

ESIS TC 17: Non-destructive Evaluation

Structural integrity assessment of engineering components means the evaluation of their resistance to strength, deformation and fracture. It is based on three fundamental inputs: (1) the awareness of the physical fields (mechanical, thermal, magnetic, electric, electromagnetic) arising in the component during operation; (2) the properties of the structural material applied (tensile properties, fracture toughness, etc.); and (3) the size and position of existing flaws (in worst case: cracks). All of these characteristics may be subject to changes during utilization of the component (e.g. plant operation) due to the detrimental effect of ageing. Ageing can affect the material properties such as embrittlement (loss of toughness), and can contribute to propagation of cracks due to fatigue and / or corrosion. Consequently, in structural integrity assessment a continuous decrease in safety margin has to be taken into account. No need to say that all three inputs are equally important for the reliable assessment. **TC 17** (Non-destructive Evaluation, NDE) as its name expresses it, **deals with NDE** as the basic tool for both **detecting and sizing flaws** and **characterizing materials properties**.

Structural integrity assessment models and NDE are related in both directions. On one hand, NDE is supplying the data about presence of flaws in terms of dimensions, flaw location within the wall including ligament dimension, flaw characteristics and proximity to eventual other flaws, etc. On the other hand, structural integrity assessment is formulating the requirements for the level of NDE performance like scope and inspection volume, flaw evaluation process, target detectable flaw size, sizing and localization accuracy, and – in case of in-service inspection – the inspection interval.

TC 17 does not intend to deal with NDE techniques and methods. Its major intention is to focus on and to emphasize the aforementioned aspects related to structural integrity assessment. Just as examples, NDE reliability which includes not only capability, as usually understood, but also suitability, reproducibility and repeatability will be in the agenda. Within capability demonstration (in Europe called inspection qualification), the determination of the target flaw size and its requested detection accuracy is an issue. Also, possible degradation processes, their kinetics and their requirements from non-destructive materials characterization will be dealt with.

Bicske, December 30, 2016

Prof. Peter Trampus (Chairman)
University of Dunaújváros
P.O.Box 152
H-2401 Dunaújváros
trampus@uniduna.hu