

## I. IDENTIFICATION DATA

<b>Thesis name:</b>	<b>Measurement of the elastokinematics of wheel suspension</b>
<b>Author's name:</b>	<b>Anand Manda</b>
<b>Type of thesis :</b>	master
<b>Faculty/Institute:</b>	Faculty of Mechanical Engineering (FME)
<b>Department:</b>	Department of Automotive, Combustion Engine and Railway Engineering
<b>Thesis supervisor:</b>	Gabriela Achtenová
<b>Supervisor's department:</b>	Department of Automotive, Combustion Engine and Railway Engineering

## II. EVALUATION OF INDIVIDUAL CRITERIA

<b>Assignment</b>	<b>challenging</b>
<i>Evaluation of thesis difficulty of assignment.</i>	
<p>The assignment covers many kinds of the work of an engineer. From the design capability, workmanship, basic understanding of electric circuit for connection of sensors, till the programming of data acquisition and data analysis. This makes the assignment challenging and interesting. On the other hand the previous diploma thesis, which dealt with the test bench was finished and prepared on very high level with good description – which provided great start-up point for Anand. Unfortunately the work was written in Czech. Therefore I treat the assignment for Anand as challenging.</p>	

<b>Satisfaction of assignment</b>	<b>fulfilled with minor objections</b>
<i>Assess that handed thesis meets assignment. Present points of assignment that fell short or were extended. Try to assess importance, impact or cause of each shortcoming.</i>	
<p>Anand fulfilled all tasks in the master thesis assignment. Unfortunately, he could not fully prove the function of test bench with the sliding table of the second wheel. The reason is partly on Anand's side – while on the beginning of the master thesis he definitely did not spend the needed time on working on master thesis, and partly on the side of the manufacturer, who did not finish the fabrication in time.</p>	

<b>Activity and independence when creating final thesis</b>	<b>C - good.</b>
<i>Assess that student had positive approach, time limits were met, conception was regularly consulted and was well prepared for consultations. Assess student's ability to work independently.</i>	
<p>Anand had big troubles with everything what he needed to do with his hands. Further the way of drawing preparation was very limited at the beginning. Fortunately he was capable to improve during the master thesis creation. He was very active and willing to consult, especially in the period when the end of the thesis was approaching, more then I was capable to grant him. Better distribution of the work load, would for sure lead to higher level of the diploma thesis. During the work, he came up with new ideas, but many times they were far from the engineering reality.</p>	

<b>Technical level</b>	<b>E - sufficient.</b>
<i>Assess level of thesis specialty, use of knowledge gained by study and by expert literature, use of sources and data gained by experience.</i>	
<p>For this type of diploma thesis assignment, I would expect the diploma thesis in form of technical report clearly explaining how to use the newly designed features, clear and easy readable schemes. For elements which are planned to be purchased, or was purchased, should be clear notation of part, manufacturer, eventually vendor in Czech Republic. From this point of view, Anand's report is far from my expectations, e.g.:</p> <p>P 20, fig 3-5: It seems that the only reason for changes was to make the wiring even more messy, then it was before</p> <p>P 21, fig 3-6: No idea where the 6-pin connector is placed. Wherefrom comes the +5 V?</p> <p>P 23, fig 3-8: No type, no vendor, and no explanation what it will mean for actual test stand. I do not understand this lack, while I know Anand spent a lot of time with this point, but without letting the trace to his successors, it was all useless.</p> <p>P 25, fig 3-9: On page 3-8 I can read that the maximal vertical force on the sliding table can be 6,9 kN, on this Figure is proposed a system with 4 kN maximally. How does this match?</p> <p>P 31, fig 3-14: For what are good the 4 threaded unused holes? What is the reason for special shape of the slider base? I do not like the system of protruded screws to stop the carriages, which I clearly noted several times. Why was not proposed another system?</p>	

P 34, fig 3-17: I do not believe that none of the sensors needs the input voltage?!

P 38, fig 3-21: I would expect in the text the explanation how to obtain parallel set-up with the wheel rim, instead of the incomprehensible sentence "...it is difficult to comment that the measuring plane is parallel to the wheel plane."

P 40, fig 3-24: I would expect more detailed explanation, how parallelism will be ensured. Is necessary to center the clamping mechanism with respect to the wheel rim center? If yes, what is the approach?

P 43: I do not believe that the successor will really be capable to follow this scheme. I do not understand how the blue terminal can serve both for +5 V and for ground? I doubt that all wires for pressure reducing valves are connected to +5V only; etc...

P 46, NI 9263: What does mean D1, E1, D2, E2?

P 47: Nowhere is mentioned, which types of sensors were used for the measurement?

Drawings – general mistakes: Nowhere is mentioned the number of pieces to be fabricated. No assembly drawing with list of used parts. Wrong sections are drawn on many drawings.

Drawings – specific mistakes: P 81, P 82, P 83 – missing holes diameter, P 83 – the isometric view does not help the understanding.

### Formal and language level, scope of thesis

**D - satisfactory.**

*Assess correctness of usage of formal notation. Assess typographical and language arrangement of thesis.*

The diploma thesis uses correct notation. The thesis is relatively easy readable. Only on some places are missing some words or are written incomprehensible sentences. Unfortunately I am missing clear explanations of his work, and I regret he did not include information about the complete work what he did.

P 7, fig 2-4: It is not a good idea to start the chapter with figure. Even worse the Figure is not appropriately described. As the scheme it is nice, but the reader cannot know, if it is description of old setup or new setup. The comparison would help to fully understand to everyone, what is new with respect to the test bench of Mr. Fišer.

P 29, fig 3-11; P 41, fig 3-25; P 42, fig 3-26: With black background invisible.

### Selection of sources, citation correctness

**B - very good.**

*Present your opinion to student's activity when obtaining and using study materials for thesis creation. Characterize selection of sources. Assess that student used all relevant sources. Verify that all used elements are correctly distinguished from own results and thoughts. Assess that citation ethics has not been breached and that all bibliographic citations are complete and in accordance with citation convention and standards.*

Anand used 18 references. They are correctly cited. Every Figure which is not Anand's photo is cited. Pity that for the books he does not used ISBN, for student works he does not distinguish between diploma and bachelor thesis, SAE references do not have any numbers, etc. So again, Anand did his best to complicate the life of his successors 😊.

### Additional commentary and evaluation

*Present your opinion to achieved primary goals of thesis, e.g. level of theoretical results, level and functionality of technical or software conception, publication performance, experimental dexterity etc.*

None.

### III. OVERALL EVALUATION, QUESTIONS FOR DEFENSE, CLASSIFICATION SUGGESTION

*Summarize thesis aspects that swayed your final evaluation.*

Anand revived the elastokinematic test bench, further he added new functions. Although I have several remarks to his work, I know it was not easy for him to work in the Czech surrounding, where not all colleagues speak Czech, and not all vendors are ready to respond to non-czech speaking customers. Although he is sometimes lacking in engineering approach, he proved he can survive in multi-cultural environment, with his great communication ability.

I evaluate handed thesis with classification grade **D - satisfactory.**

Date: 26.1.2019

Signature: