

# USING ENVIRONMENTALLY FRIENDLY CONSTRUCTION MATERIALS IN BANGLADESH

A seminar on 'Using environmentally friendly construction materials in Bangladesh' was held on August 24, 2014 at The Westin Hotel, Dhaka. Engineers and realtors called for using environmentally friendly construction materials. The use of clay bricks in construction causes tremendous pollution. This is destroying cultivable land and trees and pollution keeps rising due to this. There is no choice other than using alternative and environmentally friendly construction materials and switching to greener technology.

Mr. S. M. Kamaluddin, Chairman, Concord Group presided over the program. Mr. Anwar Hossain Manju MP, Honourable Minister, Ministry of Environment and Forest, The Government of the People's Republic of Bangladesh was the chief guest where Dr. Engr. M. Shamim Z. Bosunia, President of the Institution of Engineers, Bangladesh, Mr. Kamrul Islam Chowdhury, Chairman of Bangladesh Environment Journalist Forum, Prof. Nazrul Islam, Former Chairman of University Grants Commission of Bangladesh and Mr. Lee Yun Young, South Korean Ambassador to Bangladesh were present as special guests. Environment consultant Mr. Saleh Mustafa Kamal P. Eng presented the keynote in the program.

Environment and Forest minister Anwar Hossain Manju MP praised the entrepreneurs for innovating environmentally friendly construction materials to cope with the changing needs of the country's booming building industry.

Dr. Engr. M. Shamim Z. Bosunia said that it is urgent to use environmentally friendly construction materials that would save people and reduce damage caused by natural disasters. He also urged for sewerage system integration and rainwater harvesting.

Prof. Nazrul Islam, in his speech, said use of innovative construction materials would increase with economic development in our country. We have to find out the ways to prevent our environment from the adverse effects that will happen with economic growth. On-site sewerage treatment plants should be integrated with buildings.

Mr. Kamrul Islam Chowdhury opined for green economy, green growth, green development etc. that can help achieve sustainable development. He emphasized that the construction sector should seize the opportunity of CDM mechanism that is going to be the thriving sector. He also advised to cut down emission and ensure sustainable agriculture, energy and development for all.

His excellency Mr. Lee Yun Young addressed the gathering by emphasizing the importance of environment, danger of global warming, sea level rise and Korean commitment towards ethical approach against environmental disparity. He lauded the role of Concord in producing environmentally friendly construction products and its Chairman Mr. S. M. Kamaluddin.

**Introduction:**  
For development to be sustainable, it must take into account social and ecological factors as well as economic ones affecting the living and non-living resource base, and of the long-term as well as the short-term advantages and disadvantages of alternative actions.

In recent years, policy planners are paying more attention to environmental problems without ignoring

economic growth. However, policy planners are often baffled if the two agendas are a false dichotomy. In spite of the dazzling development in different sectors of the economy, all policy planners do agree that all future developments in Bangladesh will emanate from two basic resources - **soil and water**. It is the judicious and economic use of these two resources that will promote development and meet the needs of future generations.

**Concord became the industry standard:**  
Concord has always been at the forefront of construction technology in Bangladesh and its innovations in the construction industry have quickly become industry standards. Concord was the first company to set up automated batching plants to supply ready-mix concrete for construction back in 1990. Now it has multiple batching plants and a large fleet of transit mixers.

**Concord's pressed concrete products:**  
Concord is also a pioneer in the field of concrete building materials. It was the first company to set up concrete block plants in Bangladesh and now has four fully automated plants that manufacture concrete blocks (load bearing blocks, hollow blocks and solid blocks), paving blocks, ceiling blocks and a host of other concrete products. Concord also has a terrazzo tiles factory and a roof tiles plant. These backward linkages are very essential to ensure the quality of construction work.

Concord brought in fundamental changes in construction technology in this country.

**Pressed concrete products are safer during earthquakes:**  
Earthquakes are a sure occurrence but highly unpredictable. Bangladesh is within an earthquake prone area and is now divided into 4 zones depending on the likely severity of tremors. The vibration of the ground during an earthquake leads to the collapse of buildings and the falling of cladding materials (bricks) that break into fragments and burst into projectiles that can lead to serious injury or death for anyone in its path.

Dr. Harsh Gupta, then Director, Geological Services of India in 1999 after Latur earthquake in India, commented "Earthquakes do not kill people, it is the falling debris that kills people". About 10,000 people died during that earthquake where most of the houses were brick built.

Construction technology changed substantially in other parts of the world with the advent of tall buildings to accommodate larger populations in relatively smaller areas. Tall buildings are basically a frame of columns and beams where the openings are filled in by any suitable material. In other parts of the world the open space is filled in by using lightweight materials like hollow blocks, smaller size bricks and dry wall partition.

**Brick hazards:**  
A survey by the DOE in 1993 revealed - 2 billion bricks were produced that year in 1200 kilns scattered all over the country, most of which were in and around Dhaka. None of the kilns had 120 feet high chimneys which the DOE subsequently tried to enforce.

Burnt clay bricks cannot be vertically reinforced and integrated with the main frame of the structure as can be done with hollow blocks. Such structures pose a threat to life and property in case of an earthquake. Concord replaced bricks with hollow blocks that are more ductile and become crushed to small fragments thus not killing people.

**Savings in essential resources using pressed concrete products:**

**Fuel and cement savings:** The yearly savings in only fuel cost, if transformed from traditional clay burnt bricks to concrete blocks, is 18 billion Taka (based on the production of 17.2 billion bricks in 2011). In the case of using clay bricks, if 50% were used in walls, 84 million bags of cement would be required to erect and plaster those walls. The equivalent amount of sand-cement blocks would require only 44 million bags of cement, which means a savings of 200 million US\$ in favour of hollow blocks.

**Water saving:** To produce 17.2 billion (2011) bricks, water requirement was 6 billion cft. To produce the equivalent cement-concrete block (dry mix production method), water requirement would be 750 million cft. Thus 5.25 billion cft water could be saved.

**Soil loss:** Soil erosion may be caused by anthropogenic activities. Soil forming processes, occurring during thousands of years, maintain the soil in a favorable balance, suitable for the growth of most plants. The above production of bricks required top soil of more than 45 million tons of agricultural land. We are losing about 1% of agricultural land every year for various uses including that for brick making.

**Air pollution:** Brick production in kilns emits particulate matters, SOx, NOx, dust & smoke which are very harmful to health and the environment. On the contrary, concrete products minimize such pollution. World Bank estimates indicate that 20% of premature deaths which amounts to 750 a year, is attributed to particulate matter emission from brick kilns. Total loss due to mortality and morbidity was estimated at 500 million US\$.

**Construction cost saving:** Real Estate & housing is a 20,000 crore taka industry in Bangladesh which has a significant contribution to GDP. If concrete building products are used in construction instead of traditional burnt clay bricks, it can save up to 20% of the total.

**Waste water management:**  
UN sponsored *Brundtland Commission* report in 1989 "Our Common Future" highlights the cost of ignoring the environment for indiscriminate development. Mrs. Brundtland has urged countries of the world to take environmental protection to heart and continue development.

The Daily Star in May, 1999 ran a story about the imminent danger of failure of sewerage system in Dhaka which was saved by a World Bank loan, a Japanese grant and government aid.

**Waste water management using fixed film aeration system:**

Lake City Concord, the biggest affordable housing complex in the country with 4000 flats, was connected to a on-site fixed film aeration system waste treatment plant back in 2001. The plant using aerobic treatment of sanitary waste produces innocuous effluent before discharging to receiving water.

The government has very recently taken the decision to enforce on-site sewage treatment facility before directing the waste to the public sewer system.

The decision seems logical when asking the question: Are conventional water borne sewerage systems viable in a developing economy?

**Affordable housing:**  
Can The American Dream be a Bangladeshi dream? 'The dream to have a decent house for every family' is possible, yes, with the present economic development taking place in Bangladesh.

Environmentally benign construction materials produced by Concord for more than one and a half decades may now result in engineered houses at an affordable cost.

These houses may be supplemented with on-site sewerage treatment and green energy (again being introduced by Concord) to help reduce energy cost substantially.

**Land conservation master plan:**  
Very recently The Bangladesh Planning Commission has come up with a concept paper towards planned and integrated land use, and has taken up a pilot project. Because of unplanned urbanization - dwelling houses, roads, industrial and commercial needs, almost 1% of agricultural land is lost a year, which includes top soil for brick manufacturing. Consolidation of housing and specific land use up to villages, growth centres and upazilla level constitutes this core concept paper. Land acquisition, filling of low lands and wet lands are being severely restricted.

The Rajoir and Madaripur integrated land use plan survey reveals that about 22 people live per acre. The Govt. plans to consolidate the scattered housing and raise it to 100 per acre without sacrificing any more land.

Under the project, in 7 locations of 7 upazillas in 7 divisions, two 4-storied buildings will be built on the main road for residential purposes with all urban facilities. Later, 10 upazillas will be taken up each year.

**No alternative - Pressed Concrete Products is the answer.**

Millions of houses will be built. Top soil cannot be touched to produce burnt clay bricks. Naturally there is no alternative to pressed concrete products. Billions of such building blocks will be needed.

**Renewable energy:**  
To address the shortcoming of the present solar energy systems, Concord is planning to introduce a more efficient system.

**CONCORD HAS ONE AIM - TO IMPROVE THE QUALITY OF LIFE OF THE PEOPLE OF BANGLADESH. PROJECTS LIKE LAKE CITY CONCORD ARE AN AFFIRMATION OF THIS COMMITMENT.**



Minister  
Ministry of Environment and Forest  
The Government of the People's Republic of Bangladesh

**MESSAGE**

It is very important to protect our environment. From Bangladesh's perspective, trees like Gazari, Sundari, etc. are vanishing, our rivers and lakes are getting polluted, the air is becoming full of poisonous toxins. It is very important to give special emphasis on development that does not harm the environment.

Construction materials are different in different countries. In Bangladesh, the principal building material is burnt clay bricks. This process leads to very high levels of air pollution, loss of agricultural land, burns valuable coal & firewood and causes many premature deaths.

We need to strictly enforce all regulations and to monitor the industry to ensure that production switches over to less polluting and energy-efficient methods. Like China, which faced a similar challenge in the brick making industry, we also have to look for alternative products which are cleaner and do not harm our environment.

It is very encouraging to see that a major construction company like Concord has been working on environmentally friendly construction materials for about two decades. I hope that many other entrepreneurs will come forward with such environment-friendly ventures.

We have to protect our environment and protect our people.



(Anwar Hossain Manju MP)

**MESSAGE**

Concord has set a very high standard in the field of construction and engineering. We have a reputation of being the first at many things in our country, whether it is applying the latest technology, using environmentally safe construction materials and maintaining a high ethical standard.

According to a 2011 World Bank Report, brick making accounts for about 40% of Dhaka's fine-particle pollution. The kilns cause 750 premature deaths a year along with cancer and cardiopulmonary disease.

We are all aware of the facts that all over the world, our fuel resources are depleting, our forests are dying, our rivers are getting polluted or drying up, our air has become unbreathable and cancer rates worldwide are expected to increase by 70% over the next 2 decades, with the biggest burden on low & middle-income countries.

For sustainable development, what can the construction industry do? There are many facts, which, if properly addressed, will reduce our pollution levels and our carbon footprint, e.g. Design of efficient structural systems, Green architecture, Choice of building & finishing materials, Energy efficient construction, Use of alternative energy (like conventional and advanced solar systems), Water treatment, Waste management etc.

Most of these practices will save resources in the future but for a developing country like Bangladesh the biggest pollution right now is from the outdated brick making industry.

I am grateful to our Government for their visionary approach - without their initiative our country would not be livable. Their policies & incentives, if properly implemented, will bring about a great change to our country.

Finally, I believe that change cannot be brought about by policies alone. We need to educate ourselves. We have to be aware of the consequences of our actions. We need profound changes in our thinking, in our economic & social structure and in our production & consumption patterns.



(S. M. Kamaluddin)  
Chairman, Concord Group

## Ready-Mix Concrete Batching Plants

Bangladesh's first concrete batching plant was set up by Concord in 1990 in Tejgaon. The quality and consistency of concrete cannot be ensured unless concrete is prepared in batching plants under strict control. Over time the demand for ready-mix concrete for the construction industry grew tremendously.

Concrete of specific strength, mix-design and chemical properties is manufactured in our computerized batching plants and delivered to sites by our fleet of transit mixers.



## Pressed Concrete Products

Concord set up two fully automated high capacity European block plants on the bank of the Meghna river in 1996. This was the first commercial production of concrete blocks in Bangladesh. Much time and effort was put into educating the construction industry about the use of these products and now these are widely used.

Moreover, **concrete blocks and allied construction materials are much more environmentally friendly than clay burnt products.**

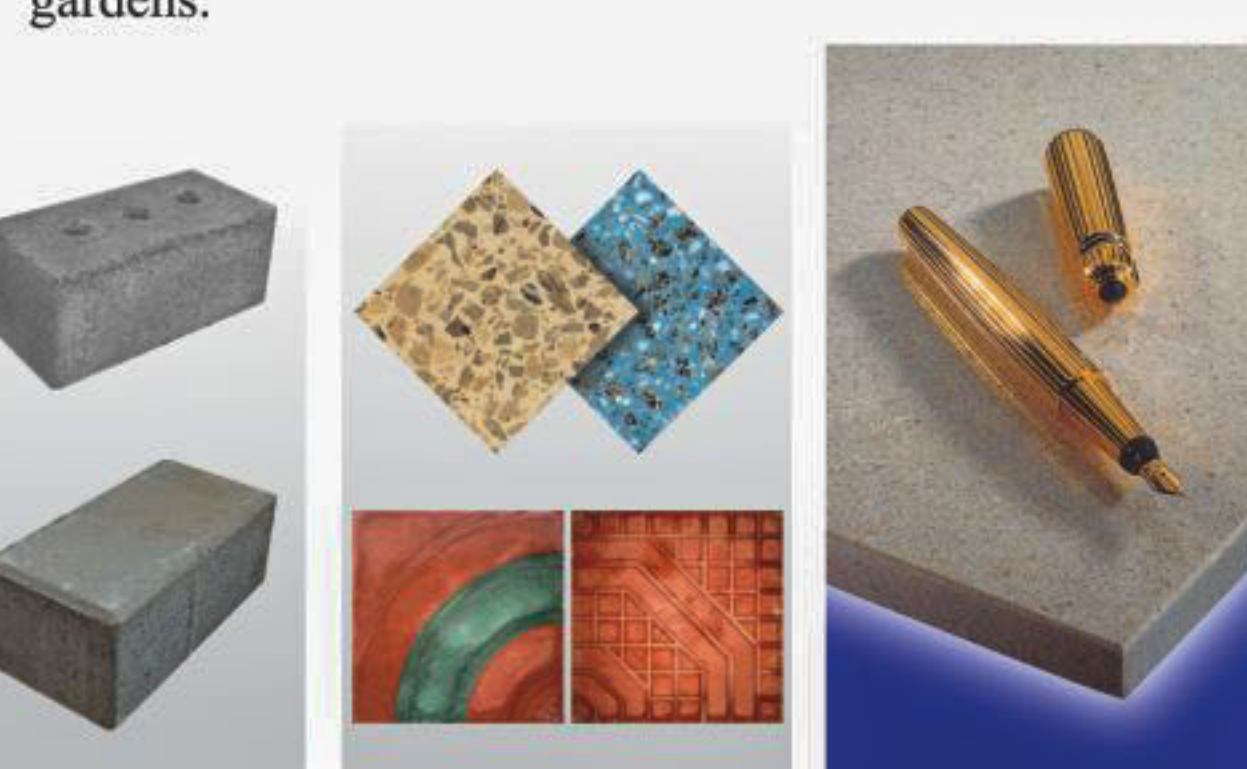
Products include Hollow blocks, Solid blocks, Ornamental blocks, Pavers, Kerb stones, Roof tiles, Cladding blocks/bricks, etc. The capacity of each plant is around 7,200,000 blocks per year.



## Terrazzo Tiles

The terrazzo tiles factory was set up in Shalna in 1999. The factory has a fully automated Italian press machine which manufactures pressed mono-layer terrazzo tiles. There are four more semi-automatic machines for the manufacture of double layer terrazzo tiles (with backing). The tiles are polished in a 10 head linear grinding machine. The shine and strength achieved by this method cannot be achieved by any other methods of production.

These machines are also very versatile. Other products include engraved cement tiles in many colours and patterns for use in driveways, pavements, courtyards and gardens.



## Load Bearing Blocks & Reinforced Concrete Block Masonry

The block plant at Anarpura, Gazaria runs a Besser V-3 Vibrapac machine to produce some of the strongest concrete blocks in the world. The capacity of the Besser Plant is 4,320,000 blocks per year. The blocks can easily achieve strengths of over 30 MPa and are used in high-rise load bearing construction, especially suited for earthquake prone zones. The Vibrapac is a very versatile machine and can also produce non load-bearing products and pavers.

The entire Lake City Concord project (with over 4000 apartments) - the most cost effective project of its kind in Bangladesh till date was constructed with these products, thus making the buildings **more earthquake resistant** than conventionally built buildings.

