

Orissa's iron ore attracts massive investments

- By Sanjay Sengupta

The Indian Steel Planners have visualized and planned for a massive growth of steel production in the next seven years up to 2011-12. From a total crude steel production of 34.8 million tonnes in 2004-05, the targeted production of crude steel of the country has been aimed at about 80 million tonnes by 2011-12.

India's growth potential for steel production arises from the fact that in addition to cheap skilled labour force, the country has a vast reserve of high grade iron ore.

The total iron ore reserve of the world has been estimated at 229,000 million tonnes with an average Fe-content of 47/48 percent. India's percentage share in the total reserve of the world is 5.46. The country has one of the highest Fe-content of 63 percent (average) in its iron ore.

Orissa : Highest reserve of hematite ore

With an area of about 156,000 square kilometers and a coast line touching 480 kilometers, the state of Orissa has huge deposits of iron ore and other minerals of great economic

value. All major inputs for steelmaking like iron ore (hematite), manganese ore, lime stone and dolomite occur in the state in abundance. Ferro alloys and additives like bauxite, quartzite etc. ore also available in plenty.

According to the Indian Bureau of Mines (IBM) the state of Orissa had a total reserve of 4,177 million tonnes of hematite ore as on 1-4-2000 with a share of 34 percent in India's total reserve of hematite ore – the highest in the country.

The break-up of total iron ore reserve in Orissa is furnished below :

Type of reserve	Reserves ('000 tonnes)
Proved	1,824,172.68
Probable	762,910.37
Possible	1,590,270.65
Total	4,177,353.70
Source : IBM, Nagpur	

Major deposits of iron ore in India

The state of Orissa may broadly be divided into four geographical regions namely, the Northern Plateau

(undulating country having a general slope north to south), Central River Basin (lies between northern plateau and Eastern Ghats), Eastern Ghat hill ranges and the Coastal Plains.

The major iron ore deposits in Orissa occur in 5 distinct geographical zones. The are as under :

- (i) Bonai – Keonjhar
- (ii) Gandhamardan
- (iii) Tomca – Daitari
- (iv) Gorumahisani – Badampur
- (v) Hirapur

The parent rocks of iron deposit are Banded Iron Formation (BIF) and particularly the Banded Hematite Jasper (BHJ) or Banded Quartzite and Ferruginous sales.

The eastern limb of Orissa deposits occur in Thakurani, Joda East, Joribhal, Jilling – Longalata, Jajang and Malantoli. The Western limb feature Kiriburu, Bolani, Kalta, Barsua and Khandadhar group of deposits. Gandhamardan and Tomka – Daitari lie widely separated towards the south east. Gorumahisani – Badampur deposits are associated with Banded Haematite / Magnetite Grunerite and Banded Heamatite Jasper (BHJ).

Company wise leaseholds of iron ore reserves in Orissa

The company wise break-up of the leaseholds of iron ore, reserves in Orissa is furnished below :

	Company	Leasehold (Mt)
(a)	Orissa Mining Corpn. Ltd.	414
(b)	Steel Authority of India Ltd.	732
(c)	BOMEL & OMDC Ltd.	153
(d)	Neelachal Ispat Nigam Ltd.	110
(e)	Tata Steel	410
(f)	Essel Mining & Inds. Ltd.	155
(g)	Rungta Mines Ltd.	149
(h)	S. L. & M. L. Sarada	248
(i)	Other Non-Captive Leaseholds	
(j)	Free hold areas	
	Malangtoli	371
	Mankarancha	250
	Baliapahar	131
	Badamgarh Pahar	49
	Thakurani 'A'	270
	Kiriburu (Orissa Portion)	65

Besides, the reserves in the free hold areas, most of the ore available in the non-captive lease holds can be mined for meeting the huge requirement of expansion of brown-field plants and setting up of greenfield projects that are coming up in Orissa.

Orissa – highest producer of hematite ore

Orissa Produced about 30.2 Mt of iron ore in 2003-04 with a share of over 25 percent of India's total production of hematite plus magnetite ore. Orissa's hematite ore production recorded a growth of about 82 percent between 2001-02 and 2003-04. In 2003-04, Orissa produced highest hematite ore in the country.

Production of iron ore in Orissa

Production of iron ore between 1999-2000 and 2003-04 are shown in Table –1

Gradewise production of iron ore in Orissa

The gradewise production of iron ore in Orissa between 2001-02 and 2003-04 is furnished in Table – 2.

It is evident from the above table that the percentage share of lumps and fines in the total production of iron ores in

Orissa, was 65 and 35 respectively in 2001-02 and 2002-03 while in 2003-04, the percentage share of lumps has decreased by 5 percent with a corresponding rise in the production of fines.

Table – 2 : Gradewise production of iron ore in Orissa ('000 tonnes)

Year	Lumps	Fines	Total
2001-02	10720 (65)	5882 (35)	16602
2002-03	14319 (65)	7758 (35)	22077
2003-04	18228(60)	11951 (40)	30179

N.B. Figures Shown in Parenthesis indicate the percentage of lumps and fines in total production
Source : Indian Bureau of Mines, Nagpur

Orissa did not produce iron ore concentrates during the above period. In the Banspani area of Orissa, Hard lumpy high grade ore occurs with Fe-

Table - 1 : Production of iron ore in Orissa : 1999-2000 and 2003-04

Year	Production ('000 tonnes)	YoY Growth (%)
1999-2000	11931	-
2000-01	14382	20.54
2001-02	16602	15.44
2002-03	22077	32.98
2003-04	30179	36.70

Source : Indian Bureau of Mines, Nagpur

content of over 65 percent.

SAIL's strategy to increase production & upgrade technology

Steel Authority of India Ltd. (SAIL) which has the highest leasehold in Orissa has iron ore mines at Bolani, Barsua and Kalta. The annual capacities of these mines are as under :

Mines	Annual Capacity (Mt)
Bolani	3.00
Barsua	2.31
Kalta	1.15

SAIL's raw material division (RMD) has undertaken a programme to supply superior quality of iron ore with Fe-content of above 64 percent and alumina as well as silica content with less than 2 percent on consistent basis.

The above upgradation will be achieved through introduction of new technologies and adoption of new product-mix. Usage of lump ore will be gradually reduced from 35 percent of the mix to 15 percent. Rich iron ore pellets will comprise another 15

percent and sinter burden will be raised to 70 percent. With this mix and quality blend, the cost of iron ore per tonne will be higher, but this will get compensated ultimately by the higher productivity of blast furnaces and better quality of hot metal.

SAIL'S RMD is making substantial investments in the following areas :

- Capacity expansion of Bolani Mines to 5 Mtpy.
- Development of a new mine at Thakurani of 1 Mtpy capacity.
- Computerized instrumentation and automation in mines.
- Installation of CCTV and mobile equity and tracking system
- Upgradation and modernization of mining machinery

Some developments in SAIL mines in Orissa are mentioned below:

(i) **Bolani** – Besides a new ore processing plant (OPP), the mine has undergone successive developments through AMR schemes. The stress is on improving beneficiation for quality ore. Capacity enhancement of existing equipment along with simultaneous reclamation of lumps and fines will help production to reach about 4 Mtpy. Installation of a 6000 TPH capacity outselling plant will give an additional 1 Mtpy. Modification of lump loading conveyor belt, stacking and blending yard at dines stockyard and reclamation of water from tailing dams are going on in full swing.

The estimated iron ore reserve at Bolani is 160 Mt.

(ii) **Barsua** – Barsua's estimated reserve of iron ore is 44 Mt. The mines in barsua has a complex deposit from bench to bench and from area to area.

Barsua is operating in three sections – 3 East, 3-West and Area – 5 possesses high quality ore modifications of the existing jigs along with the installation of modern discharge devices will reduce alumina content of the iron fines. The 3 West area is also being developed for improvement in the quality of fines.

(iii) **Kalta** – The mines at Kalta is undergoing a process of charge. Equipped with high – tech machinery along with a new screening and crushing plant, its production level has reached about 15 lakh tpy. Installation of a second circuit in screening plant is expected to push up production substantially. Kalta has gained importance for its high quality ore, potential reserve and convenient location in the Bonai range.

Higher capacity equipment & Improved methodology

About a decade back, iron ore producers in Orissa were using dumpers from 25-30 tonnes capacity with excavators between 1.9 to 5.5 cu. meters and single pass drills with diameters from 150 to 300 mm. But at present most of the iron ore producers are using 50 to 60 tonnes dumpers, excavators of 6 to 8 cu. meters and single pass drills with diameters ranging from 250 to 300 mm. Crushing instruments of 1500 tph capacity have been installed provided for 10 Mtpy and bigger mines. Complete beneficiation facilities, mechanical stacking, reclaiming, loading and modern conveyor system have been installed. Low speed classifiers are being used by major producers for under flow of hydro

cyclones for higher recovery of ore fines with Fe-contents over 64 percent.

Capacity expansion

The tenth Five Year Plan has projected the iron ore demand in the country at 122 Mt by 2006-07 and 156 Mt by 2011-12. The additional capacity from Eastern Region has been estimated to reach 45 Mtpy from the existing 27 Mtpy by 2006-07 and further to 70 Mtpy by 2011-12. The additional capacity will be generated from Orissa and Jharkhand in which Orissa will have a major share.

Infrastructure : Present Status

(i) **Railways** – The status of railway connectivity in the context of upcoming iron and steel plants as under :

(a) **Banspani – Daitari – Kakhpura (188 kms)**

This link is expected to be operational by March, 2006. Completion of this link will reduce the haulage distance between the mining area of Banspani to Jakhpura by 335 kms.

(b) **Haridaspura – Paradip (78 kms)**

Rail Vikas Nigam Ltd. with equity support of Paradip Port Trust, Jindal Steel and Power Ltd. is expected to execute the project. The project is estimated to cost Rs. 376 crore and it will be operational by 2008-09. Presently, land acquisition is in progress.

(c) **Bhadrak – Dharma (62 kms)**

A broad gauge line will link Bhadrak to Dharma with three stations along the rail line. Land acquiring is in progress. Completion is tentatively

scheduled for 2009.

(ii) Roads – Orissa has adequate road network much higher than the national average but due to paucity of funds maintenance of roads is not satisfactory. For movement of raw materials and steel products. NH-5A play a major role.

NH – 215 (Panikoli – Keonjhar – Joda – Korja – Rajamunda)

This is the most important road link in the state of Orissa. The development of the road to 2-lane has been taken up by the National Highway Authorities and the work is scheduled for completion by 2007.

NH – 5A (Paradip – Chandikhol)

The existing 76 km. road is being widened to a 4-lane highway by National Highway Authority with part equity contribution by Paradip Port Trust. Completion of work is scheduled for 2007.

(iii) Ports (a) - The major port of the state is Paradip with a capacity of 38 Mtpy. It is a 80 percent mechanized port with a ore handling plant and a coal handling plant. Work to deepen the existing draft from 12.5 meters to 16.9 meters is in progress which will help the port to handle 125,000 DWT cape size vessels in future.

(b) Dhamra (Proposed) – Tata Steel and L & T have entered into a 50:50 joint venture to develop a state-of-the-art-deep-water port at Dhamra capable of handling bulk cargo and capsized vessels of 125,000 DWT capacity or more with a draft of 18 meters round the year. During the first phase which will be completed by 2007-08, a port capacity of 12.5 Mtpy will be created. Within the next

three years capacity of the port will be doubled.

(iv) Power – The demand and availability scenario in the state at present shows surplus power is available. Most of the iron and steel plants coming up in the state will set up their own captive power plants besides generating power from waste hot gas. Hence adequate supply of power will be available. Orissa has not increased its power traded in recent years and its retail tariff for large and heavy industries continues to be one of the lowest in the country.

Orissa government's policy on iron ore mining

According to the present policy of the government companies who are willing to carry out iron ore mining in the state will have to buy land for installation of a steel making facility to make them eligible for mining in the state. They will be allowed for mining in Orissa after they spend 25 per cent of the project cost. The mining lease will be given only after they spend 50 percent of the project cost.

New greenfield projects in Orissa

A number of major domestic steel companies and POSCO of South Korea – world's fifth largest steel producer, have announced their intention of

setting up of steel plants in Orissa. The names of these companies along with their investments involved are shown in Table – 3.

Table – 3 : Capacities and investment of new greenfield steel projects to come up in Orissa

Company	Capacity (Mt)	Investment (Rs. Crore)
Tata Steel	6.0	15,400
POSCO	12.0	52,000
Jindal Stainless	1.6	7,000
* Jindal Steel & Power	2.0	4,000
Ispat Industries Ltd.	5.0	12,000
* Bhushan Steels Strips	1.2	1,650
Vedanta Resources	5.0	12,000
VISA Industries	1.5	1,600
Sunflag I&S Co.	1.0	1,000
SPS Sponge Iron	0.1	400
Neelachal Ispat Nigam	1.0	1,000
Essar Steel Ltd.	4.0	10,000
Tube Investments	2.5	6,000
Total	42.9	124,050

* Initial Investment, may expand capacity in future.

Investment and Infrastructure

About Rs. 124,000 crore is to be invested in the above projects in Orissa announced so far. Almost all the above companies have signed MoUs with the Orissa government. How such a huge investment will be mobilized is a big question. Some of the producers have planned investment initially up to 2006-07 and then make further move depending on the supply – demand situation in the domestic and foreign markets. Even if the availability of iron ore is adequate, the problem of coking coal would be a big challenge for the producers. The requirement of iron ore for the above projects would be equal to about 50 percent of Orissa's proved and probable reserves.

As for infrastructure, to move about 170 Mt of raw materials and finished steel will need a stupendous growth of railway and road infrastructure. Orissa has got about 14.88 km of railway track per 1000 sq. km. Against a national average of 18.4 km. The Rail Ministry is giving renewal of tracks rather than construction of new lines in a big way. Further, the two trunk routes via Bhubaneshwar and Rourkela do not connect many of the industrially developing areas of the state.

In recent years many bridges have been built and about 800 kms of roads have been improved. The Banspani – Daitari – Jakhpura railway lines have taken about a decade for completion.

About 2055 km of all weather road have been constructed to link the unconnected areas. In general, all the existing roads are in bad shapes due to poor maintenance for lack of funds.

Steel experts doubt the capability of the state's rail and road infrastructure to meet the upcoming challenge of the extraordinary growth of steel industry visualized up to 2011-12.

POSCO Plant

POSCO of South Korea had originally asked for one billion tonnes of iron ore before setting a plant in

Orissa. The Orissa government has, however, offered 600 Mt. According to media reports, the issue of providing infrastructural support for the 12 Mtpy steel plant is being tossed back and forth between POSCO and the state government. Domestic producers feel that it would be unfair if infrastructure for one project is provided by the state government while others have to set up the some on their own.



Some steel economists and experts are even doubting the intention of POSCO and feel that the company is more interested in iron ore and production of slabs for further is more interested in exporting iron ore to Korea and elsewhere. The project will be built in stages and the second phase expansion of capacity by 3 Mtpy every two years after 2010 would depend on the supply demand situation in the global steel market at that time.

Conclusion

More than a dozen of greenfield

steel projects are coming up in Orissa. Apart from investment which is astronomical, raw materials will pose a huge problem. Even if iron ore supply is adequate, coking coal availability will be scarce and the producers will have to look for imports at a price which is not only high at this moment but will go up in future as well. Despite the efforts of the state government, railway and road infrastructure will hardly be able to handle the high

volume of raw materials and steel products by 2011-12.

As regards environment, experts say that the dust and flue gases, slag and other waste materials that would be generated from 43 Mtpy. steel production may

completely ruin the environment in the state and holds that not enough thought has been given by planners in this regard.

Steel watchers will hopefully wait for another six to seven years to observe what is really happening in Orissa.

Acknowledgements

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2. Article by Shri D. K. Jha in 'Steelworld' February '05 issue.

