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METCON STEEL update

July-September 2010

THE RIGHT BAR

When you go shopping for steel bars for your home, a maze of claims clouds you. You would wonder if it is a must to learn metallurgy before you buy steel.

Not necessary. But some tips can be helpful.

An ISI mark. A reference from the architect. A word from a trusted dealer. That's all one would usually look for before buying steel rebars. Seldom does one inquire about metallurgy or the technology involved in their production.

Advertisements of steel companies, however, tend to confuse even a discerning customer. They talk of technology, raw material quality, processes and quality standards. Reliable and known players tell the full story, taking the customer into confidence. But some others are too smart by half. They gloat about what their assets, but are silent on their deficiencies. Like those who claim that they are an ore-to-bar company but in fact do not have appropriate technologies and processes for the raw material they use, and hence manufacture faulty products.

Steel, an alloy of iron and carbon, is produced in a two-stage process. First, the raw material—the iron ore or scrap—is smelted, producing molten iron. In the second stage, iron is converted into steel by removing impurities such as sulfur, phosphorus and excess carbon and adding alloying elements such as manganese, nickel, chromium and vanadium.

The molten steel is then continuously cast, and cut to the prescribed length. These castings are then rolled to make a variety of steel products.

Steel plants are generally two types: integrated producers and secondary producers. Integrated producers convert iron-ore into steel. The three major integrated steel producers in India are Tata Steel, SAIL and RINL. These companies have access to iron-ore and coal mines and they produce molten iron, called hot metal, from ore in blast furnaces. The hot metal feed from the blast furnace is pre-treated to remove undesired elements and then fed into the basic oxygen furnace (BOF). Here, the refined iron is converted into steel. The impurities are separated as slag and molten steel, called crude steel, is obtained.

Mini Integrated Steel Plants which process iron ore using Direct Reduction Technique (DRT). In DRT, iron ore is first crushed into fine ore. The fine ore is then reduced in solid state using reformed natural gas to produce 97 per cent pure iron called Direct Reduced Iron (DRI). DRI is then used as the feed for electric furnaces to produce steel.

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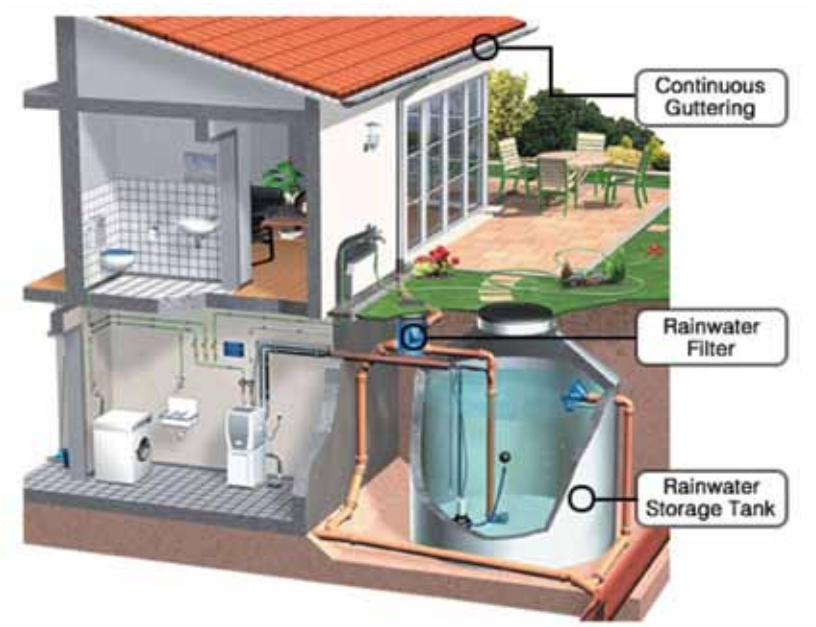
Induction furnaces are used when the metal content is as high as 80 per cent. Since iron content in ore is in the range of 30-35 per cent, it is technically not feasible to use induction furnace for plants which use iron ore.

MAKE EVERY RAINDROP COUNT



WATER, WATER EVERYWHERE, NOR ANY DROP TO DRINK

If you fret at this lament of Coleridge's Ancient Mariner, then it's time you buckled up. Kerala, despite its 44 rivers and 3000 mm annual rainfall, is inching towards severe water shortage in summer. Serpentine queues for water dot the rural landscape; people shell out as much as Rs 500 for a tanker of water. An apartment complex that uses 10 tankers daily will have to spend Rs 1.5 lakh a month for tankers alone.

Add the fact that the per capita fresh water availability in Kerala is one of the lowest in the country, and you have enough reason to look for remedies.

Rain water harvesting is an option available to water scarce-areas, especially the cities. Being an eco-friendly and economical alternative that promises to meet our expanding domestic and industrial water needs, the rain water harvesting system is gaining prominence now. Adaptable for any type of landscape, rainwater harvesting systems apart from storing rainwater can also be used to recharge the groundwater aquifers which can be tapped through wells or bore wells.

Recognising its urgent need, many States have made laws mandating the construction of rain water harvesting systems part of dwellings. The Kerala Municipality Building Rules issued by the Government of Kerala on January 12, 2004 has sought to make rainwater harvesting structures in new constructions mandatory. The rules stipulate that the minimum capacity of the rainwater storage tank shall be 25 litres/sq.m for residential buildings and 50 litres/sq.m for commercial buildings. Thus, a residential home of 200 sq.m area would need a rainwater storage tank of 5000 litres. These rules are based on the understanding that

SAROVARAM, LITERALLY

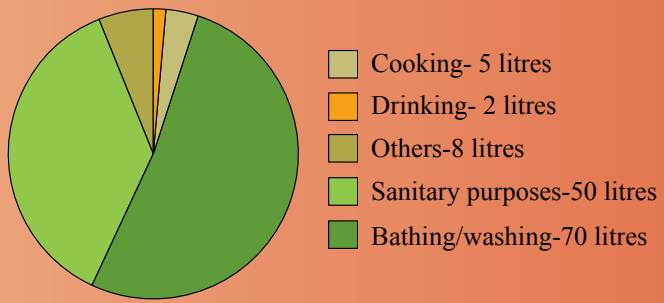
The rain water harvesting system at Hotel BTH Sarovaram in Kochi has set the tone for water conservation. Requiring close to 33000 litres per day to meet its water needs, the hotel chose to construct its own water harnessing system rather that depending on municipal and tanker lorries. It constructed an open tank with a capacity of 40 lakh litres.

The tank is expected to store water for 120 dry days. Since elastic lining impermeable to ground water percolation was used in its construction, the project cost only one third of the total cost of a conventional RCC lining. The hotel is now self-sufficient in its water needs, remaining a symbol of carefully managed and scientifically planned system. The lake adds to its landscape; the fish in it ensures it remains algae free.

Says Ms Latha Raman Jaigopal, Director, Inspiration Architects, consultants to the project, "Its time the industries and huge commercial establishments in Kerala started looking at alternatives like water harvesting to meet their water needs."

(Inspiration Architects: 0484 278 1324)

DAILY WATER REQUIREMENT OF A PERSON



an average person needs 135 litres of water a day (see chart).

Constructing a rain water harvesting system is a relatively simple affair. The main components of the system are a catchment area, the pipelines, a filtration system and the storage tank. The rooftops of buildings or open spaces can double up as the catchment area. The water falling on the roof of a building is initially made to pass through a filter unit - a chamber filled with filtering media such as fibre, coarse sand and gravel layers - to remove debris and dirt. The filtered water is then stored in underground tanks. This water can be used for all domestic purposes and can be made potable by purification.

Setting up such a system in Kerala is a good proposition. Kerala receives rains for a good 120-140 days a year, thereby allowing for sufficient storage. There are limitations of cost and space that restrict the volume of water that can be stored in tanks. To meet this constraint, the spill over or excess water from storage tanks of buildings can be diverted to bore wells or wells, to recharge the groundwater aquifers. For industrial and commercial buildings which require a huge quantity of water, an alternative is to dig a large catchment area in an open space, doubling it up as an artificial lake (see box). Open spaces can also be provided with a proper drainage system to transfer rain water to these aquifers.

The cost of rainwater harvesting systems depends on a variety of factors. A big chunk of the expenses would be for laying the pipelines and building the storage tanks. The plumbing costs can be reduced considerably by locating rainwater outlets on the roofs, judiciously. Reusing existing structures like storage tanks and wells will also help reduce cost.

Proper protection and regular maintenance is another requirement. The costs for installing the system in buildings under construction will be lesser. A proper study of the terrain on which the building is constructed, as well as its soil composition and various other factors will help determine the best method for harvesting rain and reducing cost. But this initial cost is a one time fixed basis investment with long term returns.

A scientific application of the resources available to us will go a long way in supporting the existence of our future generations.

INDIA TO BE SECOND LARGEST STEEL PRODUCER BY 2015

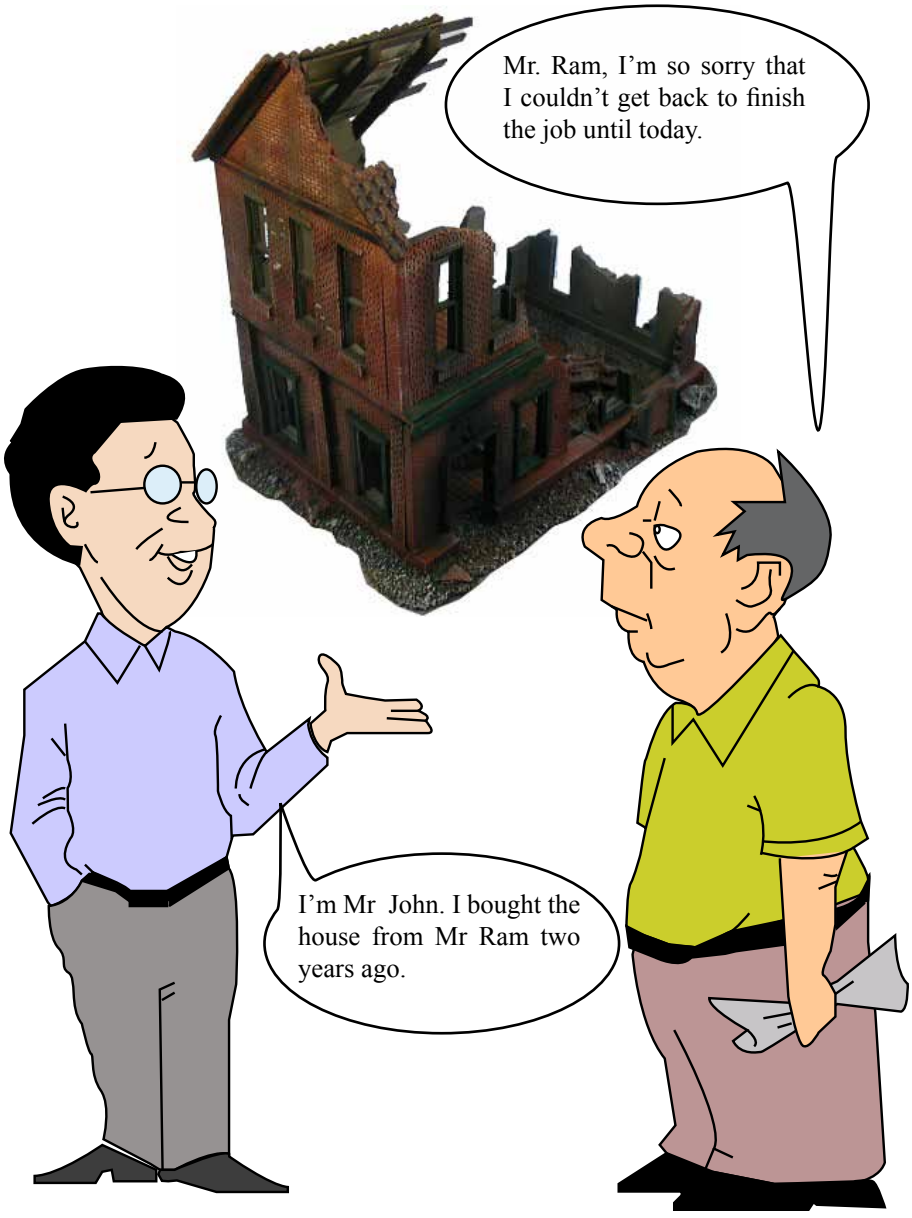
While the global steel industry reported a downturn of 8 per cent in 2009, India bucked the trend and increased its production by 4.2 per cent. At 60 million ton, India is the fifth largest producer of steel now after China, Japan, Russia and United States. Moreover, government estimates say the country is likely to become the second largest producer of crude steel by 2015-16.

According to the Ministry of Steel, 222 memorandum of understanding (MoUs) have been signed with various States for planned capacity of around 276 MT. Major investment plans are in Orissa, Jharkhand, Chattisgarh, West Bengal, Karnataka, Gujarat and Maharashtra.

The world produced 1.22 billion ton of crude steel in 2009, its lowest level since 1.144 billion ton in 2005, figures from the Brussels-based World Steel Association, whose members represent 85 percent of steel output, showed.

China strengthened its position as the world's top producer, with its production rising to a record high at 567.8 million ton. The country now accounts for 46.5 per cent of the world's total production.

Analysts said $500 billion global steel industry will rebound in 2010 with the production and demand rising by around 10 per cent.



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Mini steel plants which make steel from scrap or sponge iron/direct reduced iron (DRI) or a mix of these are secondary producers. Other manufacturing units like the independent hot and cold rolling units, re-rolling units, galvanising and tin plating units are also secondary producers.

Secondary producers operate mainly in the second stage of the process of steel production – conversion of iron to steel. Most secondary players employ electric furnaces to produce steel. Electric furnaces have lower capital and manufacturing costs, than basic oxygen furnaces used by integrated players. Electric furnaces contributed 53 per cent of the crude steel produced in India in 2009-10.

Electric furnaces are of two types – electric arc furnaces (EAF) and induction furnaces. In EAF, the feed is melted using heat produced by arcing between graphite electrodes and the iron content in the feed. In induction furnaces, heat is generated in the metal itself by eddy currents induced by a magnetic field set up by an alternating current.

Electric furnaces can process only the raw material which has high metal content. Induction furnaces are used when the metal content is as high as 80 per cent. Hence a mixture of scrap steel and sponge iron/DRI is used in such furnaces. Since iron content in ore is in the range of 30-35 per cent, it is technically not feasible to use induction furnace for plants which use iron ore. While blast furnaces can be operated with both iron ore and shredded scrap as raw material, induction furnace is suitable only for plants using scrap iron as raw material. So when companies which are not integrated or mini integrated steel plants claim that they are an ore-to-bar company, they are not telling the truth.

So next time you see an advertisement claiming the bar is made from iron ore, just be careful.

Steel from scrap

Companies that advertise their ore-to-bar claim premise their argument on another slippery floor: steel made from ore is of superior quality and that made from scrap is not. This is unscientific, and puts the logic of metallurgy on its head. Like most manufactured goods, steel has too many variables involved in its production. Like raw material. Some plants use refined iron while some others use scrap. Scrap can be a heterogeneous mix comprising steel from ship-breaking, furniture, old buildings, packets, automobiles and sundry ones. It often contains unacceptable levels of contaminants such as copper, nickel, chrome, and molybdenum. So attaining the desired specification with respect to chemical composition, cleanliness and gas content is a challenge. However, by appropriate modification, a plant can ensure the quality of the final product.

In induction furnace, the quality of scrap is very important. So the question basically is what kind of scrap one uses. Companies can opt for homogenous scrap to produce better quality steel. Like automobile shredded scrap, which is counted as one of the best scrap material, since the auto-mobile industry uses only the best quality steel.

Metrolla Steels use only automobile shredded scrap, which is counted as one of the best scrap material.

Using scrap as a raw material has other advantages.

- Steel is a key component of car parts and household appliances, and recycled steel has the same strength as new steel.
- Recycling steel prevents the need to mine additional iron and coal.
- Producing new steel from virgin materials requires more non-renewable energy than steel made from recycled steel.
- Because steel is a metal, it can be easily separated from other recyclables.
- Steel recycling saves landfill space as well as provides a scrap resource to the steel industry.
- Unlike other materials (e.g. paper, glass), steel does not need to be separated by color or size before it is recycled; it can all be melted down.

"We use only automobile shredded scarp," says Thomas Chandy, production manager at Metrolla Steels. "Quality control is easier when we use homogenous scrap material."

It is estimated that when one ton of steel is recycled, 2500 pounds of iron ore, 1400 pounds of coal and 120 pounds of limestone are conserved. United States, one of the most quality conscious markets in the world, by law requires a certain proportion of all steel to be made with recycled steel. Recycled scrap is a raw material feedstock for 2 out of 3 tons of steel made in the United States.

So when you shop for steel next time, be on guard against the lofty claims seen in advertisements.

Buyer beware.