

**OPPONENT REPORT**  
**for Professor's Inauguration**

Candidate: dr hab. inż. Elzbieta SZYCHTA  
Specialization: 5.2.11 Power electrical engineering  
Department: Politechnika Radomska im. Kazimiera Pulaskego, Radom (PL)

Following the appointment of the Dean of Faculty of Electrical Engineering, University of Zilina, prof. Ing. Milan Dado, PhD. by letter dated 4.12. 2012, I was appointed as an opponent for inauguration process of dr. hab. inż. Elzbieta SZYCHTA for professor under the Edict of the Ministry of Education SR, Nr. 6/2005 - process of obtaining scientific - pedagogical degrees of associate professor and professor. To develop the opponent report, in compliance with mentioned edict, I have been provided with following documents contained in the appendix of appointment:

- thesis of inauguration lecture,
- resume of the candidate,
- criterion for appointment of the processor at Faculty of Electrical Engineering, University of Zilina and fulfilling of them,
- list of most important scientific works,
- list of pedagogical work and achieved results.

I can say that the above mentioned material is from the point of development of referee report complete. The report was prepared under the terms of mentioned edict and recommendations set in the appointment letter.

## **1 Scientific work and erudition of the candidate**

Dr hab. inż. Elzbieta SZYCHTA, prof. nazv. currently acts as a teacher - Associated Professor at the Faculty of Electrical Engineering and Transportation, Politechnika Radomska of Kazimiera Pulaskego at Radom (PL), where she works as Dean of the Faculty and head of the Department of Electrical Engineering and Energy. She was habilitated at the Faculty of Electrical Engineering, University of Zilina, in 2007, in the specialization 5.2.11 Power electrical engineering, with habilitation thesis focused on area of multiresonant ZVS converters.

From the presented materials it is clear that the candidate significantly contributed to development of the knowledge in the field of power electronics and power electrical engineering, mainly in the area of design of resonant converters and their control and also in the field of railway transport and supporting systems, mainly in the area of devices for induction heating.

List of scientific and engineering projects documents breadth of scientific work and erudition of the candidate. The recognition by the international scientific community is supported by 64 citations, 22 of them are internationally published.

## 2 Publication activity

As can be seen from the attachment of publications overview, Dr. hab. Ing. Elżbieta SZYCHTA is author of 99 publications, 43 of them represent works that are published in scientific journals and magazines and 56 papers are published in scientific conferences. 18 publications are indexed by the Web of Science. From the given statistics, it can be seen that within last five years there is noticeable increase of publication (from 2008, whereby maximum was during 2010) as well as citation activity within last two years (maximum in 2011). Two of the most important publications are scientific monograph *Multiresonant DC/DC ZVS Converters*, which describes the problematic of soft-switching application in DC/DC converter, and second is academic textbook *Laboratorium Podstaw Energoelektroniky* (main author), which has been published in three issues. The scientific works were published at the international conferences and in magazines in Germany, Russia, Bulgaria, Lithuania, Czech Republic and Slovakia. High portion of publications has been published on national and international conferences in Poland.

From given list of published scientific works (as well as from overview of other activities) it is clear that mainly after the habilitation the candidate started to focus on centre of her scientific activity and on the problematic of perspective application of power electronic systems in the field of industry and railway transportation. Based on previous information I would like to point out that candidate belongs expressly into the science of "Power electrical engineering", whereby mentioned number of publications extends requirement criterions for professor inauguration in the field of Power electrical engineering 5.2.11.

## 3 Scientific recognition

Applicant Dr. hab. inż. Elżbieta SZYCHTA is well known scientific person in the field of power electrical engineering, and is focused mostly on the application of power electronic systems in the industry and railway transportation. Her acknowledgement by scientific community is supported by these facts:

- Extensive citations of her scientific works are published home and abroad (64 citations total, 24 of them are abroad).
- Membership in two advisory boards of scientific magazines.
- Membership in 35 scientific and in 3 organizing committees of international scientific conferences
- 6 invited sessions on international conferences
- 5 national acknowledgements

From given overview of candidate it can be pointed out that the candidate is well recognized person by national and international scientific community, whereby quantifiable indicators shows expressive overfulfilment of necessary requirements.

## 4 Pedagogical work and didactic ability

From the provided information, dr hab. inż. Elżbieta SZYCHTA has extensive pedagogical activities. She provides lectures and exercises in the relevant subjects, at the first and second degree of full-time university study in the study programs Electrical Engineering and Transportation. This includes following subjects: Electronics and Power Electronics, Power Electronics Equipment, Electric Apparatus and Equipment, Traction Power Electronics,

Electric Equipment of Means of Transport, Rail Vehicles and Traction. The candidate also significantly contributed to implementation and innovation of existed study programs and subjects and to building of five laboratories for experimental support of learning in the area of railway transport and power electronics. These laboratories are:

- Laboratory of Rail Traffic Control,
- Laboratory of Power Electronics
- Laboratory of Electrical Apparatus
- Laboratory of Electrical Machines
- Laboratory of Electrical Drives

In addition to pedagogical process, her teaching skills were also applied in the leading of diploma students and in the science education of PhD students. She led 224 final theses, including 69 in the first degree, in the study of Electrical Engineering and 36 in the study of Transportation. In the second degree of university study, she led 119 diploma theses in the study of Electrical Engineering. She also led two students of PhD degree, one of them has successfully completed the study, and the second one is in the final stage of dissertation thesis.

On the base of pedagogical activities of dr hab. ing. Elżbieta SZYCHTA, I can say that candidate is significant pedagogical person, who meets the criteria required for continuing habilitation for appointments of professors in the specialization 5.2.11 Power electrical engineering. Candidate also has submitted a proposal of inaugural lecture titled Properties of Electrical Systems for Induction Heating in Railway Transport. The content of the lecture falls into the area of Power Electrical Engineering. I accept the proposition and the thesis of lecture.

## **5 Organizational skills – leadership of team of specialists**

Applicant dr hab. inż. Elżbieta SZYCHTA has showed and is still showing managing and organizational skills in these activities:

- Dean of Faculty of Transportation and Electrical Engineering during 2008 - 2012, and from 2012 up to now.
- Vice-dean at the Faculty of transportation and electrical engineering during 2003 - 2008.
- Head of the Department
- Principal investigator of 2 grant projects and representative investigator on 4 grant projects.
- Organization of international scientific conferences (where applicant was member of executive committee and member of scientific committee). Her organizational skills were also confirmed by organization of specialized events, seminars and workshops which are listed in the attachments.

Organizational and management skills are further supported by high number of realized engineering works, which has become important economic contributions to her workplace.

## 6 Final ranking

In the terms of instructions which are presented in the letter of appointment for designation activity of dr hab. inž. Elžbieta SZYCHTA in the filed of 5.2.11 of Power Electrical Engineering from the Dean of Faculty of Electrical Engineering of University of Zilina, I am pointing out that:

- Applicant has fulfilled both requirements for the start of the process of designation, which is successful habilitation as well as experience in the given field for required length. All other criteria for process of designation at the EF ŽU have been fulfilled, rather significantly over fulfilled. Mentioned fact is mainly visible in the field of pedagogical activities, in the number of established courses, and also in the graduates work.
- Scientific activities of the applicant during the period after habilitation were oriented on problematic of power electronic systems, and next on the application of these systems in railway transportation. Received results confirm scientific erudition of the applicant and also they are giving expectations for achievement of other important results. Focus of scientific activities is in accordance with scientific field of inauguration.
- Most important scientific works were published in prestigious scientific magazines and on prestige international conferences. This fact is confirmed by the number of published works which are indexed by Web of Science. Their high level, importance and up to date status are confirmed by citations from national and international scientific committees.
- Managing skills are confirmed by her appointment as head of department, vice dean, and dean, as well as successful accomplishment of projects, where she was working as principal investigator and/or representative of principal investigator. The applicant has showed ability to define relevant problems, and also to guide the team of solutions.

**Based on the above, I can say that scientific - research activities, pedagogical activities as well as other activities, mainly in the post-habilitation period demonstrates her ability to perform all activities and functions of university professor. The candidate meets all required requirements and therefore**

### I recommend

to Inaugural Scientific Commission to submit to the Scientific Committee of the Faculty of Electrical Engineering, University of Zilina a proposal for appointment of

dr hab. inž. Elžbieta SZYCHTA

for professor in specialization 5.2.11 Power Electrical Engineering.

In Zilina, 21. january 2013



prof. Ing. Pavol Špánik, PhD.

Opponent