

Iran becomes self-sufficient in CK45 steel production



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Saba Steel Complex, a subsidiary of Mobarakeh Steel Company (MSC) inaugurated a production line of CK45 steel that will make Iran needless of importing the product. CK45 steel is classified as medium carbon steel, which is one of the most widely used non-alloy carbon steels. It has good tensile properties and machinability. So, the product is widely used in the field of machinery manufacturing. In the past two years, one of the main strategies of MSC has been the production of new products with greater added value, said Mohammad-Yaser Tayyebnia, the CEO of the company, ILNA reported. "Fortunately, out of the 14 new



of the new grade could be operational with the least damage, he added.

Mehdi Gholami, the casting production technician of the complex, said that the production of CK45 is being done for the first time in Saba Steel Complex with control on cooling parameters, speed, and thickness reduction.

Yadollah Maleki, a production technician at Saba Steel Complex, said to produce CK45, they needed to study and design all the production parameters and replace them in the LEVEL 2 system.

Also, due to the lack of testing and use of mold powder in the new grade, production for the first time was associated with risk. With the participation of domestic firms, Maleki said they succeeded in producing CK45 steel in the complex.



products produced by the MSC last year, Saba Steel Complex produced eight. This achievement shows the expertise and capability of our personnel in Saba Steel Complex."

He pointed to the mass production of stainless steels as one of the most important plans of the company in the upcoming six months. Mahmoud Mohammadi Fesharaki, the manager of Saba Steel Complex, said the company has succeeded in producing three new products this year in order to develop its product portfolio.

The new hot-rolled product of CK45 steel, which has many applications in the agricultural industry as well as making industrial tools, was manufactured by Saba Steel Complex after months of effort and relying on technology and skill, he noted. He stressed that the quantitatively, qualitatively, and economically advantageous manufacturing of products is targeted by Saba Steel Complex in compliance with environmental considerations.

Arash Hajipour, head of Planning and Metallurgy at Saba Steel Complex, said the strategy of the complex has been to produce steel grades that are either not made in the country or seriously challenging to produce.

"This strategy was devised considering the technology and skills possessed by the complex's personnel as well as their focus on CSP as one of the latest steelmaking technologies in the world," he added.

Vast product portfolio

For the current [Iranian] year, Saba Steel Complex's goal for developing its product portfolio is to produce the grades that are made by top foreign factories, including heat-treated grades, spring steels, wear-resistant steels, and martensitic stainless steels. So far, three new grades have been produced by the company, and nine more



grades will be produced by the end of the year (March 19, 2024). The produced CK45 with thicknesses of less than 2.5 mm and width of 1,500 mm is done for the first time by hot-rolling, he noted, adding that all the products are among the most widely used grades of medium-carbon steels. Hamed Safari, an expert in metallurgy and production methods of the complex, said the high strength and hardness of the new product have made these steels widely used in the manufacture of wheels and gears. In the metallurgical unit, the design of the new product has been proven to be in accordance with the DIN17200 standard after evaluating the mechanical properties of the product.

Ahmad Tarazuyeh-Zar, the production planning expert of Saba Steel Complex, said, "After making the necessary coordination regarding the orders by MSC, the production of CK45 was planned for October, and grades with the thicknesses of 6 mm, 5 mm, and 4 mm were produced according to the orders placed by clients." Moreover, the ability of the complex's rolling equipment to produce steels with lower thicknesses was investigated. After receiving



the approval of the head of the rolling unit and the experts of the rolling technical office, the production of CK45 in thicknesses of 3 mm, 2.5 mm, 2 mm, and 1.8 mm was also carried out, he noted. Rouhollah Jamali, a steelmaking expert at Saba Steel Complex, said the company's diverse portfolio of products fully satisfies the country's need for such grades and makes the production complex more dynamic. CK45 grade has more carbon content than other grades made by Saba Steel Complex. CK45 can save the consumption of electricity, refractories, and aluminum in the



case of mass production, as well as decrease the unloading time of the product.

Online process monitoring

Also, Ebrahim Shokraneh, the foreman of the steelmaking unit at Saba Steel Complex, said that the production of CK45 requires online monitoring of furnace conditions. During the operation of the arc furnace, the percentages of molten carbon and phosphorus were controlled by repeated sampling. During the discharge, some other materials were added so that the molten poured to the ladle furnace

would have suitable conditions, Shokraneh noted, adding: "We tried to ensure that all the desired molten are completely suitable and in compliance with the approved analysis."

Davoud Mirzaei, the head of steel smelting at Saba Steel Complex, said the mass production of CK45 can result in a significant reduction in cost and energy due to the possibility of using a lot of carbon during the process and reducing the consumption of deoxygenating agent in the discharge time.

Majid Fat'hi, the material handling foreman of Saba Steel Complex, said in order to produce CK45 steel, all the necessary materials and ferroalloys including carbon wire were provided, and the preparation and calibration of the material transfer equipment were done. The materials were also sent with the required quality and high accuracy in terms of tonnage. Jafar Abbasi, the foreman of Casting Production and Emergency Repairs at Saba Steel Complex, said for the production of the CK45, the content of the carbon in the steel had been increased to about 0.4%. In the production of this grade, the parameters designed for the casting machine were checked and monitored so that the production

This product is used in petrochemical, oil, construction, and automobile industries.

Hamid Hatami, the refractory foreman of Saba Steel Complex, said carefully moving the tundish during the installation of special shapes and using appropriate refractories were among the steps taken for CK45 production.

Iranian steelmakers churned out 19.7 million tons of crude steel in the first eight months of 2023, according to recent statistics released by the World Steel Association, indicating that the country stands in tenth place among steel-producing countries.

Steel mills of the country kept the rising trend for the eight-month period despite a major drop in production during the summer due to problems in electricity supply.

The country's steel ingot production for August 2023 registered a 24.1 percent shrinkage compared to the figure for August 2022.

World crude steel production for the 63 countries reporting to the association was 152.6 million tons in August 2023, a 2.2 percent increase compared to August 2022. Iran's annual steel production capacity is expected to hit a target of 55 million tons by 2025.

The country's steel output capacity had increased by more than six times in 20 years to reach the current figure of 45 million tons per year.

Iran also increased its exports of steel sheets and long steel products by 15% year on year in March-August while the overseas shipments of sponge iron rose by more than 232% over the same period to reach 0.708 million tons, according to official statistics.

The increased exports of steel from Iran come despite the fact that exporters and their foreign customers cannot access normal banking services because of US sanctions imposed against the country.