THIS TALK:

SHB Scottish House Builders Health & Safety Forum

UPDATE ON GUIDANCE FROM THE UKTFA

1st May 2013

RISK MITIGATION on

FIRE DURING THE CONSTRUCTION PROCESS

Martin Milner . UKTFA technical consultant

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THE UK TIMBER FRAME ASSOCIATION

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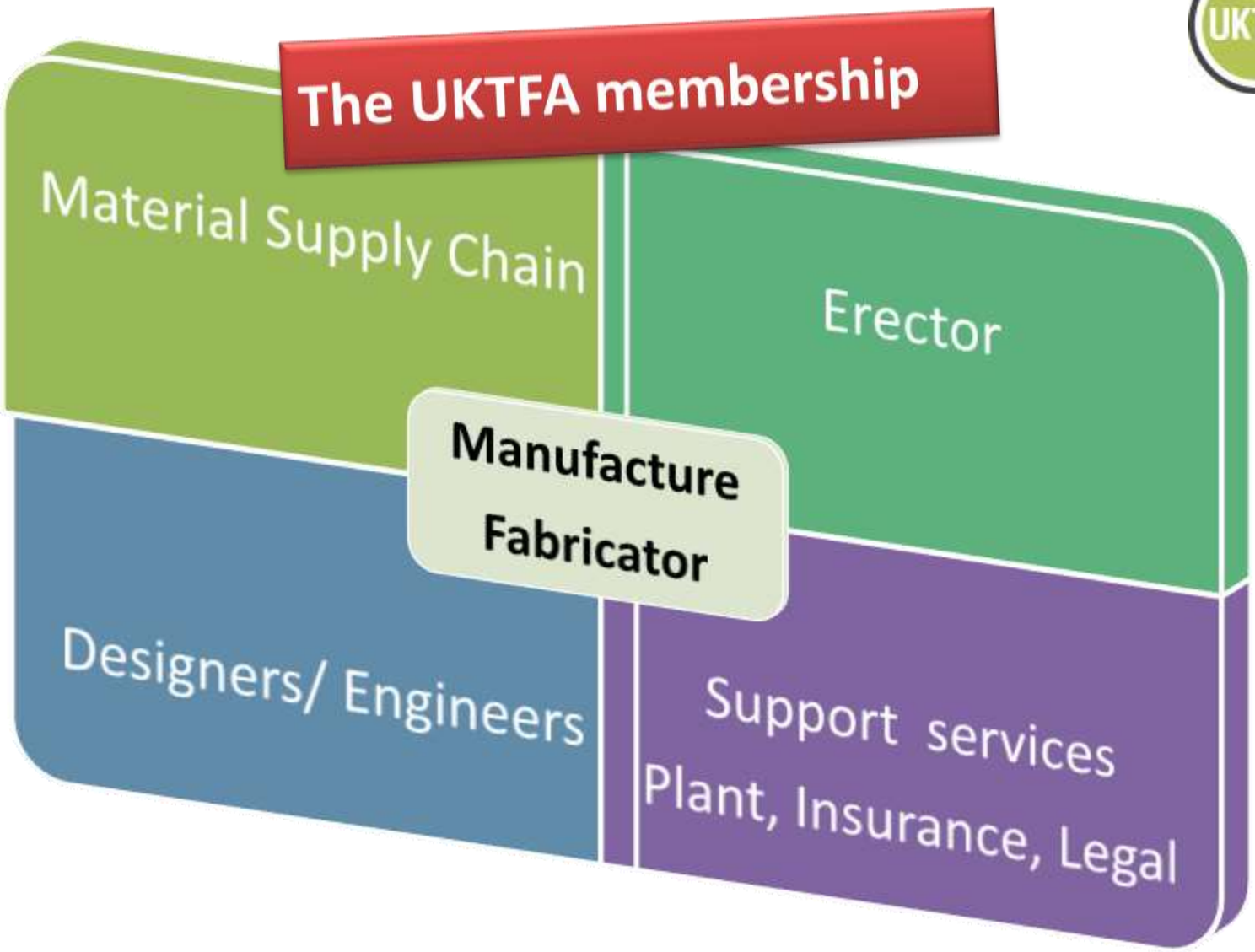

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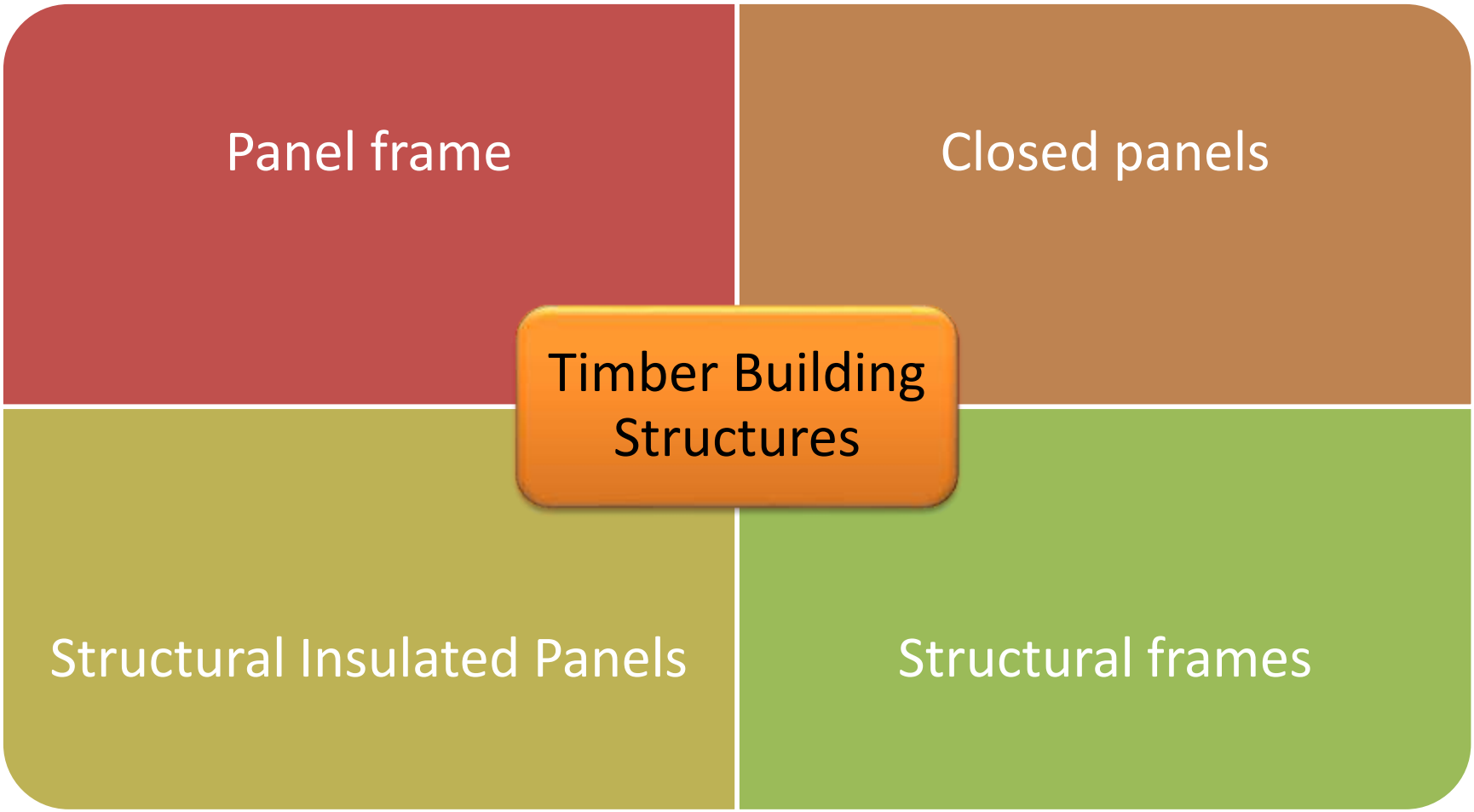
UKTFA covers



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About us

- To provide guidance and information
- To participate in continual education and research
- To foster quality and sustainability standards within members
- To engage and influence regulation
- CE marking advice to members

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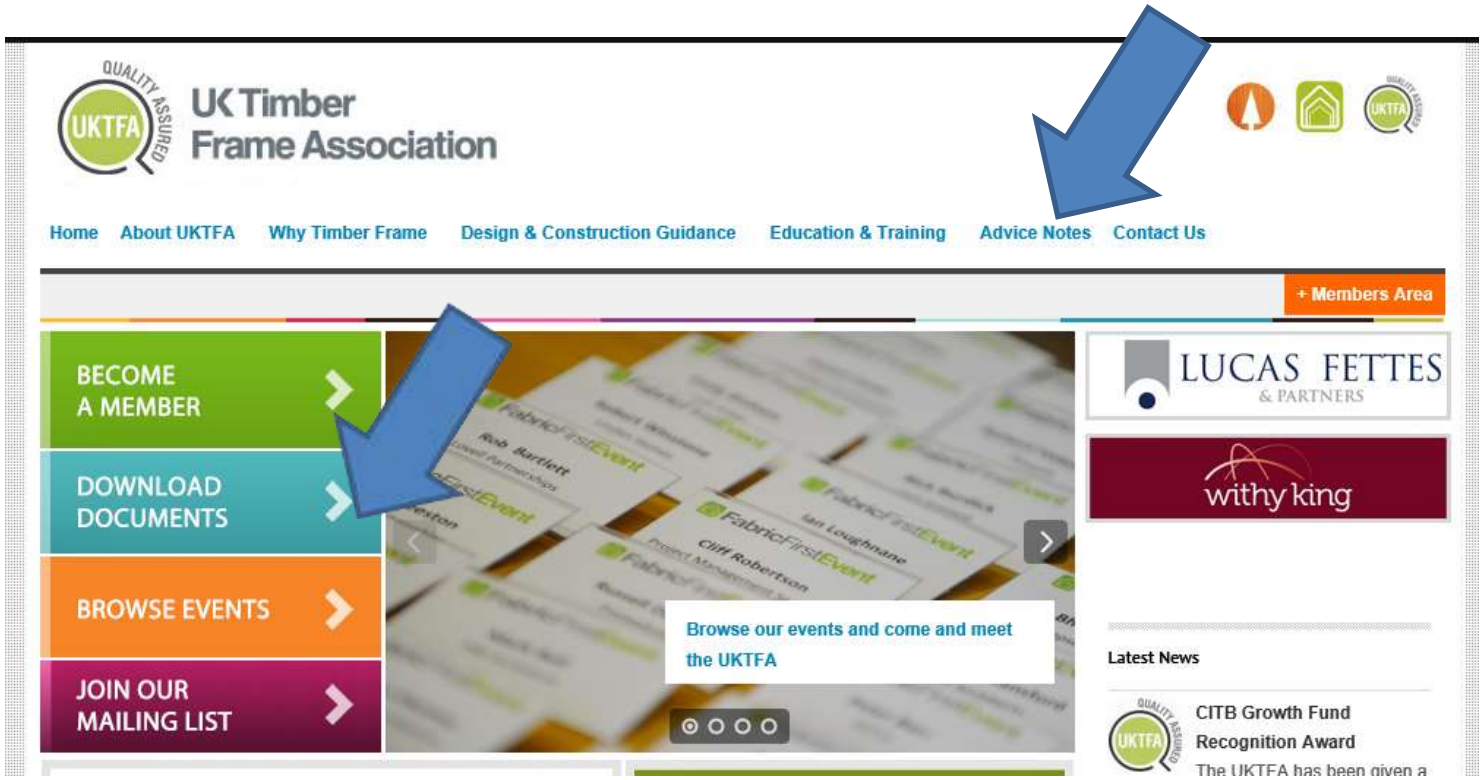
www. UKTFA.COM



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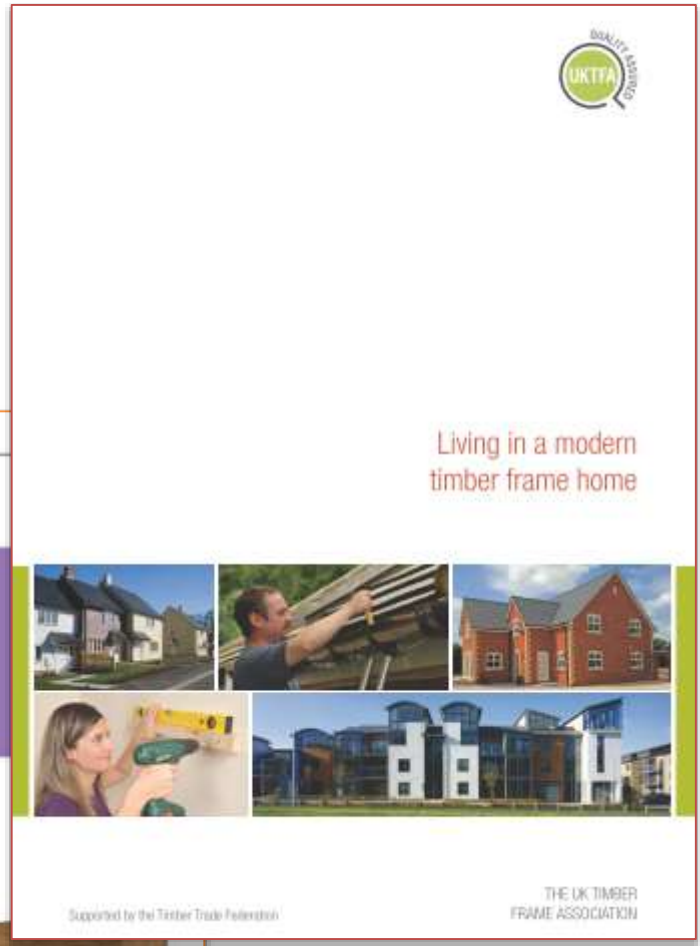
Design life of structures

In the UK the British Standards have a design life for buildings as noted in the table below:		
Design life to BS 7543: 1992	Structures	Construction Design life description: Medium Life Design life: minimum period 30 years
		Refurbishment Design life description: Short Life Design life: minimum period 10 years
	Components & assemblies	Main structural elements: design life: 60 years Floor finishes: design life < 60 years
Design life to BS EN 1990: 2002		
Design life to BS ISO 15686-1: 2000	Components & assemblies within a building	
Specific to timber frame the following co		
Design life to BS5268: Part 5: 1989	Timber in buildings	

ZERO CARBON HUB



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THIS TALK:

UPDATE ON GUIDANCE FROM THE UKTFA

RISK MITIGATION

FIRE DURING THE CONSTRUCTION PROCESS

Martin Milner . UKTFA technical consultant

What is in this talk

1)What is the guidance for
2)What is radiant heat
3)What is in the guidance
4)How to use the separation guidance
5)Pardon can you repeat that

What is in this talk

1)What is the guidance for

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5)Pardon can you repeat that

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Site works

- All materials / processes

have risk

- Falling materials,

wind driven dust, trips,

holes, heavy materials etc.

Site works

- Fire – from site works, external and arson

Mind set changing – fire and construction life!!

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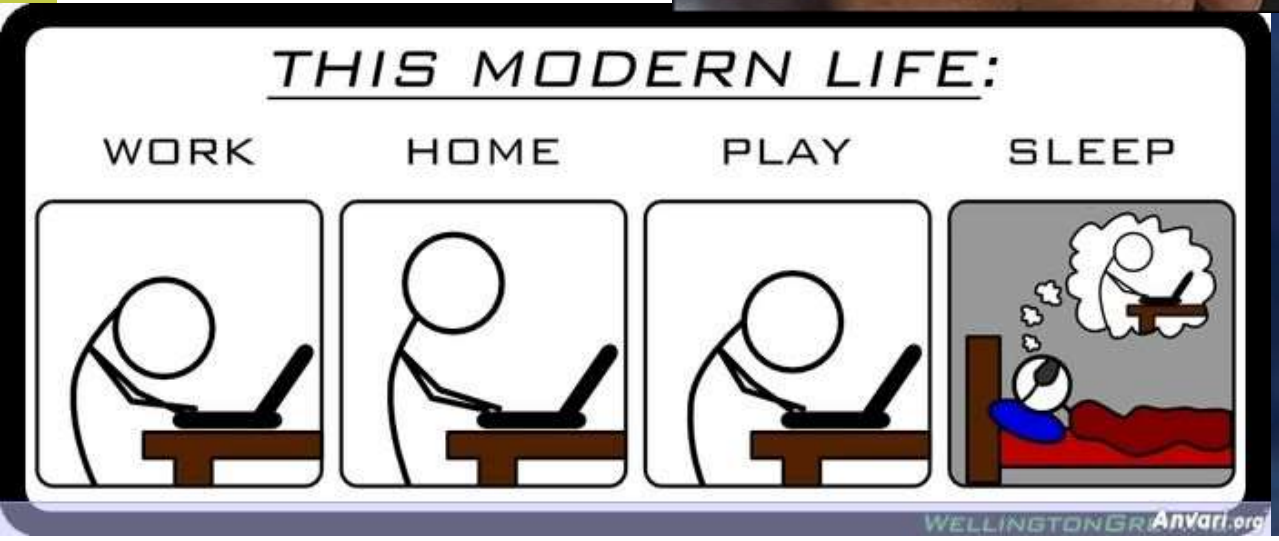
THIS MODERN LIFE:
WORK
HOME
PLAY
SLEEP


CHANGE
AHEAD

But on the construction site??

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Things do change

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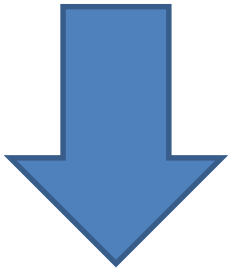
Products and processes change

- Open panel
- Pre insulated
- Closed panel



Erecting
Safety facilities

Approach to fire risk mitigation from the timber frame supplier

the UKTFA Guidance is

……..

To support UKTFA member clients in the **CDM 2007** regulation duties…….

……

on the **risk of fire** during the construction process

= UKTFA Site Safe

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CDM Red, amber and green lists

- Designs of structures that do not allow for fire containment during construction

ALL UK

- Off site fabrication and prefabricated elements to minimize on site hazards.

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Others in a construction project

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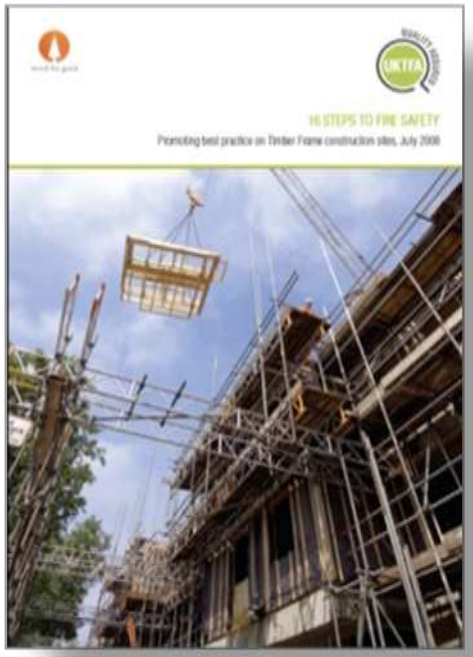

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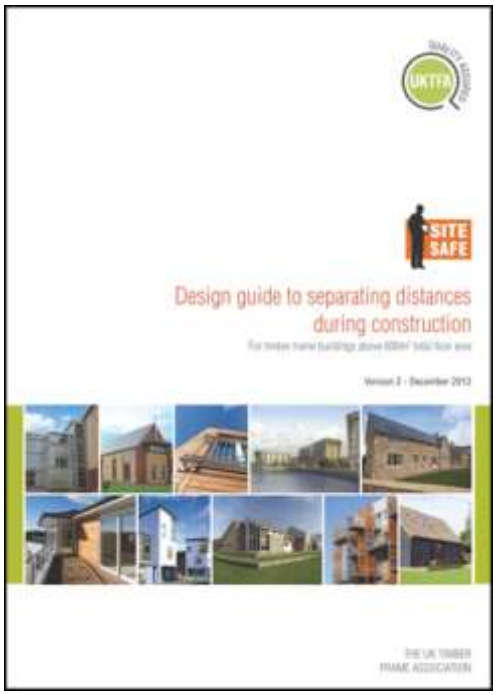

QUALITY ASSURED UKTFA

UKTFA Guidance to support the industry in reducing risk of fire during construction

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UKTFA Site Safe Strategy to address……

Concept → Design → Procurement → Construction → Use

ABC → DEF → GH → JKL

RIBA work stages

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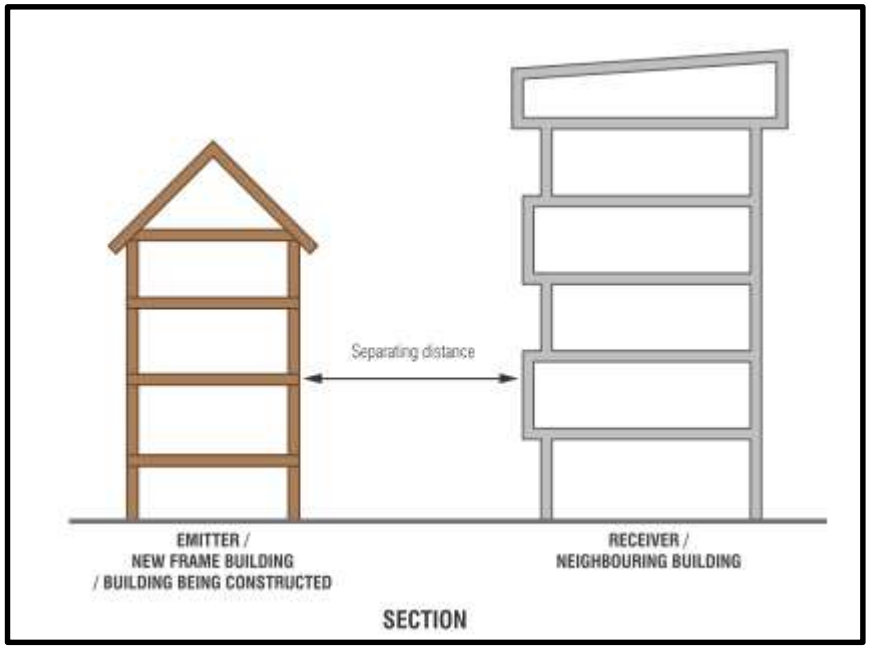
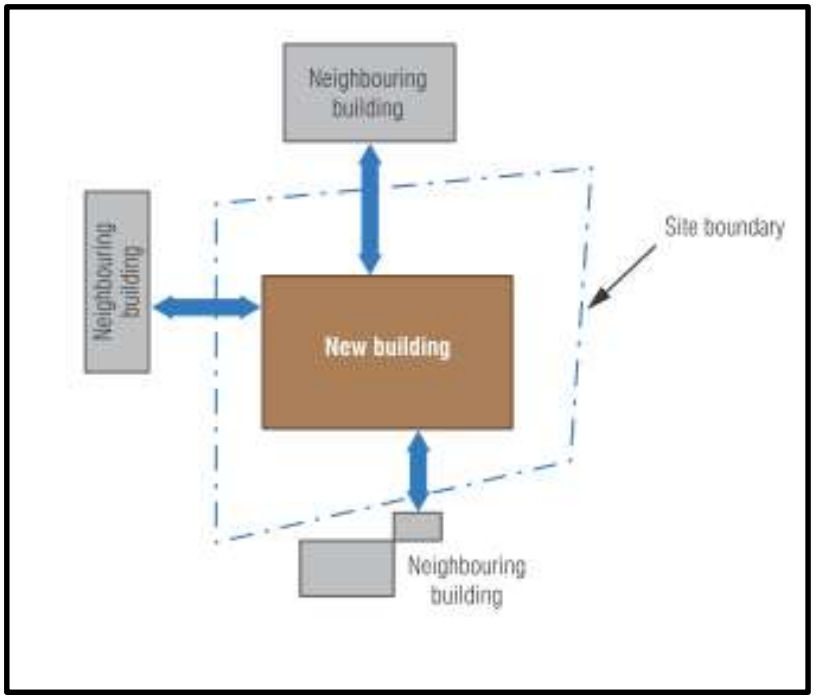
The Separation Guidance





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So we have a design guide to separating distances – based on radiant heat effects

Design guide to separating distances during construction

For timber frame buildings above 600m² total floor area

Version 2 - December 2012

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What is in this talk

1)What is the guidance

2)What is radiant heat

3)Why has it been revised

4)How do I use the separation guidance

5)Pardon can you repeat that

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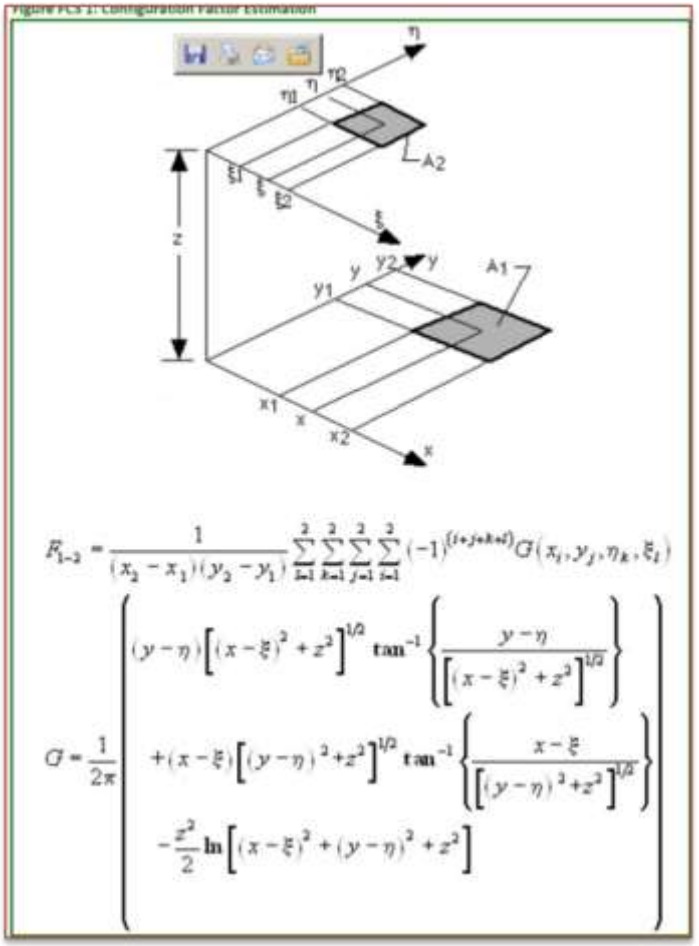
To an engineer - Radiant Heat is…

$$q = \sigma\phi\varepsilon T_f^{\,4}\ \mathrm{kWm^{-2}}$$



$$F_{1-2} = \frac{1}{(x_2 - x_1)(y_2 - y_1)} \sum_{k=1}^{2}\sum_{k=1}^{2}\sum_{j=1}^{2}\sum_{i=1}^{2} (-1)^{(i+j+k+l)} G(x_i, y_j, \eta_k, \xi_l)$$

$$G = \frac{1}{2\pi}\left\{\begin{array}{l}(y-\eta)\left[(x-\xi)^2 + z^2\right]^{1/2} \tan^{-1}\left\{\dfrac{y-\eta}{\left[(x-\xi)^2 + z^2\right]^{1/2}}\right\} \\ +(x-\xi)\left[(y-\eta)^2 + z^2\right]^{1/2} \tan^{-1}\left\{\dfrac{x-\xi}{\left[(y-\eta)^2 + z^2\right]^{1/2}}\right\} \\ -\dfrac{z^2}{2}\ln\left[(x-\xi)^2 + (y-\eta)^2 + z^2\right]\end{array}\right\}$$

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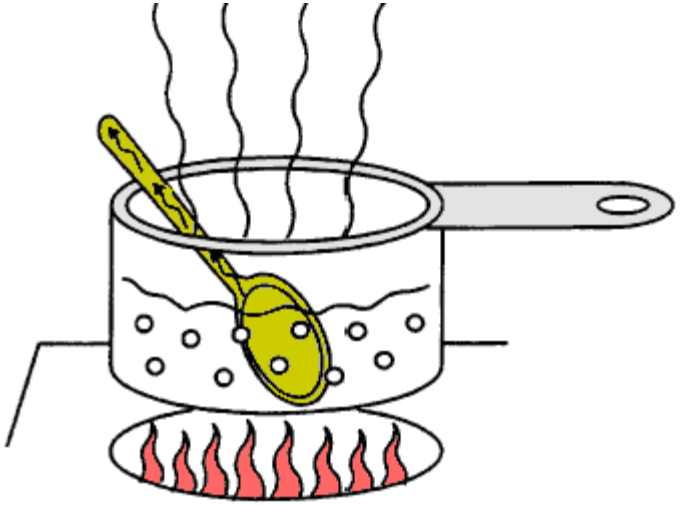

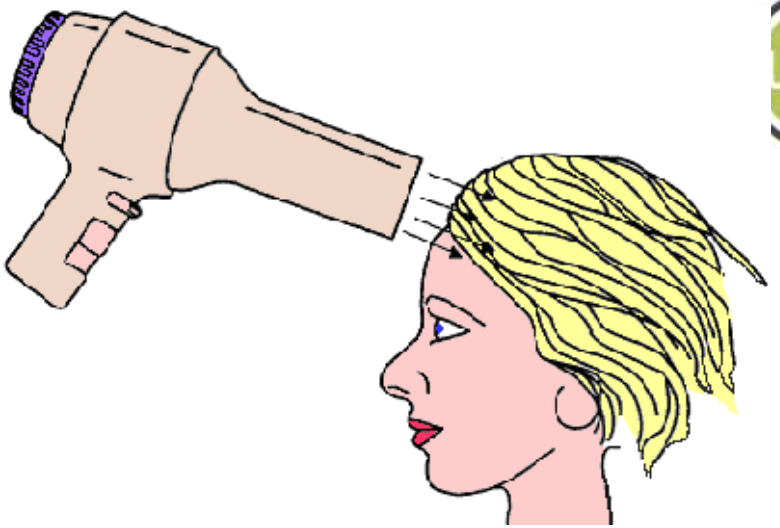

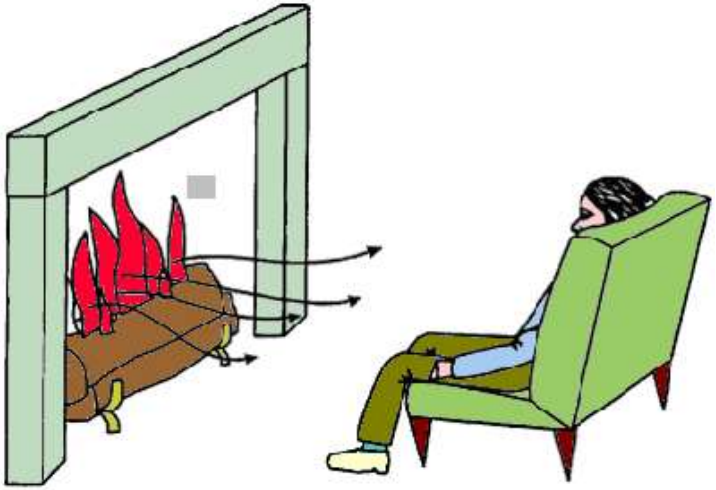

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C) 7.5 kw/m2

B) 1.4kw/m2

A) 12.6 kw/m2

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Safe distances

Not BR 187

What is in this talk

1)What is the guidance
2)What is radiant heat
3)What is in the guidance?
4)How do I use the separation guidance
5)Pardon can you repeat that

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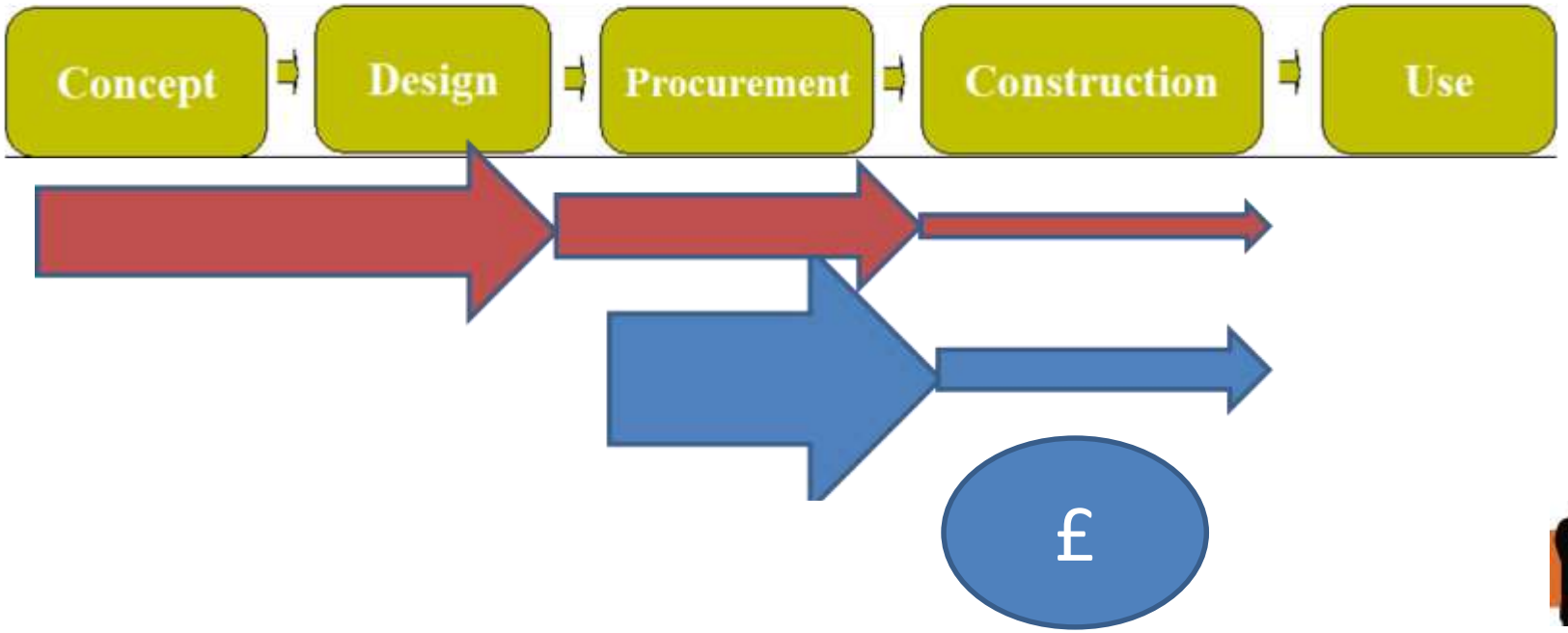
Experience
When to address the risks

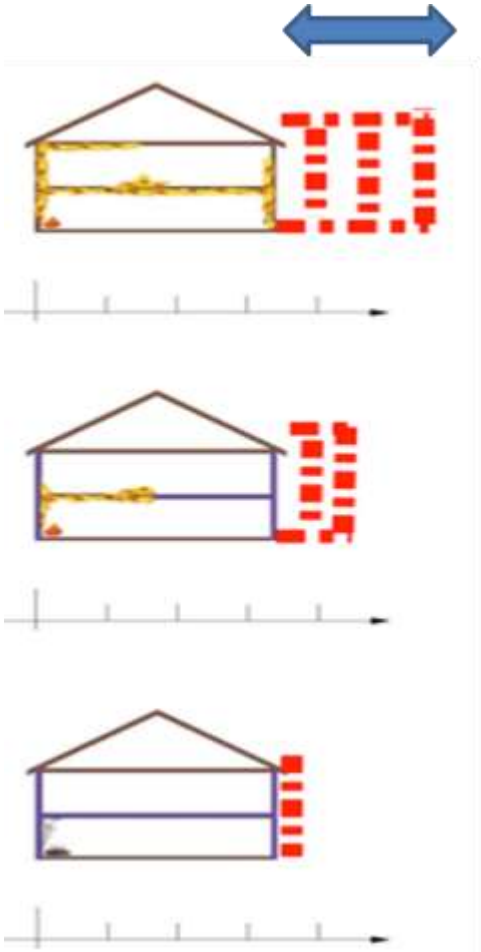


The separation distances

- The Basics

- 3 fire models
- 3 categories of timber frame
- Tables to deliver easy read solutions

what are categories of timber frame



Category A

Category B

Category C

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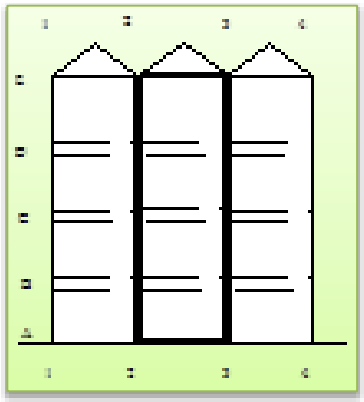
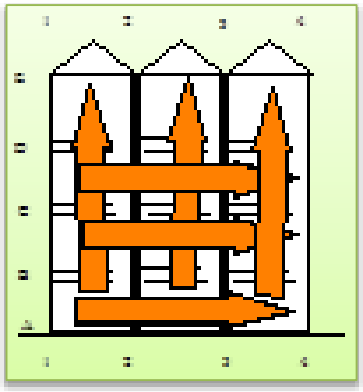
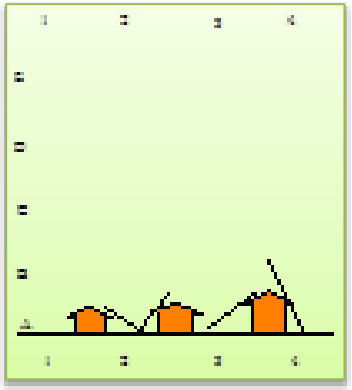
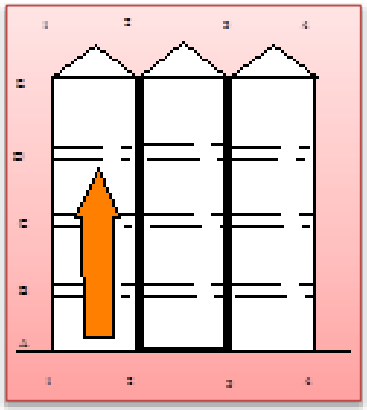
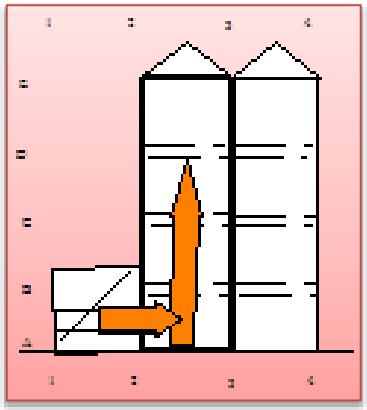
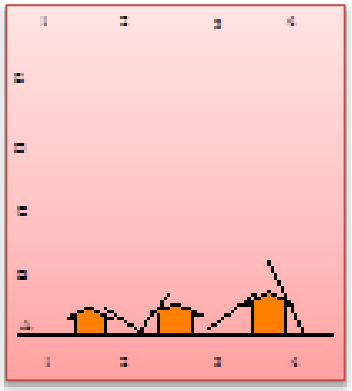
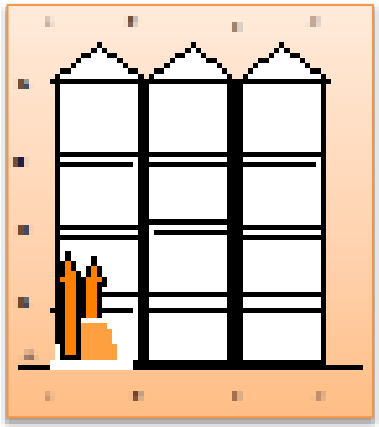
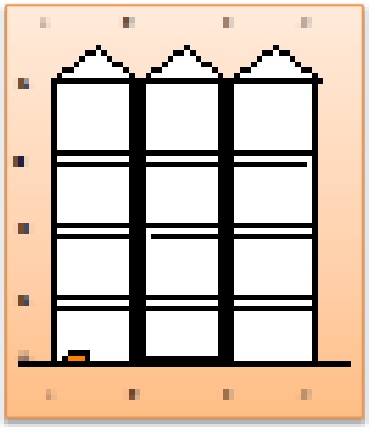
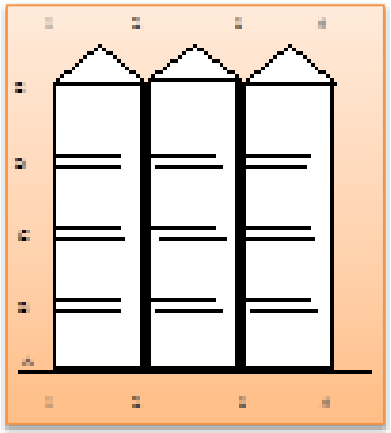

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Category A: **Standard** timber frame

- Risk mitigation through process improvements

Category B: **Reduced fire spread** timber frame

- FR treated timbers, sheathing and decking
- Pre-insulated panels and FR treated timbers, sheathing and decking

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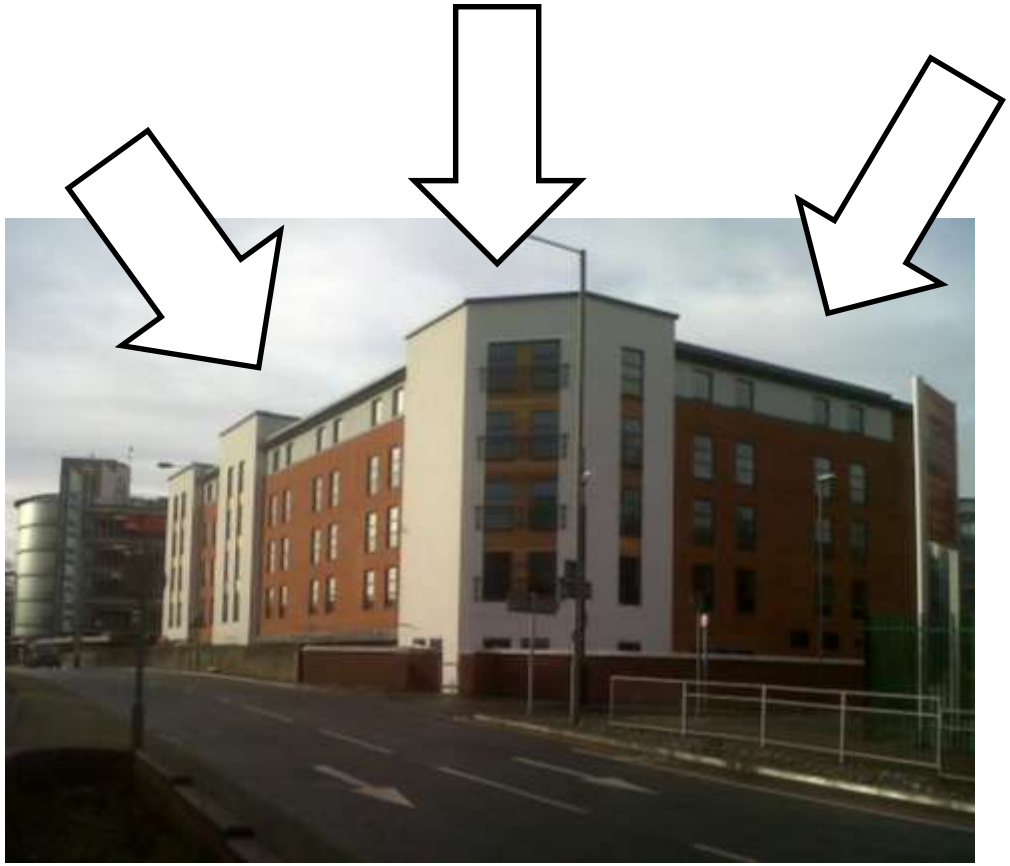
Category C: **Fire spread resistant** timber frame

- Euro Class - A1 or A2 non and limited combustibility sheathing
- FR treated timbers & decking

The Guidance – what are the inputs?



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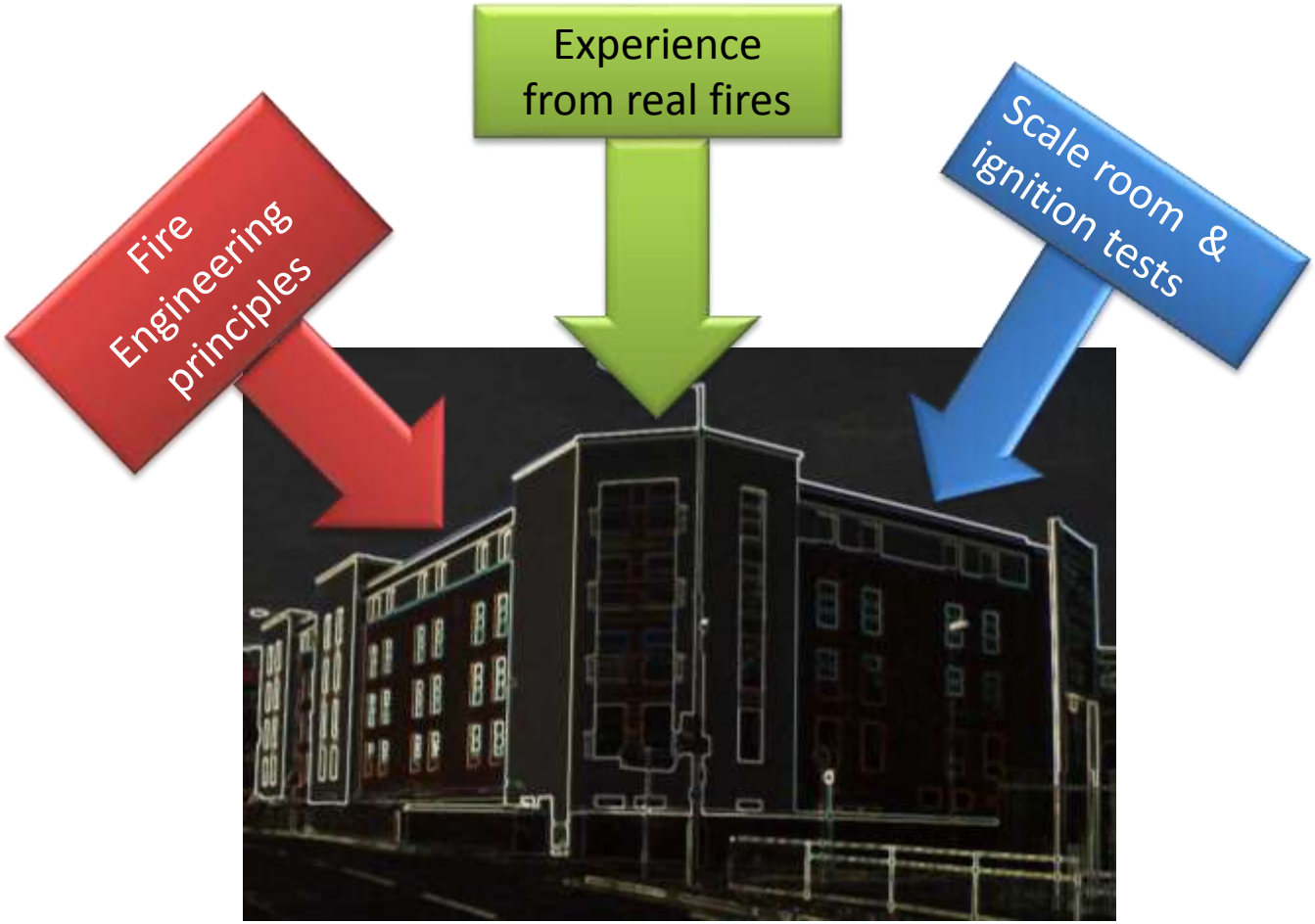
The Guidance – what are the inputs?



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The Guidance –the December 2011 version?

Limited material options

Use of Fire Shields

Fire Shields misused as a mitigation solution

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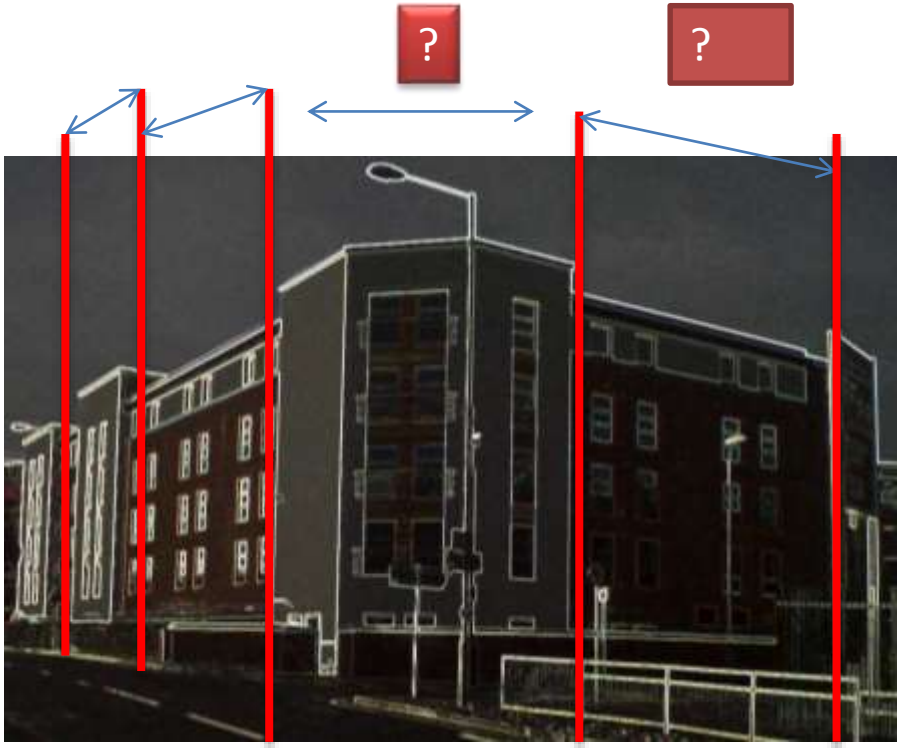
Concern on the definitions of fire barriers –

Compartmentation during construction not understood



UKTFA research in 2012 for v2

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December 2012 edition

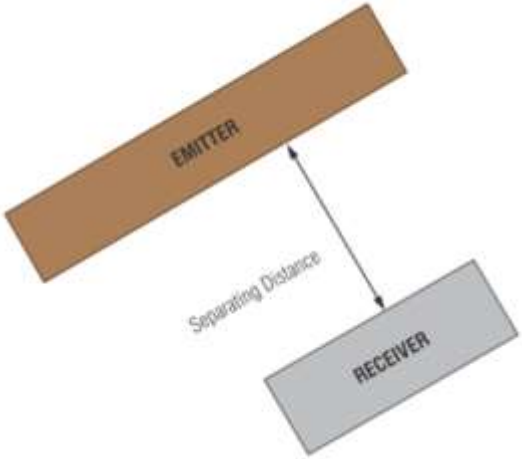
- **Category B** extended and proven
- **Fire Compartmentation** defined
- Emphasis on mitigation **at the design stage**
- Links to **Product Paper 4** – giving supply chain options
- Endorsed by **HSE and CIREG**
- Backed by the **Timber Fire Working Group**

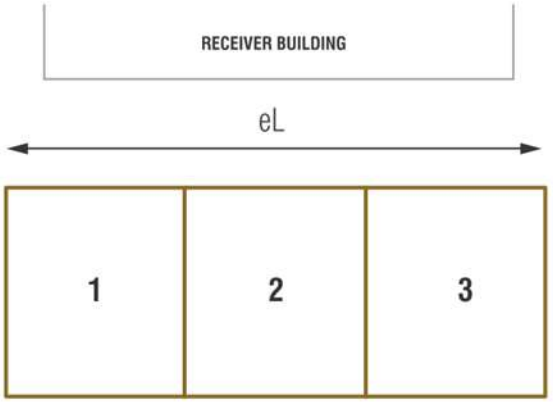
What is in this talk

1)What is the guidance
2)What is radiant heat
3)What is in the guidance
4)How to use the separation guidance
5)Pardon can you repeat that

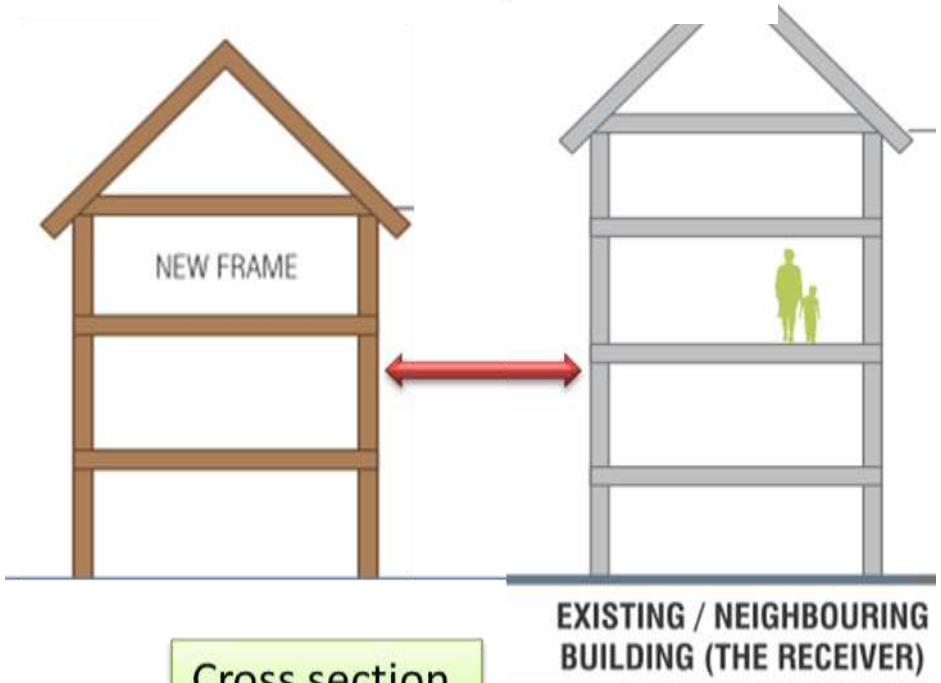
Table 1 for Category A - Timber frame separating distance (m)

Number of timber frame storeys	EMITTER LENGT				
	≤5m	≤10m	≤15m	≤20m	
1	5.5	7.25	8.25	8.75	
2	7.5	10.5	12.75	14.25	
3	9	13	16	18	
4	10	15	18.5	21.25	





Plan



Cross section

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UKTFA Separation distance guidance

Example

4 storey with 15m emitter face (building greater than 600m²)

Category A – 18.5m

Category B2 - 12.75m

Category C – 7.00m

Responsible persons:

Principal Contractor, Fire Risk Assessor

Number of timber frame storeys	EMITTER LENGTH						
	≤5m	≤10m	≤15m	≤20m	≤25m	≤40m	>40m
1	5.5	7.25	8.25	8.75	9.5	10.25	10.5
2	7.5	10.5	12.75	14.25	15.5	18	20.25
3	9	13	16	18	20	23.25	28.5
4	10	15	18.5	21.25	23.5	28.5	35.75
5	11	16.5	20.5	23.75	26.5	32.5	41.75
6	11.5	18	22.5	26	29	36	47.25
7	12.25	19	24	28	31.5	39.25	52.5

Number of timber frame storeys	EMITTER LENGTH - B2 FRAME			
	≤5m	≤10m	≤15m	≤20m
1	5	5	5.25	5.5
2	5.25	7.25	8.5	9.5
3	6	9	10.75	12.25
4	6.75	10.25	12.75	14.5
5	7	11.25	14	16.25
6	7.25	12	15.25	17.75
7	7.5	12.75	16.25	19.25

Number of timber frame storeys	EMITTER LENGTH - C1 FRAME		
	≤5m	≤10m	≤15m
1	5	5	5
2	5	5	5
3	5	5	5.75
4	5	5.5	7
5	5	6	7.75
6	5	6.25	8.25
7	5	6.5	8.75

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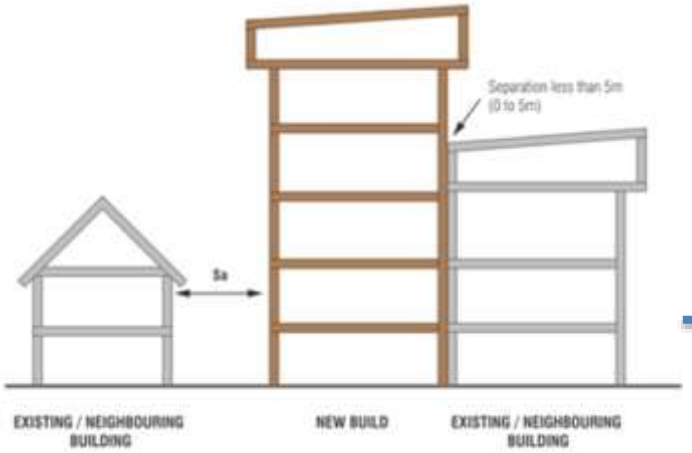

Figure 3.5 Example of extreme condition compliance: where separation distances are closer than possible using Category B and C1 (Elevation view)

Table 4 for Category C2 - Timber frame separating distance (m)

Number of timber frame storeys	EMITTER LENGTH
	n/a
1 - 7	0

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Supporting papers

Supporting documents - technical support:

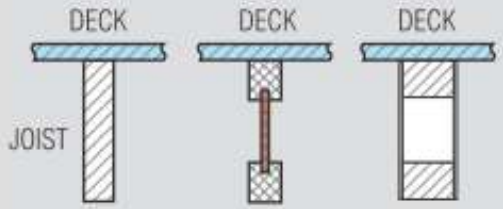
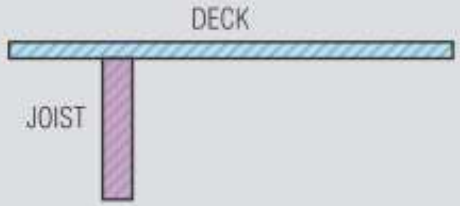
Technical Paper 1	Separating distances technical background report by UKTFA fire engineering consultants - FERMI
Technical Paper 2	Summary of timber frame categories to reduce separating distances and information for fire engineering modelling and test compliance requirements for each category
Technical Paper 3	Product test methodology for category compliance

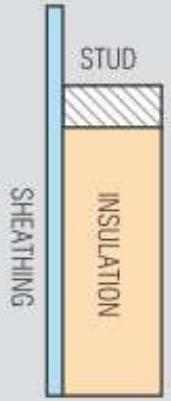
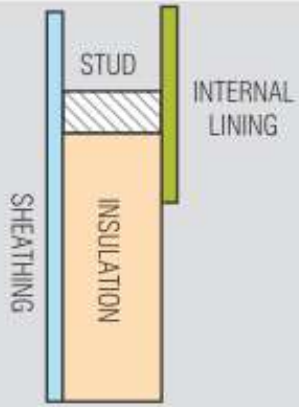
Supporting documents - product compliance:

Product Paper 1	Flame Retardant - FR Build product compliance
Product Paper 2	Insulation - FI Build product compliance
Product Paper 3	Sheathing and decking - FC Build product compliance
Product Paper 4	Product assemblies to achieve different categories of timber frame construction - *results from 2012 research programme*

Product Paper 4

Supply chain solutions

F2		**DECK** - Min 15mm - FR Build treatment **JOIST** - Untreated ***Note:*** *For the use of I joists and Open web floors the stability of the compartment walls is to be justified without the use of the floor support should it burn through.*	1
F3		**DECK** - Min 15mm - FR Build treatment **JOIST** - FR Build treated	2

W7		**STUD** - Untreated **INSULATION** - FI Build min Type 3 **SHEATHING** - FR Build treated min 9mm ***Note:*** *Insulation to be tight fitting and retention of insulation by clips or equal required*	4
W8		**STUD** - Untreated **INSULATION** - FI Build min Type 2 & 3 **INTERNAL LINING** - A1 board 9mm or A2 board 12.5mm **SHEATHING** - External min FR Build treated - 9mm	5

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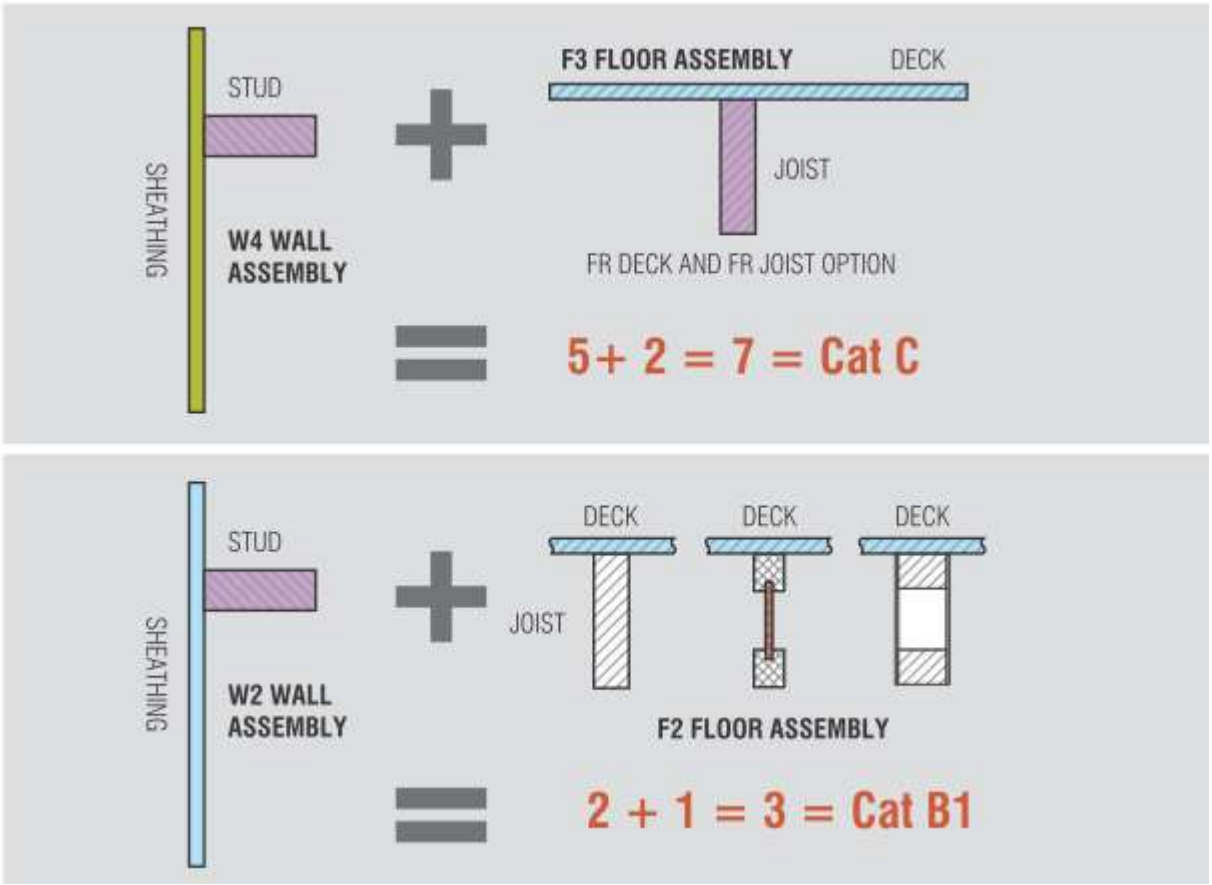

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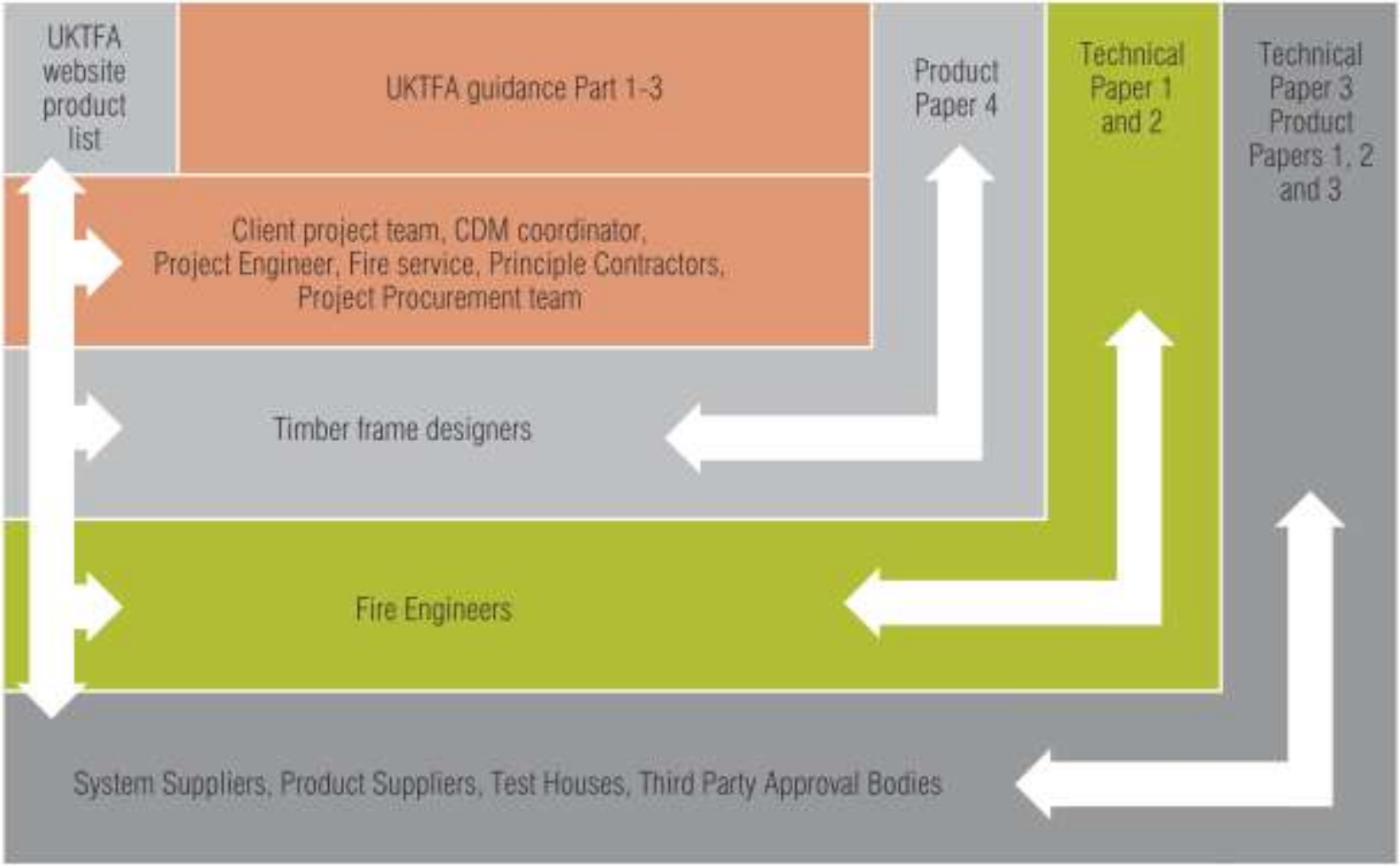

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What is in this talk

1)What is the guidance
2)What is radiant heat
3)What is in the guidance
4)How do I use the separation guidance

5)Pardon can you repeat that

60 second summary

UKTFA Site Safe strategy is joined up thinking across the concept to completed building.

The Site separation document is a part of the UKTFA site safe strategy

60 second summary

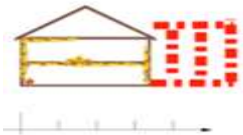
Off the site risk assessment – part of your duties under CDM.

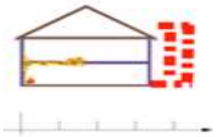
HSE across the UK requires off the site assessment.

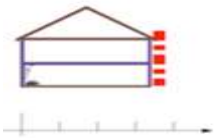
Radiant heat +

Timber frame

Model =







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60 second summary

3 frame categories for the designer to pick

- Standard (A)
- Reduced Fire Spread (B)
- **Fire Spread Resistant** (C)
- Updated Guidance tables to reflect a bigger range of products

Number of timber frame storeys	EMITTER LENGTH						
	≤5m	≤10m	≤15m	≤20m	≤25m	≤40m	>40m
1	5.5	7.25	8.25	8.75	9.5	10.25	10.5
2	7.5	10.5	12.75	14.25	15.5	18	20.25
3	9	13	16	18	20	23.25	28.5
4	10	15	18.5	21.25	23.5	28.5	35.75
5	11	16.5	20.5	23.75	26.5	32.5	41.75

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60 second summary

- The updated separation guidance is to encourage consideration at the design stage
- Supporting documents for all.
- PRODUCT PAPER 4 More choice for deemed to satisfy solutions

Thank you for listening

Confidence to deliver timber frame for a sustainable future

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