Forensic Investigation of Personal Injury Cases

An overview of the approach and benefits with detailed case studies

Insurance Institute of Sussex and North Downs Insurance Institute
CPD Conference - 13 October 2022 – Lingfield Park Resort

Ian Major MEng CEng MICE

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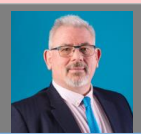
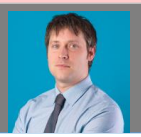
Leaders in forensic investigation

Hawkins Locations



Principal Associate (Physicist)

Damian Mutch



Senior Associate (Automotive Engineer)

James Wade

Senior Associate (Mechanical Engineer)

Richard Baker

Associate (Mathematician)

Inigo Beckett

Digital Forensics Team

Road Traffic Accident Investigation Team

IT Director (Mechanical & Electrical Engineer)

Ian Giddings

Principal Associate (Scientist)

Anna Knight

Principal Associate (Electrical Specialist)

Nick Carey

Senior Associate (Chemist)

Ed Hammersley

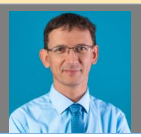
Associate (Mechanical Engineer)

Lisa Beck

Fire Investigation Team

Marketing Director (Civil Engineer)

Andrew Reeves



Regional Manager Principal Associate (Civil Engineer)

Ian Major

Senior Associate (Architect)

Samuel Morley

Associate (Civil Engineer)

Andy Ingle

Associate (Civil Engineer)

Hannah Fletcher

Built Environment Investigation Team

Managing Director (Materials Engineer)

Andrew Prickett

Principal Associate (Materials Engineer)

Eleanor Jay

Mechanical and Materials Engineering Investigation Team

Senior Associate (Plant Pathologist)

James Townsend

Associate (Pharmacologist)

James Morris

Contamination and Spoilage Investigation Team

Learning objectives

By the end of this session, attendees will:

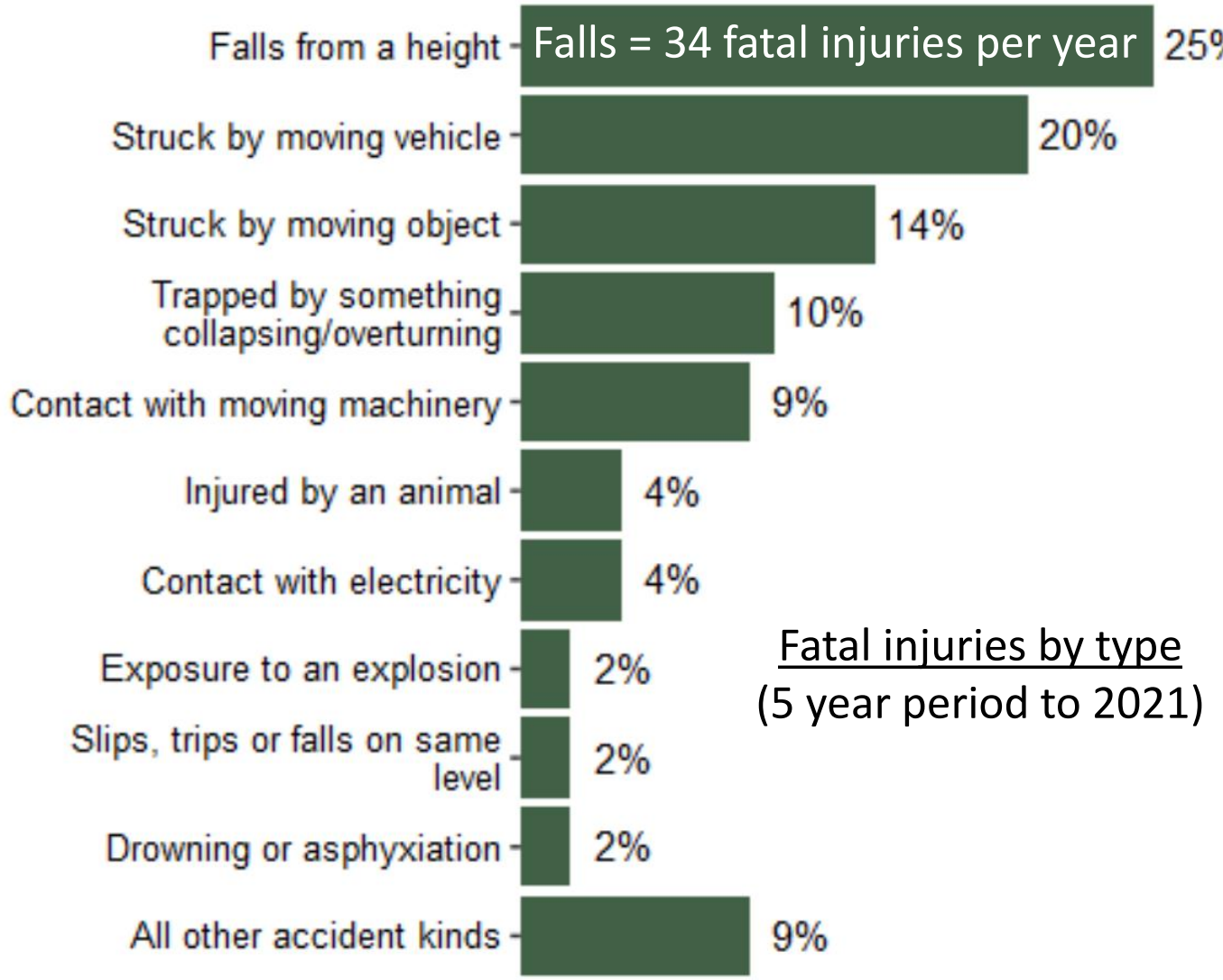
- Appreciate the broad range of injury cases that benefit from forensic investigation.
- Know the importance of using Forensic Civil Engineers or Architects for incidents involving buildings, construction or demolition.
- Know the importance of witness evidence and physical evidence in enabling support or defence of a claim or prosecution.
- Understand the value in considering and reviewing the applicable regulations, standards and guidance.

Types of incident

- Slips and trips
- Manual handling
- Noise induced hearing loss
- **Falls from roofs, balconies and windows**
- **Structural collapse**
- **Construction and demolition incidents (falls, crushing, eye damage, amputation)**
- Electric shock and electrocution
- Road traffic collisions

Statistics

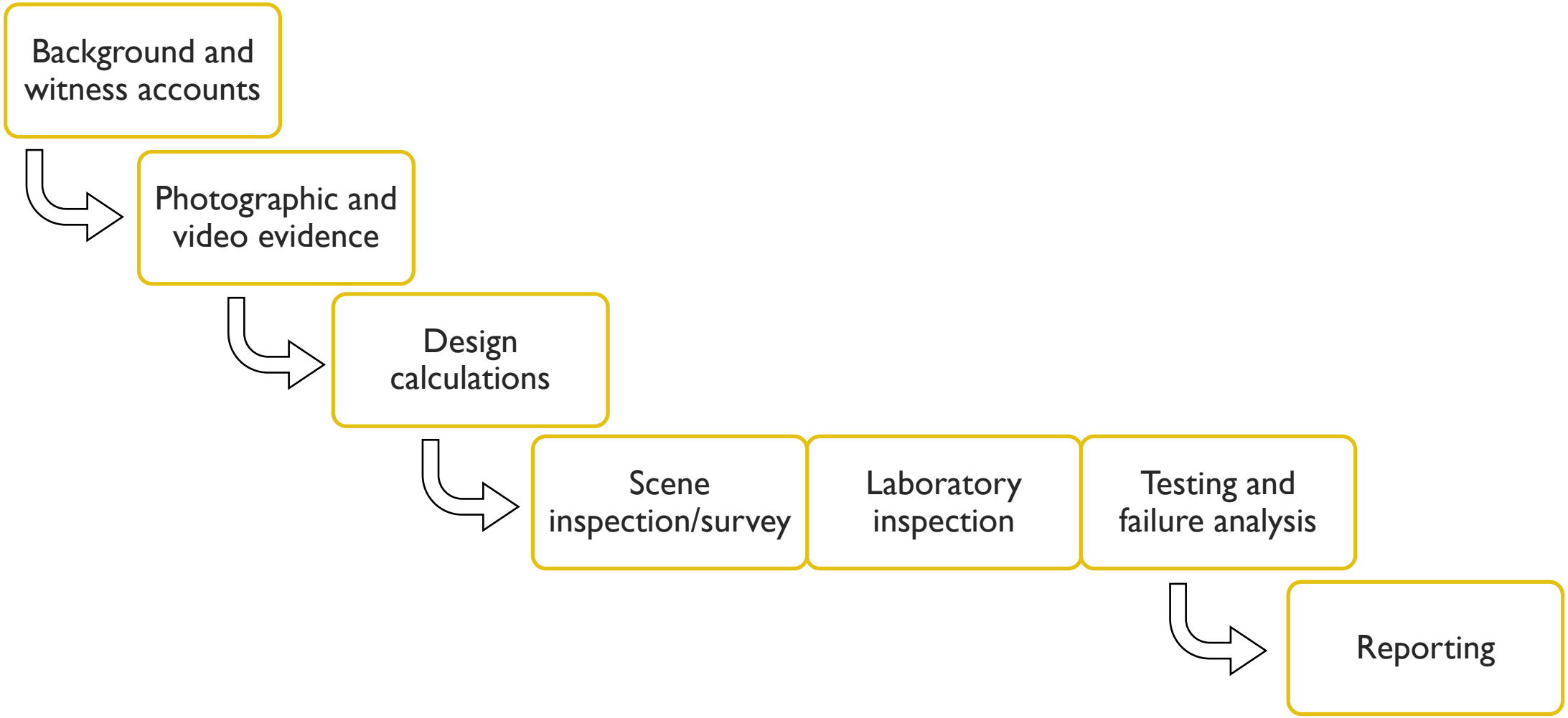
- 123 workers killed in 2021/22 (24% in construction)
- 80 members of the public killed in 2021/22 (work related accident)
- Over 50,000 reportable injuries (non-fatal) in 2021/22 – predominantly slips, trips and manual handling
- Very high accident rate in agriculture



Fatal injuries by type
(5 year period to 2021)

Kind of accident statistics in Great Britain, 2021 (hse.gov.uk)

Investigation approach



Case Study

Hoarding collapse – 30mph wind

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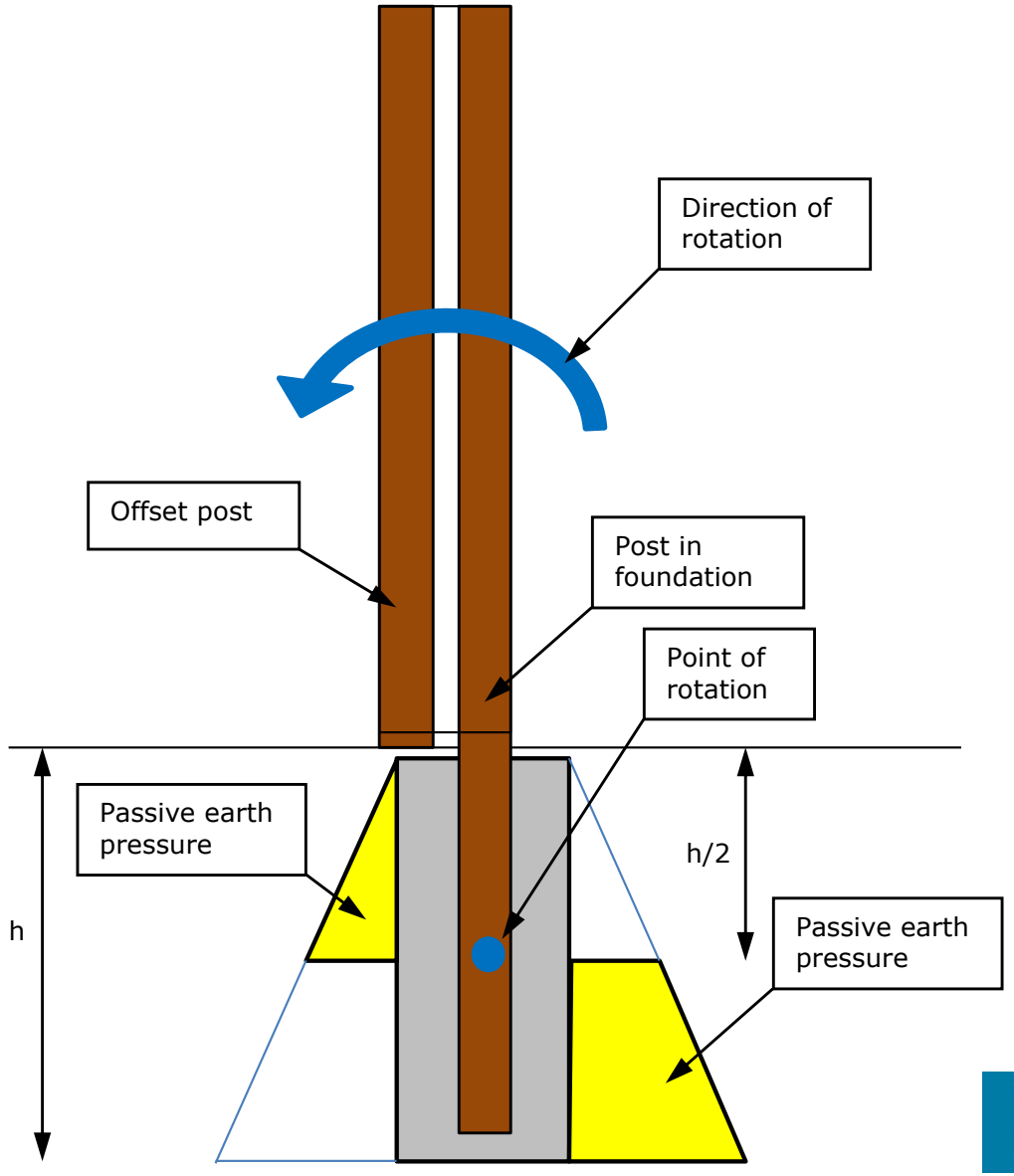
Design review

- *'Hoardings - A guide to good practice'* – identifies risk of injury or death
- Wind pressure, force and overturning moment
- Timber posts under-sized
- Concrete foundations too shallow
- Erected over 3 years prior to incident



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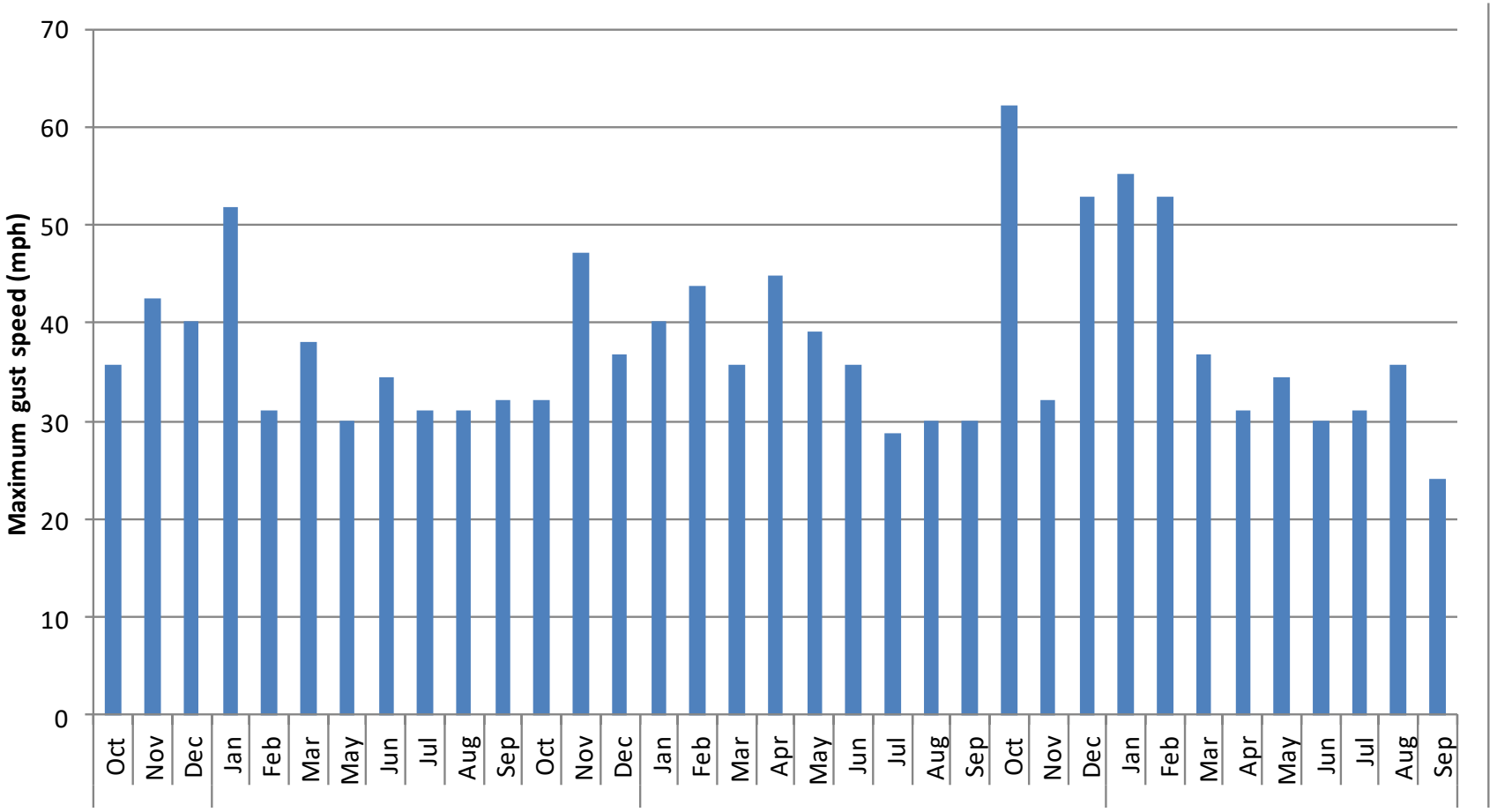
Weather review

- Wind speeds of 30 to 40mph in most months
- Wind speed >50mph on 5 occasions



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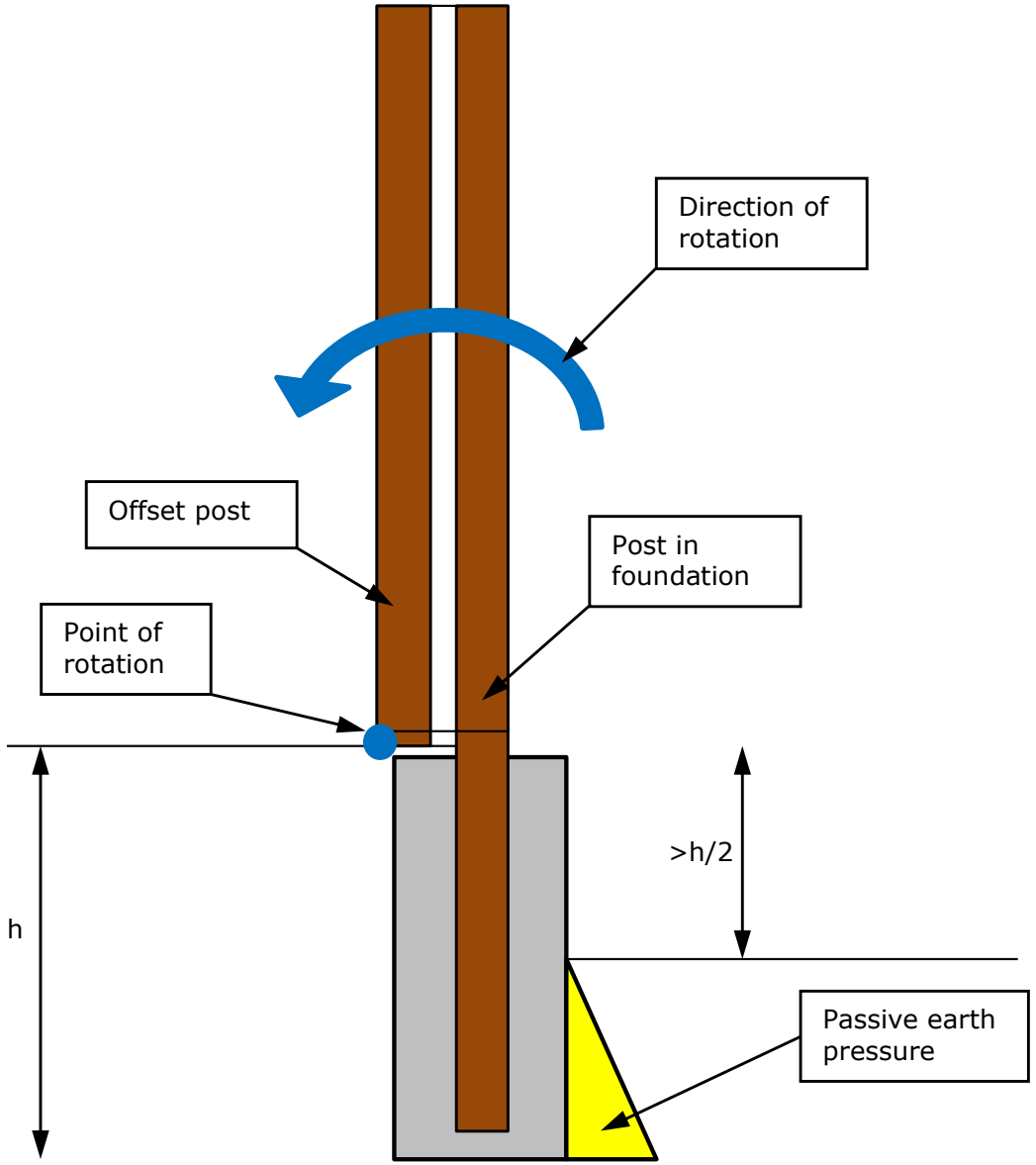
Failure analysis

- Reduced ground level
- Reduced passive earth pressure
- Reduced ground resistance moment



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Conclusion

- If designed and constructed properly, failure could still have occurred due to excavation
- Contractor pleaded guilty to H&S breaches

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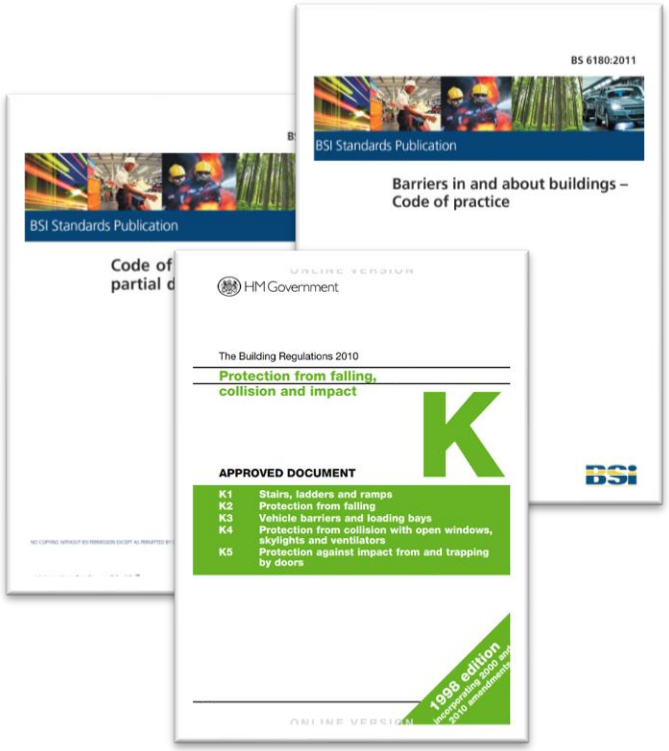
Regulations and guidance

Management

- CDM Regulations
- The Provision and Use of Work Equipment Regulations
- The Lifting Operations and Lifting Equipment Regulations
- Manual Handling Operations Regulations

Design

- Building Regulations
- CDM Regulations
- British Standards
- Codes of Practice



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Case Study

Fall from window

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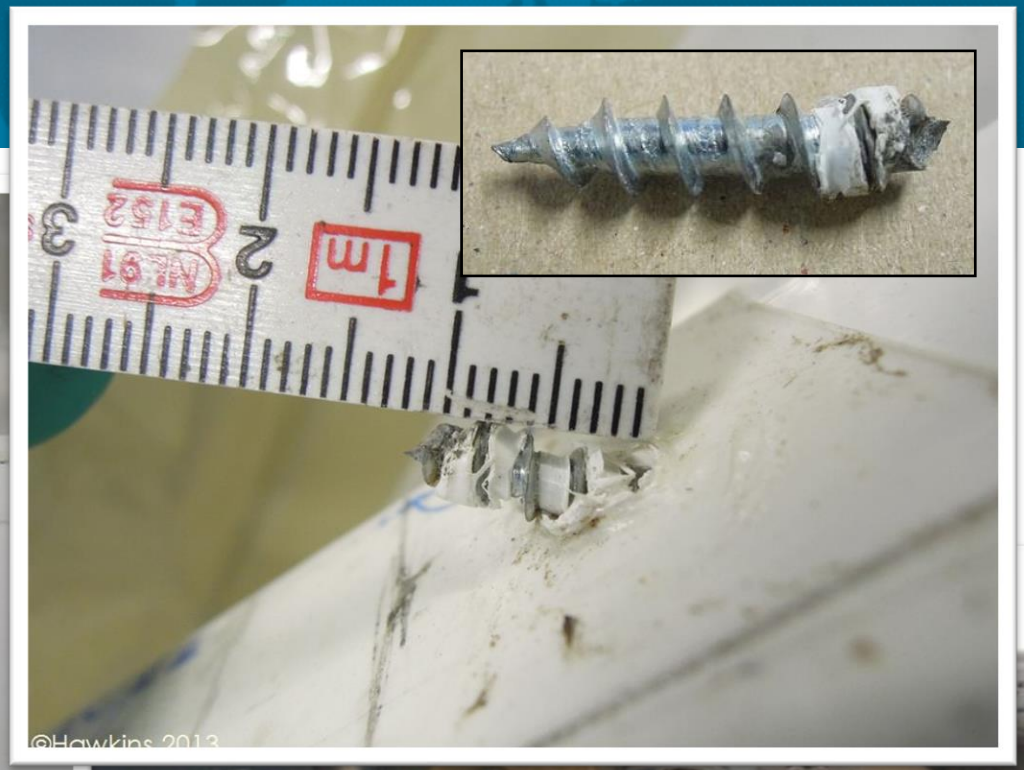
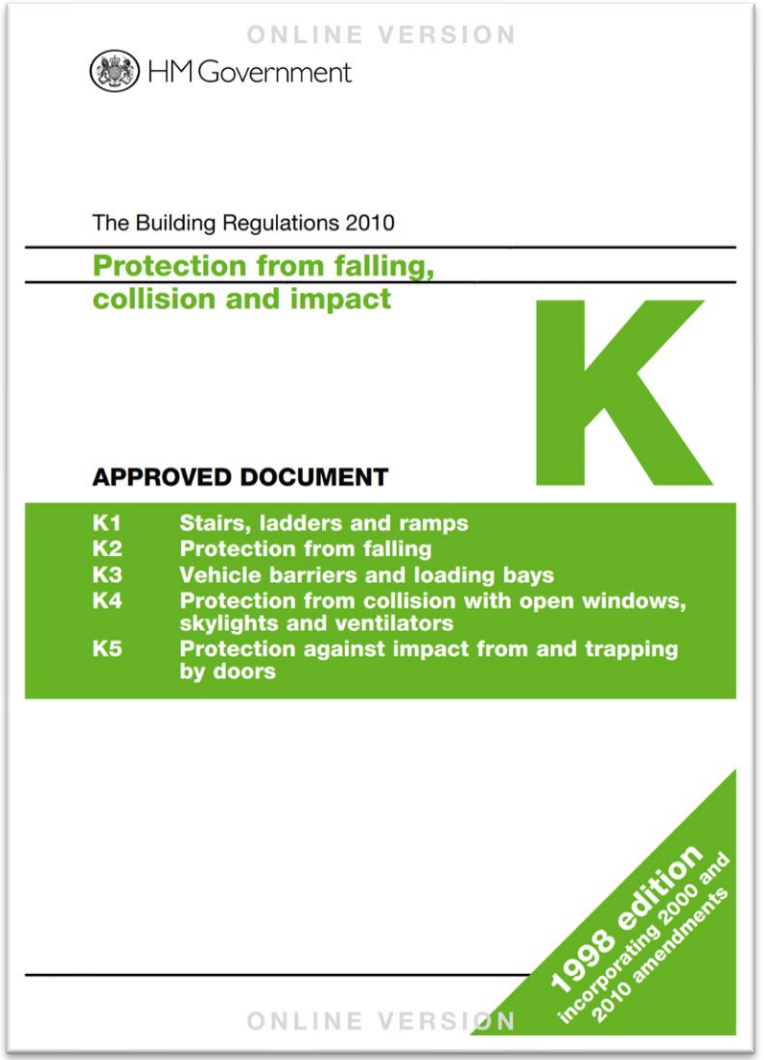
Examination (exemplar)

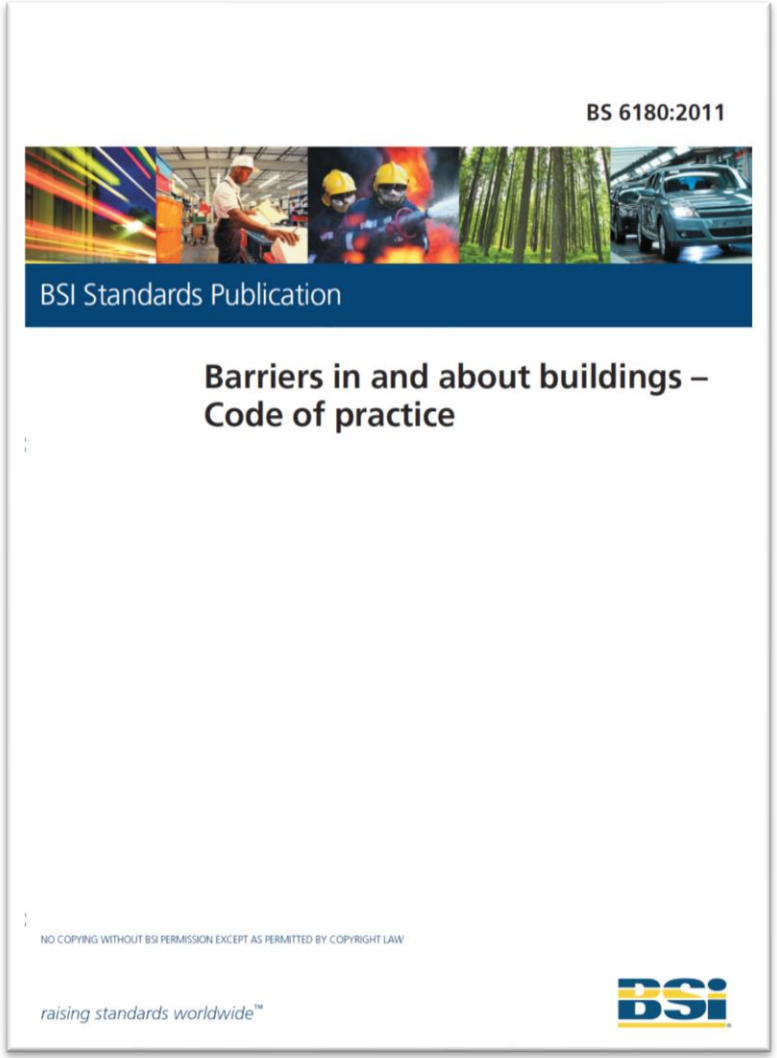
Examination (exhibit)



Design requirements

- Guarding for openings less than 800mm high
- Three load cases
- Worse case gives 500N at bracket





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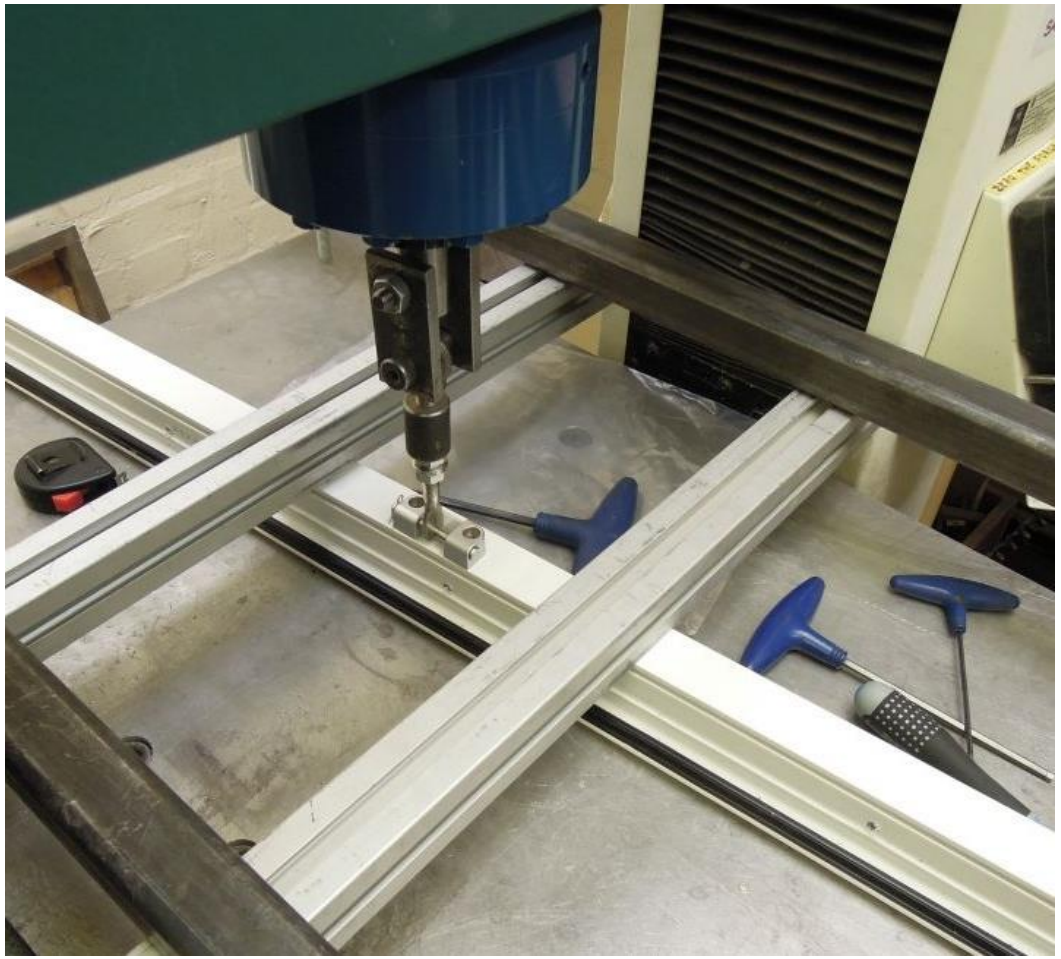
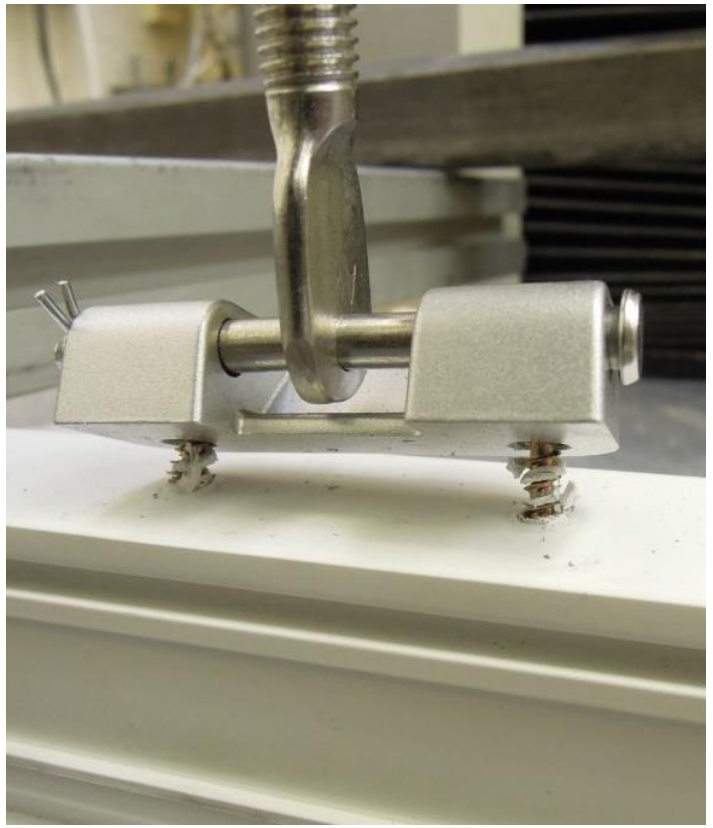
Load testing





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Analysis

Initial speed?

Mass of men?

Final speed?

$$F = \frac{m(u - v)}{t}$$

Time to decelerate?

Distance while decelerating?

$$t = \frac{2s}{(u + v)}$$

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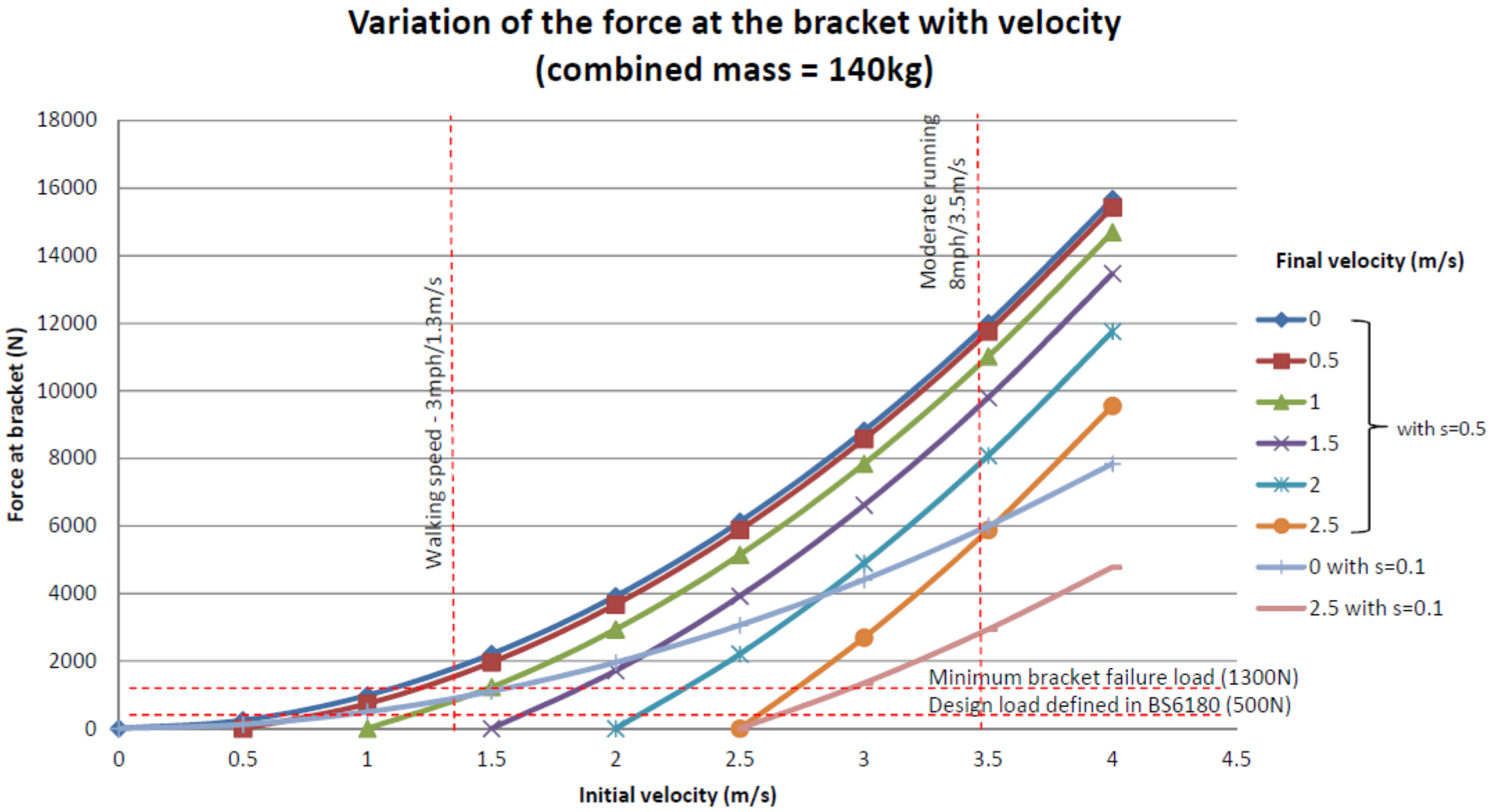
Results



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Conclusion

- Window was suitable as a guard
- Load capacity was well in excess of British Standard requirements
- No evidence of poor installation
- Analysis demonstrated plausible explanation for excessive load
- HSE dropped the case

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Case Study

Fatal demolition incident

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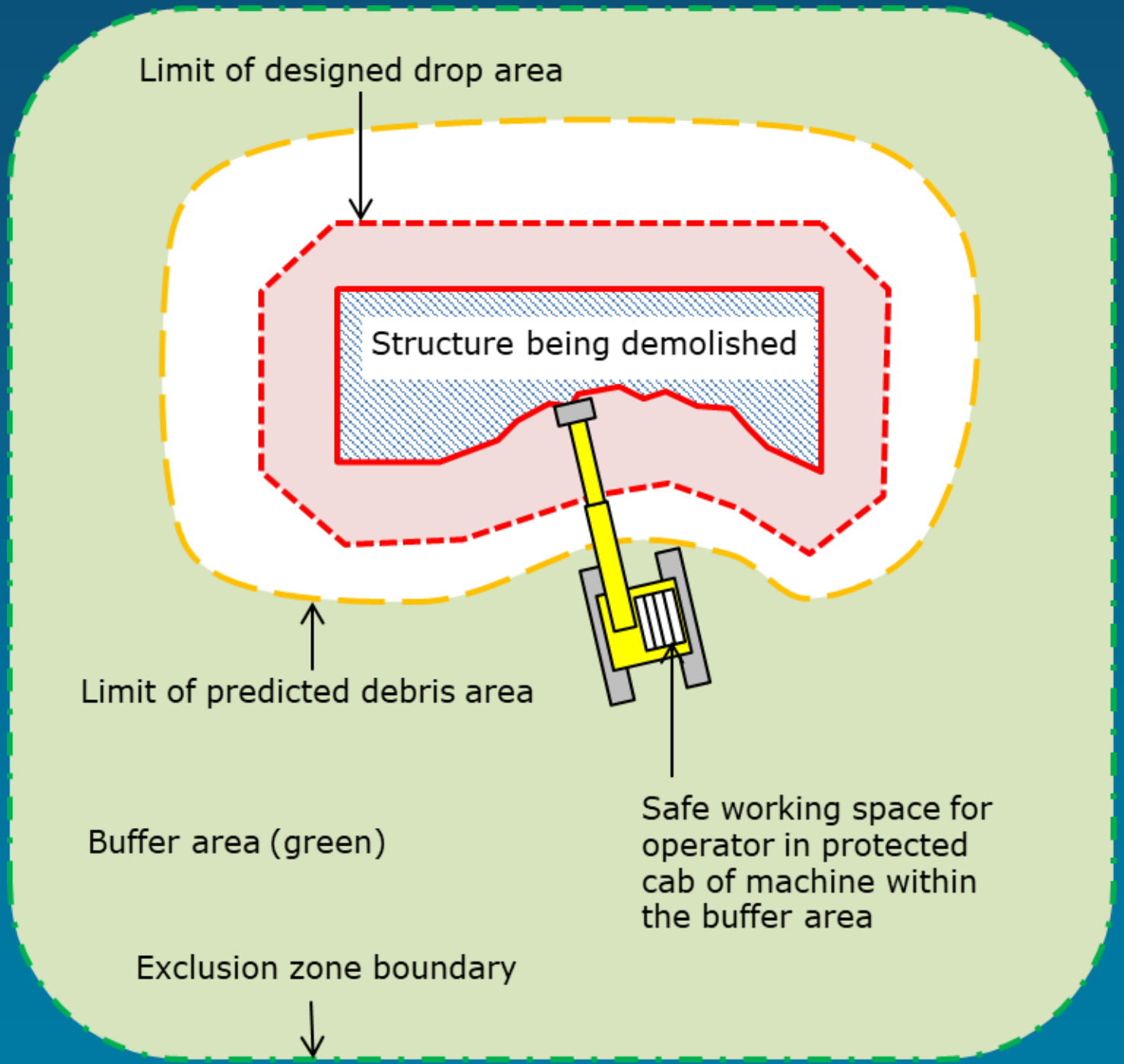
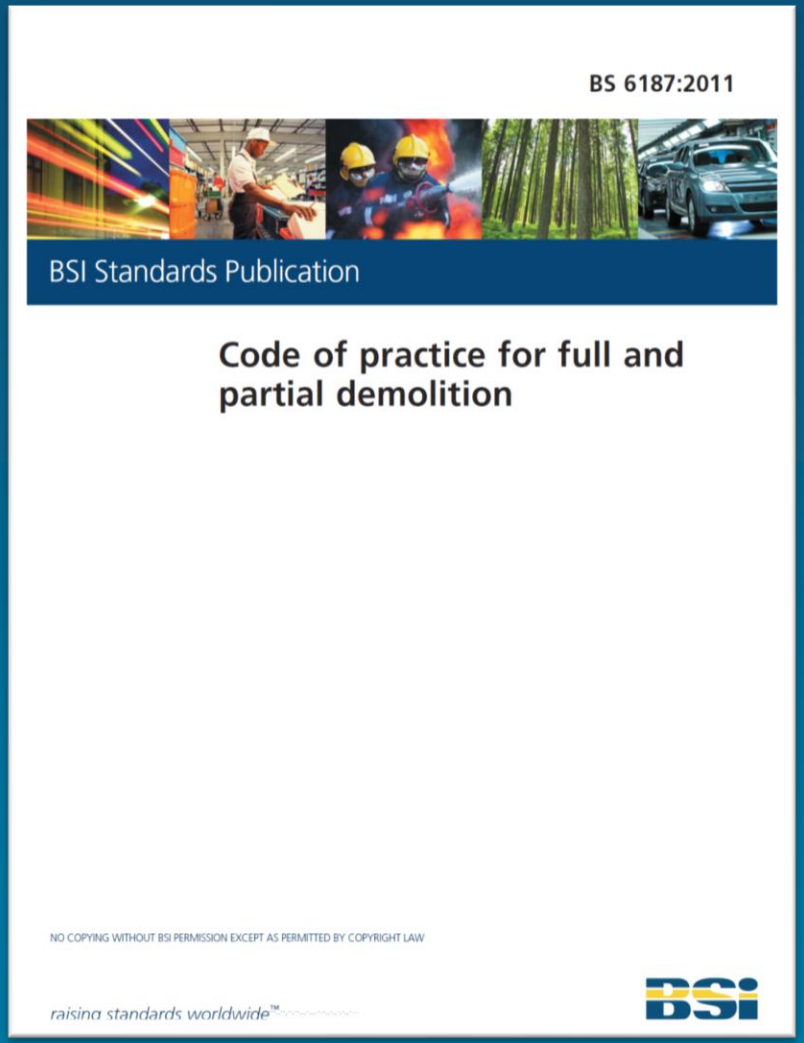

Limit of designed drop area
Structure being demolished
Limit of predicted debris area
Buffer area (green)
Safe working space for operator in protected cab of machine within the buffer area
Exclusion zone boundary


BS 6187:2011
BSI Standards Publication
Code of practice for full and partial demolition
NO COPYING WITHOUT BSI PERMISSION EXCEPT AS PERMITTED BY COPYRIGHT LAW
raising standards worldwide™
BSI

Witness and photographic evidence

- No defined areas other than a perimeter fence
- Inconsistent understanding of "*unauthorised zone*"
- Rubble 'pads' used as "*safe place*"
- Pads could be within predicted debris area, or even within drop area
- No line of sight from machine to other operatives
- No radio communication

Conclusion

- System of work not in accordance with Code of Practice
- Lack of clear communication
- Unprotected operative moved into dangerous area
- HSE chose not to prosecute
- Claim for compensation was successful

Investigation Tools

- Surveying and photography
- Light and noise meters
- Laser scanning
- Photogrammetry
- Drones

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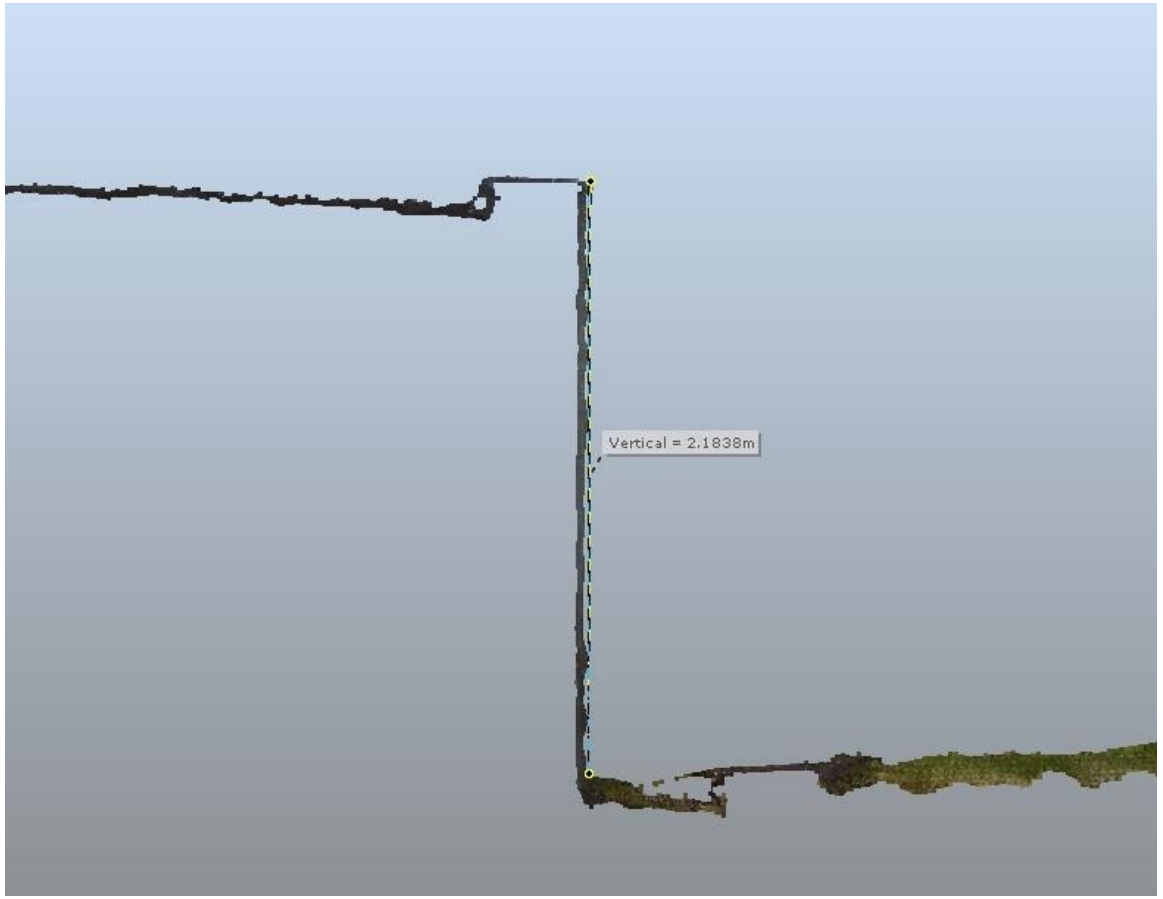
3D model – fall from wall

Sections through model



3D model – mountain bike accident

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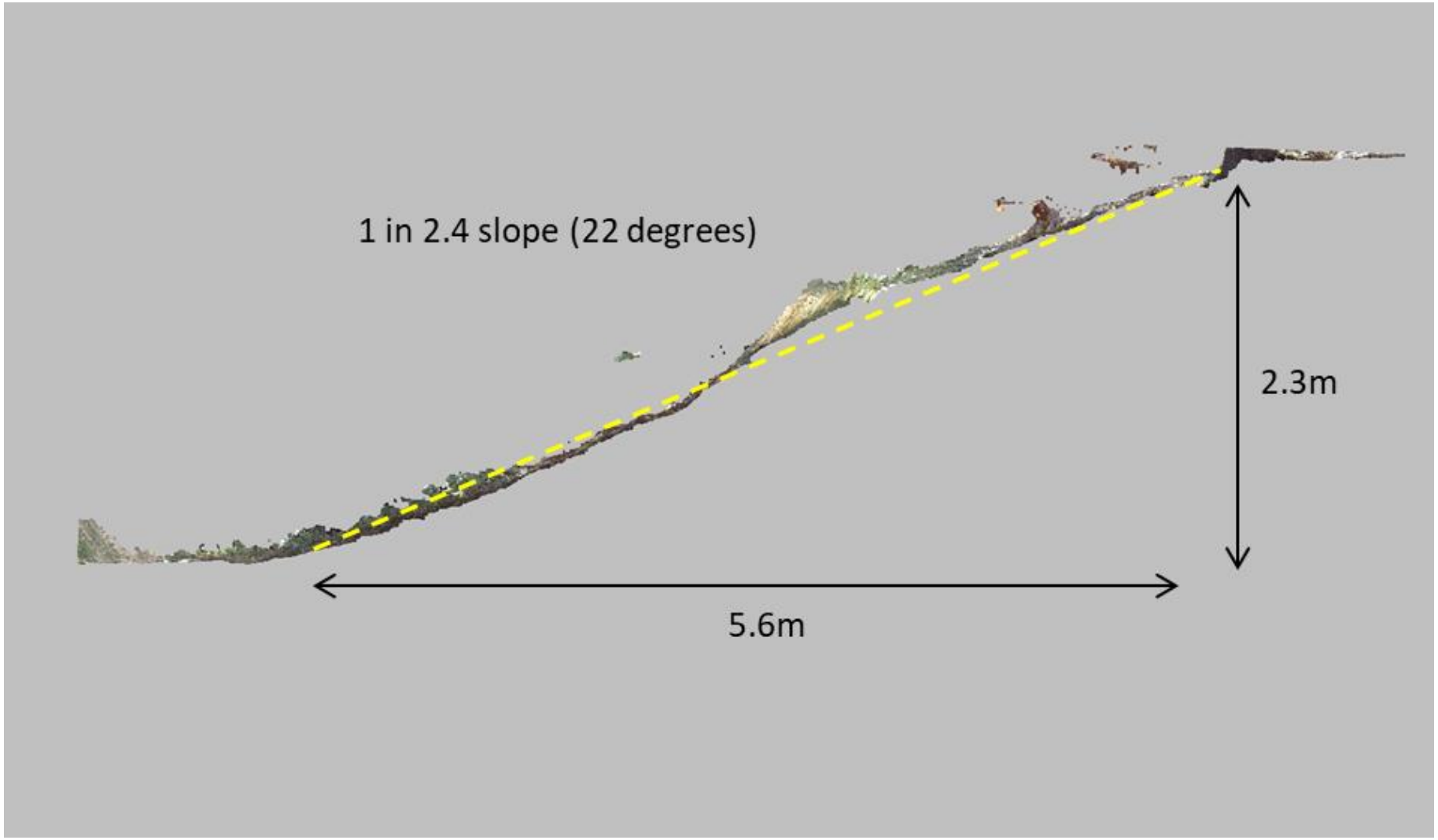
Section through slope



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Any Questions?