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Address
E.O. Paton Electric Welding Institute,
International Association «Welding»
11 Kazimir Malevich Str. (former Bozhenko Str.),
03150, Kyiv, Ukraine
Tel.: (38044) 200 60 16, 200 82 77
Fax: (38044) 200 82 77, 200 81 45
E-mail: journal@paton.kiev.ua
www.patonpublishinghouse.com

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*Calendar of August**

AUGUST 1, 1927 Date of birth of V.F. Grabin (1927–2010), a scientist in the field of metal science and welding, a representative of the Paton school. He made a significant contribution to the development of fundamentals of metal science of metals and alloys, which allowed specifying a number of regulations as to the effect of phase composition on structure and properties of welded joints of metals of different classes and the tendency to crack formation during welding.

AUGUST 2, 1930 Date of birth of S.I. Kuchuk-Yatsenko, a prominent scientist in the field of pressure metal welding, academician, representative of the Paton school. Fundamental research works of the scientist formed the basis for the development of new methods of flash-butt welding using continuous, pulsed and pulsating flashing, patented in many countries of the world. On their basis, S.I. Kuchuk-Yatsenko with a team of specialists from the E.O. Paton Electric Welding Institute developed the technology of welding different products, created control systems and new equipment models, which have no analogues in the world practice.

AUGUST 3, 1934 The engine of tanker «Poughkeepsie Socony» of the American merchant marine was launched. This was one of the most important achievements in the US shipbuilding. The tanker was one of the first to exceed the cost of the shipbuilding program in 5 million USD and was the largest all-welded merchant ship of its time built in the United States and, probably, in the whole world.

AUGUST 4, 2009 British enthusiast and engineer Alan Roy Handley decided to return to the idea of creating metal airship. He called his project Varialift. Alan decided to create a hybrid system capable of combining the advantages of an aircraft, a helicopter and an airship. The first vehicle of the Varialift series, ARH-50, is positioned by A. Handley as an airship for transportation of cargoes weighing 50–55 tons. In 2011 it was successfully tested. The shell of the vehicle was welded from aluminum sheets, the carrier gas was helium, the length of vehicle was 150 m.

AUGUST 5, 1973 From the launching pad of the Baikonur-5 Cosmodrome, the «Mars-6» spacecraft was launched by the «Proton-K» rocket-carrier. In March 1974, the launching vehicle was separated from it. In the manufacture of spacecrafts among other technologies, different welding methods were used to produce permanent joints.

AUGUST 6, 1961 By the rocket-carrier R-7 the spacecraft «Vostok-2» was launched, piloted by the cosmonaut German Stepanovich Titov (1935–2000) on board. The rockets-carriers R-7 opened up the space era for humanity. With their help, among others, the first artificial satellite was launched into orbit, the first satellite with a living being on board was launched into Earth orbit, the first spaceship with a man was launched into Earth orbit. The main methods of welding the rocket structure of aluminum alloys were manual and mechanized welding in an inert gas (argon), as well as resistance spot welding.

AUGUST 7, 1842 Date of birth of N.N. Benardos (1842–1905), engineer, inventor of electric arc welding, author of more than 100 inventions. The invention of electric arc welding and cutting of metals brought him the world fame. The method of Benardos became known all over the world and, thus, it became possible to weld separate metal fragments quite easily. But it took a half of a century until welding became the main technology of joining metals. N.N. Benardos paid a particular attention to arc welding with a carbon electrode, which was called the «Benardos method».

AUGUST 8, 1932 Date of birth of Yu.S. Borisov, representative of the Paton School, a famous scientist in the field of materials science of coatings, including gas-thermal ones, containing amorphous and quasi-crystalline phases. Yu. S. Borisov is an Honoured Worker of Science and Technology of Ukraine, the author of more than 400 articles, monographs, author's certificates and patents.

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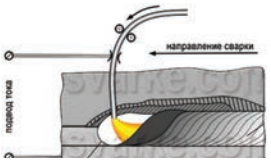
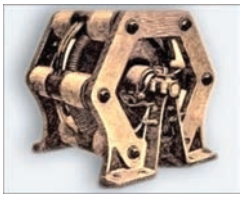
AUGUST 9, 1951 By August 1951, a group of scientists and specialists from the Electric Welding Institute (N.G. Ostapenko, V.K. Lebedev, S.I. Kuchuk-Yatsenko, V.A. Sakharnov and B.A. Galyan) for the first time developed the method of flash-butt welding and appropriate machines for flash-butt welding of rails, pipes and other products. In the future, due to the improvement in the control system, it was possible to create new models of machines, having no analogues in the world.

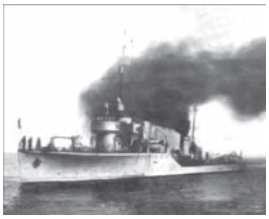


AUGUST 10, 1943 In August 1943, B.E. Paton and A.M. Makara (Institute of Electric Welding) during the investigation of the submerged arc welding process proved the presence of arc discharge. Later, other researchers determined the dimensions of a gas bubble, measured the voltages between the electrodes, the temperature of the arc column, and other process parameters.



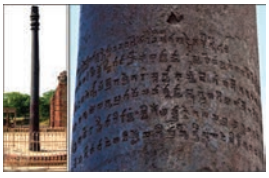
AUGUST 11, 1885 An information was published about the creation of dynamo-machine by E. Thomson. Elihu Thomson (1853–1937) designed a dynamo-machine with self-excitation (power of 18.3 kW, 1800 rpm, weight of 22.5 kg), which provided the welding transformer with alternating current. Namely its three-phase model became the basis for the new arc lighting system, which was developed by Thomson in collaboration with E.J. Houston.

AUGUST 12, 1908 Date of birth of A.E. Asnis (1908–1987), a famous scientist, a representative of the Paton school. He developed many materials for welding and surfacing, unique methods and procedures for investigations the joints and evaluation of their strength under the load conditions. A.E. Asnis was the developer of the scientific fundamentals for the development and selection of steels with a good weldability, which are scarcely-alloyed and insensitive to aging. He participated in the designing of a universal semi-automatic machine with a remote control for welding and cutting at large depths. He is the author of more than 300 scientific works.



AUGUST 13, 1927 The main defence ship of the «Uragan» type was designed, the first Soviet military surface ship in the USSR. Its designing was guided by V. A. Nikitin, a young engineer-shipbuilder. Nikitin was one of the first in the industry who took a risk to apply welding for hull structures to which many shipbuilders and naval sailors were suspicious in those years, preferring a time-tested riveting. «Uragan» entered the history of Soviet shipbuilding as a pioneer ship, from which the construction of the Soviet surface fleet began.

AUGUST 14, 1948 At «Plant No. 402» in Molotovsk, «Ognennyi», a Soviet destroyer ship of the project 30-bis, was laid. The creation of destroyers of this type required a significant increase in the volume of welding. There were not enough specialists, and then girls began to master the difficult profession. The creation of the ship was carried out with the implementing the position-assembly conveyor, large-sized assembly and wide application of electric welding. Since February 12, 1950, the «Ognennyi» was a part of the Northern Fleet.



AUGUST 15, 1947 Independence Day of India is celebrated since 1947. One of the sights of India is an iron (99.722 % F) column in Delhi, over 1500 years old. The researchers found that it was made of separate steel blocks weighing 29–30 kg, joined by means of a forge welding. Its high corrosion resistance is predetermined by an increased phosphorus content (0.114 % P) and a dry climate.

AUGUST 16, 1930 Date of birth of V.S. Gvozdetsky, a representative of the Paton School, a famous scientist in the field of the theory of cathode processes in a welding arc, based on the phenomenon of ion-electron emission of a cathode. These investigations became the basis for the development of new methods of microplasma welding of metals and alloys with a thickness of 0.1–1.0 mm. Due to his works, more than 15,000 apparatuses for different methods of microplasma welding were manufactured and implemented in industry.

AUGUST 17, 1987 The first flight of «Su-33», a Soviet carrier-based fighter of the fourth generation, took place. Many problems caused the need in welding titanium assemblies of large and small thicknesses. Specialized welding equipment was purchased, welding modes and methods for quality control of welds were tested. Among the mastered unique equipment the installation ELU-21 for electron beam welding in vacuum was applied.

AUGUST 18, 1942 The first tanks «Tiger» were manufactured, the German heavy tanks of the World War II period. The roof of the tank turret was joined to the hull sides by welding. The armour plates were abutted using the «dovetail» method and were joined by welding. Much attention was paid to the quality of welds, not only to provide the rigidity of the structure, but also to make it shell-proof. In foreign sources, British and American engineers, as well as Soviet welding scientists criticized both the quality of the filler material of the electrodes used to weld the hulls of Tiger tanks and also the technology of producing welds themselves.

AUGUST 19, 1932 The first flight of the high-speed aircraft AIR-7 took place, designed by the Yakovlev Design Bureau. On November 20, 1932 the pilot Julian Piontkovsky on an AIR-7 aircraft reached a record speed in the USSR of 325 km/h. In the manufacture of aircraft the welding was actively used to save weight. The fuselage is a truss structure, welded from steel pipes with a light frame, which imparts a rounded contour to the linen casing. To the fuselage a small centre wing section of the same welded structure was joined. The main racks of welded steel pipes were joined to the ends of the centre wing section.

AUGUST 20, 1927 The cruiser «Karlsruhe», a German light cruiser was launched, which took part in the World War II. The development of a project of new cruisers, taking into account the limitations of the Versailles Treaty, began in 1924. Three cruisers were built under the project (type «K»): «Konigsberg», «Karlsruhe» and «Cologne». The ship hull was assembled from longitudinal steel frames where welding was used; up to 85 percent of the hull was welded, not riveted as usual. The hull was divided into nineteen watertight compartments, had a double bottom, being 72 % of the length of the ship hull, and joined by welding. On April 9, 1940, the cruiser was sunk by a British submarine «Truant».

AUGUST 21, 1938 In 1938, Dr. Charles Cadwell significantly improved the design of the exothermic welding system of Hans Goldschmidt, who in 1898 patented his method of aluminothermic welding of rails, which was commercially significant. Since that time, its mass application began. The unique use of the process of exothermic welding was used during laying the railway tracks, which were previously joined with the help of cover plates, through holes in the rails.

AUGUST 22, 1972 The prototype of «T-4», a reconnaissance attack bomber-rocket carrier of the Sukhoy Design Bureau, was launched. In the manufacture of aircrafts new technologies were used, many of which had no analogues in the domestic and world aircraft industry. Aircraft glider was made using titanium alloys. The entire production cycle of the «T-4» was automated to maximum (95 % of welding operations). According to the estimates of NIAT, the full transfer of monolithic parts to assembled-welded structures, envisaged in serial production, had to provide a reduction in material consumption by 70 %, labour intensity by 45 % and reduction in production cycles by two to three times.

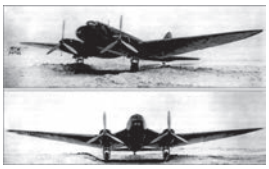
AUGUST 23, 1382 The defence of Moscow from the invasion of Khan Tokhtamysh began. In the annals of 1382 the successful use of welded artillery shells during the defence was mentioned for the first time. The iron sheet, forged from the bar, was rolled on an iron mandrel into a pipe and welded by a longitudinal weld with an overlap. Then one or two pipes of larger diameter were welded over this pipe, ensuring that the longitudinal welds were located in different places. The pipe billets forged in such a way were short. Therefore, to produce a sufficiently long barrel of guns, several such billets were joined between each other by means of a forge welding.

AUGUST 24, 1939 Date of birth of G.M. Grigorenko, academician, representative of the Paton school. He was directly involved in the development of new methods, equipment and technology of plasma-arc, arc-slag remelting, electroslag technology, induction melting with combined heat sources and in water-cooled sectional moulds. He developed technologies for melting out of high-nitrogen steels, technology for steel alloying with nitrogen from a gas phase. For the first time he analyzed and classified gas exchange processes in electrometallurgy during melting and remelting.

AUGUST 25, 1981 One of the patents of N.N. Rykalin (1903–1985), academician, scientist in the field of welding and metallurgy, was published . During the years of war, N.N. Rykalin carried out investigations on melting of electrodes and penetration of base metal. He is the author of numerous works on thermophysical fundamentals of metal treatment, metal welding, plasma processes in metallurgy. The theory of thermal processes during welding, created by him, served as the basis for the development of technological processes, in which highly-concentrated sources of power like thermal plasma, electron beam, ion fluxes, laser radiation have an effect on a substance.

AUGUST 26, 1934 The submarine «Shch-121» «Zubatka» was launched. It was the first type of medium submarines, built in the USSR. The pipes of the torpedo units were joined with the bulkheads of differential tanks and made a part of the construction of a pressure hull. Six welded bulkheads divided the hull into seven compartments. The beams were fastened to the lining by welding. Successful experiments with welding allowed providing longer service life, as well as reducing the weight of the submarine.

AUGUST 27, 1956 Turner-innovator A.I. Chudikov filed an application and received an authour's certificate No. 106270 for on the «Method of butt welding». Chudikov understood that for the implementation of friction welding it is necessary to keep three basic conditions: to operate at high revolutions of the part, not less than 750–1000 rpm; instantly stop the workpiece treated, so that the metal which transferred into the plastic state does not scroll over the joining area; apply axial force.



AUGUST 28, 1937 Pilot N.P. Shebanov set a world speed record on the aircraft «Steel-7». For its time the aircraft showed excellent characteristics in the range and speed of flight: the average speed on the route Moscow-Sverdlovsk-Sevastopol-Moscow with a length of 5068 km was 405 km/h. Steel pipes and shaped profiles, joined by welding, formed the load-carrying frame of wing and tail units. The aircraft structure with multiple elements turned out to be quite strong.

AUGUST 29, 1932 The main submarine of series VI «Malyutka» was laid. Designer-engineer A.N. Asafov (1886–1933) proposed replacing the riveting of a pressure submarine hull by the electric welding, including the reduction in roughness of the hull and increase in speed.

AUGUST 30, 1940 The monitor of the type «Hassan» (project 1190), the first vessel in a series of Soviet monitors, which served as a part of the Amur military flotilla, was launched. The hull of the ship was riveted, the outer lining and the deck were welded. The height of the side in the middle of the hull was 4 m, the largest length was 88.03 m, the largest width was 11.09 m, and the maximum draft was 2.94 m.

AUGUST 31, 1900 In the early 1900s, almost in several countries, a gas torch (more precisely a cutter) for the purposes of cutting appeared. In 1904, Jottran (Belgium) added a tube with a nozzle to a welding torch for supplying oxygen. In the same year E. Wiss (USA) patented a torch-cutter with concentric nozzles, proposed by E. Smith.