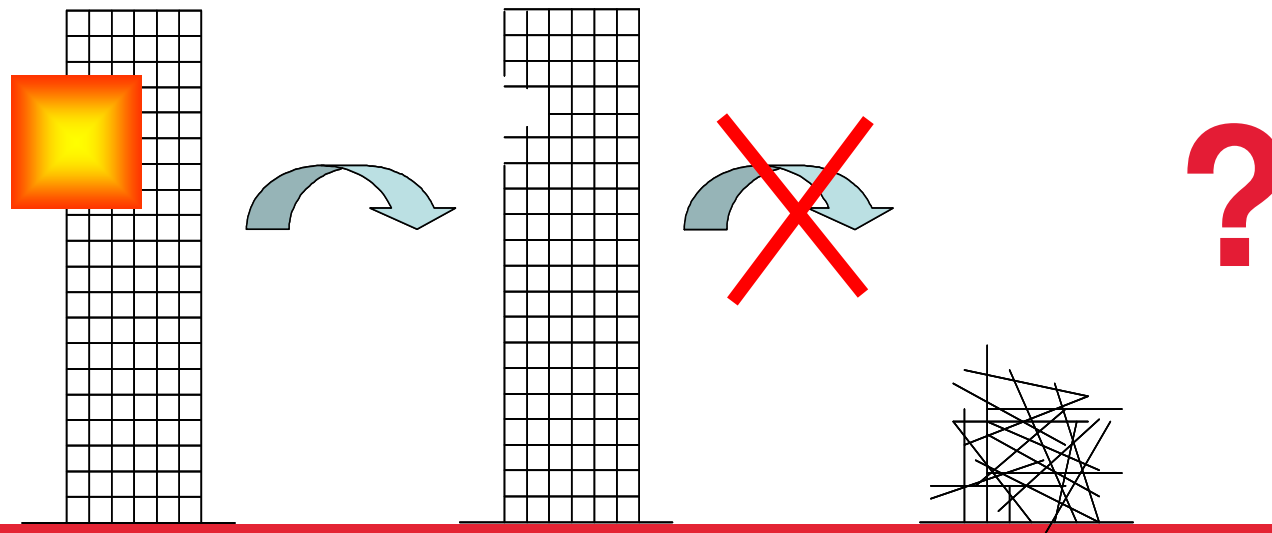


“Structural Robustness Design for Practising Engineers”

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URS-Scott Wilson, London, England

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Contents

- Why, how and for whom
- What is contained
- The future look.

Why, how and to whom

- JCSS/IABSE Workshop on Robustness (2005)
- JCSS Task Group on Robustness. Absorbed into COST Action.
- Members: Researchers, Academics, Practitioners and Government Regulators
- Document on Robustness. Item C of Final Report



“Structural Robustness Design for Practising Engineers”

- Code Developers, Researchers and Practising Engineers
- Risk-based Robustness Design
- Consequences Class 3 buildings

2. What is contained ...

- 10 Chapters
 1. Introduction
 2. History and Current Status
 - 3 – 7. Risk-based robustness design
 - 8 & 9. Extra issues,
 - » Quality and robustness
 - » Robustness during construction



- Chapter 2
 - History
 - Requirements (Related to Purpose, Safety) of Stakeholders (owners, users, public authorities ...)
 - Methods of Design (European and US)



Chapters 3 – 7

- Chapter 3. Public Perception of Risk
 - Framework for risk assessment and decisions
 - Risk communication
 - Risk tolerance
 - Risk acceptance by stakeholders

Public Perception of Risk

Risk = Probability X Expected Consequences



ALARP	NAL	NAL	NAL	NAL
ALARP	ALARP	NAL	NAL	NAL
AL	ALARP	ALARP	NAL	NAL
AL	AL	ALARP	ALARP	NAL
AL	AL	AL	ALARP	ALARP

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- Chapter 4. Hazards
 - Types: Natural and Man-Made
 - Modelling (Appendix B, examples)



- Chapter 5: Consequences
 - Types of Consequences
 - Consequence Analysis
 - System representation
 - Dependence on the boundary of considered 'System'



- Chapter 6 : Quantification and Decisions
 - In Codes
 - Risk- and Reliability-based quantification
 - Structural Systems & Robustness Indices



- Chapter 7: Designing for Robustness
 - Design Framework
 - Design Methods
 - Risk Assessment and Risk Appraisal

 - Examples from current practice
(not explicitly risk based; Class 2)

 - Risk-based design (Class 3)
 - Acceptance Criteria



- Chapter 8: Robustness During Construction
 - Most Common Failure (?).
 - Less stable, incomplete structural arrangements
 - Insufficient strength (concrete)
 - Examples



- Chapter 9: Quality and Robustness
 - Most structural failures due to poor quality
 - In concept, design, construction, maintenance etc
- Examples of failures
- Table of measures to eliminate causes or reduce occurrence.

Conclusions (& Future Look)

- Methods for CC 3 buildings design
- Information on hazards, modelling, system considerations and methods of design
- Requires more experience and practical examples
- Useful for the revision of Eurocodes and ISO2394
- A Supplementary Document/2nd Edition with Real-Life Examples? (JCSS? COST? FP?)



- Appendix A: Definitions
- Appendix B: Hazard Modelling
- Appendix C: Robustness in “other fields”

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Acknowledgement

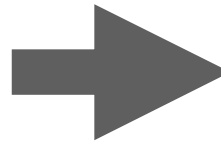
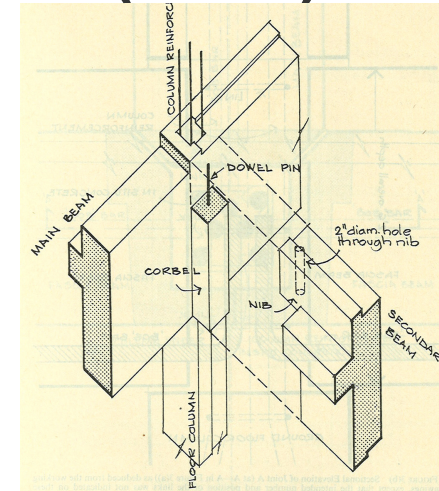
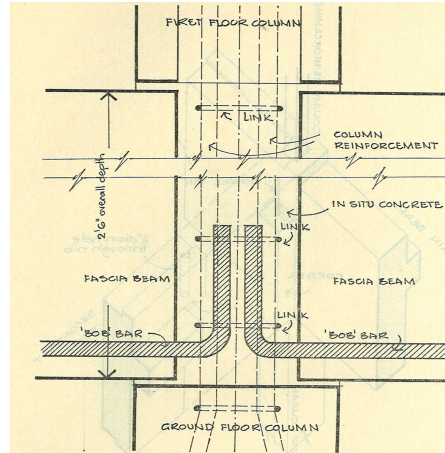
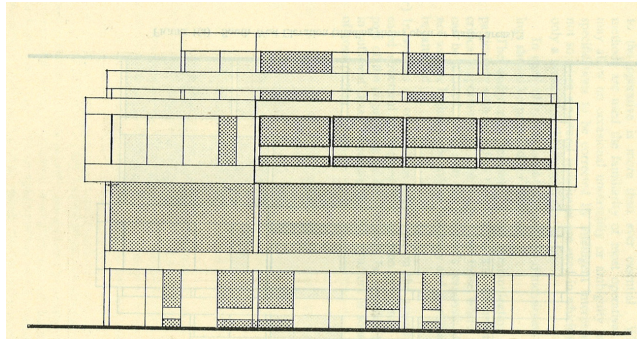
- Authors and other members of the Committee
- Contributions and comments

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If you have time ... one more thing

Officers' Mess, Aldershot (1963)



The investigation's report said ...

- *Where a system of building using prefabricated structural components is extended by use in a new building type, a **fundamental re-examination of the system design is necessary**. This must include a **reconsideration of all design assumptions** and, if necessary, a recalculation of the structural design from first principles.*
- *When novel, or relatively **novel building methods** are used, the thorough and **systematic communication of the designer's intentions** to the operative is more than ever essential.*

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- Lessons to learn ...
 - What was true nearly 50 years ago still holds true ...
 - We should not forget what our predecessors discovered ...