


## 2.10 To prediction of temperatures in connection of composite structure

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### TO PREDICTION OF TEMPERATURES IN CONNECTION OF COMPOSITE STRUCTURE

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Integrated Fire Engineering and Response - Barcelona Workshop 5-6 July 2010

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### MOTIVATION

- Thermal behaviour
- Mechanical behaviour
- Prediction model of connection
- Connections with improved fire resistance

### LIST OF CONTENTS

- Available material
- Next preparation

Integrated Fire Engineering and Response - Barcelona Workshop 5-6 July 2010

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### PARTIALLY ENCASED CONNECTIONS

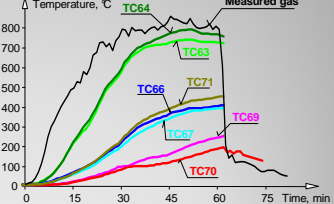

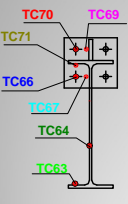


Fire test in Mokrsko 2008      Beam to beam connection

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### PARTIALLY ENCASED CONNECTIONS

- Part of the connection is embedded in concrete

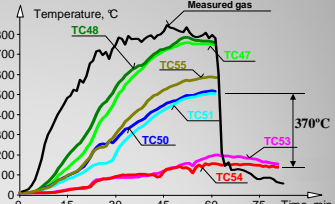

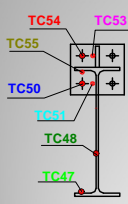


Measured temperatures on beam to beam connection

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### PARTIALLY ENCASED CONNECTIONS

- Temperatur difference of upper and lower part is 370 °C

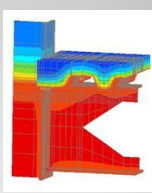
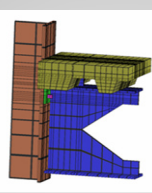



Measured temperatures on beam to column connection

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### FE MODEL FOR HEAT TRANSFER

- 3D model in SAFIR code

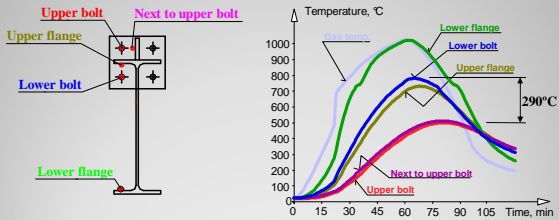


Beam to column connection for fire test in Mokrsko 2008

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## PREDICTED TEMPERATURES BY FE MODEL

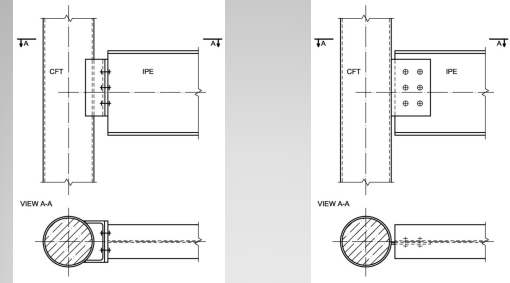
- Boundary condition: predicted gas temperature by zone model
- Results are satisfactory



Model of beam to column connection for fire test in Mokrsko 2008

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## CONNECTION TO ROUND TUBE



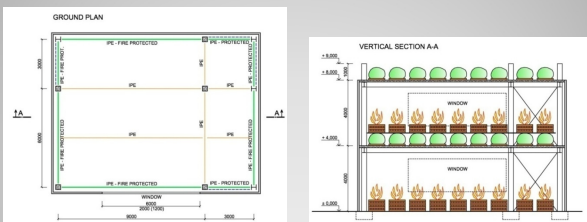
Reverse channel connection

Fin plate connection

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## NEW FIRE TEST IN JILEMNICE 2011

- Two floors of an administrative building, 9 x 12 m
- Structure with connection to round tube
- Two fire tests



Structure of experimental building

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## NEXT STEPS

- Fire experiment in Jilemnice 2011:
  - design of the structure
  - erection of the object
  - execution of the fire test
- Prediction of the heat transfer to the connections
- Prediction of the connection mechanical behaviour

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Thank you for your attention

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