

X-Ray Diffraction Technique as a Means for Degradation Assessment of Welded Joints

Authors : Jaroslav Fiala, Jaroslav Kaiser, Pavel Zlabek, Vaclav Mentl

Abstract : The X-ray diffraction technique was recognized as a useful tool for the assessment of material degradation degree after a long-time service. In many industrial applications materials are subjected to degradation of mechanical properties as a result of real service conditions. The assessment of the remnant lifetime of components and structures is commonly based on correlated procedures including numerous destructive, non-destructive and mathematical techniques that should guarantee reasonable precise assessment of the current damage extent of materials in question and the remnant lifetime assessment. This paper summarizes results of an experimental programme concentrated on mechanical properties degradation of welded components. Steel and Al-alloy test specimens of base metal, containing welds and simple weldments were fatigue loaded at room temperature to obtain Woehler S-N curve. X-ray diffraction technique was applied to assess the degradation degree of material as a result of cyclic loading.

Keywords : fatigue loading, material degradation, steels, AL-alloys, X-ray diffraction

Conference Title : ICEMA 2015 : International Conference on Engineering Materials and Applications

Conference Location : Vienna, Austria

Conference Dates : June 21-22, 2015