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Report on Research Project under the IDEA League Student Grant

Personal Information					
Full Name		Oberbeck, Jannick Nils			
Field of study		Mechanical Engineering			
Degree pursued		Master in Mechanical Eng.	Current year of studies	1	
Home university		ETH Zurich			
Sponsoring professor at home university	Name	Prof. Dr. Konrad Wegener			
	Email	wegener@iwf.mavt.ethz.ch			

Information about the research stay					
Host university		Chalmers tekniska högskola (Chalmers University of Technology) – Gothenburg, Sweden			
Research topic		Effects of tool geometry and cutting conditions on chip formation when machining 316L austenitic stainless steel			
Dates of research stay		From	01.03.2018	To	14.07.2018
Sponsoring professor at home university	Name	Prof. Dr. Peter Krajnik			
	Email	peter.krajnik@chalmers.se			

Summary of research project
(200 words max.)

The aim of the research project was to evaluate the effects of tool geometry and cutting conditions on chip formation when machining 316L austenitic stainless steel. Therefore, an orthogonal cutting process was carried out by varying the rake angle, cutting speed and material from different suppliers. The chips and used tool inserts were analyzed to measure the chip thickness and contact length under a microscope. In addition, the recorded forces were plotted on graphs to see differences in terms of cutting forces under different cutting conditions. A SEM (Scanning Electron Microscope) was carried out to analyze the tool wear in order to understand the effects of the tool wear on the cutting forces, contact length and chip thickness. Finally, all results of this work will be used for the validation of a tool life simulation.

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Experience Report
(Please tell us about your personal experience at the host university and give us an evaluation of the benefits of the research stay for the course of your studies)

Due to my research stay at the Chalmers university I could gain many new insights of the metal cutting field. The investigation of the worn inserts with a scanning electron microscope was a fascinating experience that helped me a lot to understand the complexity of tool wear. Moreover, it showed me that the material composition as well as inclusions or hard particles have a high impact on the tool wear when machining one material from two different suppliers.
Furthermore, it was a good experience to collaborate with international researcher on a challenging topic which could be used by the metal cutting industries in the near future to predict the tool life more accurately.

Picture
(Please provide a picture of you at the host university)

The report should be signed by both professors involved. The signatures will be deleted when the template is published on the IDEA League webpage.

Student *Sending professor* *Host professor*

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