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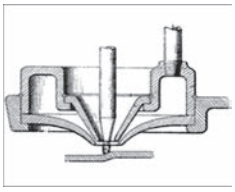
Calendar of April

APRIL 1, 1938 Tirpitz, the second Bismarck-class battleship was launched. It was part of Kriegsmarine (Germany). The ship practically did not take part in combat operation, but by its presence in Norway it threatened the Arctic convoys to the USSR and contained considerable forces of the British fleet. This battleship was characterized by a large scope of welding application in its construction. The ship hull was welded for approximately 90–95 %. This allowed a significant reduction of the ship weight, compared to application of rivets, and this, in its turn enabled creating more powerful armour protection.

APRIL 2, 1924 Birthday of A.S.Demianchuk (1924–1990), representative of the Paton school. Invented and build under his guidance, the high-frequency condensed spark generator with shock excitation enabled development of ingenious procedures for spectral analysis of various steels, welded joint metal, composite materials and diffuse coatings. The procedure was successfully introduced into practical work of spectral laboratories of research institutes and central plant laboratories. A.S. Demianchuk is the author of about 100 scientific works.

APRIL 3, 1984 In 1984 Rakesh Sharma, as a member of the international space crew, conducted the «Overcooling» experiment in the PWI developed coating unit «Isparitel-M». Rakesh Sharma is the first Indian cosmonaut and 138th man in the world, who made a space flight. Melting and solidification of spherical castings moving freely in weightlessness and vacuum was performed during the experiment. These experiments were very important for development of welding technologies in space.

APRIL 4, 1973 Construction of the World Trade Center in New York was over. During its erection, 139500 kg of metal deposited at welding, was used. The complex of seven buildings was designed by architect Minoru Yamasaki. The architectural dominant of the complex were two towers, each of which had 110 stories — the North (417 m high) and the South (415 m high). The buildings were designed as a «tube-frame» structural system. The «tube-frame» principle was a new approach, which allowed increasing the usable area space, unlike the traditional design (the towers were destroyed on September 11, 2001 during a terrorist attack).



APRIL 5, 1927 (publication date) A plasma torch or plasmatron in principle is an electrode, connected to a current source and surrounded by a nozzle with a channel of a comparatively small diameter. The second potential of the source is connected to the torch nozzle or to the item. In 1921 Himes, US inventor, applied a torch of such a design for cutting metals, achieving a high concentration of heat, powerful gas pressure and good quality of the cut. The history of plasma welding begins exactly from this moment. Himes torch was a prototype of modern plasmatrons. The term «plasma» proper was introduced by scientist Irving Langmuir (1881–1957).

APRIL 6, 1890 Birthday of Anton Herman Herard (Antony) Fokker (1890–1939), Dutch aircraft designer. In 1913 he founded an aircraft factory near Schwerin (Germany). During the First World War Anthony Fokker began applying welding in the production of fuselages of German fighters. The improved Fokker E.I. aircraft made its first flight in the spring of 1914, and in a year it was already batch produced and widely used at the fronts. In 1920s Anthony Fokker moved to the USA, where he founded a subsidiary of his company. Fokker Company became one of the leading manufacturers of civil aircraft in the world. In 1926 the flight over the North Pole was made in one of Fokker aircraft.

APRIL 7, 1947 Henry Ford (1863–1947) died. He was an US industrialist, owner of car factories all over the world, author of 161 US patents. Henry Ford organized mass production of cars on an assembly line, and focused on application of resistance, arc and gas welding instead of forge welding and riveting. The design of the chassis, bodies, exhaust pipes, tanks and a number of other assemblies and parts was created already taking into account the welding technology capabilities. Chassi in the form of a frame was welded by oxyacetylene flame at first, and then by consumable electrode arc. A significant part of the joints were made by resistance butt, seam and spot welding.

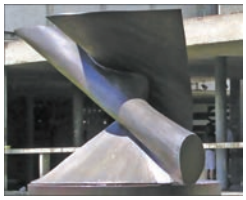
*The material was prepared by the Steel Work Company (Krivoy Rog, Ukraine) with the participation of the editorial board of the Journal. The Calendar is published every month, starting from the issue of «The Paton Welding Journal» No.1, 2019.

APRIL 8, 1919 Birthday of Yu.N. Gotalsky (1919–2002) — famous scientist, representative of the Paton school. Results of scientific works of Yu.N. Gotalsky allowed development of consumables for welding dissimilar steels, which are widely used even now. They are applied for realization of a fundamentally new welding technology, namely without preheating or heat treatment of pipes for petrochemical and power engineering industry. In PRC, electroslag welding was applied with the participation of Yu.N. Gotalsky for welding forging dies, steam boilers, rolling and other equipment already by the end of 1959. Yu.N. Gotalsky is author of 2 monographs, more than 130 papers and author's certificates.

APRIL 9, 1939 Birthday of B.V. Danilchenko — representative of the Paton school, one of the developers of the technology of wear-resistant arc surfacing of plates by flux-cored strips. He personally and as a co-author developed and put into industrial production a series of consumables for surfacing special steels and alloys, and deposition of protective thermal coatings, and created a number of technologies for surfacing various industrial parts. V.D. Danilchenko is author and co-author of about 130 scientific works and more than 40 author's certificates.

APRIL 10, 1870 Birthday of Max Ulrich Schoop (1870–1956) — developer of the method of thermal spraying of metal (metallizing). This process is related to welding. Welding joins metal elements, and thermal spraying protects surfaces from corrosion, wear, etc. Schoop's first machine transferred liquid lead using water steam. In 1913 Ulrich Schoop improved and patented the design of gas-flame sprayer, where spraying material was fed into gas torch flame in the form of wire. Owing to his significant contribution to initial development of the technologies, the methods of thermal coating deposition by spraying began to be called schooping, by the name of inventor of the technology.

APRIL 11, 1999 Birthday of S.I.Semergeev (1925–1999) — representative of Paton school. He studied the process of capacitor-type seam welding, developed the technology and equipment for application of this process in the enterprises of different industrial sectors. S.I.Semergeev studied the dependencies of mode parameters on the thickness and thermophysical properties of materials, in particular, chemically active and refractory alloys in similar and dissimilar joints. He developed technologies of welding coiled materials in metallurgical production, sealing of sensitive elements and vacuum tubes in instrument-making and radioelectronics.

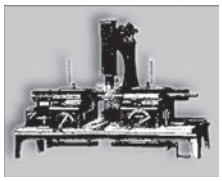


APRIL 12, 1962 Antoine (Nota Berkovich) Pevzner (1884–1962) died. He was a Russian and French artist and sculptor. In 1911 he moved to Paris, where he met A.P. Arkhipenko (1867–1964) and A. Modiliani (1864–1920). Developing the ideas of constructivism, he came to kinetic art. Pevzner's studio was at the outskirts of Paris, which is where his sculptures are located. He was one of the first artists, who used the soldering lamp to create sculptures, welding copper rods onto a sculptural form, and developed several methods which can be used in welding when creating sculptural forms.

APRIL 13, 1961 Birthday of A.M.Beinish (1911–1997) — representative of Paton school. He took an active part in development of highly-productive electrodes of ANO-1 grade with ferrous powder in their coating, low-hydrogen electrodes ANP-6P and ANO-31, technologies of commercial production of electrodes and their application at Nizhniy Tagil and Kremenchug carriage works.

APRIL 14, 1928 Academician E.O. Paton founded the Welding Laboratory at the All-Ukrainian Academy of Sciences in Kiev. Having considerable experience, he put together a comprehensive program of investigations aimed at development of materials and equipment, promising methods and technologies of welding critical engineering facilities. The very first studies performed by the Laboratory aroused interest both in the USSR, and abroad. In 1930 E.O. Paton organized the Electric Welding Committee — a public organization, the main objective of which was coordination of the activities of enterprises and institutions, involved in welding production.

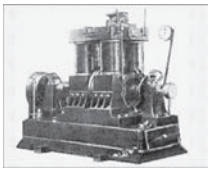
APRIL 15, 1939 Birthday of L.A. Semenov (1939–2013) — representative of the Paton school. He directly participated in performance of a package of research and technology work in the field of flash-butt welding of aluminium alloys. Technologies and equipment for welding the load-carrying elements (frames and shells) of flying vehicle bodies were developed and successfully introduced at the enterprises of the Ministry of Aviation Industry, Defense Industry and General Machine-Building of the former USSR. L.A. Semenov was involved in development of the technology of welding new components and parts of Zenith and Cyclone-4 carrier rocket bodies.



APRIL 16, 1889 (information) A fundamentally new relative position of electrodes, item being welded and arc was proposed. Ch.A. Coffin, Manager of American Electric Company, patented a roller metal electrode, moving above the item surface on a carriage insulated from it. The arc was excited between the rotating roller electrode (positive potential), and item connected to negative potential. Ch.A. Coffin used the same carriage for fastening two carbon electrodes located on both sides from the weld axis.

APRIL 17, 1938 Birthday of A.A. Zagrebelny (1939–2012) — representative of Paton school, specialist in the field of space technologies and structures. He took an active part in development of «Isparitel», «Isparitel-M», «Yantar» units, which operated in 1976–1989 on board the «Salyut» and «Mir» space stations. He is one of the developers of a versatile electron beam hand tool, which was used in 1984 at «Salyut-7» station to perform the world's first experiments on welding, cutting, brazing and coating in open space.

APRIL 18, 1932 Birthday of V.F. Lapchinsky (1932–1997) — representative of Paton school, organizer and participant of the work in the field of welding and related technologies for space environment. He participated in preparation of important experimental studies in space and development of unique hardware, including «URI», «Universal», «Isparitel», «Yantar» units, used to perform experiments on welding and related technologies in open space.



APRIL 19, 1892 One of Henry Howard's patents was registered. Based on a number of patents, the designer created the first stationary welding machine and introduced it at the factories of Lloyd&Lloyd Company in Birmingham in 1887. It consisted of four dynamo machines (500 A, 150 V), actuated by a steam engine, 1800 «Benardos accumulators» and ballast rheostats. A little later N.G. Slavyanov came up with a novel idea in those times — to eliminate the storage battery from the welding circuit. It was implemented at Perm cannon works at manufacture of two powerful DC dynamo machines (300 and 100 A).

APRIL 20, 1938 Birthday of V.Ya. Saenko (1938–2015) — representative of Paton school, renowned expert in the field of electrometallurgy, in particular, electroslag technologies for remelting, casting, welding of steels and alloys, and production of unique items for many industries. V.Ya. Saenko is the author and coauthor of about 320 scientific works, and about 300 author's certificates and patents.

APRIL 21, 1958 During the Brussels World Exhibition in 1958 the Soviet Union announced development of electroslag welding. The method of electroslag welding (ESW) was developed by PWI staff members at the beginning of 1950s. ESW is one of the variants of fusion welding. It is based on heat evolution at electric current flowing through liquid slag that enables melting the edges of parts to be welded and the filler metal, as well as maintaining a high temperature of the melt. This welding process opened up great possibilities in production of heavy metallurgical, forging and other equipment.

APRIL 22, 1886 Construction of the Statue of Liberty, one of the most famous sculptures in the world, was over. It was a present of French citizens for the one hundredth anniversary of the American Revolution. The metal frame of the Statue was attached to the central pylon, welded from four metal columns by autogenous welding. Spiral metal staircases were mounted around these columns, which consisted of 168 steps each. The Statue metal frame is covered by three hundred copper plates, fastening which required about 300 thousand copper rivets. Total weight of copper used for Statue facing is 31 t, and total weight of its steel structure is 125 t. The construction was installed by Gaget & Gauthier Company.

APRIL 23, 1854 Birthday of N.G. Slavyanov (1854–1897) — Russian engineer, inventor of metal electrode electric arc welding. The inventor paid serious attention to mechanization and automation of electric arc welding. He made and tested the world's first semi-automatic welding machine — the «electric melter». An important technological feature of his welding method was mandatory automatic regulation of the electric arc length at application of metal electrode. His opinion of the impossibility of conducting metal electrode electric welding process without automatic regulation of the arc length was not confirmed later on: consumable electrode manual arc welding became quite extensively used.

APRIL 24, 2014 A sculptor under the pseudonym of TEJN installed one of his latest sculptures — «Reaching for Freedom». TJEN is the pseudonym of a contemporary Danish artist, who began his artistic work as a street artist in 2007. Making his works from metal and using welding, he became famous owing to unsanctioned creation of sculptures. Without permission of the authorities, the artist welds or chains the monument, wherever he wants. Later on the sculptures began to be returned to their places as architectural monuments. In his work the sculptor uses welding, cutting, surfacing and other methods of metal treatment. Today his works are often displayed at prestigious exhibitions.

APRIL 25, 1990 Discovery Shuttle STS-31 put the Hubble orbital telescope into orbit. Today it is one of the most up-to-date pieces of equipment for space research. Several welding technologies were used to create this complex apparatus. Laser welding was applied in manufacture of special light-weight cellular mirrors. In this connection, Welded Sheet Metal Speciality Co. should be mentioned, which was constantly involved in welding operations during fulfillment of major projects, such as creation of Hubble telescope, manufacture of Apollo spacecraft, construction of Nautilus submarine, and many others.

APRIL 26, 2012 Having covered 540 miles with tow boats, the sea ice-resistant off-shore platform (SOSP) «Prirazlomnaya» arrived at the home site in the Pechora Sea, where it was later on mounted into a common block afloat with application of underwater welding. Already on December 20, 2013 Gazprom Neft Shelf Company announced the start of oil production at SOSP «Prirazlomnaya». At present this is the only platform, driving oil on the Russian Arctic shelf. Platform construction required wide application of underwater welding. Welding was performed with 1.6 mm flux-cored wire PPS-EK1 (PWI development) in the vertical and overhead position with two semi-automatic machines PSP-3. Total length of welds was 1020 m.

APRIL 27, 1967 1967 World Exhibition opened, the Montreal Biosphere becoming its symbol. Built as a pavilion of US exposition at Expo-67 International Exhibition, the Biosphere became one of the symbols of the city of Montreal. The construction has the form of a large sphere, which consists of a multitude of parts joined by welding. Each of them looks like a special molecular compound, belonging to a particular class of the so-called allotropic forms of carbon, known to all. In May, 1976 during repair welding operations, the Biosphere dome caught fire, but, luckily, there were no casualties.

APRIL 28, 1972 By the end of April, 1972, welder G.G. Dochkin (1842–2013) mastered the technique of producing a range of colour shades on titanium alloys in TIG welding. Using this effect, G.G. Dochkin created a number of unique works of art, having no analogs. Today many of them are in private collections all over the world.

APRIL 29, 1897 Birthday of G.S.Shpagin (1897–1952) — Soviet designer of small arms. The designer became the most famous for development of a submachine gun of 1941 model (PPSh), the most mass automatic weapon of the Red Army during the Second World War. Stamped welded structures were widely used in its design, greatly simplifying its manufacture.

APRIL 30, 1941 Three types of vessels, including Liberty dry cargo ship, were selected at the end of April for building the US transport fleet. The first ship of this series — Patrick Henry was launched on September, 27, 1941 at Bethlehem-Fairfield shipyard (Baltimore County). In January 1943 there were already about 500 of them. Just during 1942, 500 thousand tons of steel were saved due to replacement of riveted structure and riveting technology by welded structure and welding of the ships. Construction cycle was reduced to 50 days.