

**ESSENTIAL
STANDARD
no.20**

Management of Temporary Works



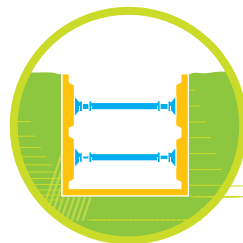
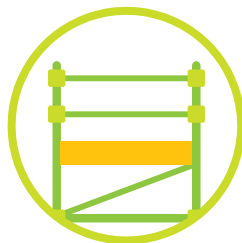
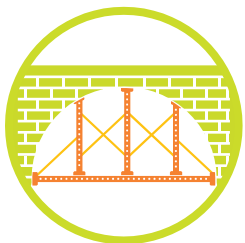
KEY MESSAGES

- All temporary works must be classified according to risk.
- All temporary works must be designed and planned by a competent person.
- Temporary works designs must be checked by a competent person (to ensure they are safe and suitable), but not by the original designer (depending on risk).
- Temporary Works Coordinator and Temporary Works Supervisor must be appointed in writing by the Principal Contractor designated individual.
- Ensure that construction and dismantling of temporary works is supervised by a competent person.
- Ensure a temporary Works register is implemented and kept up to date on site.
- Develop and implement risk assessments and safe systems of work for the construction, use and dismantling of temporary works.
- Ensure that personnel involved with the construction, use and dismantling of temporary works have adequate information, instruction and training.
- Refer proposed temporary works alterations to a competent designer before making changes.
- Only use standard trench support systems that meet the designs set out by a competent person and that meet the conditions set out in the design.

1. Introduction

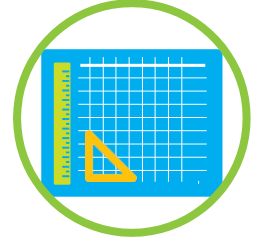
Temporary Works are “engineered solutions” used to support or protect an existing structure or the permanent works during construction, or to support an item of plant or equipment, or to support the vertical sides/slopes of an excavation during construction operations or to provide access to otherwise inaccessible areas. Amongst other things they include, false-work, form-work, scaffolds, special crossings, cofferdams and trench supports.

The risks associated with temporary works cannot be overstated. Failures in design, inadequate and unsafe construction, and unsafe procedures for dismantling them have, over the years, cost thousands of lives. This essential standard sets out the minimum procedural requirements to be followed to ensure that all temporary works are suitable and safe.



2. Classification

The Temporary Works Designer must assess the risks associated with all temporary works in order to classify it. The assessment must consider the risks at the time of the temporary works are commissioned, and must also be reviewed periodically for any changes. The lists below are not exhaustive and must be interpreted according to each temporary works and their surrounding conditions. For example, a 2.5m deep excavation in running sands may be recorded as a risk category 1, but should actually be recorded as a risk category 2 due to the increased risk caused by the adverse ground conditions.



All temporary works must be designed with the design being subject to checking and approval.

Risk Category	Scope	Comment on designer input (TWD)	Independence of checker (TWDC)
0	Restricted to approved standard solutions only, to ensure the site conditions do not conflict with the scope or limitations of the chosen standard solution; open mesh proprietary fencing	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, e.g. formwork less than 3m high; false work under 3m high (freestanding); needling & propping brickwork: single storey; trenches under 3m deep in good ground; removal of ceiling grids; solid hoardings 3m high or more	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, e.g. Designs for excavations/sheet piling over 3m deep; structural steelwork and other propping; reinforced concrete over 3m high; facade retention; tower crane bases; underpinning	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 organisation

Examples of Temporary Works and their Temporary risk category.

No	Description	*BS5975 Category 0 / 1 / 2 / 3
01	Site logistics & traffic management plan.	0
02	Perimeter hoardings as standard design.	0
03	Main large site signboard & foundations as standard design.	0
04	Heras fence to site perimeter installed to manufacturer's details to prevent overturning.	0
05	Perimeter hoarding to subcontractor bespoke design.	1
06	Foundations to stacking site accommodation. Can be category 0 if standard solution available from supplier.	1
07	Foundation slab for Mortar Silo as standard design solution.	0
08	Basic standard scaffold as defined and configured in TG20-13. Scaffolder needs to confirm compliance.	0
09	Non basic special scaffolds including birdcages, cantilever, loading bays, guardrails, temp roofs, crash decks, support scaffolds etc.	1 or 2
10	Assessment of ground conditions for excavations not requiring earthworks support.	0
11	General excavations to drainage using proprietary trench & manhole boxes as manufacturers spec.	0
12	Designed earthworks support for deep excavations, underground tanks.	1 or 2
13	Piling platform for the installation of concrete or steel sheet platform and support of associated plant.	1 or 2
14	Design and possible testing of lifting platforms for mobile crane and associated plant and loads.	1 or 2
15	Edge protection guarding to floors, openings & roof of new and existing buildings. Can be category 0 if proprietary system used.	1
16	Safety netting and platforms as fall arrest for installing metal decking, precast floor slabs, roofing works etc. Can be category 0 if proprietary system.	1
17	Design of formwork and false work to walls, columns, beams floors, foundations etc.	1 or 2
18	Temporary support works to form openings in existing structures.	1 or 2
19	Temporary support and bracing to structures until in stable designed condition.	1 or 2
20	Temporary site haul and access roads.	0
21	Stable MEWP running platforms for access and working at high level.	1
22	Design and installation of foundation for Tower Cranes bases.	2 or 3
23	Design and installation of steel sheet piling walls as earthworks support to retaining walls basements etc.	1 or 2
24	Temporary protection to existing services.	0, 1 or 2
25	Temporary protection to trees (with and without TPO's)	0
26	Structural assessment and temporary support of existing structures to take construction loads.	
27	Demolition in a controlled manner to prevent progressive collapse.	

NOTE: Further examples of temporary works typical for a Thames Water location can be found in [Appendix A](#)

A temporary works permit must be in place for ALL temporary works

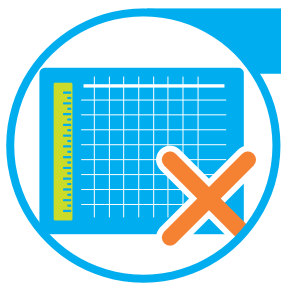
3. Temporary Works Register.

The Principal Contractor's (PC) Temporary Works Coordinator (TWC) should ensure that a temporary works register is prepared and maintained throughout the project.

- The register should identify what temporary works are needed on the contract.
- The register, often commenced at tender stage in outline, is not expected to identify all the details of all the temporary works to be required.
- As the project progresses the register should be maintained as an "active document" and the Principal Contractor's (PC)
- Temporary Works Coordinator (TWC) should ensure that it is kept up to date.

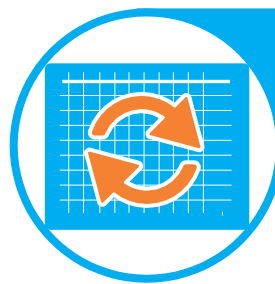
4. Hazards

There are five main causes of incidents involving the collapse of temporary works:



• Inadequate design:

The design was unsuitable for the location, the job or the loading.



• Unauthorized changes in design:

during construction



• Poor construction:

The construction was inadequate, incorrect or carried out by untrained personnel.



• Changes in the activity:

The activity that the temporary works was designed for was changed and the works was used for something it wasn't designed for.



• Dismantling:

The procedure for dismantling was inadequate or was not followed.

5 Key Roles and Responsibilities

Make sure that the following people have been appointed in writing:



a competent temporary works designer who prepares or modifies the design of any temporary works.



The Temporary Works Supervisor (TWS), where appointed, should be responsible to the Principal contractor (PC) Temporary Works Coordinator (TWC) or TWC as appropriate.

TWS should assist the PC's TWC or TWC, as appropriate, in the supervision and checking of the temporary works



The Principal Contractor's (PC'S) Temporary Works Coordinator (TWC) should be appointed by the Designated Individual (DI) of the PC. The PC's TWC should be either an employee, or be an employee of an organization contracted to provide the services of a TWC on behalf of the PC for all the temporary works on the site/project area.

Step 1 – Design Brief and Design



- You must put a design brief together in order to commission a temporary works design. It is the starting point for subsequent decisions, design work, calculations and drawings. Include all data relevant to the design.
- Enough time must be given to the designer - make sure that you prepare the brief at an early stage to allow enough time for the safest design to be done and checked.



For major works, such as the construction of a deep excavation or a shaft, you need to provide a substantial amount of information in the design brief such as:

- Details of the organisations/teams involved in the design and their responsibilities
- Any requirements to design in accordance with a particular standard or guidance document
- Information on any significant risks
- The programme for the various phases of the design, the design check, any approvals, and procurement and erection of the temporary works
- Requirements for access onto, under or around the temporary works
- Access requirements for construction, maintenance, use and dismantling of the temporary works
- Site investigation data and reports for the areas under and around the foundations of the temporary works such as information on all underground and overhead services
- Requirements for public access
- Equipment and materials that are available for constructing the temporary works
- Limitations on the positioning of temporary works loads over underground services or next to excavations or retaining walls
- Proposals for the protection of the temporary works (including foundations), against disturbance or impact
- Limitations imposed by authorities for working within or next to railways, highways, and water-courses
- Environmental constraints placed on the site, for example, a requirement to limit noise to certain hours of the day
- Details of any obstructions that may influence the position of temporary works
- Any other relevant information

Step 2 – Design Check

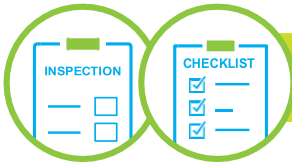


- Ensure that the design and calculations for high and medium risk temporary works (risk category's 1 and 2) is checked by an independent person.
- The independent person can be a member of the design organisation/in-house design team, as long as they are not the original designer or were consulted with concerning the design.
- For risk category 3 the check must be carried out by another organisation.

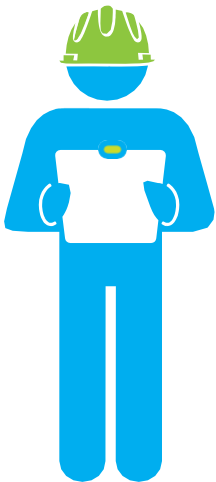


The design check must include the original calculations and include the concept, structural adequacy and its compliance with the original brief. Make sure the design check documents, such as signed drawing and calculations or certificates, are available as evidence of the design checking process. Any alterations to temporary works configurations must be subject to a design check. All interested parties must have access to the register of designs, drawings, calculations or any other relevant documentation.

Step 3 - Supervision and Inspection



Any risk category 1 or 2 temporary works must be signed off by a competent person other than the Temporary Works Supervisor assigned to the activity.



The person responsible for the Temporary Works must also be the one who communicates and enforces the implementation of the process for the control of temporary works on site to achieve project objectives, maintain health and safety standards, and quality and environmental impacts.

The Temporary Works Supervisor (TWS) should assist any Temporary Works Coordinator (TWC) by:

- Supervising the construction of the temporary works to ensure it is built safely in accordance with the agreed design using the design materials
- Confirming with the coordinator that the temporary works meets the design criteria
- A TWS would only be permitted to issue a permit to load (bring into use) or unload (take out of use) if the designated individual of the principal contractor is,
 - a) an individual TWS is competent and has been given the appropriate authority in respect of that individual; and
 - b) the risk classification identified is low or very low. (reference risk table in section 2 of this document),
- Supervising the use of the temporary works
- Supervising the dismantling of the temporary works

STOP

Remember that the Temporary Works Coordinator and Temporary Works Supervisor have the authority to stop activities involving the temporary works if it is unsafe. To do this they cancel the permit to use/load and immediately prevent further use of the temporary works.

6 Related Essential Standards

To fully understand temporary works safety, you should also read the other Essential Standards on specific subjects, for example:



- **Essential Standard 001 - Excavations**



- **Essential Standard 015 – Protecting the public during temporary works**



- **Essential Standard 017 - Scaffolding**



You must also refer to the British Standards: BS5975:2019 Code of practice when you deal with temporary works procedures and false work. If the guidelines have different rules, then you should follow the British Standards and seek advice from the temporary works design engineer.

APPENDIX A: LIST OF TEMPORARY WORKS

This list has been prepared as a quick point of reference to assist identifying items of Temporary Works (TW). This will help towards TW's being identified and planned in a timely manner and ensure we manage them effectively.

Note this is a non-exhaustive list but covers a high proportion of TW often seen on Thames Water sites. Consider the question "if it's not Temporary Works, how is it being managed?" for those items not captured.

Temporary works can be described as providing an "engineered solution" that is used to support or protect either an existing structure of the permanent works during construction, or to support an item of plant or equipment, or the vertical sides of side slopes of an excavation during construction operations on site or to provide access. It is used to control stability, strength, deflection, fatigue, geotechnical effects and hydraulic effects within defined limits.

BS 5975 (2019) 'Code of Practice for Temporary Works Procedures'

1. Site Compounds and Setup

- Site Cabins (wind, sliding, foundations, overturning)
- Double Stacked Cabins and Stairs
- Hoarding / Fencing & Gateways (acoustic barriers, signage wind loads, security)
- On and off-site Signage (TMA noticing requirements etc)
- Hardstanding / Lifting areas
- Goal posts
- CCTV or Lighting tower foundations / positions (wind loading)
- Traffic management (Highways or on site)
- Haul Roads (consider environmental impact e.g. Dust, silt / surface water etc)
- Service protection - Under roads/verges and across excavations, to avoid damage from plant loading / self-weight / impact damage (e.g. cranes, or shallow depth)
- Segregation barriers (plant from pedestrian etc)

2. Lifting and working platforms

- Crane outrigger bases (mobile cranes)
- Working platform (tracked plant)
- Working platform (piling operations)
- Hi-ab foundations
- Concrete-pump plant foundations
- Tower crane foundations
- Davit arm / Tripod foundations

3. Plant Access

- Access ramps
- Stability of plant on slopes
- Temporary bridges
- Temporary flooring (across voids / weak floors)
- Road plates crossing voids (e.g. trenches, MHs)
- Foundation for MEWP access strips
- Flotation platforms (barges / pontoons)

4. Groundwater Control / Drainage and dams

- Internal (sump pumping)
- External (dewatering wells)
- Silt removal measures, affect to surrounding structures and/or operations (loss of fines and volume change of ground)
- Ground freezing / grouting
- Drainage ditch (when 'blocking' during construction)
- Cofferdam whilst installing new valves
- French Drains / Surface water management

5. Excavations

- Trenches / pits
- Manhole, trench boxes and drag boxes
- Sheet and Frames
- Timber shoring
- Bored Piles
- Gabion walls
- Cofferdams (water exclusion)
- Stockpiles / areas of fill / imposed loads adjacent to excavations
- Battered or stepped excavations (weather, duration, drainage, etc)
- Soil nailing / Slope stability – **AVOID** excavations adjacent to the toe
- Edge/void protection
- Service Support

6. Scaffolding and pedestrian access

- Scaffolds (both TG20 'standard' and designed)
- System Scaffold
- Scaffold wraps / netting
- Scaffold foundation and ties
- Temporary Stairways, access ramps, footway boards, bridges

7. Formwork / Falsework & Rebar (consider winter pours)

- Formwork (and soffit formwork) – consider access for working / placing.
- Single sided formwork
- Bases and trenches (e.g. MCC kiosk)
- Falsework / structure propping
- Out of position manufacture of rebar cages (offsite) including lifting points / lifting beams / stability
- Rebar propping / sequencing – consider wind loading while stood

8. PCC Units

- Stability of PCC segments/units during storage / lifting / placing
- Additional reinforcement for transporting/handling
- Safe stacking, storage and turning.
- Lifting points, temporary loads associated with lifting
- Temporary stability incl. wind loads/accidental impact loads
- Temporary prop braces (or possibly kentledge / spayed footings are needed). And, if temporary prop fixings are needed; fixings need to be cast-in to PCC units.
- Core Drilling for pipes
- Sequence of build
- Edge/void protection
- Formwork for box outs

9. Pressure Testing

- Pressure testing pipework
- Pressure test ends / thrust blocks and propping
- Tank / structures

10. Demolition / Dismantling

- Instability following removal of parts
- Temporary loading of structural members
- dismantling/cleaning (decontamination) of equipment
- emptying/cleaning tanks
- temporary equipment required for cleaning, disposing of arisings, special procedures required in handling solid/liquid residues etc

11. Permanent Works / existing structures or assets

- Temporary loads; flotation, hydrostatic uplift pressure, struts
- Temporary stability states of permanent works (cantilever walls)
- Constructability / sequencing of permanent works
- Construction of multi-storey buildings where one floor is used to support the falsework to the next (back-propping)
- Backfilling behind a wall before constructing roof
- Additional loading over its current / existing loading (plant on structures, bridge crossings, propping etc)
- Sequence of load / removal of existing structural elements / temporary state.
- Needling

12. Environmental Protection Systems

- Silt containment (e.g. settlement tanks/silt curtains/hay bales)
- Spoil heap storage bunds (pollution of watercourses, drainage)
- Newt fencing, Badger gates, Traps etc (between pond and site)
- Hydro-geological check that dewatering does not affect fish in pond

- Concrete washdown facilities
- Seal-off a contaminated working area
- Changing water levels (e.g. bridge crossings)
- Excavation ramps – Egress for wildlife

Not just Civils!

13. Mechanical

- Mechanical isolations (not just valves – Stop logs, Penstocks, squeeze off, Bungs, Sandbags, Line Stops, Freezing etc)
- Pumping systems installations (e.g. over pumping, process pumping, bypass pipework, bagging, fluming, maintaining supply / service etc)
- Pneumatic systems, e.g. compressors for surge vessels etc
- Process plant installations (Screens, compressors, blowers, De-grit, sludge, filters, dewatering etc, plus all ancillaries, e.g. valves, filters, pipework, supports etc)
- Pipe supports
- Valve supports

14. Electrical, Instrumentation, Control & Automation

- Electrical installations (e.g. Welfare/cabins - temporary electrical supply, lighting, distribution, MCC's, motors etc), including cable routing & management
- Security equipment installations
- Earthing systems (Power, instrumentation & lightning etc)
- Power supplies (Transformers, generators, UPS', mains supplies etc)
- Instrumentation (Flow, level, temperature, pressure & analytical instrumentation etc)
- Control & monitoring equipment (Process control, PLC's, SCADA, Comms systems & Telemetry etc)
- Cathodic protection equipment
- Protection systems (Fault current, overload, earth leakage, EM stops, IS barriers etc)
- Power supply changeover systems (mains / generator & export considerations etc)
- Power quality filters and power factor correction equipment etc

15. Process

- Temporary process equipment (e.g. Chemical dosing, centrifuges, monitoring instrumentation, filters, screens, dewatering, UV, De-Chlorination, blowers etc)
- Package process plant (HSAF, NSAF, Nano filters, OSec, De-watering, reactors etc)
- Sampling equipment & activity