شبكة المعلومات الجامعية

التوثيق الإلكتروني والميكروفيلم

بسم الله الرحمن الرحيم

HANAA ALY

شبكة المعلومات الجامعية

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التوثيق الإلكتروني والميكروفيلم

جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

قسم

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها
علي هذه الأقراص المدمجة قد أعدت دون أية تغيرات

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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
Requirements for the Degree of
MASTER OF SCIENCE
in
Aerospace Engineering

FACULTY OF ENGINEERING, CAIRO UNIVERSITY
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Prof. Dr. Mohamed Nader Abuelfoutouh

……..

Professor
Aerospace Engineering Department
Faculty of Engineering
Cairo University

Assoc. Prof. Tarek Mostafa Hatem

……..

Associate Professor
Faculty of Energy and Environmental Engineering
The British University in Egypt

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Approved by the
Examining Committee

_____

Prof. Dr. Mohamed Nader Abuelfoutouh, Thesis Main Advisor

_____

Prof. Dr. Iman Salah El-Din El-Mahallawi, Internal Examiner

_____

Prof. Dr. Taha Mohamed Taha Mattar, External Examiner

- Director, Tabbin Institute for Metallurgical Studies, Egypt.

_____

Assoc. Prof. Dr. Tarek Mostafa Hatem, Thesis Advisor

- The British University in Egypt.

FACULTY OF ENGINEERING, CAIRO UNIVERSITY
GIZA, EGYPT
2021

Engineer's Name: Moustafa Mohamed AbdelHamid
Date of Birth: 15/06/1992
Nationality: Egyptian
E-mail: moustafaabdelhamid1@gmail.com
Phone: (+20)-122-536-0294
Address: Makka St., Western Ain shams, Cairo.

Registration Date: 01/10/2014
Awarding Date: …./…./2021
Degree: Master of Science
Department: Aerospace Engineering

Supervisors:

Prof. Mohamed Nader Abuelfoutouh
Assoc. Prof. Tarek Mostafa Hatem (The British University in Egypt)

Examiners:

Prof. Dr. Taha Mohamed Taha Mattar (External examiner)

- Director, Tabbin Institute for Metallurgical Studies, Egypt.

Prof. Dr. Iman Salah El-Din El-Mahallawi (Internal examiner)
Prof. Dr. Mohamed Nader Abuelfoutouh (Thesis main advisor)
Assoc. Prof. Dr. Tarek Mostafa Hatem (Thesis advisor)

Title of Thesis:

Multiscale Modeling of Additively Manufactured Metals for Aerospace applications using Crystal Plasticity

Key Words:
Additively Manufactured Metals; Multiscale Material Modeling; and Crystal Plasticity

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.

Name: Moustafa Mohamed AbdelHamid Date: / /2021

Signature:

Acknowledgements

I would like to thank so many. Allah for his blessing and mercy, by Him I would like to be taught, and by Him I would like to be rewarded.

I would like to thank my father for his help and support, my mother for her lasting bearing, educating, feeding, caring, and loving, my aunt (Salwa) for his understanding and patience, and my brother (Nour) for his encouragement. And I would give special thanks to my wife (Rana) and my son (Seif El-Din) for being patient and supportive during my MSc degree period.

I would also to thank my esteemed supervisors, Prof. Dr. Mohamed Nader for his teaching me during my Bachler period and his guidance that helped me during my MSc work, and Assoc. Prof. Tarek Hatem for being more than academic advisor for wisdom, teaching, his patient, and his advice that framed my professional career. I would like to thank SIAM-lab mates (Khafagy, Amir, Hendy, Hamza and Shalan) for time spent together in the lab.

I would also like to show gratitude to my committee members (Prof. Dr. Iman Salah El-Din El-Mahallawi, Prof. Dr. Taha Mohamed Taha Mattar, and Prof. Dr. Mohamed Nader Abuelfoutouh) for sharing expertise, and sincere and valuable guidance and encouragement extended to me.

I would give special thanks for Dr. Mohamed Khalil for his help and encouragement to strive me to keep up my MSc work during the military service. I would like to thank my friends (Ahmed Elaraby and Ashraf Hesham) for their encouragement all though my MSc period.

Finally, I would like to express my gratitude to Prof. Wael Akl, President of Nile University, for his permission to dedicate time and effort for my MSc work. I would also like to extend my sincere thanks to Eng. Haytham, Director of FACT Centre, for his unwavering encouragement.

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