Formwork Code of Practice Comparative Table

2006 Code section	Formwork Code of Practice 2016
1. Introduction	Introduction updated and restructured to be consistent with other recent codes. Information included on: 1.1 What is formwork? 1.2 Who has health and safety duties in relation to formwork activities? 1.3 What is involved in managing risks associated with formwork activities? 1.4 Information, training, instruction and supervision Information on training was previously in section 3.3, 4.2.1 and 8.5 of the code and has been moved to new section 1.4 (Information, training, instruction and supervision). Additional information on training included to be consistent with the duties in the WHS Regulation 2011 in relation to the provision of information, training, instruction and supervision. Information on falls from heights and unsuitability of harness systems for formwork activities moved to section 4.1.5 (Fall protection from the formwork deck).
2. Design	Text box expanded to describe more fully the existing duties of designers under section 22 of the WHS Act 2011 and outline the duties under regulation 294 regarding consultation between person who commissions construction work and the designer. New information inserted to reflect the duties of designers of structures and persons who commission construction work in the WHS Act and WHS Regulation as follows: *"Consultation should include the following:* • *preparation of a project brief by the person commissioning the construction work that outlines the safety requirements and objectives for the project and provide the designer with all available site information that may affect health and safety (e.g. proximity to underground or overhead services — especially electric lines), and* • *the designer should ask the person commissioning the construction about safety issues such as the types of activities and tasks likely or intended to be carried out in the structure.* *A safety report specifying the hazards relating to the design of a structure must be prepared by the designer for designs that have unusual or atypical features but not for common designs where the risks are already known. For example, a design specifying an unusual structure for a specific application may introduce unique hazards requiring specific risk controls. The written safety report should include information about:* • *any hazardous materials or structural features and the designer's assessment of the risk of injury or illness to construction workers arising from those hazards,* • *the action the designer has taken to control risks (e.g. changes to the design),* • *how to use a component or component system safely,*

2006 Code section	Formwork Code of Practice 2016
	• *formwork methods, and* • *the health and safety risk control measures to be used.* *Where there is a principal contractor, the person conducting a business or undertaking who commissioned the construction must give a copy of the designer's safety report to the principal contractor."* New information regarding plant design registration requirements has also been inserted as follows: *"Structural components, including formwork frames, specifically intended to support formwork do not require design registration. However, if traditional prefabricated scaffolding is used as part of the supporting structure, these components require design registration. The person with management or control of design registrable plant must ensure the design registration number is kept where it is readily accessible. If you are hiring prefabricated scaffolding, the supplier must provide the design registration number, usually on the supply docket or agreement."*
2.1 Safe design of buildings in relation to formwork	New information inserted to reflect the duties of designers of structures and persons who commission construction work in the WHS Regulation 2011 as follows: '*Safe design means the integration of control measures early in the design process to eliminate or, if this is not reasonable practicable, minimise risks to health and safety throughout the life of the structure being designed.* *Safe design must be factored in during the design phase and should begin at the concept development phase of a structure when making decisions about:* • *the design and its intended purpose* • *possible methods of construction, maintenance, operation, demolition or dismantling and disposal;* • *materials to be used; and* • *what legislation, codes of practice and standards need to be considered and complied with. '*
2.1.1 Build-ability	Amendments (in bold) made as per below. Amendments to be consistent with existing designer duties in section 22 of WHS Act 2011 and information provided in the *Design of Structures Code of Practice 2013* ***'Designers**, including engineers and architects, must consider the 'build-ability' of a structure or building and produce a design that **eliminates** or minimises the risk of injury during construction.* *The design of the final concrete structure can have a major effect on the ease of formwork construction, and consequently, on the safety of persons during construction. Generally, the more basic and simple the final concrete structure, the safer it is to erect.*

2006 Code section	Formwork Code of Practice 2016

	*Some of the measures that should be considered by the designer of the building **or structure** to minimise exposure to risk of injury during the construction of formwork include:*
	• *Reducing variations in the floor depth so that it has one consistent depth.*
	• *Reducing the number of columns required and where columns exist, design the columns so capitals or dropdowns don't exist.*
	• *Reducing cantilevered floor sections.*
	• ***Consider alternative designs (e.g. prefabricated concrete elements-columns, beams and floor panels).***
	• *Planning for manual tasks. Consideration must be given to the suitability of the design of different formwork systems that will reduce manual tasks risks, including:*
	  − *table forms*
	  − *systems with lighter weights of materials to be handled*
	  − *methods of formwork erection, alteration and dismantling*
	  − *improved access and egress for workers and movement of materials and equipment, and*
	  − *methods for moving large and heavy components, materials and equipment i.e. making allowances for a crane and other mechanical lifting devices to be used.*
	• ***Planning for adequate access and sufficient workspace, for example designing cells that have adequate floor area and height to enable workers to carry out their work in a safe environment. Issues to consider include:***
	  − ***adequate ventilation;***
	  − ***material access;***
	  − ***allowance for access and egress systems, and***
	  − ***adequate space to perform work safely.***
	• ***Allow sufficient clearance to adjacent structures and safe methods for moving large and heavy components, materials and equipment (i.e. making allowances for a crane and other mechanical lifting device to be used).***
	
	Further guidance on safe design is available in the Safe design of structures Code of Practice.
	
	Diagram 1 retained.
	
	Information previously included in Section 4.1.10 Changing floor levels relocated to be before Diagram 1 as follows:
	
	'Formwork decks are rarely flat across the entire floor, generally due to deep beams or 'drop downs' (sometimes called 'capitals') around columns. Uneven floors introduce fall hazards. It is preferable that these hazards be eliminated at the design stage. These hazards are most effectively managed by ensuring that formwork supports and the deck are progressively constructed for the lower parts of the deck before work commences on the higher-level areas of the deck.'

2006 Code section	Formwork Code of Practice 2016
2.1.2 Materials	Section heading amended to "Materials – Traditional Formwork" to clarify that information in this section does not apply to modular proprietary systems. Information on materials for modular proprietary systems is now contained in new section 2.2.2 (modular proprietary system design). Original text retained with the addition of the following text: *'Where material is designed to an international or other standard, an engineer must certify that it meets relevant Australian Standards. '* The following text that was in 2.2.5 of the code has been relocated into this section: *'A suitable system must be implemented to ensure that only materials and components that comply with the specifications of the formwork design drawings and documentation are being used. Materials and components that are damaged or excessively worn, or not fit for intended use must not be used.'* The following new text has been inserted regarding importers of plant or structures to reflect the existing duties in the WHS Act: ***'Importers of material*** *Importers have a duty to ensure, so far as is reasonably practicable, plant (e.g. prefabricated formwork) is without risks to health and safety. This includes, eliminating or minimising risks to health and safety regarding the plant being supplied, where the manufacturer has not already done so.* *Importers should confirm they are being provided with safe plant. For example, they must inspect and test the supplied plant and inspect or get third party verification of the manufacturing process. The level of inspection and testing done by an importer should be based on what is necessary to be confident that the product is safe.* *When dealing with a new manufacturer or one whose products have been previously identified as non-compliant, the inspection and testing of the supplied plant may initially need to be more extensive.* *Any imported plant must be inspected having regard to information provided by the manufacturer.'*
2.2 Formwork systems	Minor amendments (in bold) made as per below. *'The design of all formwork systems, **both traditional and modular,** must satisfy:* • *AS3610 - Formwork for Concrete* • *AS3600 - Concrete Structures.'*
2.2.1 Safe formwork design and certification	Original sections 2.2.1 (safe formwork design and verification) and section 2.2.2 (formwork design certification requirements) have been merged.

<table>
<tr><th>2006 Code section</th><th>Formwork Code of Practice 2016</th></tr>
<tr><td></td><td>
Amendments made to the original text to clarify that only an engineer, such as a suitably qualified engineer experienced in structural design can oversee the safe design and certification of the complete formwork structure. The section now reads as follows:

'An 'engineer' (as defined in Appendix 1), such as a suitably qualified civil engineer experienced in structural design, is responsible for overseeing the safe design and certification of the complete formwork structure. This includes design of the formwork support structure, the formwork deck and connection details, and certification that the formwork drawings and other formwork documentation have been completed. Sample engineer's certification letters are provided at Appendix 2. The Project Engineer is responsible for providing project documentation (as detailed in section 2.2.3 of this code) to assist with the design of the formwork.

While this Code requires that overseeing the safe design and certification of formwork systems may only be performed by an engineer, it is recognised that some design work may be performed by appropriate personnel such as a 'competent person' experienced in formwork design and documentation. Design documentation may only be prepared by a competent person in the circumstances listed in Table 1 if the competent person is using brochures, charts, tables and information which has previously been verified for compliance with AS3610 - Formwork for Concrete by a suitably qualified engineer. 'Competent person' is defined in the dictionary at Appendix 1.'

<table>
<tr><th colspan="2">Formwork design and certification</th></tr>
<tr><td colspan="2">Vertical formwork (Columns and walls)</td></tr>
<tr><td>Less than 2.4m high</td><td>Competent person</td></tr>
<tr><td>2.4 to 3.5m high</td><td>Engineer</td></tr>
<tr><td>More than 3.5m high (single arrangement)</td><td>Engineer</td></tr>
<tr><td>More than 3.5m high (repetitive arrangement)</td><td>Engineer</td></tr>
<tr><td>Single-sided less than 2.4m</td><td>Competent person</td></tr>
<tr><td>Single-sided more than 2.4m</td><td>Engineer</td></tr>
<tr><td>Self-climbing or crane assisted formwork systems</td><td>Engineer</td></tr>
<tr><td colspan="2">Soffit formwork</td></tr>
<tr><td>Less than 3m high and less than 250mm thick</td><td>Competent person</td></tr>
<tr><td>More than 3m high or more than 250mm thick</td><td>Engineer</td></tr>
<tr><td>Infill slabs less than 4.5m high, 20m^2 and 300mm thick</td><td>Competent person</td></tr>
<tr><td>Stair and landing formwork more than 3m high or more than 200mm thick</td><td>Engineer</td></tr>
<tr><td>Multistorey formwork and backpropping</td><td>Engineer</td></tr>
</table>
</td></tr>
</table>

2006 Code section	Formwork Code of Practice 2016
	References to formwork designers, and basic versus non-basic formwork systems have been removed in lieu of the table above. Information on regarding wind loading is consistent with the 2006 code except for references to 'designers of formwork' being changed to 'engineer'.
2.2.2 Formwork design and certification requirements	Information in this section has been merged with section 2.2.1 (Safe formwork design and certification). A new section 2.2.2 Modular Proprietary System Design has been inserted as follows: **'*2.2.2 Modular Proprietary System Design*** *'A number of formwork support systems are designed as modular systems that are intended to be erected in specific configurations as prescribed by the designer and manufacturer. While modular systems require engineer design certification, this certification can be done once and used as evidence of design compliance provided:* • *the design certification is carried out by an engineer;* • *the design certification is in the form of a signed compliance statement (in accordance with AS 3610 Formwork for concrete); and* • *the compliance statement clearly identifies the modular formwork system and cross references the method in which the modular system must be erected.* *The design certification can be provided as part of the brochure or erection instructions prepared by the manufacturer of the system.* *The design certification only applies when the modular system is erected in accordance with the manufacturer's documented instructions. Specific engineering certification must be provided for the modular system if;* • *there is any variation from the manufacturer's erection instructions; or* • *the modular system is used in conjunction with a traditional formwork support system or any other type of modular system.* *Timber used with modular proprietary systems may comply with the relevant standard where the system is manufactured provided;* *a) The standard is specifically for formwork applications;* *b) The timber is designed and manufactured for outdoor use;* *c) The timber is marked in accordance with the design standard; and* *d) The standard makes reference to a quality assurance standard that the timber is to comply with.'*

<table>
<tr><th>2006 Code section</th><th>Formwork Code of Practice 2016</th></tr>
<tr><td>2.2.3 Documentation</td><td>Minor amendments (in bold) made as per below.
‘Formwork drawings
Formwork drawings must explain:
• plans, elevations and sections to show the general arrangement of the formwork and to identify and locate all members and components including bracing
• wall and column form details
• the maximum point loadings to be applied
• the component types and spacings
• the maximum jack extensions
• the bearer and joist timber type, the dimensions and spacings
• the prop sizes and maximum extensions
• the methods for tying the structure together and spacing between ties (if required), and the formply size.’</td></tr>
<tr><td>2.2.4 Design variations</td><td>This section has been modified so that the code no longer distinguishes between basic formwork systems and non- basic formwork systems and all variations from the design must be checked by an engineer. Revised text (amendments in bold) as follows:
‘All variations from the design of a formwork system must be checked by an engineer and:
• certified in writing by the engineer as being acceptable (that is, complying with AS 3610 Formwork for concrete), if the engineer can verify this is the case, and
• altered in accordance with the written directions of an engineer in order to comply with AS 3610, within a time frame specified by the engineer.

Potential variations include:
• Structural design change (i.e. a thicker floor slab).
• a reduced number of formwork frames under the formwork deck
• different types of braces or props to the ones indicated on the formwork drawing
• different types and/or quantities of ties on the formwork structure
• increased spans on members supporting the formwork deck
• variations in the back-propping system specified by an engineer, and
• connections between traditional formwork and modular formwork.’</td></tr>
<tr><td>2.2.5 On site coordination and verification</td><td>The following table has been inserted into this section to clarify when a competent person can perform an inspection:

<table><tr><th></th><th colspan="2">Inspection</th></tr><tr><th></th><th>Access for trades</th><th>Pre-pour</th></tr></table></td></tr>
</table>

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<tr><td>More than 3.5m high (repetitive arrangement)</td><td colspan="2">Initial pre-pour inspection by engineer on first arrangement only and then competent person thereafter</td></tr>
<tr><td>Single-sided less than 2.4m</td><td>Competent person</td><td>Competent person</td></tr>
<tr><td>Single-sided more than 2.4m</td><td>Competent person</td><td>Engineer</td></tr>
<tr><td>Self-climbing or crane assisted formwork systems</td><td colspan="2">Initial pre-pour inspection by engineer and then competent person thereafter</td></tr>
<tr><td colspan="3">Soffit Formwork</td></tr>
<tr><td>Less than 3m high and less than 250mm thick</td><td>Competent person</td><td>Competent person</td></tr>
<tr><td>More than 3m high or more than 250mm thick</td><td>Competent person</td><td>Engineer</td></tr>
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</table>

References to formwork designer removed to be consistent with revised section 2.2.1.

Text on pre-pour inspection amended (in bold) as follows:
‘A pre-pour inspection should focus on verifying that the design has been complied with and matters such as:

correct spacing of frames, props and timbers
correct joist and bearer sizes
acceptable jack extensions
quality of materials being used
backpropping, and
adequate bracing to ensure stability.’

</td></tr>
</table>

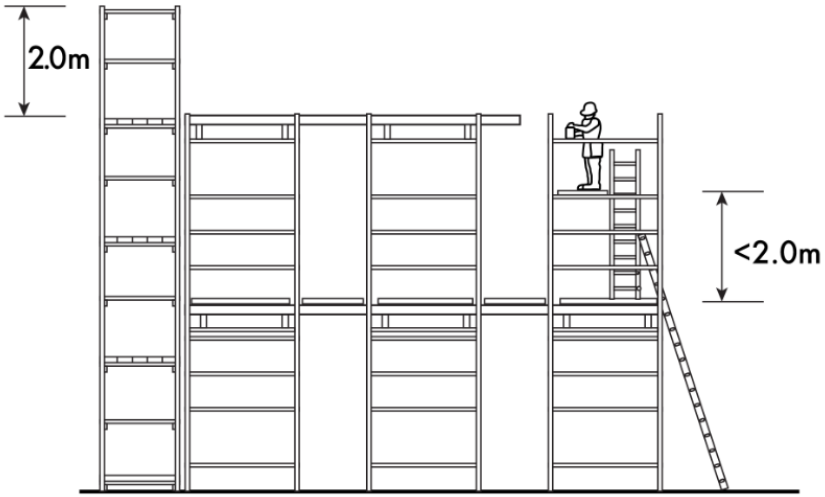
<table>
<tr><th>2006 Code section</th><th>Formwork Code of Practice 2016</th></tr>
<tr><td>3. Coordination and administration</td><td>No change.</td></tr>
<tr><td>3.1 Work program</td><td>No change.</td></tr>
<tr><td>3.2 Housekeeping</td><td>Change of title of section from ‘Housekeeping’ to ‘The work environment’.
Text box included setting out duties for general workplace facilities. Remaining text unchanged.</td></tr>
<tr><td>3.2.1 Access</td><td>Change of title from ‘Access’ to ‘Entry and exit’
Additional information included on access and egress in the event of an emergency as follows:
‘Where the plant listed in column 1 of Table 3 is available onsite for emergencies, the corresponding mechanisms in column 2 should be provided as a dual emergency access and egress option. Two forms of emergency access and egress should be maintained at all times.

<table>
<tr><td></td><td>Emergency Access and Egress Solutions required</td><td>Additional Emergency Access and Egress Solutions required</td></tr>
<tr><td>1</td><td>Man and material hoist</td><td>Stretcher stair and single scaffold stair</td></tr>
<tr><td>2</td><td>Crane only</td><td>Stretcher stair and single scaffold stair</td></tr>
<tr><td>3</td><td>Man and Material Hoist and crane</td><td>Stretcher stair and single scaffold stair</td></tr>
<tr><td>4</td><td>No crane or man and materials hoist</td><td>Two stretcher stairs are to be provided for emergency access</td></tr>
</table>
Table 3 Dual emergency access and egress solutions

Further information regarding access and egress requirements is provided in section 4.5 (use stair tread systems and ladders).’</td></tr>
<tr><td>3.2.2 Material storage</td><td>Text unchanged except for the inclusion of an additional sentence (in bold) as follows:

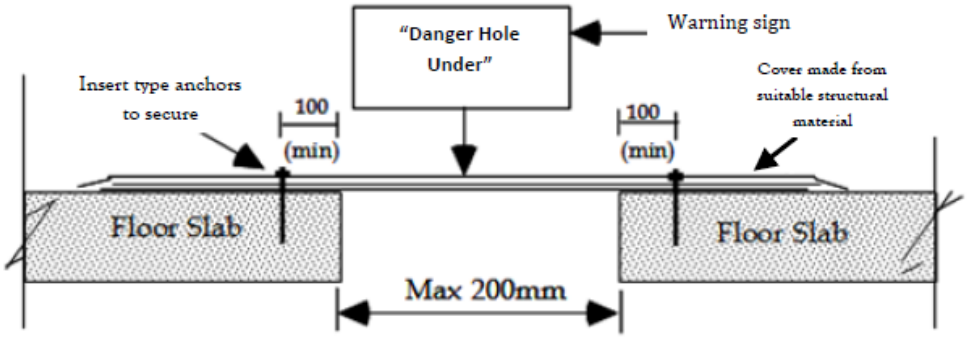
‘When not in use, wall forms may be stacked in or against purpose made “A” frames. This is preferable to leaning the forms against other structures. If this is not practical, wall forms must be stacked in such a way that they cannot move away or rotate from the surface they are placed against. An engineer must verify in writing that a surface to be used for the stacking of forms is capable of withstanding the impact of all imposed loads, including wind loading. The engineer also needs to consider both maximum and point distributed loads on the formwork deck and record this information in the formwork drawings. ‘</td></tr>
<tr><td>3.2.3 Rubbish storage and removal</td><td>No change.</td></tr>
<tr><td></td><td>New section 3.2.4 (Lighting) included as follows:</td></tr>
</table>

2006 Code section	Formwork Code of Practice 2016
	'3.2.4 Lighting *Sufficient access lighting and task lighting must be provided, whether it is from a natural or artificial source, to allow safe movement around the workplace and to allow workers to perform their job without having to adopt awkward postures or strain their eyes to see. Additionally, emergency lighting must be provided for the safe evacuation of people in the event of an emergency.* *AS/NZS 1680.1: 2006 – Interior workplace lighting and the Managing the work environment and facilities Code of Practice 2011 provide guidance on the recommended illumination levels for various types of tasks, activities or interiors.'*
3.3 Training	Content moved to new section 1.4 (Information, training, instruction and supervision). A new section on the requirement to prepare a safe work method statement (SWMS) for high risk construction work has been inserted. The section includes: • A text box to set out the duty to prepare a SWMS under section 299(1) of the WHS Regulation 2011; • All activities defined as high risk construction work; and • Information on what must be included in the SWMS, as well as the need to develop the SWMS in consultation with workers and their representatives who are carrying out the high risk work.
4. Work systems	No change.
4.1 Formwork erection – traditional systems	References to scaffolding removed. Amendment to text (in bold) above Diagram 2 as follows: '*Formwork, must be erected systematically and tied **and/or braced** in progressively to stabilise the structure. Where a person is to install joists from underneath, the vertical distance between the formwork deck and the false deck can be increased. This is illustrated in Diagram 2 below.'* Diagram 2 amended to extend the bottom ladder one metre above the platform and show the edge protection frames on the left being at least 2 metres above the formwork deck as follows:

2006 Code section	Formwork Code of Practice 2016
	
4.1.1 Foundations	Reference to formwork designer removed to be consistent with new section 2.2.1.
4.1.2 False deck	Text on false decks amended (in bold) as follows: *"In situations where a deck is at a height that would require persons to stand at heights of two metres or more to install bearers and joists for the formwork deck, a* ~~***continuous***~~ *"false" deck , which is, a full deck the same area as the* ~~***floor***~~ *area being formed, should be provided (see diagram 3). This deck should be provided both inside and between formwork frames and can typically consist of formply, scaffold planks or modular platform sections.* ***When erecting backpropping frame towers over two metres high, a full deck of planks is to be provided within the tower.*** *A protected access opening can be left in the deck to enable materials to be lifted up. The use of a captive platform system is preferable to lapped planks because a captive system cannot be accidentally dislodged. Lapped planks may only be used if secured against uplift and slipping. The false deck must be constructed such that no gap exceeds 225 mm width and gaps may only exist where a vertical member of a frame passes through the deck."*
4.1.3 Erecting frames	Text box updated to reflect section 81 of WHS Regulation 2011 as follows: ***"WHS Regulation section 81:*** *A person must not carry out high risk work, including scaffolding work, unless the person holds a high risk work licence for that class of high risk work. For example, a person must hold a scaffolder's licence if they are undertaking scaffolding work which involves erecting, altering or dismantling a temporary structure that is or has been erected to support a platform from which a person or thing may fall more than four metres."* The following sentences have been deleted:

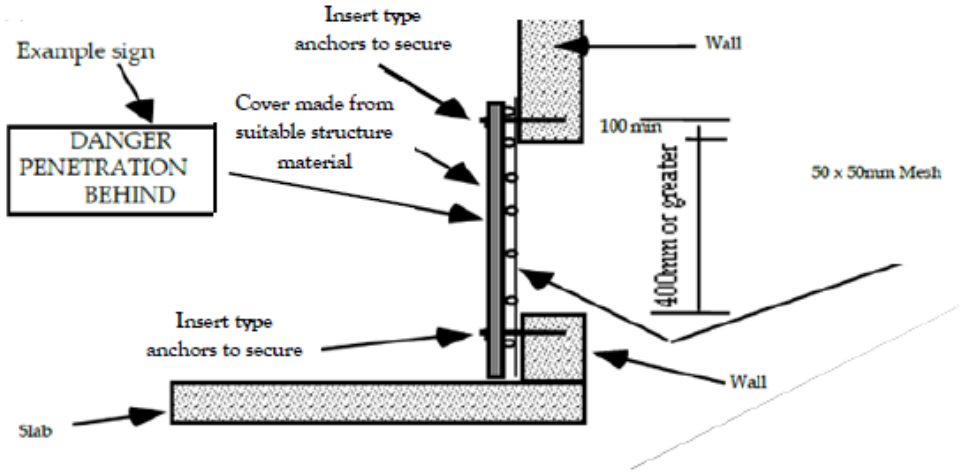
2006 Code section	Formwork Code of Practice 2016
	"~~*One means of demonstrating that a person is competent to do so is their holding a licence class to erect scaffolding (as a 'class of high risk work': see Appendix 1) or are scaffolding trainees and have experience in formwork erection*~~." '~~Trainees are permitted to perform scaffold work, provided the trainee is adequately supervised by a ticketed person who is on site, and a written record outlining the training received (such as a log book) is maintained.~~'
4.1.4 Installing bearers	Reference to formwork designer removed to be consistent with new section 2.2.1.
4.1.5 Fall protection from the formwork deck	Text box included setting out the WHS regulations relating to fall protection including regulation 306C, 306D (fall protection) and 306E (edge protection). Information on unsuitability of harness system for formwork activity originally contained in section 1.1 has been relocated to the end of this section. Minor amendment (in bold) as follows: *"During formwork construction the structure is constantly changing. Hence, continual modification of fall protection measures is also necessary. One of the biggest challenges is to provide adequate fall protection on the leading edge of the formwork deck. Where there is only one leading edge (i.e. the other edges are provided with* ***~~scaffolding~~ two metre high*** *edge protection), the provision of fall protection on the leading edge is relatively straightforward. However, where there are multiple leading edges and/or the deck is not at one consistent level the provision of fall protection can be very difficult to implement. Designers of buildings are therefore encouraged to design floor slabs that are one consistent thickness."*
4.1.6 Laying formply on the deck	Diagram 4 retained. Amendment to the following dotpoints in section on Typical work system for a leading edge (in bold) as follows: • Nail or otherwise secure formply to the joists **in accordance with the formwork design** as soon as practical. • The leading edge should be free of oil, sawdust and obstructions to reduce the likelihood of slips and trips **and fall prevention control measures should be provided for all leading edges, not just the direction formply is being laid**.
4.1.7 Cantilevers	Reference to formwork designer removed to be consistent with new section 2.2.1.
4.1.8 Penetrations	Text box included on WHS regulation 306F on fall protection covers. New information included as follows: '*All penetrations in the completed slab should be provided with a cover mechanically fixed to the floor or otherwise effectively restrained so that it remains in position except for plumbing and inspection hole covers. Mechanical fixings for a penetration cover should be structurally adequate and require the use of a tool to be removed, e.g. an insert type anchor requiring a spanner*

2006 Code section	Formwork Code of Practice 2016
	of socket. Fixings must be placed an adequate distance from the cover edges to prevent the failure of the cover, it's fixing or the supporting surface into which the fixings are placed (see Diagram 5).'



Third para amended (in bold) as follows

'Open penetrations must be protected either with edge protection (e.g. handrails) or securely covered. Cast-in metal mesh should be used for small diameter penetrations. ***Vertical penetrations (e.g. lift doors) must be fully enclosed with mesh as a minimum standard****. The mesh should have a small aperture (e.g. 50 x 50 mm mesh size or smaller), and be made of material capable of withstanding the potential imposed load. Mesh provided over larger penetrations may require engineering certification to ensure it can withstand potential loads, including those applied by people, equipment and material (see Diagram 6).'*



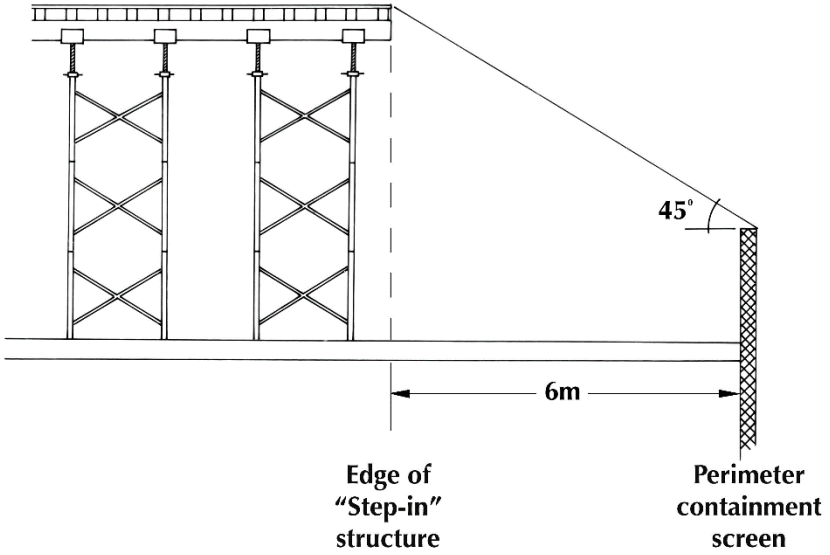
2006 Code section	Formwork Code of Practice 2016
	New information included in fifth para as follows: '*Where ply covers are used though, they are to be a single piece of ply without multiple pieces and joins and the edge of the penetration should be bevelled to minimise any trip hazard. The ply cover should also be designed to safely withstand a point load of at least 2 kilonewtons (i.e. 200 kilograms). This is the same point load as required for heavy duty scaffolding – see AS/NZS Scaffolding Part 1: General requirements for further details. '*
4.1.9 Working areas for steel fixers and others	Text updated to cover requirement for consultation between formworkers, PCBUs and other trades. Amended text in bold as follows: '*Steel fixers, plumbers and electricians, often follow closely behind the formwork erection.* ***Consultation between formworkers, the person conducting a business or undertaking and other trades should be undertaken to ensure a suitable hand over of completed elements of the formwork deck is provided. Following consultation, and access to the deck by required installers for water and power, trades that will be working on the deck and a delegated 'competent person' on site should signoff that the following has been completed:*** • ***penetrations are covered;*** • ***handrails are installed;*** • ***water and power are installed; and*** • ***there is a stair tread system provided for safe access and egress to the working deck.*** *The formwork zone must be sufficiently large to ensure that these other persons are clearly separated from formworkers. A 'formwork only' zone should be maintained behind the leading edge. This zone should be clearly demarcated by signage and flagging. Diagram 5 illustrates the 'other work' zone, the formwork zone and the area retained as edge protection (four joists spaced 1800 mm beyond the laid deck).'* Diagram 5 retained.
4.1.10 Changing floor levels	Content moved to section 2.1.1 (Build-ability).
4.2 Formwork erection – modular formwork systems	Reference to formwork designer removed to be consistent with new section 2.2.1.
4.2.1 Training	Content on training moved to new section 1.4 – information, training, instruction and supervision.
4.3 Stripping formwork	No change.
4.3.1 Safe work method statement	Text box removed as covered in the text box in new section 3.3 (Safe Work Method Statements). Text amended (in bold) as follows:

2006 Code section	Formwork Code of Practice 2016
	'4.3.1 Safe work method statement *A safe work method statement (SWMS) for the stripping operation should be prepared and provided to those who will be involved in this high risk activity.* ***The SWMS should:*** • ***identify the work that is high risk construction work;*** • ***state hazards relating to the high risk construction work and risks to health and safety associated with those hazards;*** • ***describe the measures to be implemented to control the risks;*** • ***describe how the control measures are to be implemented, monitored and reviewed; and*** • *Include:* – *The number of persons in the stripping crew.* – *The sequence of stripping activities – this would need to detail how the frames and/or other supports should be removed (that is, how far U-heads are to be lowered).* – *Whether the support system is to be completely removed in a zone prior to removal of the formwork deck or whether the supports are to be lowered slightly but still remain under the formply while it is being removed.* – *When back-propping is required or only part of the support system is to be removed, how the structural members are to remain in place and/or the type and layout of members that will replace the formwork system.* – *Any other special requirements involved in the stripping and or building process (e.g. checking of back-propping after post-tensioning).'*
4.3.2 Bond reduction	This section has been removed.
4.3.3 Certification prior to stripping	Now section 4.3.2. First sentence in 4.3.2 Certification prior to stripping amended (in bold) as follows: '*Prior to commencement of the stripping operation, a competent person,* ***from the principal contractor i.e. project engineer, is to*** ~~***should***~~ *provide written certification that formwork can be removed.* '
4.3.4 Exclusion zone	Now section 4.3.3. No change to content.
4.3.5 Drop stripping	Now section 4.3.4. No change to content.
4.4 Crane and load handling systems	No change.
4.4.1 Loading materials during formwork construction	Reference to formwork designer removed to be consistent with new section 2.2.1. The following sentence has been amended (in bold) as follows: 'Formwork is not suitable for any loading until it is fully secured, that is, the deck is in place with tie-ins and back-propping complete. In practice, some loading often occurs before the deck is completed, for example, unloading **packs** of ply and joists used to continue the deck.'

2006 Code section	Formwork Code of Practice 2016
4.4.2 Access for persons slinging loads	Second sentence deleted as follows: '*Safe access must be provided for persons slinging and un-slinging loads.* ~~*Ladders used by doggers while slinging loads should be secured to prevent movement.'*~~
4.4.3 Lifting gear	New sentence after first dot points as follows: '*Non-positive lifting gear such as plate clamps and suction devices are not to be used. '* Last para amended (in bold) as follows: *'All lifting gear, including slings, hooks and material boxes, should be periodically inspected for damage and wear. The period between inspections shall depend on the severity of use* ~~*but should not exceed 12 months.*~~ ***In the case of chain lifting slings and material boxes, a formal documented inspection should be completed at intervals not exceeding 12 months.*** *Documented maintenance records for the lifting gear should be available on site.'*
4.4.4 Lifting formwork materials	Dot point nine amended to read as follows: • Formwork frames should either be **strapped** together or lifting slings should be wrapped around the load.
4.4.5 Lifting lugs	No change.
4.5 Use of stair tread systems and ladders	Title amended to include stair tread systems. New information inserted on stair tread systems as follows. *'Stair tread systems are to be used as the primary form of access and egress to and from a formwork zone unless it is not reasonably practicable to do so. Examples where it may not be reasonably practicable to use a stair tread system include:* • *Accessing column boxes up to 3.5 metres high (e.g. a platform ladder may be used for the purpose of tightening z bars, securing props, plumbing & checking inside box);* • *Accessing wall shutters to 3.5 metres high (e.g. a platform ladder may be used for the purpose of installing rebates and penetrations to the shutter, locating z bars, splicing timbers on shutters, securing props, plumbing and checking inside box);* • *Conventional core walls up to 3.5 metres (e.g. straight ladders may be used inside shafts for access, locating z bars, splicing shutters and working corners and tread scaffold stairs may be used for accessing pouring platforms at the top of cores);* • *Trenches/pits where stair tread systems would not fit within the space (e.g. a straight ladder may be used);* • *Core systems (e.g. a straight ladder can be used for access and working inside boxes and cells and tread stairs up to one metre wide can be used to access the system externally from the top of the system to the working soffit/slab below);* • *Safety screens (e.g. a straight ladder can be used to go platform to platform within screens and tread stairs up to one metre wide can be used when accessing floor to floor with a stairway on the outside or incorporated into the screens);*

2006 Code section	Formwork Code of Practice 2016
	• *Drop panels/isolated beam to 4.5 metres high (e.g. formworkers could use a straight ladder for access). Where workers other than formworkers need access to drop panels/isolated beams there will need to be a stair tread system;* • *Soffits (e.g. access to decks should be by tread stairs up to one metre wide or stretcher stairs one metre to 1.8 metre wide.* • *High scaffolding support system (e.g. depending on the scaffold layout, access in scaffold should be by ladders for scaffolders and narrow tread stairs for formworkers getting up under the deck); and* • *Initial entry to wall systems (e.g. may use a plywood stair tread system).* *Temporary timber or plywood framed steps, stairs, treads or ramps may be fabricated by competent tradespersons to gain access to vertical formwork systems and from scaffold platforms onto adjacent formwork decks. The maximum height of a timber stair, steps or ramp should not exceed 1.5 metres. The finished walking surface of the temporary timber or plywood framed steps/stairs/ramp is to be slip resistant and provide grip for inclined surfaces. Temporary stair and step fabrication information is available from AS/NZS 1576.1:2010 Scaffolding Part:1 General Requirements.* *Stair tread systems are not required for isolated areas that are not integral to the main slab (i.e. drop panels and fire corridors).'* Information on the use of ladders amended (in bold) as follows: '***Where single or extension ladders are used*** *they* ~~*should*~~ ***must*** *be secured, either:* • ***at the top to prevent it moving (e.g. tying the top of the ladder to a plate fixed to the top of a wall frame or clamping the top of the ladder to structural steel); or*** • ***at or near the bottom to prevent it moving.*** *Other issues regarding the safe use of ladders include:* • ***At no time is material to be carried while using a ladder – three points of contact must be adhered to.*** • *A person's feet should not be higher than 900 mm from the top of the ladder,* ***and when using a platform ladder, a workers feet should not be more than two metres above the base of the ladder.*** • *Ladders should be set up on a firm, level surface. They should not be used on scaffolding or Elevated Work Platforms to gain extra height.* • *Ladders should not be handled or used if they may come into contact with electrical power lines. Metal or metal reinforced ladders should not be used in the vicinity of live electrical equipment (timber ladders often have metal running along their length).* • *Ladders must not be positioned above or adjacent to openings or edges where a potential fall could occur. Work platforms with edge protection should be provided in this instance.*

2006 Code section	Formwork Code of Practice 2016
	Ladders can only be used if equipment can be operated with one hand. Activities requiring use of both hands must not be performed while standing on a ladder, for example: • *removing tie bar from wall and column forms during form stripping – this usually requires both hands and/or the use of a 'tie-bar puller'* • *carrying timbers, formply, props or frames, and* • *using power tools, such as circular saws.* *Ladders used for access must extend at least one metre above the accessed surface. Ladders should not be used in access ways or where there is pedestrian traffic, vehicles or mobile plant.* *AS1657 – (fixed platforms, walkways, stairways and ladders-design, construction and installation) must be complied with where fixed or permanent ladders are provided.'*
5. Falling objects	Text box expanded to set out duties under WHS regulations 54 and 315H.
5.1 Prevent objects from falling	No change.
5.1.1 Perimeter containment screening	Text box added to set out duties under WHS Regulation 315I. Second para amended (in bold) as follows: *'Containment sheeting may be supported by the building, structure, or specially designed scaffolding. It must extend at least one metre above the working surface. When formwork is being erected or dismantled in the immediate vicinity of the screening, the screening should* ***be captive to the building and extend at least 1 metres*** *above the top of the completed floor slab.'* Diagrams added to clarify perimeter containment screening requirements.
5.2 Building step-ins	The following information and diagram have been removed and replaced with a new diagram. ~~*"One example of an acceptable method to prevent falling objects is illustrated in Diagram 6. In this example the outside edge of the "step-in" structure is six metres from the perimeter containment screen. The angle of an imaginary line from the top of the screen to the top of the formwork platform is an angle of 45 degrees with the horizontal.*~~

2006 Code section	Formwork Code of Practice 2016
	 ~~*Diagram 6 - Height of perimeter screen in relation to building step in"*~~
5.3 Gaps	Additional sentence added clarifying that: *"Gaps on standard decks may have ply covers that are secured using nails, however fixings used on ply covers and deflector shields for jump forms, slip forms, self-climbing and crane lifted vertical formwork should only be bolted or screw connections – nails should not be used. ".*
5.4 Prior to lifting	No change.
6 Health concerns	This section has been deleted. This included the following material which is duplicated in other codes of practice: 6.1 Noise *(covered in Managing Noise and Preventing Hearing Loss at Work Code of Practice)* 6.2 Dust 6.3 Manual tasks (covered in *Hazardous Manual Tasks Code of Practice)*
7. Special requirements for wall and column forms	Now section 7. No change to content.
7.1 Bracing for wind loading	Now section 6.1 Section amended (in bold) as follows:

2006 Code section	Formwork Code of Practice 2016
	"Wall and column forms should be designed to withstand wind loading prior to, during and after the concrete pour. The bracing and forms should not be removed from the cast element until it can safely withstand potential impact loads and wind loads. *Prior to* ***commencing formwork*** *stripping operations a competent person* ***(as described by this code) must verify that sufficient concrete strength has been achieved in accordance with the design documentation and*** ~~***as described by this Code must***~~ *provide written certification that the formwork can be removed.* *Lateral support can be provided to vertical elements in a variety of ways including horizontal and angled braces and structural connections to other parts of the building. A bracing element must be verified and signed off by an engineer. The bracing element must also be able to resist both tensile and compressive loads that may be applied by the wind. Anchors for braces should preferably be cast-in type anchors or 'through-bolts' that extend through both sides of the anchoring medium.* ***Insert type*** *anchors of the following types may be used provided they are installed in accordance with the manufacturer's instructions:* • *Undercut type anchor that do not rely on friction to function.* • *Expansion anchors of the high-load slip, torque controlled type. These anchors have a working load of at least 60 per cent of the first slip load and are generally suitable for structural tensile loads.* • *Coil bolts.* *The correct operation of i****nsert type anchors*** *is greatly dependant on their being installed in accordance with a manufacturer's specifications (e.g. drilling the correct size hole and applying the correct torque in concrete of adequate strength).* ***Insert*** *type anchors* ***are to be installed*** *using* ***a calibrated*** *torque wrench or another reliable method that* ***is specified by the anchor manufacturer****. Written* ***and signed*** *records verifying the anchors* ***have been installed in accordance with the manufacturer's instructions are to b****e available on site."*
7.2 Access platforms	Now section 6.2. No change to content.
7.3 Lifting methods	Now section 6.3. Third para deleted and included as dot point in last para '~~*Suction between two members must never be permitted for lifting.'*~~ New information inserted as follows: '*When lifting wall and column forms always make sure:* • *there is an engineer's drawing or certification for lifting the form* • *the lifting lug type, location and attachment are the same as specified on the drawing*

2006 Code section	Formwork Code of Practice 2016
	• *the types and spacing of members on the form are the same as those specified on the engineer's drawing* • *the numbers, types and spacing of bolts and screws on the form are the same as those specified on the engineer's drawing* • *the form is engineer certified for any side loading lifting (i.e. when flipping the form onto or when using multi-legged slings)* • *any bracing on the form is the same as that specified on the engineer's drawing* • *a competent person from the formwork contractor inspects the form every time it is lifted and verifies it is safe to lift.* • *there is a documented system so the forms are inspected for damage or deterioration and remain safe.* *It is important to:* • *never lift a wall or column form unless the form complies with the engineer's drawing* • *never lift a form that has lifting parts that are damaged or rotten* • *never change the lifting points without engineer approval* • *never drill extra holes in the lifting parts of the form* • *never use bolts, screws or timbers different to those listed on the engineers drawing, and* • *never allow suction between two members. '*
8. Special requirements for slip forms and jump forms	Now section 7. Heading amended to *"requirements for slip forms, jump forms, self-climbing and crane lifted vertical formwork"*. The term 'building' has been replaced with structure.
8.1 Access and egress	Now section 7.1. Section amended (in bold) as follows: '*Access to the form may be provided in a variety of ways including one or more of the following:* • *personnel and material hoists on the building* • *permanent stair systems in the building* • *a trailing stair system suspended from the slip form or jump form, and* • ***an internal** trailing ladder system.* *A trailing **access** stair system **should be the primary means of access over a** ladder system because it is **~~easier~~ safer** for persons to ascend and descend and emergency evacuation is generally **~~easier~~ safer** on a stair system. **Two forms of access and egress to the form should be maintained at all times. Where formwork systems are used on single cell cores, columns or isolated walls, a single stair tread system is acceptable provided the site crane or other alternative is available for emergency removal of workers. If the site crane, or other suitable alternative, is not available then no workers should access the system."***
7.2 Working platforms and penetrations	Now section 7.2. No change to content.
	New section 7.2.1 included on trapdoors as follows:

2006 Code section	Formwork Code of Practice 2016
	'7.2.1 ***Trapdoors*** *Where penetrations exist, work procedures should be implemented to minimise the risk of workers and materials falling through the penetrations. This should include a process that helps workers to be aware of the location of trapdoors and covers. This will reduce the risk of workers tripping on penetration covers or inadvertently jumping on to a trapdoor without knowing they are doing so.* *Trapdoors are to be constructed so that the trapdoor itself and its support will not fail. Trapdoors need to be able to support persons walking or standing on them. Persons should not jump onto trapdoors or penetration covers.* *The following applies to trapdoors:* • *The trapdoor itself should be constructed from a single piece of material.* • *The material used to construct the trapdoor should be a structurally rated material. For example, if plywood is used to construct the trapdoor the plywood should be of a structural grade to an appropriate design and manufacturing standard such as AS/NZS 2269 Plywood-Structural or AS 6669 Plywood-Formwork.* • *The trapdoor should be designed and installed to be supported, when closed, around as much of its edge as practical. For example, support should be provided under all four edges of the trapdoor, except under the area of the trapdoor removed to allow the ladder to pass through the closed trapdoor.* • *The support under the trapdoor should be by structural bearers and not strips of timber that has been screwed to the formwork deck.* • *In order to allow the ladder to protrude through the deck, part of the trapdoor will need to have a section removed. This cut out should be as small as possible, while allowing a ladder angle of 4 to 1. The cut out should not be wider than the outside of the ladder stiles.* • *Where a trapdoor is no longer in use it should be locked or fastened so that it cannot be easily opened.* • *The hinges on the trapdoor are to be robust and remain serviceable for the life of the trapdoor.* • *Trapdoors should be marked with the words 'Danger Hole Under' or, 'Danger Penetrations Below; or similar.'*
8.3 Trailing screens and platforms	Now section 7.3. Additional dot point included to clarify that the design should cover safe working loads on trailing screens when used as a work platform.
8.4 Climbing the form	Now section 7.4. Reference inserted to an appendix for a pre-climb checklist.
8.5 Training	Content on training moved to new section 1.4 – information, training, instruction and supervision.
8.6 Health issues and amenities	Now section 7.5 and renamed ventilation and amenities Amendments (in bold) as follows:

2006 Code section	Formwork Code of Practice 2016
	*"Adequate ventilation and access to all cells in jump forms or slip forms should be provided **where reasonably practicable**. It is difficult for persons to spend extended periods in cells due to the heat and cramped working conditions. Allowance should be made for these issues and it may be necessary to specify maximum times for particular cells depending on temperature, humidity and cell size. These times should be developed as part of a safe work method statement following consultation between the workers and their PCBU. Adequate ventilation and access should also be provided within cells and it may be necessary to provide ventilation **~~grills~~ fans** or access ways in the cells.* *Clean drinking water should be provided on the top level of the slip form and jump form. On larger slip forms and jump forms it may be necessary to provide clean drinking water on other levels. A chemical toilet should be provided on the top of the jump form **when installation of a plumbed toilet is not practical**."*
8.7 Engineering issues	Now section 8.6. No change to content.
8.8 Emergency issues	Second last para amended (in bold) as follows: *'Response to emergency situations must be considered during formwork design stages and in an ongoing way during construction. Emergency situations requiring evacuation of an injured worker from a formwork 'cell' need to consider how to safely remove an immobilised or unconscious person. This may include creating emergency access holes and doorways through decks and screens. Procedures must identify how to access lift-voids and other areas, including cells within the core which may have limited access. **In relation to emergency evacuation from vertically lifted systems two forms of access and egress should be provided as set out in the table in 3.2.1**.'*
Appendix 1: Dictionary	Definition of competent person amended (in bold) as follows: '*Competent person In relation to performing an inspection or other task for a control measure is a person who has acquired, through training, qualifications or experience knowledge and skills ~~to do the work in a safe way~~, including:* • *sound knowledge of relevant Australian Standards, relevant codes of practice and other relevant legislation,* • ***ability to read and interpret drawings**, and* • *sound knowledge of, and competence in, the risk management process for the erecting, altering and dismantling of formwork, including:* – *hazard identification and risk assessment* – *measures to control exposure to risks* – *safe work practices and procedures, and* – *how to plan and prepare formwork.'* Definition of formwork designer deleted. Definition of horizontal member amended (in bold) as follows:

<table>
<tr><th>2006 Code section</th><th>Formwork Code of Practice 2016</th></tr>
<tr><td></td><td>‘Horizontal member: Any horizontal member of a formwork <s>or scaffold</s> frame that is provided as stiffening for the frame and may also be used to support a working platform (included the term ‘transom’ in reference to scaffolding).’</td></tr>
<tr><td>Appendix 2: Sample engineer’s certification letters</td><td>No change</td></tr>
<tr><td>Appendix 3: Construction checklist</td><td>No change</td></tr>
<tr><td>Appendix 4: Sample structural (pre-pour) certificate</td><td>The following amendments (in bold) have been made to the Sample structural (pre-pour) certificate

This is to certify that the …….. Formwork for the above project has been inspected and is considered to <s>be adequate to support the design loads in accordance with the Queensland code of practice for Formwork and relevant AS codes including AS 3610 Formwork of Concrete</s> have been erected in accordance with the formwork design documents and meets AS 3610 Formwork of Concrete.

The following items were included in the inspection:

<table>
<tr><th>ITEM</th><th>CONDITION</th><th>WORK REQ’D Yes/No??</th></tr>
<tr><td>Base Plates</td><td>OK</td><td>No</td></tr>
<tr><td>Frame spacing</td><td>OK</td><td>No</td></tr>
<tr><td>Frame bracing</td><td>OK</td><td>No</td></tr>
<tr><td>Frame extensions</td><td>OK</td><td>No</td></tr>
<tr><td>Bearer size and spacing</td><td>OK</td><td>No</td></tr>
<tr><td>Joist size and spacing</td><td>OK</td><td>No</td></tr>
<tr><td>Prop spacing</td><td>OK</td><td>No</td></tr>
<tr><td>Prop bracing</td><td>OK</td><td>No</td></tr>
<tr><td>Eccentric loading</td><td>OK</td><td>No</td></tr>
<tr><td>Backpropping</td><td>OK</td><td>No</td></tr>
<tr><td>Prop inclination</td><td>OK</td><td>No</td></tr>
<tr><td>Timber condition</td><td>OK</td><td>No</td></tr>
<tr><td>Steel condition</td><td>OK</td><td>No</td></tr>
<tr><td>Quality of materials</td><td>OK</td><td>No</td></tr>
<tr><td>Nails in plates as req’d</td><td>OK</td><td>No</td></tr>
<tr><td>Column framing</td><td>OK</td><td>No</td></tr>
</table></td></tr>
</table>

2006 Code section	Formwork Code of Practice 2016
	Column bracing *OK* *No* *Plywood fixing* *OK* *No* ***Is there any additional work required before the pour takes place?*** ***No*** *…….* *……* *Engineer's / Competent person's name* *Signature*
Appendix 5: Defects commonly found in formwork systems	No change
Appendix 6 perimeter screen handover checklist	New appendix