



COST Action TU0904
Integrated Fire Engineering and Response
MC and WG meetings
University of Malta, Sliema, 10.-11. April 2012.

Action meetings: Fire brigade reports and investigations

**FIRE ACCIDENT AT THE SHOPPING CENTRE
IN ZADAR, CROATIA**

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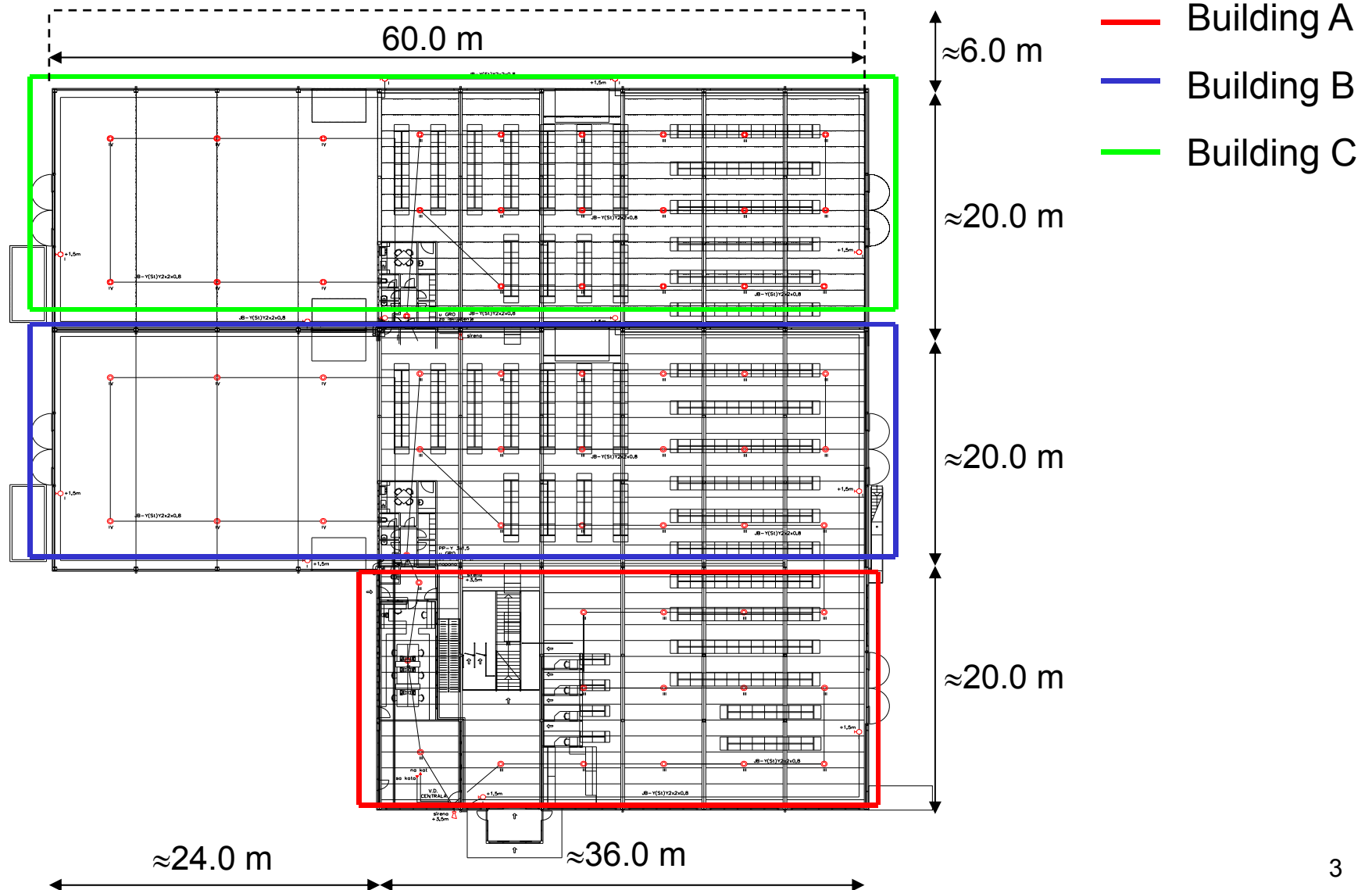


UNIVERSITY OF SPLIT, CROATIA
FACULTY OF CIVIL ENGINEERING, ARCHITECTURE AND GEODESY
Chair for steel and timber structures

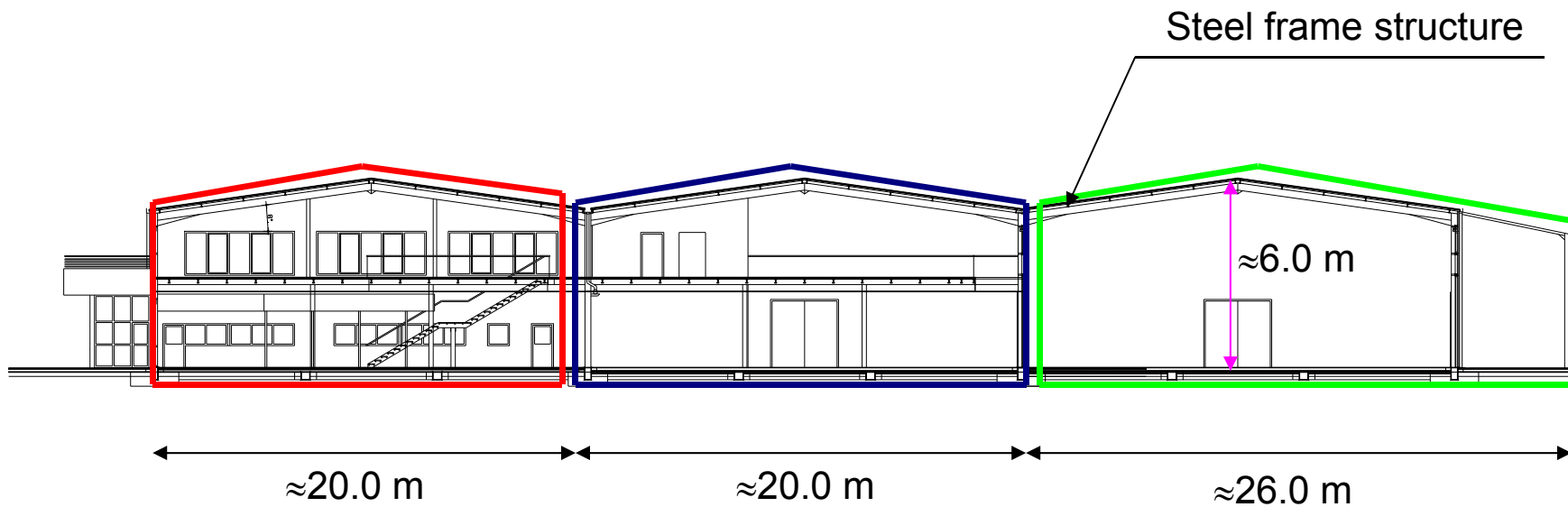
BASIC BUILDING DOCUMENTATION

- Technical documentation – Structural analysis design
 - Layout schematics
 - Section schematics
 - Building type – commercial shopping centre for home furniture and technical goods
 - Estimated fire load: 500 MJ/m²
 - Total fire duration: 2,5 hours
 - Buildings A-B were equipped with sprinkler installations in accordance with fire elaborate
 - Building C was added afterwards without any sprinkler installations
 - Buildings B-C were not designed as separate fire compartments
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- A nighttime photograph of a large fire at a commercial shopping center. Bright orange flames and thick white smoke rise from a building. A yellow sign with the word 'lesnina' is visible in the foreground. The wet pavement reflects the fire and surrounding lights.

- Layout of the shopping centre



- Section schematics



— Building A

— Building B

— Building C

FIRE SCENARIO

- **Date: February 22., 2010.**
- **23:43 h – Fire distress call**
- **23:51 h – Arrival of 15 fire trucks with 28 firemen**
- **Fire origin: Building C**



FIRE SCENARIO

- 00:20 h – fire spread to building B (there were no fire walls)
- Sprinkler system was activated in building B but with no effect on the fire spread (no water present in the system at that time)



FIRE SCENARIO



- Building B had additional furniture storage space on the first floor

FIRE SCENARIO



- Despite the firemen effort - building B was lost
- Building C collapsed 60 minutes after the beginning of fire event
- Building B collapsed 95 minutes after the beginning of fire event



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FIRE SCENARIO

- Fire continued spreading to building A
- Sprinkler system was incapacitated (no water present in the system)

A white circle containing the letter 'A' is connected by a white arrow to a bright fire source within a building's upper level. The background is a photograph of a fire scene at night, showing a fire truck on the right and a building with large windows on the left. The fire is intense, with bright yellow and orange flames and thick smoke. The ground is wet and reflects the fire's light.

FIRE SCENARIO



- Firemen were able to contain the fire in building A where it was stopped
- Partial collapse of the building A occurred
- Administrative offices were saved from the effects of fire

Comments on the fire scenario

- Buildings B-C were constructed as a single fire compartment, despite the fire elaborate requirements which demanded compartmentation
- Building C collapsed after one hour of fire spread ($\approx 00:40$ h)
- Building B collapsed at 01:15 h
- Building A was partially saved

Aftermath





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Aftermath C





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Aftermath C





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Aftermath – structure details





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Aftermath – structure details





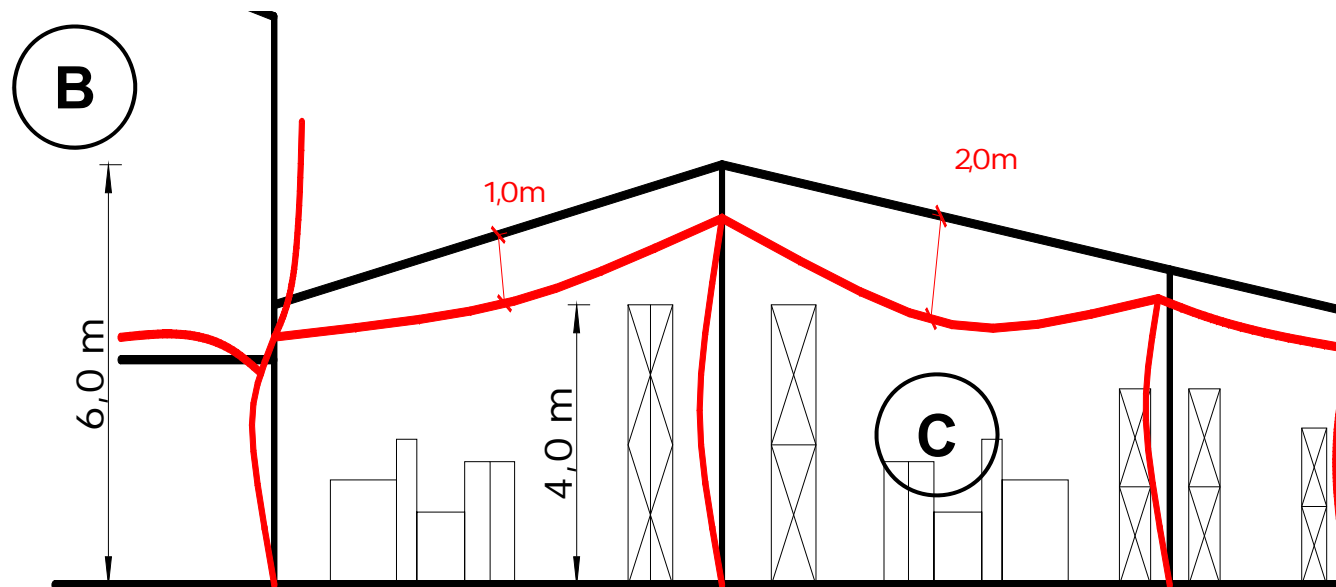
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Aftermath A



STRUCTURE DEFORMATIONS

- Building C



CONCLUSIONS

By analysing the fire event at the shopping centre following conclusions were made:

- Building C was constructed without the proper technical documentation
- Building C was not constructed as a separate fire compartment, thus creating a combined compartment with building B (A \approx 2400 m²)
- Active fire protection measures in the form of sprinklers were not effective during fire event
- Although the response time of the fire brigades was low, firemen intervention was limited because of the stated conclusions
- Fire brigade intervention was able to save only a part of building A