

Opponents Review of Dissertation Thesis

Title of dissertation thesis: Dynamic Fracture Behaviour of High Strength Steels

Author: Ing. Fatih Bozkurt

Reviewer: doc. Ing. Petr Mohyla, Ph.D.

Dissertation thesis of Fatih Bozkurt deals with measurement of fracture toughness of high strength steels used in modern rail vehicles. High strength steels provide high mechanical properties like ability of dynamic reinforcement together with ductile fracture in a wide range of working temperatures but they require very sophisticated technological processing, especially heat treatment and welding. The dissertation is focused mainly on steel Strenx 700MC.

Dissertation thesis has 172 pages and is divided into 9 chapters. The extend of the thesis is very large, printing quality is high including high quality of pictures. It is clearly articulated and is written carefully. The author works with 62 references. The work contains the list of author's publications. Fatih Bozkurt is the lead author of 9 publications related to the dissertation topic. The objectives of dissertation were fulfilled. The dissertation thesis meets the general requirements for awarding the title Ph.D.

Fracture behaviour of high strength steels is greatly influenced by the welds. In the thesis, thermal cycle simulation was applied on steel Strenx700MC to evaluate the effect of welding on fracture behaviour. In the dissertation work, attractive non-standard test methods for determination of plane strain fracture toughness (K_{IC}) and the dynamic fracture toughness (K_{ID}) are performed. Proposed work uses sophisticated research methods, such as scanning electron microscopy (SEM) for fractography evaluation. The dissertation thesis of Fatih Bozkurt has in my opinion significant scientific contribution.

Comments and questions:

Page 42, Figure 4.3: What is common name of HAZ region with T_{max} between A_1 and A_3 ?

Page 63, Table 7.4: Why did author choose filler wire Boehler UNION NiMoCr for welding of steel Strenx700MC? Have 1,5% of nickel in filler wire some importance?

Page 65, Figure 7.4: This picture is very small and not clear. Please, describe more deeply the process of weld simulation on Strenx700MC specimens.

Why is the maximum temperature of simulated weld thermal cycle 800°C ?

Conclusion

I recommend to defend this dissertation thesis, and – in positive case - I recommend to award the applicant the title Ph.D.

In Ostrava, 30th November 2018


doc. Ing. Petr Mohyla, Ph.D.