Integrated fatigue design methodology for defective materials

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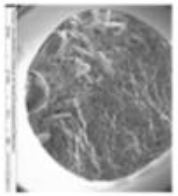
Modelisation of **defect type, size, position, morphology and loading** in a fatigue criterion
Calculation of the **allowable fatigue defect size** on an industrial component
Link between **industrial NDT** and fatigue defect (via **µtomography** analysis)
Towards a unified fatigue criterion for treating micro-notch fatigue and fretting-fatigue

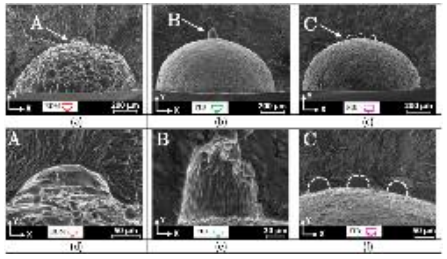
Highlights

Experimental identification of the **predominant role of defect morphology** in cast AlSi components
Beneficial role of the inert environment for **internal defects**, which explains the **difference between surface and internal defects**
Manufacturing of a fatigue sample with micro notch to represent the gradient encountered in **fretting-fatigue**
Demonstration of the effectiveness of a **probabilistic approach** to describe fatigue on micro-notch (Titanium) and defect (Fonte GS)
Implementation and experimental validation of an industrial component fatigue calculation method taking into account type, size, position, morphology and loading using the **DSG (Defect Stress Gradient)** criterion based on the Eshelby inclusion theory
Experimental validation on components

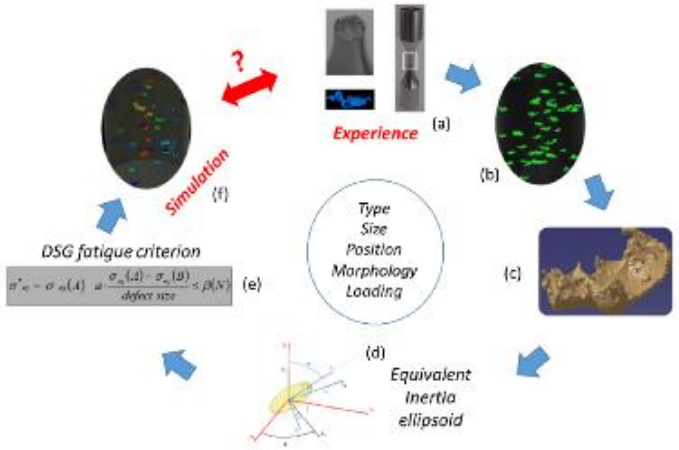
DSG criterion : Application to Additive Manufacturing



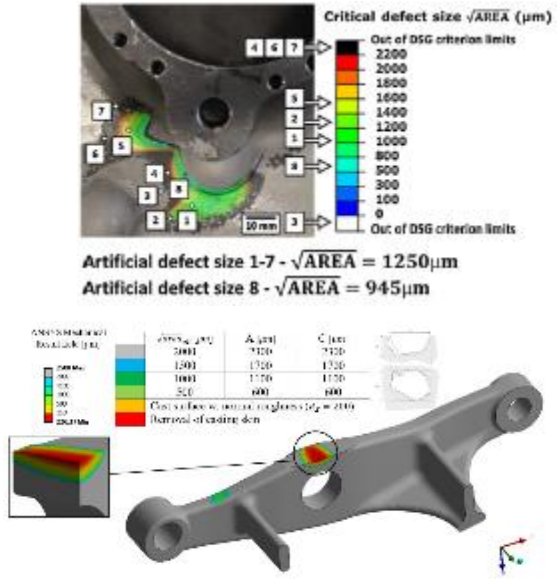
Internal defect



Local morphology



Simulation / experiment on real components



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