

ENGULFING PROGRESS OF THE GULF IRON & STEEL

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The recent Meeting 'Arab iron and Steel summit 2007' organised by The Arab Iron and Steel Union at Muscat (Oman Sultanate) from 12 to 14 March 2007 has been an opportunity to analyse:

- the development of iron and steel industry in the Arab States,
- the main actors behind such developments,
- ad the characteristics, both technical and metallurgical of these enterprises.

Expansion of the Steel industry in the Arab World

To be clear, we refer, here to the Arab States which, regarding significant steel industry is around fifteen and are indicated on the map of figure 1, the evolution of their consumption and production of steel are indicated on the table 1

and they can be summarized by following three points:

- the consumption of finished steel has increased from 14 to 15 mt in the 80's and the 90's to reach 20 mt in 2010,
- the steel production (in crude steel) increased from only 2.3 mt in 1980, then 6.5 mt 1990 and 10 mt in 2000 to reach about 14 mt now, predictions for the future are, again, not easy to do, but it is probable that it could be a jump to the range of 30-40 mt in 2010,
- Finally, as a consequence of these figures, there is for this region an important deficit in the steel products

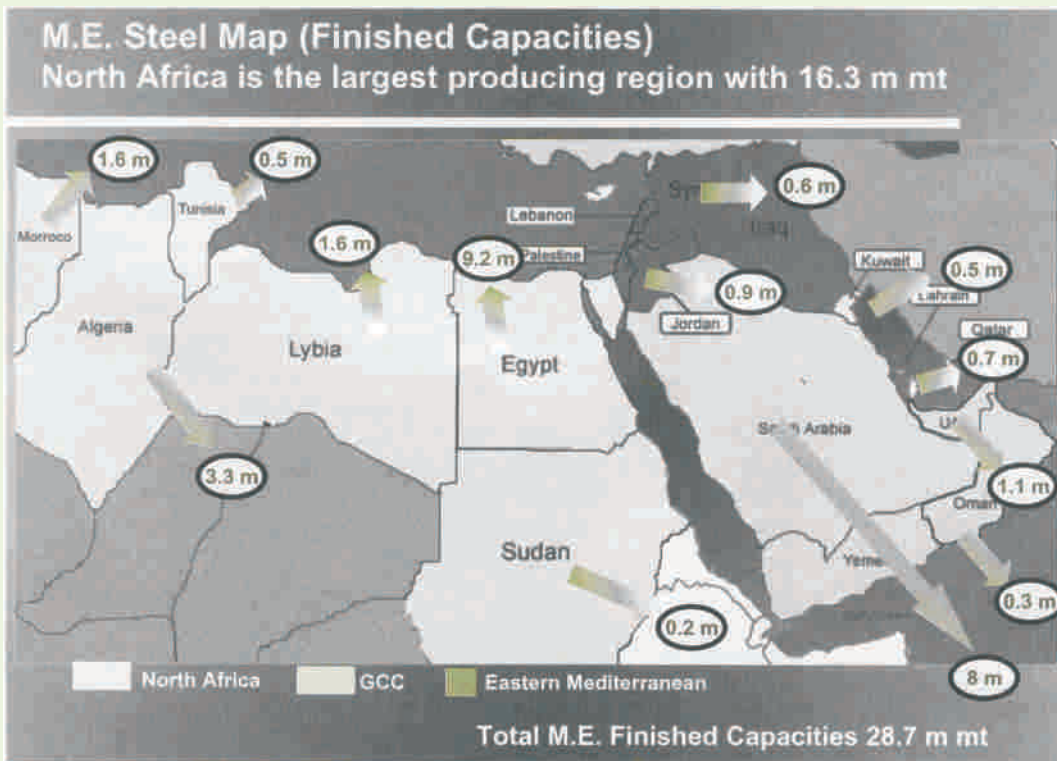


Figure 1 : The Steel Industry in the Arab World

Year	Consumption Mt		Production Mt			Source
	Crude steel	Finished steel	Crude steel	Finished steel	Capacity	
1980	16.7	13.7	2.3	...	...	IISI
1990	13.6	12.0	6.5	...	...	IISI
2000	20.3	18.7	10	10.2	15	Al Jabr Singh
			...	12.3		
2005	35.6	33.1	14.1	15 E	...	IISI Singh Madhok
			22.6 *	22.5 *		
2006	42.1	35 E	14 E	...	28.7 *	Matta Al Jabr Singh Madhok
			24.6 *	18		
			25.4 *	23		
2010	...	47 *	...	24	41 *	Matta Al Jabr Singh
			53 *	38 *			32
2015	53	42	...	38	38	Al Jabr

Table I - Evolution of Steel Consumption And Production in The Arab World.

* These high figures could include other countries of the Middle East

Year	Exports in Mt	Imports in Mt	Net Deficit	
	IISI	IISI	IISI	Singh
2000	2.7	13.9	11.2	12
2005	2.8	24.8	22	20
2006	...	...	...	21
2010	...	...	...	18

Table II - Steel Products Trade of The Arab World.

trade as indicated in table II: this deficit increased from about 10 mt in 2000 to about 20 mt now but with the new plants being built, will probably decrease in future....

It must be remembered that many re-rolling plants, practically all based on imports of billets to produce bars and this explains the discrepancies between the crude and finished steel production.

The Main Steel Enterprises in the Arab World

The main actors in this impressive development, outside of the evolution of the economy which means the demand, are the steel enterprises which, in this region can be subdivided between the four following categories;

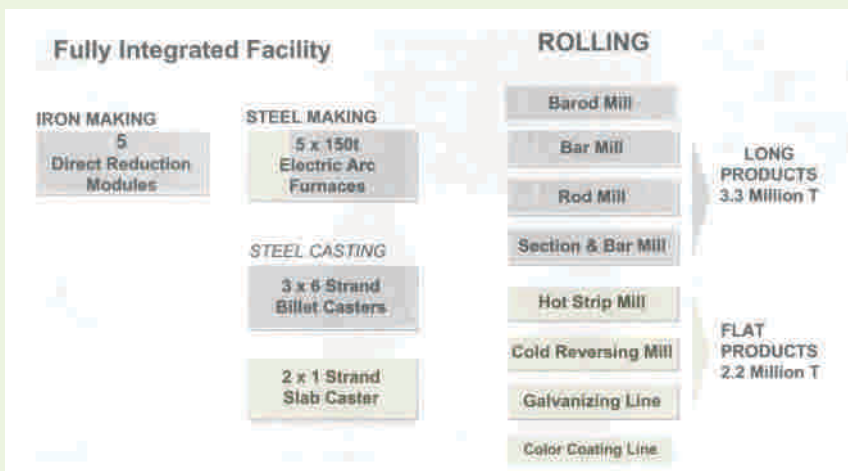


Figure 2 - Flow Sheet of The Hadeed Plant in Saudi Arabia

- 2 main important producers with present capacity, for each of them around 5 mtpy, they are:

EZDK in Egypt with the Alexandria plant and those of EZZ group, SABIC with Hadeed in Saudi Arabia where the whole production is concentrated on the EI Jubail site with the basic flow sheet is on figure 2 and where a development up to 10mtpy is contemplated.....

- 1 International Company the AL-Tuwariki group, with a present capacity of about 1.8 mtpy crude steel and 2. mtpy finished steel but with a large development aiming at more than 6mtpy of DRI and more or less the same volume of crude and finished steel in 2011 with:

in the UK, the large mini mill of Thames (ex- Sheermess)

the integrated mini mill being built at Shadeed

another similar mini mill with a capacity around 1-1.5 mtpy being built in Pakistan,

and a number of projects in Egypt and Bahrain,

- 4 other companies with for each of them, the unit capacity is between 1 and 3 mtpy, they are:

Mittal Annaba, in Algeria, which is one of the two "classical integrated plants" (i.e. with blast furnaces and oxygen converters),

Hadisolb, at Helouan, in Egypt which is another "classical integrated plant,"

LISCO in Lybia, a Misurata where important development is contemplated,

Quasco at UMM Said, in Qatar where the production will reach 2mtpy , and 58 other enterprises with unit capacity lower than 0.5 mtpy, among them we can mention:

the important ensemble, presently not integrated of the Jordanian company Jordan Steel

the interesting evolution of El Fouladh, in Tunisia moving from a small integrated plant to a mini mill with Electric Furnace,

Enterprise	GIIC	CVRD	GHC
Location	Bahrain	Sohar Oman Sultanate	In the UAE ?
Source	Sha'Sha'a (6)	Amarante (13)	Al-Dhaen (7)
In service :	One unit Grate Kiln of 4 Mt/year being expanded to 5 Mt/ year for the end of 2007	-	-
Being built :	Second unit GK of 6 Mt/year for 2009	-	-
Projects :	Third unit of 6 Mt/ year probably not in Bahrain ? Aim to a total of 17 Mt/year	One unit of 7,5 Mt/ year for 2010 Possibility to reach 22 Mt/year on this site	One unit of 6 Mt/ year ?

Table III - Developments of Iron Ore Pelletizing in The Arab World

the similar evolution of SONASID in Morocco which started recently its Electric Furnace.

In this chapter it is important to mention the role of Mining Enterprises as these impressive development in the iron and steel industry need a similar effort in the iron ore supply, the two classical integrated steel plants of Annaba and Helouan are the only ones which rely on local iron ores resources (Ouenza in Algeria and Baharya in Egypt), the other steel plants, based on DR (direct reduction) needs pellets (or possibly, in limited amounts, high grade lumps) and this point has been covered by the contributions of:

- GIIC (Table III)
- SNIM and SPHERE for the El Anoj project in Mauritania, which aims at 7 mtpy pellets,

Region or country	Brazil	Russia	Arab world	South East Asia *	India	China
Production	22.6	54.5	15 E	24.4	42.9	371.2
Exports	12.5	30.9	3 E	10	6.0	27.4
Imports	0.8	4.6	23 E	37	5.3	27.3
Net trade	Net exports : 11.7	Net exports : 26.3	Net imports : 20 E	Net imports : 27	Net exports : 0.7	Net exports : 0.1

Table IV - Comparison of The trade Pattern of Several Emergent Regions

(Figures in Mt Finished Steel For 2005)

* It means Indonesia, Malaysia, Myanmar, Philippines, Singapore, Thailand & Vietnam

E means our estimates

Region or country	Brazil	Russia	Arab world	South East Asia*	India	China
Production	31.5	66.2	14	16.2	38.1	355.8
Oxygen-steel Mt/y	24.1	40.8	2.4	0	20.0	304.4
%	78.2 %	61.6 %	18 %	0	52.5 %	85.6 %
Electric steel Mt/y	7.0	10.8	11.5	16.2	17.1	45.0
%	22 %	16.3 %	82 %	100 %	44.8 %	12.6 %
Open hearth Mt/y	0	14.6	0	0	1.0	0
%	0	22.1 %	0	0	2.6 %	0

Table V - Comparison of Steel Production Pattern of Several Emergent Regions

(Mt Crude Steel For 2005)

* It means Indonesia, Malaysia, Myanmar, Philippines, Singapore, Thailand & Vietnam

- CVRD, which outside the large development in Sohar (see table III), intends to add about 23mtpy.

The development of pellet production in this region can be illustrated by the data of table III.

The Main Technical and Metallurgical Aspects of the Development of Steel Industry in the Arab States

Before coming to the technical and metallurgical aspects, it is necessary to mention the development of this region is based on the economic growth and the local demand of steel products : in this way it appears somewhat similar to south East Asia (see table IV) and different of Brazil and Russia which rely on large steel products exports.

About the technical and metallurgical points we must emphasize the following four aspects:

- Firstly about the route to make the steel products, this Arab region (and it is similar situation in Iran), rely essentially on the flow sheet based on :

DR (Direct reduction: see table VI),

And electric steel making (As indicated in Table V),

- next linked with the preceding point, this region, the Arab World, is one where DR is developing faster (See table table VI), compared to a total world DRI or HBI Production of About 60 MT in 2006, this table VI shows that"

from 1978 to 2000, it had been built, in this region a total capacity of 7.17 mtpy DRI, these plants are operating very well as the production reached

: - 7.07 mt in 2001 &

9.19 mt in 2006.

in 2007 and 2008, will be put in operation a total capacity of 7.46 mtpy of DRI but also now of HBI,

- again linked with the preceding points, it can be seen that most of these developments are made with modern direct and continuous production lines as in the Shaheed plant (see figure 3), characterized for an annual production of about 1.5 mt by:

one single DR unit

only one electric arc furnace with the secondary metallurgy in a ladle furnace, one continuous casting machine,

and, the rolling mill (one or two) depending on the types of products,

- regarding this aspects of the final steel products, there is a sub-division between :

Start at	Company	Location	Type	Capacity mty	Remarks
1978	Qasco	Mesaieed Qatar	1 Midrex 400	0,400	Module I
1982/3	Hadeed	Al Jubail Arabie S.	2 Midrex 400	0,800	Modules A et B
1986	EZDK	El Dikhela Egypte	1 Midrex 600	0,720	Module I
1989/90	LISCO	Misurata Lybie	2 Midrex 600	1,100	Modules 1 et 2
1992	Hadeed	Al Jubail Arabie S.	1 Midrex 600	0,800	Module C
1997	EZDK	El Dikhela Egypte	1 Midrex 600	0,800	Module II
1997	LISCO	Misurata Lybie	1 Midrex 600	0,650	Module 3
1999	Hadeed	Al Jubail Arabie S.	1 HYL	1,100	Module D
2000	EZDK	El Dikhela Egypte	1 Midrex 600	0,800	Module III
2007	Al-Tuwairqi	Damman Arabie S.	2 Midrex 400	1,000	Ex CORUS
2007	Hadeed	Al Jubail Arabie S.	1 Midrex Megamod	1,760	Module E
2007	Qasco	Mesaieed Qatar	1 Midrex Megamod	1,500	Module II
2007	Al Nasser	EAU	1 HYL Micro module	0,200	
2008	Shadeed	Sohar Oman	1 Midrex Megamod	1,500	with Hot Link
2008	General Holding Co	Abu-Dhabi EAU	1 HYL Megamod	1,500	with Hytemp
2010	Beshay Steel	Sadat City Egypt.	1 Midrex Megamod	1,760	with Hot Link

Table VI - Direct Reduction Developments in the Arab World

the plants making flat products where we find, outside of two “conventional integrated plants” of Mittal Annaba and Hadislob:

- *Lisco,
- *EZDK with CSP facilities (SMS and Danieli)
- *Hadeed,

Source :	Estimates for average world data US Dollars /t	Estimates for the Arab States rich in natural gas US Dollars /t
Callis (18)	PRIMARY METALS : Scrap 250 to 300 Pig Iron about 300 DRI/HBI : Venezuela or Russia 130 to 140 Europe and USA 220 to 240	DRI/HBI 150 to 160
Callis (18)	CRUDE STEEL from DRI and/or Scrap and Pig Iron Venezuela or Russia 250 to 260 China 340 Europe and USA 400 to 420	CRUDE STEEL From DRI 270 to 280
Matta (1)	HRC (Hot Rolled Coils) POSCO 360 Tata (in India) 370 Mittal 410 ThyssenKrupp 430	HRC (Hot Rolled Coils) EZDK 410 LISCO 410 Hadeed 440

Table VII - Estimated Advantages of The Flow Sheet : Direct Reduction + Electric Steel Making in the Arab World

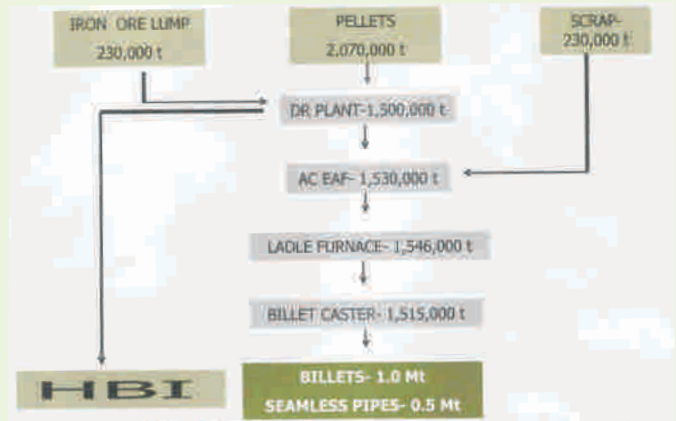


Figure 3: Flow Sheet Of The Shadeed Plant In Sohar (Oman Sultanate)

It is interesting to note that the production of sheets for the automobile industry and

in larger number, making long products

and finally, a growing and quite understandable interest for the production of tubes, both welded and seamless such, as an example the building of a 0.5mtpy unit of seamless tubes in Shadeed plant.

Conclusions and Final Remarks:

The following three conclusions can be emphasized;

- firstly after a slow development in the 70's and 80's, the economy of this region has been expanding very quickly bringing the demand of finished steel product from about 15mtpy in the 80's to 35mt now and probably around 50 mt in 2010, this contributed highly to an impressive development of the steel production which, for the same period increased from about 3mtpy to around 14 Mt in 2006 and aiming at a level of 30 to 40 mtpy in the future; however, this region is still an important steel products importers, in fact the second one, world wide, after South East Asia as indicated on the table IV,
- next, the important advantages of the short and direct route:

DR (Direct Reduction) + EAF (Electric Arc Furnace) selected in this region, from the economic point of view, for such countries with high resources in natural gas inspite of the difficulties of such comparisons, as indicated on the table VII, that this interesting situation is closely linked with relatively low costs of the primary metals which, there, are DRI (or HBI) produced from low price natural gas inspite of the necessity to import high grade pellets,

- And, finally, a very important point which has not been sufficiently shown is the advantages about the impact on the environment of the choice of this route

DR (Direct Reduction) + EAF (Electric Arc Furnace) especially for the emission of gases contributing to the green house effect; it emits, indeed, less than one half of the CO2 produced in the conventional integrated plants.

