Daido Steel Co., Ltd.

Engineering Business Briefing

Q&A Session (Summary)

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Q. The conversion of blast furnaces to electric furnaces is now being considered by blast furnace steel manufacturers, worldwide. However, I think that there are various specific issues that need to be addressed, in order to introduce large electric arc furnaces. These include the synchronization of upstream and downstream processes, expansion of the use of reduced iron, slag treatment methods, the selection of refractory materials, etc. What are your thoughts on this?

A. We think there are three main technical hurdles on the path to achieving widespread use of large electric arc furnaces. First, it is necessary to be able to maintain a large amount of electricity efficiently, in order to obtain a level of productivity from electric arc furnaces equivalent to that yielded by blast furnaces. Second, there is a concern that “flicker” (*) might occur, when large amounts of electricity are drawn by an electric arc furnace. Thus, it will be necessary to devise ways to keep the flicker value below a certain level. The third point is the need to be able to obtain efficient melting from the furnace in conditions that require it to be used to deal with the diversification of raw materials. The first and second technical hurdles concern power supplies. Each maker of power supply equipment is carrying out R&D activities to resolve these problems and we think they will be solved over time. We intend to propose optimal solutions regarding the third point, the methods required to melt raw materials and their effects on the quality of molten steel, by utilizing our long-standing knowledge of using electric arc furnaces for special steel production. In addition, since each customer's situation is different in terms of technical hurdles, such as coordination with production equipment in the upstream and downstream processes and the service life of the refractory materials, we will respond by making proposals based on designs tailor-made for each customer.

(*) Flicker is a phenomenon in which the voltage of power lines fluctuates, causing lights in homes, etc., to brighten and dim repeatedly over short periods of time.

Q. Your competitors also offer energy-saving electric arc furnaces. What are the strengths of Daido’s furnaces, as compared to the competition?

A. We believe that one of our major strengths is that we are both a manufacturer and user of electric arc furnaces.

There are various types being sold, but they can be broadly classified into two types according to the mode of charging of the material. There is the batch type, in which the raw materials are all fed into the furnace together and all melted in one batch, and the continuous type, in which raw materials are fed continuously into the furnace, where they are melted as an ongoing process. Daido's are batch electric arc furnaces. We believe that in today's business climate, with the ongoing and expected further diversification of raw materials, this type is showing its superiority to the continuous type. This is one reason that we have been developing and marketing electric arc furnaces with an emphasis on the batch type. Our high-temperature scrap preheater facilitates batch melting. Using the preheater, raw scrap material is fed directly under the electrode, and arcs are sent directly into the load to be melted. We are the only electric arc furnace manufacturer in the world that employ high-temperature preheating technology to achieve batch melting, as an integral part of the furnace's function. While the continuous furnace, in which raw scrap material is fed continuously during the melting process, can easily be made very compact in terms of its installed size, this also means that the passage through which the scrap is passed is relatively small, placing restrictions on the size of scrap materials that can be fed. We believe that this restriction is one disadvantage of continuous electric arc furnaces. Our batch product does not have any raw materials' size limitation and is capable of melting raw materials more efficiently in batches. This a big advantage over the continuous electric arc furnaces supplied by our competitors.

Q. You are targeting sales of 30 billion yen and an ROS of 10% by 2030. Could you tell us about your specific measures to increase sales and improve ROS?

A. We are aiming for 30 billion yen in sales, based on the expansion of carbon neutrality-related products that contribute to energy conservation, such as electric arc furnaces, environmental products such as sludge-carbonizing furnaces, and circular economy products that contribute to achieving the realization of a recycling-oriented society through equipment maintenance. Maintenance service is a relatively profitable business, and we intend to energetically propose retrofitting (*), and secure profits appropriate to our scale of business.
(*) Retrofitting refers to modifying existing facilities in order to incorporate the latest technology without having to completely replace the existing set-up.

Q. Would you tell us about the percentage of overseas sales you made in the previous financial term?

A. Normally, our overseas sales are about 30% of our total, but in the previous fiscal year overseas sales were as low as 15 %, mainly due to travel restrictions caused by the impact of the new coronavirus infection.

Q. What are the advantages of having the company active in both the specialty steel business and the engineering business, which allows this in-house production of equipment?

A. Well, for example, the first unit of our Electric Arc Furnace with shell Rotation Drive has been installed at our Chita Plant. The Electric Arc Furnace with shell Rotation Drive was developed through the application of a truly unique idea born during an exchange of opinions between an engineer operating our furnace and another one developing equipment: "We might improve the melting efficiency of raw materials if we turn the furnace around." If we had been in the position of having to purchase equipment from some other company, it would have been difficult to try to obtain and install what turned out to become the world's first piece of equipment based on this unique conception in our own main production facility. Fortunately, we had one department that actually operates equipment and another one that designs equipment, both within one company, so we were able to manufacture this new type of

equipment and then install and operate it successfully, all within a single business entity.

Q. I understand that the high-temperature scrap preheater features the ability to melt scrap iron without any restrictions on its size. Please tell us what problems you might encounter when attempting to increase sales of the equipment on overseas markets?

A. There is a vertical preheating shaft on top of every industrial electric arc furnace, and in our case, the shaft is almost as wide as the electric arc furnace itself. Our electric arc furnace is equipped with a preheating shaft that has the same feed capacity as the furnace. The preheating shaft in our design is moved to the center of the furnace and the material is fed directly into the furnace. Specifically, the material to be melted is fed directly under the electrodes, as is the case with a conventional batch melting process. However, although our scrap preheater performs great, it is big. We need to reduce costs in terms of price competitiveness when compared with inexpensive products of the same kind, supplied by overseas manufacturers.

Q. Which do you think will become the mainstream type of electric arc furnace, the DC or the AC ones? Also, as large electric arc furnaces become popular, will the processes and refractory materials change?

A. We can supply both AC and DC furnaces to meet our customers' requirements. If flicker turns out to be a limitation of the spread of large electric arc furnaces, we believe DC furnaces will be found to be superior in terms of flicker reduction. However, if some form of AC furnace power supply equipment is developed that meets flicker-reduction criteria, the advantage of DC furnaces will be lost, and both AC and DC furnaces will become popular. The choice of refractory materials will depend on actual operating conditions, and therefore, the choice will be made on the basis of durability, without regard to size.

Q. How will you allocate management and human resources to handle the growth of your engineering business?

A. We are reforming our product portfolio as a whole, and we intend to expand the resources needed for the engineering business by reallocating management resources without increasing assets. In addition, since the Machinery Division operates mainly on the basis of being fabless, we intend to improve our manufacturing capacity by expanding our business partners.

Q. Regarding the roadmap for the development of new heat-treatment furnaces, please tell us about any issues to be addressed in the realm of hydrogen combustion technology and progress in the utilizing of methanation. Do you have any plans to work with other companies?

A. We announced in December of last year that we had established the basic hydrogen combustion technology, and we are currently in the process of developing methods for installing it in heat treatment furnaces. We are aiming to launch hydrogen burners in 2026. Although many companies are engaged in the development of a new methanation technology, there are few development projects for use in heat treatment equipment, and we plan to select the appropriate techniques, ones that are compatible with our heat treatment equipment.

The figures in our plans contained in this document are based on certain assumptions that cannot be fully evaluated at the present time.

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