



**UNIVERSITY OF LEEDS**

This is a repository copy of *Instrumentation and Measurements of Monitoring Fire-Fighting Operation for a Fully Developed Compartment Fire*.

White Rose Research Online URL for this paper:

<https://eprints.whiterose.ac.uk/83289/>

Version: Accepted Version

---

**Proceedings Paper:**

Alarifi, AA, Phylaktou, HN, Andrews, GE et al. (2 more authors) (2015) Instrumentation and Measurements of Monitoring Fire-Fighting Operation for a Fully Developed Compartment Fire. In: Proceedings of the 8th Saudi Students Conference. 8th Saudi Students Conference, 31 Jan - 01 Feb 2015, Imperial College London, UK. .

---

**Reuse**

Items deposited in White Rose Research Online are protected by copyright, with all rights reserved unless indicated otherwise. They may be downloaded and/or printed for private study, or other acts as permitted by national copyright laws. The publisher or other rights holders may allow further reproduction and re-use of the full text version. This is indicated by the licence information on the White Rose Research Online record for the item.

**Takedown**

If you consider content in White Rose Research Online to be in breach of UK law, please notify us by emailing [eprints@whiterose.ac.uk](mailto:eprints@whiterose.ac.uk) including the URL of the record and the reason for the withdrawal request.



[eprints@whiterose.ac.uk](mailto:eprints@whiterose.ac.uk)  
<https://eprints.whiterose.ac.uk/>



# Instrumentation and Measurements of Monitoring Fire-Fighting Operation for a Fully Developed Compartment Fire

Abdulaziz Alarifi (Aziz)

Presentation for the 8th Saudi Students Conference

31<sup>st</sup> January - 1<sup>st</sup> February 2015

Queen Elizabeth II Centre, London, UK

Authored by

Abdulaziz Alarifi, Dr Herodotos Phylaktou, Prof Gordon Andrews,  
Jim Dave & Dr Omar Aljumaiah





- Introduction to Fire Science and Engineering
- Full scale fire experiments
- Designing a fire test
- Impact

# Introduction – 1



UNIVERSITY OF LEEDS

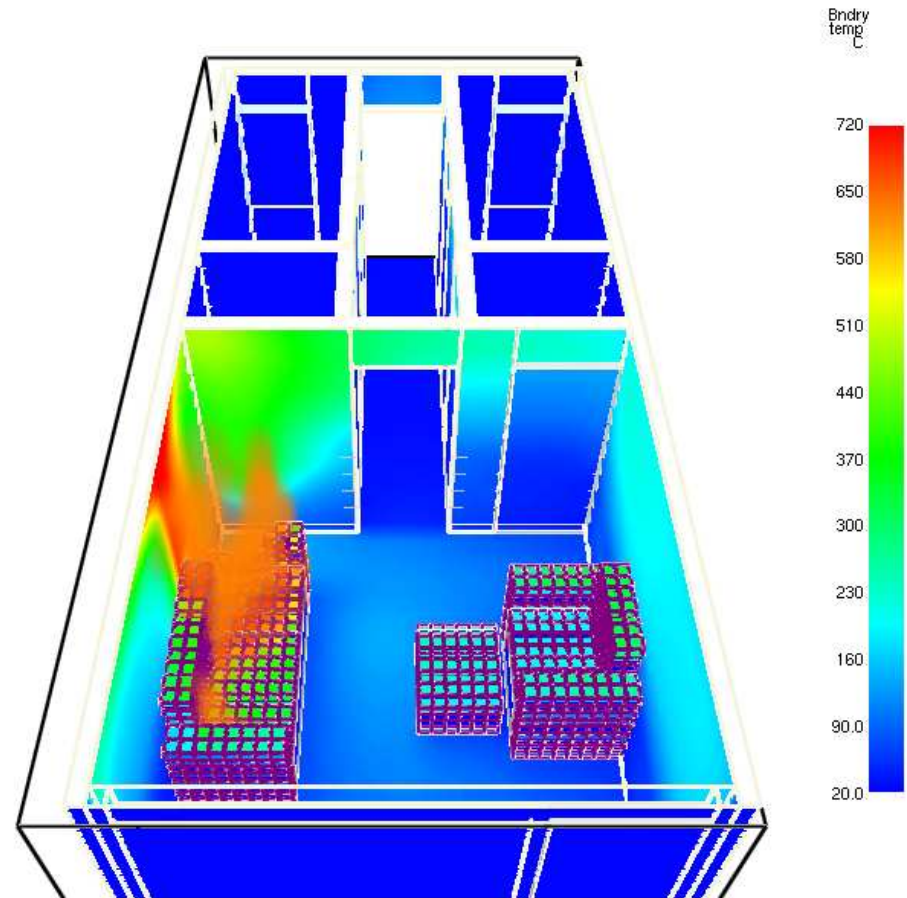
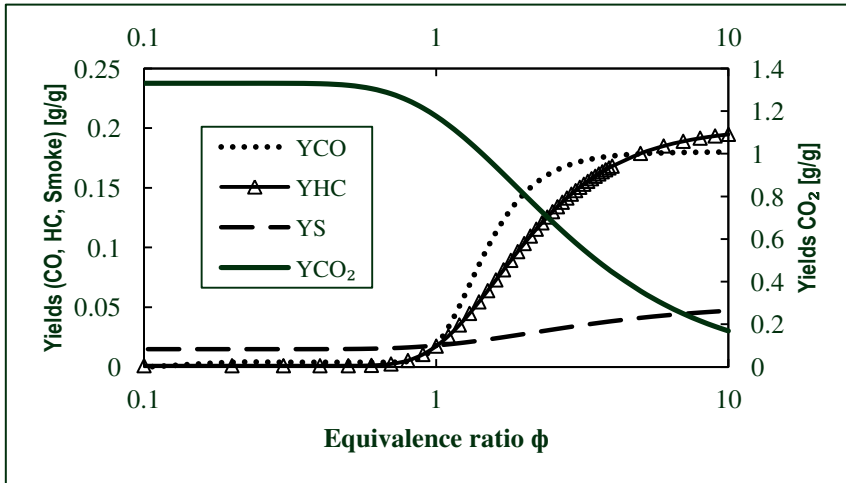
- Fire Science field
  - Importance
    - Disasters



- Fire Science field
  - Importance
    - Disasters
  - Challenges for designing
    - Too many variables

Smokeview 5.6 - Nov 1 2010

- Why?
  - To design safer buildings! How?



Frame: 414  
Time: 828.0

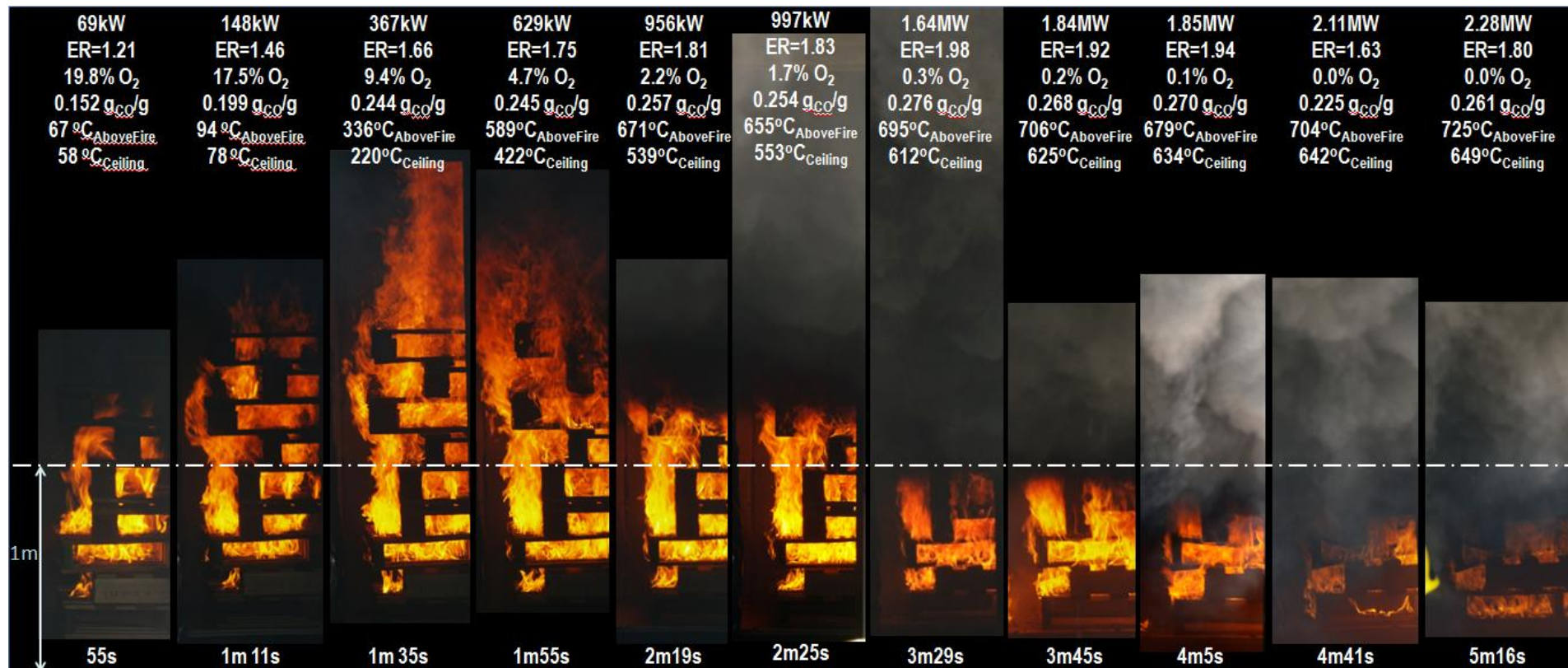
>200 (kW/m3)

# Full Scale Fire Experiments – 2



UNIVERSITY OF LEEDS

- Data output required



# Designing Fire experiment – 1

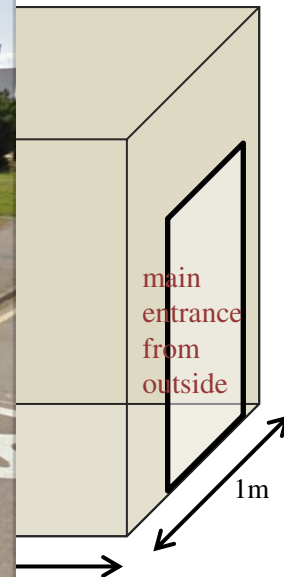


UNIVERSITY OF LEEDS

- Mass Balance



4.15m



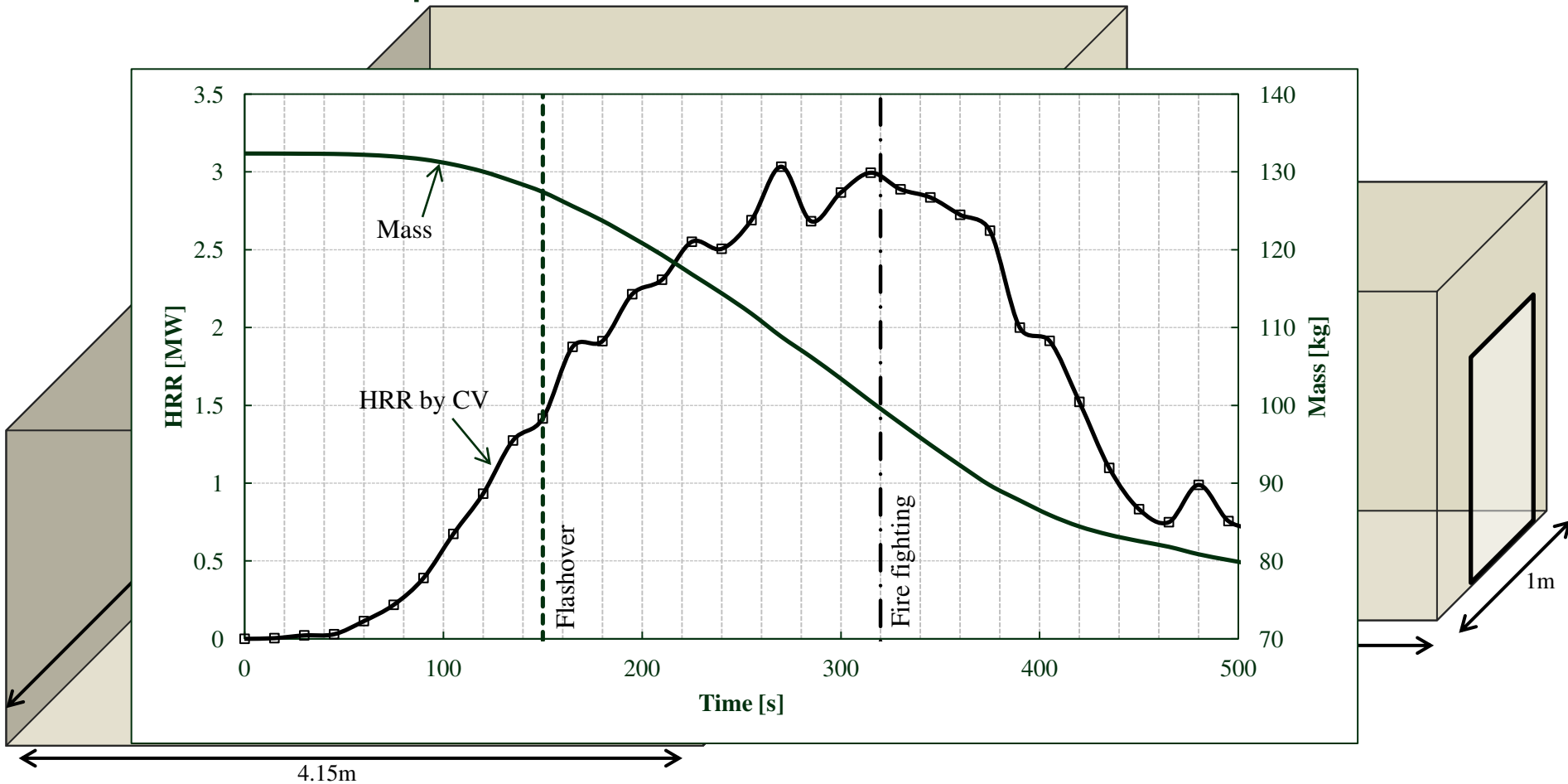


# Designing Fire experiment – 2



UNIVERSITY OF LEEDS

- Fuel? Wooden pallets

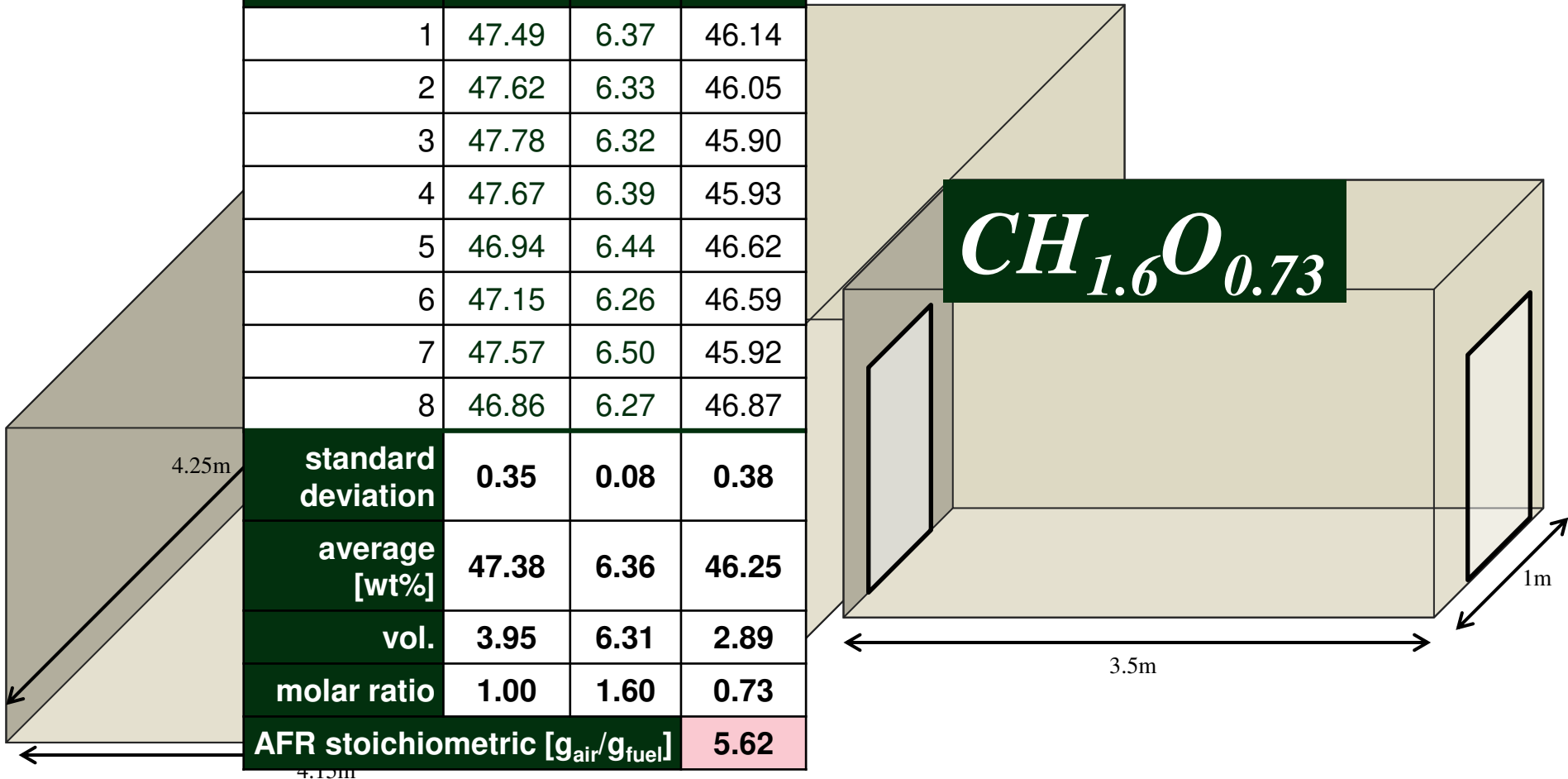


# Designing Fire experiment – 3



•Thermal

Sample#	C [wt%]	H [wt%]	O [wt%]
1	47.49	6.37	46.14
2	47.62	6.33	46.05
3	47.78	6.32	45.90
4	47.67	6.39	45.93
5	46.94	6.44	46.62
6	47.15	6.26	46.59
7	47.57	6.50	45.92
8	46.86	6.27	46.87
<b>standard deviation</b>	<b>0.35</b>	<b>0.08</b>	<b>0.38</b>
<b>average [wt%]</b>	<b>47.38</b>	<b>6.36</b>	<b>46.25</b>
<b>vol.</b>	<b>3.95</b>	<b>6.31</b>	<b>2.89</b>
<b>molar ratio</b>	<b>1.00</b>	<b>1.60</b>	<b>0.73</b>
<b>AFR stoichiometric [g<sub>air</sub>/g<sub>fuel</sub>]</b>			<b>5.62</b>



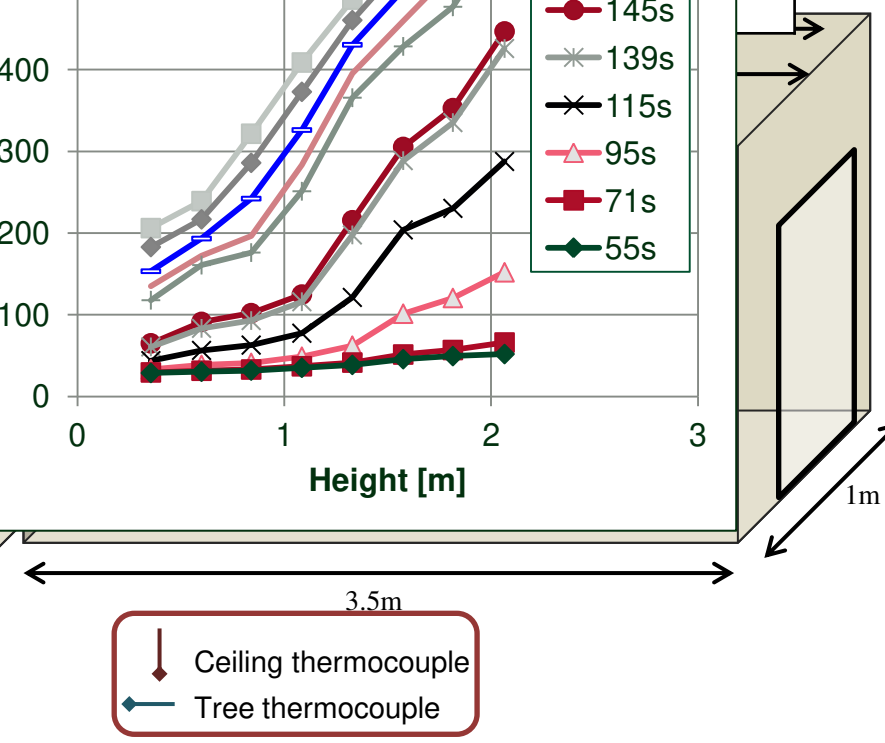
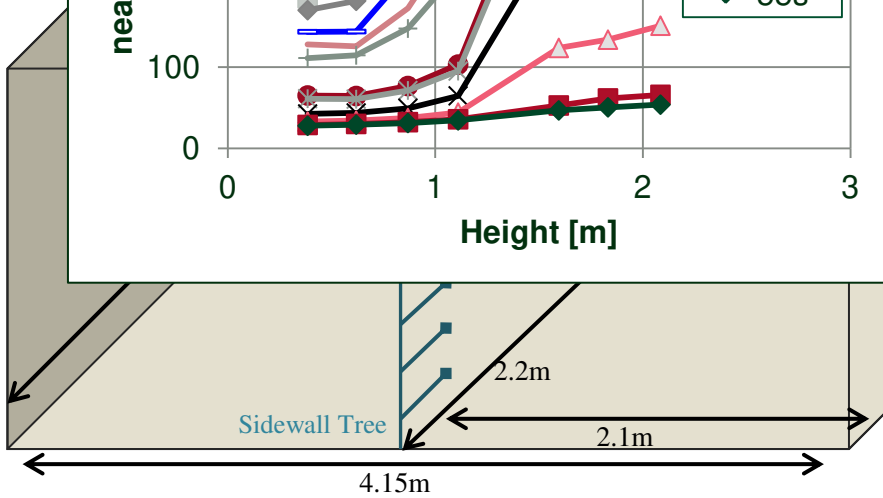
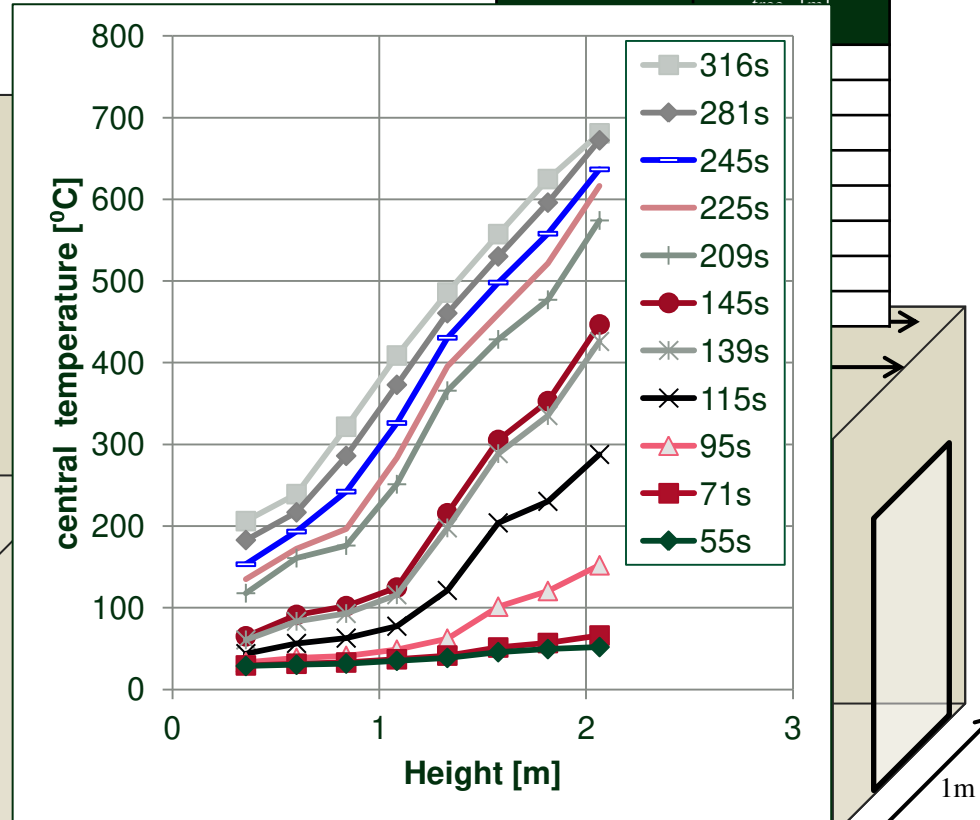
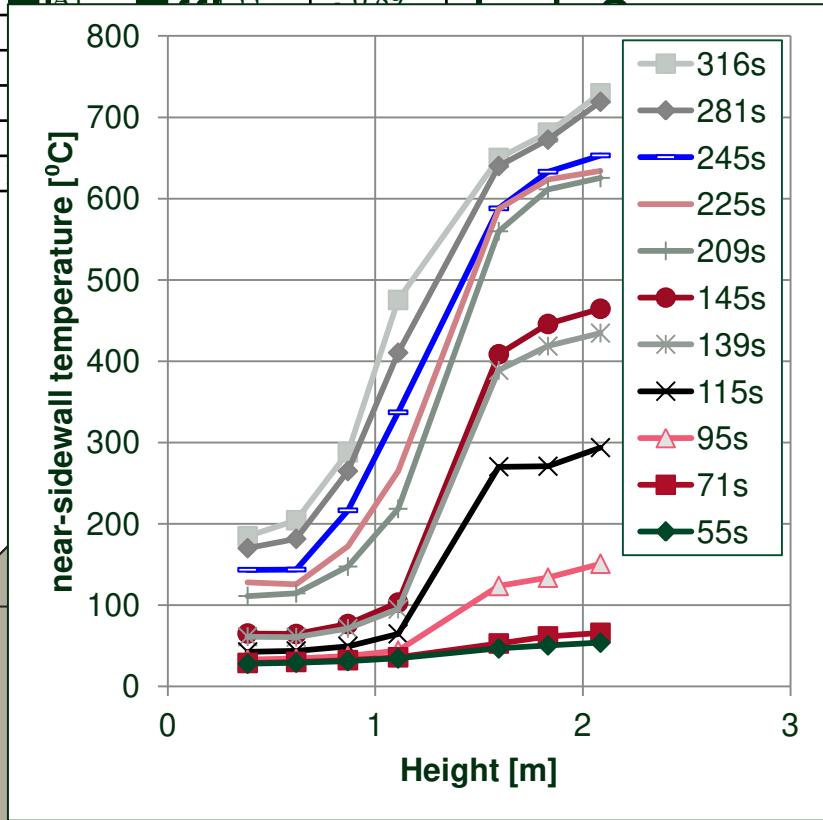
# Designing Fire experiment – 4



UNIVERSITY OF LEEDS

Thermocouple	From left – sidewall [m]	From back wall [m]
A1	2.33	0.89

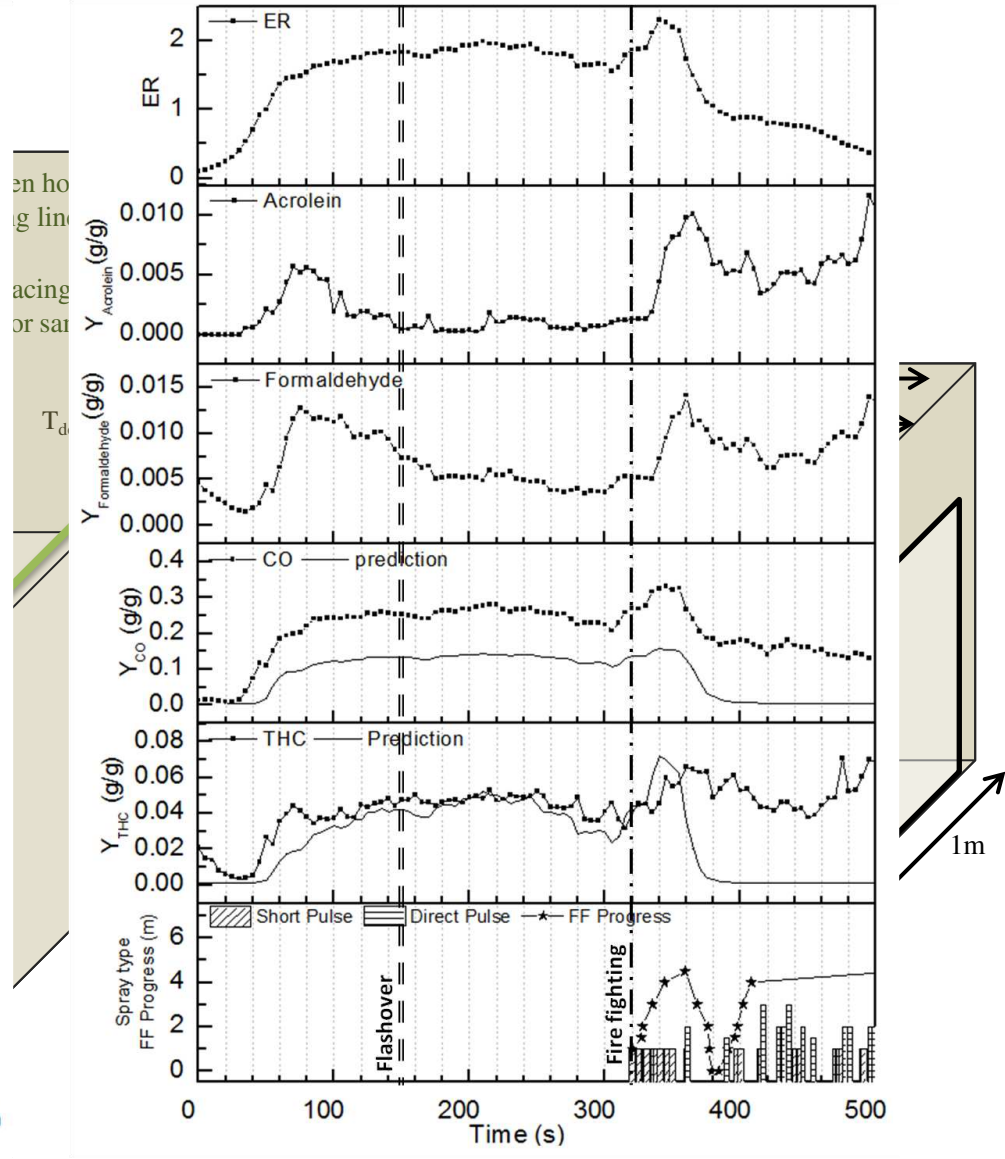
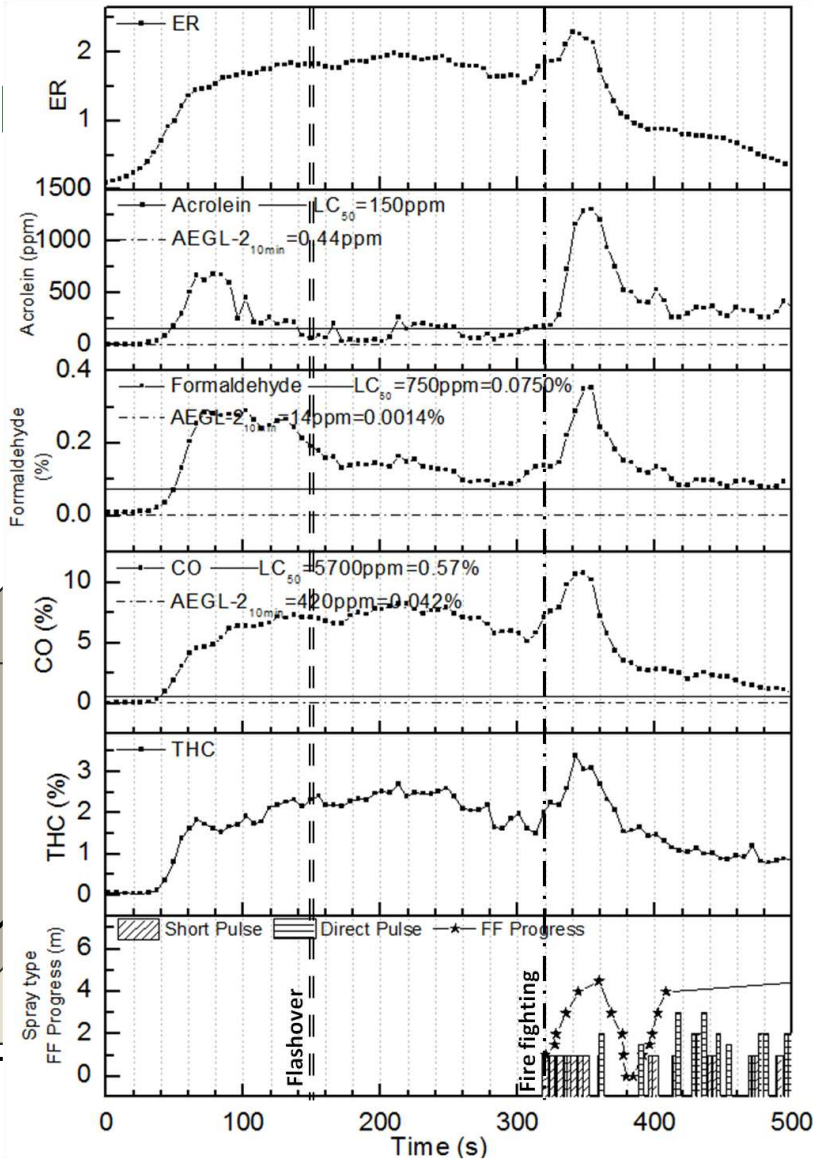
Thermocouples height of central tree [m]	Thermocouples height of sidewall [m]
316s	2.1
281s	2.1
245s	2.1
225s	2.1
209s	2.1
145s	2.1
139s	2.1
115s	2.1
95s	2.1
71s	2.1
55s	2.1



# Designing Fire experiment – 5



UNIVERSITY OF LEEDS

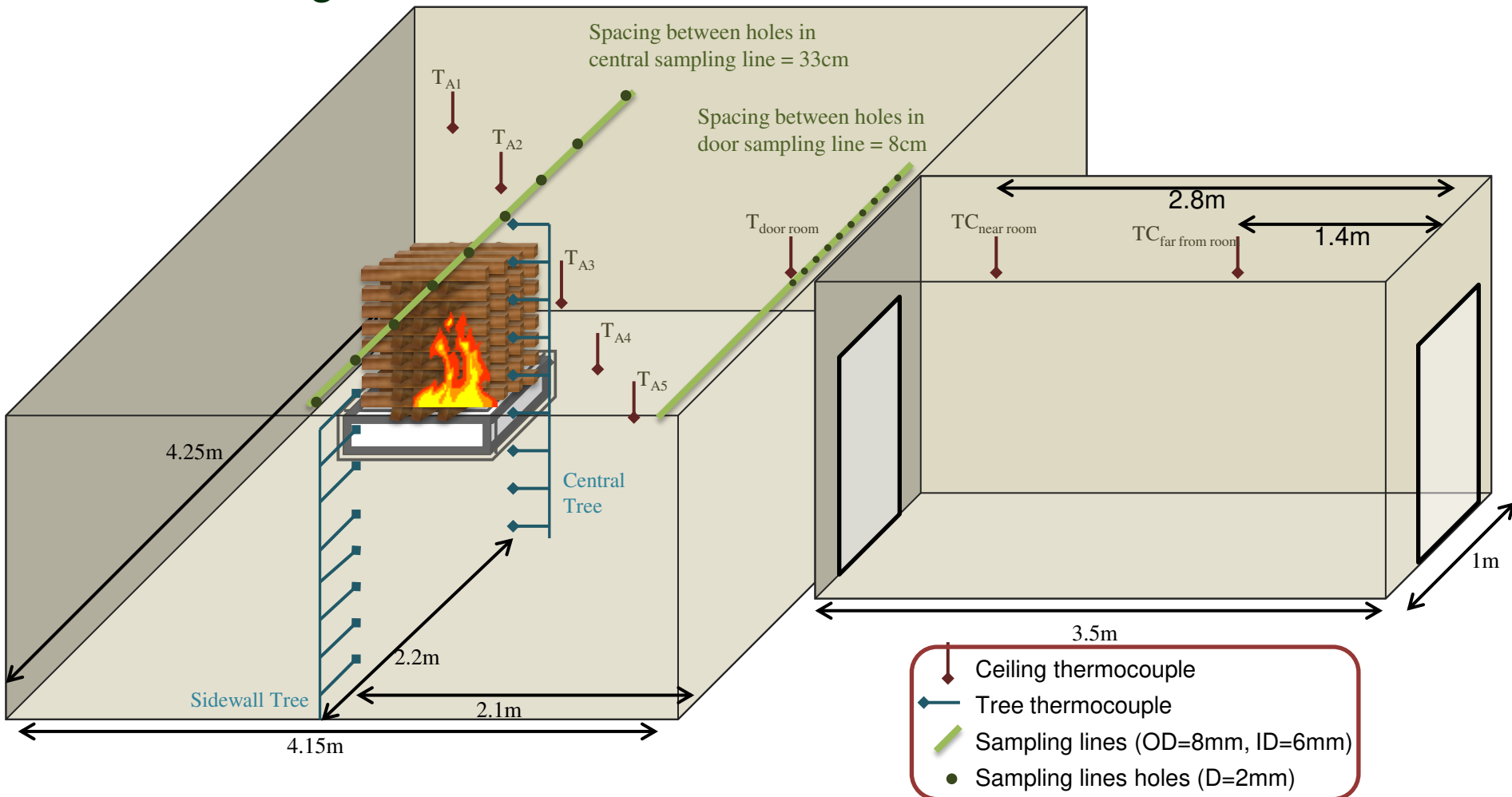


# Designing Fire experiment – 6



UNIVERSITY OF LEEDS

- Send fire-fighters in? When?

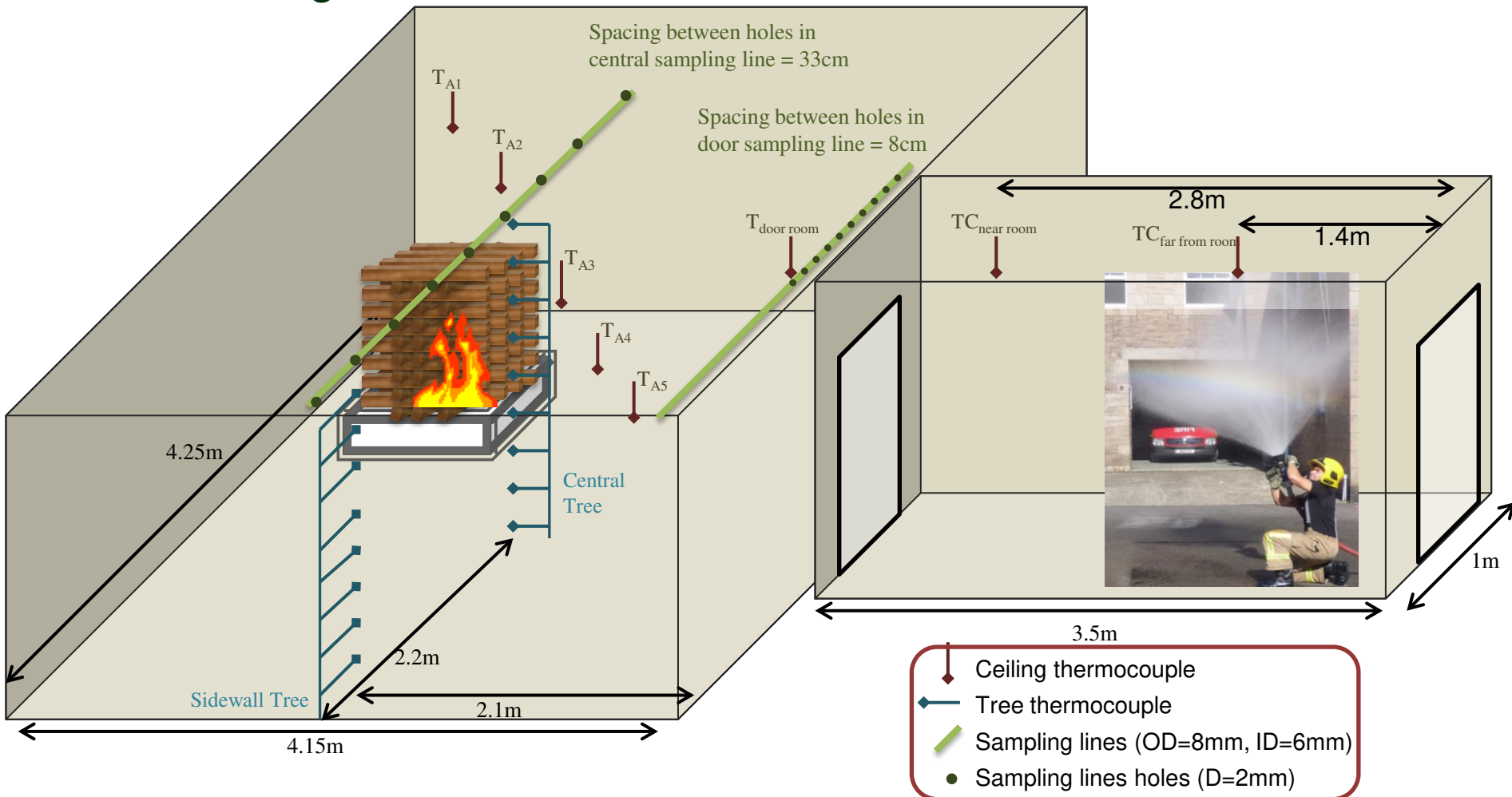


# Designing Fire experiment – 6



UNIVERSITY OF LEEDS

- Send fire-fighters in? When?





- Fire science is a developing field, that is evolving rapidly.
- Very challenging and interesting.
- Fire Engineering is the absolute meaning of a multidisciplinary field and everyone is contributing to it.

The FINAL MAIN ADVISE

**“Stay safe and don’t try what you learnt today at home, otherwise you will be homeless”**

# Thank you!



UNIVERSITY OF LEEDS



Any Questions please?