



The turn of the century was a watershed for the Indian construction industry. The “Green Building” trend began to gain momentum in India in the early 2000s. The emphasis on sustainable building strategies began to increase. The increased focus can be gauged from the many instances of high-profile projects that were stalled or cancelled for violating green rules and regulations in the recent past. On top of this “green” pressure on contractors was the pressure of economics. The topsy-turvy economy meant that no contractor could afford delays in projects and increase in project costs. The extra challenge was still adhering to stringent quality norms on top of the “green” and economic pressures. All of these factors combined allowed for the entry of several new products, technologies and concepts that enable various stakeholders in the construction industry to achieve many (if not all) of these objectives. The use of fly ash is perhaps one of the best examples of this trend.



There is no doubting the potential for the use of fly ash by the Indian construction industry. Although misconceptions about fly ash were once prevalent, they have all but gone. Much of fly ash's new reputation can be attributed to the initiatives of various reputable organizations. For example, Institute for Solid Waste Research & Ecological Balance (INSWAREB) and the World Bank, as a trustee of the Community Development Carbon Fund

(CDCF) have demonstrated their support for the use of fly ash. Additionally, the Union Ministry of Science & Technology' initiative in setting up the Fly Ash Mission (FAM) was an important move.

Notwithstanding the government's pro-active as well as discouraging actions, the cement industry has taken a big leap since 2000 by switching over to the production of Portland



Pozzolan cement (PPC). The annual consumption of fly ash in PPC alone has crossed over 40 million tons in the last 15 years. Massive marketing campaigns and workshops are needed to educate people about the durability and performance benefits that come from adding fly ash to cement.

Over the past two decades, many positive steps have been taken to ensure the continued use of fly ash. Existing standards in India have been reviewed and revised for the utilization of fly ash. Newer guidelines have meant that today fly ash and its products are being used in construction projects undertaken by various Departments of Public Works. After over two decades of struggles and legal battles, the Ministry of Environment & Forests (MoEF) has ultimately come out with a notification for the promotion of fly ash (No. 1799-2009) in



various aspects of construction. The Ministry of Road Transport & Highways has issued a similar circular asking for mandatory use of fly ash for

road construction within 100 km radius of a thermal power station. The changing market dynamics have also spurred demand. Seeing as the typical Indian contractor wants larger quantities of affordable construction materials, the use of alternative materials such as fly ash has begun to pick up. This is especially important given the continued growth of the infrastructure and real estate sectors.

Utilization by the Construction Industry

Various methods of fly ash utilization have been on the rise in recent



times. Some of its uses in the construction industry

are:

In concrete production as a complementary material for Portland cement and sand

In embankments and other structural fills in the case of road construction

Stabilization of soft soils

Road sub base preparation

As a mineral filler in asphalt concrete and in geopolymers.



The use of fly ash as a partial substitute for some of the Portland cement content in concrete has been recognized as early as 1914. Interestingly, the Romans used volcanic ash or “pozzalona” during the construction of several landmark Roman structures such as the Pantheon in Rome. “Pozzalona” possesses similar properties to fly ash. The areas in which fly ash is used are constantly increasing. For example, in the construction of roads, the use of fly ash as an embankment material becoming increasingly more popular. Soil stabilization is another area where fly ash is in demand nowadays. The US has several dams that have been constructed with high fly ash contents.

Perhaps the biggest impact of fly ash can be seen in the brick production industry. With the advent of FaL-G (fly ash-lime-gypsum) technology in 1991, the investment for the production of fly ash brick has dropped significantly, bringing fly ash brick within the reach of small



and micro-scale entrepreneurs. As a result, there is rapid proliferation of fly ash brick activity in India. As of now, over 18,000 plants are working on FaL-G technology throughout the country.

India is estimated to consume about 200 billion bricks annually. This roughly translates into 800 million tons of clay, which, in turn, erodes about 66000 acres of top soil, making the land infertile. India has been a predominant consumer of burnt clay bricks for several

centuries now. The country's brick industry is second only to China. This industry creates environmentally disastrous amounts of pollution. Not only do the brick kilns themselves pollute, but they consume staggering amounts of fuel as well. Rough estimates indicate that the brick industry in India consumes over 40 million tonnes of coal annually, producing over



58 million tons of CO₂.

These figures have been a wake up call for the environmentalists and other government authorities. Today almost every state government has begun to understand the potential benefits of using fly ash for construction purposes. This is however, just the beginning. The growth potential is huge. The changed perception about fly ash has meant that the demand for fly ash bricks and blocks is already booming. An estimated 27 million tonnes of fly ash is being put to use in brick segment and over 37 million tons for the production of PPC in India. Thanks to FaL-G technology, fly ash bricks have in a way emerged as the symbol of the fly ash revolution that is now taking place in India.

One of the reasons for the increased availability and demand for fly ash products has been



the advent of specific equipment for the purpose.

In recent times, India has emerged as a key market for fly ash brick making machines. Although the market is still dominated by the small scale sector, big name players such as Bessers, Hess India, Pakona are gradually changing the scene. High capacity machines that are easy to install, run and maintain with minimal labour are now in demand. A good

number of Chinese brands are also active to meet the demand of high capacity plants in India.

Challenges Ahead

While there is no denying the increase in utilization of fly ash, policy confusion over the dumping of this industrial effluent has led to a situation where huge quantities of the material are still going unused. According to a recent report by the Central Electricity



Authority (CEA) which has been assigned by the MoEF to monitor the 100% fly ash utilization target set by the ministry, 66 thermal power plants missed the target in 2012-13. This was significantly up from the figure of 43 reported in 2011-12. Out of the reported production of 163.56 million tonnes of fly ash in 2012-13, India could utilize only 63%. In 2011-12, against 145 million tonnes of fly ash production, a whopping 60 million tonnes went unused. Complacency in adhering to laws and rules, and lack of strict enforcement are the main reasons for dumping of fly ash by thermal power plants. This under utilization is something that MoEF needs to take a look into on an urgent basis. Otherwise, millions of tonnes of fly ash which could have been used for building the nation will continue to go to waste.

Source: [The Masterbuilder](#)