



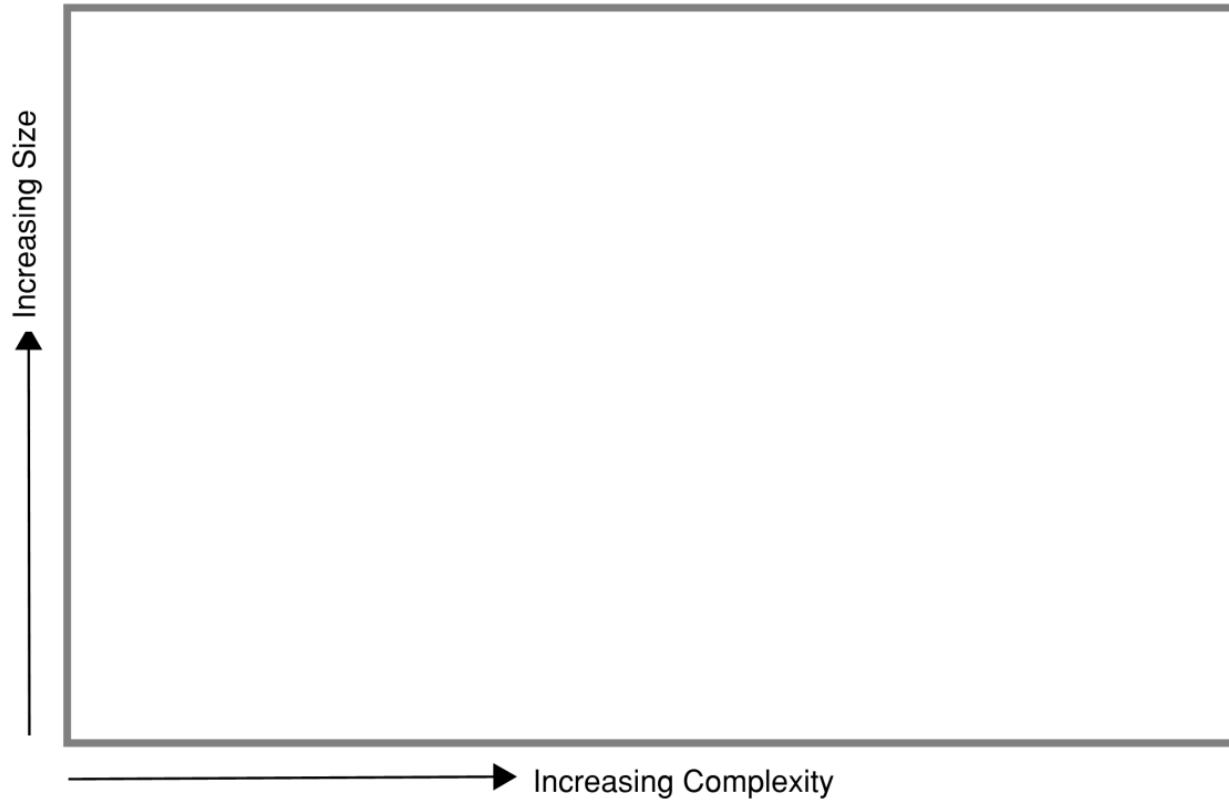
Buro Happold **Specialist Consulting**

Verification – A Fire Engineers View

Glen Forrest

IRCC – Edinburgh - 10<sup>th</sup> June 2015

# Before Performance – ‘Envelope Guidance’



'ENVELOPE' PRESCRIPTIVE GUIDANCE



# Opportunity –Mandatory (but Functional) Standards

## 2.0.7 Alternative approaches

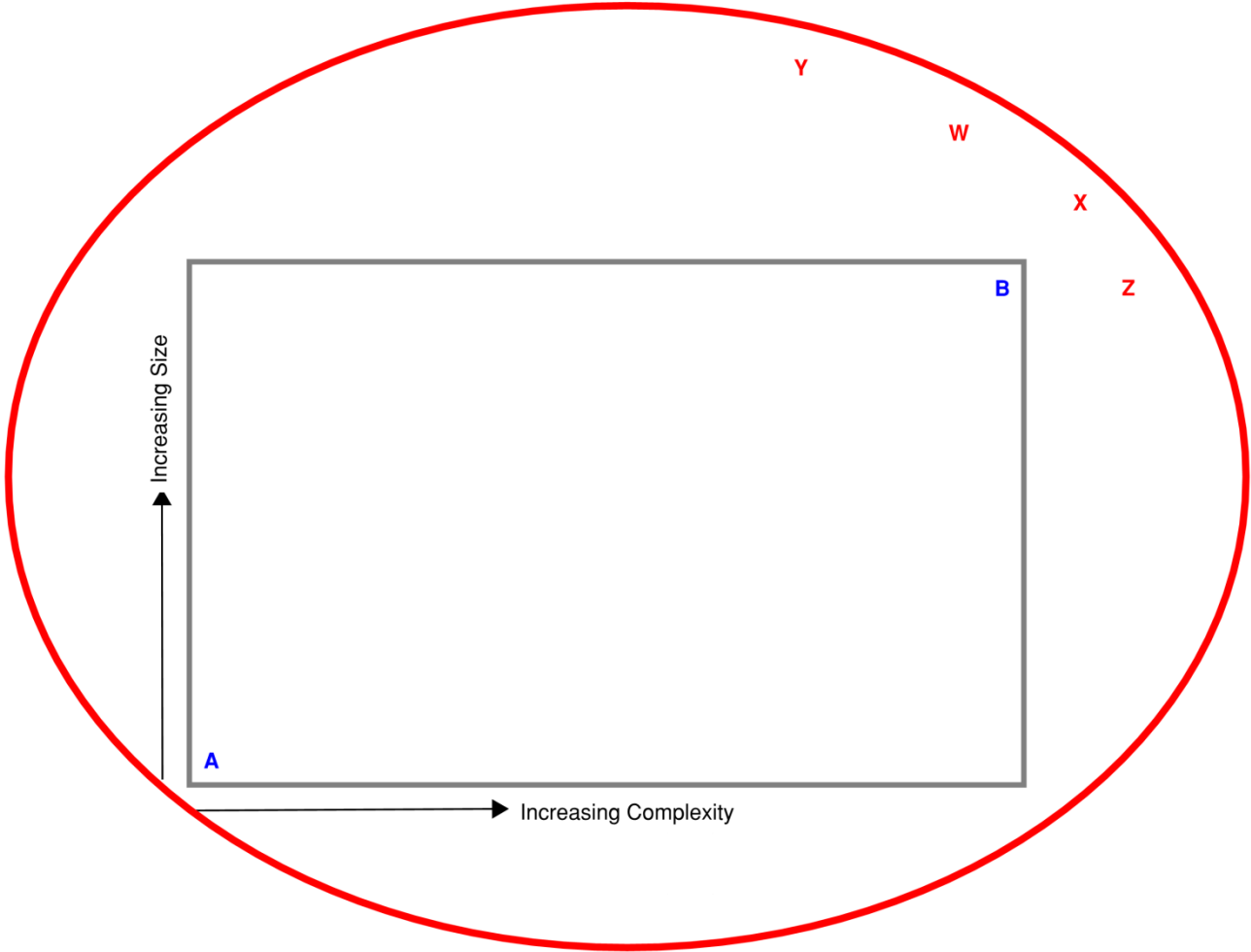
**Fire safety engineering** can provide an alternative approach to the fire safety measures contained in this Technical Handbook. It may be the only practical way to achieve a satisfactory level of fire safety in some large and complex buildings, and in buildings containing different uses such as airport terminals.

Fire safety engineering may also be suitable for solving a problem with any aspect of the design which otherwise follows the guidance in this Handbook. Alternative fire safety measures include for example, the use of automatic fire detection, suppression and ventilation systems in conjunction with passive fire protection. It is reasonable to demonstrate compliance with the functional standards by alternative means and in such cases, the verifier and the fire authority should be consulted early in the design process.

Not all cases of variance from the guidance will require the appointment of a fire engineer. Reference could be made to 'A simplified approach to alternative fire safety strategies' Scottish Government (2010).



# Outside the Envelope – Safe Design/ Build



# Verification Aids & Conflicts

## Aids

- NDTH – Clause introduction & ‘deemed to satisfy/ prescriptive’
- BSD Guidance –Simplified Guide, Published Views, FSDS
- BS7974, PDs
- IFEG
- QDR

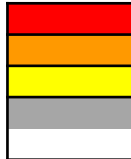


# Building Regulation Lifecycle – Concept, Design, Construct

	Need and Feasibility				Design and Construction								
RIBA stages	Pre-agreement	Appraisal	Strategic briefing		Outline proposals	Scheme design (detailed proposals)	Detail design (Final proposals)	Production information	Tender documentation	Tender action	Project planning	Construction to practical completion	After practical completion
Sub Process	Demonstrate the need	Conception of need	Outline feasibility	Substantive feasibility	Outline conceptual design	Full conceptual design	Detailed, – coordinated designs	Production information			Phasing, Site mobilisation	Construction	
Architects/designers	Yellow	Orange	Orange	Orange	Red	Red	Red	Red	Red	Red	Red	Yellow	Orange
Consulting engineers	Orange	Orange	Orange	Red	Red	Red	Red	Orange	Orange	Orange	Red	Red	Orange
Client	Red	Red	Red	Orange	Orange	Red	Orange	Orange	Yellow	Yellow	Yellow	Orange	Yellow
End User	Yellow		Orange	Orange	Yellow	Red	Orange	Yellow			Yellow	Red	Orange
F & R Services		Yellow	Yellow	Yellow	Red	Red	Red	Yellow				Orange	Yellow
Local Authorities	Yellow		Yellow	Yellow	Red	Red	Red	Yellow				Orange	Yellow
Insurers			Yellow	Yellow	Yellow	Orange	Orange	Orange			Yellow	Yellow	Orange

**INPUT KEY**

- Formal, specified
- Formal, open/unspecified
- Informal
- Possible
- No input required



# Lifecycle – Concept, Design, Construct

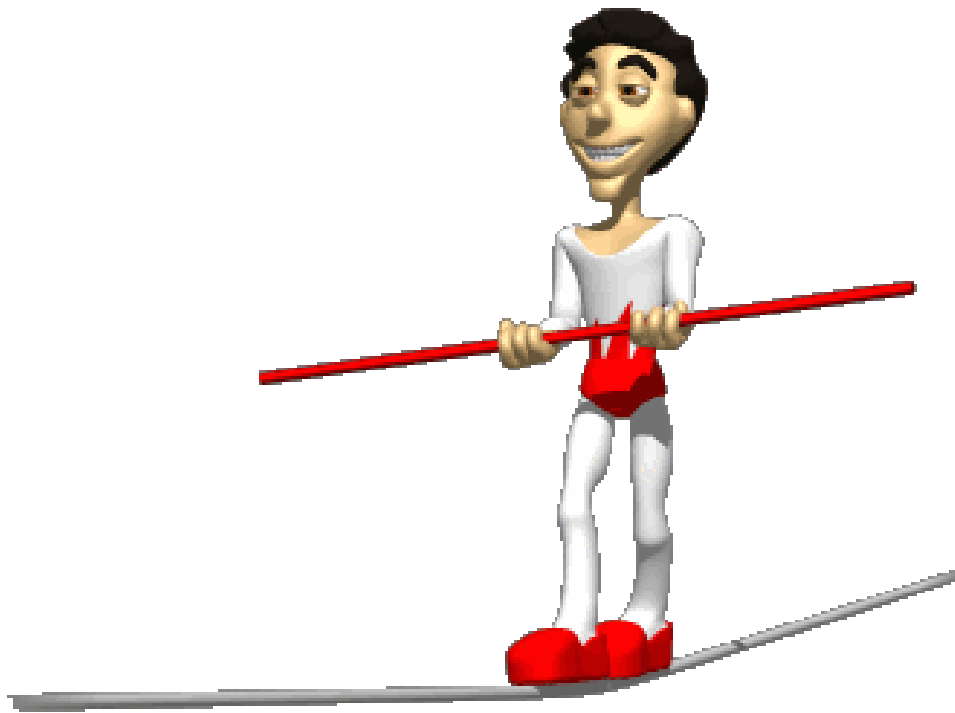
RIBA stages	Need and Feasibility				Design and Construction								
	Pre-agreement	Appraisal	Strategic briefing		Outline proposals	Scheme design (detailed proposals)	Detail design (Final proposals)	Production information	Tender documentation	Tender action	Project planning	Construction to practical completion	After practical completion
Sub Process	Demonstrate the need	Conception of need	Outline feasibility	Substantive feasibility	Outline conceptual design	Full conceptual design	Detailed, – coordinated designs	Production information			Phasing, Site mobilisation	Construction	
Architects/designers													
Client and End user													
Regulators													
Fire Engineer													
Milestones							Warrant						

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# Fire Engineer



‘The art of fire engineering’





## Conflict – Good vs Evil? 😊

- **Regulator vs Client**, [or Client vs Regulator ]
- The body who pays for the service (Client).
- The body there to verify (LA (and FRS?)).
- Both are Customers
- FE = Technical and Procedural Translator



# Conflicts – FE Brief

- Regulatory Expectation (QDR, Full fire strategy, FSSD)
- VS.....
- The Brief
- [Scope vs Fee]
- **QDR** vs Imposed FA



# Conflict –Guidance ‘Flaws’

Fundamental approach, New Research etc shows that:

- (Flawed) Prescriptive guidance - out of date, and/ or wrong.
  - Positively, or
  - Negatively

eg. External Spread, 4.5m Rule, etc.

- Pace of Regulatory change?



# Conflicts – Experience, Expertise and Language

- The most important things you know.....
- Complexity of FE design.
- 100% **technical** certainty – translated...
- Other ways to approve?
  - **Centres of Excellence**
  - **3<sup>rd</sup> Party Review**
  - **Self Certification/ Licensing/ Audit**
  - **Approved Inspectors (AIs)**

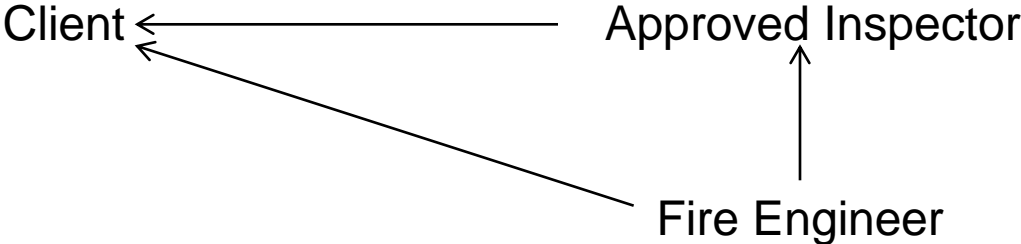


# Als - A healthy system?

## Scotland



## England & Wales



# Problem – Strategy Implementation through Construction

## Bad Buildings

### Strategy:-

- Needs to be clearly recorded and available.
- Needs to be buildable.
- Needs to be properly supervised during construction.
- Who is responsible for inspection and sign off?



# Problem– Design & Construct to Operational Safety

	Need and Feasibility				Design and Construction									Operation			
RIBA stages	Pre-agreement	Appraisal	Strategic briefing		Outline proposals	Scheme design (detailed proposals)	Detail design (Final proposals)	Production information	Tender documentation	Tender action	Project planning	Construction to practical completion	After practical completion	Evaluation			
Sub Process	Demonstrate the need	Conception of need	Outline feasibility	Substantive feasibility	Outline conceptual design	Full conceptual design	Detailed, -coordinated designs	Production information			Phasing, Site mobilisation	Construction		Handover	Operation	Maintenance	Change/ Change of use
	Building Regulations ( Fire Safety)												Operational Fire Safety Regulations				
Strategy in Place																	
Milestones						QDR	Warrant					PHFRA			FRA		New Warrant

## NDTH 2.07 – Alternative Approaches

“The fire strategy should preferably support any fire safety risk assessment required under Part 3 of the Fire (Scotland) Act 2005, as amended.”

Holistic design would help?



# Lifecycle

RIBA stages	Need and Feasibility				Design and Construction									Operation			
	Pre-agreement	Appraisal	Strategic briefing		Outline proposals	Scheme design (detailed proposals)	Detail design (Final proposals)	Production information	Tender documentation	Tender action	Project planning	Construction to practical completion	After practical completion	Evaluation			
Sub Process	Demonstrate the need	Conception of need	Outline feasibility	Substantive feasibility	Outline conceptual design	Full conceptual design	Detailed-coordinated designs	Production information			Phasing, Site mobilisation	Construction		Handover	Operation	Maintenance	Change/ Change of use
	Building Regulations ( Fire Safety)												Operational Fire Safety Regulations				
Architects/designers	Formal, specified	Formal, open/unspecified	Formal, open/unspecified	Formal, open/unspecified	Formal, specified	Formal, specified	Formal, specified	Formal, specified	Formal, specified	Formal, open/unspecified	Formal, specified	Formal, open/unspecified	Formal, open/unspecified	Formal, open/unspecified	Formal, open/unspecified	Formal, open/unspecified	Formal, open/unspecified
Consulting engineers	Formal, open/unspecified	Formal, open/unspecified	Formal, open/unspecified	Formal, open/unspecified	Formal, specified	Formal, specified	Formal, specified	Formal, open/unspecified	Formal, open/unspecified	Formal, open/unspecified	Formal, specified	Formal, open/unspecified	Formal, open/unspecified	Formal, open/unspecified	Formal, open/unspecified	Formal, open/unspecified	Formal, open/unspecified
Client	Formal, specified	Formal, specified	Formal, open/unspecified	Formal, open/unspecified	Formal, open/unspecified	Formal, open/unspecified	Formal, open/unspecified	Formal, open/unspecified	Formal, open/unspecified	Formal, open/unspecified	Formal, open/unspecified	Formal, open/unspecified	Formal, open/unspecified	Formal, open/unspecified	Formal, open/unspecified	Formal, open/unspecified	Formal, open/unspecified
End User	Formal, open/unspecified		Formal, open/unspecified	Formal, open/unspecified	Formal, open/unspecified	Formal, open/unspecified	Formal, open/unspecified	Formal, open/unspecified			Formal, open/unspecified	Formal, open/unspecified	Formal, open/unspecified	Formal, open/unspecified	Formal, open/unspecified	Formal, open/unspecified	Formal, open/unspecified
F & R Services		Formal, open/unspecified	Formal, open/unspecified	Formal, open/unspecified	Formal, specified	Formal, specified	Formal, specified	Formal, open/unspecified				Formal, open/unspecified	Formal, open/unspecified	Formal, open/unspecified	Formal, open/unspecified	Formal, open/unspecified	Formal, open/unspecified
Local Authorities	Formal, open/unspecified		Formal, open/unspecified	Formal, open/unspecified	Formal, specified	Formal, specified	Formal, specified	Formal, open/unspecified				Formal, open/unspecified	Formal, open/unspecified	Formal, open/unspecified	Formal, open/unspecified	Formal, open/unspecified	Formal, open/unspecified
Insurers			Formal, open/unspecified	Formal, open/unspecified	Formal, open/unspecified	Formal, open/unspecified	Formal, open/unspecified	Formal, open/unspecified			Formal, open/unspecified	Formal, open/unspecified	Formal, open/unspecified	Formal, open/unspecified	Formal, open/unspecified	Formal, open/unspecified	Formal, open/unspecified
Fire Engineer					Possible	Possible	Possible	Possible			Possible	Possible	Possible	Possible	Possible	Possible	Possible
Milestones						QDR	Warrant					PHFRA			FRA		New Warrant

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# (Almost)Missing Bits

- Role of the statutory consultee./ 2 part Regulation – Design, build, then operate.
- Class/ Type Approvals
- Verification of CFD and modelling
- Better integration of universal access into Fire safety



# Summary

- Enabled and optimised safe lifecycle
- VS
- Constrained, over engineered and potentially still unsafe as built.

Thank You

