

PhD Mrs. Teresa Fras – Modelling of plastic yield surface of materials accounting for initial anisotropy and strength differential effect on the basis of experiments and numerical simulation

Report of Prof. Patricia Verleysen

The PhD of Mrs. Fras deals with the description of the yield surface of materials, taking into account anisotropy and asymmetric tensile/compression behaviour. The used technique is based on the work of professor Burzynski. As the work of Mrs. Fras clearly shows, an important advantage of the adopted approach is that it is applicable to a wide range of materials. Moreover, the versatility of the model is not at the expense of the introduction of a large amount of parameters, as is unfortunately often the case.

I really appreciate the combination of experimental work and numerical modelling reported in the dissertation. Numerical simulations are not only used to determine parameters and to validate the yield model, however, numerical simulations are also extensively used to come to an in-depth understanding of the experimental observations. Various experimental techniques are used covering different stress states and strain rates. The work clearly benefits from the knowledge and expertise of the supervisors of Mrs. Fras, and the experimental and numerical facilities available in their research groups.

During the short time Mrs. Fras visited the Ghent University beginning of this year, she turned out to be a hard-working and result-driven scientist. These features are also reflected in the amount of work covered by the PhD-research: different materials, different experimental techniques, finite element modelling and material modelling techniques are all dealt with in the PhD. A weaker point here is that some aspects might be approached more critically.

The subject is well-motivated. Adequate reference to the international literature is given. Lay-out and figures are up to standards. Weaker points are mainly related to the dissertation itself. Readability of some parts of the manuscript is poor because of numerous (mainly grammatical, vocabulary) errors. At some places the manuscript certainly needs some polishing.

At the defence, my questions will be related to the role of the presented yield surface in the framework of plasticity modelling and to the interpretation of the experimental results.

In my opinion, with the presented dissertation, the candidate has proven to have the necessary capacities to conduct scientific research at a high level, and can consequently unconditionally be allowed to defend.

Yours sincerely,

Prof. Patricia Verleysen

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