accident, injury or other emergency (including the means of rescuing persons from safety harnesses following arrested falls).

4. Work systems and control measures

The principal contractor and contractor have an obligation under the *Occupational Health and Safety Act 1983* to provide and maintain a workplace that is safe and without risks to health for his/her employees in relation to those matters over which he or she has control. Control measures to prevent persons working at heights from falling should be provided and maintained as part of a safe system of work (see 3.2 and 3.3).

The system of work and control measures selected are usually determined by individual job factors discussed in consultation (see 2), and other factors identified by the risk assessment process.

The Construction Safety Regulations require that all formwork must comply with AS 3610 *Formwork for Concrete*.

4.1 Prevention of falls

The Construction Safety Regulations require that:

- safeguards or accident prevention measures be taken where necessary or advisable, and
- where persons are exposed to a risk of falling 1.8 m or more, fencing or other safeguards be provided.

A system to control risks must be provided for persons exposed to a risk of falling.

Accordingly, a risk assessment should be conducted for all work, irrespective of height, and appropriate control measures implemented. These control measures may include fencing, handrails, safety screens, scaffolding, guardrails (including mid rail and toeboards or equivalent), safety nets, elevating work platforms, fall arrest systems or a combination of these. Control measures that provide the highest level of protection, such as those that prevent falls, should be used in preference to those providing a lower level of protection such as fall arrest systems.

Systems of fall protection should also be provided for persons installing and removing safeguards. A system to prevent or arrest falls should be provided, irrespective of height, if the risk assessment identifies the following:

- an increased risk of falling, for example, slippery surface which may cause slips and falls, or
- a hazardous situation such as where the surface condition onto which a person may fall would cause serious injuries, for example, a fall onto reinforcing steel starter bars, building materials (bricks, timber, tiles etc).

4.2 Erecting the formwork deck and supports

a. At one frame high

Where the working deck height does not exceed one level of standard frames (of the standard 1.8 m height) with end fittings and control measures to prevent or arrest falls are not provided, an alternative safe work practice should be adopted based on a documented risk assessment.

An example of an alternative safe work practice is the use of trained and experienced workers who are provided with specific work instructions (see 3.5 and 6). The risk assessment should also demonstrate that the hierarchy of controls has been considered and that the provision of a higher level of control measure is not practicable.

b. Over one frame high

Where the erection of formwork deck involves work at a height of more than one standard frame (of the standard 1.8 m height) with end fittings, a system to prevent or arrest falls must be provided to safeguard persons at risk of falling.

The following fall protection measures, fall arrest measures or other means that provide an equivalent standard of safety should be implemented:

- the use of temporary working platforms, together with the frame metalwork and bracing for fall protection. AS/NW 1576 Scaffolding requires that temporary working platforms must be at least 450 mm wide (2 planks). Cleats can be used to prevent planks from slipping off the frames
- a temporary working platform as well as a system to prevent or arrest falls should be provided when erecting above the first frame or a temporary catch platform should be provided below the work area. Catch platforms should only be adopted as a risk control measure based on a documented risk assessment (see 4.2c for use of catch platforms)
- where temporary catch platforms are provided as a fall arrest measure they should be constructed no further than one frame (of the standard 1.8 m height) with end fittings, below the work or fall risk area
- intermediate working decks should be provided at a height equivalent to three standard frames (of the standard 1.8 m height) with end fittings and also at each three standard frames (or equivalent) with end fittings thereafter (see diagram 1)
- all intermediate working decks should be erected from temporary working platforms or temporary catch platforms
- control measures to prevent or arrest falls should be provided at the final deck level before work on that deck commences. Fall protection measures, such as temporary catch platforms erected underneath, or fall arrest measures should be provided for persons carrying out work at the leading edge of the deck (see diagram 2).

DIAGRAM 1

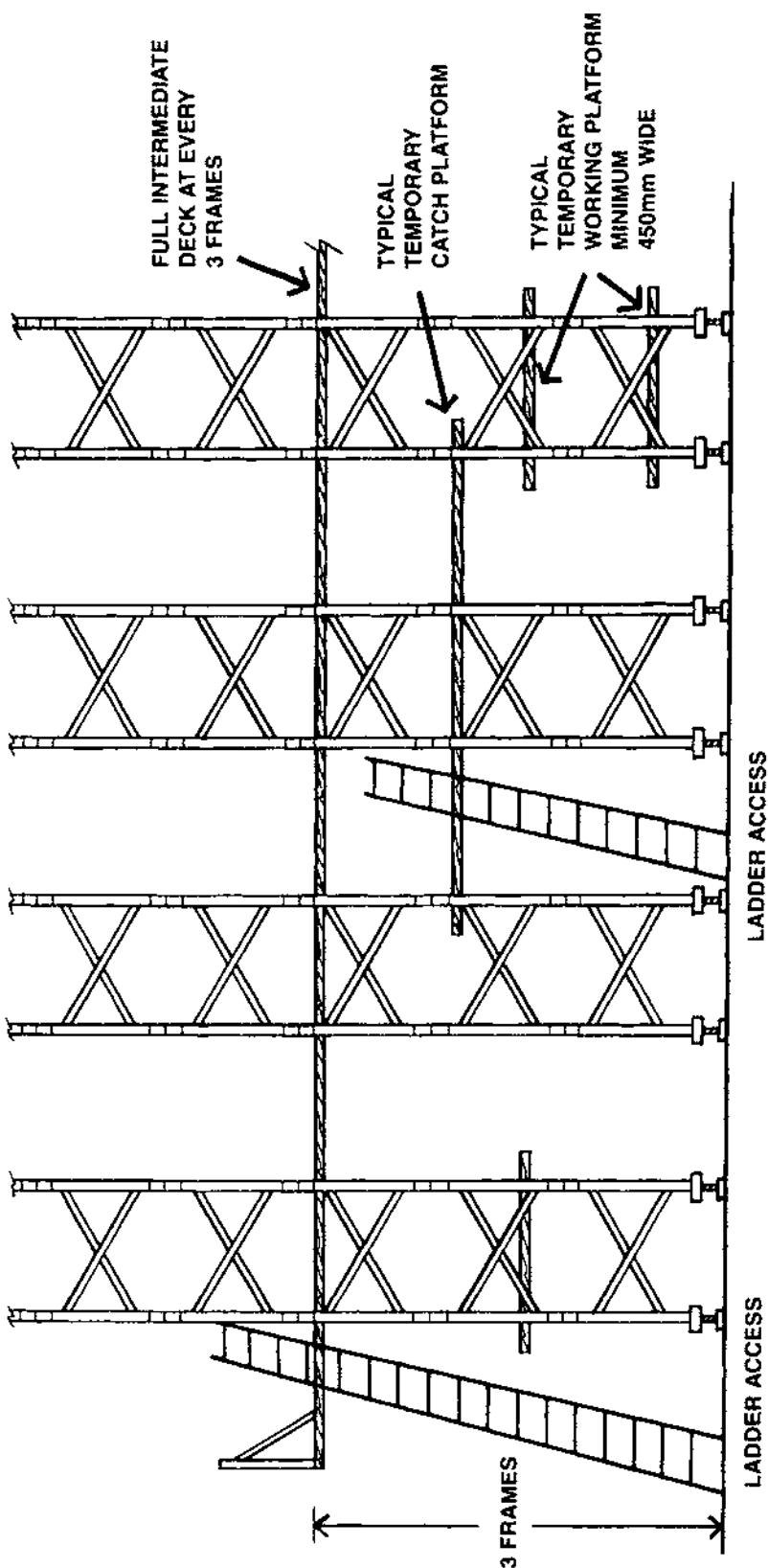
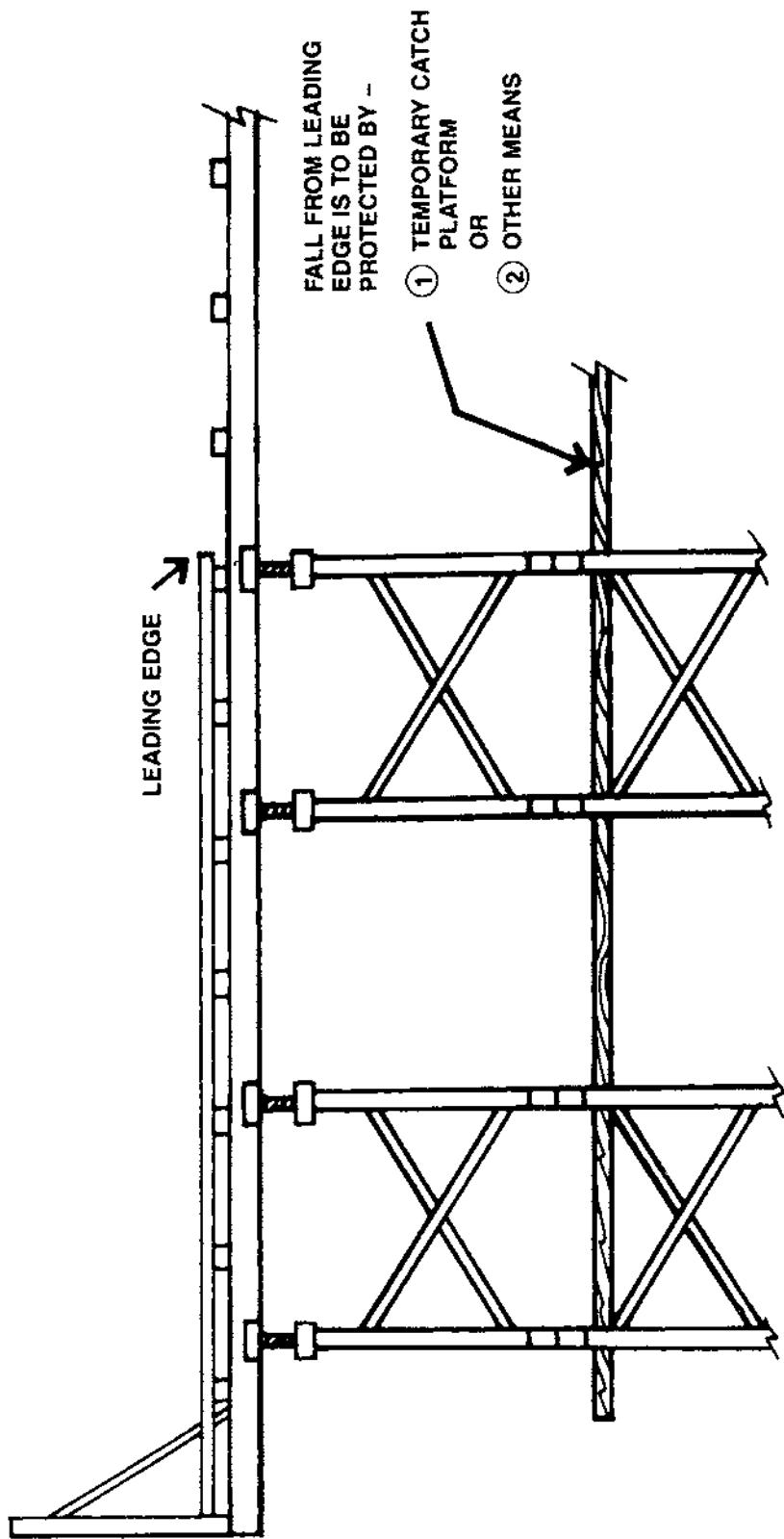


DIAGRAM 2



- when erecting the initial deck area (used for loading materials and for the initial laying of sheeting) a temporary catch platform should be erected beneath the work area as a fall arrest measure. The initial section of the final deck should be of sufficient size (completed with plywood sheeting) to create a safe working area for any further work.

Intermediate working decks may be constructed in a manner similar to a final formwork deck (that is, using bearers, joists and sheeting) or may be a further extension of a catch platform.

Temporary working platforms must be a minimum of 450 mm wide (2 planks) as required by AS 1576. Temporary working platforms should be erected on the horizontal cross members of the frames. Cleats can be used to prevent planks from slipping off the frames.

Catch platforms may be temporary working platforms that are extended and may be built from a combination of bearers, sheeting and planks or metal transoms and planks and should only be used as outlined in 4.2 c.

c. Use of catch platforms

Catch platforms should be constructed of such strength and dimensions as will ensure that they effectively catch any workers at risk of falling when carrying out any work above. They should be constructed no further than one frame (of the standard 1.8 m height) with end fittings, below the work or fall risk area.

The use of a catch platform as a risk control measure should only be adopted based on a documented risk assessment as in 4.2 b. The risk assessment should also demonstrate that the hierarchy of controls has been considered and that the provision of a higher level of control measure is not practicable.

d. Edge protection

See section 4.3.

e. Use of temporary working platforms intermediate working decks and catch platforms

Temporary working platforms and intermediate working decks should not be used to stack materials or equipment unless specifically engineered to do so. Misuse may lead to the creation of additional hazards in relation to trips and slips, persons falling onto materials or collapse of the platform or working deck.

4.3 Methods of edge protection

The Construction Safety Regulations require that where persons are exposed to a risk of falling 1.8 m or more, safeguards such as edge protection (eg handrails, guardrails, scaffolding) must be put in place prior to carrying out any work or progressively as the deck is being constructed and must remain in place until other fall protection safeguards are implemented.

Edge protection or a secured cover must be provided where there is a risk of a person, tools or materials falling through a penetration in formwork, for example, a column form.

Edge protection should be in place when erecting pre assembled formwork such as table form on floor slabs.

a. Handrails

Handrails at the perimeter of the deck or the deck openings must be at least 900 mm in height above the final working surface and have a toprail and a toeboard.

b. Guardrails

Guardrails at the perimeter of the building or deck openings must be at least 900 mm in height above the final working surface and have a top rail, mid rail and a toeboard (see diagram 3).

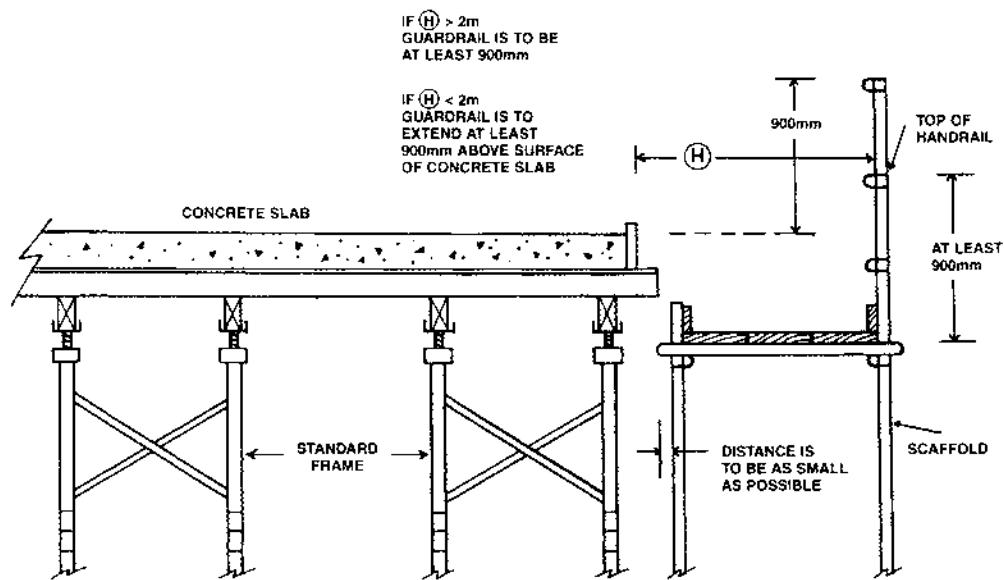


DIAGRAM 3

c. Scaffolding

Scaffolding complete with guardrails and toeboards can provide effective protection against falls at the perimeter of a building, providing the guardrail of the scaffolding extends at least 900 mm in height above the finished concrete slab. The scaffold platform should be positioned or constructed to prevent persons or materials falling between the scaffold platform and the edge of the formwork.

The OHS (Certificates of Competency) Regulation 1995 requires that all scaffolding over 4 (four) metres in height must be erected by a person holding a scaffolders certificate.

The Construction Safety Regulations require that scaffolding must be erected in accordance with AS/NZS 1576 *Scaffolding*. Scaffolding should also be erected in accordance with ASMS 4576 *Guidelines for Scaffolding*.

d. Safety screens

A safety screen system should:

- consist of an outer mesh screen erected at the edge of the concrete slab
- protect personnel erecting and dismantling formwork and other trades associated with the construction of the concrete slabs and columns
- contain materials on the upper floors prior to the installation of a safety handrail system or other fall prevention system.

Various designs and installations of safety screen systems may include the following items:

- the screens form an integral part of the formwork
- provision of a working platform
- provision of an access stairway
- jacks used to enable self climbing
- climbing by means of a crane or other lifting device.

e. Safety screen anchorages

Anchorages used to support safety screen systems, including screens with access stairway attached, should have a minimum safety factor of three (3) on the design loadings of the screens.

Anchorages should be bolts with a minimum diameter of 16 mm complete with washers and nuts as follows:

- cast in the concrete so that they are protruding above the slab, or
- through the concrete slab.

Care should be taken not to accidentally remove them during formwork stripping.

Cast in anchors should be secured to the bottom layer of reinforcing steel or in an equivalent manner.

Masonry expansion anchorages and chemical type anchorages are generally not recommended for use to support safety screen systems. If they are required to be used, anchorage suppliers should be consulted to determine the appropriateness of these anchorages and, if required, proof testing of anchorages is to be carried out prior to use.

f. Safety screen stairways

The OHS (Floors, Passageways and Stairs) Regulation 1990 requires that fixed stairs intended to provide safe access, such as access stairs which are an integral part of the safety screen system, must conform with AS 1657 *Fixed Platforms, Walkways, Stairways and Ladders*.

The underside of any access stairway which is attached to the outside of the screen system should be fully enclosed to prevent objects falling through.

A detailed procedure for the installation and climbing sequence should be given to the screen operator and should be kept on site for reference.

4.4 Methods of fall arrest

The function of a fall arrest system is to arrest a person's fall and to minimise injury if a fall occurs. Fall arrest systems should only be used after all higher levels of control have been exhausted and found to be ineffective. Fall arrest systems may be used in conjunction with higher levels of control measures, such as perimeter screens, guardrails or scaffolding.

When fall arrest systems are used in a system of work they should be evaluated to ensure that they are effective and safe and that no new hazards are created (for example, trip hazards and person's movements being restricted).

a. Fall arrest systems

Industrial fall arrest systems and devices are designed to arrest an accidental fall and consist of some or all of the following:

- anchorage point
- energy absorber
- fall arrest device
- fall arrest harness (safety harness)

- inertia reel lanyard
- lanyard assembly
- static line.

For further information, the terms used in industrial fall arrest systems and devices are explained in Appendix 2. For more detailed guidance see the *WorkCover NSW Code of Practice: Safety line systems*.

Fall arrest devices such as harnesses and lanyards can be used as travel restriction systems to prevent workers moving from safe to unsafe areas on the deck.

Industrial fall arrest systems and devices should be used in accordance with the manufacturer's instructions.

The various parts of fall arrest systems and harnesses should be compatible. It is therefore essential for the user to check that all components are compatible and fit safely together. Components of fall arrest systems and harnesses from different manufacturers should not be mixed as they may be unsafe when used together and can lead to failure of the fall arrest system.

b. Safety nets

The use of safety nets is intended to arrest a person's fall and to minimise injury if a fall occurs.

Nets should be hung as close as practicable to the underside of the work area, with sufficient clearance to prevent contact with the surface below if a person falls into them.

Care should be taken to minimise unnecessary wear and mechanical damage likely to weaken the net.

The following hazards may cause unnecessary wear and should be avoided:

- dragging the net over rough surfaces
- contact with sharp edges
- chemical attack
- sparks etc, from angle grinders, welding and burning operations and hot gases from blow lamps
- stacking material on the net
- accumulation of debris in the net.

Nets should be constructed in accordance with BS 3913 *British Standard Specification for Safety Nets*.

Nets should be inspected by a person holding a rigging or scaffolding certificate under the *OHS (Certificates of Competency) Regulation 1995* or equivalent before and after installation, relocation or repair. The use and maintenance of the nets should be in accordance with AS 4576 *Guidelines for Scaffolding*, Appendix F Industrial Safety Nets.

4.5 Manual handling

The OHS (Manual Handling) Regulation 1991 requires employers to design equipment, tasks and work environments so that manual handling risks are eliminated or reduced as far as reasonably practicable.

Employers must assess and control the risks involved in carrying out manual handling tasks. This must be done in consultation with employees who are required to carry out the work. Guidance on identifying, assessing and controlling manual handling risks can be found in the *National Standard and Code of Practice for manual handling*.

The following practical guidance outlines some ways in which manual handling risks can be controlled in formwork erection and dismantling. However, employers are still required to undertake their own risk assessments and implement control measures. This should be included in the work method statement which describes the sequence of work tasks and activities and how the work is to be done safely.

a. **the employer should control risks by:**

- designing or re designing the manual handling task to eliminate or control the risk factor
- providing appropriate training to employees in safe handling techniques. This training should also include the prevention of manual handling injuries by an approach based on a hazard identification, risk assessment and control through job and task design.

Where re design is not practicable, or as a short term/temporary measure, the employer should:

- provide mechanical aids and/or personal protective equipment. Manual handling risks may be controlled by using powered mechanical equipment to lift and move formwork frames and other materials such as floor centre spacings during erection and dismantling of formwork. Lifting equipment could include cranes, forklifts, electric pallet trucks and stackers. Mechanised systems such as climbing column formwork and table forms also eliminate manual handling
 - arrange for team lifting in order to reduce the risk. Team lifting (sharing the load between two or more employees) should be used for loading, unloading, stacking and moving frames and other large items where it is impractical to use mechanical assistance
 - ensure employees receive appropriate training in methods of manual handling involving team lifting procedures, correct use of the mechanical aids and PPE. Where the nature of the work activities or manual handling tasks are constantly changing, the risk assessment and control process and training provided should be on an ongoing basis.
- b. Weights that are manually handled should be minimised. The *Code of Practice for Manual Handling* advises caution where loads are above 16–20 kg. Furthermore persons should not be required to lift, lower or carry loads above 55 kg, unless mechanical assistance and/or team lifting arrangements are provided to lower the risk of injury. Where manual handling involves repetitive bending, twisting, over reaching, work overhead or where persons have pre existing injuries these loads should be further decreased. Loads may be reduced by substituting lighter weight components where possible, for example, using smaller sheet sizes of plywood and shorter bearers, using aluminium beams in place of steel or timber. 1800 mm x 1200 mm ply sheets could be used in preference to larger sizes and bearer lengths should be limited to 4.8 m where possible.
- c. The sequence of erection and frame components used should ensure that components can be removed separately so as to minimise weights that require manual handling. A combination of frame heights should be used to make up the height required instead of using telescoping extensions.
- Frames with telescoping extensions and screw jacks attached should not be manually lifted by one worker. Information about weights of framing components should be made available to employees.
- d. Frames should be selected in consultation with employees at the planning stage. This should take into account the methods of manual lifting and carrying that must be used, the weight and balance of the frame and the way in which the weight of the frame is to be supported.
- e. Frames and materials should be delivered as near to the work location as possible to eliminate manual double handling.

- f. Materials should be stored on racks or other supports at a height of at least 600 mm so that manual lifting can be done without excessive bending. Frames and sheets of ply that are carried in an upright position should be stored upright in a rack. (*Suggested rack arrangements are illustrated in diagrams 4 & 5 below*).

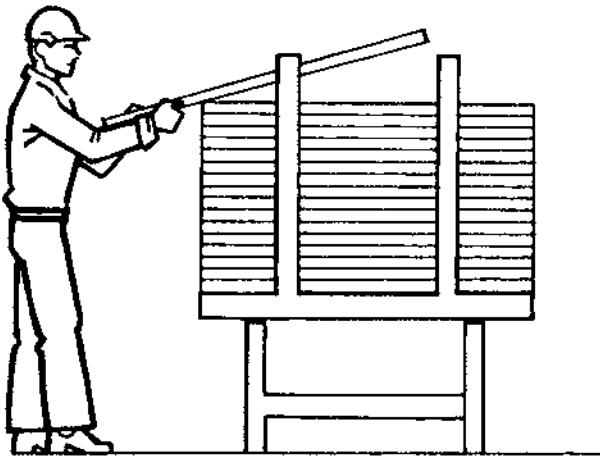


DIAGRAM 4

Rack to support ply sheets at better height for manual handling. Materials should be between thigh and shoulder height.

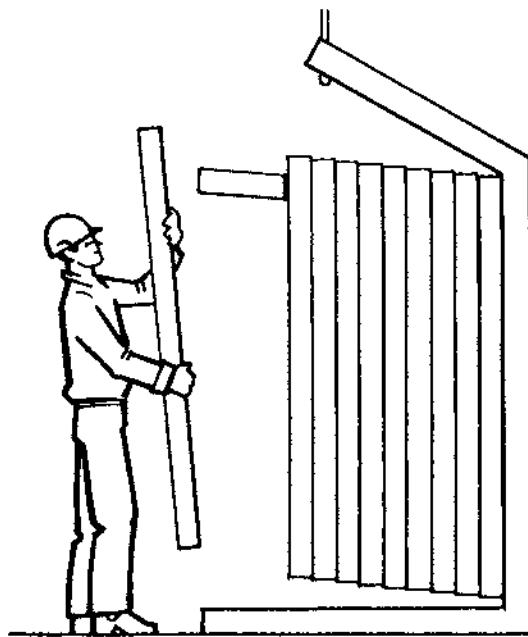


DIAGRAM 5

Rack for hanging formwork frames in upright position. Provision is made for lifting loaded rack by crane or forklift.

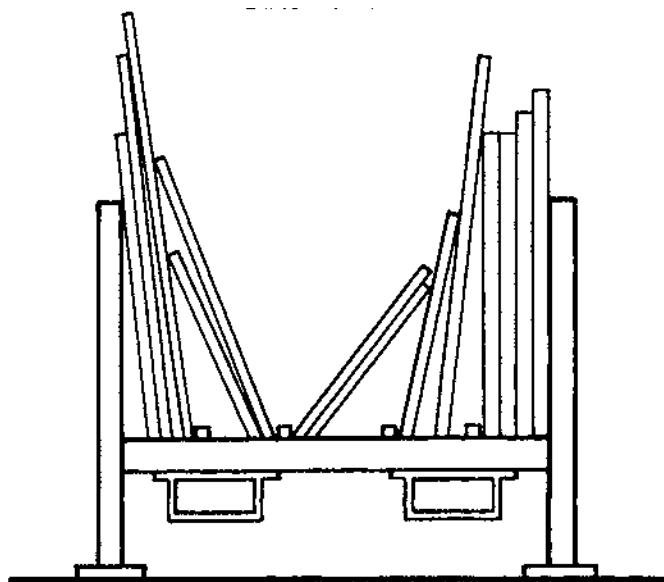
- g. The overhang of planks should be limited to 150 mm beyond the frames so that they do not obstruct frames being lifted which can cause excessive bending. The overhang may be used to temporarily support the frame before it is placed in its final location. Cleats can be used to prevent planks from slipping off the frames.
- h. The rotation of work duties should be considered in consultation with employees so that employees are not subjected to the same task for the whole shift.

4.6 Access

The *Occupational Health and Safety Act 1983* requires that a safe means of access to every place at which any person has to work at any time must be provided and maintained:

- a. All areas of access should be kept clear and free of obstructions. All materials should be properly stored to reduce trip and slip hazards, including those during dismantling ensuring all areas are kept free of projecting nails. The Construction Safety Regulations require that all formwork materials must be free of projecting nails. All nails should be removed from the formwork material during the process of dismantling. High tensile nails, (for example, explosive power tool nails), should be removed with an appropriate tool to prevent nails becoming projectiles when being removed. All plywood sheet offcuts and stripped plywood pieces should be stored in a frame similar to diagram 6. below to prevent sheeting becoming a trip/slip hazard.

DIAGRAM 6



RACK FOR USED FORMWORK MATERIALS

- b. Access requirements should take into account the number of persons using them and any tools and equipment persons may be required to carry to and from the formwork.
- c. Temporary access stairways and/or gangways with handrails should be provided where practicable.
- d. Where ladders are used for access the Construction Safety Regulations require the following (see Appendix 3 – Safety Guide Portable ladders):
 - the ladder must be secured against displacement. Ladders should have non slip feet
 - a safe and adequately sized landing place when stepping off the ladder must be provided
 - the stiles of the ladder must extend at least one metre above the landing place
 - metal or wire reinforced ladders must not be used where there is a risk of contact with electrical conductor wires (powerlines) or of electrocution. Non conducting ladders should be used or a clearance of at least four metres from conductors should be maintained.

- e. The Construction Safety Regulations require that scaffolding must be erected in accordance with AS/NZS 1576 *Scaffolding* which requires that temporary working platforms must be at least 450 mm wide (two planks). Cleats can be used to prevent planks from slipping off the frames. A system to control risks should be provided for persons exposed to a risk of falling (see 4.1).
- f. The Construction Safety Regulations require that adequate lighting (natural or artificial) must be provided to ensure the work areas and access ways are well lit. If artificial lighting is used, ensure it does not create excessive glare or shadows.

4.7 Prevention of objects falling

- a. Perimeter edge protection should be constructed to effectively prevent any materials, tools or objects falling onto persons below.
- b. Lanyards on tools should be used where there is a risk of the tool being dropped and striking persons below (see 4.3).
- c. Loose formwork materials such as plywood and plant should be secured to prevent accidental displacement, especially during high winds.
- d. Props which are not braced or tied should be secured or removed to prevent accidental dislodgement.
- e. A physical barrier such as a temporary kerb should be provided to prevent mobile plant such as pedestrian operated fork lift truck from falling off the edge of building or displacing formwork.

4.8 Moving loads and materials

Systems of work must ensure the safety of persons in the vicinity of materials or loads being moved:

- a. Tag lines should be used to guide and control suspended loads.
- b. Persons who control loads suspended from a crane must hold a dogging certificate under the *OHS (Certificates of Competency) Regulation 1995*.
- c. Areas in the vicinity of materials or loads being moved should be clear of persons when moving long materials such as joists, bearers, planks and frames to prevent striking persons nearby.
- d. Areas beneath suspended loads should be clear of persons.

4.9 Using hazardous substances

Where hazardous substances or materials are used at the workplace, the contractor doing the work should ensure compliance with the provisions of the *OHS (Hazardous Substances) Regulation 1996* so that associated formwork operations do not become a risk to health. This includes providing training in the safe labelling, handling and use of the substance and providing the manufacturer's Material Data Safety Sheet which sets out information about the hazards involved in using the substance and how to use the substance safely.

4.10 Noise

Noise management provisions should be carried out by the contractor doing the work to ensure compliance with *OHS (Noise) Regulation 1996* so that noise levels from machinery or equipment being used do not become a risk to hearing or health. The noise management provisions in the *Code of Practice for Noise Management and Protection of Hearing at Work* are a practical guide on managing noise levels at the workplace.

The risk of causing permanent hearing damage is related to both loudness of the noise and the length of exposure. For example two minutes working in noise levels of 114 decibels dB(A) may cause the same amount of damage as eight hours working in 85 dB(A).

A noise assessment should be conducted to determine the level of noise that employees are exposed to. Where the noise level is in excess of the noise exposure limits, engineering control measures should be implemented. Where this cannot be achieved or work cannot be organised to minimise exposure, appropriate hearing protection equipment should be provided to all persons in the vicinity of the noise. For more information on assessing noise levels see the WorkCover publication, *Do I have a noise problem?*

5. Personal protective equipment (PPE)

5.1 Provision of PPE

Before erecting or dismantling any formwork, the contractor should assess the risks likely to affect the health and safety of the employees or him/herself, as identified by the risk assessment procedure, and must provide and arrange for the use of appropriate and compatible PPE. A fall arrest system is a form of PPE. The following PPE should be provided where required:

a. Safety helmets

The use of safety helmets may prevent or lessen a head injury from falling objects or a person hitting their head against something. Where there is a likelihood of persons being injured by falling objects and overhead protection is not provided, the Construction Safety Regulations require that persons must be provided with and must use a safety helmet. Safety helmets should also be provided and used where a person may strike their head against a fixed or protruding object or where there is a risk of accidental head contact with electrical hazards.

b. Eye protection

Where persons are carrying out cutting, grinding, chipping or welding of concrete or metals the Construction Safety Regulations require that persons are provided with and use eye protection complying with AS 1337 Eye protectors for Industrial Applications to reduce the risk of eye injury. Eye protection complying with AS 1337 should also be provided and used where persons carry out other work, such as carpentry, where there is a risk of eye injury.

There should be sufficient supervision and monitoring conducted to ensure that employees are provided with and use the appropriate eye protection.

c. Safety harnesses

The Construction Safety Regulations require that a safety harnesses complying with the requirements of AS 1891 shall be provided where required. In selecting a safety harness for erecting and dismantling of formwork ensure that the equipment gives the wearer the maximum degree of comfort, freedom and movement and the greatest possible security against injury. For further information refer to AS 2626 *Industrial Safety Belts and Harnesses Selection, Use and Maintenance*. (See 4.4 a)

d. Safety gloves and footwear

Safety gloves and footwear should be provided when handling materials such as timbers, scaffolding components and steel frames to reduce the risk of injury.

e. Protection from sun

Workers should be protected from sunlight/UV radiation by using a sunscreen with an SPF (sun protection factor) rating of at least 15+ and wearing hats, long sleeves and long trousers. If short sleeved shirts and shorts are worn in very hot weather, the exposed parts of the body should be protected by using the appropriate sunscreen. Persons exposed to reflective surfaces (such as formwork decks) should be protected from the risks of eye damage from the increasing exposure to the sun by UV protection glasses to AS 1337 and AS 1338 as part of personal protective clothing and equipment. Even with protection, there should be sufficient supervision and monitoring conducted to ensure that workers do not have extended exposure to strong sunlight and reflection.

5.2 Clothing

Clothing should be comfortable in all positions such as standing, bending and crouching and be suitable for the work being done and the weather conditions. Loose clothing or equipment which may snag or create a trip hazard should be avoided.

5.3 Maintenance of PPE

All PPE should be regularly inspected and replaced as necessary.

6. Training and instruction

Under Section 15.2(c) of the OHS Act employers must provide training, instruction, information and supervision to ensure the health and safety of their employees. All persons involved in erecting and dismantling of formwork must be trained to follow systems of work and work practices that enable them to perform in a manner that is safe and without risks to health, and must hold appropriate certificates of competency. The persons carrying out the erecting and dismantling must have the appropriate certificates. Only those persons who have received training and instruction may carry out the work.

The employer must monitor the systems of work and provide refresher training to ensure that safe systems and work practices are being followed, including the use of PPE.

The training provided and the instruction given should include at least:

- a. Induction training which complies with the requirements of the Construction Safety Regulations and with the recommendations of the Code of Practice: Occupational Health and Safety Induction Training for Construction Work 1998.
- b. The work method to be used for erecting and dismantling of formwork and the manual handling of equipment by operators, including control measures based on the risk assessment to prevent injury.
- c. The correct use, care and storage in accordance with the manufacturer's recommendations or Australian Standards, where appropriate, of:
 - personal protective equipment
 - tools and equipment to be used
 - individual fall arrest equipment.
- d. The use of plant and associated equipment including electrical safety and hazardous substances.
- e. Procedures to be adopted in the event of accident, injury or other emergency

7. Legal requirements

7.1 Occupational health and safety

Every person at the place of work has a duty under the *Occupational Health and Safety Act 1983*, whether as an employer, employee, a self employed person or a person in control of the workplace. While the obligation for each person is different, all person must ensure that the way they carry out their work does not interfere with the health and safety of other persons present at the workplace.

Employer's responsibilities

Employers have an obligation to ensure the health, safety and welfare of employees and other persons at the place of work and to comply with the OHS Act and Regulations.

Employee's responsibilities

Employees have an obligation to take reasonable care for the health and safety of other persons in the workplace and to cooperate with their employer in the interests of health, safety and welfare. Employee must use the appropriate protective equipment for the work being done.

Manufacturer/supplier responsibilities

Manufacturers and suppliers have an obligation which requires them to ensure health and safety as regards to plant or substances used at places of work. They are required to carry out research, testing and examination, as may be necessary, and to make available adequate information about the safe use of the plant or substances and of any conditions necessary to ensure the plant or substance will be safe and without risks to health.

Person in control

Any person who has, to any extent, control of a work place, the means of access or egress, or plant or substance used, has an obligation which requires them to ensure health and safety with regards to the workplace, the means of access or egress and the plant or substances used at the work place.

Self employed persons

Self employed persons have an obligation to ensure that persons not in their employment are not exposed to risks to their health and safety arising from the conduct of his undertaking while they are at his place of work.

7.2 Statutory provisions

The following Acts and Regulations apply to formwork:

- *Occupational Health and Safety Act 1983*
- *Construction Safety Act and Regulations*
- *Occupational Health and Safety (Manual Handling) Regulation 1991*
- *OHS (Floors, Passageways and Stairs) Regulation 1990*
- *OHS (Noise) Regulation 1996*
- *OHS (Hazardous Substances) Regulation 1996*
- *The OHS (Certificates of Competency) Regulation 1995*

The following legislative requirements are mentioned in the code:

- Section 3 AS 3610 *Formwork for Concrete*
- Section 3.1 i AS 3610 *Formwork for Concrete*
- Section 3.2 h AS 3610 *Formwork for Concrete*
- Section 3.3 e *OHS (Manual Handling) Regulation 1991*
- Section 3.3 h AS 3610 *Formwork for Concrete*
- Section 3.3 k AS 3610 *Formwork for Concrete*
- Section 3.3 l AS 3610 *Formwork for Concrete*
- Section 3.3 m AS 3610 *Formwork for Concrete*
- Section 3.3 q *OHS (Noise) Regulation 1996*
- Section 3.3 q *OHS (Hazardous Substances) Regulation 1996*
- Section 3.3 r *Construction Safety Regulations*
- Section 4 AS3610 *Formwork for Concrete*
- Section 4.1 *Construction Safety Regulations*
- Section 4.2 b AS/NW 1576 *Scaffolding*
- Section 4.3 *Construction Safety Regulations*
- Section 4.3 c *OHS (Certificates of Competency) Regulation 1995*
- Section 4.3 d AS/NZS 1576 *Scaffolding*
- Section 4.3 f *OHS (Floors, Passageways and Stairs) Regulation 1990*
- Section 4.3 f AS 1657 *Fixed Platforms, Walkways, Stairways & Ladders*
- Section 4.5 *OHS (Manual Handling) Regulation 1991*
- Section 4.6 a *Construction Safety Regulations*
- Section 4.6 d *Construction Safety Regulations*
- Section 4.6 e AS/WS 1576 *Scaffolding*
- Section 4.6 a *Construction Safety Regulations*
- Section 4.6 f *Construction Safety Regulations*
- Section 4.8 b *OHS (Certificates of Competency) Regulation 1995*
- Section 4.9 *OHS (Hazardous Substances) Regulation 1996*
- Section 4.10 *OHS (Noise) Regulation 1996*
- Section 5.1 a *Construction Safety Regulations*
- Section 5.1 b AS 1337 *Eye protectors for Industrial Applications*
- Section 5.1 c AS 1891 *Industrial Safety Belts and Harnesses*
- Section 6 a *Construction Safety Regulations*
- Section 7 *Legal requirements under the OHS Act 1983*

The provisions of the OHS Act, regulations, Australian Standards and Worksafe guides and codes of practice mentioned above are mandatory provisions in legislation and must be complied with. They have been mentioned in this code of practice to provide assistance in directing readers to other legislative requirements which may have some application. The list is not exhaustive and is included in this code by way of assistance only.

Definitions

These definitions are for the purposes of this Code:

Construction work includes:

- a. building, including excavation, and the construction, alteration, renovation, repair, maintenance and demolition of all types of buildings or structures
- b. civil engineering, including excavation, and the construction, structural alteration, repair, maintenance and demolition of, for example, airports, docks, harbours, inland waterways, dams, river and avalanche and sea defence works, roads and highways, railways, bridges, tunnels, viaducts and works related to the provisions of services such as communications, drainage, sewerage, water and energy supplies
- c. the erection and dismantling of prefabricated buildings and structures as well as the manufacturing of prefabricated elements at the construction site.

Contractor (often referred to as subcontractor) means the person responsible for the erecting and dismantling the formwork and associated equipment. Depending on the contractual arrangements which are in place, the contractor doing the work may be an employer, self employed person or a person in control within the terms of the OHS Act.

Employee means an individual who works under a contract of employment or apprenticeship.

Employer means a corporation which, or a person who, employs persons under contracts of employment or apprenticeship.

Formwork means the surface, support and framing used to define the shape of concrete until it is self-supporting. Note: This term includes the forms on which the concrete is poured, the supports which withstand the loads imposed by the forms and the concrete, the bracing which may be added to ensure stability, and the footings. When complete the formwork can be known as the formwork assembly. Supports and bracing mentioned above are sometimes known as falsework.

Formwork engineer means a person qualified for corporate membership of the Institution of Engineers, Australia, having not less than 12 months' experience in the design of formwork and who is responsible for the coordination of the formwork design, erection and dismantling for a particular job.

Principal contractor (often referred to as the head or main contractor) means the person with the overall responsibility for the construction work. Depending on the contractual arrangements which are in place, the principal contractor may be regarded as an employer, self employed person or a person in control under the OHS Act.

Self-employed person means an individual who works for gain or reward otherwise than under a contract of employment or apprenticeship, whether or not he/she employs others.

Work method statement means a written statement outlining the procedures required to carry out a particular function or task safely. It identifies the work/tasks in a logical sequence, the hazards associated with the work/tasks, the relevant health and safety risk control measures and the training and qualifications required to carry out the work safely. For more information on writing work method statements see the WorkCover NSW Guidelines for writing work method statements in plain English.

More information

Codes of practice

- Code of practice: Electrical practices for construction work
- Code of practice: Safety line systems
- Code of practice: Noise management for protection of hearing at work
- Code of practice for manual handling
- Code of practice: OHS Induction Training for construction work

Standards Australia publications

- AS 1337 *Eye protectors for Industrial Applications*
- AS/NZS 1338.2:1992 *Filters for protection against ultraviolet radiation*
- AS/NZS 1576 *Scaffolding*
- AS 1657 *Fixed Platforms, Walkways, Stairways and Ladders*
- AS 1891 *Industrial Safety Belts and Harnesses*
- AS 2626 *Industrial Safety Belts and Harnesses Selection, Use and Maintenance*
- AS 3610 *Formwork for Concrete*
- AS/NZS 4576 *Guidelines for Scaffolding*
- BS 3913 *British Standard Specification for Safety Nets*

Appendix 1

A typical risk assessment checklist

The purpose of this checklist is to assist formwork contractors to identify hazards at the workplace and to develop work procedures that are safe for persons working on and about formwork.

On the following pages is a checklist to assist in identifying some of the common hazards and risks concerning work on and about formwork.

If the answer is “yes” to any question, attention is required and control measures need to be put in place.

Project:

Principal contractor:

Formwork contractor:

Site address:

Type of work:

Hazard identification		Control measures
Is there a risk of falling 1.8m or more?	NO <input type="checkbox"/>	YES <input type="checkbox"/> A system to control risks should be provided for persons exposed to a risk of falling.
Is there an increased risk of falling?	NO <input type="checkbox"/>	YES <input type="checkbox"/> A system to control risks should be provided for persons exposed to a risk of falling.
Is there a risk of falling at the leading edge of the deck?	NO <input type="checkbox"/>	YES <input type="checkbox"/> Use systems, as required by the code, to prevent or arrest falls.
Is the surface condition below the deck, onto which a person may fall, hazardous?	NO <input type="checkbox"/>	YES <input type="checkbox"/> Use systems, as required by the code, to prevent falls.
Are systems in place to prevent objects falling?	NO <input type="checkbox"/>	YES <input type="checkbox"/> Use a system to prevent objects falling onto personnel.
Would the structure exceed a height equivalent to three standard frames?	NO <input type="checkbox"/>	YES <input type="checkbox"/> An intermediate working deck should be provided at a height equivalent to three standard frames and also at each three standard frames thereafter (see diagram 1).
Are temporary working platforms and intermediate working decks required to be used to stack materials or equipment?	NO <input type="checkbox"/>	YES <input type="checkbox"/> The contractor doing the work should ensure that they are designed to be so used.
Is edge protection necessary?	NO <input type="checkbox"/>	YES <input type="checkbox"/> Edge protection must be put in place prior to carrying out work or progressively as the deck is being constructed and must remain in place until other fall protection safeguards are implemented.
By using fall arrest systems, are new hazards created?	NO <input type="checkbox"/>	YES <input type="checkbox"/> They should be evaluated to ensure that they are effective and safe and that no new hazards are created.
Are safety nets to be used?	NO <input type="checkbox"/>	YES <input type="checkbox"/> Avoid hazards as per clause 4.4 b.
Does the structure supporting the deck require modification to support safeguards?	NO <input type="checkbox"/>	YES <input type="checkbox"/> Notify the principal contractor. Do not proceed until modifications are complete.
Are the surfaces of materials on which work is to be performed: • wet? • slippery?	NO <input type="checkbox"/>	YES <input type="checkbox"/> Use systems, as required by the code, to prevent falls.
Is access to and from the site unsuitable?	NO <input type="checkbox"/>	YES <input type="checkbox"/> Arrange safe access.
Is access to and from the workplace unsuitable?	NO <input type="checkbox"/>	YES <input type="checkbox"/> Arrange safe access.
Are ladders required?	NO <input type="checkbox"/>	YES <input type="checkbox"/> Ensure ladders meet the requirements of the Construction Safety Regulations by following Appendix 3 in this code.
Are there any electrical hazards within 4.0 metres of the workplace?	NO <input type="checkbox"/>	YES <input type="checkbox"/> Power should be disconnected, insulated or otherwise made safe before proceeding.

Hazard identification		Control measures
Are the climatic/environmental conditions including lighting levels unsuitable for work at the workplace?	NO <input type="checkbox"/>	YES <input type="checkbox"/> Discontinue work until conditions are suitable.
Are there persons who have not received appropriate induction training to carry out the work?	NO <input type="checkbox"/>	YES <input type="checkbox"/> Provide appropriate induction training to carry out the work before proceeding.
Are there any manual handling issues?	NO <input type="checkbox"/>	YES <input type="checkbox"/> Provide systems of work which comply with the recommendations of the OHS (Manual Handling) Regulation 1991.
Is the plant and tackle required for lifting materials unavailable or unsuitable?	NO <input type="checkbox"/>	YES <input type="checkbox"/> Obtain suitable plant and tackle required for lifting materials.
Are there other persons/trades working at the site?	NO <input type="checkbox"/>	YES <input type="checkbox"/> Provide appropriate physical barriers or clearly display hazard warning signs as appropriate, such as: <ul style="list-style-type: none"> • PERSONS WORKING ABOVE • NAIL GUN IN USE • ELEVATOR OR HOIST IN USE.
Are portable electric powered tools being used?	NO <input type="checkbox"/>	YES <input type="checkbox"/> Ensure that they are protected by a Residual Current Device (safety switch) before proceeding.
Are there any employees who have not been supplied with the appropriate PPE?	NO <input type="checkbox"/>	YES <input type="checkbox"/> Supply with the appropriate PPE before proceeding.
Are there any persons who have not been adequately trained and instructed in the use of PPE?	NO <input type="checkbox"/>	YES <input type="checkbox"/> Train and instruct all persons in the use of PPE.
Are any personnel unaware of the emergency and rescue procedures in the event of an accident, injury or other emergency (including the means of rescuing persons from safety harnesses following arrested falls)	NO <input type="checkbox"/>	YES <input type="checkbox"/> Ensure emergency and rescue procedures in the event of an accident, injury or other emergency (including the means of rescuing persons from safety harnesses following arrested falls) are in place and known by all personnel.
Are loads or materials required to be moved?	NO <input type="checkbox"/>	YES <input type="checkbox"/> Systems of work must ensure the safety of persons in the vicinity of materials or loads being moved. See clause 4.8.
Are hazardous substances or materials being used at the workplace?	NO <input type="checkbox"/>	YES <input type="checkbox"/> The contractor doing the work should ensure compliance with the provisions of the OHS (Hazardous Substances) Regulation 1996 so that associated formwork operations do not become a risk to health.
Could noise become a risk to hearing or health?	NO <input type="checkbox"/>	YES <input type="checkbox"/> Noise management provisions should be carried out by the contractor doing the work to ensure compliance with OHS (Noise) Regulation 1996 so that noise levels from machinery or equipment being used do not become a risk to hearing or health.

Appendix 2

Terms used in fall arrest systems

Anchorage point is a secure point of attachment on a structure to which a fall arrest device or anchorage line may be secured, or a secure point on a fall arrest device to which a lanyard may be secured.

Energy absorber (deceleration device) is an attachment designed to be used in connection with fall arrest equipment which reduces the shock to the body and anchorage point by absorbing some of the fall energy.

Fall arrest device is a self locking device whose function is to arrest a fall:

- Type 1: A fall arrest device which travels along an anchorage line and, when loaded, locks to the line.
- Type 2: A fall arrest device from which a spring loaded anchorage line pays out, and which locks when loaded.

Fall arrest harness (safety harness) is an assembly of interconnected shoulder and leg straps designed for attachment to a lanyard or fall arrest device.

Fall arrest system is any device designed to minimise the distance and severity of a fall.

Lanyard is a flexible line, rope or strap used, usually as part of a lanyard assembly, to connect a fall arrest harness to an anchorage point or static line.

Lanyard assembly is the combination of a lanyard and a personal energy absorber.

Inertia reel is a retractable lifeline that has a fall arrester built into the feeding mechanism of the line.

Rope grab fall arrester reduces the potential free fall distance and may absorb much of the energy of a fall while allowing mobility along the line. The rope grab can be either manually moved along the line and locked in place, or it can be an automatic device.

Static line is a horizontal or substantially horizontal line attached to two or more anchorage points to which a lanyard may be attached and designed to arrest a fall.

Appendix 3

Transcript from the WorkCover NSW safety guide – Portable ladders

A ladder is used for gaining access to areas above or below the ground, or other levels not provided with permanent access. It is important to realise that there are limits to the safe use of a ladder. Most accidents involving ladders occur because these limits are exceeded.

Portable ladders should comply with the requirements of the relevant Australian Standard, that is:

AS 1892.1A996, Portable ladders Metal,

AS 1892.2 1992, Portable ladders Timber and

AS 1892.3A996 Portable ladders Reinforced plastic.

Presently AS 1892.4 1992 (Int), Portable ladders – Selection and maintenance, has been withdrawn but will be replaced by AS 1892.5 when published by Standards Australia.

When using portable ladders, the following points should be observed:

1. All ladders should be adequately supported at the base. Wet grass with soft soil beneath it, or a makeshift support under one side is not acceptable. If the surface is too soft to support the ladder, use a plank or board under the feet of the ladder to stop it from sinking. Depending on the degree of unevenness, a plank or board under one or both feet may be adequate, providing the plank(s) are stable, i.e. much wider than the thickness, and large enough not to sink into the ground on one side. If the ground is uneven, use a purpose made device to steady the ladder. Do not erect a ladder on a slippery surface; its stability depends on the friction at the base of the ladder.

2. A ladder should never be “walked” by the person standing on the ladder. The word “walked” above describes the action of a person standing at the top of a ladder who, by moving his body, causes the bottom of the ladder to lift the ends of the stiles alternately to cause the ladder to move. This is a very dangerous practice, since the ladder is not under proper control.

3. Set the ladder at a slope of approximately 4 in 1. For every metre in height, the ladder should extend out from the vertical surface at the base by about 250 mm. This will minimise the chance of the ladder falling backward or the bottom of the ladder sliding away from the wall, and is the most comfortable and safe slope for climbing and working from the ladder.

4. One ladder, one person, and it is recommended that one should always have three limbs on the ladder at all times. This means either two feet and one hand, or one foot and two hands on the ladder when ascending, descending, or working on the ladder. To achieve this, always carry your tools in a tool belt, holster or pouch, not in your hands. Never attach a power tool to the side of a ladder when it is not in use.

Beware of contacting power lines when putting a ladder into position. If you must work near power lines, including supply lines into a building, have them de energised, or insulated with “tiger tails”, before placing the ladder. In addition, any ladder used near power lines should be nonconducting, such as timber (without wire reinforcement, or with the wire reinforcement recessed and insulated) or fibre glass, but not aluminium or any metal.

5. Never climb higher than the third rung from the top of the ladder. The ladder should be long enough to provide at least 1 m of solid support beyond the height of the task. Where it is necessary to get onto or off at the top of the ladder, it should extend at least 1 m above the level being accessed. As a general rule, a ladder should be used as a means of access and not a place of work. If it is necessary to work from a ladder, do not climb higher than a position where the worker's shoulders are level with the top of the stiles. This allows for a secure hold to be maintained while working. Only use a ladder as a place of work if the worker can grasp the ladder near waist height, and only for tasks which allow the worker to hold the ladder with one hand. Ladders should be placed in a manner that permits the worker to face towards both the ladder and the task without leaning over the side of the ladder. When working from a ladder, always work within easy arm's reach from the ladder. This minimises the possibility of overbalancing and falling off. Extra care should be taken when painting eaves and fascia boards, as the ladder is usually below the work height.

Ladders should not be used outdoors in strong winds. If their use cannot be avoided under these conditions, adequate care must be taken to secure the ladder by tying it off at top and bottom. While the ladder is being tied off, it should be held securely by another person.

Ladders under 3 m in length, which are not normally tied off in use, should incorporate rubber (or similar non slip material) feet to prevent slipping.

Ladders longer than 3 m should be tied off for stability. The ties should be attached to the stiles of the ladder, not the rungs. While the ladder is being tied off, it should be held securely by another person

If it is not practical to tie off a ladder over 3 m in height for whatever reason, the ladder must be "footed" at the base by another person with both hands on the stiles to prevent any movement or overturn of the ladder. If a ladder must be used near a doorway, the door should be removed, blocked open or locked closed. Alternatively, a person may be placed on guard at the foot of the ladder.

If a ladder is to be left unattended for a period of time in an area accessible to the public, disable it by securing a plank that covers the full width of the rungs onto the lower half of the ladder.

6. Extension ladders, such as rope and pulley types, are suitable for accessing high areas such as rooftops and tall trees. One specialist design is the pole ladder, which has a curved top rung to give the ladder stability when used for accessing a pole or round column. To erect a rope and pulley ladder, place the unextended ladder into position and then extend it a few rungs at a time, using the rope. Always ensure that the latching hooks are properly engaged after each extension. Long ladders and heavy ladders (greater than 20 kg) should only be handled by two persons.

7. Stepladders should only be used in the fully open position. They should be positioned on a stable surface, with no tendency to wobble. They should be made as rigid as possible by side braces and cross braces. Some specialised types of stepladders have a working platform for standing on at their top; this platform should be surrounded by a handrail. Platform ladders should only be used for handling items located at a height compatible with the height of the platform.

8. Fully enclosed slip resistant footwear should always be worn when using ladders.

9. Ladders should be stored under cover, with adequate support to prevent sagging. They should be inspected at regular intervals and any defects or deterioration repaired before further use. Wooden ladders should never be painted. If a preservative is used it should be transparent, and remain transparent during the life of the ladder, to enable visual inspections to detect deterioration or defects.

10. Maximum length of ladders listed in parts AS 1892 1, 2, & 3

Metal and Plastic ladders:

single	9m	industrial
	5m	domestic
extension	15m	industrial
	7m	domestic
stepladders	6.1m	industrial
	2.4m	domestic
trestle	5m	

Timber ladders:

single, runged	9.2m	
single, cleated	4.9m	
extension	15.3m	
stepladders	5.5m	industrial
	2.4m	domestic
stepladders		
platform	5.5m	
trestle	5.1m	

Industrial ladders have a load rating of 120 kg

Domestic ladders have a load rating of 100 kg

Domestic ladders should not be used in an industrial environment.

Updated September 1997 SG4

Appendix 4

A typical example of a work method statement

(See also the WorkCover NSW document: *Guidelines for writing work method statements in plain English*)

WORK METHOD STATEMENTS

(A GUIDELINE)

Formwork contractors are required to submit Work Method Statements. Many contractors submit "Technical Procedures" for carrying out construction work processes as Work Method Statements. As such, these documents do not constitute a Work Method Statement (WMS) as required for Hazard Identification & Risk Assessment. WMS should be submitted to the main contractor prior to commencing on-site work.

A Work Method Statement requires the work method to be presented in a logical sequence. The hazards associated with each process are to be identified, and the measures for controlling these hazards specified.

Any job, no matter how complex, can be broken down into a series of basic job steps that will permit a systematic critical examination to be made of each part of the job for hazards and potential accidents. The description of the process should not be too broad as this omits activities with the potential to cause accidents and prevents proper identification of the hazards; nor is it necessary to provide too fine a detail of the tasks.

Consider the overall job in the six basic steps (see WMS-04A) and as shown below and then prepare a detailed statement, addressing all tasks and risks, see (WMS-04B & WMS-04C)

- | | |
|----------------------------|--|
| 1. <i>make it safe</i> | safety/skills training licenses, permits, job analysis/planning, lockout/tagout; |
| 2. <i>get it ready</i> | signage, barricades, ventilation, lighting, materials, equipment, tools, etcetera. |
| 3. <i>do this first</i> | initial process/preparatory works |
| 4. <i>do this next</i> | the process/es in logical sequence(s) |
| 5. <i>make it secure</i> | inspect, test, secure works, lockout/tagout, etcetera. |
| 6. <i>cleanup/put away</i> | surplus materials, waste recycling, equipment, tools, etcetera. |

A "hazard" may be either intrinsic or inherent, existing or potential, an unsafe condition and/or an unsafe act - ie: a dangerous location, an unsafe (hazardous) work process, or a potentially hazardous task as a stage of the construction work process.

The "hierarchy of control measures" is the recommended procedure for Hazard Control, with personal protective equipment (PPE) the least preferred. In some situations a combination of control measures may need to be used. References to Legislation, Code of Practice or Australian Standards are not acceptable alternatives for Hazard Control or Risk Management; the actual procedure or control must be documented.

Special Work Processes involving inherent hazards requiring special safety equipment must be referred to as the Safe Work Practice to be incorporated in the Standard Work Procedure – eg: "*When grinding or disc cutting, safety spectacles or goggles and a full face shield shall be worn*".

The WMS must nominate the occupations and number of employees required to safely do the task(s) involved. Safety and/or skills training provided or required to be completed prior to commencing work is to be identified, together with any special qualifications, permits, licenses, certificates of competency required by the employees and/or statutory regulations. Copies of such documents and training records are to be provided with the WMS.

The WMS is also required to specify the type/capacity and description of the mechanical aids, plant and mobile equipment that is to be used in the construction work processes.

Members of the workforce should be involved/consulted in the development of any WMS, and the employees are required to signify their acceptance and understanding of the WMS by signing on the last page of the WMS.

The Site Safety Induction should ensure the Formwork contractor's Employees understanding of the WMS by a suitable verification process.

WorkCover NSW

WMS-04

PROJECT:**FORMWORK CONTRACTOR:**

Cover Page One of	File No. Office use only of		
WORK METHOD STATEMENT			
Job/Task or Process:			
PERSONNEL DETAILS		EQUIPMENT DETAILS	
Occupations Trades/Skills/Work Teams	Static Plant and Equipment	Mobile Plant and Equipment	
No. of employees (Req'd. to do the work safely)	Mobile Plant and Equipment	Safety/Emergency Equipment	
Qualifications Licences/Certifications/Permits	Safety/Emergency Equipment	Personal Protective Equipment (PPE)	
Training Completed and/or required	Personal Protective Equipment (PPE)	HAZARDS (Unsafe conditions and unsafe acts) JOB/TASKS/PROCESSES (Basic steps in logical sequence - what is to be done, not how)	
1. make it safe;		(Unsafe conditions and unsafe acts) CONTROL MEASURES (Safety measures/Safe Work Practices/SPE)	
2. get it ready;			
3. do this first;			
4. do this next;			
5. make it secure;			
6. clean up/put away			

Name:

Position:

Signature:

Date:

WorkCover NSW

WMS-04B

PROJECT:**FORMWORK CONTRACTOR:**

Cover Page Two of	WORK METHOD STATEMENT	File No. Office use only of
SAFE WORK PRACTICES:		
<p>PERSONAL PROTECTIVE EQUIPMENT:</p> <ol style="list-style-type: none"> 1. 2. 3. 4. 5. 6. 		
WORK SEQUENCE BASIC JOB STEPS	POTENTIAL HAZARDS	RISK SCORE
Break the job down into steps. Each step should accomplish some major task and be in a logical sequence	Identify the hazards associated with each step. Examine each to find possibilities that could lead to an accident.	Six Point Risk Score Nomogram
STEP 1		
STEP		
Name: Position:		Signature: Date:
		WMS-04B

PROJECT:
FORMWORK CONTRACTOR:

Page _____ of _____		WORK METHOD STATEMENT			File No. _____ Date rec'd. _____ of _____
		POTENTIAL HAZARDS	RISK SCORE	PROPOSED ACTION / CONTROL MEASURE	
		<p>Identify the hazards associated with each step. Estimate each to find possibilities that could lead to an accident.</p>			Specify what action/procedures will be taken to eliminate or minimise the hazards. list of injury/damage and/or potential severity factors. include the measure to be taken to ensure the proposed controls will be maintained.
WORK SEQUENCE BASIC JOB STEPS					
Break the job down into steps. Each step should accomplish some major task and be in a logical sequence.					
STEP					

Appendix 5

A typical example of a Structural Certificate supplied by the Formwork Structural Engineer to indicate compliance with AS 3610 particularly clause 5.3.4

Engineer's Name:

Address

.....
Telephone: Fax:

Mobile: Date

Project:

.....
Level: Area:.....

STRUCTURAL CERTIFICATE

This is to certify that the Formwork for the above project has been inspected and is considered to be adequate to support the design loads in accordance with the relevant SAA Codes including AS 2600 – 1995 Formwork for Concrete.

The following items were included in the inspection:

ITEM	CONDITION Yes/No	WORK REQ'D
Base plates	OK	No
Frame spacing	OK	No
Frame bracing	OK	No
Frame extensions	OK	No
Bearer size and spacing	OK	No
Joist size and spacing	OK	No
Prop spacing	OK	replace props near columns
Prop bracing	OK	No
Eccentric loading	OK	No
Prop inclination	OK	No
Timber condition	OK	No
Steel condition	OK	No
Nails in plates as required	OK	No
Column framing	OK	No
Column bracing	OK	No
Plywood Fixing	OK	No

.....
Certifying Engineer's Name

.....
Signature

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