



**Temporary Works
forum**

Promoting best practice in
the construction industry.

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The safe management of temporary works The basics for small and medium-sized enterprises (SMEs)

This advice is aimed *generally* at those utilising temporary works in **small and medium-sized enterprises** (SMEs) who are a Principal Contractor (PC) or acting as a 'managing contractor'.

NOTE:

A 'managing contractor' is a contractor who - with the agreement of the PC - has and works to its own management procedures for temporary works (and has their own TWC).

The text is based around the requirements of the Construction (Design and Management) Regulations 2015 (CDM2015) [1.] and, broadly, the advice contained in that part of BS 5975: 2019 which covers procedures for the management of temporary works (Sections 1 and 2)¹.

For further detail see **Legal Requirements, References** and **Bibliography**.

1. Introduction

1.1 "Temporary works" is a widely used expression in the construction industry for a temporary 'engineered solution' that provides support, restraint or access. Examples are:

- **Earthworks**
Support to trenches; excavations; temporary slopes and stockpiles.
- **Structures**
Formwork; falsework; propping; façade retention; needling; shoring; edge protection; scaffolding; temporary bridges; site hoarding and signage; site fencing; cofferdams; rebar cages.
- **Equipment and plant foundations**
Tower crane bases; supports, anchors and ties for construction hoists and mast climbing work platforms; groundworks to provide suitable areas for plant erection, e.g. mobile cranes and piling rigs; site accommodation foundations; haul roads and hard standing for plant and material storage.

1.2 It is also necessary to consider permanent works that are part-built or under temporary loading conditions. This includes deteriorated, damaged or part-demolished structures as well as those that are under construction and/or being structurally refurbished. In all these cases these structures may not be able to support themselves let alone additional construction loadings.

2. Consequences of failure

2.1 Any failure may lead to collapse of the temporary works and/or the permanent structure. This could cause injury or death, as well as loss of time and money.

2.2 The causes of many past temporary works failures were foreseeable and could have been prevented by proper consideration when planning, designing, erecting, installing, loading, using or dismantling. Investigations into incidents, including collapses, have identified that a lack of co-ordination and communication between the various parties, including designers, contractors, sub-contractors, trades and equipment suppliers, has contributed significantly if not critically (see **Annex 1**).

2.3 Failures often occur with fairly simple temporary works erected by smaller contractors, who may not directly employ design staff and may not appreciate the importance of appropriate, formal design.

2.4 Many failures have occurred because excavations or structures were expected to stand up on their own at an interim stage of construction, when they could not; or ad-hoc temporary works had been used. The interim state had not been considered and a Geotechnical or Structural Engineer had not been consulted.

The Temporary Works Forum is a not for profit company (7525376)
Registered address: (c/o Institution of Civil Engineers), 1 Great George St., London, SW1P 3AA.
Correspondence address: 31, Westmorland Road, Sale, Cheshire, M33 3QX

t: 07801 594 862
e: secretary@twforum.org.uk
w: www.twforum.org.uk

Chairman: Rob Millard
CEng MICE MIDE

Secretary: David Thomas, MSc BSc(Eng) AKC CEng FICE CFIOSH

3. Statutory responsibilities

3.1 The Construction (Design and Management) Regulations 2015 set out legal requirements for all construction work and construction sites and must be followed.

3.2 A construction site must be made and kept safe. It must have safe access and egress to all work areas. There must be sufficient working space and the site must be arranged suitably, taking account of the work equipment likely to be used.

3.3 The phasing and sequence of construction must be considered, ensuring that later works do not interfere or compromise earlier works. This is only easy to organise if it is thought through and planned from an early stage.

3.4 Steps must be taken to:

- (i) ensure that wherever the permanent works is not sufficiently robust to stand up on its own during construction, appropriate supporting temporary works is designed and installed;
- (ii) ensure the temporary works themselves are stable and safe at all times;
- (iii) ensure that those constructing, using and dismantling the temporary works can carry out their work safely, with particular regard to preventing falls from height;
- (iv) minimise any risks to the health and safety of others who may be working on, or passing by, the construction activity. Incidents can result, for example, from falling materials, wind-blown plywood or scaffold boards, noise and dust, etc.; and
- (v) use the services of a structural engineer and contractors and workers who have sufficient experience of the type of work involved and are well supervised.

3.5 On sites that involve more than one Contractor, the Principal Contractor role is a legal requirement and carries responsibility for the safe co-ordination of all activities on-site (including liaison with specialist proprietary suppliers).

Industry recommended appointments

3.6 The Principal Contractor should appoint a Temporary Works Coordinator (known as the PC's TWC) to control and coordinate the temporary works and to authorize and sign off 'hold points' (see 19.).

3.7 In some instances, other contractors may also appoint a TWC (e.g. a 'managing contractor').

4. Temporary works procedures

4.1 CDM2015 requires a risk-based approach to ensuring that temporary works is suitably planned and conducted.

4.2 Part of BS5975:2019 contains a series of procedures to aid the management of temporary works. Its recommendations are widely used throughout the construction industry. The main requirements are summarised and explained in easy-to-read text within this document, which is particularly aimed at smaller contractors running smaller sites.

4.3 The use of proper procedures is essential to control risk. One of the main aims in any method of work should be to minimise the chance of errors being made and to maximise the chance of errors being discovered, if they are made. Accordingly, there should be a requirement for effective communication of information between all levels of the construction organisations involved.

4.4 The procedures should cover, as a minimum:

- (i) appointment of competent individuals (see 6.1), e.g. DI, TWC, TWS and designers (whether of permanent works or temporary works);
- (ii) rigorous identification of when and where temporary works will be required;
- (iii) preparation of an adequate design brief for each item or area of temporary works;
- (iv) completion and maintenance of a temporary works register;
- (v) production of a temporary works design (and the identification of significant risks);
- (vi) appropriate independent checking of the temporary works design;

NOTE:

Temporary works schemes should be checked 'as one' – holistically – particularly where different sub-contractors are supplying different parts (or where different works are being carried out in close proximity).

- (vii) issue of a design/design check certificate;
- (viii) pre-erection inspection of the temporary works materials and components;
- (ix) control and supervision of the erection, safe use, maintenance and dismantling of the temporary works, to:
 - (a) check that the temporary works have been erected in accordance with the design (with the identification of hold points, e.g. a permit-to-load, where necessary);
 - (b) confirm when the permanent works (e.g. reinforced concrete) have attained adequate strength to allow dismantling of the temporary works (with the issue of a permit-to-dismantle, where necessary).

4.5 Where contractors do not have the internal expertise they should seek competent external advice and support.

4.6 A template procedure is available, free, from the Temporary Works Forum (TWf)¹.

5. Client²

5.1 The Client has a major influence over the way a project is procured and managed. Regardless of the size of the project, the client has contractual control, appoints designers and contractors, and determines the finance, time and other resources available to the Contractor.

5.2 Clients who lack experience should seek professional advice.

6. Temporary works responsibilities

6.1 There are a number of key roles:

(a) Designated Individual (DI)

All organisations involved in temporary works should appoint a 'Designated Individual'. This includes SMEs. This person should be a director or senior manager. They are responsible for establishing, implementing and maintaining a procedure for the control of temporary works (appropriate to the size, complexity and involvement of that organisation). They should ensure that any sub-contractors they use have adequate temporary works procedures and suitable skills, knowledge and experience.

(b) Temporary Works Coordinator

The Principal Contractor should appoint a 'Temporary Works Coordinator' (the PC's TWC), as early as possible. Any 'managing contractor(s)' should also appoint a TWC. Their role is to co-ordinate all the various temporary works activities. They are responsible for the implementation of their own organisation's temporary works procedures (as well as those of other contractors they directly or indirectly employ).

They must be competent and have relevant up-to-date training and both the qualifications and the experience appropriate to the complexity of the project. They should be familiar with their own organisation's temporary works procedures.

On a large, technically-complex contract they might be a suitably qualified engineer. On a small, straightforward contract the role might be taken by the Contractor's site manager/site agent.

Whoever it is, they are responsible for ensuring that correct temporary works procedures are followed and that operations are carried out safely.

It is preferable that the PC's TWC is not responsible for the day-to-day progress of the temporary works. However, this might not be possible on small projects that may have no engineering staff. In this case, it is essential that their decisions are not compromised by commercial or other pressures.

Both the PC's TWC and TWC should (not exhaustive):

- operate in accordance with approved procedures;
- establish and maintain a temporary works register;
- ensure that relevant information has been received and passed on (as appropriate);
- prepare a suitable design brief;
- arrange for any temporary works design(s) to be undertaken;
- ensure that suitable design check(s) are carried out;
- arrange for relevant client and/or third-party approvals;
- ensure that there is a documented safe system of work;
- define any checks, inspections and testing (as required);
- establish hold points and ensure that (as required) permits are issued;
- advise the designer(s) of any changes or modifications that are needed.

The PC's TWC has additional coordination and management responsibilities.

(c) Temporary Works Supervisor (TWS)

To assist a TWC their DI - possibly at the request of a TWC or site manager - may appoint one or more 'Temporary Works Supervisor'³. Responsible (in respect of temporary works) to the TWC, their role is to assist the TWC in the supervision and checking of the temporary works to ensure that it is constructed in accordance with the design. As applicable to their role and company, this should include the supervision of the erection, use, maintenance and dismantling of any temporary works.

They should be competent, with relevant up-to-date training with experience appropriate to the complexity of the project and work they will be undertaking. They should:

- operate in accordance with approved procedures;
- supervise the erection, use, maintenance and dismantling of any temporary works;

¹ TWf, Temporary Works Procedure: Sample (TWf2019.03), <https://bit.ly/3GyZELS> (**NOTE: Requires customising.**)

² For advice on 'Domestic Clients' see L153 [1].

³ There may be more than one TWS (and several organisations, e.g. different sub-contractors, may opt to appoint one or more TWS).

- undertake checks during construction on site;
- liaise with the TWC to ensure that any modifications to the scheme (or differences from envisaged conditions) are drawn to the relevant designer's attention via the TWC.

NOTE:

Some TWSs may also be able to contribute to the content of the design brief.

The TWS should be present on site when the temporary works for which they are appointed to supervise are being used.

(d) Temporary Works Designer (TWD)

Designers (whether of permanent works or temporary works) must:

- (i) identify the hazards;
- (ii) eliminate the hazards, if feasible;
- (iii) by design, reduce the risks to those fabricating, constructing, using and dismantling the temporary works;
- (iv) provide the information necessary to identify and manage the remaining risks.

Particular consideration should be given to the following:

- (i) stability requirements, lateral restraint and wind uplift on untied components;
- (ii) designing temporary works that can be erected, inspected and dismantled safely including how erection and dismantling will be achieved;
- (iii) selecting adequate foundations or providing information to ensure adequate foundations are used;
- (iv) providing the information that the TWC will need to manage the interface between the temporary works and the permanent structure safely.
- (v) the provision of safe access and egress.

NOTE:

In some cases custom-and-practice within the construction industry is to rely on one designer to design the temporary structure (e.g. a scaffold) and another to assess and prove the adequacy of the interfaces (e.g. the ground that a scaffold will sit on and the permanent structure that it will be tied to). This work must be coordinated.

The 'Principal Designer' also has duties: see TWf Information Sheet No. 3 [2.].

(e) Temporary Works Design Checker (TWDC)

All designs should be checked by an independent competent person(s). The ability and independence of the checker should be greater where the temporary works are more complex or where new ideas are incorporated (see 10.8).

7. Planning

7.1 Initial planning should cover:

- (i) the requirement for and concept of the temporary works (viz. what needs supporting, what information is known and what else is needed);
- (ii) the envisaged programme period; and
- (iii) the estimated costs.

8. Temporary Works Register

8.1 The Principal Contractor (PC) should establish and maintain a 'temporary works register' for planning purposes and to facilitate management control. Other contractors should feed into the PC's register.

8.2 A typical register might include:

- design brief number (for each item) and date issued;
- short description of temporary works;
- date required;
- risk category of temporary works;
- design check category of temporary works;
- name of designer(s);
- name of design checker(s);
- date design complete;
- date design checked;
- issue of design check certificate;
- erection complete and checked (with date of hold points, etc.);
- name of the TWS(s).

9. Design brief

9.1 The contractor instigating the temporary works should prepare a 'design brief' for each item of temporary works. This is the starting point for subsequent decisions, design work, calculations and drawings. All relevant parties should contribute towards the preparation of the design brief. It should be reviewed and approved by the TWC.

9.2 If the design brief needs to be changed subsequently, then this should be done. What should not occur is that a design is issued that is at variance to the brief. The design brief and the final design should match.

9.3 The design brief should include all data relevant to the design of the temporary works. This might be from the permanent works designer (PWD), the client, or any other party. It is important that it is prepared early to allow sufficient time for all subsequent activities, i.e. design, design check, procurement of equipment and construction of the temporary works required for a project.

10. Design

10.1 All temporary works should be designed in accordance with the design brief. This will vary from the use of simple standard solutions (including, for example, tables and graphs) to site-specific, bespoke design calculations and supporting drawings.

10.2 The designer of temporary works, including those selecting any standard solutions, is commonly known as a Temporary Works Designer (TWD). The suppliers of proprietary equipment are also TWDs.

10.3 The term 'designer' has a broad meaning and includes:

- (i) anyone who specifies or alters a design, or who specifies the use of a particular method of work;
- (ii) contractors carrying out design work as part of their contribution to a project; and
- (iii) temporary works engineers, including those designing formwork, falsework, scaffolding and sheet piling.

10.4 Temporary works designs should be based on the agreed design brief and take into account the ease and safety of erection and dismantling. TWDs should provide guidance on the implementation of their design.

10.5 Where it is necessary to alter the design the TWC should be informed as soon as possible so the designer can be contacted to arrange the change. Where necessary the design brief should be reviewed and amended.

10.6 Temporary works should be designed in accordance with recognised engineering principles. The preparation of design calculations, drawings and specification should be undertaken with similar rigour to the procedures applied to the design of the permanent works.

10.7 The designer should agree a "design check category" with the TWC (see 12.). Sometimes, the client may specify the design check category.

11. Design check

11.1 Prior to the start of any construction work, proposed temporary works designs should be checked for concept, adequacy, correctness and compliance with the requirements of the design brief.

12. Design check category

12.1 Before erection commences, the temporary works design should be checked for:

- design concept – is it workable?
- strength and structural adequacy (including foundations and lateral stability) – is it robust enough?
- and
- compliance with the design brief – is it fit for purpose?

12.2 Recommendations for various categories of design check are given in Table 1 of BS 5975: 2019 [4.] (see Table 1, appended).

13. Design check certificate

13.1 When a design has been checked and is satisfactory, a design check certificate(s) should be issued. This should state the category of check - 1, 2 or 3. It should confirm that the design complies with the requirements of the design brief, design standard(s), technical literature, etc., as well as any constraints or loading conditions imposed and is fit for the intended purpose. The certificate, and any supporting information, should be issued to the TWC.

14. Design: Standard solutions

14.1 A 'standard solution' is an arrangement where the basic design work has been completed already, e.g. by a proprietary supplier or trade association (i.e. an off-the-shelf solution). The design should comply with recognised codes of practice, and recognised engineering principles. Supporting information from the supplier is usually presented in tabular or graphic form or is determined/refined using validated software. No further structural calculations are necessary for the components involved.

14.2 The choice of solution may be influenced by, for example, the availability of material and the experience of the project's workforce and supervisors. The solution adopted needs to take account of the site layout and any limitations and/or constraints.

14.3 Those selecting standard solutions are a 'designer' under CDM2015 and should ensure that they understand and take into account any limitations identified. In particular, they must check (including numerically, where necessary) that the interface(s) between a standard solution and the site provides sufficient support and space for access, etc.

15. Materials

15.1 Temporary works should be constructed, or adapted, so as to be suitable for the purpose for which it is used:

- (i) It should be strong enough and stable in use.
- (ii) Damaged components should not be used.
- (iii) Different proprietary components should not be mixed, unless expressly approved by the designer.

16. Site

16.1 Before construction work begins a risk assessment should be undertaken and a safe system of work developed. A method statement, which includes how all the hazards are to be managed, should be prepared. This should be read and understood by those doing the work.

16.2 Where a designer recommends or suggests a particular sequence or approach this should be refined by the Contractor and included within the Contractor's method statement and risk assessment (RAMS).

16.3 The Contractor may be able to justify a more efficient sequence and approach to achieve and install the design but should check this with the designer(s) to ensure that such changes do not adversely affect, for example, stability during assembly and installation.

16.4 Temporary works are sometimes categorised to indicate their 'implementation risk' (a combination of the 'execution risk' and the 'consequences of failure' risk), e.g.:

- (i) very low;
- (ii) low;
- (iii) medium;
- (iv) high.

NOTE:

'Execution risk' is the risk associated with the construction, use and removal of any temporary works. 'Consequences of failure risk' is the risk resulting from its location, and what might be affected by any failure.

16.5 The higher the risk the greater the attention that should be paid to the erection, use and dismantling, e.g. the hold points required (permits), the detail required in RAMS, the experience of the workforce, who authorises what, etc.

16.6 Company procedures on the control of temporary works should reflect the appropriate and requisite levels of control to be applied.

NOTE:

Not to be confused with 'design check category' (see 12.).

16.7 To ensure safety, temporary works should be stable at all stages of erection and be periodically inspected. Only 'working drawings' (i.e. issued for construction), and not 'preliminary drawings' (e.g. issued to allow pricing, tendering, for approval, etc.), should be used. The workforce should know:

- (i) where to start;
- (ii) whether the temporary works equipment supplied is the same as that ordered and whether the full kit of parts is present;
- (iii) at what stage inspections and 'hold points' are required;
- (iv) whether inspections have already been carried out; and
- (v) whether any permits resulting from a hold point are required.

17. Site supervision

17.1 Temporary works should be subject to careful site supervision. The temporary works should be inspected at key stages to ensure that it has been constructed, loaded, used, maintained and then dismantled safely in accordance with the design and specified materials. The risk assessment and method statement should be followed. All departures from the design and method statement should be referred to the TWC - who should consult the temporary works designer(s) and, where needed also permanent works designer(s).

18. Inspections

18.1 During construction or dismantling inspections of the temporary works should be carried out at intervals in order to check the adequacy of work in progress and that it meets the agreed design. Where it does not, remedial measures should be taken before work is allowed to progress.

18.2 A final inspection prior to the release of each hold point should be carried out to confirm that the temporary works has been constructed in accordance with the agreed design. The results of these inspections should be recorded by the TWC.

NOTE:

Once installed and handed over ongoing inspection may be required at defined intervals in accordance with statutory requirements (e.g. access scaffold inspection, excavations). Other work equipment may fall under a general requirement that requires the dutyholder to establish and implement a suitable inspection regime and interval.

19. Hold points

19.1 The TWC should ensure that appropriate 'hold point(s)' are identified and implemented. Examples are: permit-to-load, permit-to-strike, permit-to-unload, permit-to-fix, permit-to-dig, permit-to-dismantle, permit-to-proceed, etc. When identifying the need for a hold point it is useful to determine when any load path might change.

19.2 A hold point is an opportunity to check that the design intent has been implemented as planned, before work proceeds. Where it does not, remedial measures should be taken before work is allowed to progress.

19.3 Hold points should be identified in the method statement. They should be signed-off in writing by the TWC, unless identified otherwise in company procedures, e.g. in some cases the TWC may permit the TWS to undertake the sign-off. The decision to permit this should be recorded in writing, in advance.

20. Loading

20.1 Once complete, temporary works should be inspected and certified as ready for use. A procedure that records this in writing is strongly recommended. The frequency of subsequent inspections will depend upon the nature of the temporary works. They should be carried out frequently enough to enable any faults to be rectified promptly.

21. Dismantling

21.1 When the structure being supported by temporary works becomes self-supporting (e.g. a completed steel frame, a cured reinforced concrete column, a backfilled excavation, etc.), the temporary works may be dismantled (or removed). This may be carried out in planned stages.

21.2 The TWC should agree the timing and sequence of dismantling with the designer(s). A written sequence for dismantling should be agreed and detailed. It should outline any limitations and/or restrictions, in particular any imposed by the permanent works. Reference should be made to any hold points required.

21.3 Different temporary works arrangements and different designs will have widely-varying sequencing requirements. The designer must provide sufficient information to avoid workers making incorrect assumptions that could lead to a failure.

21.4 The method statement should be followed, ensuring that workers can work safely and cannot be injured by, for example, falling objects or falling from height. Inspections should take place, as identified.

22. Training

22.1 TWCs, as well as those erecting and dismantling temporary works, should be competent and trained in the safety of temporary works.

22.2 Free online general awareness training is available from the Temporary Works Forum, <https://www.twforum.org.uk/elearning1>

22.3 CITB procedural courses are available:

- (i) Temporary Works Coordinator Training Course;
- (ii) Temporary Works Supervisor Training Course; and
- (iii) Temporary Works General Awareness Training Course (online only).

22.3 Technical training may be required also (although the TWC is not normally the designer).

22.4 General advice is given in TWf Information Sheet No. 2 [3].

22.5 CITB management courses are available for managers and supervisors, e.g.:

- (i) Site Management Safety Training Scheme (SMSTS); and
- (ii) Site Supervisors' Safety Training Scheme (SSSTS).

NOTE:

The temporary works element of SMSTS and SSSTS courses is limited.

22.6 Management and supervisory courses are also available for demolition managers and supervisors⁴; and scaffolding supervisors⁵.

Legal Requirements

- Health and Safety at Work etc. Act 1974 (HSAWA⁶)
- Management of Health and Safety at Work Regulations 1999 (MHSWR⁷)
- Construction (Design and Management) Regulations 2015 (CDM⁸)
- Lifting Operations and Lifting Equipment Regulations 1998 (LOLER⁹)
- Provision and Use of Work Equipment Regulations 1998 (PUWER¹⁰)
- Work at Height Regulations 2005 (as amended) (WAHR¹¹)

References

- [1.] Managing health and safety in construction, Construction (Design and Management) Regulations 2015, Guidance on Regulations, L153¹²
- [2.] TWf Information Sheet No. 3, CDM2015: Principal Designer: Guidance on Temporary Works¹³
- [3.] TWf Information Sheet No. 2, Temporary Works Training¹⁴
- [4.] BS 5975: 2019, Code of practice for temporary works procedures and the permissible stress design of falsework¹⁵

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- www.temporaryworks.info
- GE700, Construction site safety, CITB¹⁷
- CITB, <https://www.citb.co.uk/standards-and-delivering-training/site-safety-plus-ssp/>

⁴ <https://demolition.training/>
⁵ <http://cisrs.org.uk/cards/supervisor/>
⁶ <https://bit.ly/1rxsEXQ>
⁷ <https://bit.ly/1SqSDx8>
⁸ <https://bit.ly/1CbZy0>
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¹³ <https://bit.ly/2THQZk1>
¹⁴ <https://bit.ly/2W3Ma1l>
¹⁵ <https://bit.ly/3lf6PkP>
¹⁶ <https://bit.ly/2HrhBPr>
¹⁷ <https://bit.ly/2JglRC1>



Table 1, Design check category

Design check category	Scope	Comment	Independence of checker
0	Restricted to standard solutions only, to ensure the site conditions do not conflict with the scope or limitations of the chosen standard solution. These may include standard trench boxes.	This applies to the use of standard solutions and not the original design, which requires both structural calculation and checking to Category 1, 2 or 3, as appropriate.	Because this is a site issue, the check may be carried out by another member of the site or design team.
1	For simple designs. These may include: formwork; falsework; needling and propping to brickwork openings in single storey construction.	Such designs would be undertaken using simple methods of analysis and be in accordance with the relevant standards, supplier's technical literature or other reference publications.	The check may be carried out by another member of the design team.
2	On more complex or involved designs. Designs for excavations including excavation support using sheet piles, for foundations, for structural steelwork connections, for reinforced concrete. Designs where stability is obtained by restraint at the top of the temporary works (e.g. top-restrained falsework).	Category 2 checks would include designs where a considerable degree of interpretation of loading or soils' information is required before the design of the foundation or excavation support or slope is carried out.	The check should be carried out by an individual not involved in the design and not consulted by the designer.
3	For complex or innovative designs, which result in complex sequences of moving and/or construction of either the temporary works or permanent works. It also includes basement excavations and tunnels.	These designs include unusual designs or where significant departures from standards, novel methods of analysis or considerable exercise of engineering judgment are involved.	The check should be carried out by another organization and should include an overall check to assure co-ordination of the whole design.

Source: BS 5975: 2019, Table 2 – Categories of design check in temporary works

ANNEX 1

The consequences and causes of temporary works failure

A.1 The consequences of temporary works failure

Failure to adequately specify, design, construct and maintain temporary works can lead to:

- collapse or failure of the temporary works;
- structural failures and collapse of the permanent works;
- uncontrolled ingress or egress of materials, spoil and water;
- collapse of adjacent structures (buildings, transport systems, infrastructure);
- risk of single/multiple fatalities and serious injuries to workers and members of the public;
- risk of significant delay and increased costs to construction projects;
- significant financial and commercial risks to contractors, sub-contractors, designers, suppliers, and clients.
- inadequate, or lack of, appropriate level of checking of temporary works designs;
- lack of awareness on site of temporary works design assumptions;
- unavailability of temporary works equipment;
- inappropriate use of temporary works equipment;
- poorly constructed temporary works and/or absence of checking of adequate erection;
- unauthorised changes to an approved temporary works design;
- overloading of temporary works, i.e. failure to control loading or lack of awareness of the capacity of the equipment;
- inadequate communication of details of the temporary works design to the erectors;
- inadequate foundations for the temporary works;
- lack of adequate lateral stability for the temporary works.

A.2 Causes of temporary works failures

The main causes of temporary works failures include:

- absence of or an inadequate temporary works procedure;
- no temporary works coordinator (TWC) appointed;
- inadequate site investigation (including geotechnical investigation, identification of underground services, assessment of the structural condition of existing and/or adjacent buildings);
- inadequate, or lack of, design brief;
- inadequate, or lack of, design for the temporary works;

ANNEX 2

The history of BS 5975

Source:

The management of temporary works in the construction industry, HSE, SIM 02/2010/04 (withdrawn)

- A2.1 Following a number of significant falsework collapses in the 1970s and an apparent lack of authoritative guidance, a report on falsework by the Joint Committee of the Institution of Structural Engineers and the Concrete Society (1971¹⁸) was followed by an advisory committee to investigate the use of falsework, which produced reports, (1974¹⁹) (1975²⁰) - the so-called "Bragg Report".
- A2.2 Industry then produced the first code of practice (in compliance with one of the recommendations of the Bragg Report), BS 5975: 1982, Code of practice for falsework,
- A2.3 BS 5975: 1982 codified all relevant aspects that should be considered when preparing a design for falsework and included recommendations for materials, design and work on site. It described procedures as well as technical aspects because the success of falsework is closely linked to its management. Recommendations were given on the actions that should be taken and the allocation of duties to individuals.
- A2.4 The Bragg Report recommended that the duty of ensuring that all the relevant procedures and checks are carried out be given to one individual known as the "Temporary Works Coordinator". BS 5975: 1982 included this recommendation but adopted the narrower term of "Falsework Coordinator" because the section on procedures only considered falsework and not the wider activities covered by the more general term of temporary works, such as scaffolding and excavations. A second edition of the standard was published in 1996.
- A2.5 BS 5975: 2008+A1: 2011 provides recommendations and guidance on the procedural controls to be applied to all aspects of temporary works in the construction industry, as well as specific guidance on the design, specification, construction, use and dismantling of falsework (using permissible stress design). It describes procedures as well as technical aspects because the success of falsework and temporary works is closely linked to their management.
- A2.6 Recommendations are given on the actions that should be taken and the allocation of duties to individuals. It is recommended that the duty of ensuring that all the relevant procedures and checks are carried out be given to one individual known as the "Temporary Works Coordinator".
- A2.7 BS 5975: 2019 introduces options to supplement the PC's TWC. In some cases, there may be more than one PC's TWC, e.g. on large or complex sites with well-defined areas of work (such as connected, long rail, road or tunnel projects). In such cases, one of the PC's TWCs must be appointed as the lead PC's TWC to manage the interfaces between the areas.
- A2.8 When contracted to manage their own temporary works, also allowed is the appointment by a sub-contractor, e.g. a specialist, of their own TWC; responsible to the PC's TWC. This requires the PC's DI to implement a robust and auditable vetting process to check the competence of these other contractor(s); and then be proactive in monitoring the performance of the contractor(s) and their compliance with their own procedures.
- A2.9 At the time of updating this information sheet (April 2023) BS 5975: 2019 is due to be split into BS 5975: 202X, Part 1 and Part 2.

¹⁸ The Concrete Society, Falsework – Report of the joint committee, The Concrete Society and the Institution of Structural Engineers, Technical Report TRCS 4, London, July 1971

¹⁹ Bragg, SL (Department of Employment, Department of the Environment), Interim Report of the Advisory Committee on Falsework, London, HMSO, 1974

²⁰ Bragg, SL (Department of Employment, Department of the Environment), Final Report of the Advisory Committee on Falsework, London, HMSO, June 1975

ANNEX 3

Industry changes

- A3.1 There have been significant changes to the construction industry since the mid-1970s which have affected how falsework, and more generally temporary works, are dealt with. Research²¹ identified the principal changes, including:
- Few 'main contractors' now have their own temporary works departments whereas, in the 1970s, almost all would design temporary works in-house; the responsibility for temporary works now often falls to a specialist contractor/supplier which can result in a lengthy supply chain.
 - In the 1970s, most falsework and temporary works were constructed from scaffold 'tube and fittings' whereas proprietary systems now dominate the market; therefore, the design skills and knowledge of the performance of the systems now tends to lie within the specialist organisations.
 - There has been a gradual but inexorable loss of traditional skills within the construction industry; in practical terms this means that the site foreman with a lifetime's experience of 'what works' has been largely lost.
 - Procurement routes are now largely chosen to maximise commercial benefit with little regard to considerations for the flow of information; the difficulties caused by long supply chains are further exacerbated when design and erection responsibility are split; and when design/supply briefs do not provide for site visits/inspections.
- A3.2 Research²² into various aspects of falsework produced some worrying findings which included:
- a lack of understanding at all levels of the fundamentals of stability of falsework and the basic principles involved;
 - wind loading is often not considered when it should be;
 - a lack of clarity in terms of the design brief and coverage of key aspects such as ground conditions;
 - the assumptions for lateral restraint of the falsework made by designers were often ignored or misunderstood by those on site;
 - a lack of adequate design checking and erection accuracy;
 - interface issues in situations where several contractors provide and install interconnected parts of a temporary works design.
- A3.3 Based on the research, a number of key concerns were identified:
- competency of the falsework/temporary works designer;
 - sufficiency of information;
 - adequacy of supervision;
 - role of the Temporary Works Coordinator (TWC);
 - competency of those erecting falsework/temporary works.

²¹ Standing Committee on Structural Safety (SCOSS), Falsework: full circle?, SCOSS Topic Paper SC/T/02/01, 2002, <https://bit.ly/2CxotH4>

²² Investigation into aspects of falsework, HSE Contract Research Report 394/2001, HMSO, 2001, <https://bit.ly/3mOYG7l>



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Readers should note that the documents referenced in this TWf Information Sheet may be subject to revision from time to time and should therefore ensure that they are in possession of the latest version.

ⁱ To become **BS 5975-1**, *Temporary works. Part 1: Management procedures for the control of temporary works – Code of practice* (at the time of publication, 24.4.23)