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CONTENTS

Interview with A.V. Stepakhno — Director General of the E.O. Paton Electric Welding Institute PPWE

Pilot Plant of Welding Equipment is the leading production facility of Science-Technology Complex «E.O. Paton Electric Welding Institute». From the moment of the start of its operation in 1959, the main objective of the Plant was optimization of the technology of manufacturing new welding equipment, developed by scientists of the Electric Welding Institute.

Over the past years, the Plant produced a lot of unique equipment – from high-precision small-sized units used for welding in space, up to high-power automated machines of «Styk», «Sever» type, for instance for flash-butt welding of large-diameter pipes, for welding longitudinal welds of pipes under the conditions of automated manufacturing, etc. At present the Plant focuses on manufacturing reliable welding equipment fit for operation under any production conditions.

Today manufacturing of special-purpose welding and surfacing equipment, including automatic equipment, by special orders from major users takes up a considerable share of production. PPWE was the first to master batch production of inverter equipment in Ukraine. The Plant has good prospects of economic, and production development, and its products enjoy high consumer demand.

Your enterprise has been successfully developing over the recent years. What promoted or contributed to beginning of intensive growth?

Strategy of enterprise development was elaborated for long-term perspective. Our goal was to become the leaders in the production of welding equipment in Eastern Europe. To reach this goal, radical reconstruction of the Plant capacities was performed, modern market of welding equipment was analyzed, and priorities in the range of manufactured products were determined.

Starting from the moment of its founding up to 1990, the Plant serially produced classical welding equipment (transformers, semi-automatic machines, rectifiers). Over all these years, hundreds of thousands of equipment pieces were manufactured for enterprises from almost all continents of the world.

Over the next years, despite the instability of economic situation in the country, the Plant management always invested into enterprise development and brought together a team of professionals, literally «living in their business». This brought its results and today we occupy a significant part of the market of welding equipment and consumables in Ukraine and outside it. Over the last decade, production volumes increased almost

100 times. In 2006 50 pieces of inverter equipment and about one hundred transformer pieces were produced per month. Planned output for this year is equal to 50 thousand inverters and more than 2 thousand pieces of classical equipment. We are optimistic about the annual plan, as these are the real indicators of the current capabilities of the Plant.

It is known that during the period of independent Ukraine, the market of arc welding equipment in the country was developing actively, and became quite saturated. What niche in the extensive product range have you planned for PWI PPWE?

During the period of formation of independence of Ukraine the Plant, was on the brink of survival, similar to many other enterprises. However, in 1998 serial production of the most sought classical equipment was resumed. Advance of technology markedly influenced the welding equipment sector: all the units were modified to save energy, and transformer equipment was gradually moving out of the consumption segment. We had to look for something new. We began studying the experience of technologically advanced countries. Plant specialists visited the enterprises and industrial exhibitions of Europe, China and CIS countries, where the vector of development of welding equipment manufacturers was determined. We chose the direction of design and manufacture of welding inverters.

The enterprise changed its course to production of inverter equipment, designed for mass segment of the market: private shops on repair of electric equipment, household appliances, and production of furniture, household farms; service stations; construction companies; manufacturing enterprises and utility companies.

In 2005 an experimental section was set up for manufacturing inverter welding machines, which now are sales leaders. By 2008 the Plant was already manufacturing small batches of inverters for manual arc welding of three modifications for 120, 160 and 200 A currents. Today the inverter line includes 25 models for currents from 140 up to 315 A, and by the end of the year models for up to 500 A current will be introduced.

What did reconstruction of production facilities include?

Today the Plant has well-fitted production facilities, including shops for manufacturing classical and inverter equipment, and shops for metalworking with high-tech TRUMPF machines-tools as well as production site for electrode manufacturing.

Launching our own metalworking shop allowed a considerable lowering of the cost of manufactured welding machines and attracting orders from other companies for producing various metal products. In addition to production facilities, administrative, office and storage premises of the Plant have been upgraded.

Transformations, probably, also involved the changes of enterprise personnel policy?

All the Plant shops and sections are staffed with highly qualified personnel. Plant staff is unique: as welding professionals they share their experience with promising young specialists under the actual production conditions.

Plant management continuously invests into development of its employees. Training and internship are conducted regularly not only in Ukraine, but also abroad. Plant specialists visit leading industry exhibitions in Essen, Beijing and CIS countries, so as to keep abreast of the latest innovations and trends in the industry. Students from the National Technical University of Ukraine «Igor Sikorsky KPI» also do internships at the Plant. Thus, the Plant promotes sharing scientific experience and revival of technical potential of our country.

Has the geography of equipment supplies expanded today?

After the Plant has taken up a significant share of Ukrainian market, we began to deal with export. Foreign consumers gradually responded and new partners appeared.

In 2012 the first export delivery of welding inverters was made to Equatorial Guinea. Starting from 2013 welding units began to be exported to Georgia, Moldova and Azerbaijan. In Georgia a distribution network has been actively working for three years now, and a service center has been established.

In 2014 we received the European certification CE for inverters, and this year we have confirmed it for the entire line of currently manufactured inverters. And this opened up new opportunities for us.

In 2015 PATON welding equipment was presented in the markets of Czech Republic, Uzbekistan, United Arab Emirates and Myanmar, in 2016 — in those of Korea, Belarus, Kazakhstan, Estonia, Poland and Bulgaria. This year we began exporting welding electrodes and machines to Latvia, Lithuania, Rumania and Iran.

Today, export geography covers more than 20 countries. Our products are in good demand, as we are in the middle price segment, and approach such known manufacturers as ESAB, Fronius and Kemppi as to equipment characteristics.

In terms of production diversification PWI PPWE also mastered production of coated electrodes. What prospects do you see for the enterprise in the market in this connection?

Mastering electrode production provides our customers with a whole range of services. Each of them can immediately obtain the welding machine and electrodes he needs. Due to quality electrodes, their range and technical support, we are creating a wide client base. Our goal is to provide the market with consumables of our own production, corresponding to EC requirements.

Your connections with the Electric Welding Institute are traditional. Can you give examples of effective recent cooperation?

Yes, the Plant continues to work closely with the Electric Welding Institute and Experimental Design and Technological Bureau on development of specialized welding equipment.

As examples, we can note the following projects on the national and international scale performed over the recent years:

- in 2013 development of welding technology and equipment for manufacturing combined welded rotors by automatic submerged-arc welding by the order of OJSC «Turboatom» was completed;
- in 2014 a project was fulfilled for State Oil Company of Azerbaijan Republic (SOCAR) on separation of two pontoons from a block by the method of directed explosion at construction of an off-shore stationary platform No.7 at Guneshli field in the Caspian Sea;
- in 2015 a project for State Company «Ukrspetzexport» on development and manufacturing of a batch of welding equipment for tropical climate was completed. Equipment with improved characteristics and increased reliability was supplied to one of the shipyards of South-East Asia;
- in 2016 we performed two joint contracts for East European machine-building plant for electroslag welding of up to 200 and up to 450 mm thick metal;
- in 2016 the Plant together with EDTB developed multistation welding rectifiers VDU-1202P, which were used for refitting SCB Foundry — a Car-Building Plant of CKD Kutna Hora a.s. Group (Czech Republic);
- also in 2016 a project was completed for State Company «Ukroboronservis» on development of an automatic mortar coordination system. A plate was designed and its folding system was developed. The developed complex allows aiming the mortar on the target automatically. The project was presented with success at XIII International Specialized Exhibition «Armament & Safety–2016».

At present all the Plant units are staffed by qualified personnel, fitted with modern equipment and demonstrate their readiness to implement projects of varying complexity.

It is known that the enterprise uses PATON brand for their products. What does it imply?

This, primarily, obliges us to manufacture products of exceptionally high quality.

Quality control is carried out at all stages of production: from purchasing materials and raw materials up to testing each welding unit in special stands. Final product control is performed directly before shipment to the client. In addition, if required, the Plant provides advisory and engineering support to product buyers.

It is known that as a result of privatization many enterprises have completely disappeared from the market, or are at the stagnation stage in our country. The case of PWI PPWE is different. Please name three main principles of leadership, realized at the enterprise for its successful development.

The basic principles of leadership are laid down in our motto — «Reliability. Quality. Traditions».

We manufacture welding units, the reliability of which has been confirmed by 5 year guarantee, and their quality – by European certificates CE. Traditions are passed on from experienced welding professionals to promising young specialists of the Plant in practical operation.

We continuously invest funds into production and technical base of the enterprise, purchasing up-to-date equipment, and in personnel development — as a guarantee of future success of our enterprise. I believe that production is the main driver of the country's economy. Development of the industry largely depends not only on the selected strategy of its leaders, but also on the possibility to invest into the innovative developments and directions.

The Plant always puts the customer first, seeking the most competitive solutions and trying to reach the highest product level. And for many years now Plant products have enjoyed well-earned popularity in different countries, due to their reliability and quality.

We would like to thank you, Mr. Stepakhno, for interesting and detailed information on the activities of Pilot Plant of Welding Equipment, and to wish your enterprise further successes for the benefit of Ukraine.

The interview was recorded by A.T. Zelnichenko, V.N. Lipodaev

STAGES OF DEVELOPMENT OF PWI PPWE

1959–1969

- In January, 1959 E.O. Paton Electric Welding Institute Pilot Plant was established. Development and manufacturing of submerged-arc welding machines and tractors of TC-17 type began.
- Electroslag welding machines and power sources of TShS type for 1000 and 3000 A current were put into production.
- Semi-automatic CO_2 welding machines of A547 type were put into production.
- Batch production of small-sized welding transformer STSh-250 began in 1968.
- Special units and machines for flash-butt welding and surfacing were developed and put into production.
- «Vulcan» unit for welding in space was produced.

1970–1980

- Welding machines were manufactured for VAZ and KAMAZ plants.
- Special welding machines for KUF-8 combine harvesters for agriculture were put into production.
- Batch-production of multistation rectifier VMG-5000 for CO_2 welding began in 1973.
- «ARAKS» apparatus for Soviet-French space experiment was produced.
- The first sample of a unique powerful in-pipe machine K-700 for flash-butt welding of pipes of oil and gas pipelines in the conditions of the North was manufactured.
- In 1974 the State Quality Mark of the USSR was awarded for the first time within the Ukr.SSR AS to three batch-produced units: STSh-250 transformer, VMG-5000 rectifier, A1114M semi-automatic machine.
- From 1975 till 1980 more than 50 sets of unique welding machines were supplied to the USA, FRG, Sweden and Japan.
- In February 1979 the Plant celebrated its 20^{th} jubilee.

1981–1990

- Equipment for Khartsyzsk and Vyksa Pipe plants was manufactured.
- «Isparitel» unit for deposition of protective coatings in space was produced.
- Export supplies to Austria, Bulgaria, East Germany, India, Canada and Japan begin to be made.

● In 1981 State Quality Mark of the USSR was awarded for the second time to STSh-250, VMG-5000 and A1114M units.

● In July, 1984 cosmonauts Svetlana Savitskaya and Vladimir Djanibekov successfully performed the operations of cutting, welding, brazing and spraying of metal plates in open space using portable electron beam unit URI in orbital scientific-research complex «SALUT-7».

● Unique apparatuses and units were produced for various welding processes.

1991–2000

● Machines for welding fuel tanks of «Zhiguli» car and tank cars were manufactured for Neftekamsk car plant.

● Batch-production of STSh type transformers for 250, 315 and 400 A currents, VD type rectifiers for 250, 315 and 400 A currents and upgraded semi-automatic machines of PS type for 180, 250 and 315 A currents is started.

2001–2010

● Unique vacuum chambers were produced for electron beam welding of critical products.

● A unique transformer with square-wave current for welding longitudinal welds of large diameter pipes for Khartsyzsk Pipe Plant was developed and put into production.

● In 2004 the name of PATON – academician E.O. Paton, the founder of the E.O. Paton Electric Welding Institute, was added to the name of equipment, manufactured by the Plant.

● In December 2004 official presentation of the first inverter power source VDI-160M was conducted.

● In 2006 surfacing machines were manufactured and introduced at «Krivorozhstal» Combined Works, OJSC «Azovmash», OJSC «ZSMK» at Novokuznetsk.

● Production of high-efficient ploughs for agricultural sector was mastered.

● In 2008 the first salon-shop «Svarka» with a wide range of welding equipment and consumables was opened.

● Production of the first batches of VDU type inverters for manual arc welding for currents of 120, 160 and 200 A was started.

● In 2009 the Plant marked its 50th jubilee; Plant veterans were awarded Diplomas of the government of Ukraine and Kiev City Administration.

● In 2010 new samples of inverter power sources were put into production: VDI for manual arc welding; ADI for argon-arc welding and PSI for semi-automatic welding.

2011 — up to now

● Serial production of classical power sources is going on: STSh transformers for 250, 315 and 400 A currents, VD-310N, VD-400 and VS-650SR rectifiers.

● Production of high power sources TShS-3000-1 and TShP-10000-1 for electroslag technologies was resumed.

● In 2012 the first export delivery of welding inverters to Equatorial Guinea was made.

● Since 2013 welding units have been exported to Georgia, Moldova and Azerbaijan.

● In 2014 a contract was completed with State Oil Company of Azerbaijan Republic (SOCAR) on separation of two pontoons from the block by the method of directed explosion at construction of off-shore stationary platform No.7 in Guneshli field in the Caspian Sea. New methods, technologies and equipment for deep-water and ground welding and cutting were developed.

● In 2014 a unique complex of equipment for narrow-gap welding of large turbine rotors was manufactured for OJSC «Turboatom».

● Starting from 2014 5-year guarantee for welding inverters of ADI and VDI series has been introduced for the first time in CIS.

● In 2014 the Plant as the leading national manufacturer of welding equipment started rendering support to the state in the ATO zone.

● In 2014 European certification CE of all the manufactured inverters was obtained.

● In June 2015 the first batch of new welding inverters VDI of EKO series for 160, 200 and 250 A currents was produced, which has become the sales leader.

● In 2015 batch-production of ballast resistors RPB-304 for welding current regulation in multistation welding, as well as all-purpose welding rectifiers VDU-6303P and VDU-1202P began.

● In November, 2015 the car-building plant of CKD Kutna Hora a.s. Group of Companies, Czech Republic, was reequipped with the following Plant equipment: all-purpose rectifiers VDU-1202P, multistation rectifiers VDM-1202P, rectifiers VS-650SR, ballast resistors RBP-302, semi-automatic machines PS-351.2 and argon-arc inverters ADI-200S.

● In December 2015 the Plant started manufacturing completely digital welding inverters of VDI Professional series, as well as semi-automatic machines PSI-250S and PSI-250R with a new control panel and digital adjustment of parameters.

● In December, 2015 the Plant was awarded the Certificate of Appreciation of SC «Ukroboronprom» for fruitful cooperation and professional assistance in solving the problems of upgrading the combat and special equipment for detachments and units of the Armed Forces of Ukraine.

● In 2015 a batch of welding machines of tropical modification was produced for a shipyard in Myanmar: VS-650SR rectifiers with BP-608 feed units, and VDI-200R inverters.

● In 2015 the foreign markets of welding units and electrodes were extended to Czech Republic, Uzbekistan, United Arab Emirates and Myanmar.

● At the beginning of 2016, our Plant supplied to a machine-building plant a batch of specialized equipment for electroslag welding of metal up to 450 mm thick: all-purpose rail welding machine A535 in a set with transformer TShS-1000-3 and self-propelled welding units ASh115 in a set with VDU-1202P rectifiers.

● Welding units are supplied to armor plants of SC «Ukroboronprom»: inverters of VDI series, semi-automatic machines of PS series, feed units BP, as well as welding electrodes.

● In February 2016, the first batch of VDI-mini units — the smallest size welding units in the world for rated powder of 3.5 kV·A was produced.

● In April, 2016 the Plant started manufacturing welding electrodes by the classical formulation: ANO-21, ANO-36, ANO-4, UONI 13/45, UONI 13/55, MR-3, special electrodes T-590, TsCh-4, OZL-8 and TsL-11, as well as electrodes of Elite series by an improved formulation: Elite ANO-36, Elite MD6013, Elite ANO-21.

● In July 2016 the first batch of welding inverters of ADI, VDI and PSI series was supplied to Korea.

● In October 2016, a project was completed for SC «Ukroboronservis» on development of an automatic system of mortar coordination.

● In 2016 welding units and electrodes were exported to Belarus, Kazakhstan, Estonia, Poland and Bulgaria.

● Production of welding machines exceeded 50 thou units per year.

● Volume of electrode production is more than 600 tons per month.

● At the beginning of 2017, a shop for manufacturing cases for welding machines was put into production. It is fitted with high-tech equipment of TRUMPF model and a powder coating line.

● Starting from 2017, welding electrodes and machines have been supplied to Latvia, Lithuania, Rumania and Iran.

● In September 2017, the line of inverters of VDI Standard and VDI Professional, PSI Standard and PSI Professional series was complemented by units for higher current values of 315, 400 and 500 A.

● In 2017 overhauling of all the office, production and storage premises was performed.

Geography of export supplies: Austria, Azerbaijan, Armenia, Belarus, Bulgaria, Hungary, Germany, Georgia, India, Iran, Kazakhstan, Canada, Korea, Latvia, Lithuania, Moldova, Myanmar, United Arab Emirates, Poland, Rumania, Slovakia, Turkey, Uzbekistan, Finland, Czech Republic, Equatorial Guinea , Estonia, Japan.

Objective of Pilot Plant of Welding Equipment of the E.O. Paton Electric Welding Institute remains unchanged — to become a leader in manufacturing welding equipment and consumables in Eastern Europe.

PILOT PLANT OF WELDING CONSUMABLES

State-owned enterprise «Pilot Plant for Welding Consumables of the E.O. Paton Electric Welding Institute of the National Academy of Sciences of Ukraine» is one of the biggest manufacturers of welding consumables in Ukraine.

The Plant is specialising in manufacture of a wide range of high-quality consumables for different welding processes: general- and special-purpose electrodes for manual arc welding, surfacing and cutting, flux-cored wire for mechanised and automatic welding and surfacing as well as severing, and fused and ceramic fluxes for automatic welding and surfacing. The Plant manufactures about 35 grades of electrodes, 40 grades of flux-cored wires, and 25 grades of fluxes.

One of the latest achievements of the Plant is upgrading of flux-cored wire production lines, which made it possible to produce small-diameter (1.2–1.6 mm) flux-cored wire.

In its operations the Plant uses the Quality Management System in compliance with ISO 9001:2000. The Plant Testing Laboratory has accreditation for technical competence by the National Accreditation Agency of Ukraine, and for technical competence in compliance with requirements of the Russian Maritime Register of Shipping.

The current production capacities of the Plant allow producing annually 12,000 t of general- and special-purpose electrodes, 500 t of flux-cored wires and 150 t of fused and ceramic fluxes, which makes it one of the leading enterprises for manufacture of welding consumables in Ukraine and other CIS countries.

www.paton-ozsm.com.ua

PRODUCTION OF TITANIUM ALLOY INGOTS

AT «TITAN» CENTRE

At present, industrial production of titanium alloy ingots by the method of electron beam cold-hearth melting (EBM) is organized in the facility of SE «SPC «Titan» of the E.O. Paton Electric Welding Institute of the NAS of Ukraine» with equipment providing 3000 tons total annual capacity. Company specialists continue work on creation of new titanium-based alloys, develop and manufacture locally-produced equipment and technology of ingots melting based on titanium and other metals by EBM method.

Electron beam unit UE-5812

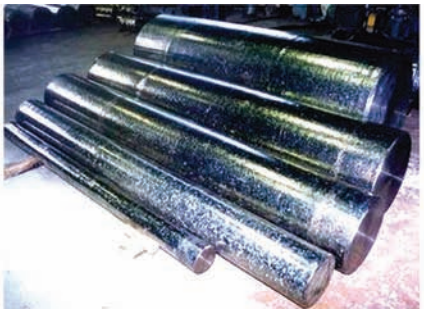
All-purpose electron beam unit UE-5810

Range of products produced by SE «SPC «Titan» of the E.O. Paton Electric Welding Institute of the NAS of Ukraine» is given in the table:

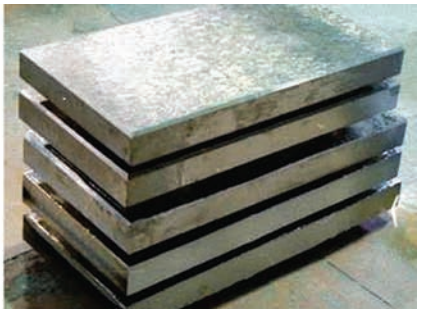
Size range
Diameter, mm: 110, 150, 200, 300, 400, 500, 600, 830, 1100; of up to 4000 mm length Width of thickness, mm: 165×950, 150×530; of up to 4000 mm length
Grades*
VT1-00, VT1-0, PT1M, 3M, ET3, VT5, PT7M, PT3V, VT6, VT8, VT9, VT3-1, VT14, VT20, VT22, VT23, T110, Grade 1, Grade 2, Grade 5, Grade 9, Grade 12
*Other alloy grades can be produced by agreement with the Customer.

Chemical composition of the ingots meets the requirements of the local and foreign standards GOST, ASTM, AMS, etc. (ISO 9001 Quality System Certificate).

Titanium ingot of 1100 mm diameter



Titanium ingots of 100–600 mm diameter



Titanium slabs of 165×950×1500 mm

www.stc-paton.com/eng/centers/spctitan

TRAINING AND QUALIFICATION CENTRE

The Training and Qualification Centre provides continuous multidiscipline vocational training of personnel in the field of welding and allied processes aimed at developing and deepening their professional competence. The Centre has accreditation in the national education system and accreditation of the International Institute of Welding for occupational training with the awarding of International Welding Qualifications.

Special training, advanced training and certification of welding engineers and technicians in accordance with national and international standards:

- Engineers, technologists and foremen;
- Welding supervisors (coordinators);
- Chairmen and members of welder examination boards.

Advanced training and certification of welding instructors in accordance with national and international standards:

- Teachers of special welding disciplines;
- Fusion welding instructors.

Vocational training, retraining, advanced training and certification of the following personnel in accordance with national and international standards and rules:

- MMA welders;
- MIG/MAG welders;
- FCAW welders;
- TIG welders.

Modern training facilities, innovative training techniques, highly skilled lecturers and instructors ensure that each student receives a designated qualification level.

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