

SUGGESTED PROGRAM FOR FATIGUE DESIGN COURSES AT UNIVERSITY OF PISA

Course 1: Introductory course for Master-Students

Title: Selected Influencing Parameters on Fatigue Strength - Design Examples of Metallic (Non-Welded) Components

Contents: 1. Introduction of design concepts (nominal, local, crack propagation)
2. Testing and statistical evaluation strategies, failure criteria (Woehler / Gassner-lines, safety factors)
3. Influencing parameters (loading mode (axial, bending), mean stress (ratio R), notches (K_t , K_f), support effects (stress gradients, highly stressed volume), multiaxiality, spectrum type, exercises (statistics, mean stress and notch evaluation)
4. Design examples

- Nominal stress concept: Lever of a printing machine
- Local strain concept: High pressure vessel
- Local stress concept: Angle lever of a Diesel injection pump

Time: 2 days (4 blocks à 3 hours each)

Course 2: Elevated course

Title: Modern Local Concepts for Designing Welded Structures – Background and Application Examples

Contents: 1. Introduction of fatigue design concepts for welded structures (nominal, structural, notch, fracture mechanics)
2. Variants of local concepts (structural with surface and internal linearization), notch stress (micro-support (fictitious radius), notch strain, crack propagation, stress intensity) and relation to design codes (IIW, multiaxiality, damage accumulation)
3. Design examples

- Blade support
- Offshore K-nodes
- Spot-welded automotive door

Time: 1 day (2 blocks à 3 hours each)

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