# Public Workshop on Assessment of Residual Stresses in Welds


# Report of Contributions

https://indico.frm2.tum.de/e/351

Contribution ID: **1** Type: **not specified**

# A deconvolution method for the mapping of residual stresses by diffraction

*Wednesday 23 November 2022 15:00 (20 minutes)*

**Presenter:** BRAHAM, Chedley (Arts et Métiers ParisTech)

**Session Classification:** Public NeT Workshop

Contribution ID: **2** Type: **not specified**

# Into the world - how NeT has influenced Structural Integrity Assessment in UK Nuclear Plant

*Wednesday 23 November 2022 09:15 (45 minutes)*

**Presenter:** SMITH, Mike (University Manchester (UK))

**Session Classification:** Public NeT Workshop

Contribution ID: **3** Type: **not specified**

# How you can implement the lessons learned from NeT round robins to day-to-day problems in nuclear industry

*Wednesday 23 November 2022 11:00 (45 minutes)*

**Presenter:** ROBIN, Vincent (EDF (F))

**Session Classification:** Public NeT Workshop

Contribution ID: **4** Type: **not specified**

# Lessons learnt from NeT and applied to other projects like NNUMAN/ATLAS+ or MATTEAR

*Wednesday 23 November 2022 12:05 (25 minutes)*

**Presenter:** VASILEIOU, Anastasia (University Manchester (UK))

**Session Classification:** Public NeT Workshop

Contribution ID: **5** Type: **not specified**

# Residual stress: a matter of structural integrity for nuclear reactors

*Wednesday 23 November 2022 10:00 (30 minutes)*

Manufacturing processes results in residual stresses that can be high enough to plastically deform the material. The superposition of residual stresses to those resulting from external loadings can not only contribute to premature failure of structural components, but also affect the driving force for crack initiation and propagation.
In the last year, crack problems have been reported in the nuclear industry, resulting from the association of residual stresses with corrosive environments, high temperatures, internal pressure, and so on. Understanding the physical mechanisms related to the presence of these cracks and developing robust models for its prediction are major challenges of the research carried out at the Energy Division (DES) of CEA.
In this context, the welded joints of structural materials are of high interest as they present mechanical and microstructural discontinuities within the structural material due the successive torch passes during the welding process. Instrumented experimental tests and numerical simulation studies have therefore been carried out in order to master welding processes, in order to better understand their effects on different materials.
In relation with the NeT activites, these studies allows:
• validating numerical welding models (finite element code Cast3M) in respect to experimental measurements and observations (residual stress, plastic strain, temperature, microstructure and so on);
• improving the existing material property databases and discussing on suitable constitutive material behavior for welding simulations;
• obtaining a better knowledge on residual stress profiles and on their effect on crack triggering.

**Presenter:** GONCALVEZ, Diogo (CEA)

**Session Classification:** Public NeT Workshop

Contribution ID: **6** Type: **not specified**

# Deep hole drilling (DHD) measurements and observations of the first 20 years of NeT TG specimens

*Wednesday 23 November 2022 14:00 (20 minutes)*

**Presenter:** TRUMAN, Chris (University Bristol (UK))

**Session Classification:** Public NeT Workshop

Contribution ID: **7** Type: **not specified**

# Application of the contour method to NeT components

*Wednesday 23 November 2022 11:45 (20 minutes)*

**Presenter:** BOUCHARD, John (Open University (UK))

**Session Classification:** Public NeT Workshop

Contribution ID: **8** Type: **not specified**

# Neutron Diffraction in NeT

*Wednesday 23 November 2022 14:20 (20 minutes)*

Diffraction methods are powerful tools for non-destructive analysis of applied or residual stresses. The high penetrating power of neutrons when compared to laboratory x-ray sources, i.e. several cm instead of a few tens of µm, opens up the possibility to analyze residual stresses in the interior of technical components rather than just at the surface. This makes neutrons an ideal tool for residual stress determination in thick samples like the welded test specimens used in the different NeT task groups.
In addition, the possibility to keep the measurement gauge volume cubic in all possible sample orientations is extremely helpful in order to analyze the local stress tensor used to validate the extensive numerical simulations of the corresponding NeT task group projects.
In this presentation, we will give an overview on the basic principles and requirements of the method and its use within NeT. A few key examples are given as well as a quick review on lessons learned during the measurement campaigns.

**Presenter:** HOFMANN, Michael

**Session Classification:** Public NeT Workshop

Contribution ID: **9** Type: **not specified**

# Uncertainties due to grain size issues in residual stress determinations using neutron diffraction

*Wednesday 23 November 2022 14:40 (20 minutes)*

**Presenter:** WIMPORY, Robert (Helmholtz Zentrum Berlin (D))

**Session Classification:** Public NeT Workshop

Contribution ID: **10** Type: **not specified**

# NeT–TG6: Three superimposed Alloy 82 weld beads on a plate Alloy 600 nickel-base superalloy using TIG

*Wednesday 23 November 2022 16:10 (20 minutes)*

**Presenter:** AKRIVOS, Vasileios (University Manchester (UK))

**Session Classification:** Public NeT Workshop

Contribution ID: **11** Type: **not specified**

# Numerical activities for the NeT Task Groups

*Wednesday 23 November 2022 15:50 (20 minutes)*

**Presenter:** DEPRADEUX, Lionel (EC2 Modélisation (F))

**Session Classification:** Public NeT Workshop

Contribution ID: **12** Type: **not specified**

# Wire + arc additive manufacturing : the challenge of distortions and residual stresses

*Wednesday 23 November 2022 16:30 (20 minutes)*

**Presenter:** BENDAOUD, Issam (Universite Montepellier (F))

**Session Classification:** Public NeT Workshop

Contribution ID: **13** Type: **not specified**

# 20 years of NeT, a summary of the achievements

*Wednesday 23 November 2022 16:50 (20 minutes)*

**Presenter:** OHMS, Carsten (JRC Petten (NL))

**Session Classification:** Public NeT Workshop

Contribution ID: **14** Type: **not specified**

# Final Discussion, Round up

*Wednesday 23 November 2022 17:10 (20 minutes)*

**Session Classification:** Public NeT Workshop