THE ALL-UNION CONFERENCE OF STEEL Melters

M. A. Pertsev

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From August 23 to August 26 the All-Union Conference of Steel Melters was held in Stalino, more than 600 specialists taking part—representatives of steel plants and research institutes in the Soviet Union, leading scientists, production innovators, Heroes of Socialist Labor and workers of the Central Institutions.

About 100 reports were discussed, dealing with various problems in steel melting production. Of considerable interest was the discussion of the general state and further possibilities for development in Soviet steel melting production. The conference approved the trends decided in the last few years for the development of steel production, the main points being:

1. Increasing the fraction of large furnaces by building new furnaces, increasing the capacity of existing furnaces and scrapping low capacity obsolete units.

2. Further introduction of rapid methods of steel melting, using oxygen and air, using new types of refractories, improving the preparation of the charge—metal scrap, iron and fluxes.

3. Increasing the production of steel in oxygen converters and electric furnaces.

4. Introducing vacuum melting processes, the use in electric furnaces of molten iron instead of solid iron, converting phosphorus irons in converters, the development and operation of new, more efficient designs of furnaces and new methods for operating the main sections of steel melting departments.

5. Further automation in processes, using computers to control steel melting units.

6. Equipping the steel melting departments with more powerful and improved equipment and improving the mechanisms of those sections still using manual labor.

The conference was divided into three sections—open-hearth, electric melting and converter.

The open-hearth section concentrated on the intensification of smelting as the main source of increasing steel melting at existing furnaces.

The use of oxygen for the intensification of melting can increase the output of furnaces at the best plants by 20% and more. The steel workers of the "Zaporozhstal" Plant and the Nizhne-Tagil Combine, operating with oxygen, have increased the average yield of steel from 1 m² of hearth area to 10 tons. However, even at these leading plants there are still large unused reserves of production which can be utilized by improving the methods for using oxygen. Feeding oxygen directly into the bath of the open-hearth furnaces during the melting and finishing periods, which is now the practice at the Makeev Plant, can double the effectiveness of oxygen compared with feeding it into the spray. This method of operation should find extensive application.

The conference noted the necessity for the extensive building of oxygen stations at steel plants, considering it the most important condition for increasing steel melting within the next few years.

The delegates exchanged experience on the firing of open-hearth furnaces with cold natural gas and coke oven gas. Of special interest is work with cold gas in the new large-capacity furnaces of the Magnitogorsk Combine and in one of the furnaces of the "Azovstal" Plant. Improved designs of these units, in particular the
increased hearth area can give a higher output than firing with a mixture of coke oven and blast furnace gases. All possibilities must be used in redesigning existing furnaces and converting them to operation with cold gas.

It was pointed out that the output of open-hearth furnaces should be increased by increasing the weight of a heat (converting furnaces to double charge) with the simultaneous conversion to operation with all-welded ladles and more powerful ladle cranes.

Recommendations were accepted for the main parameters of furnaces with 600-700 and 800-900-ton charges.

The conference decided that decisive measures should be taken to improve the preparation of raw materials for steel smelting production, the low level of development of which is now holding up the intensification of the melting process. In the first place powerful presses must be produced to compress the scrap; also enrichment and lumping of the ore with simultaneous fluxing (especially at the Ukrainian plants); the quality of the iron must be improved, in particular its sulfur content should be reduced and there should be a sharp reduction in the fluctuations in silicon content. At plants where the quality of iron cannot be improved in the blast furnace due to the quality of the blast furnace raw material, the iron must be treated outside the blast furnace.

The delegates stressed the fact that the quality of open-hearth refractories must be improved since existing refractories do not fulfill the new requirements for operation with oxygen intensification. In the first place the production of dense highly calcined refractories for the working spaces of open-hearth furnaces should be expanded.

The conference discussed problems in the automation of open-hearth operation. The system used at the Nizhne-Tagil furnaces was approved. The hope was expressed that in the near future the experience of various plants on the automation of open-hearth furnaces would be generalized so that the best systems could be selected.

There were discussions on increasing the yield of useful steel by reducing the amount cut from the tops of ingots; this can be done by improving the heating of the ingot tops and by the production of semikilled steels. The delegates emphasized the necessity of speeding up the introduction of continuous casting of steel.

The reports of workers from the steel plants were interesting. The head of the Central Factory Laboratory of the Magnitogorsk Combine, N. M. Selivanov, reported on experience in the operation of a new design of high-capacity open-hearth furnace and on experience in melting and using low-sulfur conversion iron with a constant content of impurities.

A foreman from the Kuznets Combine, Gurskikh, reported on the operation of open-hearth furnaces at the Combine and on the remote control of steel pouring. Shvetsov, a steel worker of the Taganrog Steel Plant and Hero of Socialist Labor, dealt with experience in operating open-hearth furnaces with natural gas.

In the electric steel melting section there was a discussion on problems of selecting the most efficient methods for vacuum melting of steel outside the furnace. Those taking an active part in the discussion were A. M. Samarin, Corresponding Member of the Academy of Sciences, USSR, Dr. M. V. Pridantsev, Director of the Institute of High-Quality Metallurgy of the Central Research Institute for Ferrous Metallurgy, Dr. G. N. Oiks and Dr. N. M. Chuiko.

Much time was devoted to a discussion of the operation and design faults of new 80-ton electric furnaces. B. V. Barvinskii gave an interesting lecture on this problem.

The section noted the large program of work on the development of complex devices for the mechanization of operations in electric steel melting production and the automatic control of the melting and pouring of metal.

Of the new advanced processes special mention was made of the treatment of metal with synthetic molten slags in the ladle, developed by the Central Research Institute for Ferrous Metallurgy together with the Zlatoustovsk Steel Plant, and also the melting of special high-duty steels and alloys in induction and arc vacuum-electric furnaces and by the method of electro-slag remelting, developed by the Paton Kiev Institute of Electrowelding together with the "Dneproproststal" Plant.

The section recommended that steel concerns should extensively adopt the treatment of metal by synthetic slags in steel melting production. Recommendations were also made for the use of various high-quality refractories for lining electric furnaces.