

Centro Interuniversitario “Corradino D’Ascanio” di Ricerca e Servizi sulle
Tecnologie e l’Ingegneria dei Veicoli

Structural Durability and Surface Treatment

22, 23 and 24 settembre 2015

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Lecturer: prof. C.M. Sonsino, Fraunhofer Institute for Structural Durability and System Reliability LBF (Darmstadt - Germany)

Contents:

22 e 23 settembre (8:30-12:30, 14:30-16:30)

1. Definition of structural durability, design criteria for safety components (misuse, special events / structural yield point, designated normal service conditions);
2. Statistics, probabilities of survival and failure, safety factors, risk covering, exercises in statistics;
3. Determination of Woehler- (LCF, MF, HCF) and Gassner-lines, statistical features and parameters, failure criteria, design data;
4. Stress concentration, micro- and macrosupport, structural yield point and structural durability, size effect, exercises on stress gradients and local stress evaluation;
5. Material selection under service loadings (crash, impact, cyclic) and under consideration of geometry and manufacturing (cast, forged, welded, plastics), mean- stress sensitivity, improvement techniques of fatigue strength, environment (corrosion, temperature), exercises on material selection;
6. Cycle counting methods and cumulative damage, damage equivalence, reduction of testing time, exercises on determination of spectra, fatigue life estimation, spectrum intensity evaluation;
7. Structural durability design concepts for component development, concepts of nominal-, structural- and notch-stresses (strains), multiaxial fatigue (selected hypotheses / critical plane concepts);
8. Design examples (lever of a printing machine (nominal stress concept), high pressure vessel (local strain concept), angle lever of a diesel injection pump (local stress concept), synchronizer hub (local stress concept), gear (bending and rolling contact fatigue, local stress concept);
9. Final remarks, conclusions.

24 settembre 2015

Thermal and Mechanical Surface Treatments and Fatigue; Local Geometry and Residual Stresses