



UNIQUE CETIM ACADEMY'S TWO DAY MASTERCLASS

The Fatigue Design of Welded Structures
20 & 21 January 2020

DAY 1, ABOUT THE COURSE

The first day of the course will provide a unique opportunity for attendees to learn about welding-induced residual stresses and distortions which can have significant impact on the manufacturability and structural integrity of welded components:

- provide a critical assessment of the "state of the art" residual stress modeling, analysis, and measurement techniques
- demonstrate effective modeling and analysis procedures for various industrial applications
- train participants to define and solve day to day residual stress and distortion problems, e.g., how to effectively:
 - mitigate residual stresses and distortions
 - incorporate residual stresses in fracture and fatigue assessment procedures

DAY 1, SCHEDULE

RESIDUAL STRESSES DISTORTIONS AND FITNESS FOR SERVICE ASSESSMENT

8h30 - 10h15

Why should we be interested in residual stresses ?

Weldability, Structural manufacturability, Structural integrity

Residual stress/distortion development mechanisms: 1-bar, 3-bar, and n-bar model based descriptions, Plastic zone versus shrinkage zone, Shrinkage mode versus distortion types, Basic principles for controlling residual stresses and distortions, Application examples

10h15 - 10h45 - Coffee Break

10h45 - 12h-30

Basic requirements for FE modeling procedures: Shrinkage force versus shrinkage strain method, Thermoplastic modeling procedures, Buckling distortion modeling method

Comments on residual stresses: Available techniques, Assumptions and limitations, Why measurements can be wrong!, How to interpret measurements results, How to devise an effective measurement plan, Some well-documented examples

12h30 - 13h-30 - Lunch

13h30 - 14h-30

Residual stresses in weld repairs: Key differences between repair and initial fabrication welds, Key controlling parameters, Mitigation techniques

14h30 - 15h-30

Post-weld heat treatment (PWHT) and local PWHT: Residual stress relief mechanisms in PWHT, Limitations of local PWHT, Alternative stress relief procedures

15h30 - 15h45 - Coffee Break

15h45 - 17h00

Residual stresses as secondary stresses for FFS or ECA: Modern interpretations of primary and secondary stresses, Fracture mechanics treatment of secondary stresses, A full-field residual stress profile generation method, Residual stress profile extraction

Cloture and Q/A

19h30 - Diner



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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