

Diploma Thesis review

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Study branch: 2301T048 – Engineering Technology and Material

Evaluation of the thesis targets:

Diploma thesis is 67 pages long and is divided into two basic parts – theoretical and experimental. Thesis addresses difficult up-to-date issue in automotive industry. Tribological properties of two different coatings deposited on steel and creation of 3D colored maps for objective evaluation of test results are covered.

Thesis composition is logical. Experiment setup is thoroughly described in research stage and realized at later stage. Tribological 3D maps serve as a main result and are addressed in the conclusion.

All goals set by author were met.

Evaluation of the Thesis content:

Thesis is at high professional level. In the theoretical part, I would prefer going deeper with focusing on automotive and manufacturing. Some topics in theoretical part of thesis are irrelevant for automotive.

Author is describing material characteristics in chapter 3.1. Table 3.1 is misleading. Process of material choice is much more complex than described. I find "Ease of manufacturing" parameter in the table as a really unfortunate choice. Its implementation is misleading without its further explanation and doesn't correspond to reality. Does author know, on what criteria the parameter was based on?

There is an interesting information on magnesium use in chapter 3.2.4., however no reference to the source of this information is present.

Chapters 4.3 and 4.4 do not correspond to production of steel sheets for automotive. Author provides us only with a general description of production technologies. Steel galvanizing technologies are much more specific.

Material designation as HDG and NIT in chapter 5 is misleading. NIT layer is applied on surface of already hot dip galvanized steel. Therefore the correct designation should be HDG and HDG + NIT. I am missing closer description of NIT coating and explanation of its purpose.

There are tables with force measurement on page 44. I don't find it appropriate to calculate an average and mean deviation based on two measurements.

Formal Evaluation:

Graphical layout level of the thesis is really high. Few mistakes were made. Different font is used for content on page 6. Typing error on page 16 is present, saying "election" instead of "electron". In formula (4) on page 50 stands "p" for pressure while "P" is used in legend.

Contribution to practical automotive manufacturing:

This thesis contributes highly to practical use. 3D coloured maps of tribological properties are bringing in particular new and interesting point of view in material classification. I highly appreciate calculation of volume under the tribological plane, which quantifies tribological properties at different parameters. The thesis confirms contribution of HDG + NIT coating to the benefit of friction reduction. It is a pity, that there is no detailed discussion about use of 3D map in the thesis.

Questions and comments:

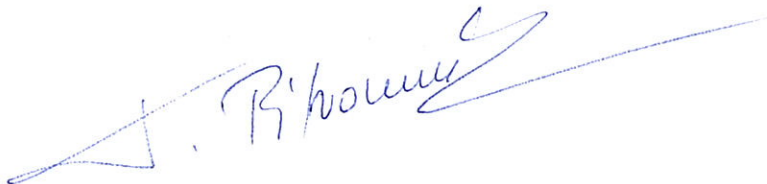
- Author should describe more in detail what NIT is and what it is used for.
- What is the practical use of 3D maps in press shop or in pressing tool design?
- What recommendation for further multiparameter evaluation of steel tribological properties is proposed for future research?

Thesis meets requirements set for diploma thesis. It is very well made and despite some minor shortcomings is therefore recommended by me for defence at state exams. I rate thesis as:

Excellent (1)

Ing. Tomáš Pilvousek, Ph.D., IWE

Technical Service of Press-shop and Body-shop ŠKODA AUTO, a.s.

A handwritten signature in blue ink, appearing to read 'T. Pilvousek', with a long horizontal stroke extending to the right.