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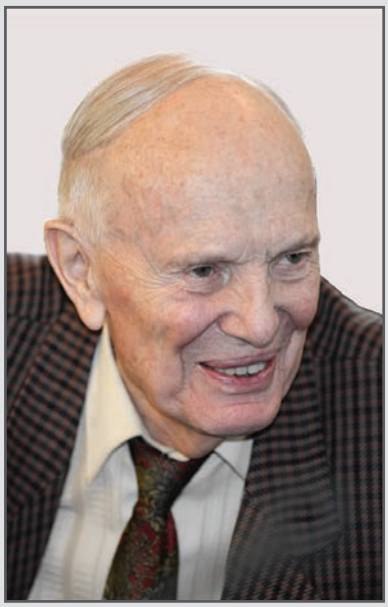
BORYS EVGENOVYCH PATON — IEEE HONONARY MEMBER!



Honorary membership of the Institute of Electrical and Electronics Engineers (IEEE) is given to a person for life. It is awarded by IEEE Board of Directors to people, who, not being IEEE members, have made an outstanding contribution into progress of humanity in IEEE fields of interest.

IEEE Advancing Technology for Humanity

IEEE Ukraine Section is proud to announce that Professor Borys Paton, President of the National Academy of Sciences of Ukraine, Director of the E.O. Paton Electric Welding Institute of the NAS of Ukraine, was selected to receive the 2020 IEEE Honorary Membership Award. This is a recognition of his achievement within IEEE engineering fields, which had an impact on development of electrometallurgy, materials science, electric welding of metals and biological tissues.

At the end of this year, IEEE Board of Directors meeting approved a decision on granting Prof. Borys Paton, President of the National Academy of Sciences of Ukraine, Director of the Electric Welding Institute of the NAS of Ukraine, a special award — IEEE Honorary Membership with the following definition «For achievements in IEEE engineering fields that have an impact on development of electrometallurgy, materials science, electric welding of metals and biological tissues».

The title of Honorary Member is awarded by IEEE for outstanding contribution into development of engineering sciences, designated by IEEE. The Institute of Electrical and Electronics Engineers has more than 400 thou members from 160 countries of the world. However, there are not more than 50 Honorary Members. The recipients of this title are presented with the Certificate, «Honorary Member» pin and crystal sculpture.

In the previous years, the IEEE Honorary Membership recipients were Telle Whitney (2019), Anton Zeilinger (2018), Rodolfo Stefano Zich (2016), Elon Musk (2015), Shirley Marie Tilghman (2014) and others.

Dear Professor Paton,

It is a great pleasure to inform you that the IEEE Board of Directors selected you to receive the **2020 IEEE Honorary Membership Award,** which is given elected by the Board of Directors from among those individuals, not members of IEEE, who have rendered meritorious service to humanity in IEEE's designated fields of interest.

The award comes with the following citation:

"For lifetime achievements within IEEE technical fields of interest in the development of processes of electrometallurgy, materials science, electric welding of metals, and biological tissues."

For nearly a century, the IEEE Awards Program has paid tribute to researchers, inventors, innovators, and practitioners whose exceptional achievements and outstanding contributions have made a lasting impact on technology, society, and the engineering profession. Each year the IEEE Awards Board recommends a small number of outstanding individuals for IEEE's most prestigious honors. You now join this select group.

Details regarding the award presentation will be sent separately via electronic mail by the IEEE Awards Staff.

Congratulations on your achievement, and thank you for your commitment to IEEE and its mission of advancing technology to benefit humanity.

Very truly yours,

José Manuel Fonseca de Moura

Jose' Moura
IEEE President

*Calendar of December**

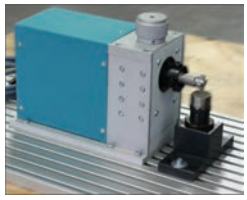
DECEMBER 1, 1884 Alonzo Pawling and Henry Harnischfeger established P&H Mining Equipment Inc. In 1933 the Company developed the first in the world all-welded excavator. Regardless, low market demand, the management of the Company continuously introduced innovations and improved production. Rivets were replaced for all-welded structure. Methods of welding were also improved by own patents. Creating the cranes and excavators, which were more robust, lighter and cheaper, P&H Mining Equipment Inc. confidently took its place on the market.

DECEMBER 2, 2008 Monument to V.G. Shukhov (1853–1939), engineer and architect, was unveiled. He invented a hyperboloid structures, overlap gridshells and commercial units for thermal cracking of oil. He was an author of projects and technical manager during construction of the first Russian oil pipelines (1878) and oil refining plant with the first Russian oil crackers (1931). He made an outstanding contribution in the technologies of oil industry and pipeline transport, in development and construction of welded frames of buildings of open-hearth and converter shops, gas mains of hot blowing and blast furnace heater.

DECEMBER 3, 1959 A national flag was hoisted on ice-breaker «Lenin» that commemorated beginning of new age in a civil ship-building of USSR. Development of qualitatively new type of ship requires mastering of principally new technologies. For the first time, already in the process of nuclear ship construction, there were developed and implemented new methods of welding of stainless steels. Workers of QC department, checking the quality of welds, thoroughly followed the welding operations. The most critical welds were subjected up to 11 tests. 4 km of X-ray film were used for X-ray testing of welds. Leakage of weld of not more than 4–5 drops per year was allowed. The ice-breaker worked around 30 years under heavy arctic conditions.

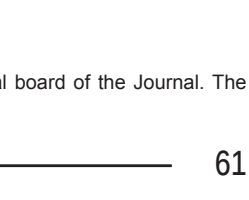
DECEMBER 4, 1945 A method of stud welding was published. The method was developed by Ted Nelson back in 1936, but even many years on it is still the most efficient and reliable for welding of fastening devices. The process of stud welding by Nelson includes the same basic metallurgical principles as any other type of technology of electric arc welding, namely use an arc discharge in order to melt the bolt (stud) end or electrode with part of main structure of metallic billet. Today the company, established by Nelson, continues to carry its name and is one of the largest suppliers of equipment for stud welding.

DECEMBER 5, 2014 It was a successful launch of «Orion» spaceship, replacing the Space Shuttles. The peculiarity of this space ship is application of friction stir welding. Engineers of Marshall Space Flight Center of NASA developed an innovative instrument for friction stir welding. In addition to space technologies the new technologies is used in manufacture of ship hulls, car roofs, wings and fuselage of the airplanes.



DECEMBER 6, 1963 The patent for ultrasonic method of welding of thermoplastics was applied by Robert Soloff and Seymour Linsley. Appearance and initial development of ultrasonic welding refers to 1930–1940th. During the investigation of ultrasonic oscillations it was discovered that simultaneous effect on a welding zone of specific compression force and ultrasonic oscillations provokes joining of the samples without passing through them electric current.

DECEMBER 7, 1995 Descent probe Galileo entered Jupiter atmosphere. This automatic space apparatus of NASA was developed for exploration of Jupiter and its satellites. During the flight it was on-board problems due to welded to each other in vacuum parts of its antenna. This event received wide publicity in 2006. European Space Agency issued a document, in which the possibility of application of cold welding in vacuum was considered as specific damage for space apparatuses. In order not to allow something similar, the designers should reduce the number of moving parts, produce them of different materials or cover their surface with a protective layer.



*The material was prepared by the Steel Work Company (Kryvyi Rih, Ukraine) with the participation of the editorial board of the Journal. The Calendar is published every month, starting from the issue of «The Paton Welding Journal» No.1, 2019.

DECEMBER 9, 1937 Nils Gustaf Dalen died (1869–1937). He was a Swedish inventor, founder of AGA Company, Nobel Prize winner on physics in 1912. The researcher lost his sight during the experiment and still could get a prize «for invention of automatic regulators, used in combination with gas accumulators for light sources on lighthouses and buoys». AGA Company (before the mergence in 2000 with Linde Company) was the largest manufacturer of commercial gases.

DECEMBER 10, 1964 C. Townes (50 %, USA), N.G. Basov (25 %, USSR) and A.M. Prokhorov (25 %, USSR) was awarded with the Nobel Prize for discovery of new principle of generation and amplification of light, i.e. laser. Based on these works in the beginning of 1960th in the USA it was developed the first optical quantum generator — ruby laser used in welding. The laser was titled by the first letters of English phrase — «Light — Amplification by Stimulated Emission of Radiation».

DECEMBER 11, 1954 «Forrestal», an American aircraft carrier, the main ship of its type was laid. It was the first aircraft carrier designed in the postwar period, in which the experience, gained during the World War II, was fully taken into account, and also the requirements of jet aviation were taken into account. During construction of an aircraft carrier of the «Forrestal» type, about 700 tons of welding materials were consumed, which was a record of such materials application in shipbuilding.

DECEMBER 12, 1961 A new method of welding pipes was patented. The installation was designed on the basis of a specific request for the construction of power plants, the technical characteristics of which required the provision of perfect repetitive welds in order to guarantee the maximum level of safety. For the development of a new method in industrial production, the French welding company «Polysoude» was founded.. Today, «Polysoude» designs, manufactures and sells equipment and installations for orbital and mechanized welding and surfacing.

DECEMBER 13, 1816 Date of birth of Werner Siemens (1816–1892), a famous German engineer, inventor, scientist. Together with Johann Halske (1814–1890), he created the company «TelegraphenBauanstalt Siemens & Halske», which was engaged in a wide range of works in the field of precision mechanics and optics, as well as the creation of electro-medical devices. As the basic area of activity, the company chose the electro-telegraphy. Namely the telegraph with its huge number of wires needed to be connected, became the catalyst for the development of resistance welding. Thus, the ends of the telegraph wires with a specially made oblique cut of the ends were assembled with an overlap and joined by «incandescence» of the passing direct current.

DECEMBER 14, 1922 Opening of the underground metro line in Glasgow, Scotland took place. The line is the third oldest underground system in the world after the London and Budapest metro. This is the only metro in the British Isles outside London, which is located completely underground. During the construction of the metro, arc welding was used.

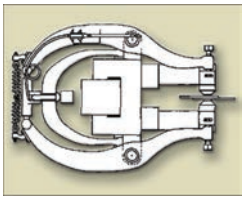
DECEMBER 15, 1932 The Soviet mainline cargo-passenger DC locomotive VL19, produced since 1932 to 1938, was put into service. It was the first all-welded electric locomotive, and among the serial ones (until March 1953) it was the only electric locomotive, the design of which was made in the USSR. In 1931, at almost all the locomotive-building and car-building plants of the Soviet Union the production was transferred to welding of parts, assemblies and structures.

DECEMBER 16, 1947 Experimental physicist Walter Brattein, who worked with the theorist John Bardin, assembled the first serviceable spot transistor. Later, due to creation of the p-n-junction theory by William Shockley (1948–1950), a junction transistor, later a planar transistor (1959) was produced, which became the basis for creating monolithic integrated circuits, including those, used in welding inverters.

DECEMBER 17, 1946 Gravity welding was patented. This type of welding is not widely spread. It is used, for example, in shipbuilding during welding of panels, but in some cases it is convenient and necessary. During welding in hard-to-reach places, a fire-cracker welding is used. Its advantage consists in the fact, that due to a simple mechanization, the process becomes easily controllable. One worker can serve several installations at once. Strong light radiation of the arc during ignition of electrodes negatively affects the welder and those, who work nearby. Automation of both the process of ignition of the arc (from the control panel) as well as the whole process of gravity welding allows the welder to be removed from the zone of light radiation and harmful dust evolutions.

DECEMBER 18, 1959 The first in the world nuclear-powered submarine K-162 with a titanium hull was laid. The Soviet nuclear-powered submarine of the second generation was the fastest submarine in the world, reaching the speeds over 80 km/h (42 knots) in a submerged state. Welding of titanium structures had to be carried out in argon (about 1 million m^3 of argon was consumed). In the process of works an extremely high precision and a surgical cleanliness were required.

DECEMBER 19, 1939 The medium tank T-34, was added to the armament of the Red Army and in March, 1940 it was approved for serial production. In total during the years of war, more than 35 thous T-34 of all modifications were produced. Initially, the hull and the turret of T-34 were welded manually by electrodes with a special coating.. In total, a few dozen of welds were produced. Simultaneously with the development of technology, two installations for automatic welding of the hull side with a wing guard of the tank T-34 were designed and manufactured. In January 1942, the first experimental model was welded. The technology and equipment passed a successful testing. On the initiative of E.O. Paton the first in the world' line for production of armored tanks was put into operation, which equipped with about 20 installations for automatic submerged-arc welding. The efficiency of automatic welding was 10 times higher than that of manual welding (photo of the tank T-34 at the territory of the E.O. Paton Electric Welding Institute).



DECEMBER 20, 1898 O. Kleinshmidt published a patent on one of the developments of spot welding. Kleinschmidt replaced carbon electrodes in the «devices» of Benardos by copper electrodes. Also Kleinshmidt invented an improved device for welding, having mounted the transformer directly into the tongs. Since that time, the spot welding left the stage of laboratory experiments and the work on improvement of the process efficiency began.

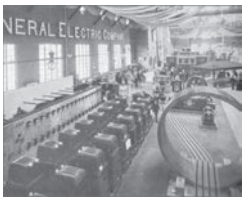
DECEMBER 21, 1928 John Calvin Coulidge, US President (1872–1933) signed a Bill, approving realization of the project of construction of gravity dam on Colorado River. The first electricity was generated by the station generators already after eight years. Hoover Dam is a unique hydraulic construction in the USA, which is a concrete arch-gravity structure 221 m high and hydroelectric station located in the lower reaches of Colorado River. The water comes to the turbines from 100 m height through steel cylindrical wells assembled from welded segments.

DECEMBER 22, 2007 French carrier rocket Ariane 5 launched the first ever African satellite. To create Ariane 5, the engineers supervising welding of the fuel tank for the rocket, made it from aluminium 3 mm thick. The welding unit was rotating inside the tank that allowed conducting seamless welding. The weld integrity is of critical importance, as cryogenic tanks form the load-carrying structure of the carrier rocket first stage. In addition, KUKA welding robots were used to build the rocket, which also ensured seamless welding.

DECEMBER 24, 1818 Birthday of James Joule (1818–1889) — English physicist, who made a significant contribution to formation of thermodynamics. In 1853–1854, together with W. Thompson, English physicist, he discovered the phenomenon of gas cooling at its slow flowing through a porous partition. During electricity studies, wire bundles were fused in a coal box, due to passage of electric current through the wire, i.e. resistance welding was performed in principle.

DECEMBER 25, 1901 On Christmas night, 1901, the land bank in Hannover was attacked. Robbery attempt failed, and it would not be worth remembering, had it not been for one circumstance: here the criminals used the «gas cutter» — autogenous cutting torch for the first time for opening the safe. The unknown robbers, who can be called «technically illiterate», failed. The point is that a large amount of oxygen is required for iron to burn, while they were only able to get through the eight millimeter casing of the safe made from plain sheet steel.

DECEMBER 26, 1922 Robert Nobel from General Electric Company developed automatic direct current welding using arc voltage for regulation of feed rate. This method was mainly applied for repair of worn engine shafts and crane wheels. This process used bare electrode wire, the feed rate of which depended on arc voltage.



DECEMBER 27, 1968 The flight of Apollo-8, the second manned spacecraft within the US Apollo space program, was completed. During this flight, men reached the another celestial body, the Moon, for the first time. This was the first manned start of Saturn-5 rocket. Saturn-5 rocket remains to be the most lifting and powerful, the heaviest and largest of the rockets putting payloads to orbit, which has been developed so far. Electron beam, laser and plasma-arc welding processes were used for welding the rocket aluminium tanks.

DECEMBER 28, 1927 One of the patents of D.A. Dulchevsky (1879–1961), Soviet inventor in the field of electric welding, was published. The inventor scientist created an automatic machine of an ingenious design. By its principle of operation, it is a transition from intermittently operating automatic machines to continuously operating automatic machines. This automatic machine has found practical application in railway transport, mainly for performance of surfacing operations. Starting from 1940, this process began to be actively introduced into industry and construction.

DECEMBER 29, 1920 A floating assembly workshop «ESAB IV» was accepted by the Lloyd's register. Two welding stations with DC generator were installed on the ship. ESAB Company was able to perform repair-welding operations «afloat». In many cases such technique of repair operations performance turned out to be indispensable. ESAB IV vessel functioned for 60 years.

DECEMBER 30, 1957 James Byron patented the apparatus for ultrasonic welding. In welding engineering the ultrasound can be used for various purposes. By applying it to the weld pool during crystallization, we can improve the mechanical properties of the welded joint, owing to refinement of weld metal structure and better removal of gases. The ultrasound can be the source of energy for producing spot and seam joints. Ultrasonic welding of metals is becoming ever wider applied, as this method has several advantages and special features, compared to resistance and cold welding. Ultrasound welding is particularly promising for application for microelectronics products.

DECEMBER 31, 1986 N.N. Benardos (1842–1905) got a patent on spot resistance welding. It is not known when and under what circumstances N.N.Benardos came to the principle of spot resistance welding. World's first patent for this process (and «apparatus» for its realization) was issued in his name in Germany. Used as electrodes in it were graphite rods, inserted into tongs, compressed manually.