

# ZPRÁVA ŠKOLITELE O VĚDECKÉ ČINNOSTI STUDENTA

Supervisor's report on the student's scientific activities

Titul, jméno a příjmení studenta:

Title, name, surname of student

Ying Li

Osobní číslo:

Personal number

S22P0016K

Doktorský studijní program:

Doctoral study programme

P0715D270027 Manufacturing and Materials

Název disertační práce:

Topic of the dissertation thesis

High temperature mechanical behavior of  
functionally graded material SS316L/IN718  
fabricated by directed energy deposition

Školitel:

Supervisor

Prof. Ing. Ján Džugan, Ph.D.

## Vyjádření školitele:

Supervisor's statement

Ing. Ying Li was enrolled in the academic year 2018/2019 as a PhD candidate at the Faculty of Mechanical Engineering at the University of West Bohemia in Pilsen, on the PhD study programme of Manufacturing and Materials, at the branch of study: Materials Engineering and Engineering Metallurgy. Meanwhile, she joined COMTES FHT a.s. in 2019 as a researcher at the Department of Mechanical Testing and Thermophysical Measurements, where she conducted her PhD research. Since the beginning of her professional activity, she has been involved in the field of Additive manufacturing of multi-material components deposition by Powder Blown Laser Directed Energy Deposition process. Her doctoral thesis deals with the assessment of high temperature mechanical behavior of functionally graded material SS316L/IN718 fabricated by directed energy deposition.

In the case of her thesis, the defined area of interest is the investigation of deposition parameters and the effect of heat treatment of individual materials and their combinations on high-temperature properties during uniaxial loading modes such as tensile and creep tests. At the same time, these results are supported by a detailed analysis of the structures with an emphasis on the area of the connection of the two basic materials. All the results found have an impact on the applicability of the material produced in this way in technical practice. Additively manufactured materials are known for their very complex thermal history, which defines their unique structural and material properties. In the case of depositing material layers on an existing component or repairing a damaged component, it is thus necessary to guarantee that the resulting material connection will have the quality and properties corresponding to the operating conditions of the given component. Due to the assumed wide scope of the work, there is extensive amount of material research techniques in which the student had to specialize during her studies and manage all these activities by herself as part of her workload. Namely, these are the additive manufacturing of the above-mentioned materials and the choice of deposition parameters, the design of heat treatment, the design and production of test samples for mechanical tests, the implementation of mechanical tests and the metallographic analysis of structures. The topic of the doctoral thesis is closely related to the workload of the student, who solves all activities within the framework of research projects. Her main project related to Ph.D thesis was:

EF17\_048/0007350 Pre-Application Research of Functionally Graduated Materials by Additive Technologies 2019-2022.

The doctoral student was very active throughout her studies with a creative approach solving the given problem. She generated unique results that she appropriately processed and interpreted that made it possible to publish her work in top scientific journals. In the course of her Ph.D studies she published 11 papers (6x as a first author out of which 5xQ1) in highly ranked international scientific Jimp journals (7xQ1 and 4xQ2). Currently she has 83 citations and H-index=6 according to Scopus.

Throughout her doctoral studies and the preparation of her dissertation, she had a very responsible approach, and the presented results are a valuable contribution to the development of additive manufacturing of multiple materials components by L-DED process. I assess the dissertation of Ing. Ying Li very positively and recommend it for defence.

Datum

Date

21/02/2024

Podpis školitele:

Signature of supervisor