

WG1 Fire Resistance

Introduction

COST C26 Workshop Prague



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- ➔ □ Introduction of WG Fire resistance

- Quality of today prediction
 - Fire test Ostrava 2006
 - Local fire
 - Compartment fire

- WG1 Session at Praha Workshop



Introduction

- WG 1 Fire Resistance
 - Cooperation of national projects in the field of structural fire research

- Structural Integrity
 - sufficient resistance, stiffness and deformation capacity of the structure under accidental actions and to enhance structural safety under extreme conditions.



Fire Design

- Fire engineering approach – performance based design



- Fire scenario

- Heat released from the fire and the resulting atmospheric temperatures within the building



- Transfer of heat into structure

- Conduction, convection and radiation the rise in temperature of the structural materials



- Mechanical loading

- Differs from the maximum mechanical loading for ambient temperature design



- Structural response

- At elevated temperature

- Integration of models



WG1 Delft Meeting – Presentations of national projects

1. [Ian Burgess](#), UK: 'Robustness of connections in fire'
2. [Ulf Wickström](#), Sweden: 'Heat transfer from fires to structures'
3. [Milan Veljkovic](#), Sweden: 'Behaviour of thin-walled steel columns in fire'
4. [Aldina Santiago](#), Portugal: '3D behaviour of steel joints under a natural fire and its influence on structural response'
5. [Nuno Lopes](#), Portugal: 'Behaviour of stainless steel structural elements in case of fire'
6. [Beatrice Faggiano](#), Italy: 'Post-earthquake Fire Resistance of Moment Resisting Steel Frames'
7. [Gordon Geißler](#), Germany: Aspects of material modelling of wood and concrete
8. [Raul Zaharia](#), Romania: Fire design of composite steel-concrete columns
9. [Kimon Thomopoulos](#), Greece: 'Aluminium structures'
10. [Zenon Drabowicz](#), Poland: 'Pre-stressed bolted steel connections under high temperature loading'
11. [Arnoud Breunese](#), The Netherland: 'Presentation of Efectis Nederland'
12. [Martin Gillie](#), UK: 'The Fire Safety Engineering Group in University of Edinburgh'
13. [Roland Abspoel](#), The Netherland: 'Sensibility of Plate Girders in relation to fire'
14. [František Wald](#), Czech Republic: 'Fire test on structure in Ostrava, May 2006'



Main Research Topics of National Projects from WG1 Delft Meeting

- Fire modeling
- Connection modelling
- Member behaviour
- Material simulation
- Fire after earthquake
- Global analyse



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Fire Test Ostrava 2006

- Local fire 15.6.2006

-  □ Column temperature

- Compartment fire 16.6.2006

-  □ Connections temperature

-  □ Internal forces

- Temperature of external steelwork

- Sandwich panel connection

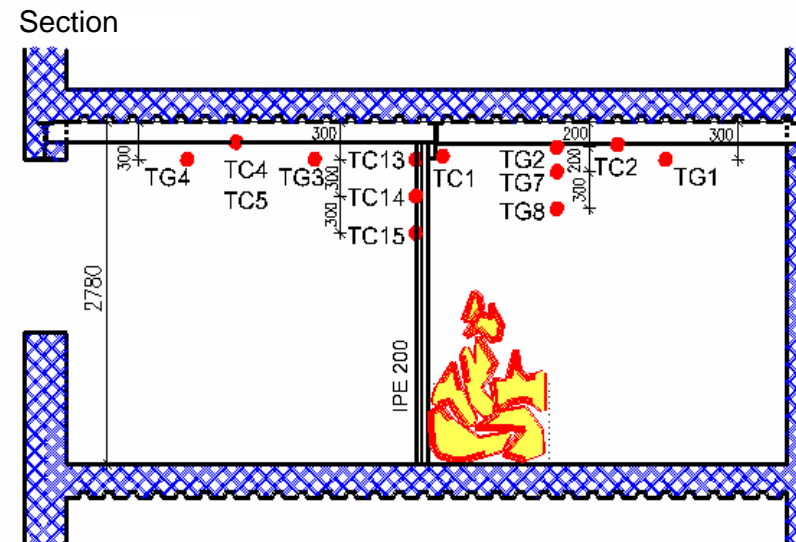
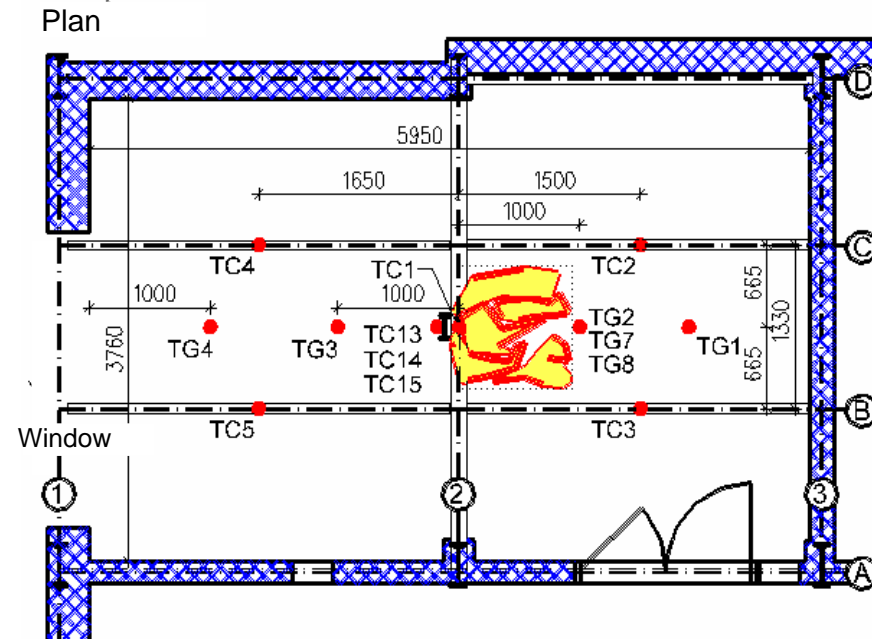
- Composite timber-concrete beam

- Timber light panel



Local Fire

- Column temperature







































































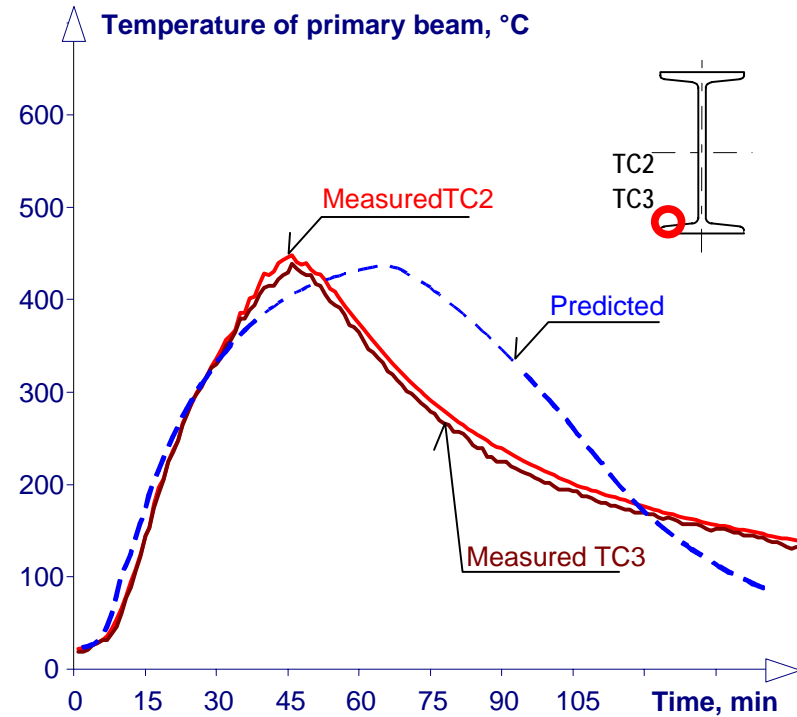
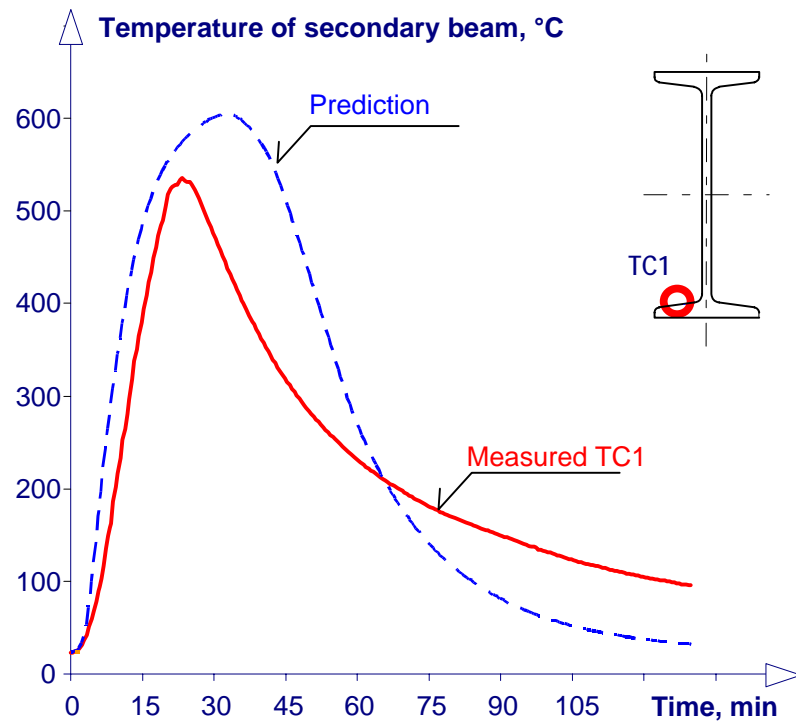
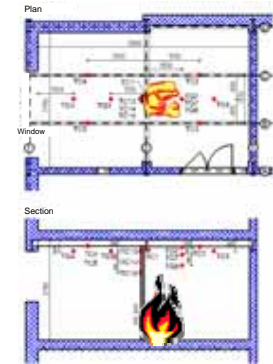






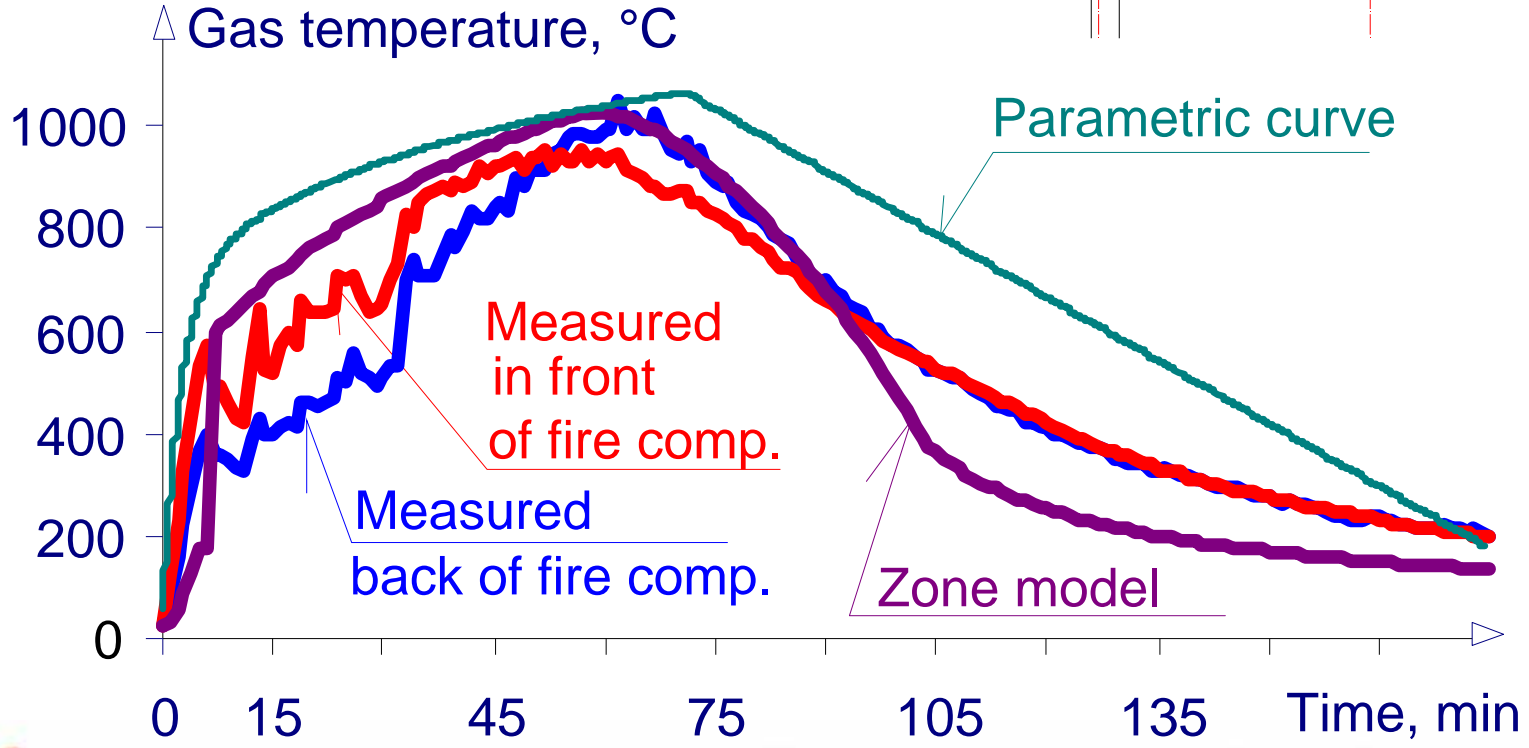
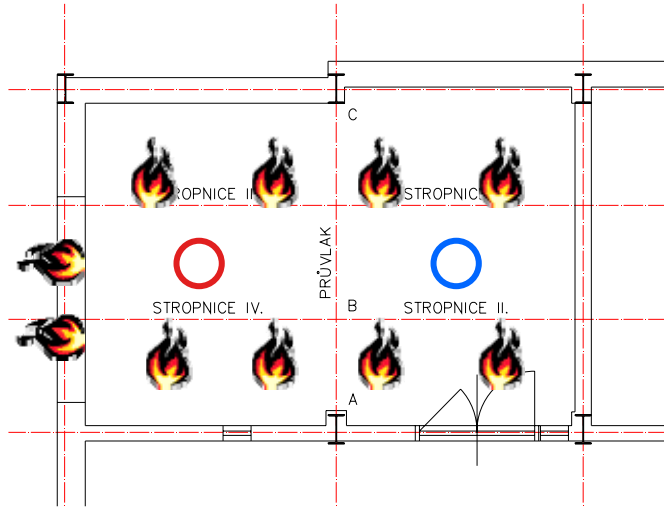
Local fire

□ Temperature of beams



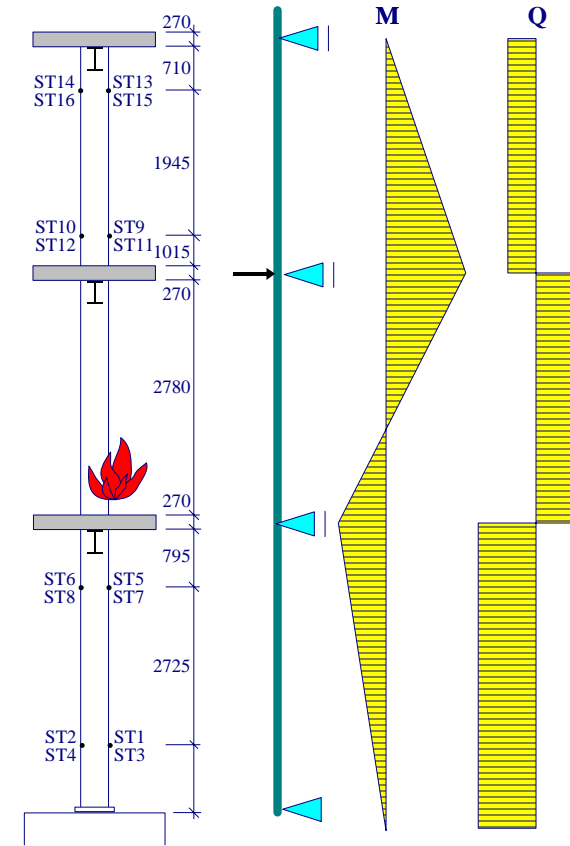
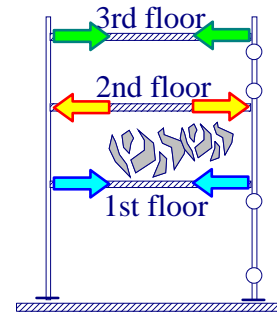
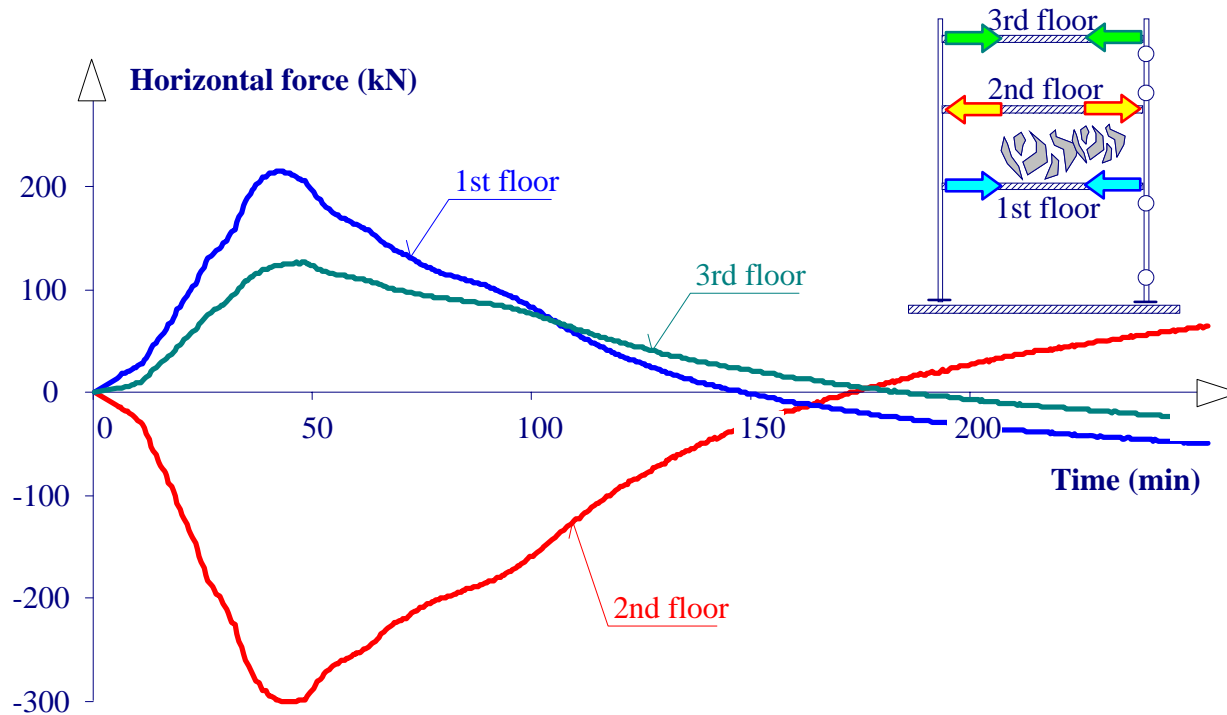
Compartment Fire

□ Prediction of Gass Temperature



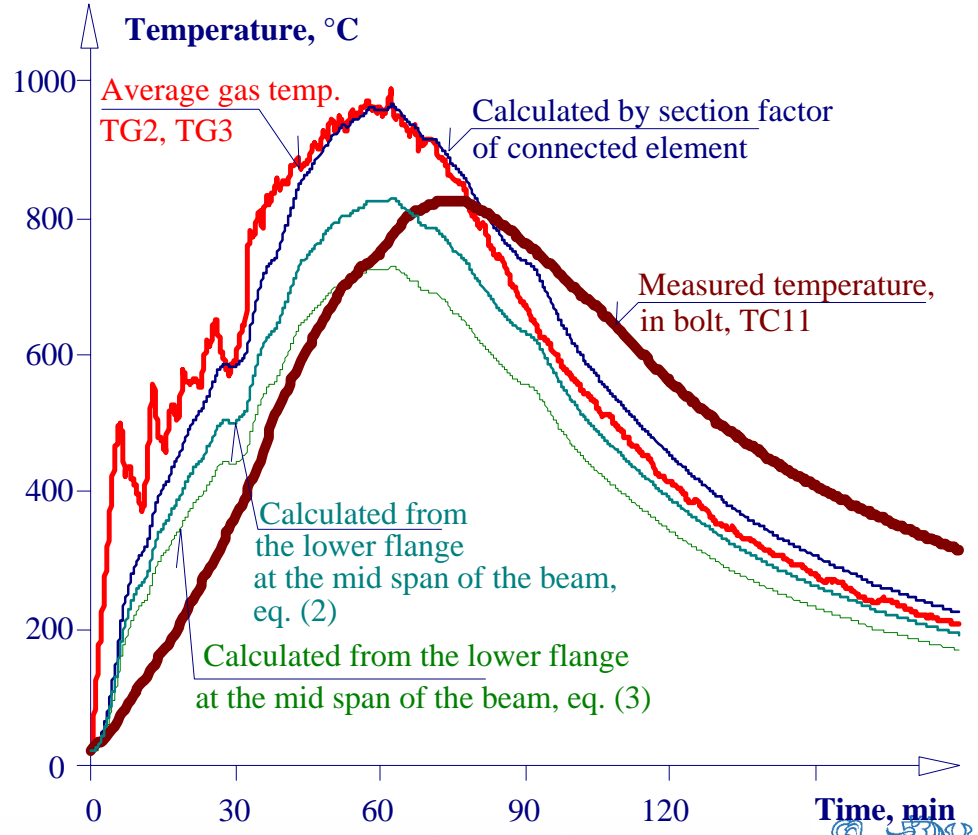
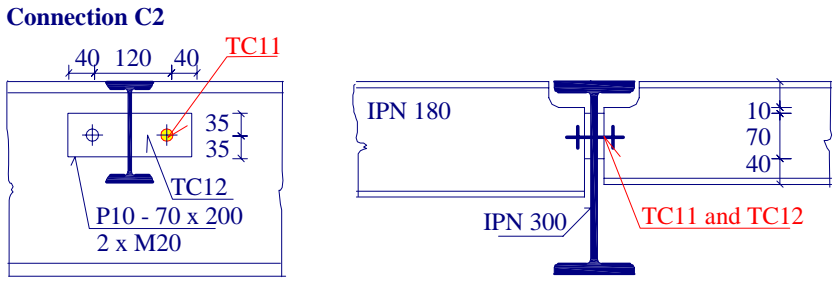
Compartment Fire

□ Horizontal forces



Compartment Fire

Temperature of beam to beam connection from gas temperature



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WG1 Praha Workshop Session

- Composite steel to concrete structures, *Tan Kang Hai*
- Connection modelling, *I. Burgess*
- Members behaviour, *N. Lopes*
- Fire after earthquake, *B. Faggiano*
- Global analyses, *M. Gillie*

- State of the art and invitation to poster session, *Y. Wang*

 □ Poster session



Thank you
for your attention



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