Temporary Works
Part Two

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Temporary Works Part Two

Further principles of design and construction

Edited by
Ray Filip

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Dedication

This book is dedicated to the memory of Peter Pallett and Stuart Marchand, both of whom contributed so much to temporary works over the last five decades and have left us too soon.

Peter was my mentor, colleague and friend. He was Technical Manager for Rapid Metal Developments for many years, a member of the British Standards Institute technical committee responsible for BS 5975 from 1977 onwards, a founding member of Temporary Works Forum, Fellow of the Institution of Civil Engineers and Fellow of the Concrete Society. Over the last 30 years, he trained numerous temporary works coordinators in many countries. Initially I did a temporary works training 'double-act' with Peter, whereby he taught 'above-ground' and I taught 'below-ground'. Peter was involved in many technical publications and was a Law Society expert witness. I collaborated with Peter on many publications and co-edited part 1 of this publication. His attention to detail was second to none and he taught me so much.

Stuart was founder and Managing Director of Wentworth House Partnership, also a long standing member of the BS 5975 technical committee and a founding member of Temporary Works Forum. He was a mentor to many young engineers and contributed to numerous industry publications, including previous versions of this publication. Stuart was my friend for 20 years and over the years I jointly worked on many publications with him, benefiting from his knowledge and experience.

Peter and Stuart were both 'go to' people for complex engineering problems and questions.

The editor, chapter authors and whole temporary works community would like to commemorate the memory of our much-respected colleagues Peter and Stuart and thank them for their contributions. They were pioneers and made us all proud to call ourselves 'temporary works engineers'. They are truly irreplaceable and will be missed.

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Foreword

Temporary works have always been, and remain very much, a key stage in the safe delivery of construction projects, whether they be a simple shallow excavation in the ground or a complex multi-location project like HS2. How much people are aware of this, or provide due regard and early consideration of it, is still up for debate amongst many professionals. Comments heard over the years, like 'temporary works are something the contractor has to consider', 'our insurance dosesn't cover temporary works', or the long-lived 'we've always done it like that in the past', are not appropriate in a modern industry. Neither were they appropriate in the past, but they have all too often been inappropriately used.

Our industry has improved for the better. The large-scale temporary works collapses and failures of the 1960s and 1970s are now a relatively rare occurrence in the UK construction sector. The continuing development of BS 5975 has led to improvements in the way temporary works are designed, built, inspected, used and removed. That is not to say that near misses and close calls haven't occurred, and we should all learn from them.

Those involved daily in the field of temporary works often mutter phrases such as 'why has the permanent works designer done that?', 'surely the contractor knew this had to be carried out in a directed sequence?' and 'well, it was obvious that would happen, wasn't it?'. It's at those in the wider industry that the shared experience and knowledge contained within this book is aimed, as well as practising temporary works professionals. The intent and purpose of this book align very much with the objectives of the Temporary Works Forum which are as follows:

- Give authoritative guidance and, when required, professional leadership to the industry.
- Consider aspects of permanent works and interfaces between permanent works and temporary works, as are relevant.
- Consider both current practice and likely development.
- Be aware of trends and innovations in design, construction and use.

Continuing professional development should be something that we all strive for, not just for our own benefit but for the benefit of those working on projects with us, the members

of the public impacted by our works during construction and those after completion. This is very much aligned with one of the principles of the Health and Safety at Work etc. Act and very much with the broader principles of the Construction (Design and Management) Regulations ('CDM'). This revision and update builds on the original chapters while adding further areas of knowledge and shared wisdom, not just to enhance our engineering knowledge but to share key and important issues with the wider construction community.

This publication is not just aimed at temporary works specialists, but anyone involved in the temporary works process who would like further information. It should be read in conjuction with *ICE Temporary Works: Principles of Design and Construction*, 2nd edition. The definition of temporary works covers a wide scope of items and the information provided is relevant to all sectors of the construction industry (civil engineering, building, demolition, utilities etc.).

My thanks go to all those involved, directly and indirectly, in sharing valuable experience.

Robert Millard
Managing Director, De Construction Solutions;
chair, Temporary Works Forum, UK

Preface

Temporary works is a wide subject which covers all aspects of the construction industry. It has developed and continues to develop with an increasing awareness of its importance. I have been involved in temporary works now for over 35 years and have seen many changes. Perhaps the most satisfying is the positive change of status of temporary works for the engineers and other professionals involved. Temporary works is now recognised as a separate specialist subject which requires a set of unique skills, perhaps above all 'practicality' – knowing what solution 'will work' effectively and safely. I have been fortunate to have worked for, collaborated with and known some outstanding engineers, from whom I have learnt so much.

The inquiry into the Grenfell Tower disaster highlighted many failings across the construction industry and regulatory framework. Competence of organisations and individuals was identified as a significant issue. Knowing what you are competent in and being able to prove and maintain / develop that competence are vitally important. Considering this, there is some concern amongst senior members of the temporary works community due to changes to the attributes of professionally qualified membership (Chartered Engineers), whereby 'designers' no longer require 'site experience'. For example, the site experience requirement was removed by the Institution of Structural Engineers (IStructE) and Institution of Civil Engineers (ICE) a few years ago.

The IStructE criteria for the 'Construction' core objective are (from IStructE website):

The candidate must demonstrate that they have gained experience of:

- construction techniques, construction plant and machinery
- designing, specifying or reviewing temporary systems
- reviewing construction programmes and construction sequencing
- reviewing or producing fabrication or shop drawings
- erection methodologies
- identification and correction of potential errors
- how their observations of construction / fabrication have informed their approach to design / buildability.

ICE criteria include (from ICE website):

- Understanding and Practical Application of Engineering.
- Maintain and extend knowledge of engineering theory and practice, and how technology assists its application.
- Identify, review and select techniques, procedures and methods to undertake engineering tasks.

This would appear to be at odds with:

- requirements for continuing professional development
- Construction (Design and Management) Regulations 2015 - Part 3 - Section 9 - Duties of designers
- Management Regulations - Schedule 1 - General Principles of Prevention
- ICE attribute: for all professional grades to have an understanding and practical application of engineering and to exercise sound engineering judgement.

If a designer has not had first-hand experience of the site environment, site risks and the construction process, they are likely to lack the awareness of how to minimise their design risks and how to produce a buildable scheme. This could directly result in impractical, inappropriate, unsafe and poor value designs. A design which properly addresses design and construction risks is one that is both practical and safe and can be considered as 'buildable'. Site is where design buildability is tested. Without site experience one of the two components of competence (experience and knowledge) is compromised. This therefore compromises the ability to produce a design that is both practical and safe.

Anyone who considers themselves to be a competent, well-rounded designer should have direct hands-on experience of site working practices and have an insight into practical issues and conditions prevalent in the construction environment. Furthermore, site experience is considered by many to be an essential attribute for a temporary works designer and needs to be maintained throughout their career.

The editor, in conjunction with Temporary Works Forum (TWf), has been carrying out research into temporary works accidents and near misses (see chapter 18) and

capturing / recording senior temporary works professionals' experience. One of the legacy questions we asked was:

> What advice would you give to a young engineer wanting a career in temporary works?

The most common type of answer that was given was:

> Get site experience first to understand how things are built and the risks involved in working on site.

Finally, section 6 of the Bragg Report states:

> the effectiveness of training depends on its integration with experience on site… The Institution should accept that an essential qualification for corporate membership should be proven awareness of the importance of safety and safe working.

Ray Filip BEng (Hons) MSc DIC CEng FICE
Managing Director, RKF Consult Ltd, UK

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Acknowledgments

I would like to thank all those authors who contributed and shared their experience in the production of this book. I would also like to thank all those who contributed to my research in chapter 18 and the Temporary Works Forum legacy project (this work will continue after this book is completed and will be made publicly available).

Finally, I extend my thanks to: Chris Bennion, Godfrey Bowring, Ben White, Bill Hewlett and Ben Beaumont for their advice and help at various stages during the production of this book.

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About the editor

Ray Filip BEng (Hons) MSc DIC CEng FICE
Managing Director, RKF Consult Ltd, UK

Ray is a Chartered Civil Engineer and Fellow of the Institution of Civil Engineers, with over 35 years of experience in temporary works. Educated at University of Surrey and Imperial College, London, he spent the first 18 years of his career working for major contractors and specialist subcontractors in the UK and Southern Africa. He was involved in various aspects of temporary works, including design, design checking, pricing, construction and inspection. In 2007 he formed his own specialist temporary works consultancy, RKF Consult Ltd. He has had the roles of Designated Individual, Temporary Works Coordinator and Temporary Works Supervisor at various points.

Ray has designed numerous items of temporary works and advised many UK and international organisations on temporary works procedures, design management and risk management. He also carries out site audits and inspections and is regularly consulted by the Health and Safety Executive on temporary works issues. He has provided a wide variety of temporary works and other technical training courses to organisations in the UK, a number of European countries and Australia.

Ray has been involved in producing technical publications for Construction Industry Research and Information Association (CIRIA), The Concrete Society, Contractors Plant-Hire Association, Deep Foundations Institute and Institution of Structural Engineers. Since 2016 he has been a member of the committee responsible for the British Standard on temporary works (BS 5975).

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About the contributors

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Nick Cook
Formerly with Laing, Laing O'Rourke and Balfour Beatty (now retired), Nick has been designing and involved with temporary works in heavy civil engineering for 49 years. His work has included temporary steel structures, such as specialist lifting equipment, slipform shutters, loading and access platforms, excavation supports, façade retention, lifting and moving systems. Projects have included British Sugar silos, Sizewell B, Cardiff Principality Stadium, Second Severn and Oresund Crossings, Heathrow Terminal 5 and Crossrail, to mention a few.

Professor Colin Eddie FREng BSc (Hons) CEng FICE
Colin is an internationally recognised expert in tunnel design and construction with over 40 years of experience. He has a deep understanding of various tunnelling methods and ground improvement techniques. As the former Engineering Director at a major UK tunnelling contractor, he has contributed significantly to the sector by developing numerous innovations in tunnelling and underground space which have been credited with improving the safety, efficiency and sustainability of many recent major projects. Today he and his organisation (CECL-Global) provide expert support and advice to an international client, and he manages an active research and development programme.

Matthew Hall BA (Hons) MA PhD
Matthew is Director of Technology at Richter, heading up the development of their in-house autonomous design generation tools. He is dedicated to a career of innovation within temporary works and is driven by a mission to reduce harm on site while maintaining fully engineered and optimised solutions. Matthew spent much of his career at Costain as a temporary works designer and found his passion for driving

such initiatives while on site as a temporary works supervisor. Since graduating with a PhD from Swansea University, he hopes to further innovate the developed streamlined processes with the Richter in-house tools by incorporating finite element analysis with a rapid modelling interface, creating new suites of tools targeted directly at the swift delivery of onsite temporary works design support.

Sam Hurst MEng CEng CEnv MICE
Sam has over a decade of experience as a Chartered Civil Engineer and Chartered Environmentalist. He has a proven track record in leading sustainability initiatives and implementing carbon reduction strategies on large-scale projects, particularly within the infrastructure sector. Sam's expertise extends to temporary works design and construction, where he champions the integration of sustainable practices. He is a recognised authority in his field, contributing to writing multiple guidance notes and 'how-to guides' on low-carbon temporary works and construction practices. He is a Senior Sustainability Engineer.

Jan de Klerk BSc MSc CEng MIMechE
Jan started his engineering career in 2011 at TWD in the Netherlands. In 2019 he moved to the UK to help set up the UK branch of TWD and is currently the technical lead there. Over the years he gained extensive experience in designing working methods, equipment and temporary works for the installation of a wide variety of projects in the marine civils and offshore industry.

EUR ING Ronan O'Driscoll BEng (Hons) MSc CEng IntPE(UK) MICE MIMechE MIStructE LCGI DIS MNucl
Ronan is a Chartered Engineer with over 25 years of experience in construction engineering, specialising in temporary works. He is the temporary works lead on the Hinkley Point C construction project, ensuring compliance with BS 5975 standards. Ronan has worked on a variety of projects, both managing and delivering temporary works on site as well as designing temporary works and management off site. Ronan regularly shares valuable industry insights on LinkedIn. He authored *Construction Engineering – A Guide to Temporary Works in Construction & BS 5975:2019*, which he has shared freely to benefit the industry since December 2022.

Jeff Mahony BEng (Hons) CEng EUR ING FIEI FICE
Jeff is Head of Temporary Works for the HS2 (S1/S2) project which, when it was started, was considered the largest infrastructural project in Europe. With over 27 years of experience in major civil engineering projects throughout the UK and Ireland, his experience extends from major road and rail schemes, major pipelines, significant demolition works in the centre of London to time in the military as an engineer officer. The last 12 years of his career have been completely dedicated to the temporary works industry, most of which have been with Costain. Passionate about innovation, he has led various improvement projects in temporary works within the HS2 programme, along with intercompany reviews and improvements at Costain. He is also heavily involved with the Temporary Works Forum on a regular basis and has recently chaired a working group for the 'Design and Construction of Granular Working Platforms for Construction Plant'.

Robert Millard BEng (Hons) MSc CEng MICE MIDE
Rob is Managing Director of De Construction Solutions and the current Chair of the Temporary Works Forum (since June 2022), having previously been a director of the board. With 26 years of experience across many sectors of construction, he has spent the last ten years providing specialist engineering support to the demolition, enabling and construction fields. In addition, through the development and delivery of temporary works courses, Rob is able to provide relevant and up-to-date learning opportunities in the field of temporary works. More recently his SKEB has been put to further service to clients, providing expert witness support involving demolition engineering, temporary works and construction practices.

Dr Henry Pairaudeau MA MEng PhD CEng MICE
Henry has over 14 years of experience in engineering design, management and research for major infrastructure and tunnelling projects. His major project contributions include the Lee Tunnel, Thames Tideway West and the UK's Geological Disposal Facility for radioactive waste. Recently, he has completed a PhD at the University of Warwick, researching novel materials for tunnel linings.

Martin Pike MSt MEng CEng MICE
Martin is a Chartered Civil Engineer with over 20 years of experience in the construction industry. With expertise in technical engineering, prefabrication projects, and health,

safety and quality management, Martin has contributed to the successful delivery of high-profile projects, including airports, data centres and residential developments. As an Associate Director at Mace UK, he has led the development of innovative construction methodologies, particularly in off-site manufacturing, ensuring value and efficiency. His practical problem-solving approach and knowledge of temporary works and concrete structures have been key to delivering successful outcomes.

Malachy Ryan BEng MSc CEng MICE
Malachy is a Chartered Civil Engineer and serves as the Strategy Director at Alan White Design in Scotland. With a wealth of experience, Malachy has held the role of ICE Supervising Civil Engineer and previously served as a Director of the Temporary Works Forum. Malachy's expertise extends to his past involvement as a committee member of BSI B/525/9, focusing on the structural use of aluminium. He holds a master's degree in concrete technology from the University of Dundee, further enhancing his knowledge in the field. Over the span of 15 years, Malachy has made significant contributions to the temporary works industry.

Simon R Smith CEng FICE FIStructE DipEM FFB
Simon is Managing Director of Contractors Design (CDS) Ltd, which he established in 2000. CDS has now become a well-established business offering a wide range of engineering design services in the fields of demolition, geotechnics, building refurbishment and basements, together with all facets of temporary works. Simon has over 40 years of experience in the construction industry, most of which have been acquired in the management and design of temporary works.

David Thomas MSc BSc (Eng) AKC CEng FICE CFIOSH MInstRE
David is a Chartered Civil Engineer and a Chartered Safety and Health Professional. Largely retired now, his career has included engineering and management consultancy, enforcement, contracting and promoting industry best practice. He has provided support and advice on work at height and the management of temporary works. David was a Director and Company Secretary, Temporary Works Forum from 2014 to 2023. He worked at the Health and Safety Executive (1997 to 2007) and was latterly an HM Principal Specialist Inspector of Health and Safety (Construction). He was SHE Director

at William Hare Ltd (2007 to 2011), a global leader in engineered steel solutions. In 2023 he was awarded the Garth Watson Medal by the Institution of Civil Engineers (ICE) for dedicated and valuable service in the field of temporary works and the whole of the civil engineering industry, and in 2024 was awarded the Darren Saffill Lifetime Achievement Memorial Award by the Northwest Construction Safety Group. He is the Director of Heightsayfe Ltd. He is also trustee of No Falls Foundation.

Mike Webster BEng MSc PhD DIC CEng FICE FIStructE
Mike is a chartered engineer with over 30 years of experience and the Director of MPW R&R Ltd. He specialises in CDM, construction and structural safety and provides consulting, forensic and expert witness services in those areas. He is a member of the Temporary Works Forum, the Institution of Structural Engineers' Health and Safety Panel, Structural-Safety and CROSS (the panel for Collaborative Reporting for Safer Structures). Mike has led independent evaluations of CDM 1994 and CDM 2007 and, in 2021, was appointed by HSE to lead a review of the CDM 2015 Principal Designer role. Mike frequently acts as an expert witness following collapses and other problems on construction sites (including temporary works) and has been instructed by both prosecution and defence teams.

Steve Williams BEng (Hons) CEng FIStructE FICE MPWI
Steve is a Buildings and Civils Engineering Expert for the Technical Authority in Network Rail. He has played a pivotal role in the design, execution and assurance of numerous projects for over 35 years in various sectors of the construction industry. His specialisms include the structural engineering of building and civil engineering structures, and the management of temporary works interfaces to ensure efficient design and construction in the railway sector. He leads Network Rail's Health & Safety by Design Buildings and Civils Working Group. He is actively involved in many forums, panels and initiatives, including the Temporary Works Forum, Collaborative Reporting for Safer Structures UK (panel expert), Institution of Structural Engineers' Design Practice and Structural Safety Committee (panel member) and the Get It Right Initiative.

Kit Yardley
Kit has a career in the design of temporary works spanning five decades, with George Wimpey, Laing and Laing O'Rourke.

He has designed a large variety of temporary works elements on projects such as National Bank of Dubai, Houses of Parliament Victoria Tower refurbishment, Sizewell B NPS, Second Severn Crossing, Cardiff Principality Stadium, A55 North Wales and Edinburgh Airport Control Tower. He is now semi-retired and but still delivers temporary works training.

Ray Filip
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Chapter 1
Introduction, understanding temporary works duties and recent updates

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1.1. Introduction

Temporary Works: Principles of Design and Construction, 2nd edition (Pallett and Filip, 2019) is now six years old. Most of the information provided in the second edition is still relevant and valid today. This publication should be read in conjunction with the second edition, as the aim is to provide relevant updates and expand the information by providing 18 new chapters, covering subjects which were not included in the second edition. It further highlights the wide variety of items and subjects under the heading of 'temporary works'. This book summarises and signposts existing guidance and information available into a single document for easy use and reference. In addition, some of the existing guidance and information is now several decades old so, where appropriate, technical updates and personal experience have been added. This publication also provides some pertinent learning from Temporary Works Forum (TWf), recent major projects such as Hinkley Point C and High Speed 2, as well as many smaller projects.

The construction industry continues to evolve, and this book considers important trends which can affect temporary works, such as modern construction methods and the increasing use of digital technology and artificial intelligence. Finally, across society, there is an increasing awareness and concern regarding the detrimental effect that humans are having on our planet and this publication highlights how we should consider sustainability and the environment for temporary works purposes.

1.2. Continuing industry changes

It is now 50 years since the publication of the Health and Safety at Work etc. Act (HMG, 1974) and almost 50 years since the publication of the Bragg Report (Bragg, 1975) (see 2nd edition, section 1.2). The last half century has seen significant changes in the construction industry and both these documents have contributed to significant improvements in overall health and safety performance. However, temporary works failures are still commonplace and often catastrophic. Chapter 18 of this publication explores some of the common reasons for temporary works incidents, near misses and failures. It includes a summary of issues obtained from the Health and Safety Executive records, personal archives and responses to a questionnaire received from eminent temporary works engineers, who between them have extensive temporary works experience and knowledge.

Section 1.2 of Pallett and Filip (2019) highlighted some industry changes that have occurred since the early 1970s. The following may also be added as of result of further evolution in recent years (including the evolution of legislation):

- Temporary works has traditionally been seen as the domain of principal / main contractors and some specialist subcontractors (concrete frame subcontractors, groundworkers etc.). There is an increasing realisation that many other specialist sectors are involved in temporary works, such as mechanical / electrical contractors, process engineering (oil / gas sectors), utilities and building maintenance contractors. There continues to be an increasing level of awareness of the important roles and responsibilities for those involved in the management of temporary works (see section 1.3).
- There is a continued drive in the industry towards offsite manufacture, prefabrication, standardisation of components and automation, with elements being assembled on site, rather than traditional construction techniques using traditional construction skills.
- The traditional role of main / principal contractor, utilising their own in-house equipment, plant, labour and temporary works design skills, has continued to diminish. These contractors seek to divert risk and duty downwards and manage package subcontractors with their own specialist skills (including specialist temporary works design and construction). The common name for this is management contracting.
- The development and utilisation of specialist technology (software, digitalisation, automated equipment etc.) in the construction industry and its use for temporary works purposes. Technology is rapidly developing and evolving at an ever-increasing rate. It could be argued that the construction industry is struggling to keep up with and embrace some of these developments, especially when compared to other industries, such as manufacturing or pharmaceuticals.
- Relatively large independent temporary works design consultants now offer a wide variety of professional services to multiple contractors. However, it should be noted that relevant professional indemnity insurance is becoming increasingly costly and comes with significant exclusions (CROSS, 2021 and TWf, 2022a).
- There is some continued development in awareness of clients, principal designers (TWf, 2017 and Webster, 2023) and permanent works designers of their duties relating to temporary works (it could be argued that progress is relatively slow – see section 1.4 and chapter 2). Also, increasingly permanent works designers are recognising the opportunity

to develop their business model by offering a temporary works design service, thereby creating a 'one stop shop'. However, as mentioned in section 1.2(e), there can be issues with professional indemnity insurance.

- The construction industry is taking steps towards a more sustainable, reusable, considerate and environmentally aware future. Temporary works cannot be excluded from this ambition, but the overall rate of progress has been relatively slow and further positive action is becoming increasingly critical.
- The construction industry is international, with UK companies having to compete against multinational companies. In the UK domestic market there is an increasing choice of international organisations offering a wide range of specialist services, products, equipment and labour for temporary works purposes.
- Since the worldwide Covid pandemic of the early 2020s, working practices are changing. Flexible and remote working are becoming increasingly commonplace, along with the use of remote meetings and training. The construction industry is starting to embrace these opportunities but must also be aware of the limitations (reduced mentoring / supervision and less hands-on experience).

1.3. Awareness of temporary works and management roles

There is an increasing awareness of the importance of temporary works to the safe, efficient and successful completion of a project. BS 5975 Parts 1 and 2 (BSI, 2024a, 2024b) are widely recognised in the UK and referred to around the world – for example, Eire, Australia and New Zealand. Many organisations around the world now follow the general principles of BS 5975.

Temporary Works Forum (TWf) has now been in existence for 15 years and membership in the UK continues to increase. Members are now not only from Tier 1 contractors but include a wide range of organisations with an interest in temporary works (e.g. clients, equipment suppliers, specialist subcontractors, designers, academia). TWf has been recognised by the Institution of Civil Engineers (ICE) as a 'specialist knowledge society' and continues to produce specific guidance and provide a focal point for all matters relating to temporary works. Also, there are now several active TWf branches around the world (the original group started in London), including Australia, New Zealand and Hong Kong. TWf has links with international organisations such as the American Society of Civil Engineers (ASCE) to share knowledge and experience.

The importance of the specific management roles recommended by BS 5975 (BSI, 2024a, 2024b) have been recognised. There is now a series of widely recognised training courses (for temporary works coordinators and temporary works supervisors) administered by Construction Industry Training Board (CITB), with a transferable qualification, granted following the successful completion of an examination. However, it should be stressed that the qualification alone does not infer competence of an individual and should be part of a wider overall assessment of competence, which includes specific experience and knowledge of temporary works and personal attributes. TWf has also started to produce a series of e-learning modules, which are available for all. Some training providers also provide temporary works design courses.

In 1975 the Bragg Report (Bragg, 1975) made a recommendation (number 20) to include 'falsework' in university civil engineering design courses; over the years the uptake on this has been slow (this recommendation is also included in BS 5975-1 (BSI, 2024a, clause 4.2). Temporary works subjects are increasingly being taught at universities in the UK (such as Swansea University), offering specific temporary works modules or carrying out research into temporary works issues. Individual companies and TWf provide funding for research and offer sponsorship to courses and student scholarship.

1.4. Understanding temporary works duties and responsibilities

It is accepted that a suitable temporary works management procedure plus trained and experienced personnel are a good starting point for demonstrating legal compliance. However, across the construction industry there continues to be some confusion regarding these legal obligations and duties relating to temporary works. The term 'temporary works' is rarely explicitly mentioned in law or general regulations or contracts; however, they can be implied. It is important to differentiate between criminal law and contract law, whereby criminal law (such as health and safety laws and duties) take precedent over civil law (such as contracts and contractual duties – i.e. client requirements). A client cannot attempt to contract out of their legal duties or require an individual or organisation they employ to break the law. Figure 1.1 is an overview of the hierarchy in the UK.

Pallett and Filip (2019) section 1.7 provides further information on contractual obligations.

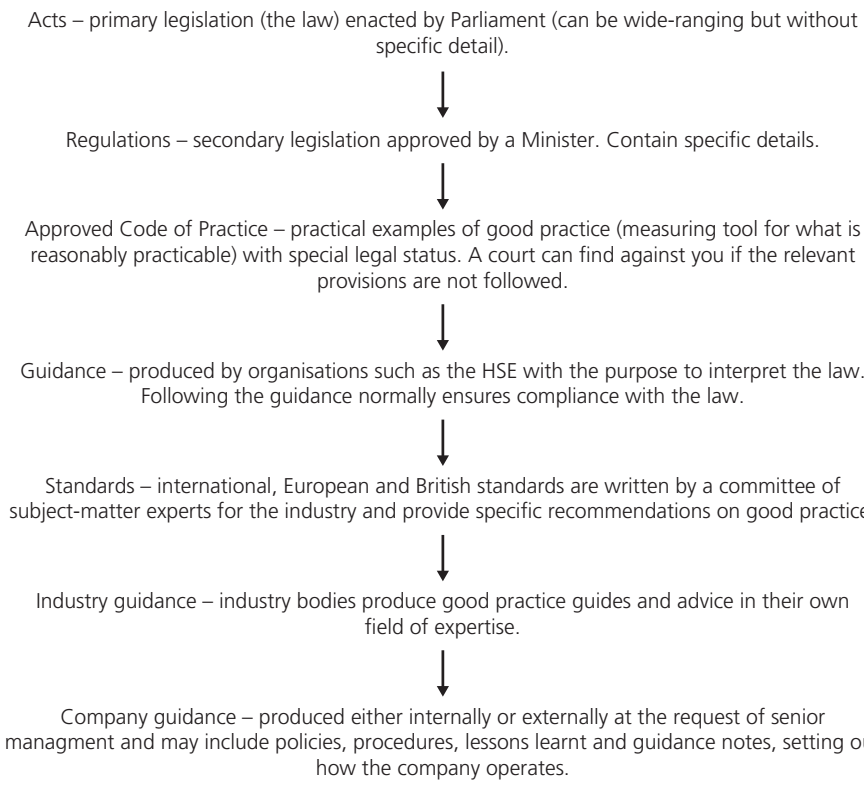
The Health and Safety Executive (HSE) is tasked with enforcement (Office of Rail and Road undertakes this role for rail construction projects and Office for Nuclear Regulation undertakes this role for nuclear construction projects) and their inspectors focus attention on ensuring that appropriate temporary works management procedures are in place, commensurate with the scale and complexity of the project and the construction risk involved. HSE inspectors can issue an improvement notice, a prohibition notice, seize, render harmless or destroy dangerous items and can ultimately prosecute. If there is a material breach the HSE will charge a 'fee for intervention' at an hourly rate.

It is essential that roles, duties and responsibility are clearly identified, clarified, assigned and communicated to avoid ambiguity and confusion and to improve operational efficiency. A spreadsheet (matrix) can be created covering the headings of: responsible, accountable, consulted and informed (RACI) (see TWf, 2019a), with the various stakeholders listed on an organisational project-wide and individual level.

Note on definitions:

- Duty – an obligation or commitment that someone must fulfil in accordance with laws, regulations or conventions and is performed for the 'greater good' rather than for 'self-interest'. Duty is often an integral part of any role and cannot be transferred to other parties.
- Responsibility – being accountable, the act of accepting and acting on an assigned task to achieve a desired result; these actions may be voluntary.

Figure 1.1 Hierarchy of control documentation (editor's own)



1.4.1 Legal obligations and requirements (Acts)

If in breach of part of an Act, then the individual or organisation can be prosecuted (legal criminal action). Table 1.1 provides some examples of Acts which can directly or indirectly relate to temporary works.

1.4.2 Regulations

Regulations usually accompany HSWA but can include those accompanying European Directives (now part of UK law). If in breach of part of a regulation, then the individual or organisation can be prosecuted (legal criminal action). Table 1.2 provides some examples of regulations which can directly or indirectly relate to temporary works.

1.4.3 Standards / codes of practice / guidance

Table 1.3 contains examples of standards and organisations that have an influence or interest in temporary works. They produce good practice recommendations and specific guidance. Following these recommendations is a reasonable course of action under law. However, it is not obligatory to follow these recommendations (free to take other actions) but, if something goes wrong, they may be used in evidence against you in court and you would have to justify

Table 1.1 Some Acts which can relate to temporary works

(HSWA) Health and Safety at Work etc. Act 1974 (HMG, 1974)	HSWA does not specifically mention temporary works (temporary works is implied) but it gives general duties relating to health and safety: ■ duties on employers in relation to employees and the public ■ duties on suppliers in relation to their services and products ■ duties on employees not to risk themselves or others (i.e. employers must manage their work safely and hence by implication they must manage temporary works safely). Most of the duties are qualified by the principle of 'so far as is reasonably practicable' whereby there is balance between feasibility and cost.
Corporate Manslaughter and Corporate Homicide Act 2007 (HMG, 2007)	This Act was created to overcome limitations of the common law offence of 'gross negligence manslaughter' as applied to companies. It clarifies the criminal liabilities of an organisation (corporate liability) where the way in which its activities (including temporary works) are managed or organised cause a person's death and amounts to a gross breach of a relevant duty of care owed by the organisation to the deceased. Individuals (e.g. directors and site managers) could still be prosecuted for other health and safety offences (e.g. gross negligence manslaughter).
Health and Safety Offences Act 2008 (HMG, 2008)	See Pallett and Filip (2019) section 1.6 for summary.
Building Safety Act 2022 (HMG, 2022a)	See section 1.5.1

Table 1.2 Some regulations which can relate to temporary works (continued on next page)

Lifting Operations and Lifting Equipment Regulations 1998 (HMG, 1998a)	Place duties on organisations and individuals who own, operate or have control over lifting equipment. Such equipment is often used for temporary works purposes.
Provision and Use of Work Equipment Regulations 1998 (HMG, 1998b)	Requires that any equipment provided for work (including temporary works equipment) is suitable for its intended purpose, safe, well maintained, inspected to ensure it does not deteriorate with use and persons using the equipment are provided with adequate training and information.

Table 1.2 Continued

Management of Health and Safety at Work Regulations 1999, amended 2003 and 2006 (HMG, 1999)	More explicit guidance given to employers on management of health and safety (under HSWA) and requires employers to make suitable and sufficient assessment of risks to employees and those not in their employ who may affected by their work and to record the significant findings and implement the risk control measures identified. General principles of prevention are to be applied.
Work at Height Regulations 2005 (HMG, 2005)	To adequately plan any necessary work at height and control risks to prevent death and injury caused by falls from height. It is common for temporary works to provide protection from falls from height (e.g. temporary edge protection systems). See Pallett and Filip (2019) section 1.5 for summary.
Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 2013 (HMG, 2013a)	Accidents and certain dangerous occurrences relating to temporary works activities may occur and may need to be reported; records of such accidents are to be kept.
Construction (Design and Management) Regulations 2015 (HMG, 2015)	Requires that health and safety is managed through all stages of a project from conception, design, construction, maintenance to demolition. Introduced a series of specific duty holder roles. Contractors must plan, manage and monitor construction work (this includes permanent and temporary works). Principle contractors are also required to coordinate the construction work. See Pallett and Filip (2019) section 1.4 for summary and chapter 2 in this publication.

Note: for secondary legislation (regulations) the duties may be qualified by 'so far as is reasonably practicable' or 'practicable'.

Table 1.3 Some standards and organisations which produce guidance relating to temporary works (continued on next page)

Health and Safety Executive (HSE)	National regulator responsible for preventing workplace deaths, injuries and illness. Provides specific advice, guidance and information to influence workplaces and raises awareness of issues. Information helps interpret the law, helps with compliance and provides technical advice. Undertakes targeted inspections and investigations and prosecutes when necessary. Includes a specialist construction division.

Table 1.3 Continued

British Standards BS 5975-1:2024 and BS 5975-2:2024 (BSI, 2024a, 2024b)	Provides overall good practice recommendations on how to manage and design temporary works (see section 1.5.2).
Construction Industry Research and Information Association (CIRIA)	Public bodies whose activities are defined by statutory instruments and many others set up as charitable organisations.
Building Research Establishment (BRE)	Undertake research and publish guidance and warnings on specific subjects or products, many of which will be directly related to temporary works.
Temporary Works Forum (TWf)	Some members provide training courses.
The Concrete Society (CS)	
Steel Construction Institute (SCI)	
The Concrete Centre (TCC)	
Office for Nuclear Regulation (ONR)	Set up under the Energy Act (HMG, 2013b) as the UK's independent nuclear regulator with legal authority to regulate security and safety and to ensure high standards during construction and operation of nuclear facilities and environmental protection of nuclear waste.
Office for Rail and Road (ORR)	Non-ministerial government department responsible for the economic and safe regulation of Britain's railway network. ORR regulates Network Rail's (NR) activities and funding, regulates rail network access and licenses operators of railway assets. ORR regulates competition on the railway network and enforces consumer protection law.
Institution of Civil Engineers (ICE) Institution of Structural Engineers (IStructE)	The ICE, IStructE and other professional bodies are centres of excellence and provide industry voices which maintain relevant professional standards and award professional qualifications.

that what you were doing is equal to or better than the recommendations (the onus of proof would be on you to prove compliance with the law by other means).

An Approved Code of Practice (ACoP) is approved by HSE with endorsement from the Secretary of State and has special legal status. An ACoP will describe preferred or recommended methodology or standards to be met to comply with regulations and duties imposed by HSWA.

It has been suggested that guidance, either from the government or HSE, is not legally binding, it is just 'guidance'. So, on the face of it, it is designed to afford flexibility to employers. However, the underlying reality is that the guidance is much more prescriptive in nature. Employers have to prove they have done all that is reasonably practicable, and the courts tend to judge that according (in part) to the regulatory or industry guidance as to acceptable