PAS 8811:2017

Temporary works – Major infrastructure client procedures – Code of practice

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Contents

Foreword

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Acknowledgement is also given to the members of a wider review panel who were consulted in the development of this PAS.

This PAS is not to be regarded as a British Standard. It will be withdrawn upon publication of its content in, or as, a British Standard.

The PAS process enables a code of practice to be rapidly developed in order to fulfil an immediate need in industry. A PAS can be considered for further development as a British Standard, or constitute part of the UK input into the development of a European or International Standard.

Relationship with other publications

This PAS is one of two BSI PAS publications sponsored by HS2 and the TWf and can be used in conjunction with PAS 8812, *Temporary works – Application of European Standards in design – Guide*, which gives guidance on the application of European Standards in the design of temporary works in the UK for practitioners in the fields of structural and geotechnical temporary works design.

This PAS complements, and is intended to be used in conjunction with, BS 5975, *Code of practice for temporary works procedures and the permissible stress design of falsework*, expanding areas where there is limited information provided for client requirements.

BS 5975, *Code of practice for temporary works procedures and the permissible stress design of falsework* is the main UK standard for temporary works. However, major infrastructure clients can follow the recommendations in this PAS in addition to the general procedural controls for other duty holders that underpin the temporary works industry, as recommended in BS 5975:2008+A1:2011, Section 2.

Use of this document

It has been assumed in the preparation of this PAS that the execution of its provisions will be entrusted to appropriately qualified and experienced people, for whose use it has been produced.

For the purposes of this PAS, the terms and definitions given in the Construction (Design and Management) Regulations 2015 and BS 5975, *Code of practice for temporary works procedures and the permissible stress design of falsework* apply.

Presentational conventions

The provisions of this PAS are presented in roman (i.e. upright) type. Its recommendations are expressed in sentences in which the principal auxiliary verb is "should".

Commentary, explanation and general informative material is presented in italic type, and does not constitute a normative element.

The word "may" is used to express permissibility and the word "can" is used to express possibility, e.g. a consequence of an action or an event.

Spelling conforms to *The Shorter Oxford English Dictionary*. If a word has more than one spelling, the first spelling in the dictionary is used (e.g. "organization" rather than "organisation").

Contractual and legal considerations

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

Compliance with a PAS cannot confer immunity from legal obligations.

0 Introduction

Procedural controls for temporary works are covered in BS 5975:2008+A1:2011, Section 2 and are widely used across the industry. Whilst this standard provides the basis for contractors' procedures for temporary works, it does not provide explicit guidance for clients. Consequently, client organizations have tended to develop individual requirements resulting in a variety of approaches which have created confusion and complexity particularly with respect to approval and compliance, with adverse impact on administrative costs and programme. At an industry workshop (held at BSI on 28 February 2014), it was widely recognized that standardizing, streamlining and clarifying infrastructure clients' procedures would provide significant benefits to the industry in terms of cost, time and safety. This PAS is intended for use by all major infrastructure clients and may be used to inform other clients.

This PAS arises from the above concerns and specifically the work of High Speed Two (HS2) Limited and the Temporary Works Forum (TWf). HS2 is committed to the implementation of the UK HM Treasury *Infrastructure Cost Review* – 2010 [1] and 2014 [2] and the Institution of Civil Engineers Industry Standards Group report, *Specifying Successful Standards* (July 2012) [3], which recommended updating and defining standards.

It is understood that technical committee B/514/26, Falsework is revising BS 5975 to cover client procedures. The recommendations of this PAS will be taken into account in the development of that revision, however on publication of the revision of BS 5975, the future of this PAS will be reassessed with a view to ensuring there is no overlap of scope between the two documents.

HS2 is keen for this document to be used industry-wide and hence ensured that the industry was represented by the steering group.

1 Scope

This PAS gives recommendations on major infrastructure client procedures for all temporary works and temporary conditions of permanent works during construction. It covers processes, roles, responsibilities and competences, and provides example pro forma documentation.

The aim of this PAS is to establish a unified approach to client involvement in temporary works across all stages (e.g. defining requirements, procurement, installation, use and removal of temporary works structures) and eliminate unnecessary procedures and conflicts in order to achieve clarity and minimize delays during compliance and approvals processes and other necessary procedures.

This PAS is designed to complement BS 5975, *Code of practice for temporary works and the permissible stress design of falsework* with the same aim of controlling risk and ensuring adequate procedures. It concentrates on those client activities which are not covered by BS 5975.

This PAS does not cover the contractual responsibilities of clients, suppliers or contractors. Where there are relevant existing standards or industry documents, this PAS refers to these. It is not the intention of this PAS to replicate existing material.

This PAS supports the principle of making it clear at which points it is good practice for the client to actively stipulate procedures and/or processes in temporary works, and/or the design of temporary works.

NOTE 1 *This PAS is intended to complement the requirements of the Construction (Design and Management) Regulations 2015 (CDM 2015) [4] in respect of client duties in order to promote improved working practices and industry initiatives.*

NOTE 2 *This PAS reflects the beneficial influence clients and major infrastructure third parties are able to bring to bear on project outcomes, by adopting common procedures and terminologies and setting standards and expectations with regard to temporary works.*

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

BS 5975, *Code of practice for temporary works procedures and the permissible stress design of falsework*

3 Terms and definitions

For the purposes of this PAS, the terms and definitions given in the Construction (Design and Management) Regulations 2015 [4], BS 5975 and the following apply.

3.1 client

person for whom a project is carried out

***NOTE** According to CDM 2015 [4], the main duty for clients is to make sure their project is suitably managed and that these arrangements are maintained and reviewed.*

3.2 client site inspector

competent person appointed by the client during the construction phase to monitor the execution of the temporary works on site

3.3 client-specified hold point

stage in the temporary works process where the client specifies that no further progress is to be made by the principal contractor without the client's agreement

***NOTE 1** A client-specified hold point is separate from any hold point specified by the temporary works coordinator (TWC) (e.g. permit to load).*

***NOTE 2** A client-specified hold point might arise, for example, where the temporary works affect a client or third party asset outside the control of the principal contractor.*

3.4 competency

3.4.1 competent organization

organization with sufficient skills, knowledge and experience of the specific tasks to be undertaken and demonstrating organizational capability, with regards to its approach to the well-being of persons affected by its undertaking

***NOTE 1** Typically competency can be demonstrated by compliance with PAS 91,* Construction prequalification questionnaires, *or similar means.*

***NOTE 2** CDM 2015 [4] refers to "organizational capability".*

3.4.2 competent person

person with sufficient skills, knowledge and experience of the specific tasks to be undertaken, and the risks which the work will entail:

- to enable them to carry out their duties in relation to the project;
- to recognize their limitations; and
- to take appropriate action in order to prevent harm to those carrying out construction work, or those affected by the work

***NOTE 1** Modified from BS 5975 to align with CDM 2015 [4].*

***NOTE 2** Further guidance is provided in **6.1** and Clause **7**.*

3.5 design and design check certificates

3.5.1 design and design check certificate

certificate, signed by the designer and the design checker, certifying that the design meets the design brief and, where provided, the design statement

3.5.2 design check certificate

certificate, signed by the design checker, certifying that the design meets the design brief and, where provided, the design statement

3.6 design brief

document including all data and requirements relevant to the design of the temporary works

***NOTE 1** Based on text from BS 5975:2008+A1:2011, **8.2**.*

***NOTE 2** For further clarification of what these requirements might be, see BS 5975:2008+A1:2011, **8.1** to **8.6**.*

3.7 design check

evaluation of the design to determine whether it conforms with the design brief and can be expected to provide a safe engineered solution

***NOTE 1** Based on text from BS 5975:2008+A1:2011, **3.10.2**.*

***NOTE 2** This is different to an execution check, which is an on site inspection to determine whether the temporary works have been constructed in accordance with the design (see BS 5975:2008+A1:2011, **3.10.1**).*

3.8 design statement

document outlining the design requirements, the means by which the design will be developed, the assumptions, method of analysis, and other controls, including the potential to affect/impact operational infrastructure

NOTE 1 *A design statement, written by the temporary works designer, might be requested by the client, or the TWC, for the more complex schemes (e.g. where the TWC believes that such a statement would add clarity for those undertaking the checks or for a peer review).*

NOTE 2 *Based on text from BS 5975:2008+A1:2011,* ***9.1.3****.*

NOTE 3 *The design statement may be combined with the design brief so as to minimize the number of documents, so long as client-requested information is readily discernible.*

NOTE 4 *The design statement also includes specific reference to any temporary works elements which are proposed to be left in place.*

NOTE 5 *The design statement is referred to by some clients as "approval In principle", "conceptual design statement" or "statement of design intent".*

3.9 designated individual

senior person within organization involved in temporary works, responsible for establishing, implementing and maintaining a procedure for the control of temporary works for that organization

NOTE *Based on text from BS 5975:2008+A1:2011,* ***6.3.1****.*

3.10 major infrastructure client

client responsible for the construction, maintenance or repair of built infrastructure, either on a national or regional scale, or which is outside the normal procedural or funding mechanisms

NOTE 1 *A major infrastructure client might be public, a private sector organization, or a mixture of the two charged with similar duties.*

NOTE 2 *Examples of major infrastructure clients on a national or regional scale include Highways England, Network Rail, LUL, utilities, and energy providers.*

NOTE 3 *Examples of major infrastructure clients outside the normal procedural and funding mechanisms include HS2, Thames Tideway and Crossrail.*

3.11 peer review

review of the temporary works undertaken by independent person(s), and separate from a design check

NOTE 1 *The review scope is determined by the party sponsoring it, but including any client requirements, and might include the concept, design, methodology, inspection and test plan as considered necessary.*

NOTE 2 *Developed by the Standing Committee on Structural Safety (SCOSS) and adopted on the more complex schemes (see SCOSS,* Independent review through peer assist *and* Appointment of independent reviewer through peer assist *[5]).*

NOTE 3 *See also* ***5.6****.*

3.12 permanent works designer PWD

designer of the permanent works, engaged by either the client or a contractor

3.13 robustness

the ability of a structure to withstand events like fire, explosions, impact or the consequences of human error, without being damaged to an extent disproportionate to the original cause.

[SOURCE: BS EN 1991-1-7:2006+A1:2014, **1.5.14**]

NOTE 1 *This applies to all stages of the construction, use and dismantling of a temporary works structure and any permanent works affected.*

NOTE 2 *For temporary works situations it is likely that impact and human error will be the most relevant events.*

3.14 significant risk

risk that is not likely to be obvious to the principal contractor or temporary works designer, that is unusual, or that is likely to be difficult to manage effectively

NOTE 1 *Based on definition from HSE Guidance on CDM 2015 L153, Glossary [6].*

NOTE 2 *Significant risks are separate from the categorization used in BS 5975:2008+A1:2011, Table 1 for checking. Significant risks are generally applicable to the higher categories, but not necessarily so.*

3.15 temporary works

parts of the works that allow or enable construction of, protect, support or provide access to, the permanent works and which might or might not remain in place at the completion of the works

[SOURCE: BS 5975:2008+A1:2011, **3.40**]

NOTE 1 *Examples of temporary works are given in Table 1 (reproduced from PAS 8812). The groups indicated in the first column relate to PAS 8812 and are not used in this PAS.*

NOTE 2 *The TWf* Client's guide to temporary works *[7] suggests the following addition to the definition: "states of the permanent works which are temporary, loading conditions of the permanent works during construction or project execution which not envisaged in the permanent condition, structures in states of modification or demolition".*

Table 1 – Groups of temporary works

Group	Sub-group	Examples
Group 1	**Falsework**	Support to a partially completed structure (e.g. in situ and precast concrete, steelwork during assembly) Propping Façade retention Needling Flying shores Gantries/cantilever Service bridges Structures providing stability during construction, alteration or demolition
	Formwork	Vertical (wall and column) Soffits Sloping Arches Cantilever soffits Permanent formwork
	Simple advancing falsework/ formwork	Formwork travellers (horizontal) Climbing formwork (vertical) Advancing/launching formwork
	Access	Tied scaffolds Freestanding scaffolds Gantries Special scaffolds (e.g. underslung scaffolds)
	Protection	Hoardings Protection fans Temporary roofs

Table 1 – Groups of temporary works *(continued)*

Group	Sub-group	Examples
Group 2	**Geotechnical**	Trench and excavation support Tower crane bases Piling/crane mats Retaining walls Earthworks Foundations Cofferdams Horizontal and inclined propping Underpinning Ground anchors Haul/site roads
Group 3	**Vehicle and pedestrian bridges and related works**	Temporary bridges Propping trafficked bridges
Group 4	**Underground**	Tunnels/headings Shafts Chambers Tunnelling thrust pits
Group 5	**Marine temporary works**	Temporary quay walls Dolphins Access jetties Floating plant
Group 6	**Other temporary structures**	Bridge launching Heavy lift systems Moving of structures Protection decks Structural support to cranes or other lifting devices Erection gantries Hydraulic equipment Jacking

[SOURCE: PAS 8812:2016, Table 1]

3.16 temporary works coordinator TWC

competent person with responsibility for the coordination of all activities related to the temporary works

[SOURCE: BS 5975:2008+A1:2011, **3.41**]

3.17 temporary works design checker

independent person appointed to undertake a design check

NOTE *The degree of independence depends upon the category of design check (see Clause **5**).*

3.18 temporary works lead design checker

competent designer appointed where more than one temporary works design checker is involved, with the responsibility for ensuring that the design check has considered overall structural robustness at all stages and all interfaces and interactions between designers have been adequately covered

NOTE 1 *This role requires a specific brief and is normally fulfilled by one of the temporary works design checkers. It may be carried out by the TWC, if a competent designer.*

NOTE 2 *This role relates to coordination of technical design issues. General coordination is the responsibility of the TWC.*

NOTE 3 *This role is introduced specifically to ensure that the design is robust at interfaces and at any intermediate stages.*

3.19 temporary works designer TWD

designer of the specified temporary works or an identified part of it

3.20 temporary works lead designer

competent designer, appointed when there is more than one temporary works designer, with the responsibility for ensuring that the overall design is structurally robust at all stages and that all interfaces between designers have been adequately considered

NOTE 1 *This role requires a specific brief and is normally fulfilled by one of the temporary works designers. It may be carried out by the TWC, if a competent designer.*

NOTE 2 *This role relates to coordination of technical design issues. General coordination is the responsibility of the TWC.*

NOTE 3 *This role is introduced specifically to ensure that the design is robust at interfaces and at any intermediate stages.*

3.21 temporary works register

tabular document listing all temporary works items associated with the project and the key issues relevant to each item

NOTE 1 *This might include a short description, type classification, category of design check, date required, date accepted, designer and design checker.*

NOTE 2 *The register is the responsibility of the TWC [see BS 5975:2008+A1:2011, **7.2.5**b)].*

3.22 temporary works pre-construction schedule

schedule of anticipated temporary works with significant risks compiled by the permanent works designer and passed to the principal contractor as part of the pre-construction information

NOTE *This can only be complete to the extent that the permanent works designer has the necessary information at the time of compilation.*

3.23 temporary works supervisor TWS

competent person who is responsible to, and assists, the temporary works coordinator

[SOURCE: BS 5975:2008+A1:2011, **3.42**]

NOTE *In the majority of instances, each TWS is appointed by the DI of the organization constructing the specific temporary works item.*

3.24 third party

party, independent of the project, whose procedures have to be followed, and approvals obtained, to temporary works proposals affecting their assets, users or their land ownership

NOTE *An example of a third party would be a highway authority, affected by a new rail structure over their asset, required as part of the client's project, or a government department or foreign embassy.*

4 Client management of temporary works

4.1 General

NOTE 1 *The client procedures described in this PAS do not conflict with, and are subordinate to, the specific legal obligations given in CDM 2015 [4] and complement the roles of others described in BS 5975.*

NOTE 2 *The TWf clients' guide [7] states: "In defining the role of the client, CDM 2015 gives a useful starting point. First, these Regulations set out legal duties. More than that, they give an understanding of best practice which if acted upon will deliver not only health and safety, but also economy, speed and good quality".*

4.1.1 In cases where the client does have specific requirements for type N temporary works (see Table 2), these should be followed.

NOTE *Whilst normally there are no client requirements for type N temporary works (see Table 2), clients do expect the contractor to use their own engineering assurance procedures and to follow BS 5975.*

4.1.2 The client should declare any required procedures, standards and requirements which impinge on temporary works matters at the earliest opportunity.

NOTE 1 *These might include, for example, timescales, sequences, approvals and design standards.*

NOTE 2 *Normally the earliest opportunity is the tender or negotiation stage for either permanent works designers or contractors.*

NOTE 3 *It is important that the client recognizes that they have appointed a contractor to manage temporary works, and does not introduce unnecessary additional requirements.*

4.1.3 The client should identify an individual in the client organization to act as the designated individual (DI).

4.1.4 The DI's responsibilities should include establishing, implementing and maintaining a procedure for the client's involvement in temporary works. This procedure should include:

a) allocation of responsibility for each of the provisions of this PAS to competent persons in the client organization;

b) a process for deciding whether an action from this PAS is implemented (e.g. the appointment of site inspectors);

c) identification of, and minimum competencies for, those authorized to sign/acknowledge submissions and certificates as set out in Annex A, including alternative agreed nominees.

4.1.5 Documented records of responsibilities allocated, instructions given and actions taken (see **4.1.8**) should be maintained.

4.1.6 The client should not allow the modification of its procedures, standards and requirements (see **4.1.2**) by their representatives and local staff.

4.1.7 Client procedures should include for any temporary works which it is subsequently proposed by the contractor to leave in place.

4.1.8 The client should include all required procedures and standards which require action or compliance by other parties, for example permanent works designers or contractors, in its contracts with those parties.

4.1.9 Where the client has an established procedure or wishes to implement the use of another party's procedures, the client should have in place a structured plan for assessing and minimizing discrepancies between their procedures, BS 5975 and this PAS.

NOTE 1 *The TWf clients' guide [7], Table 1: Sequence of project execution from the perspective of temporary works, provides a useful schedule of actions for client information.*

NOTE 2 *It is important that required procedures and standards are written such that they have regard to clarity of purpose, predictability and project efficiency, whilst maintaining safety, and minimize unnecessary requirements which do not add value to the project or improve health and safety.*

4.1.10 Client procedures should include any requirements or restrictions on the use of electronic signatures, scanned signatures, scanned documents containing signatures, and original inked signatures on submissions and certificates.

4.1.11 The client should require in the construction contract that this PAS is applied by the principal contractor to any sub-contracting (for design or construction), in respect of temporary works.

4.2 Competence of the client

The client should ensure it has the organizational capability to assess and understand the type, complexity and scope of temporary works relevant to the project, including the inherent risks.

NOTE 1 *Buildability generally, and temporary works specifically, are often complex subjects requiring specific competency to appreciate their importance and influence on project programme, safety and cost. If the client lacks such competency internally this may be through the appointment of the principal designer or of an independent advisor.*

NOTE 2 *Appointing a contractor and/or a specialist temporary works designer, in a consultancy capacity, to advise on critical temporary works is often a beneficial action. The criticality might arise from a safety perspective, buildability, robustness, programme constraint, land take requirements, site investigation (SI) scope or other similar issue.*

4.3 Identifying codes of practice to be adopted

4.3.1 Where the client wishes to specify which codes of practice are to be used in the design or execution process, these should be set out in the design and construction contracts.

NOTE *Stipulation might be required, for example, in order to achieve consistency with the permanent works and/or third parties, to suit the client's strategic policy, or to comply with public sector procurement rules. It is important that the client does not stipulate codes unnecessarily and is aware of inadvertently creating risks by doing so (which might attract duties as a designer under CDM 2015 [4]).*

4.3.2 Any significant risks arising from the choice of codes of practice (see **4.3.1**) should be included in the pre-construction information.

NOTE *For example, risks arising where permissible stress and limit state designs occur on the same project.*

4.3.3 The client's choice of design approach for temporary works, if stipulated, should take account of, as a minimum:

a) any interaction with permanent works, and its design approach (so as to obtain necessary compatibility);
b) use of temporary works (e.g. proprietary equipment, scaffolding) which might be limited to or based on permissible stress design;
c) temporary works design competence likely to be available.

NOTE *The preference is normally to adopt the Eurocodes and other European Standards. For publicly procured works that fall within the scope of the Public Contracts Regulations 2015 [8], Eurocodes are normally mandatory. PAS 8812,* Temporary works – Application of European Standards in design – Guide*, provides additional technical guidance on the use of Eurocodes and European Standards.*

4.3.4 In all cases, the client should retain BS 5975:2008+A1:2011 Section 2, *Procedural control of temporary works* and specify this in the construction contract, as this contains the contractor management processes for temporary works which are not included in any other BSI code of practice.

4.4 Classifying temporary works which might affect client's or third party assets or the public

NOTE 1 *This subclause supports the principle of the client becoming involved in temporary works procedures only when necessary.*

NOTE 2 *For examples of the range of temporary works, see Table 1.*

4.4.1 During the planning stages, or where permanent works design occurs before the principal contractor is appointed, the client should require the permanent works designer to make an initial assessment of the likely temporary works types in accordance with Table 2, and the likely category of design check. This should be recorded in the temporary works pre-construction schedule.

NOTE 1 *It is important that classification is made as early as practicable and in any event prior to preparation of the pre-construction information. This can only be complete to the extent that the information is available to the permanent works designer at the time.*

NOTE 2 *Client involvement, in line with this classification, is shown in Table 2 and elsewhere in this PAS.*

4.4.2 The client should require that the permanent works designer records in the design outputs where:

a) determination as to whether an element is temporary or permanent works is open to debate, or this classification might change during the project;

   NOTE *For example, tunnel linings or earthworks might start as temporary works and then become part of the permanent works during the project.*

b) the extent of the permanent works design responsibilities are not apparent;
c) specific design issues arise.

This requirement should be made either directly to client-appointed designers or through the construction contract for design and construction formats.

NOTE *Usually it is beneficial to include this information on the drawings.*

Table 2 – Type classification of temporary works

Type	Qualifying criteria	Example
N	"N" signifies no involvement of the client. Temporary works having no potential for impact on client or third party assets or on any person other than those under the direct control of the principal contractor.	Construction of a retained excavation with no adjacent assets.
S	"S" signifies temporary works that have an effect on a permanent works structure, either existing or under construction. Temporary works having potential for impact on client or third party assets, but not on any person other than those under the direct control of the principal contractor.	Construction of a retained excavation adjacent to a client rail tunnel, which has been closed for the duration of construction.
P	"P" signifies temporary works affecting the public. Temporary works having potential for impact on any person other than those under the direct control of the principal contractor, which might also have potential for impact on client or third party assets.	Construction of a retained excavation adjacent to a client rail tunnel, which is operational for the duration of construction.

4.5 Progression stages of temporary works

In order to allow consistent nomenclature and referencing, the progression stages of temporary works, client requirements, and the required outputs at each stage, should conform to Table 3.

***NOTE** The stage numbers are suggested nomenclature. They do not occur elsewhere in this PAS.*

Table 3 – Progression stages of temporary works – client requirements and outputs

Stage	Required output	Applies to Type: (see Table 2)			Comments
		N	S	P	
1	Design statement	—[A)]	Y	Y	Omitted for design check category 0 (see **5.3**).
2a	Design check certificate	—[A)]	Y	—	For categories of design check, see Table 10.
2b	Design and design check certificate	—[A)]	—	Y	For categories of design check, see Table 10.
3	Client-specified hold point	Not applicable	Y	Y	As set out in the contract or in the temporary works meetings
[A)] Contractor's own procedure adopted.					

***NOTE 1** Y indicates an action is required, if specified by the client (see **4.6.2**).*

***NOTE 2** Details of the progression stages and actions are given in Table 4.*

***NOTE 3** Some clients might denote stage 1 as "approval in principle", "conceptual design statement" or "statement of design intent" or other such stage (see **4.6.2**).*

***NOTE 4** The use of stage 3 depends upon the specific circumstance. For example, it might be implemented for a temporary pedestrian bridge or at a point when the temporary works are partially dismantled, but still fulfil a support function with regard to a client asset.*

***NOTE 5** Table 3 does not affect the decisions taken by others, processes or other outputs, in accordance with BS 5975.*

4.6 Design information

NOTE 1 *Figure 1 illustrates the flow of information in the pre-construction phase, and Figure 2 illustrates information flow during the construction phase.*

NOTE 2 *Temporary works pre-construction schedules are described in* ***6.6.***

NOTE 3 *Pre-construction information is described in* ***4.16****.*

Figure 1 – Pre-construction flowchart

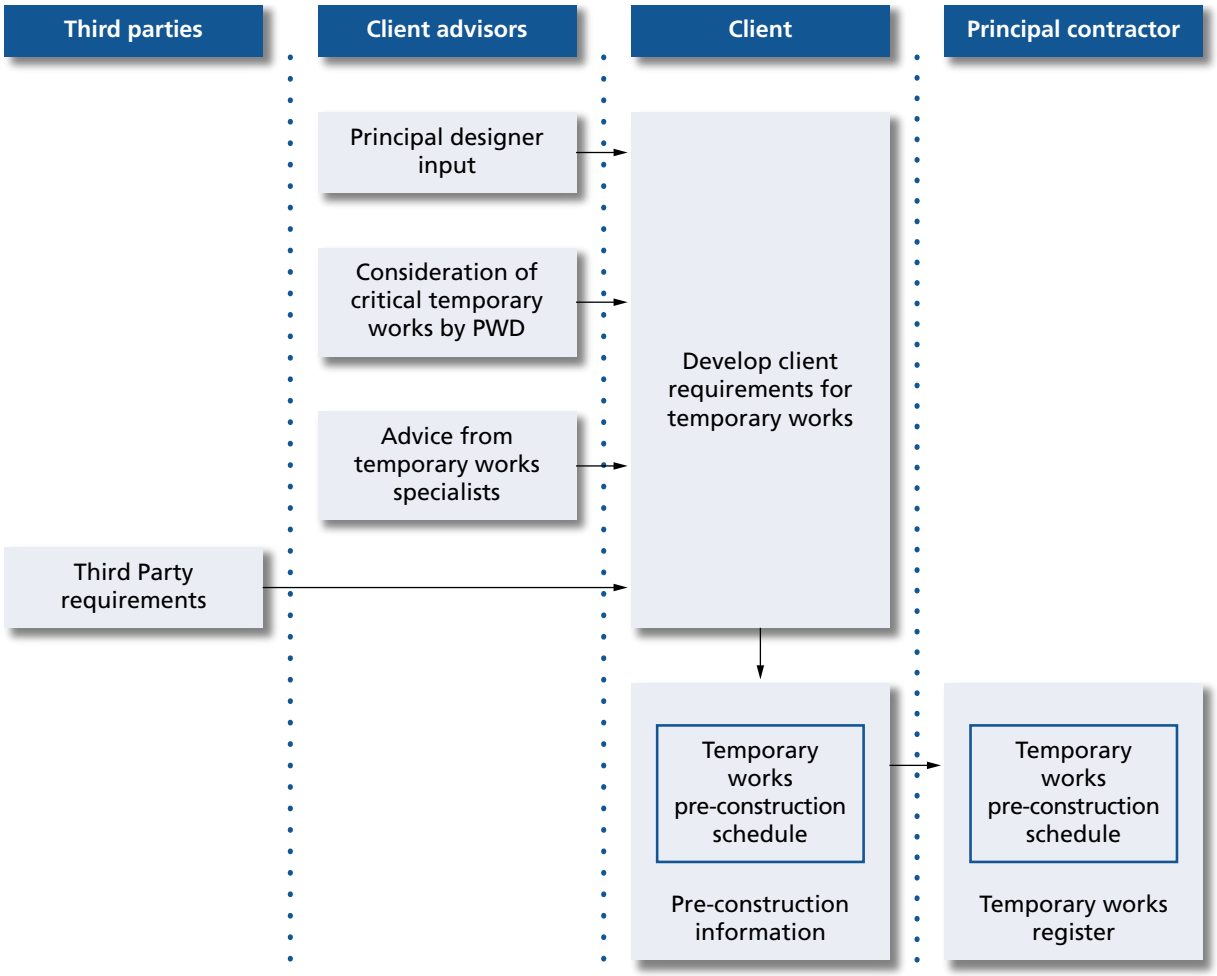
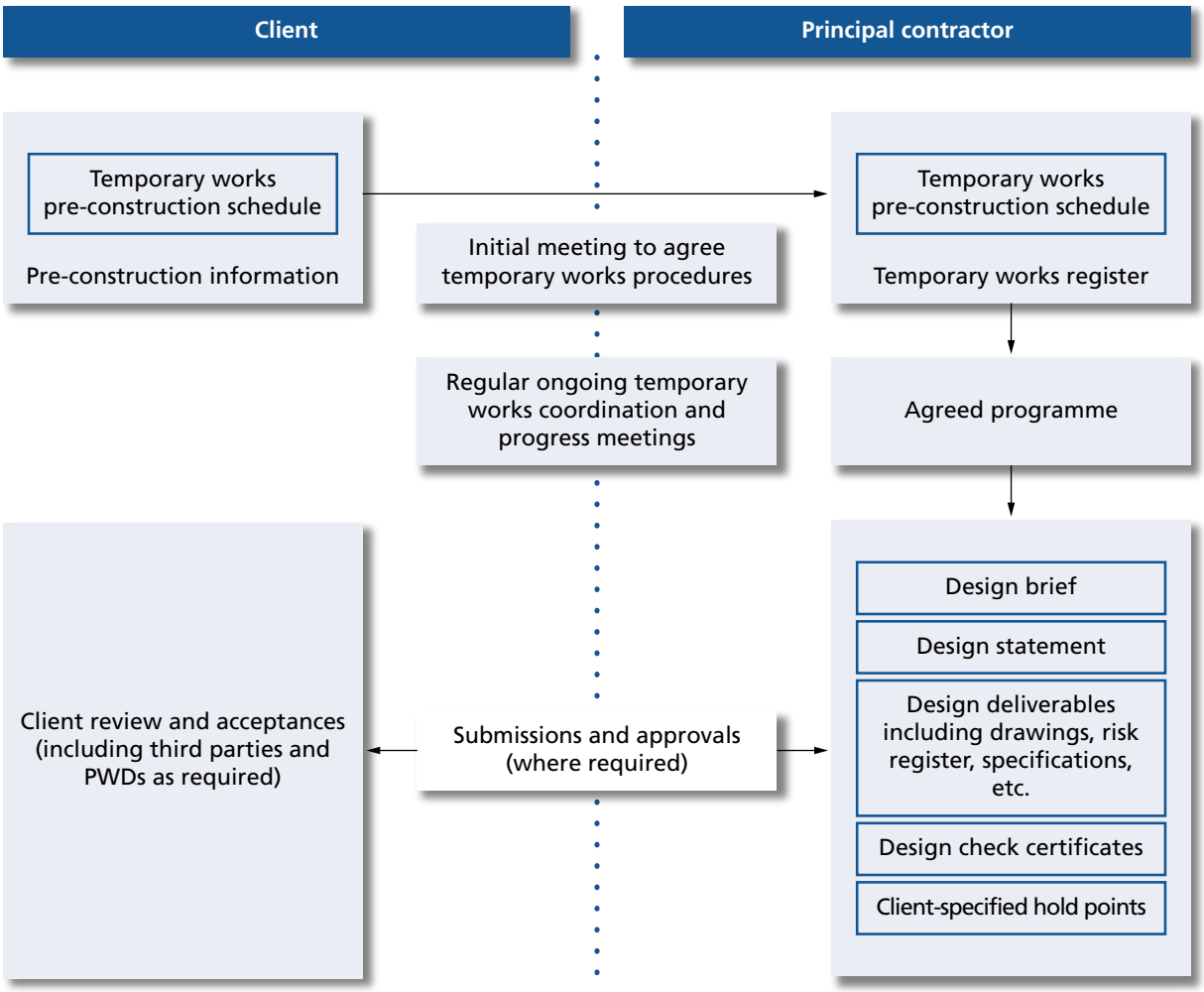


Figure 2 – Construction phase flowchart for type S and type P temporary works



4.6.1 Design brief

The client should require all design briefs to indicate the consequence of failure risk category (CFR) (see Table 6).

NOTE *The TWC is responsible for ensuring that a design brief is prepared [see BS 5975:2008+A1:2011,* ***6.3.1.3****d) and* ***7.2.5****d)]. The design brief is described in BS 5975:2008+A1:2011, Clause* ***8*** *which recommends that it is: "… prepared with full consultation, is adequate and is in accordance with the actual situation on site".*

4.6.2 Design statement

4.6.2.1 If the client requires the submission of a design statement (see **A.1**), the client should indicate in the design and construction contracts which of the data shown at **A.1** is required for submission and acceptance.

4.6.2.2 The client should assess and record the need for any deflection and/or movement or settlement (vertical or horizontal) criteria to be complied with in the temporary works design.

NOTE 1 *BS 5975:2008+A1:2011,* ***9.1.3*** *refers to the need for a design statement on more complex schemes.*

NOTE 2 *The design statement (referred to by some clients as "approval In principle", "conceptual design statement or "statement of design intent"), is closely aligned with the design brief.*

NOTE 3 *Notwithstanding any requirement of the client, the TWC might require, or the TWD might choose to produce, a design statement.*

4.7 Setting client requirements for building information modelling (BIM) on temporary works

4.7.1 As specified in PAS 1192-2:2013, the client should provide a definition of the employer's information requirements (EIR) to enable designers and contractors to produce and deliver consistent temporary works information.

4.7.2 The client should define standards, methods and protocols to be used to ensure that information received meets requirements, is of sufficient quality, and can be shared with other parties.

NOTE 1 *It is important that the wording of the design and construction contracts is such that they do not unnecessarily constrain designers or contractors in their preferred approaches to BIM.*

NOTE 2 *Examples of recorded temporary works might include those which interact with the existing or new permanent works, or are left in place on completion of the works.*

NOTE 3 *It is important that the client recognizes the constraints faced by small temporary works design or construction organizations in accommodating BIM into their working practices.*

4.8 Key personnel

4.8.1 Key client personnel

Where the client is involved in temporary works submissions and acceptances, the client should set out, prior to commencement of the design and construction contracts:

a) a schedule of relevant client post-holders with an explanation of their individual roles; and

b) a nominated client post-holder to act as the point of contact with the principal contractor on temporary works matters.

NOTE *The nominated point of contact might require notified delegates to act, for example, in times of absence or significant workload in accordance with the client's own procedures.*

4.8.2 Key principal contractor personnel

The client should require the principal contractor to identify a point of contact, within the principal contractor's organization.

NOTE 1 *The nominated point of contact might require notified delegates to act, for example, in times of absence, significant workload or separate areas of work.*

NOTE 2 *This could be the TWC or agreed principal contractor's alternative.*

4.9 Combined client, principal contractor and/or principal designer

When the client organization is also the principal contractor and/or the principal designer, in order to make a clear distinction in all communications, the client should:

a) nominate individual(s) to act as the principal contractor's and/or principal designer's point of contact;

b) make clear in all communications as to whether the communication comes from the client, principal contractor or principal designer;

c) ensure that communications from client, principal contractor and/or principal designer are issued separately.

NOTE *The nominated point of contact might require notified delegates to act, for example, in times of absence, significant workload or separate areas of work.*

4.10 Third party requirements

4.10.1 Where the project involves the acceptance by third parties of temporary works submissions, or sight of certificates, the client should enter into discussions, before the appointment of the principal contractor, with the third parties to agree processes for this purpose for temporary works.

NOTE *It is important that duplication of paperwork and certification is avoided.*

4.10.2 The client should set out agreed processes for submissions and acceptances, for each third party in the construction contract.

NOTE *Encouraging third parties to adopt the principles of this PAS and those of BS 5975, can help to provide consistency of approach.*

4.10.3 The client should not allow local modification of their procedures.

4.11 Client acceptances

NOTE *It is important that the client does all that is reasonably practicable to simplify the acceptance process. For example, by minimizing the number of internal acceptances or by ensuring comments are made expeditiously and are clear in their intent.*

4.11.1 Where acceptance needs to be obtained from more than one post-holder within the client organization, the client should establish a process for achieving this expeditiously.

NOTE 1 *A number of client post-holders might be involved in multi-disciplinary undertakings, for example Network Rail.*

NOTE 2 *By encouraging early submissions, agreeing timelines for key activities, and by using temporary works progress meetings (see **4.13.2**) to identify aspects of difficulty, the time required can be minimized.*

4.11.2 The client should require independent checking organizations engaged by the client to adopt the approach set out at **4.11.1** and encourage third parties to do likewise with their independent checking organizations.

4.11.3 Where the client needs to involve operational, non-technical post-holders in the acceptance process, it should ensure that they are assisted and informed by technically competent post-holders.

4.11.4 The client should set out in the construction contract any requirements for multi-disciplinary reviews of temporary works proposals [see also **4.13.1.2**e)].

4.11.5 The client should ensure that a single set of consolidated reviewed comments are assembled prior to issue to the principal contractor.

4.11.6 Where the client wishes to impose a hold point, this should be stated in the construction contract or in temporary works meetings prior to commencement of design work. The client should stipulate:

a) the description and the reason for the hold point(s);
b) the criteria to be satisfied for release of the hold point(s);
c) the time required for the client to assess the principal contractor's request for release; and
d) the means by which the client will convey permission to release.

4.12 Timing and turnaround periods for submissions and acceptances

NOTE 1 *The timing and turnaround periods for design, procurement and construction, are of key importance to principal contractors as they have the potential to delay the design, procurement and construction, with numerous knock-on effects.*

NOTE 2 *This PAS seeks a reasonable balance between the need to safeguard the client's and third party assets and their businesses generally, and the parallel need to progress the works timeously.*

4.12.1 General

4.12.1.1 The client should set out the maximum time period allocated or required for each stage of the submission and acceptance process, in accordance with Table 4, in the construction contract. The client should encourage measures designed to minimize delay and uncertainty.

NOTE 1 *It is not considered feasible to set generic timescales for the stages outlined in Table 4 as there are many ways in which the times given could be inappropriate or invalidated. Instead it is suggested that the optimum way forward is to set project-specific contractual timescales to allow the principal contractor to programme the works, but rely on discussion and a good understanding of the requirements by all those involved to facilitate improvements on the times set.*

NOTE 2 *Certificates do not generally require acceptance as they are statements of fact, relating to an agreed design statement.*

4.12.1.2 The client should communicate the need, and encourage all third parties, to achieve uniformity of timing and turnaround of submissions acceptances.

Table 4 – Submission process

Stage	Title	Comment	Client and/or third party acceptance time period in construction contract
1	Design statement (see **4.6.2**)	Where specified, client requirements should follow Annex A and indicate what data applies.	Yes
2a	Design check certificate	Where specified, client requirements should follow Annex A.	Yes
2b	Design and design check certificate	Where required by the client, client requirements should follow Annex A.	Yes
3	Client-specified hold points	Where specified, client requirements should follow **4.11.6**. Might require client or third party signature to allow progress.	Project-specific; if applicable, a period is required to be stated.

4.12.1.3 The client should discuss and encourage advance submissions for the more complex or critical elements of type S and type P temporary works (see Table 2) at temporary works progress meetings (see **4.13.2**).

NOTE *When setting time limits, it is important that the client is realistic and considers the adequacy of the time chosen in relation to the complexity and other aspects of the temporary works. Time spent turning around submissions can be reduced if all stakeholders have worked collaboratively through the period in which the submissions are prepared; clients can encourage such an approach (see BS 11000 (all parts),* Collaborative business relationships*). However, this needs to be done without loss of independence.*

4.12.2 Changes to approved proposals

NOTE *It is important for the client to recognize the inevitability of changes being required to some approved temporary works proposals, and the need for balancing safety and other client/third party concerns against a proportionate change control procedure. It is also important to differentiate between a material change (requiring the full change control procedure) and a minor change which could be approved via an amended drawing or similar simple mechanism.*

4.12.2.1 Procedures for changes to approved proposals should be discussed at the initial temporary works procedures meeting (see **4.13.1**).

4.12.2.2 The client's involvement should be limited to changes to the concept and principles recorded in the design statement, which follow the agreed procedures.

NOTE 1 *The intent is to avoid unnecessary time being spent on minor issues. In particular, where an independent organization is involved, it is desirable to agree a protocol for minor changes being agreed within a reasonable timescale, which recognizes that time is of the essence.*

NOTE 2 *The client might wish to encourage proposals, where change can be foreseen, to be developed incorporating design options so as to pre-empt later change and avoid the need for re-submission.*

NOTE 3 *The TWC is responsible for the management of agreed changes [see BS 5975: 2008+A1:2011, **7.2.5**l) to m)].*

4.13 Temporary works meetings

NOTE *Temporary works meetings reflect the important role of temporary works in ensuring site safety and the construction programme. Identifying issues of concern or criticality at an early stage is an important element of this. Figure 2 illustrates the flow of the information and acceptance process for type S and type P temporary works.*

4.13.1 Initial temporary works procedures meeting

4.13.1.1 The client should require the principal contractor to arrange an initial temporary works procedures meeting to be held at the beginning of the construction period with the client, third parties and any other relevant contractors and designers to discuss temporary works procedures and the likely high-risk items, and to agree the criteria for timely submission (by the principal contractor) and timely acceptances (by the client and third parties). The client and the principal contractor should monitor actual progress periodically against the agreed criteria.

4.13.1.2 The initial temporary works procedures meeting should also establish:

a) whether the client needs to attend the temporary works progress meetings (see **4.13.2**);

b) the relationship between the design brief (see **4.6.1**) and the design statement (see **4.6.2**) [see BS 5975:2008+A1:2011, **6.3.1.3**d)];

c) the key personnel involved in the submission and acceptance process (including any agreed nominees) (see **4.8**);

d) whether the client intends to use client site inspectors (see **4.17**) and, if so, the duties and lines of communication, so as to avoid uncertainty on site;

e) when multi-disciplinary reviews are to be implemented, and the process for carrying these out (see **4.11.4**);

f) the procedure for design changes (see **4.12.2**);

g) the format for submission and acceptance forms (see **4.14** and Annex A);

h) the way in which temporary works controls are to be integrated with inspection and test plans and other forms of work control; and

i) the way in which sub-contractor procedures are to be integrated.

NOTE 1 *The temporary works pre-construction schedule (see **6.6**) is essential in the management of this process, as is the temporary works register.*

NOTE 2 *The intent of the initial temporary works procedures meeting is to discuss the management of temporary works generally, and to agree specifically how submissions and acceptances can be dealt with in a time proportionate to the task, rather than using the maximum contractual time available.*

NOTE 3 *BS 5975 emphasizes the importance of communication and proper procedures to the effective management of temporary works (see BS 5975:2008+A1:2011, **6.1.6** and **6.2**).*

4.13.2 Temporary works progress meetings

The client should require the principal contractor to arrange regular temporary works progress meetings with the client, third parties and any other relevant parties, to review type S and type P temporary works matters. The purpose of these meetings should be to:

a) agree the type classification (see Table 2) and design check category (see Table 10) of temporary works;

NOTE Design check categories from the TWf clients' guide [7] are given at Table 11.

b) identify where early design intent submissions could be beneficial to all parties;

c) assist in monitoring progress of the submission and acceptance process;

d) help to resolve contentious issues where they impact on client or third party interests;

e) provide any information the client might have that could assist the principal contractor in developing the proposal;

f) give guidance and reasoning as appropriate to the principal contractor on which particular temporary works solutions are likely to be acceptable or unacceptable;

g) identify any temporary works to be left in place, and associated actions [see also **6.2**d)]; and

h) identify lessons to be learned, and disseminated, from feedback of actions already taken.

NOTE 1 *The temporary works pre-construction schedule (see **6.6**) is essential in the management of this process, as is the temporary works register (see **4.18**).*

NOTE 2 *Contractor and designer representation and involvement in the temporary works progress meetings could also benefit the project.*

4.14 Standardizing submission and acceptance forms

4.14.1 The client should assess and record whether to adopt standard submission and acceptance forms in accordance with Table 5.

4.14.2 The client should require submission and acceptance forms to include, as a minimum, the data set out in the standard forms at Annex A.

NOTE 1 *The use of the standard forms at Annex A is preferred, however clients and contractors may use their own forms, provided they contain the recommended data as a minimum.*

NOTE 2 *The client may add supplementary explanations regarding the data required with the forms to suit their own procedures.*

4.14.3 When required by the client, submission and acceptance forms should not inadvertently require those signing to sign for matters outside their brief, knowledge or control.

4.14.4 If any calculations are requested from the principal contractor by the client, the assessment should be made by a competent designer of temporary works.

NOTE *It is important that the client only requests calculations as part of the principal contractor's submission data when necessary, and where the client can provide justification for doing so.*

Table 5 – Submission and acceptance forms

Stage (Table 3)	Title	Submission/acceptance form (Annex A)	Comment
1	Design statement	A1-S/P (**A.1**)	Used for type S and P (see Table 2) design check categories 2 and 3 (see Table 10). This may include design documentation and other back-up data.
2a	Design check certificate	A2-S (**A.2**)	Signed by all checkers, as appropriate; accepted by client and third parties, as appropriate.
2b	Design and design check certificate	A2-P (**A.3**)	Signed by all designers, checkers, as appropriate; accepted by client and third parties, as appropriate.
NOTE *Table 5 relates to client requirements. The principal contractor might wish to adopt more stringent requirements.*			

4.15 Consideration of work package split

4.15.1 Where the client determines the split between permanent works designers, or construction work packages, the client should assess and record the effect on temporary works.

4.15.2 The client should include any significant risks resulting from a split between permanent works designers or construction work packages in the temporary works pre-construction schedule (see **6.6**), which should be part of the pre-construction information.

4.15.3 The client should ensure that responsibilities are set out at interfaces for associated temporary and permanent works.

NOTE *For example, the location of the work package split might lead to split responsibilities, interim instability issues, or complex sequencing which could be avoided by re-positioning the split.*

4.16 Pre-construction information

4.16.1 General

4.16.1.1 The client should ensure that pre-construction information includes consideration of temporary works issues (see **6.6**).

4.16.1.2 Client-specified deflection and/or movement or settlement (vertical or horizontal) criteria should be included in the pre-construction information (see **4.6.2.2**).

NOTE 1 *Pre-construction information is required by CDM 2015 [4], regulation 4(4).*

NOTE 2 *The principal designer has a role to play in this regard [CDM 2015 [4], regulation 11(6)].*

NOTE 3 *The use of permanent works drawings to convey pre-construction information on temporary works is desirable.*

4.16.2 Construction phase plan

The client should ensure that the principal contractor's construction phase plan contains management procedures and controls for temporary works.

NOTE 1 *CDM 2015 requires the construction phase plan to be drawn up by the principal contractor [see CDM 2015 [4], regulation 4(5)].*

NOTE 2 *The principal designer also has a role under CDM 2015 [4], regulation 11.*

4.17 Use of client site inspectors

4.17.1 The client should inform the principal contractor of the use, role and any powers of client site inspectors through the construction contract or, if not envisaged at that time, thereafter in writing.

4.17.2 Client site inspectors, engaged by the client to provide additional oversight of temporary works, should not impinge on the roles of the TWC and TWSs.

4.17.3 The client should ensure that client site inspectors have regard to BS 5975:2008+A1:2011, Clause **10** (Coordination and supervision of work on site).

4.18 Temporary works register

If the client wishes to ensure specific information is included in the temporary works register, this should be set out in the construction contract, or specifically communicated to the principal contractor prior to the commencement of that package of design.

NOTE 1 *Specific information might include, for example, requirement for specific hold points, third party acceptances, minimum design check levels.*

NOTE 2 *It is the responsibility of the TWC to ensure that the temporary works register [see BS 5975:2008+A1:2011, **7.2.5**b)] is established and maintained.*

NOTE 3 *The temporary works register is an essential reference document for the temporary works progress meetings (see **4.13.2**).*

4.19 Principal designer

At the earliest opportunity the client should agree and record with the principal designer how the role is to be discharged with regard to temporary works risk management. This should include consideration of how the role is to be implemented given that temporary works might be designed by several organizations in a number of different locations.

NOTE *CDM 2015 [4], regulation 11 sets out the responsibilities of the principal designer. Regulation 11(2) in particular is likely to be a key part of the principal designer's duties with regard to temporary works.*

5 Design and execution risk management

5.1 General

NOTE 1 *The responsibility for risk management of temporary works on site lies with the principal contractor. However, the client may set minimum levels of action and standardize nomenclature.*

The client should:

a) include all risk control measures set out at **5.2** to **5.4** in the construction contract:
   1) consequence of failure risk (see **5.2**);
   2) design complexity risk (see **5.3**);
   3) execution risk (see **5.4**);

b) use Table 6, Table 7, Table 9 and Table 10, if stipulating minimum categories of design check, or the type of check that is to be undertaken.

NOTE 2 *These risk control measures are based on the description of the design check categories in BS 5975:2008+A1:2011, Table 1 and extended to provide a broader consideration of risk. The additional considerations, and some of the text in Clause **5**, are taken from the TWf clients' guide, Article 1 [7]. This includes Tables 6, 8, 9 and 11.*

Figure 3 illustrates the pathways using BS 5975:2008+A1:2011 and also the TWf clients' guide [7].

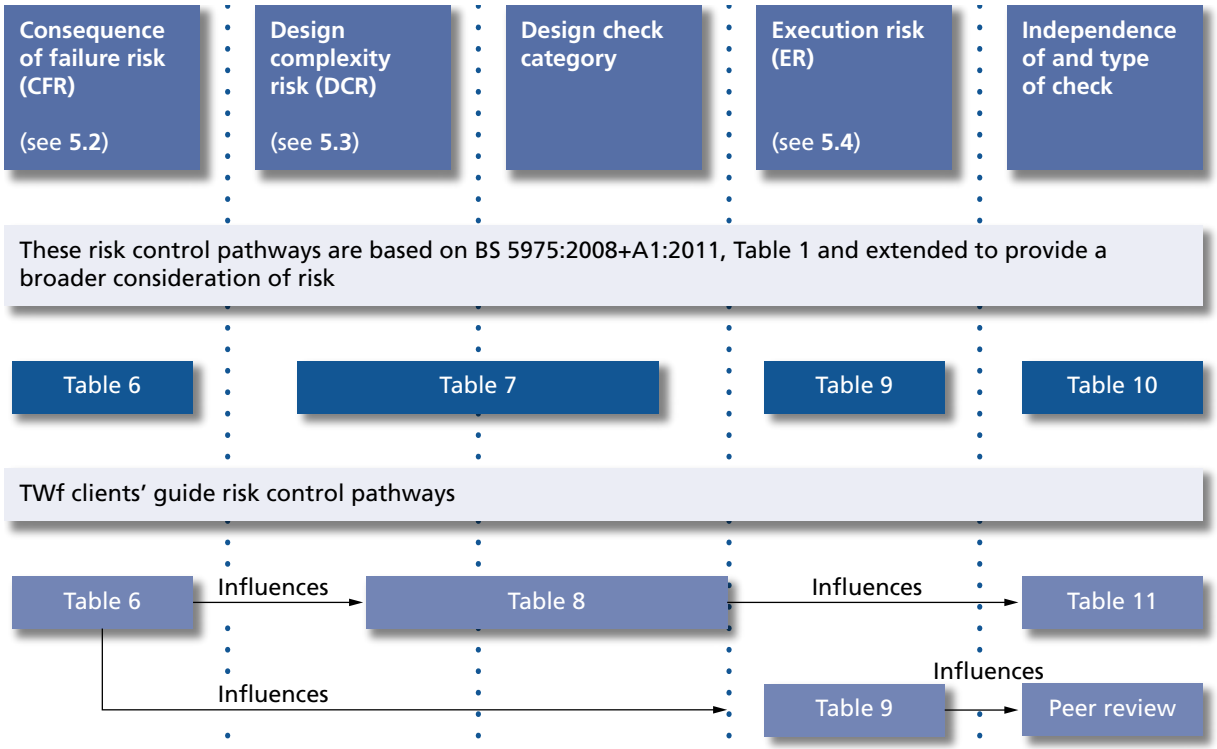
NOTE 3 *In certain circumstances, the client, permanent/temporary works designer, or third parties might wish to impose a minimum category on items of temporary works in accordance with Table 6, Table 7 and Table 9. Such decisions need to be made and communicated to the principal contractor in the construction contract or prior to the commencement of that package of design (e.g. during the client acceptance of the design statement).*

NOTE 4 ***5.2*** *and* ***5.3*** *focus on specific aspects of the risk management of temporary works from the perspective of the works themselves. In parallel with this, it is necessary for the principal contractor to consider other generic risks arising, for example, from the competence of the people involved and the quality of the processes used (for example to design, to check, to review, to procure, to validate software). Other, non-safety related risks might also require consideration in the classification of temporary works.*

NOTE 5 *The Institution of Structural Engineers publication,* Manual for the systematic risk assessment of high risk structures against disproportionate collapse *[9] provides additional information on the principles of risk management.*

NOTE 6 *It is important that clients and third parties are objective with regard to design check categories and that the category is not unduly onerous. It is also important that client-imposed categories are not enhanced where designs are prepared by the principal contractor's own competent design departments, provided appropriate independence is maintained.*

Figure 3 – Risk control pathways



5.2 Consequences of failure risk (CFR)

NOTE 1 *CFR springs from the nature of the works to be carried out, the location of the works and what is in proximity such that it might be affected if failure of the temporary works occurs. This categorization can assist in the temporary works meetings (see **4.13.2**).*

The client should require the principal contractor to categorize CFR in accordance with Table 6, consulting with stakeholders in order to identify the categories CFR2 or CFR3.

NOTE 2 *Stakeholders might include the client, permanent works designers, temporary works designers and third parties.*

NOTE 3 *There might be occasions where other consequences, for example, reputation or programme, demand an increase in the category shown.*

5.3 Design complexity risk (DCR)

DCR should be categorized in accordance with Table 7, and is used to draw attention to complexity issues generally.

NOTE 1 *The DCR categories given in Table 7 are as the four categories of design checking (0, 1, 2 and 3) given in BS 5975:2008+A1:2011, Table 1, reproduced here for ease of use (see Table 10).*

Table 6 – CFR categories for temporary works

Category	Characterization of impact in consequence of failure
CFR0	Benign, no impact if it fails.
CFR1	Low impact and entirely within site; inconvenient but personal injury unlikely.
CFR2	Potentially major effect, but failure, while potentially of major impact (for instance involving fatalities and injuries and/or significant economic loss) would not initiate any secondary or chain reaction of major incidents.
CFR3	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 7 – DCR categories for temporary works

Category	Scope	Comment
DCR0	Restricted to standard solutions only, to ensure the site conditions do not conflict with the scope or limitations of the chosen standard solution.	This applies to the use of standard solutions and **not** the original design, which will require both structural calculation and checking to category 1, 2 or 3, as appropriate.
DCR1	For simple designs. These may include: formwork; falsework (where top restraint is not assumed); 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.
DCR2	On more complex or involved designs. Designs for excavations, for foundations, for structural steelwork connections, for reinforced concrete.	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.
DCR3	For complex or innovative designs, which result in complex sequences of moving and/or construction of either the temporary works or permanent works.	These designs include unusual designs or where significant departures from standards, novel methods of analysis or considerable exercise of engineering judgement are involved.

***NOTE 2** The TWf clients' guide [7] adds two further DCR categories: DCR00 and DCR4 and provides additional qualifications for the existing categories, which are reproduced at Table 8 for ease of use. The corresponding design check categories from the TWf clients' guide are reproduced at Table 11.*

Table 8 – Categories of design complexity risk (DCR) from TWf clients' guide [7]

Category	Characterization of design
DCR00	temporary conditions, items or structures which can be safely managed by competent persons in competent site teams, without design, by following custom and practice and an industry standard safe system of work, provided Consequence of Failure Risk is CFR0 or CFR1 (Table 2 refers) [A)]
DCR0	standard solutions provided Consequence of Failure Risk is CFR0 or CFR1
DCR1	simple designs provided Consequence of Failure Risk is CFR0 or CFR1
DCR2	more complex or involved designs provided Consequence of Failure Risk is CFR2 or below; also designs with Design Complexity Risk DCR00, DCR0 or DCR1 either with Consequence of Failure Risk CFR2 or where there is interaction between adjacent but separately managed schemes (or both)
DCR3	complex or innovative designs which result in complex sequences provided Consequence of Failure Risk is not CFR3
DCR4	abnormal and highly innovative designs beyond the scope of normal design codes and practice; also any scheme with Consequence of Failure Risk CFR3 [B)]
[A)] Elements for DCR00 might include kicker shutters, shaping of the ground and so forth; the safe system of work normally includes risk assessments which focus on the operation at hand in its context, method statements and supervision. These would not normally feature in the temporary works register. Hence DCR00 features in order to allow nominal temporary works to be separated out from standard solutions (DCR0) which, although low risk, require some formality. [B)] Category DCR4 is for temporary works that have abnormal and highly innovative designs, beyond the scope of normal design codes and practices and where Consequence of Failure Risk is CFR3 or above.	

[SOURCE: TWf, *Clients' guide to temporary works*, Table 3 [7]]

5.4 Execution risk (ER)

NOTE 1 *ER is a measure of the propensity for failure resulting from issues related to use, workmanship and/or materials. ER is therefore influenced by design but its management and control requires appropriate care and attention both in materials procurement and on site, at all stages of erection, assembly, use, operation, maintenance, disassembly and removal.*

NOTE 2 *ER is used to assist contractors in particular to consider the necessary capabilities and site control measures.*

NOTE 3 *In this PAS, ER categories are used to determine the need for a peer review (see **5.6**). There might be occasions where it would be appropriate for category 3 designs to also have a peer review.*

ER should be categorized in accordance with Table 9.

Table 9 – ER categories for temporary works

Category	Characterization of the propensity to failure during erection, assembly, use, operation or removal
ER0	No identified practical mode of failure, and CFR is CFR2 or below even if it did fail.
ER1	Minor structures with high levels of robustness and redundancy provided CFR category is CFR2 or below.
ER2	Conventional structures provided CFR category is CFR2 or below.
ER3	Schemes with dependency on critical structural details or significant tension details, or with little or no redundancy or with inherent instability; also any scheme with CFR category CFR3.

5.5 Design checking

Design checking should be categorized in accordance with BS 5975:2008+A1:2011, Table 1 (reproduced as Table 10 for ease of use).

NOTE 1 *The DCR categories given in Table 7 are aligned with these four categories.*

NOTE 2 *It is important that, when the client is setting checking categories, standard solutions used as part of the temporary works scheme assembly do not inadvertently become categorized with an unnecessarily high check category. This applies in particular to the incorporation of proprietary products which might be used as part of a larger scheme involving bespoke temporary works assemblies.*

NOTE 3 *The TWf clients' guide [7] adds two further design checking categories: DCR00 and DCR4, consistent with the additional DCR categories at Table 8, and provides additional qualifications for the existing BS 5975 design check categories, all of which are set out in Table 11.*

5.6 Adoption of peer review

The client should require that, for all schemes where the CFR category is CFR3 or the ER category is ER3, a peer review is implemented both during concept design and towards the end of the design phase.

NOTE 1 *A peer review would be applicable for DCR category DCR4 (see Table 8), if used.*

NOTE 2 *Peer reviews may be implemented for other categories of risk, at the discretion of those in control of the risk management process.*

NOTE 3 *The peer review process is described in SCOSS [5]. It is not the same as a design check and does not replace it.*

Table 10 – Categories of 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.	This applies to the use of standard solutions and **not** the original design, which will require 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 (where top restraint is not assumed); 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, for foundations, for structural steelwork connections, for reinforced concrete.	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.	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.	These designs include unusual designs or where significant departures from standards, novel methods of analysis or considerable exercise of engineering judgement are involved.	The check should be carried out by another organization.

[SOURCE: BS 5975:2008+A1:2011, Table 1]

Table 11 – Checking regimes for categories of design complexity risk (DCR) from TWf clients' guide [7]

Category	Independence of checker
DCR00	site procedure for authorisation of method statements applies [A)]
DCR0	another member of the site or design team
DCR1	another member of the design team
DCR2	an individual not involved in the design and not consulted by the designer
DCR3	an independent organisation not involved in the design and not consulted by the designer [B)]
DCR4	an independent organisation not involved in the design and not consulted by the designer [C)]

[A)] This may include self-checking.

[B)] A peer review might be appropriate (see **5.6**).

[C)] A peer review will also be involved (see **5.6**).

[SOURCE: TWf, *Clients' guide to temporary works*, Table 6 [7]]

6 Client-appointed permanent works designers and principal designer

*NOTE Clause **6** applies to the appointment of the principal designer and also when the client is appointing permanent works designers directly. See Clause **7** for contractor-appointed permanent works designers, for example under design and build formats.*

6.1 Assessing competencies in temporary works and buildability matters

As part of the client's procedures for assessing the competence of prospective client-appointed permanent works designers and the principal designer, the client should assess the proposed permanent works designer's and proposed principal designer's specific skills, knowledge and experience in respect of temporary works and buildability.

NOTE 1 Suggested means of assessing organizational capability are set out in PAS 91. Other methods may be used.

NOTE 2 The assessment with regard to temporary works and buildability could be achieved through a written statement or oral presentation indicating experience of similar temporary works designs/checks, in order to demonstrate an understanding and experience of the issues.

*NOTE 3 The principal designer under CDM 2015 [4] has an important role in temporary works risk management (see **4.19**).*

6.2 Permanent works design brief

The client should ensure that the permanent works design brief includes provision for:

a) amendment of drawings and/or schedules, when requested by the principal contractor following temporary works design, to allow for temporary works items;

   NOTE For example, amending the permanent works drawings and schedules to reflect the casting of inserts into the permanent works additional reinforcements or other features to allow for the temporary works. This can lessen the risk of error.

b) interaction between the permanent and temporary works designers on temporary works elements which affect the permanent works;

c) identifying an assumed and practicable construction sequence;

d) identifying any envisaged temporary works to be left in place (e.g. tower crane bases); and

e) the ability of the permanent works to support temporary loads, or permanent loads requiring support, during the assumed construction sequence.

6.3 Early consideration of critical temporary works

6.3.1 The client should assess and record which elements of permanent works design are likely to involve temporary works categorized as DCR3.

*NOTE 1 **6.3.1** would also apply to category DCR4 (see Table 8) if used.*

NOTE 2 It is important that early permanent works design decisions do not inhibit later temporary works options and solutions.

NOTE 3 This action is likely to be informed by the permanent works designers.

6.3.2 The client should require client-appointed permanent works designers to assess the need for early involvement and appointment of contractors, specialist temporary works contractors or temporary works designers so as to enable critical temporary works issues to be discussed and progressed at an early stage. Outputs should be included in the pre-construction information.

NOTE 1 Issues to be discussed include:

a) permanent works/temporary works interfaces;

b) interim stability, robustness and serviceability issues relating to the permanent works;

c) temporary load cases on the permanent works;

d) the potential for detrimental effects on the permanent works, or third party assets, arising from the temporary works;

e) method of construction, sequencing, and assumptions.

NOTE 2 *There are occasions when it is advantageous for the principal contractor to use the permanent works structural analysis model to analyse temporary load cases arising from temporary works conditions. It is important to consider this scenario at the earliest opportunity and give consideration as to how this might be achieved in a cost-effective, efficient manner, without blurring liability.*

NOTE 3 *The early appointment of the principal designer and principal contractor, as required by CDM 2015 [4], can assist in this regard.*

6.4 Client briefing on temporary works issues

6.4.1 The client should require client-appointed permanent works designers to provide a briefing to the client, during the design process, on any temporary works categorized as DCR3.

NOTE 6.4.1 *would also apply to category DCR4 (see Table 8) if used.*

6.4.2 The timing of the briefing should be chosen to avoid the preclusion of any critical temporary works issues to be considered.

NOTE *Critical temporary works issues might include: technical complexity, cost, impingement on client or third party assets, sequencing constraints or constraints on the likely temporary works solutions arising from the permanent works design development, temporary conditions of the permanent works where there might be a lack of robustness.*

6.5 Timing of appointments

The client should ensure that any direct appointments of designers and contractors occur at the earliest opportunity so as to maximize the benefit of collaborative working.

NOTE *Under CDM 2015 [4] one of the duties of the principal designer is to advise the client on the appropriate timing of appointments [see CDM 2015 [4], regulation 11(1)].*

6.6 Temporary works pre-construction schedule

The client should ensure that pre-construction information is made available to be passed to the principal contractor and includes a temporary works pre-construction schedule of temporary works with foreseeable significant risks as a means of identifying issues for early discussion. The schedule should contain details of:

a) the assumed type classification (see Table 2) and check category (see Table 10) of temporary works;

b) the items exampled in **6.3** and **7.1.3**.

NOTE 1 *This schedule does not replace the temporary works register required in BS 5975:2008+A1:2011, **7.2.5**b) which is the responsibility of the TWC. It is an aide memoire to assist early discussion, and made before the principal contractor is appointed.*

NOTE 2 *This information complements that provided under **4.16**.*

NOTE 3 *Under CDM 2015 [4] the principal designer has a role in ensuring pre-construction information is provided [CDM 2015 [4], regulation 11(6)].*

7 Assessing competencies of contractors in temporary works and buildability matters

7.1 General

7.1.1 Where permanent works design is procured within a design and build contract, the client should include assessment of the proposed permanent works designer as part of their procurement process.

7.1.2 As part of the procedure for assessing the competence of prospective contractors, the client should assess the contractor's specific competence in respect of temporary works and buildability.

7.1.3 The assessment should concentrate on temporary works issues which:

a) are complex/unusual;

b) have a:

   1) critical interface with the client undertaking;

   2) critical interface with third parties; or

   3) other point of criticality.

The assessment should cover how the volume of temporary works briefs and activities is to be managed, including the necessary checking regimes.

NOTE 1 *Suggested means of assessing organizational capability are set out in PAS 91. Some clients might have their own specific procedures for undertaking this assessment.*

NOTE 2 *The assessment with regard to temporary works and buildability may be achieved through a written statement or oral presentation indicating experience of similar temporary works designs/checks, either of which can demonstrate an understanding and experience of the specific issues.*

7.1.4 The assessment should include the means of management and delegation of temporary works design and construction.

NOTE *These matters are to be addressed in the principal contractor's temporary works procedures in accordance with BS 5975 and will include the means by which workers are briefed and informed of key information regarding temporary works.*

7.2 Required minimum competencies for the TWC and TWSs

If the client wishes to stipulate specific requirements for elements of competency, for example on training, qualifications or experience, these should be set out in the construction contract. They should be set out as minimum requirements or equivalent alternatives.

NOTE 1 *The appointment of a competent TWC is made by the principal contractor in accordance with BS 5975:2008+A1:2011,* ***7.1.1****. The appointment of a competent TWS is made by the organization responsible for the specific item of temporary works in accordance with BS 5975:2008+A1:2011,* ***7.3.1****.*

NOTE 2 *The TWf has provided advice on competency issues [10]. Advice is also provided by HSE [6].*

NOTE 3 *The competence of the TWC is related to the complexity of the project, whereas the competence of a TWS is related to the scope of work undertaken by the TWS and its complexity.*

7.3 Required minimum competencies for permanent works designers

The client should adopt the checks described in **6.1** on design and build construction contracts as a means of assessing the principal contractor's proposals for providing permanent works design services and specific competence in temporary works. These checks should take place prior to appointment of the principal contractor.

7.4 Required minimum competencies for temporary works designers and design checkers

The client should set out in the construction contracts any required competencies for those signing submissions and design and check certificates on behalf of their organizations. For category 3 checks (see Table 10), certificates should be signed off by a competent person with CEng and either MICE or MIStructE membership, or a competent person acceptable to the client.

NOTE 7.4 *would also apply to category DCR4 checks (see Table 11), if used.*

Annex A (normative)
Temporary works standard forms

*NOTE 1 The forms presented in this annex give the minimum data recommended (see **4.14.2**). Principal contractors may use their own in-house style of form, provided they meet the minimum data, as noted in Note 1 to **4.14.2**.*

*NOTE 2 The forms provided in this annex omit project headings, the temporary works scheme titles, revision references, issue dates and the like for simplicity. The format for these may be those of the client, the principal contractor or agreed at the initial temporary works meeting (see **4.13.1**). They are essential additions.*

*NOTE 3 See **4.13.1** and **4.14**.*

A.1 Form A1-S/P – Design statement

*NOTE The necessary information and level of detail at each point in this form would have been agreed at the relevant temporary works meeting (see **4.13.1** and **4.13.2**).*

This form sets out (in Part 1) the information that is required for acceptance by the client. It may be incorporated into the design brief (see BS 5975:2008+A1:2011, Clause **8**) as long as it is readily identifiable.

Part 2 provides for the various submission or acceptance signatures. Part 2 should be included with the submission.

PART 1: DETAILS

1.0 Description of temporary works

Temporary works element description box.

1. *A description of the temporary works proposals and in particular whether more than one temporary works designer is involved (see **A.1**, **1.3.4**). This may be accompanied by drawings/sketches where these are helpful in understanding the submission.*

2. *If the robustness of the design depends upon other temporary/permanent works, designed by others, this is stated here (see **A.1**, **1.3.5**).*

3. *The consequence of failure risk (see Table 6) is included here, if requested by the client.*

1.1 Scope of construction works

This submission relates to the design of the following altered or new client asset(s).

Description of client asset(s)
1
2
3, etc

1.2 Design check categories

1.2.1 Categories (category 2 or 3)

NOTE *This is also applicable for category DCR4 checks (see Table 11), if used.*

State the design check category.

If category 3 provide name of independent checking organization.

If scheme has more than one category indicate split and associated name of checking organization.

1.2.2 Timeline for submission

Set out the timeline with key milestones.

NOTE *This would have been agreed in advance at a temporary works progress meeting (see **4.14.2**).*

1.3 Design statement

1.3.1 General

Include specific requirements for installation, use, inspection, removal.

1.3.2 Geotechnical

If applicable, provide details of reports or other data, and any special procedures for ensuring stability and controlling movement.

1.3.3 Impact on third parties

If the proposals impact on third party assets, provide details of the third party, the asset affected, how this impact occurs and the proposals to mitigate risk.

1.3.4 Individual temporary works design work packages

Detail the design/supply and erection packages proposed and how design and construction interfaces are to be dealt with.

Include the DCR categories (Table 7) against each separate package, together with the name of the design and design checking organization.

1.3.5 Impact on other temporary or permanent works

Detail the impact and how it is managed. Include any client specified deflection and/or movement or settlement (vertical or horizontal) criteria and how these are to be achieved.

1.4 Standards to be used in the design

*This only needs to list those which are supplementary to those stated in the construction contract (see **4.3**).*

Indicate which elements are designed to Eurocodes and which to permissible stress codes (if any), where known at this stage.

1.5 Derogations and temporary non-conformances to standards

Any derogations or non-conformities agreed by all parties.

1.6 Any other relevant information

This may be specified by the client or third party, or by the principal contractor.

Temporary works designer:	
Signed	Title
Name (print)	Date
Design organization:	

***NOTE** Repeat as required.*

Lead temporary works designer:	
Signed	Title
Name (print)	Date
Design organization:	

***NOTE** Unless agreed with client to omit.*

TWC or principal contractor's agreed nominee:	
Signed	Title
Name (print)	Date

PART 2: THIRD PARTY'S COMMENTS (if applicable)

(repeat for number of third parties)

Name of third party.....

We have considered the submission. Our comments on the submission are as follows:

If the submission is not approved, include commentary on what actions are required to obtain acceptance.

Design statement accepted including any listed derogations and/or non-conformances:

Acceptance Status	**Tick**	**Action to be taken**	**Next stage**
Accepted		—	Proceed to detailed design
Accepted with comments		Resolve comments to client acceptance	Proceed to detailed design while resolving comments
Rejected		Revise submission and resubmit	Do not proceed to detailed design

Agreed third party nominee:	
Signed	Title
Name (print)	Date

PART 3: CLIENT'S COMMENTS

We have considered the submission. Our comments on the submission are as follows:

If the submission is not accepted, include commentary on what actions are required to obtain acceptance. *A submission may be rejected either due to client concern, or due to a third party comment requiring revision and resubmission (Part 2).*

Design statement agreed (including any listed derogations and/or non-conformances):

Acceptance Status	**Tick**	**Action to be taken**	**Next stage**
Accepted		—	Proceed to detailed design
Accepted with comments		Resolve comments to client acceptance	Proceed to detailed design while resolving comments
Rejected		Revise submission and resubmit	Do not proceed to detailed design

Agreed client nominee:	
Signed	Title
Name (print)	Date

A.2 Form A2-S – Design check certificate – Type S

Attach design statement Part 1, 2 and 3.

NOTE *All parts are to be included even if not used so as to avoid uncertainty.*

PART 4: DESIGN CHECK

We certify that reasonable skill and care has been used in the preparation of the design check of the temporary works described in the attached design statement, with a view to securing that:

i. it has been checked in accordance with the design brief and, if applicable, the design statement dated:

Date(s) of issue (including any re-submissions).

attached including any client or third party directives scheduled.

Any design standards, codes, methods, and criteria additional to those defined in the design statement, along with justifications for their inclusion are scheduled below.

NOTE *Departures from the design statement are not to be recorded on this form, but require a resubmission of the design statement.*

ii. the design of the temporary works has been accurately translated into temporary works drawings, specifications or other instructions, as listed below.

The unique numbers of these drawings, schedules and other instructions are:

The design check involved the organizations noted below, each of whom is signing for their element, as noted in Part 1 of the design statement.

Design check organization's agreed nominee:	
Signed	Title
Name (print)	Date
Design check organization:	
Extent of check: ***NOTE*** *To describe limits when there is more than one checker.*	
Check category (see Table 10): ***NOTE*** *Design check categories from the TWf clients' guide [7] are given at Table 11.*	

NOTE *Repeat for each involved checker.*

PART 5: TEMPORARY WORKS LEAD DESIGN CHECKER
(where more than one checker is used)

We confirm that we have used reasonable professional skill and care in determining that the design check has considered structural robustness at all stages.

Temporary works lead design checker or agreed nominee:	
Signed	Title
Name (print)	Date
Organization:	

PART 6: PERMANENT WORKS DESIGNER

The permanent works designer is satisfied that all requirements for temporary works have been identified and that the temporary works as designed have no detrimental effects on the permanent works.

Permanent works designer's agreed nominee:	
Signed	Title
Name (print)	Date
Design organization:	
Extent of permanent works design affected: ***NOTE** To describe limits when there is more than one permanent works designer.*	

***NOTE** Repeat as required.*

PART 7: PRINCIPAL CONTRACTOR

We are satisfied that the temporary works identified above have been adequately checked.

TWC or principal contractor's agreed nominee:	
Signed	Title
Name (print)	Date

A.3 Form A2-P – Design and design check certificate – Type P

Attach design statement Part 1, 2 and 3.

NOTE *All parts are to be included even if not used so as to avoid uncertainty.*

PART 4: DESIGN and DESIGN CHECK

We certify that reasonable skill and care has been used in the preparation of the design and design check of the temporary works described in the attached design statement, with a view to securing that:

i. it has been designed/checked in accordance with the design statement dated:

Date(s) of issue (including any re-submissions).

attached including any client or third party directives scheduled.

Any additional design standards, codes, methods, and criteria additional to those defined in the design statement, along with justifications for their inclusion are scheduled below.

NOTE *Departures from the design statement are not to be recorded on this form, but require a resubmission of the design statement.*

ii. the design of the temporary works has been accurately translated into temporary works drawings, specifications or other instructions, as listed below.

The unique numbers of these drawings, schedules and other instructions are:

PART 5: TEMPORARY WORKS DESIGNER(S)

The design involved the organizations noted below, each of whom is signing for their element, as noted in Part 1 of the design statement.

Temporary works designer's agreed nominee:	
Signed	Title
Name (print)	Date
Design organization:	
Extent of design: ***NOTE*** *To describe limits when there is more than one designer.*	
Consequence of failure risk (CFR) (see Table 6):	

NOTE *Repeat for each involved designer.*

PART 6: TEMPORARY WORKS LEAD DESIGNER
(where more than one designer is used)

We confirm that we have used reasonable professional skill and care in determining that the design has considered structural robustness at all stages.

Temporary works lead designer or agreed nominee:	
Signed	Title
Name (print)	Date
Lead design organization:	

PART 7: TEMPORARY WORKS DESIGN CHECKER

The design check involved the organizations noted below, each of whom is signing for their element, as noted in Part 1 of the design statement.

Design check organization's agreed nominee:	
Signed	Title
Name (print)	Date
Design check organization:	
Extent of check: ***NOTE*** *To describe limits when there is more than one checker.*	
Check category (see Table 10): ***NOTE*** *Design check categories from the TWf clients' guide [7] are given at Table 11.*	

NOTE *Repeat for each involved checker.*

PART 8: TEMPORARY WORKS LEAD DESIGN CHECKER
(where more than one checker is used)

We confirm that we have used reasonable professional skill and care in determining that the design check has considered structural robustness at all stages.

Temporary works lead design checker or agreed nominee:	
Signed	Title
Name (print)	Date
Organization:	

PART 9: PERMANENT WORKS DESIGNER

The permanent works designer is satisfied that all requirements for temporary works have been identified and that the temporary works as designed have no detrimental effects on the permanent works.

Permanent works designer's agreed nominee:	
Signed	Title
Name (print)	Date
Design organization:	
Extent of permanent works design affected: ***NOTE** To describe limits when there is more than one permanent works designer.*	

***NOTE** Repeat as required.*

PART 10: PRINCIPAL CONTRACTOR

We are satisfied that the temporary works identified above have been adequately designed and checked.

TWC or principal contractor's agreed nominee:	
Signed	Title
Name (print)	Date

Bibliography

Standards publications

For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

BS 5975, *Code of practice for temporary works procedures and the permissible stress design of falsework*

BS 11000:2010 (all parts), *Collaborative business relationships*

PAS 91, *Construction prequalification questionnaires*

PAS 8812, *Temporary works – Application of European Standards in design – Guide*

PAS 1192-2, *Specification for information management for the capital/delivery phase of construction projects using Building Information Modelling*

Other publications

[1] HM TREASURY AND INFRASTRUCTURE UK. *Infrastructure Cost Review: Main Report*. London: HM Treasury, 2010.

[2] HM TREASURY AND INFRASTRUCTURE UK. *Infrastructure Cost Review: Measuring and Improving Delivery*. London: HM Treasury, 2014.

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[4] GREAT BRITAIN. Construction (Design and Management) Regulations (CDM) 2015. London: The Stationery Office.

[5] STANDING COMMITTEE ON STRUCTURAL SAFETY (SCOSS). *Independent review through peer assist* and *Appointment of independent reviewer through peer assist*. Available from: http://www.structural-safety.org/publications/topic-papers/?page=2

[6] HEALTH AND SAFETY EXECUTIVE. L153, *Managing health and safety in construction*. London: Health and Safety Executive, 2015.

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[9] INSTITUTION OF STRUCTURAL ENGINEERS. *Manual for the systematic risk assessment of high-risk structures against disproportionate collapse*. London: Institution of Structural Engineers, 2013. Available from: http://shop.istructe.org/manual-for-the-systematic-risk-assessment-of-high-risk-structures-against-disproportionate-collapse.html

[10] TEMPORARY WORKS FORUM (TWf). *Competencies of the TWC*. London: Temporary Works forum, 2012. Available from: http://www.twforum.org.uk/publications/public-twf-documents/

Further reading

HEALTH AND SAFETY EXECUTIVE (HSE). *The management of temporary works in the construction industry*. Available from: http://www.hse.gov.uk/foi/internalops/sims/constrct/2_10_04.htm

TEMPORARY WORKS FORUM (TWf). *The use of European Standards for Temporary Works design*. London: Temporary Works forum, 2014. Available from: http://www.twforum.org.uk/publications/public-twf-documents/

Useful websites

General advice on temporary works is available at: http://www.twforum.org.uk

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