

Procedure

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Temporary works Procedure

(For use where LU is acting as Principal Contractor)

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1 Purpose

The purpose of this procedure is to ensure that the requirement for Temporary Works on London Underground (LU) infrastructure is properly assessed and thereafter that the Temporary Works are designed and implemented in a controlled manner, in accordance with the requirements of BS5975. Reference should also be made to PAS8811:2015 'Code of Practice for Temporary Works – Client Procedures'.

2 Scope

This procedure applies to all works carried out on LU infrastructure where the LU is undertaking the role of Principal Contractor (PC).

Note: Where a Principal Contractor (PC) has been engaged by LU, it is the responsibility of the Project Manager to ensure that the PC has similar procedures in place to satisfy the requirements of BS5975.

3 Procedure

3.1 General

- 3.1.1 Notwithstanding the definition of Temporary Works given in section 6.0 (see also BS 5975 Cl 3.40) further clarification may be required with regard to what is considered to be Temporary Works. Examples are given in BS 5975 and [S1062](#), and these include structures, supports, back-propping, earthworks and accesses. Other examples include: demolition (checking of stages), any supported excavation, slopes, falsework, formwork, loading gantries, working platforms for tracked or wheeled plant (piling mats), tower crane bases, mobile crane outrigger foundations, site hoardings & major signboards.
- 3.1.2 The list is not exhaustive nor is it prescriptive and the construction team should assess the project to define elements where a Temporary Works scheme is required. Temporary Works will include an “engineered solution” where this is used to support or protect either an existing structure or the permanent works during construction, or to support an item of plant or equipment.
- 3.1.3 The Temporary Works may be removed or left in place after the completion of the permanent works but in the latter case would not be relied upon and necessarily contribute to the capacity and stability of the permanent works.
- 3.1.4 A Temporary Works study may involve an assessment of the permanent works during the various stages of construction, modification or demolition to determine adequacy of strength and/or stability. This would normally require liaison with the permanent works designer.

3.2 Appointment

- 3.2.1 The LU Engineering Director’s role as Designated Individual, in accordance with the requirements of BS 5975, has been delegated to the Head of Civil Engineering & Construction, who will be responsible for maintaining [a register of competent Temporary Works Co-ordinators \(TWCs\)](#) and [Temporary Works Supervisors \(TWSs\)](#). As a minimum, TWCs and TWSs on this register must have attended a CITB/TWf-accredited training course, and the register will denote the individuals’ areas of specialism, e.g. structures, earthworks, etc. The following are the

competence requirements for inclusion on the register of competent TWCs and TWSs.

3.2.1.1 For a Temporary Works Co-ordinator (TWC):

- relevant academic and professional engineering qualifications (eg HNC, HND, BEng, MEng; Eng Tech, IEng, CEng, MICE or PWI)
- industry recognised safety certification (eg CSCS Card, ICI/Sentinel Card)
- three years' appropriate construction, maintenance or track engineering experience working in a railway environment.

3.2.1.2 For a Temporary Works Supervisor (TWS):

- relevant professional affiliation (e.g. ICW, ICE, PWI)
- industry recognised safety certification (eg CSCS Card, ICI/Sentinel Card)
- three years' appropriate construction, maintenance or track engineering experience working in a railway environment.

Note: The requirements for qualifications, certification and years of experience working in a railway environment listed above are indicative rather than absolute. They broadly reflect the attributes necessary to satisfactorily attain the knowledge, understanding, and skills associated with the TWC and TWS roles. However it is the individual skills and knowledge assessment by the Project Manager using the Competency Assessment Questionnaire Form F5683 that will determine if the candidate has the requisite competency to undertake the TWC or TWS role for the specific project.

3.2.2 Appointment of competent TWCs and TWSs from this register on individual contracts will be the responsibility of the Project Manager (as defined in section 4.2), using the 'Competency Assessment Questionnaire' [F5683](#). Where considered necessary, the Project Manager will consult with the Designated Individual regarding the competence of the persons to be appointed as TWC and TWS.

3.2.3 The Project Manager will propose the appointment using [F7963](#), which the proposed TWC will sign to accept the appointment. The completed form will be returned to the TWC for inclusion within site records.

3.2.4 Where the TWC is absent from site for a significant period the Project Manager will ensure that alternative arrangements are made for checking of the erection of Temporary Works by appointing a competent substitute using the above process.

3.2.5 On large sites, or where the Project Manager considers it necessary, or where the TWC requests assistance, the Project Manager shall appoint a competent TWS to assist in the inspection of the Temporary Works during erection, use and dismantling. The TWC will propose the appointment and define the remit of the TWS using [F7964](#), which the proposed TWS will countersign to accept the appointment. The completed form will be returned to the TWS for inclusion within site records.

3.3 Register

- 3.3.1 The TWC, in conjunction with the Project Manager, will identify the construction activities which will require a Temporary Works design. Further activities may be identified as the contract progresses.
- 3.3.2 The TWC will prepare a register using [F7965](#), indicating each of the Temporary Works schemes required on the project. The register is a tool to enable the efficient co-ordination of the Temporary Works. In preparing the register, the TWC will consider (by reference to the contract programme) the dates required for each of the following (as required) for each element of Temporary Works:
- a) preparation and issue of design brief
 - b) Conceptual Design Statement (CDS)
 - c) completion of design
 - d) completion of an independent check
 - e) Accredited Assurer approval, where required
 - f) period for material/plant procurement
 - g) preparation of Inspection and Test Plan
 - h) Temporary Works permit
 - i) implementation
 - j) use
 - k) dismantling.

3.4 Standard solutions

- 3.4.1 The Code of Practice for Temporary Works (BS 5975) permits the use of standard solutions. Various publications contain standard solutions to a range of common requirements on construction sites. For example, the NASC publication “Guide to Good Practice for Scaffolding with Tubes and Fittings”, TG20:13, contains standard solutions for scaffolding. Proprietary equipment suppliers also provide a range of standard solutions.
- 3.4.2 BS 5975 states:
- “A ‘standard solution’ comprises a suitable arrangement for which the basic design work has already been carried out and presented in tabular or other easily assimilated form, and for which no further structural calculations are necessary.”*
- 3.4.3 Where suppliers produce ‘standard solutions’ to suit their products, these should be in accordance with the recommendations of BS 5975 and should be accompanied by information covering layout, loading, limitations and tolerances together with information for safe erection and dismantling. When selecting a ‘standard solution’ those responsible should ensure they understand and take account of the limitations of these designs so that they are only used in appropriate circumstances.
- 3.4.4 Where a ‘standard solution’ is employed no further design, checking or certification (other than a Permit to Load) is required. The ‘standard solution’ should be clearly

described in the method statement. The use of a standard solution should be recorded in the Temporary Works Register.

3.5 Design brief

- 3.5.1 If a 'standard solution' cannot be adopted, the TWC shall agree with the Project Manager as to who will be responsible for preparing the design brief for each scheme. When preparing the design brief the appointed person shall consider:
- scope of the work
 - specification
 - contract drawings
 - site investigation report
 - function
 - form of structure and geometry
 - preferred methods and materials
 - re-use of materials/scheme
 - tolerance
 - programme
 - health, safety and environmental issues
 - the effects on the Permanent Works and adjacent structures.
- 3.5.2 The design brief will be prepared on [F7966](#), and will be submitted, together with relevant drawings, sketches etc, to the designer. The information supplied in the design brief may include a description of the preferred method(s) to be employed, and sketches if complex schemes are required.
- 3.5.3 Designs checks to be carried out by others should be submitted to them in accordance with an agreed timetable. The same design brief should be used for both designer and checker, ie do not prepare a separate brief just for the checker. Where significant changes to the requirements of the design brief are proposed, a revised brief should be submitted.
- 3.5.4 For further guidance, see TWf2014:02, section 2.1.1.

3.6 Design and checking

- 3.6.1 The TWC will ensure that each Temporary Works design is certified by both the designer and checker, using [F-30020](#). The TWC will also verify the competence of the proposed designer, and where necessary will consult with the Project Manager and/or Accredited Assurer prior to their appointment. The designer will consider, amongst others, the:
- design brief
 - conceptual design statement
 - construction sequence
 - Temporary Works erection/construction tolerances

- loadings
- design life
- design codes; British/European Standards; LU standards
- other publications/design principles
- statutory requirements
- ground conditions
- health and safety
- environmental effects.

- 3.6.2 All Temporary Works shall be assured in accordance with the Assurance standard [S1538](#). The assurance regime for Temporary Works design is described in section 3.5 of Temporary Works standard [S1062](#), noting in particular the following sub-clauses:
- 3.5.4 – the requirement for a CDS for bespoke Temporary Works designs. Form [F-10382](#) Civil Engineering CDS template may be used for this purpose, modified as described in Attachment 7 of S1062.
 - 3.5.6 – the requirement for additional LU approvals (track clearance, etc).
 - 3.5.8 – the requirement to control any changes to the Temporary Works design during the fabrication, installation, testing and commissioning phases.
 - 3.5.9 – the procedure for changes of concept design for the Temporary Works after approval of the CDS.
- 3.6.3 Risk assessment of the scheme, identifying the major hazards and the means of minimising hazards/risks, will be carried out and recorded by the designer. The Designer's Risk Assessment proforma in section 7.1 of [W0199](#) Bridges & Structures Designers Risk Assessment may be used for this purpose. Any residual risks will be identified and communicated to the site team. This risk assessment will address risks introduced by the Temporary Works design, over and above those encountered during normal construction operations.
- 3.6.4 The designer's calculations will be based upon the relevant European & British Standards, Codes of Practice and recognised principles. Sufficient drawings and sketches together with outline method statements will be prepared to allow the Temporary Works to be constructed, inspected, used, maintained and dismantled in a safe manner.
- 3.6.5 During the design phase, consideration will be given to facilitating the inspection of the installation and removal of the Temporary Works. Where appropriate, the designer will identify inspection and test requirements, including hold points, and advise the TWC. The TWC must ensure that the relevant requirements are included in the Inspection and Test Plan.
- 3.6.6 The TWC shall verify the competence of the proposed checker, and where necessary will consult with the Project Manager and/or Accredited Assurer prior to their appointment. During the checking of designs the checker will consider the ground, environmental effects, loading, overall stability and design in both concept and detail.

3.6.7 The checker will only refer to the designer’s calculations when in disagreement with the elements of the prepared scheme. Any disagreement must be resolved between the designer and checker before the issue of a check certificate, Form F-30020.

3.7 Categories of design check

Design checks should be undertaken in accordance with one of the categories in the table below (BS 5975 Table 1).

Table 1 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.

3.8 Implementation

3.8.1 For straightforward schemes, a combined Permit/Check List should be used. The Permit, Form [F7967](#), may be adapted to suit the requirements of a particular item or phase of Temporary Works. For more complex Temporary Works in longer-term use, an Inspection and Test Plan (ITP) may be required, to ensure compliance with the design requirements. This will identify elements that are to be inspected and the dates for inspection. Where issued, the ITP will include or refer to check lists for each element, upon which the inspections will be recorded.

3.8.2 The TWC will ensure that the site team are briefed as to the correct installation, use and removal of the Temporary Works. The TWC will identify, to the foreman or site manager, the hold points noted in the Check List or ITP to allow the TWC/TWS to inspect and confirm that the Temporary Works are erected in accordance with the

certified scheme. The TWC/TWS will issue a Permit, Form F7967, upon satisfactory completion of the inspection before loading of the Temporary Works or continuation of construction. The permit will confirm that the Temporary Works have been erected in accordance with the relevant drawings, sketches, method statements etc. and will be used in accordance with the design.

- 3.8.3 The Temporary Works will be inspected by the TWC/TWS, and a new Permit issued, before any new loading condition is instigated, after a change in environmental conditions, after an unexpected load application (eg shock loading), or change in configuration of the Temporary Works.
- 3.8.4 When the function of the Temporary Works has been completed, the TWC/TWS will issue a Permit to Unload/Strike, form [F7968](#).

3.9 Documentation

- 3.9.1 The TWC will be responsible for maintaining all site records relating to Temporary Works. The Project Manager will be responsible their archiving in Livelink.

4 Responsibilities

- 4.1 Designated Individual: The senior person within LU with responsibility for the management of Temporary Works and the responsibilities of the Designated Individual in accordance with the requirements of BS 5975.
- 4.2 Project Manager: The person nominated for the activity or work to manage, co-ordinate and bring it to a satisfactory completion. Depending on contractual arrangements, this role may be undertaken by a Senior Project Manager, Maintenance Manager, Contract Manager, Construction Manager or Lead/Construction Engineer.
- 4.3 Temporary Works Co-ordinator – the responsibilities of theTWC include:
- a) be responsible to the Project Manager, with functional responsibility to the Designated Individual
 - b) co-ordinate the brief, design and checking functions, and inspection and certification of the safe construction, maintenance, use and dismantling of the Temporary Works on site, in accordance with this Procedure
 - c) ensure that each scheme is designed, checked and implemented in accordance with this procedure
 - d) where not delegated to the TWS, be responsible for inspection and certification, in stages where applicable or stated by the designer, of the safe construction, maintenance, use and dismantling of the Temporary Works on site
 - e) when requested by the Project Manager, determine the requirement for Temporary Works schemes and, as appropriate, prepare a programme for design, approval, materials, plant and work on site
 - f) liaise with the Project Manager to ensure that the design is submitted for approval (where required by the contract) and is reviewed by the designer if the circumstances change

- g) liaise with the, designer, Project Manager, other site staff and subcontractors/suppliers to ensure that the scheme is constructed in accordance with the design and on programme
- h) liaise with the designer to ensure any proposed modifications to the design, including those identified in the course of erection, are approved before proceeding
- i) ensure that the designer and checker are informed of any variations to the conditions originally envisaged and confirmation/amendment is received before proceeding, eg ground, water, environmental or use
- j) maintain a Temporary Works file on site, including the Temporary Works register, and ensure that it is available for inspection at any time by the Project Manager
- k) issue, only when satisfied that it is safe to do so, a permit, indicating the date of inspection and the conditions of certification. This responsibility may also be carried out by the TWS, where so delegated.

4.4 Temporary Works Supervisor – the responsibilities of the TWS, as outlined in BS5975, include:

- a) be responsible to the Project Manager, with functional responsibility to the Designated Individual
- b) understand the limitations of their remit, as described on their appointment form
- c) where requested by the TWC, and within their remit, be responsible for inspection and certification, in stages where applicable or stated by the designer, of the safe construction, maintenance, use and dismantling of the Temporary Works on site
- d) liaise with TWC and/or designer to ensure any proposed modifications to the design, including those identified in the course of erection, are approved before proceeding
- e) ensure that the designer and checker are informed of any variations to the conditions originally envisaged and confirmation/amendment is received before proceeding eg ground, water, environmental, proximity of adjacent structures or use
- f) where requested by the TWC, and within their remit, issue, only when satisfied that it is safe to do so, a Permit, indicating the date of inspection and the conditions certified
- g) provide copies of the Permit and inspection certificates to the TWC

5 Person accountable for the document

Name	Job title
Brian McGinnity	Head of Profession – Civil Engineering & Construction

6 Definitions

Term	Definition	Source
Temporary Works	Parts of the works which allow or enable construction of, protect, support or provide access to, the permanent works and which may or may not remain in place at the completion of the works.	BS5975:2008
Project Manager	The person nominated for the activity or work to manage, co-ordinate and bring it to a satisfactory completion	S1622
Temporary Works Co-ordinator	Competent person with responsibility for co-ordination of all activities related to the Temporary Works.	BS5975:2008
Temporary Works Supervisor	Competent person who is responsible to and assists the Temporary Works co-ordinator.	BS5975:2008
Accredited Assurer	An Engineer accredited by a Head of Technical Discipline to undertake defined tasks. The accreditation shall be recorded in the Engineering Accreditation Matrix (ref H018 Manage Engineering Handbook). The person (Accredited Engineer) responsible for the assurance of the Temporary Works in accordance with the requirements of S1538 – Assurance.	H018

7 Abbreviations

Abbreviation	Definition	Source
TWC	Temporary Works Co-ordinator	BS5975:2008
TWS	Temporary Works Supervisor	BS5975:2008
CSCS	Construction Skills Certification Scheme	
HNC	Higher National Certificate	
HND	Higher National Diploma	
ICE	Institution of Civil Engineers	
ICI	Industry Common Induction	
PWI	Permanent Way Institution	

8 References

Document no.	Title or URL
S1062	Temporary Works
S1538	Assurance
S1622	Glossary of Terms.
W0199	Work Instruction: Bridges & Structures Designers Risk Assessment
F-10382	Conceptual Design Statement – Civil Engineering
F-30020	Design Check Certificate
F5683	Temporary Works Competency Questionnaire
F7963	Memorandum for appointment of Temporary Works Co-ordinator
F7964	Memorandum for appointment of Temporary Works Supervisor
F7965	Temporary Works Register
F7966	Temporary Works design brief
F7967	Permit to Load Form
F7968	Permit to Unload/Strike Form
BS 5975:2008+A1:2011	Code of practice for Temporary Works procedures and the permissible stress design of falsework
TWf2014:02	Temporary Works Forum: Clients' Guide to Temporary Works
BSI PAS8811:2015	Code of practice for Temporary Works – Client procedures (<i>Expected to be published later during 2016</i>)

9 Document history

Issue no.	Date	Changes	Author
A1	May 2015	New procedure produced as per change No. 03824.	Martin Roach
A2	May 2016	Clauses 3.2, 3.5, 3.8 revised and Form F5683 introduced as per change No. 04588	Martin Roach
A3	January 2017	Links added to document and reformatted to the current template as per change No. 05282.	Martin Roach