

Ankündigung eines Gastvortrages

im Rahmen des Mechanik Seminars

zum Thema

Determination of Material Mechanical Properties of Operating Plant Components

**Ort: Technische Universität Berlin, Gebäude MS,
Raum MS 209, Einsteinufer 5, 10587 Berlin
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Gastdozent:

Dr. Jude Foulds, Clarus Consulting, LLC Charlotte, NC USA

Abstract:

As industrial plant components age, the need for assessing their structural integrity is becoming more common and critical. Of the three primary sets of variables required for integrity assessment – stresses, defect or damage condition, and mechanical properties – mechanical properties, including those relating to fracture, remain the most challenging to determine for operating equipment. This is because standard test procedures for properties, such as tensile strength, creep strength, fracture toughness, etc., specify test specimens of a size so large that test specimen material removal from an operating component would be “destructive” and typically require significant component repair. Beginning with the subsized test specimen methods developed for nuclear reactor vessel applications in the US nearly 40 years ago, there has been considerable progress in development of non-standard, miniature mechanical test specimen methods, including in Europe (e.g., 2006 CEN Workshop Agreement 15627 on Small Punch Testing). In parallel, and providing practical incentive for miniature specimen testing, has been the availability of sample removal machines capable of removing small enough material samples from in-service components such that minimal or no repair is required; i.e., a virtually “nondestructive” method. This presentation summarizes the state of the art in material sample removal, miniature specimen mechanical testing, and some in situ test methods that are gaining increased popularity. Mechanical properties currently determined are tensile stress-strain behavior, creep, and fracture toughness. Some details are provided on the two non-standard small specimen testing methods that are becoming more common – the impression (indentation) creep test and the small punch (miniature disk-bend) test.