

2.12 Research in the field of structural fire safety engineering in Germany (short version)

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Research in the field of structural fire safety engineering in Germany

Prof. Peter Schaumann
Thomas Kirsch



COST Action TU 0904 "Integrated Fire Engineering and Response (IFER)"
Workshop Barcelona 05th July 2010

1. UCoSiF
2. Slim-Floor-Beams in Fire

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Ongoing Research Projects

1. UCoSiF (Unbraced Composite Structures in Fire)
2. Behaviour of Slim-Floor-Beams in Fire
3. National Fire Safety Concept
4. High Strength Bolts in Fire
5. Membrane Effects in Composite Slabs
6. Life-Cycle-Engineering and Fire Safety

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UCoSiF

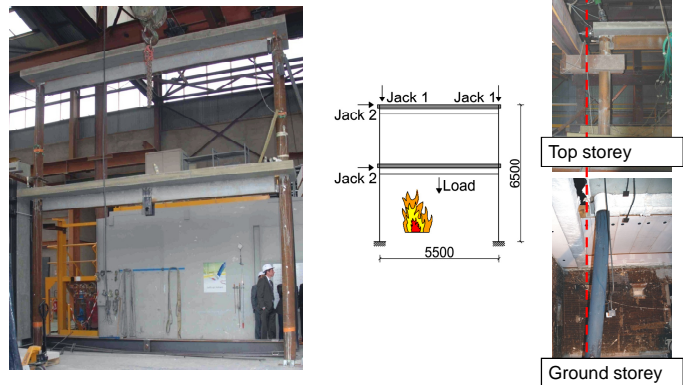
- Topic: Investigation in the behaviour of unbraced composite frames in fire
- Duration: 3 years
- Partners: Leibniz University Hannover, CTICM, LABEIN, FOSTA, City University London, Hochtief
- Funding: RFCS (EU-Project)

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Fire Tests



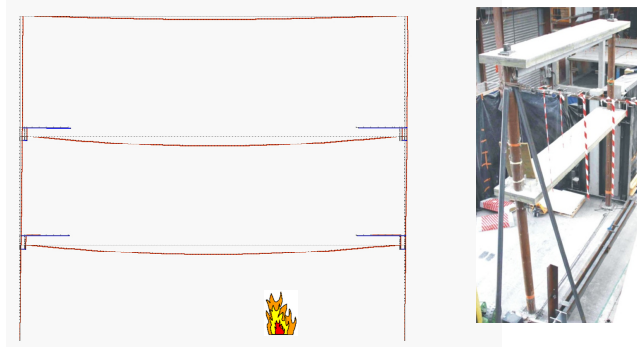
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Frame Simulation

- Calculation of frame behaviour using SAFIR



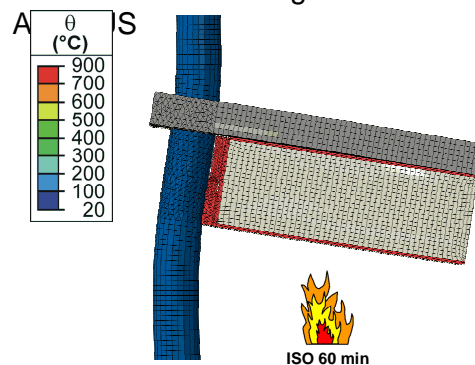
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Joint Simulation

- Calculation of semi rigid connection using

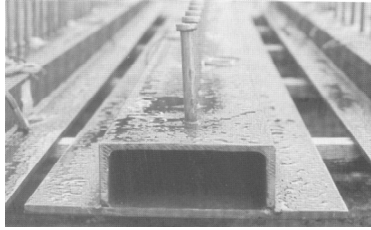


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Slim-Floor-Beams in Fire



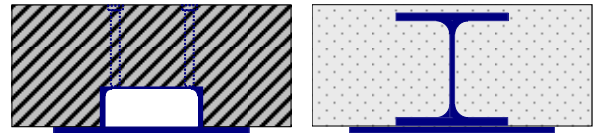
Investigation in the behaviour of continuous slim floor beams at room temperature and in fire

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Research Objectives

- Increase of fire resistance time of different slim floor beams
- Development of beam to column connections and investigation in their fire behaviour

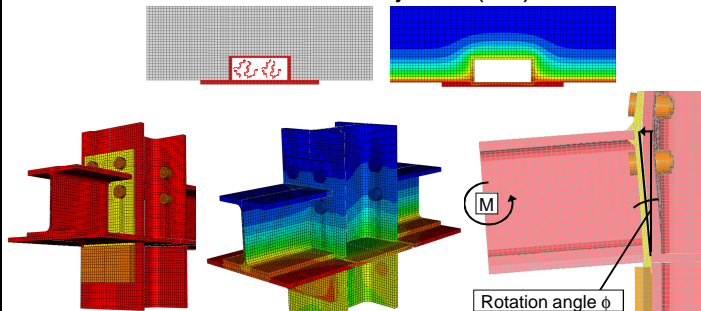


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FEM - Simulations

- Thermal and mechanical FEM simulations of cross-sections (2D) and joints (3D)

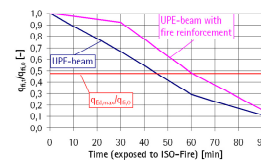


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Results

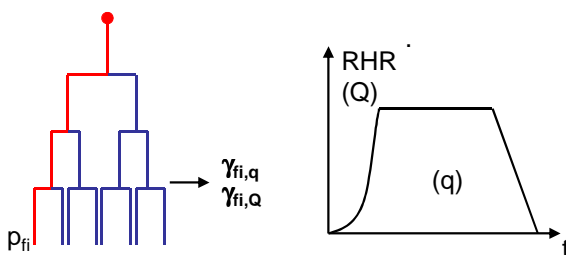
- Fire resistance increased by activating support moment
 - using reinforcement for composite beams
 - using semi rigid connection for steel beams
- Good performance of semi rigid joints in fire



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National Fire Safety Concept



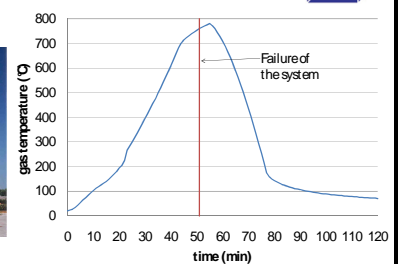
Safety concept for structural fire design – application and validation in steel and composite constructions

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Scenario 1

- Office building



- Results:
Fire protection of composite beam may be substituted using sprinklers

Temperatures without sprinklers (only automatic fire detection)

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