

## **VALIDATION OF A NEW DEEP HOLE DRILLING (DHD) TECHNIQUE FOR MEASURING NEAR YIELD RESIDUAL STRESSES**

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An accurate measurement of residual stresses is essential to determine their effect on the structural integrity of engineering components. Semi-destructive and destructive measurement techniques, involving cutting and removal of material, are the only methods that can be used to measure the stresses deep within large section components. Recently it has been shown that such mechanical measurement techniques can fail to measure the stresses correctly when the stresses are of high magnitude because plastic redistribution may occur when cutting is carried out. In previous work the authors developed a new deep hole drilling (DHD) technique that appears to have solved this problem.

In the present investigation the new DHD technique is validated using a variety of different residual stress fields. Shrink fit specimens have been used to generate axisymmetric and non-axisymmetric stress fields. Low yield stress aluminium alloys have been used to examine the performance of the technique when plasticity occurs. The results of the simulation were compared with experimental measurements and a very good correlation was observed.

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