



UNIQUE CETIM ACADEMY'S TWO DAY MASTERCLASS

The Fatigue Design of Welded Structures

20 & 21 January 2020

DAY 2, ABOUT THE COURSE

The second day of the Masterclass is dedicated to the details of the mesh-insensitive structural stress method for fatigue evaluation of welded structures, from its mechanics basis, numerical implementation to S-N data correlations and life predictions. Through this training courses, participants will become familiar with some of the most important issues associated with fatigue of welded joints and existing design and analysis methods.

Participants, with hands-on experiences gained during the training course, should be able to solve basic fatigue design problems or effectively interpret fatigue test data.

A bound volume of all course notes will be provided to all registered participants.

DAY 2, SCHEDULE

ADVANCES IN FATIGUE DESIGN AND LIFE EVALUATION METHODS FOR WELDED STRUCTURE

8h30 - 10h00

Fundamental aspects of weld fatigue

Some relevant terminologies and definitions, Unique fatigue issues associated with welded joints, A brief overview of conventional fatigue evaluation procedures: Stress definitions and calculation procedures, Code-recommended S-N curves and assumptions, Unresolved critical issues

10h00 - 10h15 - Coffee Break

10h15 - 11h-30

Mesh-insensitive traction stress method-I: Traction stress definition and mechanics basis, Numerical implementation, Simple calculation procedures, Measurement techniques and validations, Treatment of weld toe versus weld throat cracking

11h30 - 13h-00

Mesh-insensitive traction stress method-II: Generalized calculation procedure, Mesh-insensitivity validations, Multi-axial stress state, Examples

13h00 - 14h-00 - Lunch

14h00 - 15h-00

The Master S-N Curve Approach: Fracture mechanics consideration, Master S-N curve formulation and validation, Treatment of load-versus displacement-controlled conditions

15h00 - 16h00

Fatigue evaluation procedures using traction stress based master S-N curve method: Structural stress calculations - do's and don'ts, Other weld types, e.g., spot welds, laser welds, friction stir welds, etc., Treatment of weld root/throat failure, Life prediction examples

16h00 - 16h30 - Coffee Break

16h30 - 17h30

Special topics: Treatment of low cycle fatigue using structural strain method, Structural strain based master E-N curve, Treatment of multi-axial fatigue and non-proportional loading, A hybrid method for simplified treatment of spot welds

17h30 - 18h00 - Cloture and Q/A



Course Instructor

The course will be taught by Dr. Pingsha Dong of Battelle, who has published over 180 peer-reviewed papers in archive journals and major conference proceedings. He has lectured internationally as a keynote or invited speaker on fatigue/fracture of welded structures and advanced process computational modeling techniques for welding/joining processes. He has received numerous prestigious awards/recognitions, including *IIW Fellow* (2015), *IIW Evgeny Paton Prize* (2008), *R&D Magazine's R&D 100 Award* (2006), *TIME Magazine's Math Innovator* (2005), *Aviation Week and Space Technology's Aerospace Laurels Award* (2004), *AWS's R.D. Thomas* (2004) and *Dr. R. Wasserman Awards* (1998), *SAE's Henry Ford II Distinguished Award for Excellence in Automotive Engineering* (2003), *ASME G.E.O Widener Literature Award* (2002).

Venue

CETIM SENLIS

52, avenue Félix-Louat,
CS 80067 - 60304 Senlis Cedex - France

Cetim Senlis is located closed to Paris Charles de Gaulle airport (25 km) and with direct access by car or taxi through the A1 highway, exit 8. Senlis is approximately located at 50 km from the Eiffel Tower.

FOR MORE INFORMATION, PLEASE CONTACT:

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