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PLANT «YUZHicable WORKS»: MILESTONES OF THE ROAD (75TH ANNIVERSARY OF THE PLANT «YUZHicable WORKS»)

With the history of the creation and development of the Plant «Yuzhcable works», the formation of the national cable industry is connected. The enterprise is the flagship of the industry. Its production potential and the range of products demonstrate the unique capabilities of this production. Such a plant has become thanks to a systematic approach to the technical re-equipment of existing facilities, which has been going on here for the last decades. Modern technological equipment, new workshops and sites ensure the production of competitive products that are in demand both in Ukraine and abroad. References 5.

Key words: history of the plant «Yuzhcable works», cable, cable products.



С историей создания и развития завода «Южicable» связано становление отечественной кабельной промышленности. Предприятие – флагман отрасли. Его производственный потенциал и номенклатура выпускаемой продукции свидетельствуют об уникальных возможностях этого производства. Таким завод стал благодаря системному подходу к техническому перевооружению существующих мощностей, который здесь длится на протяжении последних десятилетий. Современное технологическое оборудование, новые цеха и участки обеспечивают изготовление конкурентоспособной продукции, пользующейся спросом как в Украине, так и за границей. Библи. 5.

Ключевые слова: история завода «Южicable», кабель, кабельная продукция.

Today the Plant «Yuzhcable works» is the leader of the Ukrainian cable industry. It recycles 40 % of the total volume of non-ferrous metals used in the domestic cable industry [1]. It is one of the ten largest producers of cable products in the CIS, it is the leading among the machine-building enterprises of Kharkiv in the production of marketable products [2]. Annually, the plant sells cable products worth more than USD 60 million.

«Yuzhcable works» did not begin immediately the modern, dynamically developing plant. This was preceded by 75 years of painstaking work of many generations of plant's workers, who built the first workshops, mastered the production of cables and wires necessary for the front and victory.

Looking at the modern look of the production buildings of the Kharkiv plant «Yuzhcable works», it is hard to believe that in those distant military and postwar years everything began on the abandoned outskirts of the city, where even before the Second World War, the foundation of the shops of enterprise No. 332 of the radio engineering industry – branch of the Kharkiv electromechanical plant was laid.

To create a large enterprise in Kharkiv, which received No. 804, the All-Union Administration «Glavcable» was appointed group of managers – plant Director G.A. Zybin, Chief Engineer V.I. Yuzefov and two experienced, qualified engineers N.V. Kudryavtsev and N.N. Garnier.

The new enterprise produced trial products on March 7, 1944. These several tens kilograms of winding and enamel wires were the first prototype production, so necessary for the front and the industrial enterprises that are being restored in Ukraine. People rejoiced at this event as something extraordinary.

By early 1946 the plant already had 286 units of various equipment. In addition to the three main workshops, they also commissioned own lacquer section, a spinneret. No matter how difficult it was, they also created a central plant laboratory for input control of raw materials and testing of finished products.

Considering the special importance of the plant's products for the construction of enterprises and housing in the country, on May 9, 1951, the Council of Ministers of the USSR revised and approved a new technical passport of the plant, after which the construction gained acceleration. Almost immediately the construction of the building No. 2 began – the winding wires workshop as well as the building No. 4 – the power cable workshop.

In 1954, their construction was completed. The equipment, mainly imported, came on schedule and was immediately mounted on production sites.

In the Soviet period, all the efforts of the labor collective were directed towards the fulfillment of the state plan. Export of goods was a significant part of the commodity output. Quality of cables with the brand «Yuzhcable works» was especially appreciated in many countries of the world.

About 20 % of the total output was exported to Cuba, Argentina, Vietnam, Mongolia, India, Iran, Iraq, Syria, Egypt, Romania, Angola, South Africa and many other countries. For example, enamel wires were shipped to Vietnam in large quantities, and power cables to India. In 1956 – 1959 in the Bhilai (State of Madhyapradesh, India), the USSR built a metallurgical plant. Almost all power cables used at this facility were branded with the «Yuzhcable works».

In this period, the enterprise management paid special attention to the development of the power cable workshop as a promising direction. This workshop was one of the first in the country where they installed a unique domestic hydraulic press for the application of aluminum shells П-958, mounted new, instead of old, paper insulation machines ИЖ-32Э and torsion-isolating machines, extrusion presses for applying plastic shells to power cables «Anduard-150» and «Anduard-200» and booking machines. This equipment made it possible to significantly increase labor productivity.

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In 1978, the consumer goods workshop was put into operation, which by that time was advanced in terms of technical equipment and production organization. It replaced a small section of consumer goods in the workshop of signal-blocking cables. Thanks to this, the plant was able to establish the manufacture of extension cords, various connectors, adapters, switches, which differed in high quality and reliability, which were in high demand not only among Kharkovites.

In the same year, the plant built wastewater treatment plants, such necessary for the purification of industrial wastewater. The enterprise became one of the first in Kharkiv, which put into operation such an environmental protection facility.

The crisis of the 80s and 90s brought certain adjustments to the plans for the technical development of the plant. They became a kind of exam, which the collective had to take. The destroyed planned system of supplying raw materials and materials, selling finished products forced the team to seek their own ways of solving the emerging problems. It was necessary not only to independently develop and mount the necessary equipment, but also to create new cable designs, which consumers so much need. For example, at that time the specialists of the plant successfully mastered the production of wires for water and oil submersible pumps.

In an effort to preserve the enterprise, in the early 90s the labor collective transferred to lease relations, and then, in 1995, initiated a change in the form of economic activity - the repurchase of the enterprise as an integral property complex.

In September 1995, a meeting took place, at which workers of the plant decided to create a closed joint-stock Company «Yuzhcable works».

The plant's incorporation by the labor collective gave a powerful impetus to the development of its production potential. The initiative, the indifference to what is happening, the conscientiousness, diligence of each worker, multiplied by common goals, soon yielded positive results. The enterprise overcame the crisis and began to develop rapidly. At that time, the strategy and tactics for the technical re-equipment of cable production was developed.

The first in the framework of this plan we put into operation an aluminum press П10-741, which simplified the process of manufacturing conductive cores of power cables, and a high-performance drawing-string «Synchron».

Soon, without any outside investment, the plant was able to purchase from the well-known Austrian firm MAG two enamel aggregates. These new units are technically advanced, much more productive, environmentally safer than the equipment that was dismantled at the plant several years ago. Thus, the plant has restored this production already at a completely different, modern level.

It is necessary to emphasize that all services and divisions, all specialists of the Company, have been engaged in technical re-equipment and continue to be actively engaged from design to installation and commissioning. Since 2003, the plant almost every year

put into operation new production – a new workshop or site, new equipment [3].

It was this year that a large-scale project was successfully implemented to organize the production of power cables with XLPE insulation for voltage up to 110 kV at a cost of USD 9.4 million. In its framework, a new workshop with an area of 5000 m² was built on the territory of the plant.

High-tech equipment was purchased and put into operation:

- universal torsion machine of DRUM TWISTER type from Company «Pourtier» (France);
- inclined line of continuous vulcanization from the Company «Troester» (Germany);
- machine for twisting conductor cores of cables from the firm «Cortinavis» (Italy);
- extrusion line for the application of shells from the Company «Troester» (Germany);
- test equipment from firms «Hipotronics» (USA) and «Haefely» (Switzerland);
- torsion machine from the firm «Cortinavis» (Italy), where for the first time in the CIS the industrial production of sealed conductor wires with a section of up to 800 mm² with longitudinal sealing against the spread of moisture by waterblasting threads was mastered. This technology has significantly increased reliability and improved performance of power cables for medium and high voltage.

The implementation of this project in 2003 made it possible to refuse from importing expensive cables from world-famous manufacturers such as «Nexans», «Prysmian», and «Telefonika» to Ukraine.

At that time, some CIS cable plants were just beginning to work in this direction, and we already had a ready-made production facility for the production of cables with a voltage of up to 110 kV and a cross-section of the core up to 800 mm². Cables of these brands today are the most in demand in the world, reliable in operation and more simple for installation and maintenance [4, 5].

Just in time for development and implementation in mass production since 2003 of medium and high voltage domestic cables (6-110 kV), in 2007 the State Prize of Ukraine in the field of science and technology was awarded to the general Director of the Plant «Yuzhcable works», Candidate of Technical Sciences V.M. Zolotaryov, Candidates of Technical Sciences, Chief Engineer V.P. Karpushenko and leading specialists of the company – Yu.A. Antonets, L.G. Vasilets and A.F. Krivenko. This became a recognition of the merits of the plant's staff members in ensuring the energy security of the national economy.

In 2004, the team implemented a second investment project to create the production of fiber-optic communication cables. Equipment was purchased from the company «Nextrom» (Finland-Switzerland) was purchased. This is an optical fiber color line, an optical module manufacturing line, an SZ-twist line, an extrusion line for cable shielding, a cable rewind line and a test equipment set. Separate units of the lines were additionally equipped with the equipment from the

Companies «Weber & Schör» (USA), «Medek & Schörner» (Austria), «Sikora» (Germany) and other leading firms. The equipment also included a torsion machine from the firm «Proton & Products» (UK) for applying wire armor to the cable.

According to the technical specifications developed by the plant, the production of a wide range of fiber-optic cables began, which fully met the various needs of consumers.

The design capacity of the new workshop was 8,000 kilometers of fiber optic cable per year.

In 2006, a workshop was put in operation to produce self-supporting and protected wires of the СИП type. These wires are designed for transmission and distribution of electrical energy in overhead lines, as well as for branches to entrances to houses and outbuildings.

The use of the equipment of leading European companies in this workshop allowed to raise the quality of produced self-supporting insulated wires to the requirements of international Standards. In particular, the manufacture of a core with the use of a high-strength aluminum alloy has been mastered. It replaced the traditional designs of such wires, reinforced with steel wire. Such alloy is used in СИП, which are exported to the countries of near and far abroad.

With the increase in the nomenclature of manufactured cable products, it became necessary to organize modern insulating materials production at the plant. For this purpose, a scientific and technical center was created, whose workers, together with specialists of the central plant laboratory, develop materials for insulation, filling and shells, including special formulations.

In parallel with such research work, preparations were made for placing in the enterprise production of processing polymeric materials and working off formulations of individual materials for use in the drawing and signal-blocking cables workshops, as well as power cables. The creation of a new workshop with a complex technological cycle took the plant several years. The painstaking work of engineering services in this direction was crowned with success. Today the Plant «Yuzhcable works» has a workshop for processing polymeric materials, analogues of which are not available at other cable plants. Here work is carried out, starting from research and laboratory works and finishing with the industrial manufacture of finished products.

For this purpose we installed:

- line from the firm «Repkon» (Turkey) for the production of insulating and hose compositions of PVC plastic;
- multifunctional equipment from the firm «Ermafa» (Germany) for the manufacture of compositions of polyolefins (including silanol-crosslinked, light stabilized, fireproof). The line is equipped with computerized control of the technological process, including systems for formulating, transporting and dispensing ingredients of polymer compositions, maintaining process parameters, degassing of volatile products;
- equipment for the production of highly filled PVC and halogen-free polyolefin compositions from the firm

«X-Compound» (Switzerland). With the putting in operation of this equipment, the plant was able to fully provide its own production with highly-filled and halogen-free compounds.

Equipment of the workshop for processing polymeric materials with progressive equipment made it possible to use silanes here. This allowed the workshop to reach a whole new level in its development. After all, such high-tech industries are few in the CIS countries. They require not only sufficient investment, but also qualified personnel capable of mastering advanced technologies and further working on particularly complex equipment.

Economic analysis indicates that the prices of polyolefin compositions developed at the plant are 5 to 20 % lower than those of other manufacturers of similar products. This makes it possible to reduce the cost of the «Yuzhcable works» products as a whole and, thus, to receive certain preferences when selling it.

In addition to the production of insulating materials, the plant also organized the production of round anoxic billet from cathode copper by the method of ascending casting from the leading European firm «Upcast» (Finland), which allows to produce up to 10,000 tons of billets per year with a diameter of 8 to 20 mm.

This technology, which has almost 50 years of history, has proved to be a good choice for many manufacturers of cables and wires for various applications. Currently, there are more than 130 plants for the production of oxygen-free copper rod in the world using the method of continuous ascending casting.

This site is able to ensure a 100 % transition of the main workshops of the plant to the use of copper of its own production. The plant's capacity can flexibly vary according to needs.

In 2008, the «Yuzhcable works» successfully implemented one of its most ambitious projects: a new plant equipped with high-tech equipment was built by the plant workers to produce power cables with XLPE insulation for a voltage of 6 to 330 kV inclusive.

The construction of a new production was a natural result of the reaction of plant specialists to the world development trends of both domestic and global power systems. Every year the demand for high and ultra high voltage power cables is increasing. This is due to the implementation of major projects in energy, metallurgy, mining and the construction of megacities. The laying of such cable lines makes it possible to replace overhead power lines, which saves energy and ensures the reliability of its transmission.

Cables with XLPE insulation have long been widely used in the power systems of economically developed countries. For example, in the USA 85 % of power cables have polyethylene insulation, in Finland, France, Sweden, Germany and Japan only cables with polyethylene insulation are used. A number of power systems in Russia, Ukraine and other CIS countries also use such cables.

At the new site, the specialists of the plant installed:

- line of superimposition of screen elements on cables of the «DRUM TWISTER» type produced by the firm «Pourtier» (France);

- two lines of rough drawing of copper and aluminum wires from the firm «Niehoff» (Germany);
- line for rewinding and laying armored pouches made of steel tapes from the firm «Pourtier» (France);
- inclined line of continuous vulcanization from the firm «Maillefer» (Finland);
- machine for twisting conductors of aluminum and copper from the firm «Ceeco-Bartell» (USA);
- line of application of the outer shell from the firm «Maillefer» (Finland);
- test equipment, including two modular reactors, each providing a test voltage of 250 kV, from the firms «Hipotronics» (USA) and «Haefely» (Switzerland).

Specialists of the plant chose an energy-saving test technology with increased voltage based on a series resonance using a test facility from these companies. Today, in Ukraine only the «Yuzhcable works» has such a powerful facility. It also carries out tests to measure the level of partial discharges in each construction length of the cables, determine the tangent of the dielectric loss angle in insulation, the electrical resistance of the core and insulation.

To organize such a complex production, the plant built a new building with an area of 12000 m². This is the only such a high-tech and science-intensive production in the CIS with a capacity of 2000 kilometers of cable per year, taking into account the specialization of the workshop for the production of high and extra high voltage cables.

The volume of capital investments since the beginning of construction of a new workshop was USD 20 million.

In September 2010, the plant manufactured and tested 8.6 kilometers of XLPE insulated power cable for voltage of 330 kV for Berezovskaya TPP (Republic of Belarus). Such cable in the CIS countries was first manufactured at the «Yuzhcable works».

And in the beginning of 2011 all work on laying, installation and commissioning of the first in Belarus cable line for 330 kV has been completed.

This year, the «Yuzhcable works» has already produced and supplied 9.5 kilometers of power cable with XLPE insulation with an aluminum conductor of cross-section of 2000 mm² for 220 kV for the substation Kremenskaya, in the Lugansk region. As a result of military operations in the region, main and distribution power networks were damaged. The commissioning of this substation with the cable system from the «Yuzhcable works» will allow to synchronize the power supply system of the north of Donbass with the United Power System of Ukraine, which previously operated with a lower generation of the Lugansk TPP. The commissioning of the substation will enable the Severodonetsk Company «Azot» and the Lisichansk refinery to operate at full capacity.

Ultrahigh-voltage cables have successfully passed tests at the European testing center of the company «KEMA» (Netherlands), the plant received international quality certificates.

To work for consumers, take into account their wishes and needs – this is the rule that our Company is guided by in its activities.

For example, in Ukraine, the demand for winding wires has increased. To meet this demand, the plant bought a modern, high-performance two-way machine from the firm «Newtech» (Italy). In the shortest time, we assembled it, carried out commissioning and commissioned the production of wires with fiberglass insulation. The wires made on this machine have higher performance and reliability.

The «Yuzhcable works» takes an active part in the national program on import substitution. Increasing the range of cables produced, the Company thereby provides an opportunity for consumers in the Ukrainian market to choose between similar imported and domestic products, which sometimes are much better in quality than foreign ones and competitive in price.

It was within this program that the plant purchased new equipment for manufacturing low-voltage fire-proof cables and flexible household wires:

- from the firm «Niehoff» (Germany) 8-creek drawing machine MMN 121 for drawing copper wire in the range of diameters of 0.20 – 1.13 mm and three double-twisting machines D631 and D1001 for the production of high-quality flexible conductors of cross-section of 0.5 – 35 mm²;
- from the firm «Rosendahl» (Austria) two universal lines designed for insulating conductors with a cross-section of 0.50 – 35 mm² and for their twisting by the «SZ-twist» method with the simultaneous application of the inner and outer shells.

The plant received the certificates of the Institute for Testing and Certification VDE (Germany), Institute Innogy SE Eurotest (Germany) and the Research Institute of Energy IEn (Poland). Due to the huge work on adaptation of cables and wires with the brand «Yuzhcable works» to foreign Standards and requirements, the Company now exports its products to the CIS countries, the European Union, and also to the countries of Southeast Asia and the Middle East.

Our plant continued its active participation in the national import substitution program. It was decided to expand the range of products produced by manufacturing special-purpose cables that are in demand at nuclear power facilities, transport engineering enterprises, and also used in critical fire alarm and fire fighting systems.

During 2015-2016 the plant concluded contracts with leading foreign Companies for the supply of special technological equipment:

- line for the production of copper wire coated with tin by electrolytic tinning;
- two high-speed tape winding machines for applying insulation from glass-mica belts to conductive wires. Their introduction into production allows the enterprise, first of all, to master the production of fire-resistant control cables of small cross-sections with current-conducting wires of non-welded and tinned copper, and also of thermocouple alloys;
- two braiding machines and one cane machine for making copper and copper tin-plated wire screens.

The regulatory documentation for the manufacture of special-purpose cables by the plant's employees was developed, agreed upon and approved. Jointly with the representatives of the State Nuclear Security Center, the State Enterprise NAEC «Energoatom» and representatives of the three NPPs of Ukraine, the acceptance tests of the experimental lots of new products were successfully carried out. And these are control cables and small ones that have a number of technical advantages in terms of noise immunity, fire safety and corrosion resistance in comparison with traditionally used cables.

Taking into account the wishes of consumers and the rapid development of solar energy in the country, the specialists of the enterprise developed the design and in a short time mastered the production of cables for photovoltaic systems (solar power stations). These are single-core cables with flexible copper tin-plated cores. The insulation and shell of these cables are made of halogen-free cross-linked material.

The total amount of investments into the production of the plant in recent years has amounted to more than UAH 3 billion.

The implementation of projects for the technical re-equipment of production was largely made possible thanks to many years of close business cooperation between the plant specialists and the NTU «KhPI», in particular, with the Department for Electrical Insulation and Cable Technology, as well as with the staff of the Institute of Electrodynamics of the National Academy of Sciences of Ukraine.

Today the enterprise produces about 25 thousand markings of various cables, wires and cords. The «Yuzhcable works» is a recognized brand. The Company is well known in the countries of near and far abroad. The plant has a stable credit and financial history. The «Yuzhcable works» is one of the main participants of the International Associations «Electrocable» and «Intercable», which includes companies – world leaders in the manufacture of cables and wires, high-tech equipment, producers of raw materials for the cable industry.

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The basis for the stable development of the «Yuzhcable works» is a successfully operating quality management system in accordance with the requirements of ISO 9001 and the environmental management system in accordance with the requirements of ISO 14001, which have been recertified according to the new version of the 2015 Standards.

The main wealth of the plant is its labor collective. The 75-year history of the plant shows that the plant's team has always successfully solved and will continue to solve the problems arising before it, achieving the set goals.

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