

## HCF damage model for fatigue in composites

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### ABSTRACT

This work proposes a damage constitutive model at composite constituent level that accounts for fatigue effects by affecting both the strength and the stiffness of the composite component. The behavior of the composite material will be obtained by means of the rules of mixtures (ROM) theory [1].

The constitutive model is based on the damage model proposed by Oliver et al. [2] and used in Oller et al. [3]. Its capabilities of dealing with “High Cycle Fatigue” in steel have been studied by Barbu et al. [4] and offered good results in terms of life prediction.

The present work explores the use of the coupled plastic damage model and ROM theory for composite materials where the failure occurs in the “High-Cycle Fatigue” regime and is due to either component failure or to delamination between matrix and fiber. At component level, the model is valid for materials with a softening behavior. Numerical examples will be shown in order to better illustrate the model behavior and a comparison with the experimental results shown by Keller et al. [5] will be made in terms of life prediction and failure mode.

### References

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