

Calendar of September*

SEPTEMBER 1, 1939 Beginning of the Second World War. Preparation to it significantly effected application of electric welding in production of all types of arms. Germany in order to circumvent peace agreement started using welded joints in the defense industry. Series of technologies, such a underwater welding, received a large development in this time. During the first years of the war volume of welding engineering in America increased more than three times due to manual electric arc welding and submerged arc welding.



SEPTEMBER 2, 1939 «K-53», Soviet cruising diesel-electric submarine of the World War II period was set afloat. A series of novelties such as all-welded light body was used in construction of vessels. New project assumed increase of tonnage and autonomy. Basements for auxiliary and main mechanisms were made using welding. 13 ballast systems were constructed, part of which were fuel ones. Light and strong casing and erection were formed from 6 mm ship steel using welding.



SEPTEMBER 3, 2001 I.M. Savich died (1927–2001). He was a representative of the Paton school. Scientific fundamentals of underwater welding and cutting were developed under his leadership. He investigated the peculiarities of arcing under conditions of high hydrostatic pressure and conditions for providing its stability at various depths, behavior of molten metal and mechanism of weld formation, peculiarities of metal to gas interaction. He participated in a series of original materials and unique equipment.



SEPTEMBER 4, 1907 Birthday of K.V. Lyubavsky (1907–1984), a well-known researcher in the field of metallurgy of welding processes, author of many consumables and technologies of arc welding. Its largest achievement in science is related with development CO₂ welding. K.V. Lyubavsky became a laureate of State and Lenin Prize.



SEPTEMBER 5, 1945 American submarine of «Salmon SS-183» class made its last patrolling. Submarines of this class, constructed by Porpoises Company, has new all-welded structure. A the same time, main part of engineers, employed by US government insisted on application of riveted structure of the body. As a result, «Salmon SS-183» submarines proved the relevance of application of welding in manufacture of vessel body. Thanks to this «Salmon SS-183» submarines became operational in US Navy and successfully participated in sea battles of the Second World War.



SEPTEMBER 6, 1938 Birthday of V.M. Kislitsyn (1938–2017), representative of the Paton school. Several types of water electrolytic generators, which found wide application in flame treatment of steel, copper and its alloys, precious metals, glass and other materials of thickness from tens of micrometers to several millimeters was developed with his participation for the first time in the Soviet Union.



SEPTEMBER 7, 1997 First flight of F-22 Raptor, American multipurpose fifth generation fighter aircraft, designed by Lockheed Martin, Boeing and General Dynamics Companies. New fighter aircraft was made using novel developments, including state-of-the-art avionics, new engines with digital control as well as low-observability for radars. Unique electron-beam welding unit was used in aircraft development. Electron-beam welding process allowed getting multifunctional complex in permanent form in planer design. This transfer significantly reduced the need in fastening elements, decreased structure weight and simplified assembly and cut its price.



SEPTEMBER 8, 1941 Nazi-German armed forces stated military blockade of Leningrad. Welders played a particular role in city defense. The first in the world underwater pipeline for pumping of oil products was proposed in 1942 in blockaded Leningrad. Pipeline was constructed for 43 days, length was 30 km, 21 of them were laid on the bottom of Ladoga Lake at 1–13 m depth. Adjustment and welding of «branches» continued till June 14, 1942. Assembly of 200 meter branch pipeline was carried out on offshore construction site, and then they were joined and laid on the Ladoga Lake bottom by divers. Efficiency of pipeline (besides, it was called «Artery of life») reached 350 t of fuel a day. There were different types of fuel, namely petrol, ligroin, diesel fuel. The pipeline was active for 20 months, during which 40 thou t of fuel was pumped through it.

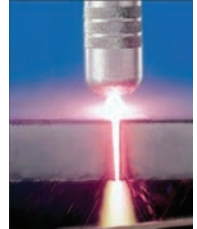


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SEPTEMBER 9, 2013 Las Vegas High Roller amusement ride of 168 m was opened in the USA. The observation wheel is the fantastic fulfillment of achievements of machine-building and design as well as world record-holder in height. New amusement ride is equipped with 28 cabins of 6 meters diameter, each of which can include up to 40 people. External rim of «High Roller» wheel was welded from two tubular steel beam of inch thickness, then they were joined in groups of four on four beams forming rim section. Each of these elements then were joined and as a result an external wheel rim was obtained. Supporting structures were designed and constructed in the same way in order to carry tremendous load of the wheel.



SEPTEMBER 10, 1957 Plasma cutter was patented. Plasma cutting was invented in 1954 in a laboratory of Linde department of Union Carbide Company. Young scientist Robert Gage found that TIG arc passed through small diameter nozzle significantly rises its intensity and temperature. Passing through this focused arc sufficiently large gas flow, he discovered that such arc can be used for metal cutting. Arc temperature, reaching more than 24000 K, melts metal and intensive air flow blows out molten metal for cutting. Since gas in arc was in overheated state, called plasma, this process was named plasma cutting.



SEPTEMBER 11, 1938 Birthday of A.S. Zubchenko (11.09.1938–27.06.2017), a well-known scientist in the field of weldability, brittleness nature and development of technological high-chromium corrosion-resistant steels and consumables for their welding. For many years he was a head of large research organization, TsNIIT-mash, Moscow.



SEPTEMBER 12, 1935 American submarine «USS Pike (SS-173)» was set afloat. After commencing the design of «P» type vessels in 1933 the American submarine fleet started development of a new line of submarines, which improving from series to series resulted firstly in military series «Gato» and ended in 1951 by vessels of «tang» type. In comparison with vessels of type «C» increments of tonnage made 140 t that, as a result, lead to 1310 t tonnage. They were 8 m longer that made 92 m of length. Speed increased to 19 knots. Welded bodies of «Pike» vessels allowed their submergence to large depth and provide reliable protection from depth bombs.



SEPTEMBER 13, 1972 The patent was applied for improvement of electron beam welding by D.A. Stor. Back in November 1957 the French Committee on Nuclear Energy made first public disclosure of information on process developed by D.A. Stor, namely, on electron beam welding method, which uses a focused flow of electrons as a power source in vacuum. Regardless the complexity of joint development using such a method, EBW became frequently used in production of different types of critical products and mechanisms. It promoted high quality of weld metal and series of other technological advantages.



SEPTEMBER 14, 1973 Large submarine hunting ship «Azov» was set afloat. It was included in Chernomorsky fleet of USSR naval forces. In construction of the ship welding was the main method for body elements joining. Construction of the ship was performed on the stock by block method, but taking into account the peculiarities of assembly of section on inclined stock, namely mating of blocks and sections was carried out at their lowing on the stock, and joining by performance of single block circumferential weld using automatic welding. This structure is an example of reasonable application of equipment in manufacture of composite structure.



SEPTEMBER 15, 2014 Huge welding installation was developed at NASA. Vertical assembly platform is a single 170 meter welding aggregate, which was called «Vertical Assembly Center» and located inside the NASA assembly center based in New Orleans. This huge welding installation is designed for welding of lift launch vehicle tank. This development allows successful welding of parts of perspective super heavy — lift launch vehicles that are planned to be used for the most different purposes among which Mars flights.



SEPTEMBER 16, 1937 A sculpture of 25 m height and around 75 t weight «Worker and Kolkhoz Woman» for Soviet Pavilion at the International Paris Exhibition was composed using electric welding at Pilot Plant TsNIITmash. Sheets of stainless steel were joined by spot welding. The sculpture was a symbol of Soviet age. The author is Vera Mukhina, conception and idea of architecture Boris Iofan.



SEPTEMBER 17, 1951 Monograph of N.N. Rykalin «Calculations of thermal processes in welding» was published. It considers the processes of heat distribution in metal heating by arc and gas flame, effect of nature of heat propagation on processes melting the electrodes and base metal as well as welding thermal cycle and structural transformations of metal.



SEPTEMBER 18, 1952 E.O. Paton Electric Welding Institute developed A-314 apparatus for electroslag welding. Electroslag welding of blast-furnace jacket at «Zaporozhstal» Plant and assembly of erection joints of E.O. Paton all-welded bridge in Kyiv was for the first time in the world practice performed using this apparatus.



SEPTEMBER 19, 1935 K.E. Tsiolkovsky (1857–1935) died in Kaluga. In 1935 scientific-technical group of Tsiolkovsky working at «Dirizhablestroy» combine near Moscow started construction of a prototype of the first all-metal airship with a shell from corrugated sheets of stainless steel of 0.1 mm thickness, which were joined with the help of electric welding. Soon the representative of K.E. Tsiolkovsky in «Dirizhablestroy» Ya.A. Rappoport pushed ahead an idea of buying electric welding machine for spot welding and roller contact welding of sheet metal. Works of Konstantin Tsiolkovsky attracted attention to welding technology for manufacture of flying vehicles.



SEPTEMBER 20, 1948 The first flight of Mi-1, the first Soviet multi-purpose commercial helicopter designed by M.L. Mil DB. The central part of fuselage of the helicopter is welded frame of steel tubes, to which a cabin framing is attached with fixed to it duralumin skin. In the front part of fuselage there is glass cabin. From the end of the central part of the fuselage there is all-metal tail boom with transmission beam and intermediate gearbox. In 1954 the inter-government agreement was signed on production in Poland of Mi-1 and spare parts to it. In total 1683 helicopters of various modifications were manufactured in Poland.



SEPTEMBER 21, 1919 Birthday of D.M. Kushnerev (1919–2002), a well-known scientist in the field of metallurgy of arc processes of welding, representative of the Paton school. His name is related with development of ceramic fluxes and organization of their commercial production. Application of such fluxes in many respects determines high quality of weld metal in automatic submerged-arc welding.



SEPTEMBER 22, 1791 Birthday of Michael Faraday (1791–1867) who is an English physics experimenter and chemist. Member of Royal Society of London (1824) and many other scientific organizations, including foreign Honorary Member of Petersburg Academy of Sciences (1830). In 1831 Faraday discovered an effect of electromagnetic induction, which gave grounds to electrical engineering fundamentals. Further on investigation of this phenomenon was studied by Russian physicist E.K. Lenz (1804–1865) and B.S. Jacobi (1801–1874).



SEPTEMBERS 23, 1969 For the first time in world practice the specialists of the E.O. Paton Electric Welding Institute carried out semi-automatic welding by composite weld of high-pressure steel pipeline at 10 m depth on the bottom of the Dniper River in Dnepropetrovsk region.



SEPTEMBER 24, 1975 Legendary AN-2 airplane transported 250 million passenger. The airplane has a series of qualities, which made it so popular, namely simplicity, reliability, possibility of operation on small flight strips. In order to simplify airplane repair under the field conditions a fuselage structure was made of steel tubes joined by welding and skin was linen. An-2 was manufactured in USSR and Poland and is still produced in PRC. In total 18 thou machines were constructed. It was recorded in the Guinness Book of World Records as a single airplane, which has been manufactured already for 60 years.



SEPTEMBER 25, 1990 Under the leadership of K.A. Yushchenko (prominent scientist, academician, representative of the Paton school) till September 1990 there was developed the scientific fundamentals of cryogenic materials science, created corresponding materials and processes of welding, which found application in manufacture of special equipment. Around 50 new grades of steels, welding wires and fluxes, developed under his leadership are used in cryogenic machine-building. They were realized in Buran, Tokamak-7, Tokamak-15 projects, space imitators and MHD-generators.



SEPTEMBER 26, 1938 Day of signature of Acceptance Certificate of Kirov cruiser, the Soviet light artillery cruiser of project 26. The cruiser played an important role during defense of Leningrad. Electric welding, which just started to be implemented in the shipbuilding, was used in ship construction in limited scopes. The main problem which appeared was small tonnage. It was assumed, if possible, to use welding and aluminum alloys and, thus, to the maximum lighten the structures and mechanisms. The initial value of standard tonnage in 6500 t was obviously underestimated. By initiative of V.P. Vologdin in construction of such type of ships up to 20 % of all metal used in vessel body construction was welded.



SEPTEMBER 27, 1908 The first specimen of Ford Model T was built at Pickett Plant. It was also known as «Tin Lizzie», the car was manufactured by Ford Motor Company from 1908 till 1927. It was first in the world car being manufactured by million series. Henry Ford in opinion of many people «put America on wheels», making a new passenger car comparatively available for middle class Americans. It was possible thanks to such innovations as application of conveyor instead of individual manual assembly as well as implementation of a series of new technologies for joining the parts and assemblies of car. In particular, resistance and autogenous welding were used in conveyor manufacture.



SEPTEMBER 28, 1931 Designing of three turret medium Soviet tank T-28 was started. It was developed by the engineers of Tank Tractor Design Bureau VAO under the general leadership of S.A. Ginsburg. Tank hull is of a box form, rivet-welded or welded in models after 1940. The hull was assembled of rolled butt welded armor plates of 13–30 mm thickness. Frames of engine, primary gear, fan and gearbox were welded to the bottom of hull along the engine compartment.



SEPTEMBER 29, 1940 Birthday of L.M. Lobanov, prominent scientist, academician, representative of the Paton school. His works dedicated to methods of optical modelling, holography, electron speckle-interferometry and stereography for evaluation of stressed state and quality control of welded joints in the structures of metallic, composite and polymer materials received wide recognition. Developed methodological approaches and devices have high accuracy and information content. His works allowed forming new scientific direction, namely deformation-free welding of structures.



SEPTEMBER 30, 1964 American engineer Gaspar Kazlauskas, a staff member of North American Aviation Company got a task to develop a welding apparatus for pipe welding. As a result he patented his own invention — orbital welding head. Application of this device is related with wide use of tubular structures in modern industry.

