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JPRS: 16,948

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3 January 1963

AD No. 405228

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CONFERENCES ON DIFFUSION WELDING

AND ELECTROSLAG REMELTING

- USSR -

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OFFICE OF TECHNICAL SERVICES
JOINT PUBLICATIONS RESEARCH SERVICE
Building T-30
Ohio Dr. and Independence Ave., S.W.
Washington 25, D. C.

Price: \$1.10

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DIFFUSION WELDING
AND
ELECTROSLAG REMELTING

-USSR-

Following are translations of articles
in the Russian-language periodical
Avtomaticheskaya Svarka (Automatic
Welding), No 9, 1962, Kiev. Bibliographic
information is given with the individual
article.

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**SECOND SCIENTIFIC-TECHNICAL CONFERENCE
ON VACUUM DIFFUSION WELDING
OF METALS, ALLOYS AND NON-METALLIC MATERIALS**

- USSR -

[Following is a translation of an article by L. S. Koval'skiy, in the Russian-language periodical Avtomaticheskaya Svarka (Automatic Welding), Kiev, No 9, September 1962, pages 93-94.]

The second scientific-technical conference on the topic "Vacuum Diffusion Welding of Metals, Alloys and Non-Metallic Materials" was held on 24-26 May, in Moscow.

The conference, attended by approximately 300 representatives of various enterprises of the Soviet Union, was opened by M. P. Ivanov, deputy chairman of the National Economy Council of the Moscow Oblast'.

A communication on the use of vacuum diffusion welding and its prospective development, was presented by Candidate of Technical Sciences, Professor N. F. Kazakov (NTIMMP [Moscow Technological Institute of the Meat and Dairy Industry]). The use of diffusion welding, for joining any crystalline materials, makes it possible to develop new designs of the units and parts of machines and instruments, and to improve their quality.

The results of studies on the use of vacuum diffusion welding on pipeline mains, were reported by Doctor of Technical Sciences, V. D. Taran (Moscow Institute of Petrochemical and Gas Industry, Imeni I. M. Gubkin).

Communications on the putting into practice of diffusion welding at enterprises of the Gor'kiy Economic District, were presented by V. Z. Vysotskiy, I. P. Iudin, and S. Ye. Ushakova. To promote a widespread putting into practice of this welding method, special experiment

installations have been established at the Planning-Technological and Scientific-Research Institute (PTNII) of the Gor'kiy National Economy Council. A high-output semi-automatic unit of rotary type has been built for vacuum diffusion welding of cutting blades for smooth-planes and fore-planes.

Engineer V. F. Kvasnitskiy described the work conducted by the department of welding of the Nikolayev Ship Building Institute, on ascertaining the feasibility of applying vacuum diffusion welding to heat-resistant materials. The promising nature of the use of this method in series production of gas-turbine parts has been demonstrated.

The engineers V. N. Moiseyev and G. G. Smirnov, reported on experience with welding of dry-friction brake drums of FMK-8 and FMK-11 ceramet, to steel.

Candidate of Technical Sciences, I. I. Metelkin, presented a report on vacuum welding of non-metallized mineral ceramics to metals. The use of diffusion welding is particularly promising in the manufacture of electric vacuum-devices. An industrial unit has been built, which was successfully tested in trial runs.

The engineers A. F. Khudyshev, I. V. Afanasyev and E. S. Karakozov, described the use of diffusion welding in lieu of soldering, argon arc welding, and spot welding, in the manufacture of electric vacuum devices. This substitution improved the accuracy of assembly, strength and neatness of the joints, and raised productivity of labor. At the enterprise which uses vacuum diffusion welding the annual savings amounted to 23 thousand rubles.

Candidate of Technical Sciences K. G. Alekseyev reported that in a newly developed, high-output loom of an original design, one of the basic units -- the eccentric of the warp dividing mechanism -- is produced by vacuum diffusion welding.

The vacuum welding of high speed steel R18 was described by engineers N. A. Mashkova and I. G. Gorin.

Interest was aroused by the communication of Candidate of Technical Sciences N. F. Kazakov, on the physical foundations of vacuum diffusion welding of metals, alloys and non-metallic materials.

A report on investigation of the adhesive affinity of the cyanidation layer produced in the vacuum diffusion welding assembly SDVU-6, was presented by Candidate of Technical Sciences E. I. Vrzhashch.

Engineer A. V. Krivoshey reported on vacuum diffusion welding of high-melting metals.

The specific features of the diffusion junction of

materials, which form intermetallic compounds on their interaction, were reported by Engineer K. Ye. Charukhina.

Engineer V. S. Il'in described the joining, over a spherical surface, of high-hardenability 3KhNA steel with cast bronze.

Animated discussions followed the communications of I. D. Alekseyev, V. Z. Vysotskiy, I. V. Kupriyanov, P. I. Shestkov and V. G. Elbakidze, on designs of units for vacuum diffusion welding.

A report on checking of the welded joints produced by vacuum diffusion welding, was presented by Engineer A. V. Krivoshey.

The economic efficiency of the use of vacuum diffusion welding was described, citing specific examples, by Engineer N. N. Sokolova.

The Conference adopted a resolution on further development of the method of vacuum diffusion welding, and reviewed the plan of scientific research work to be conducted in 1963.

ALL-UNION CONFERENCE ON ELECTROSLAG REMELTING

- USSR -

[Following is a translation of an article by L. M. Stupak, in the Russian-language periodical Avtomaticheskaya Svarka (Automatic Welding), Kiev, No 9, September 1962, pages 92-93.]

The All-Union Conference on Electroslag Remelting was held on 14-16 June at the Institute of Electric Welding, imeni Ye. O. Paton, of the Academy of Sciences Ukrainian SSR.

The conference was called by the Institute of Electric Welding, imeni Ye. O. Paton, which, pursuant to the resolution of the Goskomitet SM SSSR [State Committee at the Council of Ministers USSR] on coordination of scientific-research, is the leading institute in the field of electroslag remelting.

In the conference took part more than 200 representatives of 120 organizations, which included 70 metallurgical and machine-building plants, 24 scientific-research institutes, 6 institutes of planning and design, and 20 national economy councils and state committees of the Council of Ministers USSR.

The Conference was opened by the president of the Academy of Sciences Ukrainian SSR, director of the Institute of Electric Welding, Academician B. Ye. Paton.

Academician B. Ye. Paton noted that theoretical and experimental investigations of electroslag remelting are conducted at the present time not only at the Institute of Electric Welding, but also at a number of other scientific-research institutions, as well as at plant laboratories. He described the present state of electroslag remelting and the prospects of its development in metallurgy and machine building.

At the conference were presented and discussed 38 communications from metallurgical and machine building plants which have put into practice the electroslag

remelting, and from machine building plants which are consumers of electroslag metal.

The Conference adopted unanimously a resolution which noted that during the period from 1960 to 1962 further, substantial advances have been made in the adoption of the electroslag remelting method at metallurgical and machine building plants, in the production of electroslag metal on a larger scale, widening of the list of steels and alloys subjected to the remelting, in the study of the process of electroslag remelting, in the quality of remolten metal, and improvement of equipment and technology of the method.

During the above-stated period the electroslag remelting has been put into practice not only at the "Dnevroststal" plant, but also at a number of other plants throughout the country. At the Novo-Kramatorsk plant of machine building, the largest electroslag furnace has been built, designed for the production of ingots weighing 10-12 tons. The building of a forty-ton electroslag furnace is being planned.

In 1962 the production of electroslag metal is increasing to more than fourfold of that in 1960.

At the present time some plans have been completed, and other are in preparation, for the installation of new departments equipped with electroslag furnaces, which are to be built at a number of metallurgical plants. The changeover from operation of single electroslag furnaces to the building of special departments of electroslag remelting will make it possible sharply to increase the scale of production of electroslag metal and to lower its cost.

The list of the varieties of steels and alloys produced by remelting and supplied to the consumers has been considerably expanded.

The electroslag remelting has been developed to the production stage for more than 75 varieties of ball bearing and construction steel, stainless chromium-nickel pipe steel, tool and heat resistant steel, nickel- and nickel-cobalt base alloys.

The possibility has been ascertained of improving the quality of high-coercivity magnetic alloys, non-ferrous metals and alloys (Monel, nickel, alloys of aluminum and titanium), and also of utilizing chips of heat resistant alloys, by means of electroslag remelting.

It was noted in particular, that the investigations have revealed the possibility of sharply increasing the resistance to cold of low-alloy construction steels, which looms large in the utilization of electroslag metal for the production of containers and structures

employed at low temperatures, and the saving of alloy metals in short supply, particularly of nickel.

Of great practical significance is the ascertained fact of the drastic improvement of working plasticity and quality of high-boron austenite pipe steels as a result of their remelting.

The conducted investigations have shown that the bearings produced from electroslag steel are much more dependable and durable than bearings made of conventionally produced steel.

A resolution has been adopted to publish the proceedings of the conference and to produce a scientific popularization motion picture film on electroslag remelting. The Conference noted the necessity of training of metallurgical engineers who specialize in electroslag remelting.

The Conference has worked out a coordinated plan of scientific research, planning and design, and experimental work during 1963, on electroslag remelting.

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