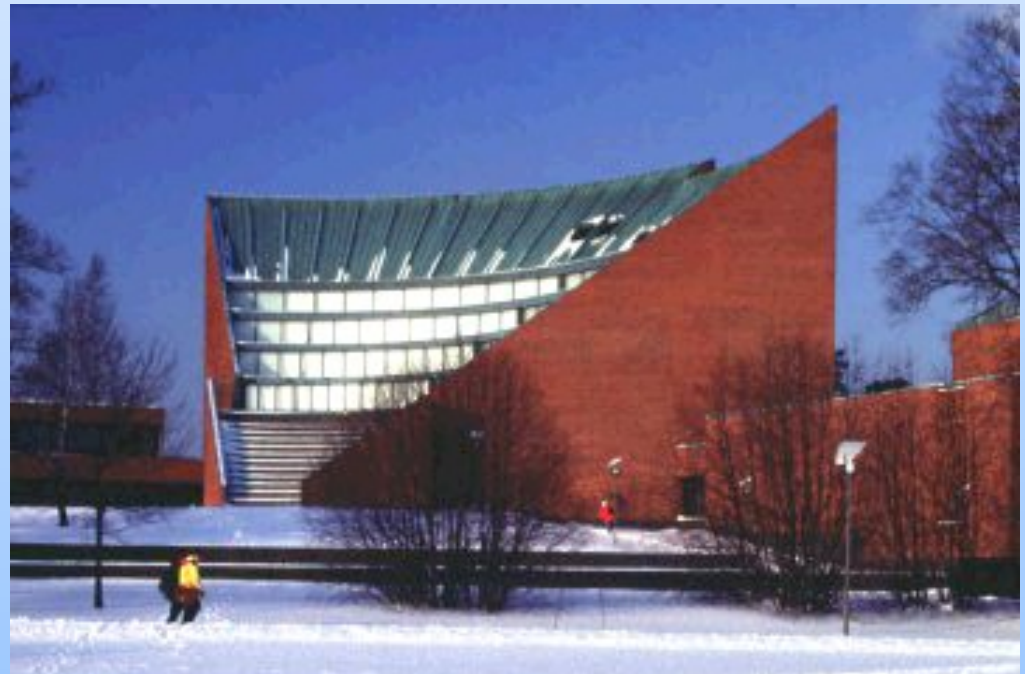




HELSINKI UNIVERSITY OF TECHNOLOGY  
Laboratory of Engineering Materials

# *Helsinki University of Technology* *TKK*

- ♦ *Oldest and biggest technical university in Finland*
- ♦ *Key figures*
  - *13807 students*
  - *959 degrees/year*
    - ♦ *90 doctor's degrees*
    - ♦ *869 master's degrees*
  - *2302 staff*
  - *12 departments,  
20 research institutes*

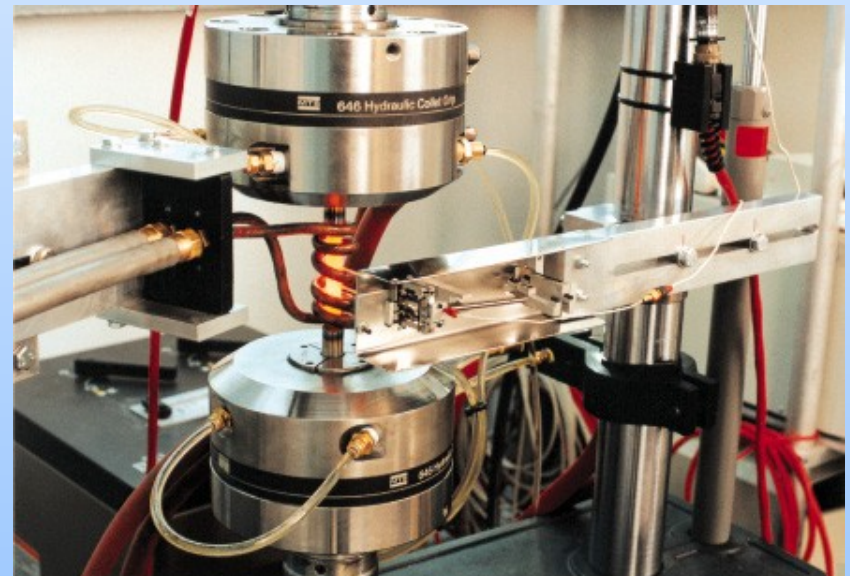




HELSINKI UNIVERSITY OF TECHNOLOGY  
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# *Laboratory of Engineering Materials*

- ♦ *Part of the Department of Mechanical engineering*
- ♦ *Permanent staff*
  - *1 professor, 1 laboratory engineer*
  - *4 assistants*
  - *6 technical staff*
  - *18 researchers*
- ♦ *Degrees in annually (approx.)*
  - *2 doctor's*
  - *7 master's degrees*





# Facilities

- ♦ New Zeiss FEG-SEM
- ♦ X-ray diffraction
  - for residual stress measurement
  - for high temperature materials characterization
- ♦ 3 MTS test systems
- ♦ Ring-core residual stress machine
- ♦ Thermal fatigue test machine
- ♦ Internal Friction test machine
- ♦ Varestraint test for welds
- ♦ Narrow gap TIG and SAW welding
- ♦ FSW test machine







# Current Interests in Materials Research

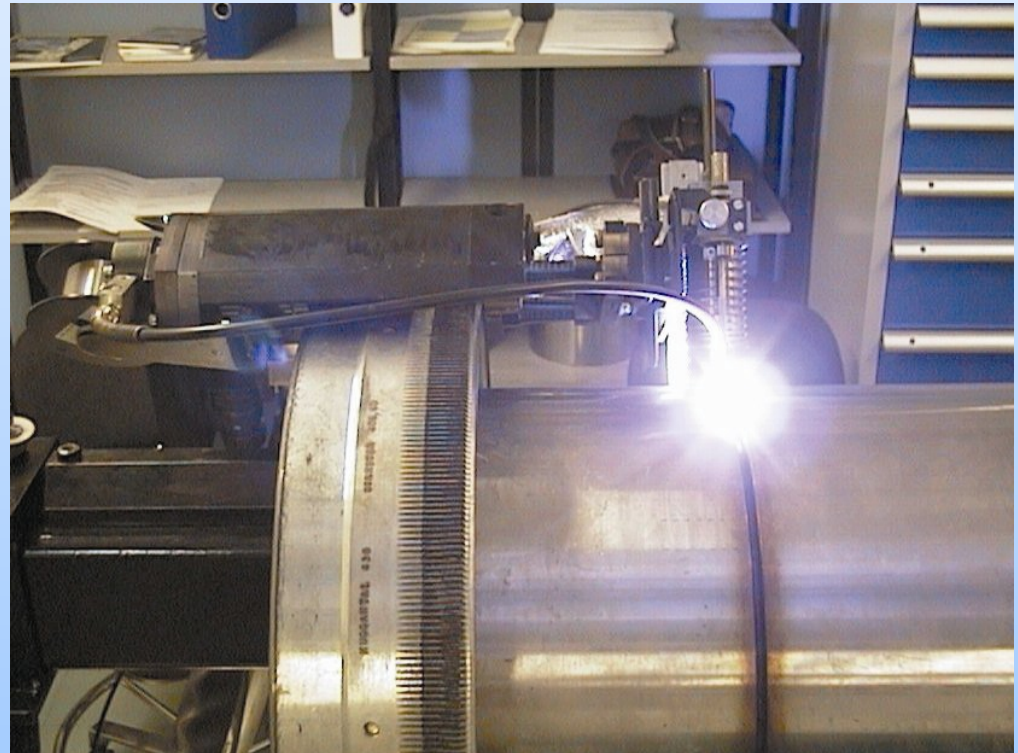
- ♦ Thermal Fatigue
- ♦ Measurement and modeling of residual stresses
- ♦ Environmentally assisted cracking mechanisms
- ♦ Hydrogen behavior in various materials
- ♦ Internal Friction studies
- ♦ Artificial crack manufacturing for NDT validation

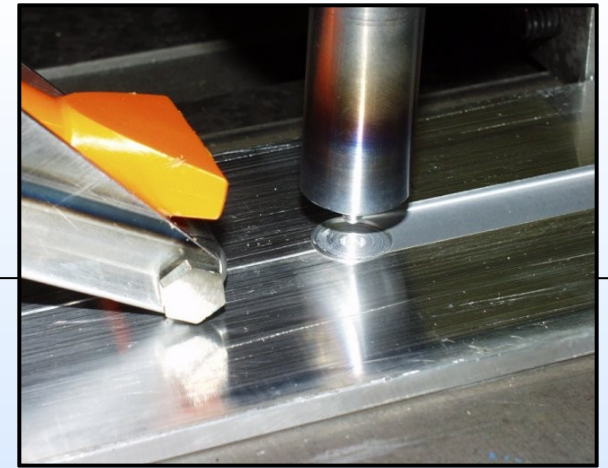




# *Current Interests in Welding*

- ♦ *Dissimilar metal welding for power industry*
- ♦ *Friction stir welding*
- ♦ *Narrow gap TIG and SAW welding*
- ♦ *Spot welding of stainless steels*





# *FSW projects at TKK*

- ♦ 1.4.-31.12.2000: Friction Stir Welding – FSW (KTHAUS). Tekes pre-project.
- ♦ 05/2000-08/2002: Technology transfer project funded by the Boeing Company. A part of the F/A 18 Hornet compensation transaction.
- ♦ 1.2.-31.10.2001: The possibilities of FSW-technology in Finland (KTHAUS 2). Tekes pre-project.
- ♦ 1.4.-31.12.2000: Friction Stir Welding – FSW (KTHAUS) Tekes pre-project
- ♦ 1.12.2000-1.12.2005: Euro-Stir –Eureka research project. (STIR) Tekes research project
- ♦ 1.6.2003-28.2.2005 Tekes research project
- ♦ 1.10.2005 – 31.12.2007: Friction Stir Welding and Processing of High Temperature Materials (KUUMA)



# *FSW research areas*

- ♦ *FSW and FSP of Cu and Cu -alloys*
- ♦ *FSW of PH stainless steel sheet*
- ♦ *FSW of Cu/Al dissimilar joints*
- ♦ *Productivity in Al FSW*
- ♦ *Fatigue of FSW welds*