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Making tomorrow a better place

Temporary Works in Construction and Refurbishment

Hoardings Workshop

working well together

Good practice

- Hoardings – A guide to good practice
  - Temporary Works Forum
  - Free to download

http://www.twforum.org.uk/publications

What we will cover

- Design considerations
- Design methods
- Loading and load combinations
- Factors of safety
- Foundation design
- Site considerations

Fences and hoardings are items of temporary works and needs to be treated accordingly.

Design considerations

- Design life (1 week or 3 years?)
- Purpose of the fence or hoarding
- Loading
  - Wind
  - Crowd
  - Vehicle
- System type
  - Solid panel or mesh fence
  - Traditional timber with embedded posts
  - Free standing proprietary system
  - Bespoke free standing system
  - Metal faced with embedded scaffold tube posts

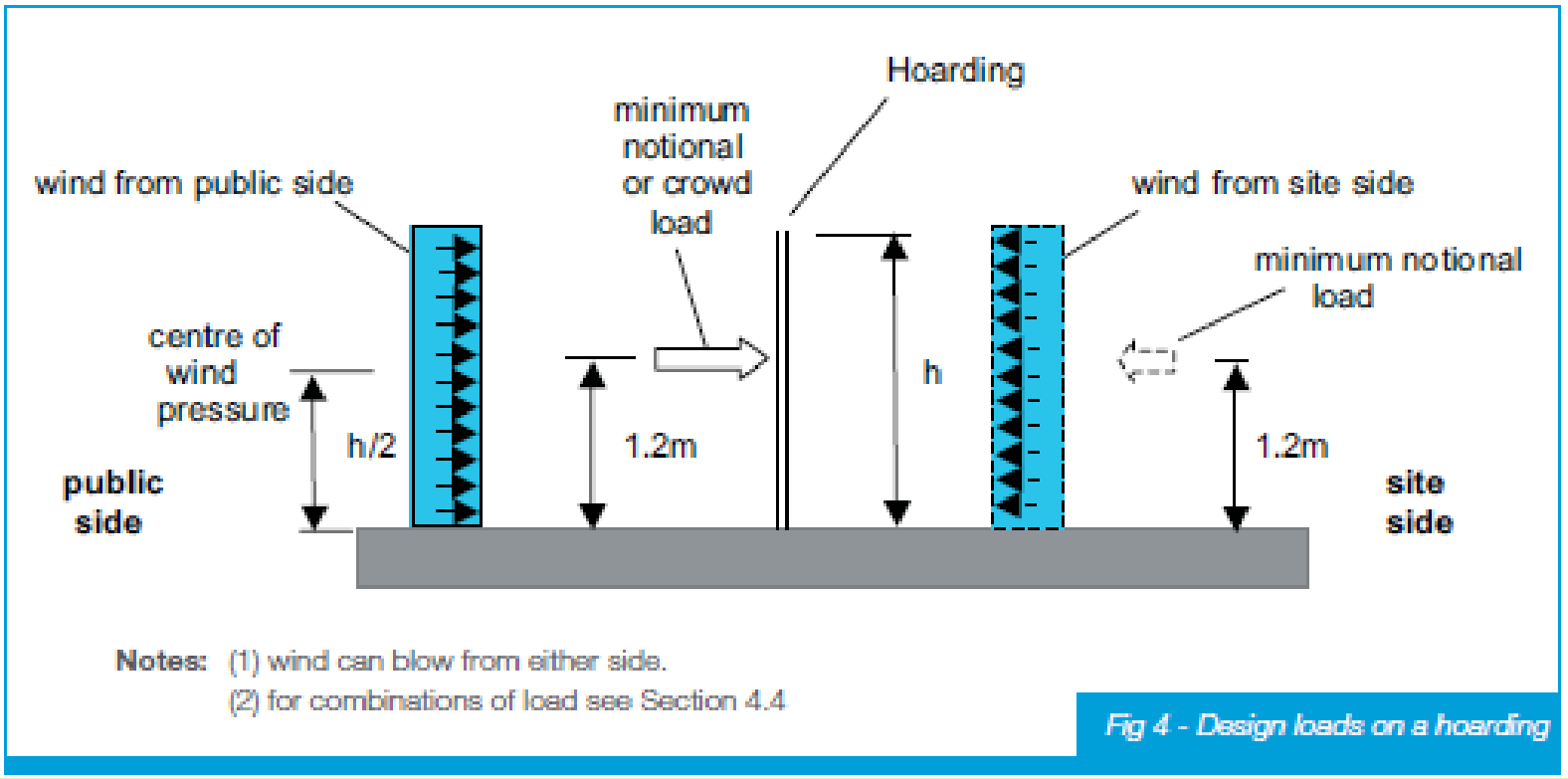
Design considerations

- Location
  - Exposure to wind
  - Risk to the public
  - Highway and other restrictions
- Height of hoarding
- General appearance
- Below ground services
- Ground conditions
- Possibility of need to alter or relocate the hoarding
- Requirements for gates, vision splays and access points.

Design Methods

- Permissible stress
- Limit State to Eurocodes

Loading and load combinations



Notes: (1) wind can blow from either side.
(2) for combinations of load see Section 4.4

Fig 4 - Design loads on a hoarding

Loading and load combinations

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Table 1. Load Combination Factors – Crowd and Wind for Permissible Stress Design

Direction		From Public Side				From Site Side		
	Load Case	Maximum Wind	Working Wind	Minimum Notional Load	Crowd Load	Maximum Wind	Working Wind	Minimum Notional Load
NO CROWD	LC1	1.0	0	-	n/a			
	LC2	0	1.0	1.0	n/a			
	LC3					1.0	0	0
	LC4					0	1.0	1.0
WITH CROWD LOAD	LC5	0	1.0		1.0			
	LC6	1.0	0	-	0			
	LC7					1.0	0	0
	LC8					0	1.0	1.0

Table 2. Load Combination Factors (ψ_0) – Crowd and Wind using Euro Codes for Ultimate Limit State Design

Direction		From Public Side			From Site Side	
	Load Case	Maximum Wind	Minimum Lateral Load	Crowd	Maximum Wind	Minimum Lateral Load
NO CROWD	LC9	1.0	0.7	n/a		
	LC10	0.5	1.0	n/a		
	LC11				1.0	0.7
	LC12				0.5	1.0
WITH CROWD	LC13	1.0	-	0.7		
	LC14	0.5	-	1.0		
	LC15				1.0	0.7
	LC16				0.5	1.0

Factors of safety

- Overall stability (Permissible stress approach)
  - Embedded post 1.5 generally, 1.2 when ground conditions known
  - Ballasted bases 1.2
- Sliding (Permissible stress approach)
  - Ballasted bases 2.0
- Structural failure (Permissible stress approach)
  - Use material strengths recommended in BS5975 (repeated in the guidance)

Foundation design

- Considerations
  - Ground conditions
  - Method of excavation (Hand dig, machine dig, bore out, or driven posts)
  - Concrete surround or back filled
  - Services and obstructions
  - Time
  - Cost

Foundation Design

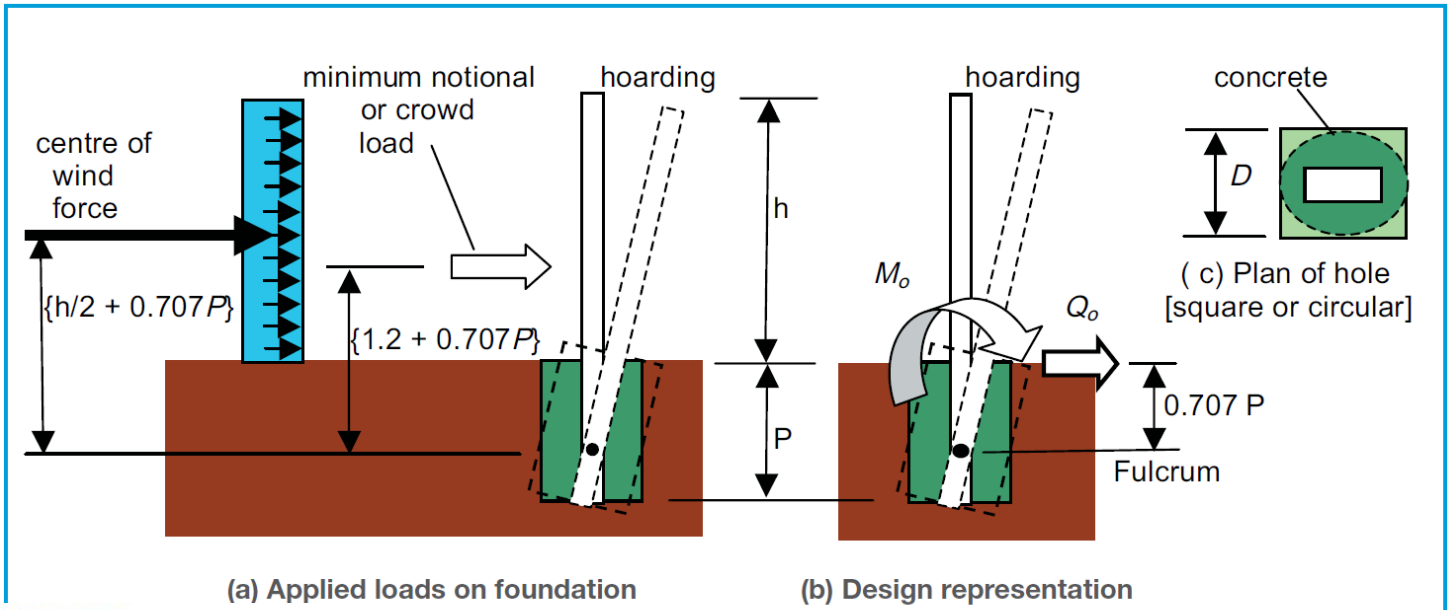

Fig D1 - Post foundation

Table D1. Ground classification

Classification	Quality of the ground	G (kN/m2)
Good	Compact, well graded sand and gravel, hard clay, well-graded fine and coarse sand, decomposed granite rock and soil. Good soils drain well.	630
Average	Compact fine sand, medium clay, compacted well-drained sandy loam, loose coarse sand and gravel. Average soils drain sufficiently well that water does not stand on the surface.	390
Poor	Soft clay, clay loam, poorly compacted sands, clays containing a large amount of silt and vegetable matter, and made-up ground. Includes site placed backfill unless fully compacted. Poor soils are normally wet and have poor drainage.	230

$$M_g = \frac{G \times D \times P^3}{10}$$

$$M_g \geq \{ M_o + (0.707 \times Q_o \times P) \} \times 1.5$$

Site considerations

- Design takes account of the site conditions, constraints and requirements (TWC needs to brief the designer)
- Hoardings or fences need to be built to the design any changes need to be approved by the designer.
- Hoardings and fences should be regularly inspected and maintained (Weekly and after period of severe weather in a high risk area perhaps monthly in low risk locations)
- Hoardings may need lighting in some circumstances
- Positioning vehicle access points to avoid conflict with pedestrians and creating blind spots.

Site considerations

- Size of gates needs consideration. Large gates may present risks of blowing open. Mesh gates should be considered.
- Crowd loading around some venues. (Football stadiums, concert venues, transport hubs etc).
- Security risk. (Some areas may require a taller hoarding e.g football stadiums)
- Consideration of future work and the need to relocate or undermine hoardings.
- Potential for stacking materials behind a hoarding.
- Public image and client requirements

Any questions?

Thank you for listening