TWf NZ TECHNICAL GUIDANCE NOTE TGN 05.23
Temporary Works Risk Assessment and Categorisation

Temporary Works forum NZ
Promoting best practice in the construction industry.

1.0 INTRODUCTION

This Technical Guidance Note is intended to provide further information and a risk-based approach for the selection of check categories in accordance with the Temporary Works Procedural Control – Good Practice Guideline (TWfNZ GPG01:19). This guidance note should be read in conjunction with Section 2.0 and Appendix E of the GPG.

Feedback from users of the GPG indicates that there is some inconsistency in selection of the check categories 0, 1, 2 and 3. While Appendix E of the GPG provides some guidance on the scope and independence of the checker for the different categories there is only brief comment on the consequence of failure and risk profile of the proposed temporary works. This guidance note provides risk assessment tools and a matrix to determine a check category and provides further guidance on when a Chartered Professional Engineer (CPEng) should be part of the design or design check.

When assessing the check category for an item of temporary works the Temporary Works Co-ordinator (TWC) should consider:

- **Consequence of Failure**
- **Design Complexity**

These are discussed in the following sections.

The reasons for selection of the risk of Consequence of Failure and Design Complexity should be recorded so that the logic, assumptions and decision may be reviewed along with the design. In some cases, the risk assessment and categorisation of temporary works items may benefit from robust discussion with the Temporary Works Designer, however ultimate responsibility for category selection remains with the TWC.

2.0 CONSEQUENCE OF FAILURE

When assessing the level of competency for design and checking it is appropriate to assess the consequences of failure.

If failure of the temporary works is highly unlikely to result in injury to people, damage to property or damage to the environment but the analysis of the load and required resistance would be costly and time consuming, then it would be appropriate to use a site developed detail and make allowances for repairs or remediation as this would represent a more cost effective and sufficiently safe method of work.

In the case that the design of the temporary works is quite simple, (for example, a 1 m high concrete form which would normally be developed on site with no external checking) but where the consequence of failure is such that it could set off a chain of events potentially resulting in catastrophic consequences, then it would be appropriate to select a higher check category and undertake more rigorous and robust checks to ensure that failure is all but eliminated.

Table 1, below, gives direction on how the reasonably foreseeable outcome of failure can be used to assess the Consequence of Failure Risk from minor to catastrophic.

Consequences of Failure Risk (Reasonably Foreseeable Outcome of Failure)	
Minor	Low impact and entirely within site; inconvenient but personal injury unlikely.
Significant	Significant impact and entirely within site; potential for personal injury but fatality unlikely.
Major	Potentially major effect, but failure, while potentially of major impact (for instance involving fatalities and injuries) would not initiate any secondary or chain reaction of major incidents.
Catastrophic	Failure, should it occur would be catastrophic in its own right or, even if minor in its own right, might initiate a secondary or chain reaction of major or catastrophic incidents.

Table 1: Consequences of Failure Risk

The consequences in Table 1 relate to safety outcomes. Failures in temporary works may also result in equivalent consequences relating to environmental harm, commercial or programme impacts, reputational damage or social harm. These should be considered when determining the Consequence of Failure Risk and may override the safety related consequences if more severe.

3.0 DESIGN COMPLEXITY

Similarly, to Consequence of Failure Risk, the Design Complexity Risk can also be used to guide selection of the Check Category. A basic design, which is easy to review and has minimal steps in which to make an error is considered lower risk than a complex and innovative design where several assumptions and interpretations must be undertaken and checked both in design and during construction.

Table 2 is provided to guide the selection of the Design Complexity Risk with a view to classifying it from basic through to complex or innovative. It should be noted that the table below provides a starting point for assessment, however scale, constraints, load environments and other site-specific aspects may move the complexity of a given temporary works item into a different risk level following sound engineering judgement.

Design Complexity Risk	
Basic	Basic access scaffolds and platforms. Excavations of less than 1.5m not adjacent to services or foundations. Proprietary edge protection Minor wooden access stairs and ramps for pedestrian access. Standard mesh panel fencing. Proprietary cantilever loading platforms. Proprietary lifting beams.
Simple	All other access scaffolds and stairs.* Sheeted scaffold / scaffold loading bays.* Temporary hoardings and access gates. Excavations of 1.5m to 3m deep. Piling mats and working platforms. Mobile crane outrigger assessments. Hoist bases and ties. Formwork and falsework up to 3m in height. Loading and site side access gantries. Signage over 2m in height. Temporary access roads. Proprietary vehicle impact barriers Stage 1 and stage 2 basement propping. Site temporary office structures. Steel frames/bracing providing lateral stability to a simple IL2 structure Temporary berms and cutting < 6m high Proprietary precast lifting eyes Hoarding up to 3m high Simple precast propping schemes
Involved	Simple tower crane bases. Mobile crane RC foundations. Formwork and falsework over 3m in height. Façade retention. Bespoke cantilever loading platforms Bespoke lifting beams. Temporary bridges. Crane staging Excavations of over 3m or including ground anchors. Bespoke edge protection. Steel frames/bracing providing lateral stability to any other structure Ground retention >3m high Temporary berms and cuttings in complex soils or >6m high Propping schemes over multiple levels Needling and underpinning of existing structures
Complex or Innovative	Shafts more than 15m deep Complex tower crane bases. Temporary structures spanning over a footpath, rail track and/or roadway. Bridge launches Temporary works supporting IL3, IL4 or IL5 assets as defined by the Client.

Table 2: Design Complexity Risk

*CPEng sign off may be required by the Scaffolding in New Zealand Good Practice Guidelines, WorkSafe 2016. See TWfNZ TGN01:20 Engineered Scaffold for further guidance.

4.0 ASSESSMENT OF CHECK CATEGORY

Following assessment of the Consequence of Failure and the Design Complexity, the matrix below can be used to assess the Check Category.

It must be noted that this is intended to be a guide and is not a substitution for sound engineering judgement. If the outcome of this assessment seems optimistic then someone experienced in temporary works risk assessment should be engaged to provide guidance or opinion.

Check Category		**Consequences of Failure Risk**			
		Minor	Significant	Major	Catastrophic
Design Complexity Risk	Basic	Cat 0	Cat 0	Cat 1	Cat 2
	Simple	Cat 1	Cat 1	Cat 2	Cat 2
	Involved	Cat 2	Cat 2	Cat 2	Cat 3
	Complex or innovative	Cat 2	Cat 3	Cat 3	Cat 3

Table 3: Temporary Works Risk Assessment Matrix

5.0 DESIGNER AND CHECKER COMPETENCY

The GPG notes the following when detailing the minimum competency of designers and checkers:

1) All Designers will be assessed as competent by their Employer
2) The complexity of the design and compliance with national design standards and Good Practice Guides will determine the minimum requirement of the Designers experience and qualifications.
3) Relevant experience in the determination of risk categorisation to the package.
4) A practical knowledge of local conditions that have an effect on the design.
5) If in doubt, all signatures should be by a CPEng engineer.

The responsibility around competency sits with the designer's and checker's employer or the designer and checker themselves.

Some guidance on when a CPEng engineer should be engaged is provided in Table 4. It should be noted that there may be other sources which establish the requirement for a CPEng designer (e.g. CPEng designer requirement for engineered scaffolds under the WorkSafe GPG – see TWfNZ TGN01:20 Engineered Scaffold) or minimum competency levels directed by the Client's Temporary Works Specification. The more onerous competency requirement should take precedence.

Check Category	Minimum Competency	Independence of Checker
0	The Designer and Checker should be suitably competent and experienced.	The check may be carried out by another member of the site or design team.
1	The Designer and Checker should be suitably competent and experienced.	The check may be carried out by another member of the design team.
2	The Designer and Checker should be suitably competent and experienced. The checker should be a CPEng engineer.	The check should be carried out by an individual not involved in the design and not consulted by the designer.
3	The Designer and Checker should be suitably competent and experienced. The designer and checker should be CPEng engineers.*	The check should be carried out by another organisation.

Table 4: Minimum Competency and Independence of Checker

*It should be noted that there may be special cases where a Temporary Works Designer can demonstrate suitable competency and experience for complex or innovative designs without holding CPEng status. In these cases, it is essential that the Checker is a CPEng engineer.


TWf
NZ