

TIP sheet

Formwork and falsework

T013 – SEPTEMBER 2007



Minimum requirements

Managers and Supervisors must identify, register, risk assess and then eliminate or minimise all risks associated with formwork to as low as reasonably practicable prior to work being commenced.

Formwork is the surface, supports and framing used to define the shape of concrete until it becomes self-supporting and includes the forms on which the concrete is poured, the supports which withstand the loads imposed by the forms and concrete, the bracing which may be added to ensure stability and the footings. The supports, bracing & footings utilised can also be known as falsework.

Managers and Supervisors shall ensure that all formwork and falsework:

- Complies with AS 3610 Formwork for concrete &
- Is designed, constructed and maintained so as to support safely all loads that are to be placed on it.

Managers and Supervisors shall ensure that formwork that has a deck greater than 3 metres above the lowest surrounding ground level, or has a deck that is greater than 16 square metres and is designed to hold more than 2.5 cubic metres or 6 tonnes of concrete:

- Is inspected and certified by a qualified engineer as safe for its intended purpose and the loads that will be placed on it prior to the concrete pour

- Is undertaken by workers who hold a formwork Certificate of Competency issued by WorkCover.

Some of the hazards associated with formwork include (refer to relevant TIP sheets):

- Fall hazards due to working at heights ladders and platforms.
- Slip and trips hazards due to poor housekeeping, unstable and uneven ground, poor lighting etc.
- Falling objects & ejected material such as dropped / dislodged tools and materials, collapsing formwork etc.
- Mobile plant strike
- Exposure to the sun/heat/cold.
- Manual handling hazards due to handling material and equipment.
- Electric shock and noise from plant and equipment used in the project.

Risk assessment

Risk assessments shall be undertaken for all formwork activities that are to be undertaken at the work site and shall consider the following factors:

- The size and weight of the structure to be constructed and the type of formwork /falsework required.
- The plant and equipment required for the construction and dismantling.

- The environment in which the structure is to be constructed e.g. slopes, wind and rain.
- The level of experience of the personnel involved in constructing and dismantling the formwork.
- The height of the work.
- Any other identified hazards associated with the work.

Risk control

All risks identified and assessed through the risk assessment process are required to be eliminated or minimised to as low as reasonably practical through the introduction of risk control measures.

Risk control measures shall be implemented in accordance with the hierarchy of control set out within the OHS Regulation 2001.

The following risk control measures shall be undertaken where practicable:

- Edge protection and netting to protect from falling objects where necessary.
- Fit for purpose work platforms, scaffolding and ladders where utilised.
- Traffic management control for mobile plant and vehicles.
- Mechanical lifting equipment to reduce manual handling.
- Adequate lighting of work area and surroundings.

- Administrative controls – safe work procedures and SWMS
- Workers with appropriate training and certificate of competency.
- Appropriate PPE and housekeeping.

Competency based training

All personnel required to undertake tasks involving formwork must be trained in safe work methods. The training shall incorporate instruction in:

- The induction of all personnel on site in accordance with the OHS management plan.
- The nature of hazards involved, the means adopted to control the risks and the emergency procedures in place.
- The requirements of AS 3610.
- The operation of plant and equipment.
- PPE use, maintenance and storage and
- SWMS dealing with the construction & dismantling of formwork and falsework.

All TIP sheets are available on the RTA [internet](#) or contact your OHS facilitator for assistance.

Review

Risk Assessments, SWMS & work procedures must be reviewed & revised when there is evidence that:

- The original assessment is no longer valid or older than 3 years.
- Injury or illness results from demolition work.
- A significant change is proposed at the place of work, or in work practices or procedures.
- During the planning, construction and dismantling processes associated with formwork, a competent person shall regularly review the systems of work utilised on site through the use of the checklist attached to this TIP Sheet.

Planning

All documentation concerning the construction & dismantling of formwork shall be available to all personnel involved in the project and shall include:

- Design drawings for the structure,
- Site and environmental surveys,
- Risk assessments associated with the work, and
- All other applicable documentation required by AS 3610.
- Construction, adjustment of formwork, placement of concrete and dismantling of formwork shall be planned in accordance with the formwork documentation.
- An onsite traffic assessment shall be undertaken to prevent mobile plant and vehicles from coming in contact with the proposed formwork.

- The project should be planned so as to avoid the necessity of excavating service trenches under, through or adjacent to any formwork.
- All loose material that can be dislodged by wind, storms etc. should be made secure before leaving the work area.

Constructing formwork

The formwork shall be assembled in accordance with AS 3610 including:

- The construction of the formwork should not be altered from the formwork planning documentation unless the formwork designer has approved the changes.
- If a crane or hoist is required to lift formwork materials, operators of this plant must be certified.
- Any defects to formwork components and materials such as joists, bearers, plywood, support frames, and jacks should be reported immediately to the appropriate Manager.
- Precautions shall be taken to prevent the dislodgement or undermining of any part of the formwork foundations by water run off, etc.
- The area where formwork is to be erected should be free of any obstructions.

Placement of concrete

An inspection shall be carried out prior to the placement of concrete to ensure the formwork assembly complies with the formwork documentation.

An observer shall continuously supervise the placement of concrete into the formwork assembly.

A system of communication (radio or visual signals) should be put in place between the formwork supervising personnel and the concrete placing crews in case an emergency should arise.

The placement of concrete should be less than the maximum calculated pour rate on the inboard part of any formwork before proceeding to a cantilever section to maintain stability of the forms.

Hoisting, pumping and other equipment should not be attached to the formwork assembly unless specifically designed for the purpose..

Dismantling of formwork

Dismantling of formwork shall only be undertaken by trained and competent persons after a risk assessment has been conducted and then only in compliance with the SWMS work method that ensures the gradual transfer of the load from the formwork to the supports of the permanent structure.

Emergency preparedness

Emergency provisions shall be determined to minimise the effect of incidents such as collapsing formwork, falls from height, electric shock and fire, etc. Emergency procedures shall be developed to include:

- The need and placement of fire fighting and emergency equipment.
- Contact details for external emergency services and the relevant on site personnel.
- The recovery of personnel suspended from a fall arrest device or underneath a collapsed structure.
- The provision of first aid facilities and first aid officers.

Personal protective equipment

Fit-for-purpose PPE as prescribed in the Risk Assessment and SWMS shall be available and shall:

- Meet the appropriate Australian Standard where applicable.
- Be appropriate for the person & task.
- Be used as per original equipment manufacturer (OEM) directions & ,
- Be inspected regularly and before each use for damage & 'use-by' dates.

References

- NSW OHS Act 2000 & OHS Regulation 2001 Ch 1-5, 7, 8 & 9.
- NSW Code of Practice – Formwork
- WorkCover Code of Practice: use of fall arrest systems.
- RTA Risk Management Policy 2.0
- RTA OHS Policy 2.11 Working at Heights
- RTA OHS Policy 4.0 Personal Protective Equipment.
- AS 1470 Health and safety at work – Principles and practices
- AS 3610:1995 Formwork & for concrete
- AS/NZS 1891 Series Industrial fall arrest systems and devices.
- AS/NZS 1892 Series Portable Ladders.

Formwork Checklist

Planning

1. Is the formwork documentation provided in an easily understood format?
2. Has the formwork designer approved any changes and has the formwork documentation been amended?
3. Have workers received proper instruction and competency based training?
4. Are plant operators certified to operate equipment?
5. Are workers correctly attired / possess appropriate PPE?
6. Is lighting of the work area adequate?
7. Has external protection been considered (i.e. screens / scaffolding / barricading / warning signs)?
8. Have measures been taken to prevent mobile plant from striking formwork (i.e. exclusion zones)?

Construction of Formwork

9. Is the formwork assembly free from defects?
10. Have any defects in the formwork assembly been reported to the formwork contractor?
11. Is the area free of obstructions?
12. Have ground conditions and foundations been checked as adequate?
13. Are formwork components consistent with specifications?
14. Have frames been assembled correctly?
15. Have diagonal braces been assembled on frames?
16. Are frames greater than 2 metres in heights tied in position?
17. Do base plates have full bearing on sole plates?
18. Are inclined props securely tied?
19. Are all bearers positioned over the centre of 'U' heads?
20. Are correct pins used in props and frames?
21. Is formwork deck level and within tolerances?
22. Have precautions been taken against water erosion?
23. Have precautions been taken to prevent the dislodgement of formwork?
24. Has the formwork been inspected prior to the placement of concrete?
25. Are all fittings tight and unlikely to become loose when concrete is vibrated?
26. Have observer(s) been positioned?
27. Is there a system of communication in place with all workers?
28. Are workers trained in the placement of concrete?
29. Are all workers aware of the maximum concrete pour rates?

Dismantling of Formwork

30. Have workers been trained in formwork dismantling?
31. Are barricades / warning signs in place to create an exclusion zone?
32. Have minimum dismantling times been established and communicated?
33. Is the dismantling to be carried out in a sequential manner?
34. Has housekeeping been maintained?
35. Is re-shoring / back-propping installed as per formwork documentation?
36. Has back-propping been checked after post-tensioning?

