Opinion on master thesis

ANALYSIS OF MATERIAL DEFORMATION RESPONSE TO DYNAMIC TENSILE TESTS

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The master student has written a manuscript discussing the problem of strengthening mechanisms in dependence on rate of loading during impact. The focus of this research is to examine effects of stress distribution and dynamic peak forces corresponding each time step of the impact loading in different position of specimen. The work is divided into several parts. If we go through the first very short part Introduction we meet second chapter describes contemporary state of knowledge regarding dynamic tensile tests. The overview takes into account test methods, where mainly strain gauge method is deeply described (this method was used for research part of the master thesis), however mentioned are One–bar method and Split Hopkinson Bar (SHB) method also. Other necessary parts connected to tensile test such as clamp types, load machines, principles of material dynamic strengthening are discussed. The overview is written clearly with sufficient information.

Chapter three includes identification of used technology during measurements. I would like to highlight an instrumented impact pendulum tester Zwick Roell which is the unique technology of Jan Perner transport faculty situated in Educational and research centre in transport. Application of impact pendulum tester for tensile tests is not standard. Interesting is application of very cheap amplifier for analogue signal magnifying at given sample frequency 1 million samples per second.

The most important chapter 4 called "Method of experiments" deals about student research work. Procedure contents preparation of specimens (including geometry of specimens), stress calculation, static calibration, mounting and clamping specimens into pendulum tester and experiment description. There are three questions, which has to be answered:

1) First, what was position of strain gauges glued to specimens (why the step 1 mm)?
2) Second, for identification real forces by given calculation is necessary to know real cross-section surface during tests (including sectional contraction). Is it possible to determine inaccuracy in case of application initial cross-section surface?
3) Could be performed a deeper analysis of the records of individual tests?

In spite mentioned questions is chapter described comprehensibly. All results are introduced and discussed in chapter labelled "Results and Evaluations". The maximal force values bring the information about real strengthening effect in each position of tested samples. The intensity of dynamic strengthening is identified by comparison with the static maximal force obtained during standard static tensile tests for the samples with the same geometry and material parameters. Final chapter gives conclusions and recommendations.

In general, the student suggests new method for testing specimen during high speed tensile tests (to improve standard tensile test into instrumented tensile test). Consultations with tutor were regular. During preparation of tests and realisation tests were some problems (preparation of strain gauges, cable damages, resistance of amplifier). However, the problems were not fundamental.

I am rating the work with degree **"very good"**.

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