



شبكة المعلومات الجامعية
التوثيق الإلكتروني والميكروفيلم

بسم الله الرحمن الرحيم



HANAA ALY



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HANAA ALY



MULTISCALE MODELING OF ADDITIVELY MANUFACTURED METALS FOR AEROSPACE APPLICATIONS USING CRYSTAL PLASTICITY

By

Moustafa Mohamed AbdelHamid

A Thesis Submitted to the
Faculty of Engineering at Cairo University
in Partial Fulfillment of the
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FACULTY OF ENGINEERING, CAIRO UNIVERSITY
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Multiscale Modeling of Additively Manufactured Metals for Aerospace applications using Crystal Plasticity

Key Words:

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Summary:

In this study, the porosity, one of the additive manufacturing (AM) defects, was modelled as a parameter that influence on the mechanical behaviour of material and the failure mode of the structural component. A three dimensional (3D) multiple-slip crystal-plasticity dislocation-densities based model is used to study the effect of AM defects on the deformation behaviour in dynamically loaded microstructures of AM-built metals. The results show that the mechanical behaviour of microstructure linked to the materials' characteristics of mechanical properties at meso-macro scale.

Disclaimer

I hereby declare that this thesis is my own original work and that no part of it has been submitted for a degree qualification at any other university or institute.

I further declare that I have appropriately acknowledged all sources used and have cited them in the references section.

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