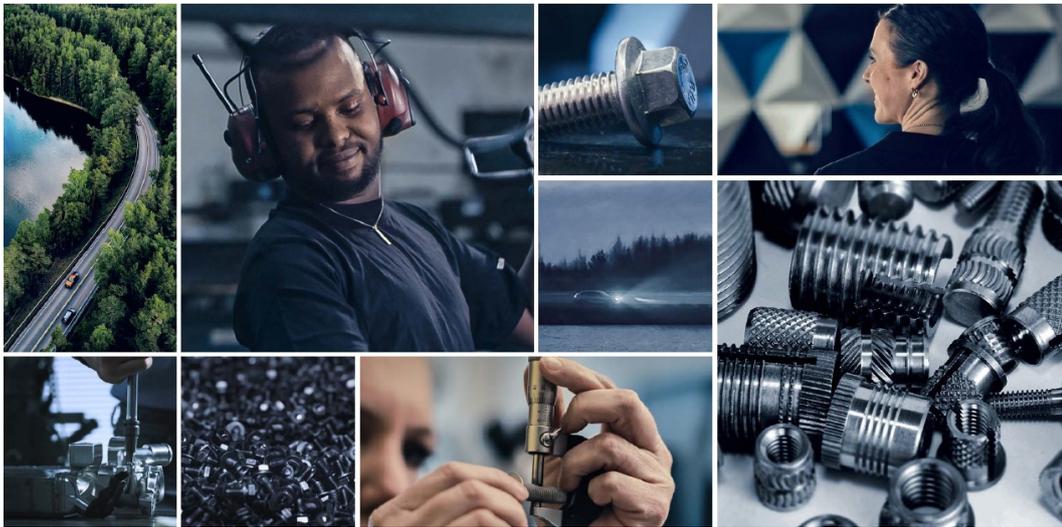


Master Thesis work – Effect of work hardening on fatigue performance of fasteners



Introduction

Bulten Group is one of the leading suppliers of fasteners to the international automotive industry.

The company's product range includes everything from customer-specific standard products to customized special fasteners.

The company also provides technical development, line-feeding, logistics, material and production expertise. Bulten offers a Full Service Provider concept or parts thereof.

The company was founded in 1873, has some 1,600 employees in sixteen countries and head office in Gothenburg. The share (BULTEN) is listed on Nasdaq Stockholm.

Read more at www.bulten.com.

Technology Background

In 2019 Bulten started a project to reduce the CO₂ footprint of fastener production, called BUFOe. The majority of all automotive fasteners are today heat treated via a energy intensive process that generates more than 30% of all the CO₂ emissions linked to fastener production. Within the BUFOe project, Bulten have now successfully developed a production method to fully exclude this heat treatment step of the production process.

This heat treatment free fastener technology is based on achieving material strength via work hardening (deformation) instead of via heat treatment. One of the challenges with

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the new process is to reach high enough strength, and at the same time achieving uniform mechanical properties and good endurance performance of the fastener.

The mechanical properties of these heat treatment free fasteners are a result of the steel microstructure combined with the deformation introduced into the steel via the cold forging process, and will as such vary depending on deformation degree. The basic mechanical properties, such as strength and hardness, are measured and controlled according to the international ISO standard. However, for more endurance related properties, such as relaxation, creep and fatigue life, there are today no standards in place that provides requirements for what can be considered approved results, that in the end can guarantee good performance of the fastener.

Goal for the thesis

The effect of cold working (dislocation density) on the endurance properties of steels is an area where very little literature and data exists. Moreover, it is an area which the fastener industry has never had to pay any attention, as the majority of all fasteners are heat treated which in fact remove all the dislocations that are generated by the cold working.

Bulten is now aiming to expand the knowledge of fatigue properties of heat treatment free fasteners. We have a special interest in understanding the effect of dislocation density (amount of cold working) on fatigue properties of heat treatment free fasteners.

As a thesis worker in this project, you will work both at the Department of Industrial and Materials Science at Chalmers, and at the Bulten Technology & Innovation department, BATC, located in Arendal, Gothenburg. At BATC you will experience working in a fully agile environment and will have the opportunity to be a key researcher to deliver one of the most important sustainability contributions of the fastener industry.

Details:

- 20 weeks, flexible start date in the spring of 2022.
- 30 ECTS / hp
- Location: Part time at Chalmers and part time at BATC Arendal in Gothenburg

Desirable expertise and skills

We are searching for one or two master-degree students with a passion for mechanical properties and material technology.

You are curious, have a problem-solving attitude, good communication skills, and are fluent in English. Some experience in metal working and mechanical testing is an advantage

What we offer

This is an opportunity to apply your theoretical knowledge in practice in a friendly and innovative company culture. At the same time, of course, it is a way for Bulten to connect with students and take advantage of new ideas and knowledge. You will make valuable contacts for the future, and Bulten has the opportunity to meet potential colleagues.

Apply with your CV, academic transcripts and a cover letter in English. We look forward to receiving your application.

Recruiting Manager Emmy Pavlovic, SVP Technology & Innovations, +46 31 734 59 40, will answer your questions.

Send your application to emmy.pavlovic@bulten.com

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