

Sincere greetings to lecturers, staff and students on the occasion of 65th anniversary of establishment of the Chair of Equipment and Technology of Welding Fabrication and 40th anniversary of the Welding Faculty of Priazovsky State Technical University (PSTU)!

Establishment of the Chair in 1946 and organizing the Welding Faculty at the end of 1971 were of great importance for training specialists on welding and related technologies for industrial enterprises of the South and South-East of Ukraine, primarily, Donbass region, as well as rapidly developing metallurgical and mechanical engineering giants in Mariupol, Kramatorsk, Kharkov and Lugansk. Over the 65 years the Chair has trained about 6000 specialists, many of which are leading major construction projects, enterprises, and are at the head of a number of higher educational establishments: 115 graduates of the Chair and Faculty became Candidates of Science, 10 are Doctors of Science and 11 are Professors. Over the last five years the Chair lecturers prepared 5 manuals approved by Ministry of Education and Science of Ukraine, and 6 monographs. Mariupol school of welders has gained recognition far beyond Ukraine.

During all these years the Chair of Equipment and Technology of Welding Fabrication and Welding Faculty have been in cooperation with leading scientific and training centers of Ukraine, China, Poland, Hungary, Slovakia, Czechia, Germany and have been actively involved in the work of International Association «Welding».

Published below is a selection of papers, which will allow the journal readers to get an idea about the directions and level of research, performed at PSTU.

*E.O. Paton Electric Welding Institute
Editorial Board and Editorial Office of the Journal*

SPECIALIST TRAINING AT PSTU WELDING FACULTY

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Stage-by-stage improvement of the system of student training at the Welding Faculty of the University and features of their specialization are described. At present specialist training is performed under the conditions of multilevel system of higher education.

Keywords: *welding fabrication, higher education, specialist training, Bachelors, Specialists, Masters, curricula, module-rating system*

The first group of welding engineers graduated from Mariupol (Zhdanov) Metallurgical Institute in 1947. With each year the number of specialists graduating after different forms of training increased and by now it has risen to 5000 persons. Annual intake of applicants to the Welding Faculty was about 100 persons up to 1996.

In 1994 Mariupol Metallurgical Institute was transformed into Priazovsky State Technical University (PSTU) and certified to IV level of accreditation. From 1993 till 1997 PSTU Welding Faculty trained Bachelors in Welding in four specialities:

- 8.092301 «Equipment and technology of welding fabrication»;
- 8.092302 «Technological and metallurgical processes of welding»;
- 8.092303 «Automated electric welding processes and machines»;
- 8.092304 «Equipment and technology of improvement of wear resistance and reconditioning of machine parts», as well as specialists in technical fields, called Engineers, and Masters [1–3].

At the end of 1998 Materials Science Chair was added to the Faculty. In the same year the Ministry of Education and Science of Ukraine took a decision on changing a number of names of specialities, in particular in 0923 «Welding» and 0901 «Applied Materials Science» training fields. Here speciality 8.092302 «Technological and metallurgical processes

of welding» was moved to one of the specializations of speciality 8.092301. Thus, from 1998 up to 2010 PSTU Welding Faculty conducted training and awarded diplomas of Bachelors, Specialists (Engineers) and Masters in the following specialities:

- 8.092301 «Technology and equipment of welding» (TEW);
- 8.092302 «Welding systems»;
- 8.092303 «Technology and equipment for reconditioning and improvement of wear resistance of machines and structures» (TERIWRMS);
- 8.090101 «Applied materials science» (AMS).

Starting from 2011 PSTU Welding Faculty will perform training and award diplomas to Bachelors, Specialists and Masters in the following specialities:

- 8.05.04.01 «Welding technology and equipment»;
- 8.05.04.03 «Reconditioning and improvement of wear resistance of parts and structures»;
- 8.0504301 «Applied materials science».

Up to 2007 the stage of training Bachelors in the above-mentioned specialities was completed by fulfillment of graduation (qualification) work with its subsequent defense before a State Certification Commission under the condition of successful passing of examination session of VIII semester. Bachelor's graduation work was the summing-up work of the four years of training at the University, and had the objective of systematizing, consolidation and widening of theoretical knowledge through independent development of topics in one of the branches of welding fabrication, applied materials science, envisaged by the individual task; development of design-graphic skills of students and skills of independently solving technical, organizational, design and other tasks.

Composition and scope of graduation work are determined by Graduation Chair. As a rule, the structure of graduation work consisted of explanatory note of not more than 60 pages and graphic part of 4–5 sheets of A1 format.

Starting from 2007 the stage of Bachelor training in the above specialities is completed by passing a state examination before the members of the State Certification Commission.

Bachelors, having basic higher education, can get complete higher education and Specialist qualification in three specialities having passed the second training stage (Figure) during two semesters, which is completed by defending the diploma project before the State Examination Commission.

Realization of the program of training Masters in welding specialities started in 1995 by special curricula based on engineering education [1]. In keeping with the Act of the Cabinet of Ministers of Ukraine of January 20, 1998, #65 «Regulations on education-qualification levels», starting from 1999 the Faculty began training Masters based on the qualifications of Bachelor and Specialist. The main tasks solved in Master training are as follows:

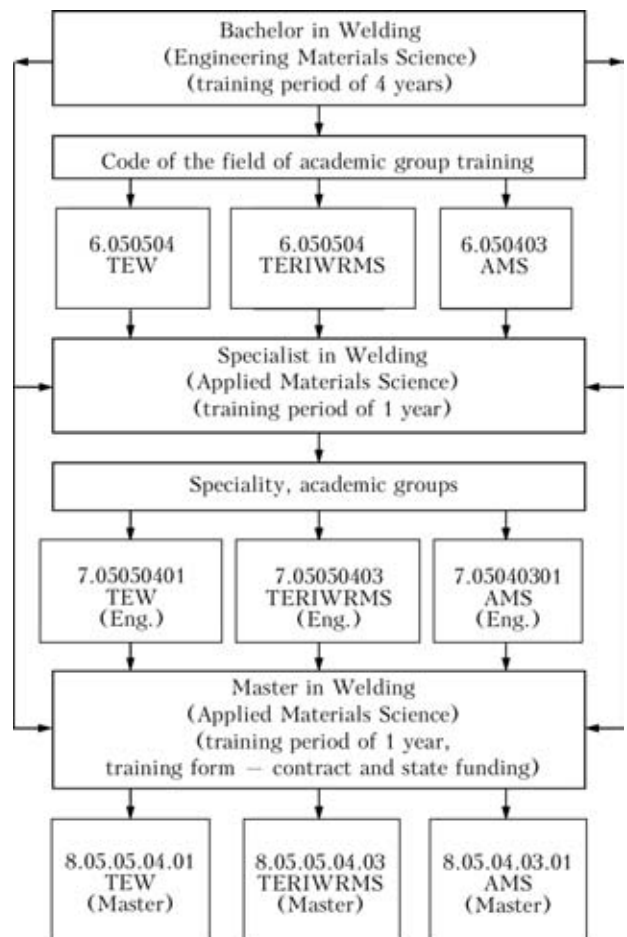
- more profound and specialized study of problems of the respective scientific field;
- narrow specialization in the respective branch of knowledge;
- state training for scientific-pedagogical activity in a higher educational establishment, etc.

On the whole, training of Masters at the Faculty is performed by the following schematic (see the Figure):

- after obtaining the qualification of Bachelor, for one school year (two semesters) on budget funding basis;
- after obtaining the qualification of Specialist, for one school year (two semesters) predominantly on contract basis by individual curricula. Contract cost is approximately equal to Specialist training cost.

In both the cases the applicants to Masters course should have a positive recommendation of the Graduation Chairs and Scientific Councils of PSTU Institute of Metallurgy and Welding (established in February 2010) and the University. In addition, the University established entrance quotas for Masters course, equal to 20% of the total number of graduates with higher education.

Masters training is completed by fulfillment and defense of qualification work before the State Examination Commission.



Block diagram of specialist training in PSTU Welding Faculty

Quality of specialist training under the conditions of multilevel higher education system, in our opinion, is directly related to solving a number of problems [1]:

- improvement of the level of applicant training;
- including secondary technical school leavers into PSTU student membership and reverse rotation of university students into PSTU secondary technical schools;
- ensuring the correspondence of the process of specialist training to European and international standards;
- improvement of scientific-pedagogical level of professors and lecturers;
- improvement of educational process by application of modern technical teaching means, including computers;
- improvement of mastering of foreign languages and economic education of graduates, etc.

During the last eight years the practice of enrolling secondary school graduates into the second and third years has been justified. As a rule this student category is characterized by quite conscientious attitude to studies and high level of practical training. In 2000 the curricula for all the specialities of the Faculty for the first and second semesters and curricula of PSTU secondary technical schools were finally coordinated in order to reduce the scope of a number of subjects, in which additional exams were required, and facilitating the first stage of training at the University.

Junior students, unable to continue their university studies for some reasons, are given an opportunity to complete their education in one of PSTU secondary technical schools. This was made possible by inclusion of three secondary technical schools into the University structure in 1998: mechanico-metallurgical, mechanical engineering, industrial and technical lyceum.

Further development of higher education in Ukraine is unthinkable without taking into account the world and European experience of training specialists, as well as requirements of international standards as regards education and certification of welding specialists [1]. In this connection, participation of our Faculty in the activities of International Association «Welding» is believed to be advantageous. Being an IAW member for about 15 years, the Faculty has a real possibility of establishing and maintaining contacts with scientists and science-production organizations in CIS and distant foreign countries.

The main requirement and most important condition of market economy development is improvement of product quality in all the industries. Welding fabrication products most often come into the category of critical structures. In this connection, the factor of correspondence of these products to the European and world standards is believed to be highly important.

Professional level of professors and lecturers of Welding Faculty Graduation Chairs is quite high: 96 % of the lecturers have the degrees of Candidate and Doctor of Science. 8 Doctors of Science, 9 Professors are working in the Faculty Chairs. At present 12 persons are taking the post-graduate course and 3 persons — the Doctor's course. During the last 5 year period more than 30 lecturers and scientific staff have improved their qualifications through a system of ongoing courses at the University in the following directions: art of teaching, psychology and pedagogy, computer training, etc.

Because of financial difficulties it is still impossible (the situation has not changed since 1996) [1] to improve the lecturers, qualifications in the leading higher educational establishments of Ukraine, CIS and foreign countries', or organize practical studies of lecturers in the leading enterprises. For the same reason the facilities of Graduation Chairs are upgraded not as intensively, as it is required by the modern conditions.

Module-rating system of student knowledge assessment which is used for stage-by-stage assessment of knowledge and level of subject mastering, was tried out within the Faculty and the University as a whole in 1980s, and at present is widely used in the Faculty Chairs. Boulogne system of student knowledge assessment was introduced into the teaching process for all the academic years at the Faculty and is quite effective.

In conclusion it should be noted that the Faculty has for a long time maintained the business and creative contacts with its graduates, working in different industrial organizations, business units, enterprises and teaching establishments, that allows revealing the need for specialists of certain qualification.

1. Belousov, Yu.V., Shaferovsky, V.A. (1996) Improvement of staff training in conditions of multilevel system of higher education. *Avtomatich. Svarka*, **8**, 6–8.
2. Razmyshlyayev, A.D., Shaferovsky, V.A., Belousov, Yu.V. (2001) Education of specialists at the Welding Faculty of the Priazovsky State Technical University. *The Paton Welding J.* **8**, 5–7.
3. Razmyshlyayev, A.D., Shaferovsky, V.A. (2006) Personnel training at the PSTU Welding Department. *Ibid.*, **8**, 2–4.