Indian Seamless Pipes & Tubes Industry

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Introduction

Steel pipes can be broadly classified as seamless and welded. Seamless steel tube is defined as a steel tubular product made without a welded seam. It is manufactured by hot working steel or if necessary by subsequently cold finishing the hot worked tubular product to produce the desired shape, dimensions and properties.

The major processes used for the production of seamless hollows are:

a) Piercing & Rolling
b) Extrusion
c) Casting & Rolling
d) Powder metallurgy

The last two processes are not employed for commercial production.

Seamless steel tubes are produced in the size range of 12 mm to over 700 mm outer diameter and 2mm to around 100 mm wall thickness. The wide size range makes them suitable for use in a number of versatile areas of applications. The tubes are produced in several steel grades ranging from ordinary carbon steel to high alloy and stainless steels. Seamless pipes have higher pressure bearing capacity as they do not have any joints along the length. As such they are used for high pressure applications. Seamless pipes can handle pressures of around 15000 psi.

The characteristics of seamless steel tubes differ with applications. The characteristics are specified for each application in almost all international standards. The specifications of seamless steel tubes have been drawn by IS, API, ISO, DIN, GOST and other international standards.

Seamless steel tubes find their application in special areas where strength is prime consideration. The seamless steel tubes employed for rotary drilling must possess great torsional strength and high resistance to fatigue stresses. The casing pipes for deep oil wells require seamless pipe having high resistance to collapse to withstand the high external pressures. The oil refining, chemical and pressure steam industries also demand special seamless steel tubes/pipes to withstand temperatures as low as (–) 268°C. The considerable quantity of pipe and tubing find uses in structural application because of favorable strength to weight ratio.

Seamless tubes find application in the manufacture of bearings, automobile parts, drill rods, hydraulic cylinders, gas cylinders, boilers, etc. The value added products for such industries include bearing rings, gear blanks, shifter sleeves, cages for constant velocity joints, swaged and machined axles, threaded and coupled casings and a host of similar products.

Seamless tube has homogenous wall without any weld or joint along its length. The homogenous wall and smooth

inner surface of the tube is not subjected to weaknesses caused by internal weld, bend and different chemical compositions and micro structures at the weld zone. As such, there is no danger of preferential corrosion caused by self engendered galvanic action. This makes the seamless tube a natural choice for applications where strength and resistance to corrosion are of high importance. The end-uses of seamless steel tubes are diversified. Considering the quantum and nature of consumption, the major end-uses of seamless tubes/pipes have broadly been classified under the following heads:

i) Oil and gas exploration
ii) Tool jointing material
iii) Refinery
iv) Anti-friction bearing industry
vi) Power boiler industry
vi) Industrial boilers
vii) Automobile
viii) Earthmoving machinery
ix) Fertilizers
x) Miscellaneous industries

(including petrochemicals, chemical units, cylinders etc.)

The encouraging development of indigenous end-using industries stimulated the growth of direct consumption of seamless steel tubes. Literature survey reveals that oil sector accounts for around 60 percent of the total consumption while the share of bearings, automobile & boiler sector together are estimated as about 30 percent and the rest are consumed in other miscellaneous engineering industries. The present article deals with the demand and supply scenario of seamless pipes/tubes in India.

Domestic demand

The estimated apparent consumption of seamless steel tube/pipes during 2001-02 to 2007-08 is furnished in table-1.

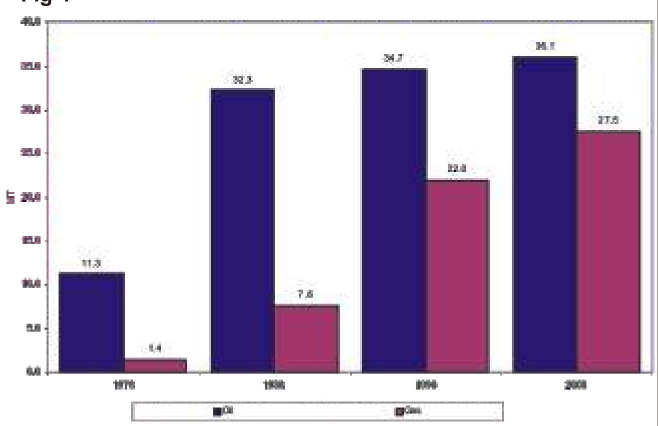
Table-1: Estimated Apparent Consumption for seamless steel tubes/pipes **('000 T)**

Year	Production	Imports	Exports	Apparent Consumption
2001-02	231	55	73	213
2002-03	256	90	125	221
2003-04	269	122	51	340
2004-05	279	120	52	347
2005-06	381	253	111	523
2006-07	487	154	112	529
2007-08	512	384	333	563

Table-1 reveals that the apparent consumption of seamless pipes/tubes increased from the level of about 2,13,000 tons in 2001-02 to about 5,63,000 tons in 2007-08 with a CAGR of about 18 percent per annum.

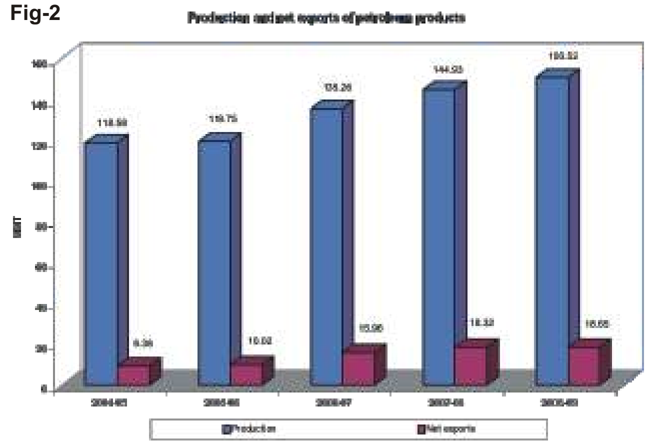
The imports of seamless steel tubes in India have grown from about 55,000 tons to 3,84,000 tons during 2001-02 to 2007-08 and the exports of the same have recorded an increase form 73,000 tons in 2001-02 to 3,33,000 tons in

Fig-1



Source: British Petroleum statistical review

Fig-2



Source: Ministry of Petroleum and Natural Gas

2007-08.

There has been a steep rise in imports may be attributed to quality and specification aspects, which may not be available indigenously.

Major exporting countries of seamless tubes/pipes to India are USA, Germany, Italy, Japan, France, Romania, Hong Kong and UK and the major importing countries of the same from India are Sierra Leone, South Africa, Singapore, UAE, Iran and Iraq.

The phenomenal growth in domestic demand may be accounted by a high growth in major end-using sectors viz. oil and gas, power, automobile and other engineering sectors. As such, it is thought prudent to have a brief overview of these consuming sectors.

An overview of the major consuming industries

Oil and gas

One of the major driving forces for the demand for seamless pipes are exploration and production (E & P) activities in the oil and gas sector. The ever increasing energy needs have resulted in increased production of oil and gas in India as illustrated in fig-1.

The oil production in India has increased from 11.3 Mt to 36.1 Mt with a CAGR of around 3.9 percent during the period 1978 to 2008, whereas the gas production increased from 1.4 Mt to 27.5 Mt with a CAGR of around 10.4percent during the same period.

In terms of refining capacity, India has surplus capacity and is a net exporter of petroleum products (LPG, naphta, LDO, FO, lubes etc). As of 2007 there were 19 refineries in India with a total refining capacity of 149 Mt. According to the Working Group report, India's refining capacity will be enhanced to 241 Mt by the end of the 11th plan (2011-12).

The production and net exports of petroleum products during 2004-05 to 2008-09 are depicted in fig-2.

The production of petroleum products have gone up from 118.58 Mt during 2004-05 to 150.52 Mt during 2008-09 with a CAGR of 6.2 percent. The net exports of these products during the same period have grown by 18.7 percent from 9.38 Mt to 18.65 Mt. Surplus refining capacity bodes well for a country like India, as it provides employment, energy security and creates new and replacement demand for seamless pipes/tubes.

The Working Group has also drawn up projections for demand of petroleum products for the milestone years 2011-12 and 2016-17 which are furnished in table-2.

The demand estimate is likely to vary between 131.8 Mt and 141.8 Mt during 2011-12. The same may be varying between 160.2 Mt and 179.3 Mt during 2016-17.

Table-2 Projected Demand for Petroleum Products (MT)

Year	Demand Estimate
2011-12	131.8 to 141.8
2016-17	160.2 to 179.3

The availability of petroleum products in future years has been estimated by the Working Group by analyzing the data from refineries. The availability during 2011-12 has been assessed as 218.3 Mt which far exceeds the estimated demand for the milestone year 2011-12 as well as that for 2016-17.

In the case of natural gas, the demand has been projected as 279 MMSCMD (Million Metric Standard Cubic Metres per Day) while the supply has been projected as 202.30 MMSCMD for the year 2011-12. The crude oil requirement during 2011-12 has been estimated as 235 Mt while the production has been projected as 39.51 Mt.

India is well placed as far as refining is concerned but there is an urgent need to ramp up production of crude oil and natural gas to reduce the dependence on imports and utilizing refining capacity to the extent possible.

The Working Group on Petroleum and Natural Gas has set certain targets to be met by the end of the 11th five year plan, which are elaborated below.

The 11th Five Year Plan envisaged exploratory drilling of 3222.78 m and 1100 new exploratory wells. In order to boost oil and gas production in India the Government has allowed private participation in E & P activities. The breakup of private and public sector players in this activity is furnished below:

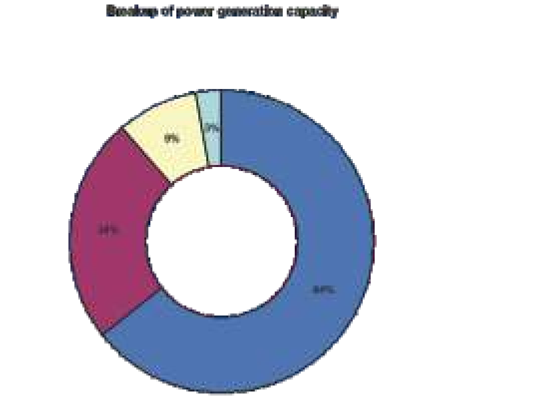
	Public sector	Private sector/JV	Total
Exploratory drilling (m)	2390.78	832	3222.78
Exploratory wells (Nos)	800	300	1100

The outlook for seamless pipes in the form of Oil Country Tubular Goods (OCTG) products is encouraging considering the good progress of the New Exploration Licensing Policy. The total Plan outlay for upstream facilities by national oil companies has been earmarked as Rs 1515 billion. Apart from this, investment by private sector/JVs may be to the tune of US $ 9 billion. Under the circumstances, the demand for seamless pipes is expected to get a boost from the substantial investment on E & P activities.

Power sector

It is learnt that 1 MW of power generation capacity requires approximately 100 tons of boiler tubes. Currently India has a total installed power generation capacity of 152360.09 MW, the source-wise breakup of which is furnished in fig-3.

Fig-3

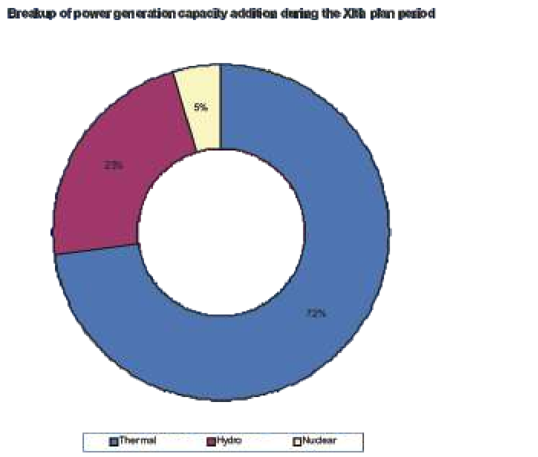


Source: Central Electricity Authority

The figure above indicates that around 67 percent or 102165 MW of the installed capacity is in the form of thermal (98045 MW) and nuclear (4120 MW) power projects. The demand for boiler tubing comes from these sectors mainly.

According to the Working Group on Power, a capacity addition of around 69000 MW has been planned for the XIth Plan period. The breakup of the envisaged accretion in generation capacity is furnished below in fig-4.

Fig-4



Of the 69000 MW of generation capacity envisaged to be added during the XIth plan period, 72 percent will be in the form of thermal power, 23 percent in the form of hydel projects, while the share of nuclear power will be 5percent.

For the 12th plan period, the Working Group recommends an addition of 82000 MW of generation capacity, of which around 30000 MW of the addition is likely to be hydel based while 11000 MW to 13000 MW will be nuclear based. The balance of around 40000 MW of capacity addition will be in the form of thermal projects.

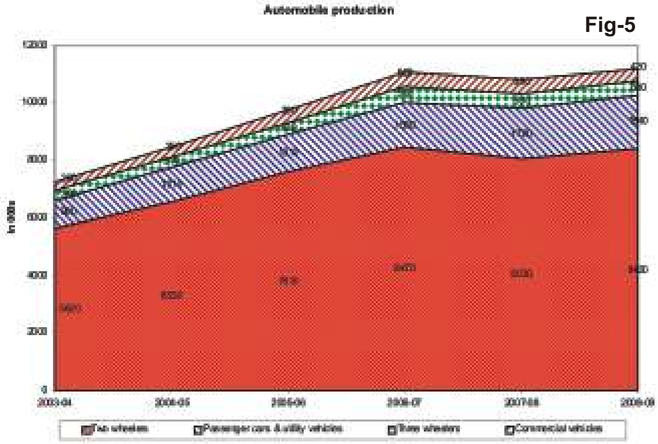
The capacity addition discussed above does not take into consideration merchant power plants which may come up additionally.

Thermal power forms a major chunk of the capacity enhancement being planned in the power sector during the 11th and 12th plan periods. As such, it bodes an encouraging outlook for the seamless pipes/tubes industry.

Automobile industry

The Indian automobile market is gearing towards international standards to meet the needs of the global automobile giants and become a global hub. Players are strategizing to consolidate their position and gradually increase market penetration with the launch of new models targeting different segments. Last five years have not only witnessed faster production but also the technological upgradation, increase in number of players in each segment/categories and change of models over previous years. All the international manufacturers like the Hyundai, Daewoo, General Motors, Mitsubishi, Volvo, Honda, Ford India Ltd., Mitshubishi Motors etc. have entered into Indian economy and have found acceptable production base for themselves. The production of automobiles for a period from 2003-04 to 2008-09 is depicted graphically in fig-5.

Fig-5



Source: Society of Indian Automobile Manufacturers (2009)

Fig-5 reveals an all round increase in production of all categories of vehicles. Two wheelers have recorded a growth of around 8.4 percent during the period 2003-04 to 2008-09, while the same for passenger vehicles, three wheelers and commercial vehicles have been around 13.2 percent, 6.8 percent and 8.4 percent respectively. The growth in the automobile sector as a whole has been of the order of 9 percent.

The Working Group on Automobile Industry for the 11th Five Year Plan has projected the production of automobiles for the milestone years 2011-12 and 2016-17 as furnished below in fig-6.

Fig-6

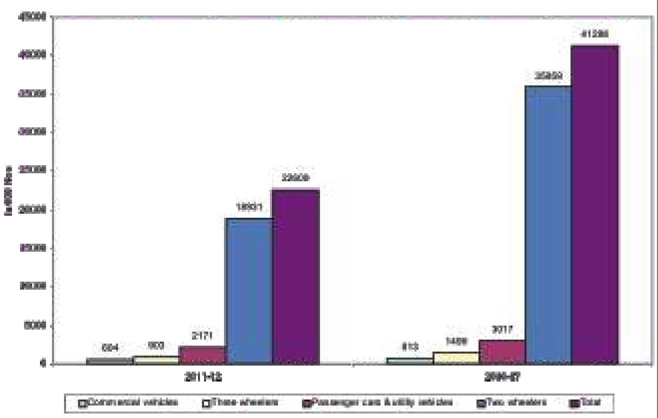


Fig-6 reveals that the production of commercial vehicles, three wheelers, passenger cars and utility vehicles, and two wheelers during 2011-12 is projected as 6.0 lakhs, 9.0 lakhs, 21.7 lakhs and 189.3 lakhs respectively which are likely to increase to about 8.1 lakhs, 15.0 lakhs, 30.2 lakhs and 359.6 lakhs respectively by the milestone year 2016-17.

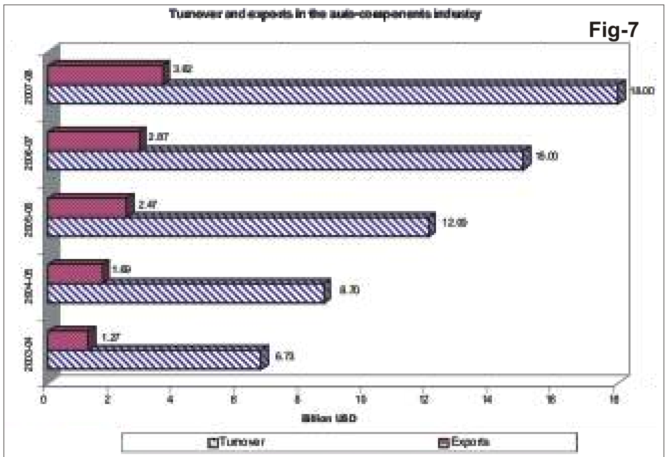
Auto components

India has gradually become a sourcing hub of auto-components for the auto companies worldwide. Among the companies outsourcing from India are Volvo, Fiat, Ford, Renault-Nissan, DaimlerChrysler, Toyota, Delphi, Bosch and Cummins to name a few.

It is experienced that India's competitive advantage does not come from cost alone, but from its Full Service Supply

(FSS) capability. A number of Indian companies with global ambitions are gradually moving towards creating a niche in the world market. The turnover and exports of the auto-components industry have grown with an annual rate of growth of about 28 percent and 30 percent respectively during the period 2003-04 to 2007-08 as depicted in fig-7.

Fig-7



Source: Auto Component Manufacturers' Association

Despite the relatively small share of Asia in the global pie, India is managing to up the numbers. During 2007-08, auto component exports from India were valued at around USD 3.6 billions and the Automotive Mission Plan (2006-2016) has predicted that this figure will be around USD 20-25 billion level by 2015.

In view of high growth in apparent consumption of seamless pipes/tubes in the past and phenomenal growth in major consuming industries viz., petroleum and natural gas, power sector, automobile and other industrial sectors, CAGR of 10 percent till 2011-12 and 8 percent till 2016-17 has been assumed to derive the domestic demand for seamless pipes/tubes.

The domestic demand thus, worked out is furnished below in table-3.

Table-3 Projected Domestic Demand for Seamless Pipes/tubes

(In 000'tons)

Year	Demand
2011-12	820
2016-17	1210

Demand with exports provision

The exports and imports are integral part of an economy. Therefore, in working out demand for seamless tube/pipes, the export provision is also needed to be considered. An analysis of exports as percentage of apparent consumption during 2001-02 to 2007-08 reveals that the exports has been ranging from 15 percent to 83 percent of apparent consumption during the period. In view of the past performance of exports, an export provision of 20 percent of the domestic demand for the milestone years 2011-12 and 2016-17 respectively are considered. The demand with export provision thus, derived as depicted below in table-4

Table-4 Projected demand with export provision

(In 000'tons)

Year	Demand with export provision
2011-12	990
2016-17	1450

Supply Scenario

The installed capacity of

major producers of seamless steel tubes/pipes in India is furnished in table-5. It has been observed that the Indian Seamless Metal Tubes Ltd with a capacity of 55,000 tons per annum (tpa) has merged with Kalyani Seamless Tubes Ltd. which has production capacity of 100,000 tpy. The combined capacity of the unit after merger is 155,000 tpy which retain the name Indian Seamless Metal Tubes (ISMT). With the addition of a new Premium Quality Finishing (PQF) mill ISMT's capacity has been ramped up to 450,000 tpy. Maharashtra Seamless Ltd. has expanded its capacity to 350,000 tons per annum. Total installed capacity in the country at present is estimated to about 990,000 tons as furnished in table-5.

Table-5 Capacity of Major Producers of Seamless Steel Pipes/Tubes in India

	(In tones/yr)
Name of unit	**Future capacity**
Indian Seamless Metals Tubes Ltd.	450,000
Maharashtra Seamless Ltd.	350,000
Jindal SAW Ltd.	100,000
Remi Metals Gujarat Ltd.	50,000
Bharat Heavy Electricals Ltd.	40,000
Total	**990,000**

Past studies reveal that the capacity utilization of the seamless steel tubes/pipes plants varies between 49 percent and 62 percent. However, under the present improved circumstances, capacity utilization of 80percent and 85 percent for 2011-12 and 2016-17 respectively have been considered to estimate the future availability of seamless tubes/pipes. The availability thus, works out to about 792,000 tons and 842,000 tons for the milestone years 2011-12 and 2016-17 respectively.

The estimated demand and availability of seamless pipes/tubes in India deliberated in the previous paragraphs for the milestone years 2011-12 and 2016-17 are depicted in fig-8.

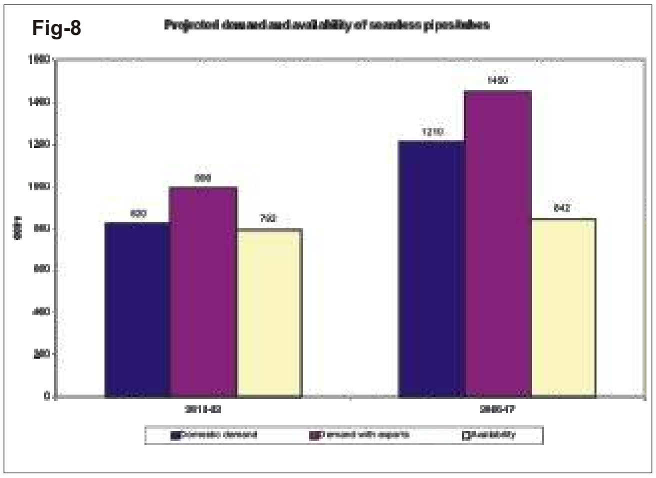


Fig-8

Literature survey reveals that MSL has envisaged enhancing its seamless pipe making capacity from 350,000 tpy to 500,000 tpy. If the envisaged project comes up within the time horizons considered in this study, the gap between demand and availability would be narrowed down.

The way forward

Following the financial meltdown of 2008-09, economies over the world are on a steady path of revival. Under the circumstances production of petroleum products and electrical energy are expected to pick up to meet the domestic demand and sustaining future supplies would require heavy investment in E&P activities and power projects which would drive the demand for seamless pipes.

The Indian seamless pipe industry should make all efforts to cash in on this opportunity. The indigenous manufacturers should aim at eating into the market enjoyed by imported products. As far as the export market is concerned, India's geographical proximity to the Middle East offers a natural advantage in the form of freight costs, which is a major component when it comes to bulk goods like pipes. In order to exploit the full potential of the domestic as well as overseas markets, the Indian pipe manufacturers should focus on continuous quality improvements and globally competitive pricing.