

Calendar of October*

OCTOBER 1, 1934 Presidium of the USSR AS appointed E.O. Paton (1870–1953) as a director of Electric Welding Institute. To recognize welding as a reliable technological process it was necessary to carry out complex investigations of mechanics of welded structures, processes of metallurgy and materials science of welding, arc discharge physics; it was a need in development of apparatuses, materials and new welding technologies. These are the purposes, which made a basis for establishment by the initiative of E.O. Paton the first in the world practice Institute, which in the next years won leading grounds in development of welding engineering and technologies.



OCTOBER 2, 1934 First fly of training, two-seater low-wing aircraft AIR-9 with M-11 engine of Yakovlev DTB, piloted by pilot Yu.I. Piontkovsky. On July 4, 1937, pilots Irina Vishnevskaya and Ekaterina Mednikova made a woman international record for light aeroplanes of the first category. They reached 6518 m height. The fuselage of the plane is truss, welded of steel tubes and additionally braced. Such a decision was very unusual for that time, but significantly simplified plane production.



OCTOBER 3, 1967 Experimental rocket airplane «North American X-15A-2» gained the speed of 7273 km/h that is 6/72 times higher the sound velocity. First and for the 40 years single in the history piloted hyperacoustic air vehicle-plane performed suborbital piloted space flights. The peculiarity of airplane «North American X-15» was wide application of welding in its production. Thus, around 70–80 % of welded structures were in the airplane structure.



OCTOBER 4, 1957 First artificial Earth satellite was launched. Work of designers and manufacturers during satellite production was carried out simultaneously due to constricted terms. The main difficulty was in manufacture of spherical semi-shells by hydrodrawing, their welding with frame and polishing of the outer surfaces, even minor scratches were not allowed on them; welding of welds should be tight and was X-ray controlled, and tightness of assembled container was checked by helium leak detector.



OCTOBER 5, 1929 Birthday of N.P. Lyakishev (1929–2006), researcher-metallurgist, academician of the RAS and NAS of Ukraine. He developed a series of sparsely-alloyed cold-resistant steels with good weldability for main gas pipelines of northern designation and technological processes of their commercial production. He initiated implementation in the metallurgy of the process of direct iron production. In 1975–1984 he was a director of I.P. Bardin TsNIIchermet; in 1987–2004 he was a director of A.A. Baykov Institute of Metallurgy and Materials Science.



OCTOBER 6, 1893 Birthday of Meghnad Saha (1893–1956), Indian physicist and astronomer, member of the Royal Society of London (1927). The scientific works of M. Saha refers to thermodynamics, static physics, astrophysics, theory of propagation of radio waves, nuclear physics. An important scientific basic for development of arc welding was a theory on plasma ionization. To characterize the process of ionization M. Saha in 1921 proposed the equation, named after that by his name. In development of this equation in 1924 I. Langmuir derived the formulae for determination of the level of ionization of vapors of substance evaporating from heated surfaces.



OCTOBER 7, 1934 Akulov N.S. (1900–1976), Soviet physicist, academician, specialist in the field of ferromagnetism developed in 1934 the first magnetic flaw detector. He studied influence of magnetic fields on different characteristics of ferromagnetic metals. He was awarded with the USSR State Prize for application of developed theory of ferromagnetism in metal flaw detection.

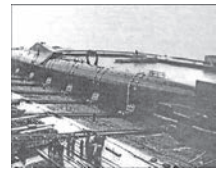


OCTOBER 8, 1936 Birthday of V.N. Zamkov (1936–2005), a well-known scientist in the field of metallurgy and welding of titanium alloys. Among the works of V.N. Zamkov it is necessary to note the development of a new method of argon-arc welding of titanium over a flux layer, which allowed fundamentally changing titanium welding technology, and thus, solving the problem of increase of welded joint quality. Under his direct leaders there were developed fundamentally new consumables for welding, namely fluxes and flux-cored wires.



*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.

OCTOBER 9, 1950 USSR State Prize was awarded to B.I. Medovar, R.I. Lashkevich (PWI), G.K. Slysh, A.M. Garagulya, P.I. Sobolev (Khartsyzsk Pipe Plant) for development of a new high-performance method of automatic twin arc welding of large diameter pipes. Method of automatic twin arc welding of pipes promoted rapid development of domestic pipe production.



OCTOBER 10, 1731 Birthday of Henry Cavendish (1731–1810), British physicist and chemist. In 1766 Cavendish published the first important work on chemistry «Artificial air», where he informed about discovery of «combustible air» (hydrogen). He extracted (1766) carbon dioxide and hydrogen in pure form, accepting the latter as phlogiston, determined the main composition of air as a mixture of nitrogen and oxygen. He derived nitrogen oxides. These discoveries were an important constituent for next development of technology of autogenous welding.



OCTOBER 11, 1963 Howaldtswerke-Deutsche Werft Company in Kiel laid down a keel Otto Hahn, one of the fourth ever built merchant ships with nuclear power system. It was set afloat in 1964. In 1968 38-megawatt nuclear reactor of the ship was launched and seal trial was started. In October of the same year Otto Hahn was certified as merchant and research ship. In order to secure a crew it was decided to weld a reactor block in special large compartment. At that particularly rigid requirements were made to the welds and for this multiple tests of their quality were carried out.



OCTOBER 12, 1940 Soviet pilot V. Kokkinaki started testing of the second variant of single-seat plane Il-2, Soviet attack aircraft designed at DTB-240 under the leadership of Ilyushin S.V. Being the main attack power in the Soviet aviation, Il-2 attack aircraft played outstanding role in the Second World War. It was the war-plane of the most mass production in the history of air construction. In total there were produced 36 thou. The fuselage of the aircraft was all-metal or mixed type. The front part represented itself welded shell (armored hull) of stamped sheets of armor of 4–6 mm thickness, joined by riveting and welding. Developed high-performance technology of combined welding of elements of structure of Il-2 and Yak-7 of hardened steel was honored with Stalin Prize in 1946.



OCTOBER 13, 1941 State Defense Committee made a decision on construction of two plants in Barnaul, one of them on production of tank T-50. Tank hull was welded of armour sheets of 45 mm thickness, except for bottom and top (20 mm). In welded faceted turret 45 mm gun of 1934 year type and coaxial with it machine-gun of 7.62 mm bore were located. Sheet of the hull of T-50 were joined by welding and located under high tilting angles. To 1942 the engineering drawings for hull of homogeneous armour of 40 mm thickness optimized for semi-automatic welding were prepared.



OCTOBER 14, 1948 The first in the history of aviation supersonic flight took place in 1947. It was done by pilot Charles Yeager on «Bell X-1» plane with liquid rocket which was launched from carrier aircraft Boeing-B29 and gained 2600 km/h velocity. Airframe was made of high-strength aluminum, fuel tanks were welded of steel. Welding was also used in manufacture of airframe parts.



OCTOBER 15, 1992 Publication of one of the patents of B.I. Medovar (1916–2000), leading scientist in the field of welding and metallurgy, academician, representative of the Paton school. Starting from 1960 he was developing the theoretical fundamentals of materials science and metallurgy of austenite steel welding. He was dealing with the problems of surfacing, remelting and casting. He is one of co-authors of technology of electroslag welding. Starting from 1979 he was a head of the works on development of new class of structural metallic materials obtained by electroslag remelting method.



OCTOBER 16, 2104 The last model of new generation of iMac computers was issued. The main peculiarity of it was strikingly thin body. In presentation it was mentioned in passing about some revolutionary welding technology, which allowed making the body significantly thinner. It emerged that for joining the parts of new iMac the technology of rotation friction welding was used. As a result it was possible to get smoother and stronger joint, which provides the possibility to make the part thinner at that this process uses less energy than traditional joining technologies. Thanks to this thickness of body edge in Apple computer is only 0.5 cm.



OCTOBER 17, 2001 Day of death of P.I. Sevbo (1900–2001), a well-known designer and scientist, representative of the Paton school, which for a long time was a head of design bureau of the E.O. Paton Electric Welding Institute. During the Second World War the personnel of the bureau under P.I. Sevbo leadership rapidly developed and implemented tens of specialized apparatuses and machines for automatic welding of armour hulls of T-34 tank. In the post-war years P.I. Sevbo actively worked on development and improvement of welding equipment for many branches of industry. He developed a series of projects related with complex automation of welding production.



OCTOBER 18, 1888 Method of metal-arc welding developed by N.G. Slavyanov was tested on public in presence of state commission in welding of crankshaft steam-engine. This date is considered as a birthday of Russian electric welding. The first in the world welding shop (so called electric casting factory with electric generator) was organized at the plant and since 1889 the record started to be kept «Record on works carried using electric casting of mining engineer Slavyanov at Perm cannon plant». Certificates on quality of performed works after part operation was mandatory attached to the record.

OCTOBER 19, 1958 Opening of the First International Exhibition in Brussels, where one of the main sights was Atomium. One the symbols of Brussels is a huge steel construction located on North-West, on Heysel park hill. It was designed by architect André Waterkeyn and constructed under the leadership of André and Michel Polak. By the idea of Waterkeyn its structure symbolizes beginning of new age, i.e. age of science, exploration of space and peaceful usage of nuclear energy. These unusual structure consists of 9 spheres «atoms» and presents a model of crystal of ferrum enlarged 165 bln times. Atomium can be considered as an anthem of welded structures of the XX century.



OCTOBER 20, 1480 Birthday of Vannoccio Biringuccio (1480–1539), Italian alchemist, metallurgist and architect. He was studying alchemy, metallurgy and casting for a long time in Italy, Czechia and Austria. He was a well-known in Europe casting craftsman and dealt with manufacture of military equipment in Florentine Republic. Here in 1529 Biringuccio casted one of the largest for that time cannons of more that 6 t weight and 6.7 m length. In his ten-volume work «Pyrotechnics» he describes, in particular, creation of butt joint using forge welding with the help of silver, broken glass and other materials. This was the way for joining swords and other types of weapon.



OCTOBER 21, 1954 Birthday of I.V. Krivtsun, leading scientist in the field of theoretical investigations and mathematical modelling of physical phenomena in low-temperature technological plasma, academician, representative of the Paton school. He developed such novel hybrid processes as laser-microplasma welding of metals of small thicknesses, laser-plasma powder surfacing and spraying of ceramic materials, laser-plasma deposition of diamond and diamond-like coatings. For practical implementation of indicated technological processes it was developed a series of integrated laser-arc plasmatrons, which have no analogues in the world practice. I.V. Krivtsun is the author of more than 270 research works, four monographs and ten patents.



OCTOBER 22, 1967 During the International Exhibition in 1967 the visitors were able to see the largest in the world open air geodesic dome, known as Montreal biosphere. The dome was constructed using approximately 65000 parts, including 13 km of extruded aluminum tubes welded in hexagon. It has no inner bearing elements and almost all 80 tons structures stands on five pylons filled with concrete.



OCTOBER 23, 1953 First public performance of the largest for that time helicopter YH-16 Transporter. It was piloted by Harold Peterson and George Callahan and became the first in the world helicopter with two gas turbine engines. Length of heavy transport helicopter made 24 m, diameter of two main rotor — 25 m. Such a dimensions were explained by technically set duration of flight, i.e. 2250 km. For the first time high-frequency resistance welding was used in construction of the helicopter.



OCTOBER 24, 1804 Birthday of Wilhelm Eduard Weber (1804–1891), German scientist-physicist. The main works of scientist belong to the field of magnetic phenomena and electricity. He determined an absolute system of electric measurements. The unit of measurement of magnetic flux is named after him. It was stated in 1881 at International Electric Congress in Paris.



CALENDAR OF OCTOBER

OCTOBER 25, 2005 Start of operation of airliner A380, wide-body passenger plane, the largest serial airliner in the world. According to the designers, the most complex problem in development of plane was the problem of weight reduction. Seat capacity is 525 passengers in the cabin of three classes and 835 passengers in one class configuration. Progressive welding technologies and improved aluminum alloys were used for reduction of plane weight. For lower panels of fuselage laser welding of stringers and skin was used that significantly reduced amount of fasteners.



OCTOBER 26, 1972 Sikorsky I.I. (1889–1972) died. He was a world-known aircraft designer of Ukrainian origin. First serially produced helicopter of his design Sikorsky R-4 Hoverfly flew for the first time on January 13, 1942. Its fuselage was framed and welded of steel tubes. Whole fuselage had linen skin. The cabin was with Plexiglas windows and aluminum aprons between them.



OCTOBER 27, 1984 Official opening of through traffic on Baikal-Amur mainline (construction in 1938–1984) of 3819 km length. Nowadays there is reconstruction of mainline, including laying of continuous track using aluminothermic welding.



OCTOBER 28, 2013 Zumwalt class missile destroyer was set afloat. Zumwalt destroyer is the key part of the SC-21 program of USA Navy. Program started in 1991 was directed on development of a family of universal ships of new generation. Destroyers of this series are the multipurpose and designed for attacks of enemy on shore, counter-air missions and fire support from sea. Development of this type of ship is one of the recent achievements of military equipment. Arc welding having increased requirements to weld quality was widely used in this project realization.



OCTOBER 29, 1955 Battle ship Novorossiysk (until 1948 ship of Italian Navy «Giulio Cesare») went down in Sevastopol harbor. 829 people died. In May 1955 it was included in the Black Sea Navy Fleet and regardless declining ages (44 years) it became the most powerful ship in USSR. Repair was carried out in Sevastopol with wide application of welding.



OCTOBER 30, 1961 The most high-capacity explosive device in the history of humanity was exploded in Novaya Zemlya. AS of USSR headed the development of bomb AN602. Capacity of explosion is 575 megatons in TNT equivalent.



OCTOBER 31, 1935 First pilot variant of DI-6 plane (CDB-11), Soviet two-seat fighter was given by the plant-manufacturer for ground and plant tests. In the process of manufacture of this fighter atomic-hydrogen welding was used for the first time in the USSR for welding of wing spars. Fuselage of DI-6 is framed and welded of steel tubes with light outer cage, coated from the back side with linen. The wings are two-spar and welded of tubes. Later on the plane started to be produced with welded fuel tanks.

