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# Outlook of Iron Ore Supply

Tetsuya SHIODA\*

# Abstract

Since iron ore quality has deteriorated and the price has become volatile, it's becoming more and more important to develop and expand the technology to cope with these issues quickly and flexibly.

## 1. Introduction

The world crude steel production increased 2.1 times over the 20-year period from 1997 to 2017, reaching 1690 million tons (Mt, all the units herein being metric); China is responsible for 81% of the increase. During the same period, the world iron ore consumption grew 2.5 times to reach 2100 Mt, and in response, the world to-tal production of iron ore increased from 850 Mt to 2160 Mt. As much as 84% of the increment went to the seaborne market, which invited 3.3 times expansion of the volume of iron ore in the seaborne market during the period, with China's import accounting for 92% of the increase. Consequently, China's share in the iron ore seaborne market rapidly grew from 12 to 68%, making the presence of the country in the international market overwhelming (see Fig. 1).

## 2. Change in Iron Ore Quality

The iron ore production of the two major supplier countries, Australia and Brazil, increased 3.8 times from 350 Mt to 1320 Mt over the same 20-year period. To make this happen, mining companies of these countries developed new deposits, expanded their excavation volume by capacity increase, and enhanced their land transport and port loading capacities by heavily investing in infrastructures. In addition, they improved the efficiency of ore handling by consolidating ore brands to blend and standardized ore qualities so eventually they were able to blend low grade ores that used to be held in-house. As a result, the average Fe content of iron ore has decreased by approximately 2.0% over the last ten years.

The decrease of the Fe content is more conspicuous with highgrade ore brands, and consequently, flexibility for steel mills to select supply sources has been reduced. Accordingly, steel mills are in need of increasing the mixing ratio of beneficiated ultra-fine ore for sinter feed in order to maintain the quality of sintered ore (see Fig. 2).

## 3. Change in Iron Ore Market Trend

The iron ore price, which was determined every year through negotiations between purchasers and suppliers (the method being



Fig. 1 Comparison of supply-demand balance between 1997 and 2017 (based on WSA yearbook)

known as "the benchmark pricing"), has come to be set based on the price index publicized daily ("the index pricing") since April, 2010. As a result, the iron ore price has become sensitive to the supply and demand balance in the seaborne market and more volatile within a short-term period. Recently, the price has been fluctuating within a

<sup>\*</sup> General Manager, Mineral Resources Research, Raw Materials Div.-II 2-6-1 Marunouchi, Chiyoda-ku, Tokyo 100-8071

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Fig. 2 Change in total Fe contents of Australian and non-Australian ore brands (averages of Nippon Steel's purchase)



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relatively high range because of the steady demand from the Chinese steel mills and temporal supply disruption (see Fig. 3).

In addition to the high price of iron ore, the price premiums of lump ore and pellets have also been rising accompanied by big volatility. That is because 1) Chinese steel mills are in need of using high-grade iron ore, which is a countermeasure to the country's stricter environmental regulations, and 2) Chinese steel mills need to enhance productivity corresponding to the production regulation for sintering plants. (see Fig. 4).

#### 4. Future Prospect

The collapses of the tailing pond dams of Brazilian iron ore mines in 2015 and 2019 and enactment of stricter environmental regulations are inviting an increasing number of mines to newly adopt dry ore treatment. Consequently, steel mills have become concerned about further decrease of the Fe content of fine and highgrade lump ores. In addition, pisolite deposits (low-alumina and low-phosphorus ore) and the low-phosphorus Brockman deposits, both in the Pilbara region, Australia, will run out before long. Hence, the supply and demand balance of high-grade iron ore is expected to become much tighter. Moreover, the blending of ores originating from different mines is expected to advance further, which is a result of miners' improving activities such as supply chain streamlining and enhancement of effective use of mineral resources. As a consequence of those, adverse effects on blast furnace operation are a concern due to the Fe contents standardization of iron ores and the composition change of iron ore that is charged to blast furnaces. Meanwhile, steel mills must keep a careful watch on the production level of Chinese steel mills that has an overwhelming influence on the global iron ore market and the trends of their domestic use of scrap metals that is expected to increase from now on.

#### 5. Conclusion

There are many uncertainties in the worldwide iron ore market as explained above. To maintain the competitiveness of our steel products under such situation, it is essential to further strengthen the technology to quickly and flexibly respond to the changes in the quality and market price of iron ore.



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Tetsuva SHIODA General Manager, Mineral Resources Research Raw Materials Div.-II 2-6-1 Marunouchi, Chiyoda-ku, Tokyo 100-8071