UNIVERSITY OF PADERBORN
Laboratory of Materials and Joining Technology

Kick Off Meeting:

JoinTec

July 19, Paderborn, Germany

Laboratory of Materials andJoining Technology

Dipl.-Ing. Matthias Wissling

Contents

Presentation LWF

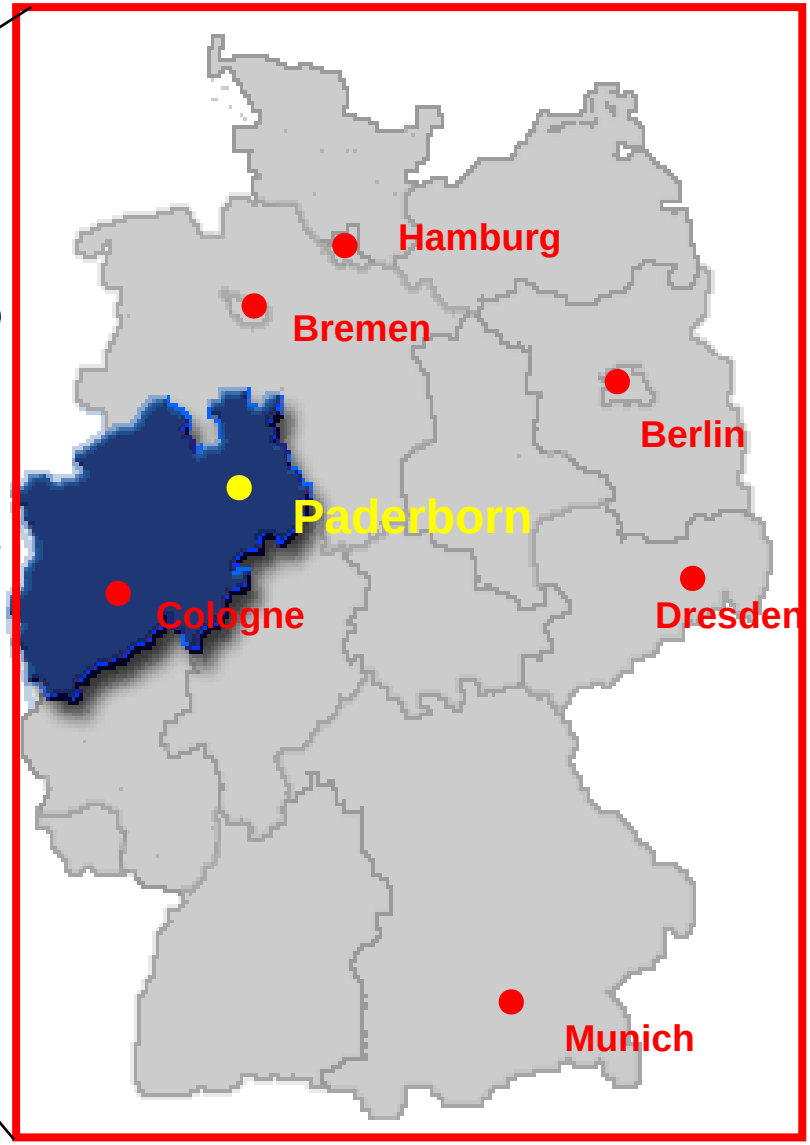
Introduction

Project objectives

Discussion

- Presentation LWF
- Introduction EU-Project: JoinTec
- Project Objectives
- Disscussion all project partners

Information about Paderborn



Germany

Position: Central Europe

Population: 83 Mill.

Area: 357.000 km²

Capital: Berlin

Information about Paderborn

Federal State: North Rhine-Westphalia

Population: 134.000

Area: 180 km²

Branches of trade:

- Computer industry
- Furniture industry
- Automotive supply industry
- Household industry
- Food industry
- Training and advanced training
- Tourism

City Hall

Cathedral

Abdinghof Church

Bartolomäus-Chapel

Adam & Eve House

University of Paderborn

Year of foundation: 1972

Faculties: 5

Professors*: ca. 200

Academic staff*: ca. 880

Non-academic staff*: ca. 680

Students*: ca. 14.000

External research: 29,9 Mill. Euro **funds (2003)**

(* January 2004)

Laboratory of Materials and Joining Technology

Director of the LWF : Prof. Dr.-Ing. O. Hahn

Academic staff : 16

Non-academic staff* : 14

Student assistants* : 35

Extra research Funds (2004) : € 1,5 Mill.

(* January 2005)

Main Research-Topics

Material
- material property
- rheological equation of state

Testing of material and components
- Detection of strength under static, dynamic load etc.
- Component testing
- Failure analysis

Design
- Calculation and design
  - Calculation concepts
    - Joint properties

Production
- Joining systems
- Process analysis
- Process monitoring
- Process control

Information technology
- Expert systems
- Technology storage
- Knowledge Management

Education and Qualification
- Training and advanced training in joining technology

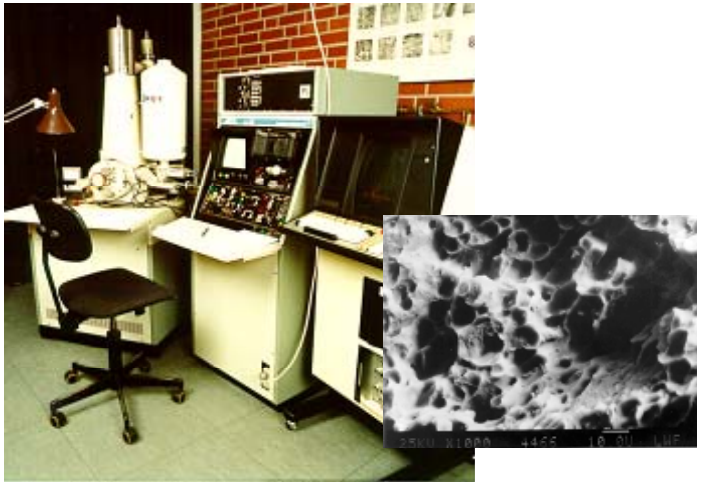
FEM
- Process simulation
- Stress analysis

Materials and Componentes Testing

Digital-optical facility for rivet joints quality control

Crash and high speed tearing facilities

Magnetic pulse resonance testing facilities frequencies up to 300 Hz



SEM facility for damage analysis

Materials and Components Testing

- eclective -

Bauknecht

THYSSEN KRUPP STAHL

Lear

Cenco

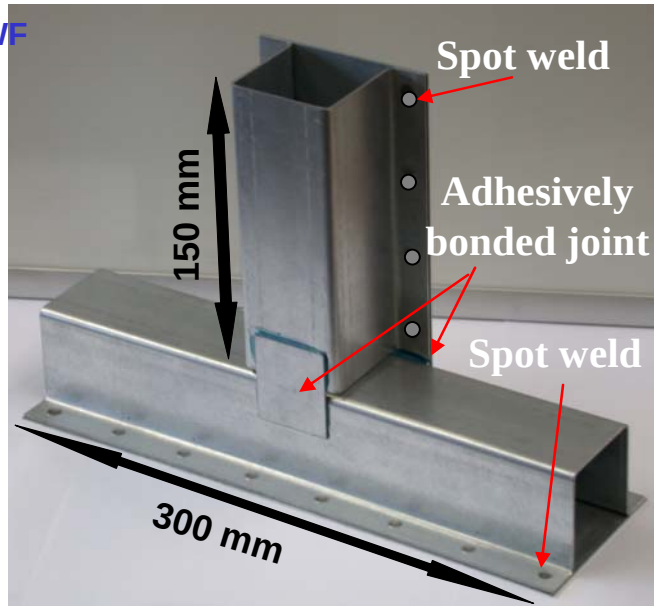
JoinTech

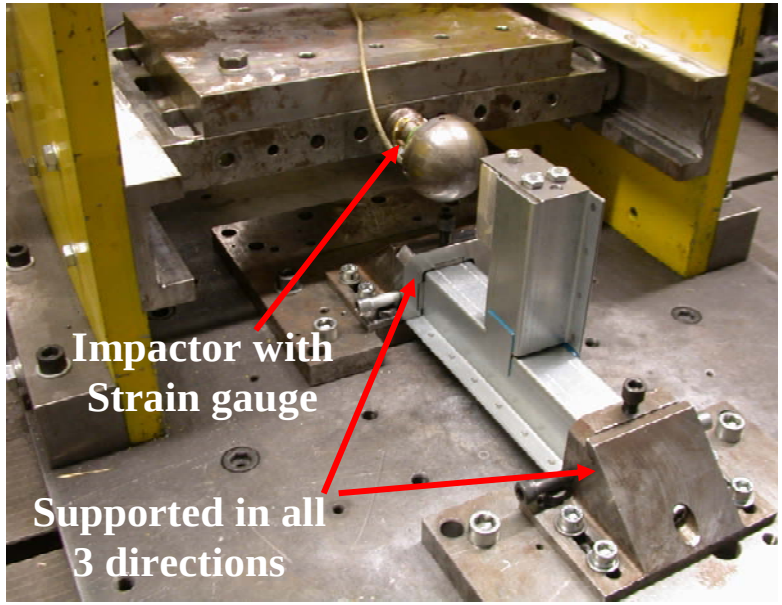
Mertens

Rover

Research of adhesively bonded joints

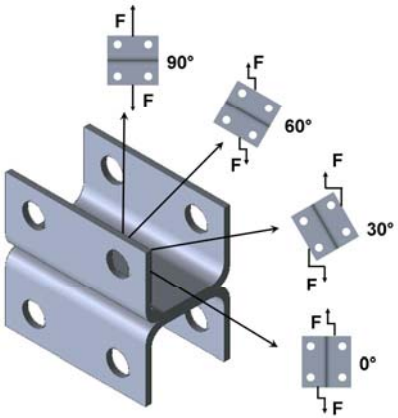
Geometry of T-component and crash stand.





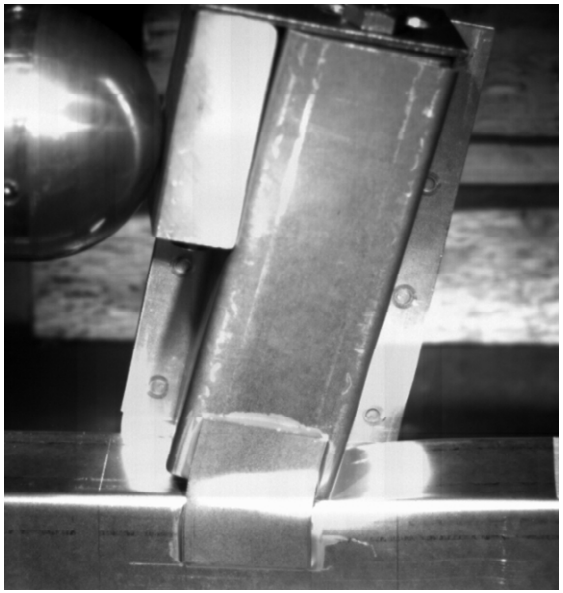
The T-component was tested under an initial velocity v_0 = 2,3 m/s of the impactor.

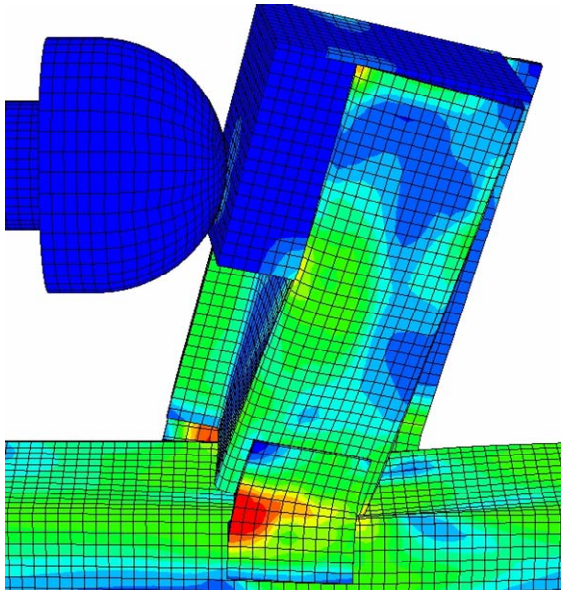
Parameters from small specimens



T-component under crash loading

T-Component, crash stand for dynamic loading, and experiment vs. simulation after t = 0,035 sec.





The T-component was tested under an initial velocity v_0 = 2,3 m/s of the impactor.
The FEM-model delivers appropriate correlation of experiment and simulation

JoinTec

Objective:

Innovative and competitive new joining technology for steel pipes using adhesive bonding

1 July 2007 – 30 June 2010 (3 years)

JoinTec

Project partners:

Salzgitter Mannesmann Forschung GmbH (Mr. Fluegge, Mr. Zimmermann)

Gaz de France (Mr. Billet)

Sika Danmark A/S (Mr. Burchardt)

Bohlen & Doyen Polska Sp. Z o.o. (Mr. Behrends)

Centro Sviluppo Materiali S.p.A. (Mr. Bufalini)

Mannesmann Fuchs Rohr GmbH (Mr. Brauer)

Arbeitsgemeinschaft für Wärme & Heizkraftwirtschaft – AGFW – e. V. (Mr. Besier)

University of Paderborn, Coordinator (Mr. Wissling)

Project Program

Presentation LWF

Introduction

Project objectives

Discussion

5 Co-ordination of project: University of Paderborn (UPB)

Management of the project:

- Maintaining adequate lines of communication between partners
- Progress monitoring: achievements versus project objectives time and budget
- Preparation of output of the project (reports)

1 Joining Fundamentals small scale tests - UPB

- Joint design
- Surface treatment
- Adhesive
- Application method
- Curing system

2 Process quality control - Salzgitter Mannesmann Forschung

- Non-Destructive Testing (NTD) technique
- Repair procedure
- Transfer technology to field conditions

JoinTec

Focus:

Small pipes with diameter d ≤ 200 mm for water distribution

Large pipes with diamter d ≤ 600 mm for gas, heat and water distribution

3 Full scale pipe testing - Centro Sviluppo Materili

- stress strain design curves
- Save defect tolerance criteria
- FEM-model of adhesively bonded pipe joints

4 Adhesive bonding concept - Bohlen&Doyen

- lay tests at site
- Commerical and technical benefits
- Guidelines and design concept

Work package 1: Main Objectives

Presentation LWF

Introduction

Project objectives

Discussion

Objectives:

-Survey of main requirements:

=> in-service loading conditions in pipe joints in the gas, water and heat distribution net

- Choice of joint design
- Development of adequate adhesive.
- Selection of economical and technological beneficial surface treatment
- Development of easy application method including curing method

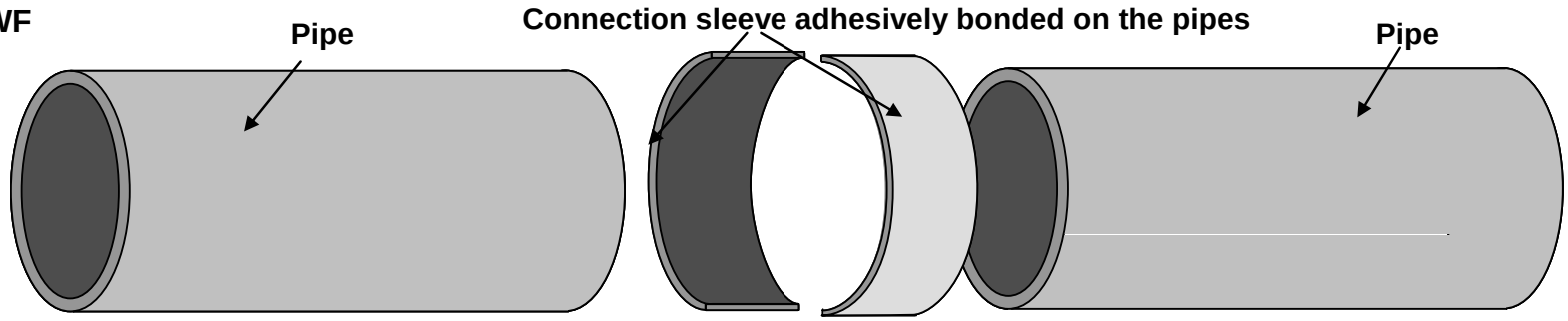
Wall thickness and the steel grades of the pipes are:

- d = 508 mm, t = 8.0 mm, L360NB acc. EN 10208-2,3-Layer MDPE-Coating (acc. DIN 30670) outside.

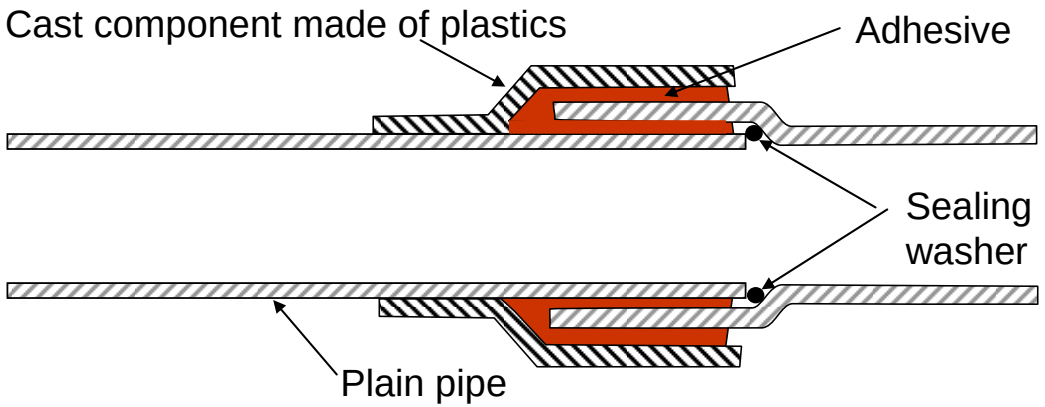
- d = 168.3 mm, t = 4 mm, St 37.0 (comparable to L245NB);
- PE-Coating outside and cement mortar lining inside

Joint Geometry

- Larger pipes up to 600 mm: d = 508 mm, t = 8.0 mm, L360NB



- Smaller pipes up to 200 mm in diameter: d = 168.3 mm, t = 4 mm, St 37.0



Summary

Thank you very much for your attention!

If you have any questions, please do not hesitate to ask.

Further work

All project partners:

discussion project procedure