

Temporary Works Forum (TWf)

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TW/12/006 July 2012 FINAL

Minor revision September 12

MANAGEMENT OF THE DESIGN AND PROCUREMENT OF TEMPORARY WORKS

This note reviews key actions, designed to ensure the successful use of temporary works, both commercially and safely. It is particularly relevant to Clients and permanent works Designers, but will be of interest also to temporary works Designers and Contractors. It supplements the HSE note *‘The management of temporary works in the construction industry’* [ref.1]. This note is written to raise awareness and encourage those involved to give careful thought to the design and management process.

Successful projects will almost always depend upon well managed temporary works. This management requirement relates not only to the construction phase but also to the design, specification and procurement. It also applies to the management of the permanent works as on some projects these, if not thought through, can make the temporary works design and implementation extremely costly or unsafe. Hence a number of parties will have responsibilities, to varying degrees, be they contractual or statutory.

Temporary works may be wide ranging. On some projects temporary works will include critical access and lifting operations.

The codes and guides quoted in this note include:

BS5975:2008 +Amendment A1 2011	Management requirements for all temporary works and permissible stress design for falsework
BS EN12811-1:2003 ¹	For the design of independent tied scaffolds for access and working platforms. Design is to the Eurocodes
BS EN12812:2008	Falsework: Limit state design where a system is specified
BS EN12813:	Temporary works equipment. Load bearing towers of prefabricated components including particular methods of structural design
NASC TG20.08 plus supplement 1	Designed scaffolds are to the Eurocodes, but presented in working load terms
BS EN1990-1999	The ‘structural Eurocode’ suite
NASC TG9:12	Guide to the design and construction of temporary roofs and buildings

¹ There is a concern relating to the removal of ledger bracing implicit within this standard. See TG20.08 for details

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BS7121 suite of standards	Code of practice for the safe use of cranes
Construction (Design & Management) Regulations 2007	

Permanent works design: buildability

Permanent works design will take place prior to, and usually during the construction phase, and involve a number of designers employed by both client and contractor. The CDM regulations place a duty on Designers to produce a structure that can be built and maintained (and if necessary dismantled) safely. Clients will expect this to be achieved economically.

This consideration will take cognisance of a number of factors, including the practicality, cost and safety considerations of the envisaged temporary works. This has been considered elsewhere [ref.2] but would include, for instance:

- Interim stability and safe loads from anticipated temporary works
- Work at height
- Ease of access
- Ability of permanent works to accommodate temporary lateral loads
- Propping methodologies

On the more complex schemes, advice may be needed from contractors or temporary works designers and suppliers on the appropriate temporary and permanent construction methodologies, and loads from say climbing systems or other proprietary equipment.

It is important to recognise that even standard established constructions e.g. in-situ flat slabs, may require careful consideration and information to be passed to the contractor on, for example, prop loading, striking times or strengths and safe floor loads.

Temporary works design: design co-ordination

Although all designers have a duty to co-operate, co-ordinate and communicate with each other good practice requires one person to have a co-ordination role to bring together and check the interface between the temporary and the permanent works. If the temporary works co-ordinator (TWC)² does not have sufficient design competence this may necessitate the specific appointment of one or more designers to assist the TWC in this role.

On larger projects³ there will be a CDM-C, part of whose role is to ensure co-ordination between all designers (both permanent and temporary works). However the CDM-C is not within the control of the Principal Contractor and may not have the

² Temporary Works Co-ordinator is defined in BS5975

³ Defined in the Construction (Design & Management) regulations.

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specific competence required. Hence this issue needs early discussion between the TWC and CDM-C so as to ensure the necessary actions are taken and the skills are available.

Client-led procurement

In order to obtain the requisite level of management control, on all projects, apart from the simplest, a Temporary Works Co-ordinator (TWC) as defined in BS5975:2008 should be appointed. In order to avoid contractual dispute, this role may need to be specified in the contract. This stipulation is particularly important if other codes are quoted elsewhere (BS EN12812:2008 for design of falsework, for example) as these standards do not include equivalent provisions. In addition it may be beneficial to include contract requirements relating to other items where choice is available,

e.g.

- Temporary works design check procedures including categories of check and competencies of checkers.
- Any specific requirements relating to the competency of the TWC (and Temporary Works Supervisor (TWS) if relevant)⁴.
- Specific design parameters e.g. movement limits, striking constraints [ref.2]

On major, or complex projects, a key consideration of the permanent works team is whether temporary works are to be designed to permissible stress methods, limit state philosophy or left to the contractor's discretion. Design codes may be detailed within the contract.

The options from typical temporary works design codes are:

Category	Design options:		Note:
Falsework	Limit State	Typically BS EN12811, 12812, 12813). TG20.08 should be specified for scaffolding as it is currently the industry norm.	1,2
	Permissible Stress	Typically BS5975	
Temporary works other than falsework	Limit State	Eurocodes	3
	Permissible Stress	Typically BS59755	

⁴ See TWf note '[Competency of the TWC](#)'

⁵ The definition of falsework is broad, but BS5975 does not give design information on the support of excavations (BS 6031) nor does it describe flying shores or façade retention systems (see CIRIA C579

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Note 1: Whereas there is a choice of design approach for falsework, designed scaffolding (to TG20.08) is to the Eurocodes, converted back to working loads.

Note 2: In the UK, proprietary temporary works products are still being designed and tested using permissible stress methods. Some European products may have been designed to Eurocodes and be CE marked but calculations are rarely, if ever, available.

Note 3: Any temporary works may be designed to the structural Eurocodes (BS EN1990-1999)⁶. However, it is more likely that permissible stress methods will currently be used for temporary works, as this is still the industry norm.

The decision in respect of the choice of design philosophy will need to take account of:

- Any interaction with permanent works, and its design approach (so as to obtain necessary compatibility)
- Use of proprietary equipment (which may be limited to permissible stress design)
- Temporary works design competence likely to be available.

Contractor-led procurement

The Principal, or Main Contractor, will, as is the norm, pass through applicable client-led procurement requirements to his sub-contractors, supplemented by any requirements of his own (this is distinct to the design brief) and may include:

- The project-specific role of the TWC, as implemented by the principal/main contractor
- Required appointment by the sub-contractor of a Temporary works Supervisor (TWS).
- Any mandatory (contractual) duties of the TWS
- Minimum or limiting competencies of the TWS
- Reporting structure to the TWC (and possibly the CDM-C)
- Design co-ordination requirements

Site management

The measures described above will provide a sound platform for the sufficient management of temporary works. Implementation on site will be co-ordinated by the TWC as envisaged in BS5975.

⁶ Design Class B1 of BS EN12812 is wholly in accordance with the structural Eurocode suite

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Conclusion

Careful thought, early on in the project, will reap dividends for all those involved. The permanent works designer has an important role, directly in relation to the design itself, and also in ensuring adequate thought is given to information provision and procurement issues.

References

- 1 http://www.hse.gov.uk/foi/internalops/sims/construct/2_10_04.htm
- 2 Designing for safer concrete structures. Concrete Centre 2011.

Other Documents

- 1 Guidance on the competency of the TWC at <http://www.twforum.org.uk/pubs.html>