

## Influence of ferrite fraction within martensite matrix on fatigue crack propagation: an experimental verification with dual phase steel

### Abstract :

The influence of a ferrite areal fraction within a martensite matrix on fatigue crack propagation is studied experimentally. The variation of the areal fraction is achieved by means of intercritical thermal treatment, which specifically aims at optimizing the resistance to fatigue loading. Within the intercritical annealing temperature range, the areal fraction of ferrite increases with decreasing soaking temperature. Furthermore, the experiment also reveals that the highest fatigue strength was achieved when the ferrite areal fraction was approximately 65%, which in this particular test, corresponds to 748 degrees C. It is concluded that appropriate thermal treatment can contribute to a significant improvement of fatigue properties and strength, which was also verified by computational modeling. (c) 2012 Elsevier B.V. All rights reserved.