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Review report on Doctoral Dissertation

of **Gabriela Kosiuk**

entitled „**COMPREHENSIVE CHARACTERISTICS OF THE GEOMETRIC
STRUCTURE OF SURFACE OF WOVEN FABRICS WITH DIFFERENT
CONSTRUCTION**“

(scientific supervisor Prof. Dr. Hab.Eng. Małgorzata Matusiak)

prepared based on the invitation in accordance with Resolution no. 59/7/IJK/2023 of the
Council for Academic Degrees dated July 10, 2023

The review was performed on the basis of the Doctoral Dissertation in Polish. The doctoral dissertation consists of an introduction and 6 chapters, including literature review (55 pages), theoretical part (21 page), part of materials and methods (26 pages), and three chapters of results and discussions (total 109 pages), 12 conclusion (3 pages) and list of 145 references. Also the list of published papers and conferences is presented. Author presented 2 papers in journals cited in Web of Science database, in both of them author is the first co-author of paper. The investigations also were presented in 7 international conferences in Poland and Portugal, and 6 national conferences in Poland. The doctoral dissertation contains 141 pages.

The first chapter “Introduction” presents the research problem, the aim and objectives of the dissertation, justification of the choice of the research study, hypothesis, and description of the structure of the dissertation. I can confirm that the work presented with well described novelty and significance.

The second and third chapters presents literature review and theoretical analysis, and overview of the current state of the problem and a review of the scientific literature. Majority of presented 145 references are research papers in WoS journals of the last 10 years. Literature review presented all problems investigated in present work. However, in my opinion in these chapters are presented a bit too superfluous information in which a

basic knowledge of textile materials are presented a knowledge of which need be mandatory even for bachelor students in textile engineering. Herewith, in my opinion, the splitting literature review into two parts (literature review and theoretical part) is not right decision as theoretical part also is literature review and could be like subchapter of the chapter literature review.

In the fourth chapter, the materials and methods of investigations used for the study are presented. I have some doubts about some fabrics which are named as Twill 3/1 S and Twill 2/2 S – they really was weaved like is presented? Did author checked how they looks on the loom? Maybe it was Twill 1/3 Z and Twill 2/2 Z? Usually Z direction are used in twills manufacturing. Also, in this chapter some properties of fabrics are presented in a table 4.2 (surface density, crimp of yarns, thickness) but there are not presented how they were measured and what variation of measurements. Such table should be in the part of results as author makes measurements. In the part of materials description the set of warps is missed. In a Table 4.1 a parameters of fabrics are presented without set in warps. From the Table 4.2 seems that the same set likely of 30 ends per cm was used but it is not clarified.

In the 5th, 6th and 7th chapters an empirical investigations and discussions are presented. All investigations are presented with very deep and strong statistical analysis of importance of one or other factor on the investigated property. Such statistical analysis is done very well, however, the information about statistical parameters of measurements is missed. What coefficient of variation was for every average value calculation is not presented.

The 8th chapter presents the conclusion of dissertation. In conclusion the results are well described, however, conclusion looks like statements without any numerical description of results and from them is not easy to understand about importance of every part of investigations. Especially, when a short summary of results after every empirical part is not presented. Such short summary is presented after literature review, but not after experimental parts.

As a novelty of the work I would like to underline that it is the first such comprehensive study of the geometric structure of surface of textile materials. So far, works in a similar scope, addressing the issue so comprehensively or broadly, have not been published. The use of surface measurements to assess abrasion resistance (Martindalle test) seems to be an interesting and innovative proposal. Research in this area should be continued, and in my opinion, especially in the field of correlation with weave factors.

Conclusion: The presented dissertation makes a significant contribution to the development of the scientific discipline of materials engineering at the same time, fulfils all formal requirements set forth in Article 187 of the Law on Higher Education and Science dated July 20, 2018, and conforms to principles and requests to the structure of scientific research for the degree of doctor. In my opinion, the Dissertation submitted by Gabriela Kosiuk is ready to be defended orally in front of the respective committee. Therefore, I recommend the Dissertation for the next procedure at the Lodz University of Technology. In case of positive results of the defence of the Dissertation, I recommend awarding Gabriela Kosiuk the title of Ph.D.



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