

HS2



SHWeLT Temporary Works

Awareness for Designers Course Launch

5th May 2020

For a better meeting experience:

- Please mute your microphones and leave your videos off
- There will be an opportunity to ask questions- please use the chat

SHWeLT

Temporary Works Awareness for Designers Course

Delivery Director



SHWeLT

Temporary Works Awareness for Designers Course

Welcome and Introductions



HS2


HS2

"Temporary Works Procedure"

Document no: HS2-HS2-CV-PRO-000-000001

Revision	Author	Reviewed by	Approved by	Date approved	Reason for revision
P01	Ed Pointer/ Colin Rawlings	Eddie Woods	John Irwin	01/04/2016	First issue.
P02	Ed Pointer	Colin Rawlings	Richard Adam	02/05/2017	Updated to BSI PAS 8811, BSI PAS 8812 and BS 5975. Other references updated. Health & Safety common text added and reference to Procedure Owner included.
P03	Meeta Sandhu	Ed Pointer	Ed Pointer	26/04/2019	Inclusion of assurance requirements and BS5975 updates.
P04	Ed Pointer/ Daniel Kendall	Eddie Woods/ David Smith	Ed Pointer	02/01/2020	Inclusion of 'CE VAP Assurance and Technical Approval' Sections.

BS 5975:2019




BSI Standards Publication

Code of practice for temporary works procedures and the permissible stress design of falsework

bsi.

Committee member copy - Do not reprod

PAS 8812:2016
Temporary works – Application of European Standards in design – Guide



hs2 engine for growth TWf bsi.



HSE

Managing health and safety in construction
Construction (Design and Management) Regulations 2015



Guidance on Regulations

PAS 8811:2016
Temporary works – Major Infrastructure client procedures – Code of practice



hs2 engine for growth TWf bsi.

Temporary Works Awareness for Designers Course

Key Contacts



Working Group Members



Temporary Works Awareness for Designers

Elements	Details
Participants	Permanent Works Designers Temporary Works Designers Temporary Works Coordinators
Locations:	MWCC JV offices or Design JV offices
Duration:	1 day per course
Group Size:	12 Nominal (3 groups of 4 or 4 groups of 3 [Min 8, Max 20])
Participant Seniority:	Senior Engineers/Principal Engineers
Facilitators:	2 No. (1 Pro + 1 from SSHELT WG)



Temporary Works Awareness Course Outline

HS2

Course Pack Outline

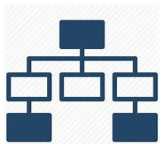


Session 1 & 2

Intro & Organisation Roles & Responsibilities

Aim and objectives of the course.

Checking current levels of awareness of **roles & responsibilities** for temporary works design. How can we **improve integration** of permanent works and temporary works on HS2?

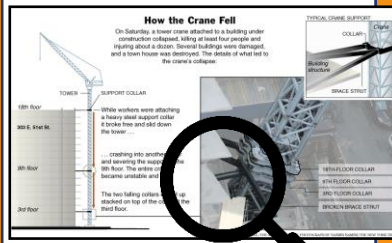


Session 3

Case Studies

What could possibly go wrong? It will be ok – won't it?

A look at **major collapses** of infrastructure around the world and the lessons learnt. Includes collapse video footage.

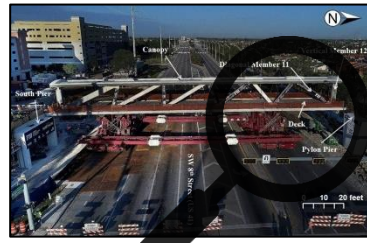


Session 4

Case Studies Group Work

Bank of 9 case studies.

How could we, as Designers, have **influenced** a safer outcome? If you were leading the design, what could you have done **differently**?



Session 5

Reducing Risk Through Design

Occupational health risks and design.

Discuss the ERIC principle and the stages in the design process at which the **control measures** apply to temporary works.

ERIC



Session 6

Standards Update

BS 5975 : 2019 New revision update on key duty holder **requirements** and **procedures** for clients, permanent works designers and temporary works designers.



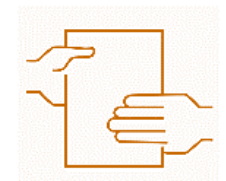
bsi.

...making excellence a habit.™

Session 7

Effective Information Transfer & Wrap Up

Look at Designer's CDM obligations and risk assessments to see if they are effective in achieving what they are supposed to. Use of Risk Registers, Temporary Works Register and SHE Boxes.

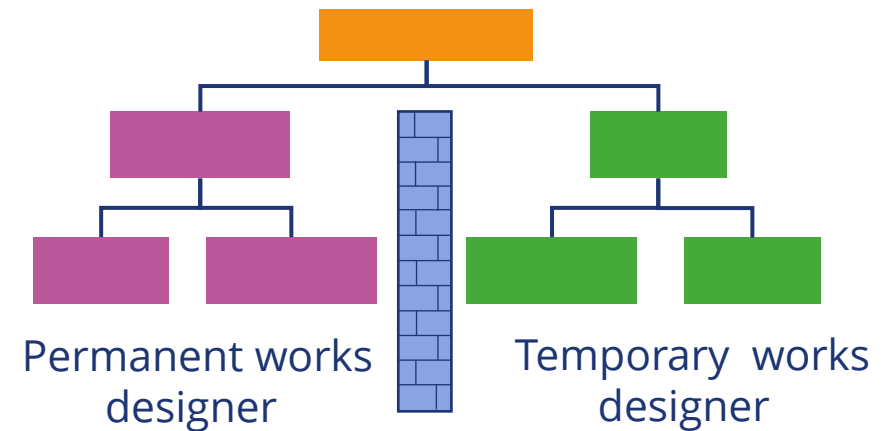


Session 2 Roles & Responsibilities



Session 2 Roles & Responsibilities

- Session looking at current levels of awareness of temporary works design management
- Do permanent works designers have a role to play or is it just “out of scope”?
- How do contractual arrangements on a project influence the integration of permanent and temporary works design?
- What are the opportunities that we have on HS2 to improve design integration and safety?



Session 2 Roles & Responsibilities

- Envisaged as an interactive session to allow designers to share knowledge and ideas
- Leads towards the need to improve the knowledge of temporary works management and awareness of how this can be influenced through permanent works design
- Highlights the opportunities within the project to remove traditional barriers within projects and improve
- Provides links to more learning resources



Session 3 Case Study Videos



Session 3 Case Study Florida International University (FIU) Bridge Collapse Miami Mar 15 2018

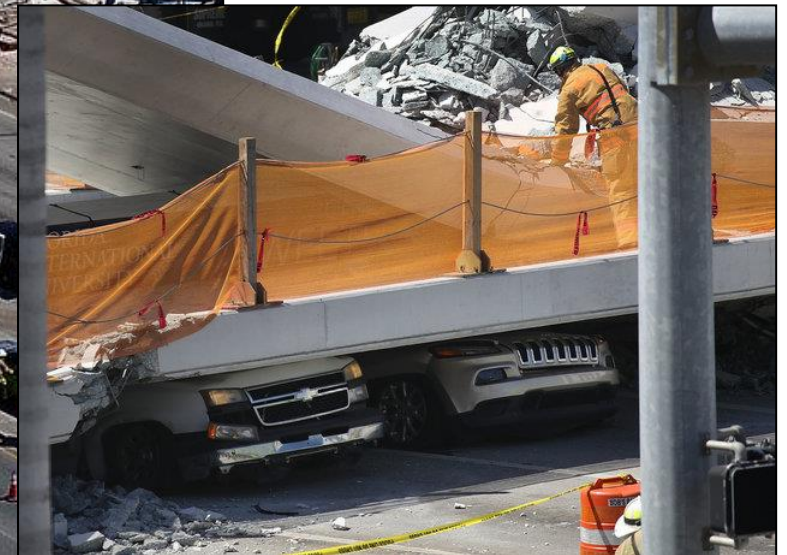


Session 3 Case Study Florida International University (FIU) Bridge Collapse Miami Mar 15 2018



6 people killed.

1 construction worker
and five in their cars waiting
underneath.



Session 3 Case Study Florida International University (FIU) Bridge Collapse Miami Mar 15 2018



- Design Axial load in diagonal strut member 11 was already very high.
- Additional stress put on when they tried to re tighten.
- This was a key connection point.
- It was under designed for both temporary and permanent loadings

Session 3 Case Study Florida International University (FIU) Bridge Collapse Miami Mar 15 2018



- Piers constructed and then span installed using SPMTs.
- Cracks appeared at diagonal member joint.
- Tensioning rods were in process of being retightened to North span when it collapsed.
- Bottom joint of the diagonal member (which contained the anchor nut for the post tensioning) failed explosively 5 days after erection.



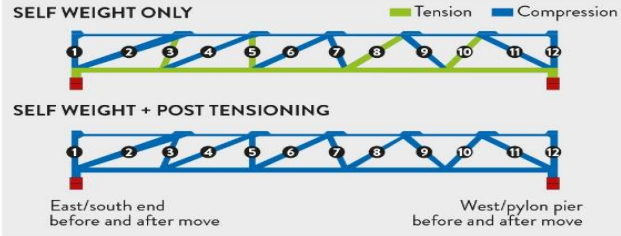
Session 3 Case Study Florida International University (FIU) Bridge Collapse Miami Mar 15 2018

FIU BRIDGE LESSONS LEARNT

PRELUDE TO THE DISASTER

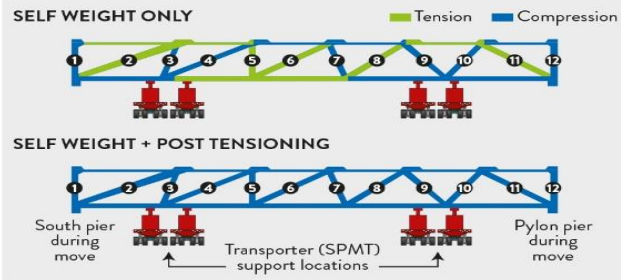
STAGE 1: IN POSITION IN THE YARD

Supported on its end diaphragms, truss members 2 and 11 are in compression. Post tensioning is correctly applied to put the bottom chord in compression also.



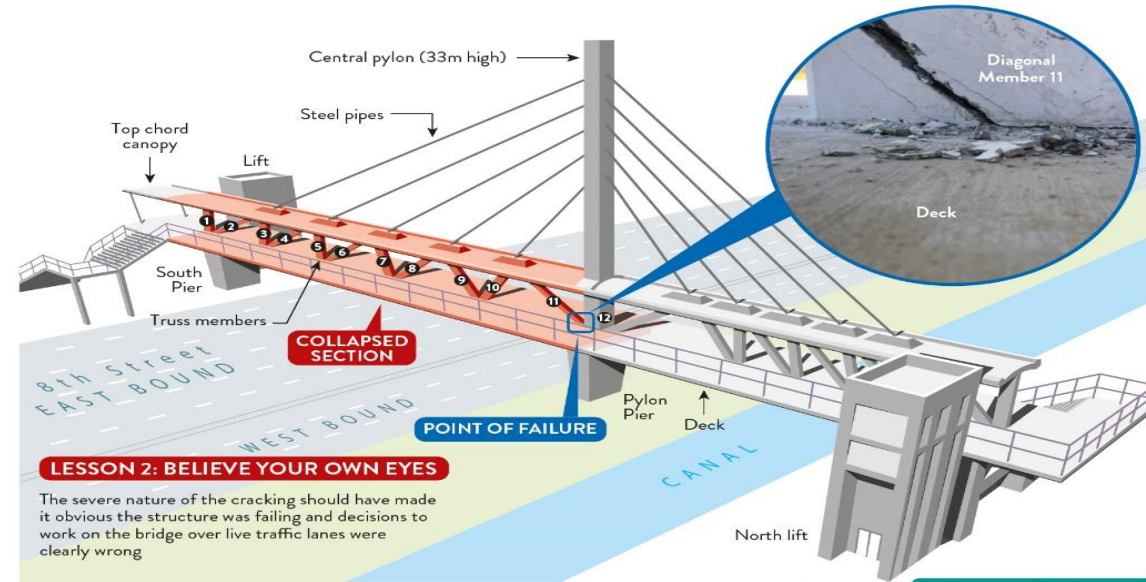
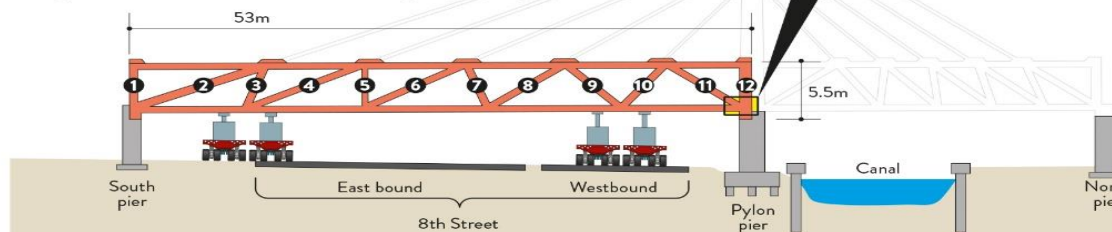
STAGE 2: PREPARING FOR TRANSPORT

Without post tensioning, members 2 and 11 would now be tension (top image) – hence temporary post tensioning is applied (all structure is now in compression).



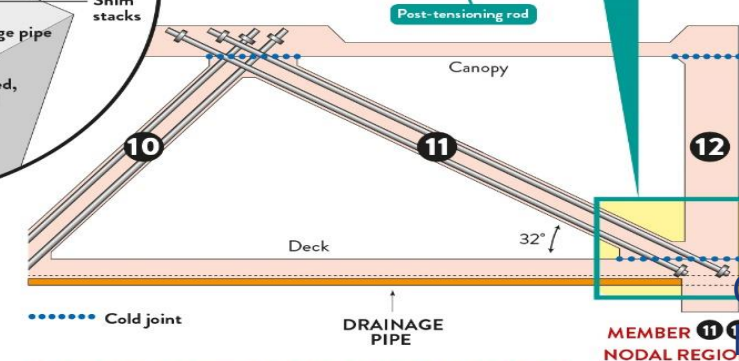
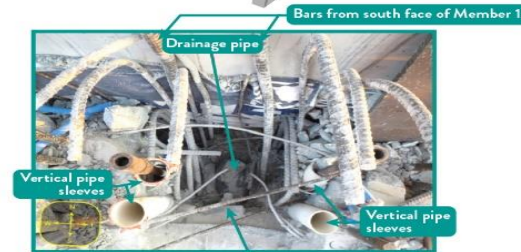
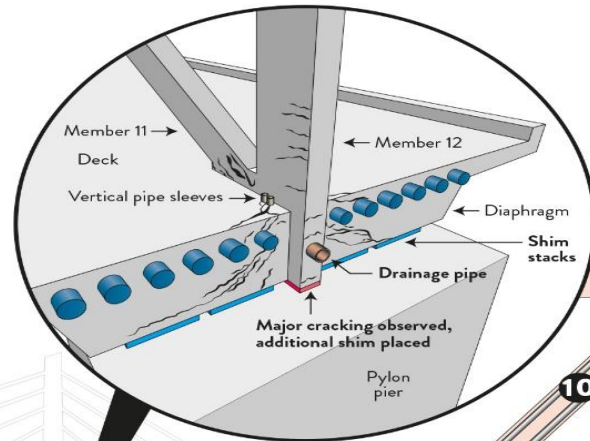
LESSON 1: CHECK DESIGN IN ALL STAGES OF CONSTRUCTION

STAGE 3: DECK PLACED ON TEMPORARY SHIMS IN FINAL POSITION
Post-tensioning of members 2 and 11 is removed as they are naturally in compression. However use of temporary shim stacks does not replicate the final resting position of the truss and induces stresses triggering cracking.



LESSON 2: BELIEVE YOUR OWN EYES

The severe nature of the cracking should have made it obvious the structure was failing and decisions to work on the bridge over live traffic lanes were clearly wrong



LESSON 3: PAY ATTENTION TO CRITICAL DETAILS

Decisions to locate a drainage pipe and run several cable ducts through the 11/12 nodal region, and construction decisions to cast the structure with cold joints at the base of the diagonals, all contributed to creating a weakness at a critical location

Courtesy of
NewCivilEngineer

Crane Collapse Varese, Milan May 2017

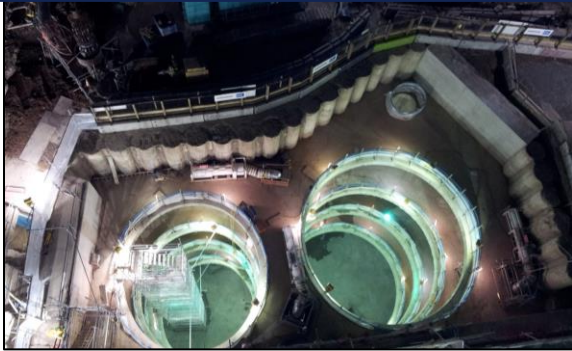


Session 4 Case Studies Group Work



Session 4 Case Studies Group Work

Case Study 1 :
A CASE OF YING & YANG



Case Study 2:
A CASE OF OVER ENGINEERING?



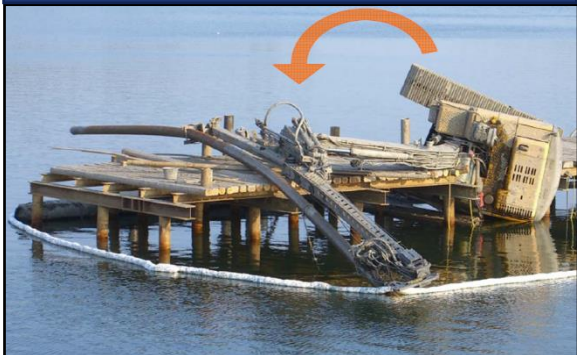
Case Study 3 :
NEVER KNOWINGLY UNDERSOLD?



Case Study 4 :
LODDON ALL OVER AGAIN?



Case Study 5 :
A MYRIAD OF LOAD COMBINATIONS?



Case Study 6 :
A BRIDGE TOO FAR?



Case Study 7 :
A DESIGN ON THE EDGE?



Case Study 9 :
WAKE TECH BRIDGE COLLAPSE?



Session 4 Case Studies Group Work

- Group 1 Case Study 2 - Paddington Box
- Group 2 Case Study 5 - Temporary Jetty
- Group 3 Case Study 6 - Demolition of Bridge
- Group 4 Case Study 9 - Wake tech bridge



Discuss and feedback

The effect of both Permanent works and temporary works design on methodology and safety during construction and installation.

How can we as designers influence safety and communicate our design assumptions and mitigated risks onwards?

Case Study Group feedback

If you were leading the design of the permanent works or the temporary works in this case study

What would you have done differently to either eliminate or reduce the risk and prevent failure?



Session 5 Reducing Risk Through Design



Session 5 Reducing Risk Through Design



- Why do designers focus more on mitigating construction accident risks than health risks?
- Session leads participants through the issue and looks at the main health issues experienced in construction
- Proposes that the principles of prevention give a good starting point for designers to find best ways to mitigate health risks
- Encourages the participants to share ideas on how to improve



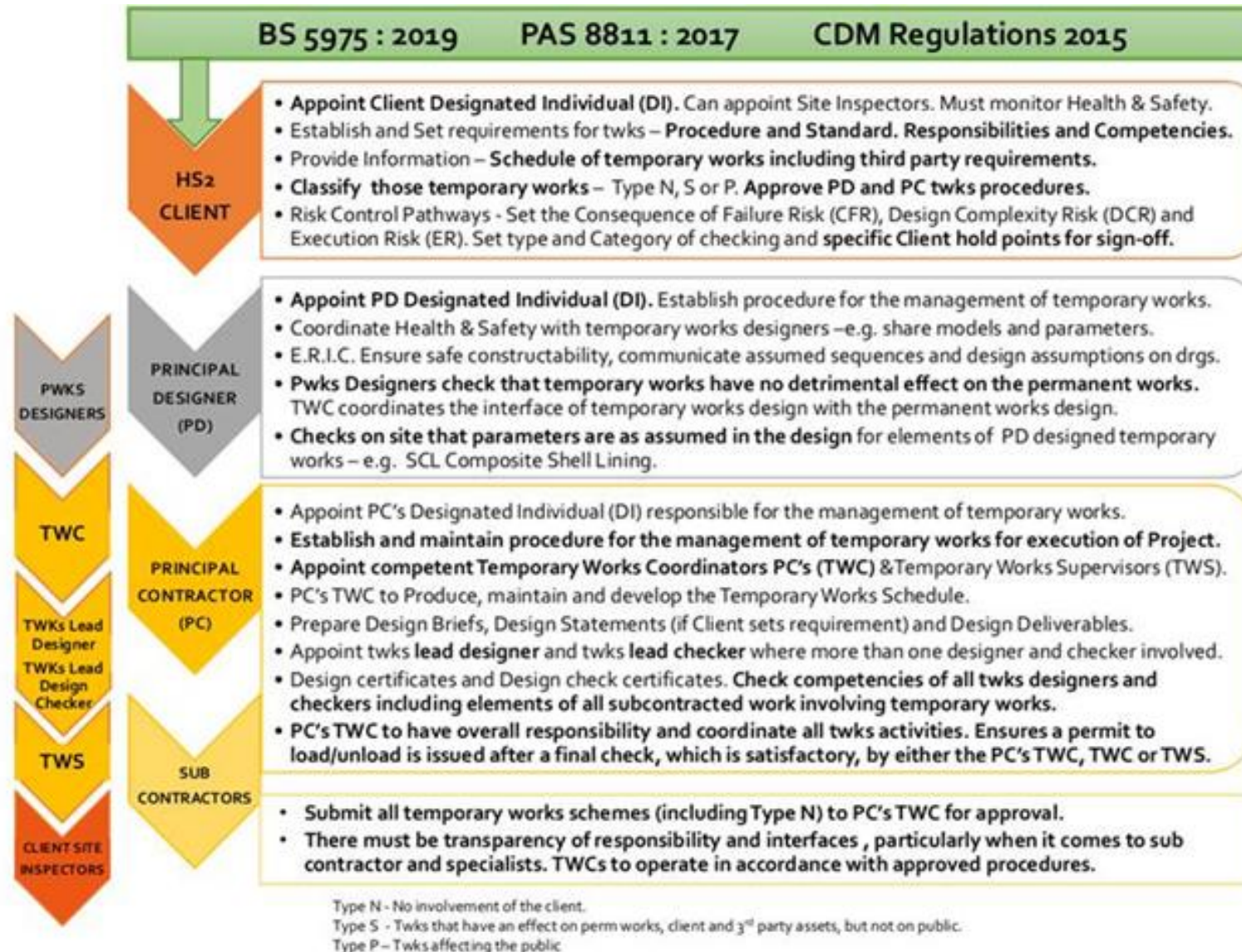
Session 6 – Standards Update



Session 6 Standards Update

	<p>BS 5975 : 2019</p>	<p>bsi. PRIVATE CIRCULATION BS/514/26_19_0002 For information</p>
		<p>PRIVATE CIRCULATION Draft BS 5975, 2019-01-18 BS 5975:2019</p>
<p>BSI Standards Publication</p>	<p>BSI Standards Publication</p>	<p>or temporary and the design of</p>
<p>Code of practice for temporary works p and the permissible design of falsework</p>	<p>Code of practice for temporary works procedures and the permissible stress design of falsework</p>	<p>reset document. Persons commenting on matters of typography and layout. by the BSI Drawing Office.</p>
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Session 6 Standards Update



Permanent Works designers requirements

8.3 Permanent works designers

8.3.1 Permanent works designers should address the buildability of the permanent works and identify, and make provision for, any temporary works and temporary conditions required by their design and their assumed method of construction. This should include:

- a) a proposed method and sequence of construction which should have no adverse effects on the permanent works;
- b) deciding on and communicating the intended construction process, giving particular attention to new or unfamiliar processes;
- c) considering the stability of existing structures and partially constructed/erected/demolished structures and, where this is not immediately obvious, providing information to show how temporary stability could be achieved;
- d) identifying where standard industry details are not suitable, and where detailed structural design is to be carried out by others;
- e) considering the effect of the proposed work on the integrity of adjacent/existing structures, particularly during refurbishment;
- f) ensuring that the overall design takes account of temporary works which might be needed, no matter who is to develop those works;
- g) ensuring that consideration has been given to the availability of sufficient space required to construct or maintain the structure; and
- h) clearly stating loads for which the structure has been designed including the proposed plant installation loads and plant routes.

Session 7 - Effective Information Transfer



Session 7 Effective Information Transfer

- A session looking at designer's risk assessments and how to improve them
- Examines the typical shortcomings of designers' CDM risk assessments
- Suggests some ideas for improvements and invites participants to make their own suggestions
- Discusses the merits and shortcomings of SHE boxes on drawings

CDM Regulations 2015



Hazard	Likelihood	Severity	Risk	Mitigation	Revised Likelihood	Revised Severity	Revised Risk	Risk Owner
Working at height	High	High	High	Contractor to provide edge restraint	Low	High	Medium	Contractor
Working next to live traffic	Medium	High	High	Traffic barriers to be provided	Low	Medium	Medium	Contractor
Construction over water	Medium	Low	Medium	Workers to be provided with buoyancy aids	Medium	Low	Medium	Contractor
Working in Confined Spaces	Low	High	Medium	Permit to work system and safe evacuation procedures	Low	Medium	Medium	Contractor
Live electricity cables	Medium	High	High	Locate, isolate and protect cables	Low	Low	Low	Contractor
Weil's disease	Low	Low	Low	Avoid work in water	Low	Low	Low	Contractor

Next Steps and Feedback

Course materials can be downloaded from the  Safe at heart portal here:

SHWeLT

<https://highspeedtwo.sharepoint.com/sites/SafeatHeart/SitePages/Home.aspx>

If you need access please contact email : safeatheartdevelopment@hs2.org.uk

Supply chain - for immediate temporary access a file will be sent via We Transfer to your email

The material includes the course slide pack with embedded videos and notes and today's presentation and accompanying notes. Then it's a case for you further develop the course content as you see fit and deliver it.

Feedback and Metrics: We would like you to send details on numbers of designers who have received this training, together with any feedback on the effectiveness of the course to Ed Pointer and Adrian St. John. You can build your own feedback mechanism into your 'wrap up' session at the end of the course.

If you need help, advice or further background to the course, please contact any of the working group members, details are on my first slide.

A project temporary works forum across the project is currently being established, championing and sharing best practice with feedback and ideas coming directly from the courses and other areas of design engagement within the programme.

We need to measure and improve

Temporary Works Designer Course Feedback form

Please complete this form after each course and return to:

Course delivered by:

No of attendees:

Date:

Location:

What aspects of the course went well?

What aspects of the course did not go well?

What could be changed to be more engaging or supportive to the learner?

Any other comments?

Questions



Thankyou

