Centro Interuniversitario "Corradino D'Ascanio" di Ricerca e Servizi sulle Tecnologie e l'Ingegneria dei Veicoli

FE-Modeling and Fatigue Assessment of Welded Structures

2 dicembre 2016 (8:30-12:00, 13:00-16:30)

AULA MAGNA PACINOTTI - *Scuola di Ingegneria -Università di Pisa*

Lecturer: Dr. J. Baumgartner, Fraunhofer Institute for Structural Durability and System Reliability LBF (Darmstadt - Germany)

1 Introduction

2 Characteristics and failure mechanisms of welded structures

- 2.1 Geometric properties
- 2.2 Acting stresses
- 2.3 Failure mechanisms

3 Modeling and numerical stress analysis

- 3.1 Use of finite element method
- 3.2 Meshing
- 3.3 Submodel technique
- 3.4 Non-linearities

4 Fatigue assessment approaches in rules and standards

- 4.1 Linear-elastic approaches
- 4.2 Nominal stress approach
- 4.3 Structural stress approach
- 4.4 Effective notch stress approach
- 4.5 Fracture mechanics
- 4.6 Influencing factors

5 Notch stress approaches

- 5.1 Effective notch stress approach with r_{ref} = 1.0 mm - background
- 5.2 Notch stress approach with r_{ref} = 0.05 mm
- 5.3 Effective stress approach (Neuber and Peterson)

6 Elastic-plastic approaches

- 6.1 Cyclic material behavior
- 6.2 Determination of acting stresses and strains
- 6.3 Fatigue assessment
- 6.4 Consideration of mean stresses
- 6.5 Consideration of size effects

7 Discussion of the approaches and their limitations, further developments