INSG Insight

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Nickel Ore Shipments to China

Introduction

This Insight report, the sixteenth in the series of INSG Insight briefing reports, provides members with information on nickel ore shipments to China. This trade has grown very rapidly due to the growth of nickel pig iron production in China. The emergence of nickel pig iron production in China has had a dramatic impact on mine production and trade in ore with other countries in the region. INSG has provided information to members on the growth of the Nickel Pig Iron industry in several presentations as well as a publication '*China Nickel Pig Iron Market Study*' which was issued in 2010.

Summary

Shipments of ore for the production of nickel pig iron have surged in value from practically nil in 2005 to nearly $5 billion in 2011. Indonesia and the Philippines are now the world's first and third producers of nickel, respectively. The rapid growth has required the shipping industry to respond to the challenge of moving this cargo. In Indonesia regulations are set to come into effect in May 2012 which will ban the export of unprocessed ore. In addition, export taxes may be imposed.

Background

In the past decade one of the most significant changes in the pattern of world nickel markets has been the emergence of nickel pig iron (NPI) as a new contributor to global production. Nickel pig iron output has expanded rapidly in China. The ore used in NPI production is a laterite ore with nickel content between 1.0 and 2.0 percent originating primarily from Indonesia and the Philippines. Indonesia usually provides higher grades of ore with a nickel content averaging around 1.6 per cent while Philippines ore has a somewhat lower average grade. The iron content of the ore is variable but can range as high as 50 percent. The ore is usually mined in open cut operations and shipped directly with no beneficiation at the mine. The ore is typically fairly high in moisture content, at times over 30 percent water.

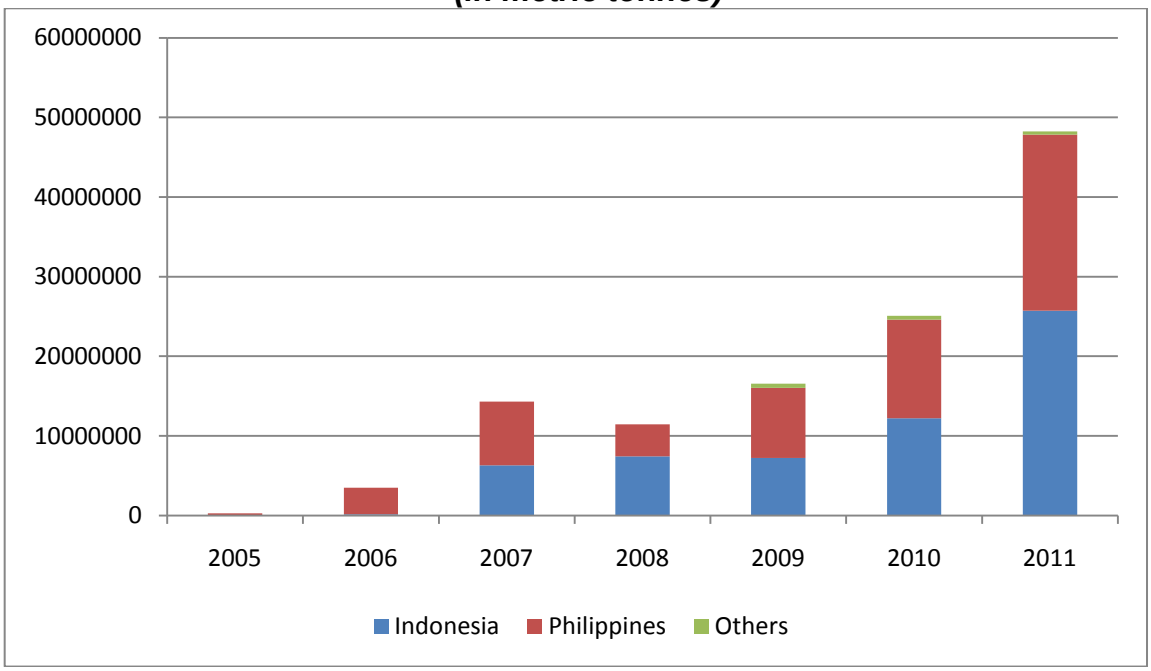
Trends in Nickel Ore Shipments 2005 - 2012

The demand for nickel ore to feed the Chinese blast furnaces turning out nickel pig iron has shown exponential growth. Chart 1 shows the reported levels of imports of nickel ore to China from 2005 through 2011. Imports of laterite material began with a small volume in 2005. Imports grew rapidly, exceeding one million tonnes in

2007, then passing two million tonnes in 2010 and more than doubling again to over four million tonnes in 2011. For the first two month of 2012 imports of nickel ore and concentrate into China continued to see rapid growth, increasing by 75.7 percent for January and February on a year-over-year basis, driven in part by a rush to export Indonesian ore before a possible ban on the export of unprocessed ore comes into effect in May 2012.

The value of the trade is significant as well. For 2011 Chinese government data provides a value of U.S. $ 4.9 billion for nickel ore and concentrate imports. For the first two months of 2012 the value of nickel ore imports to China was reported as $604.2 million.

Chart 1
Chinese Nickel Ore Imports – 2005- 2011
(in metric tonnes)



Source: INSG

Table 1 provides a comparison of mine production of Indonesia and the Philippines in relation to other leading countries. With the large volume of ore destined to the Chinese NPI industry the two countries have emerged as two of the top three nickel mine producers. Russia, Canada and Australia also produced more than 200,000 tonnes of nickel mine production in 2011.

Table 1
2011 Nickel Mine Production in '000 tonnes
(in terms of nickel content)

Indonesia	294.0
Russian Federation	270.0
Philippines	245.0
Canada	222.6
Australia	201.5
New Caledonia (France)	128.2
Brazil	102.0
Total World Mine Production	1898.5

Source: INSG

While Indonesia and the Philippines are leaders in mine production their refined nickel production is not significant. Table 2 shows the countries which produced more than 100,000 tonnes of refined nickel in 2011 along with the production of Indonesia for comparison. There was no reported refined production for the Philippines.

Table 2

Refined Nickel Production 2011 in '000 tonnes

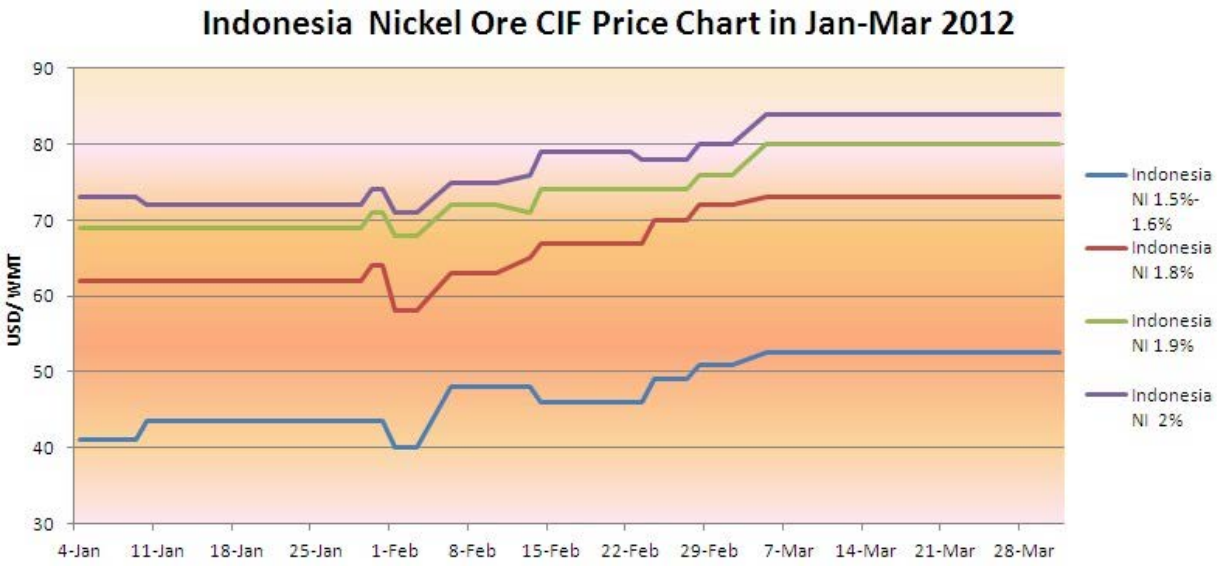
China, P.R.	411.2
Russian Federation	266.8
Japan	157.9
Canada	144.4
EU 27	117.0
Indonesia production	19.7
Total world production	1589.4

Source: INSG

Prices

Prices for nickel laterite ores reflect the nickel content with price increments for ore described as 1.5–1.6% nickel, 1.8% Nickel, 1.9% nickel and 2.0% nickel. As would be expected, premiums are paid for higher nickel content. Data on prices is readily available online, facilitating the trade of the ore. Recent price charts show the range of prices. Chart 2 below shows the range of prices for nickel laterite ore from Indonesia for the period January through March of this year. Chart 3, on the next page, show similar data for the Philippines.

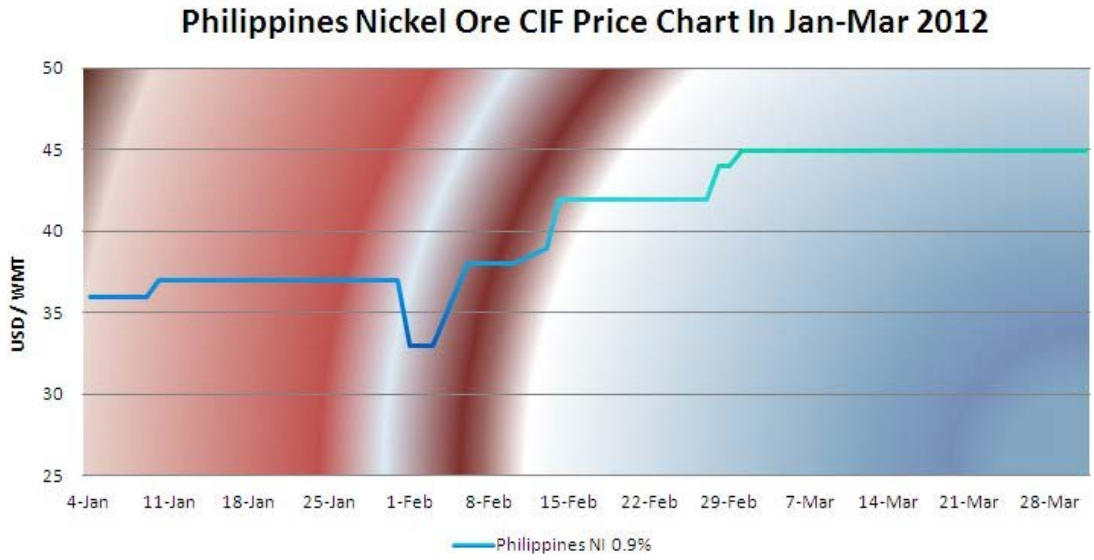
Chart 2



Source: http://www.ferroalloynet.com/article/indonesia__nickel_ore_cif_price_chart_in_janmar_2012.html

As mentioned previously, the nickel content of Philippines ores tends to be lower than those from Indonesia.

Chart 3



Source: http://www.ferroalloynet.com/article/philippines_nickel_ore_cif_price_chart_in_janmar_2012.html

The Problem of Liquefaction of Nickel Ore Shipments

Mineral cargoes in bulk can liquefy if they contain too much moisture. This problem can occur in mineral cargoes of predominantly fine particles, mined and stored in conditions which allow absorbing large amounts of water. Conditions with minimal drainage or evaporation can exacerbate the problem.

Nickel ore shipped from Indonesia and the Philippines typically contains substantial moisture content. The ore is often mined and stored in quite simple facilities that provide no protection from the environment. The ore is a mixture of fine clay-like particles and larger rock-like particles. Especially in the monsoon season the humidity of the shipment may increase and there is a danger that the ore in the cargo hold of a ship may turn to liquid. In some tests nickel ore has turned to liquid with moisture content in the range of 35 percent. The liquefaction of a cargo can occur quite rapidly and may be started by vibration.

Bulk carriers are not designed to carry cargo in such a state. A liquid cargo destabilizes the vessel, causing listing and ultimately capsizing and sinking.

In Indonesia, mines are in operation on the islands of Sulawesi, Halmahera and Papua and not all of these locations have testing facilities to accurately determine the moisture content of the shipments.

Within the past two years the loss of at least four vessels has been attributed to unstable nickel ore cargoes. The ships and the dates of sinking are: Jian Fu Star October 27, 2010, Nasco Diamond, November 11, 2010, Hong Wei, December 3, 2010, and Vinalines Queen, December 25, 2011.

The International Maritime Organization (IMO) mentioned this problem in its Current Awareness Bulletin vol. XXIII no. 4 in April 2011. Maritime insurance companies have also issued warnings about this problem.

Indonesian Export Regulations and Taxes

In February 2012 the Indonesian government issued Regulation No 7/2012 entitled 'Improving Value Added Mineral Processing and Purification through Mineral Activities', which imposed limitations on the export of unprocessed copper, gold, silver, nickel, tin, bauxite and zinc. The proposed regulations would have a major impact on the export of nickel ore to China. The stated intention behind these new regulations is to encourage the processing and smelting of ores within Indonesia.

Under Regulation No.7/2012, export of ore and raw materials is to cease as of 6 May 2012. The regulation also imposes an obligation on mining companies to develop plans to process and refine mineral products. Depending on the stage of development the mining project, the requirement to process may be extended until 2014, 2015 or 2016. For nickel the regulation sets out a requirement to process to a nickel matte product with greater than 70% nickel content, according to a report by the law firm Baker Mackenzie.

The regulation gives wide discretionary power to the Ministry of Energy and Mineral Resources in the implementation of these requirements. In March 2012 there were discussions between ministries as to how the regulation would be implemented. A representative of the Ministry of Industry was quoted in March 2012 as saying that "For a first step, it is better to impose an export tax while driving investment in metal smelters, then in 2014 we impose a total export ban on mineral and metal ores."

Also in March the Indonesian government stated that it expects to introduce an export tax later in the year. In late 2011, plans were outlined to introduce export taxes on metals and minerals, aiming to encourage investment in the mining sector. The date of introduction of the tax is not yet certain.

Lateritic Nickel Ore

Source:CBI China

Typical nickel laterite ore deposits are very large tonnage, low-grade deposits located close to the surface. The photo shows nickel laterite ore imported to China.

Conclusions

Nickel pig iron is now an established product and accounts for a significant portion of global nickel production. It can be anticipated that the production of nickel pig iron and refined nickel will increase in Indonesia and the Philippines as efforts are made to increase the value added to the mining countries. Demand however will be directly affected if the price of nickel falls below the cost of nickel pig iron production. Further attention to regulations on shipping of nickel ore may also come to the fore to prevent shipping catastrophes.

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