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INFRASTRUCTURE

ALTERNATIVE TO BRICKS

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Bricks are rectangular blocks of baked topsoil from agricultural land and are used mainly for building walls and roads. They are also used for making coarse aggregate for concrete in civil engineering structures of some countries including Bangladesh.

Making burnt clay bricks requires a huge amount of topsoil as well as fuel for burning the soil. Studies reveal that every year Bangladesh loses one percent of agricultural land of which 17.4 percent is used for manufacturing bricks amounting to 18,000 hectares (180 square kilometres) of agricultural land. The loss of such vast amounts of land has an explicit negative effect on food security. Moreover, about 8 million tonnes of coal and wood are being used for baking 25 billion bricks per year causing emissions of about 15 million tonnes of oxides of carbon and usage of 60 million tonnes of topsoil as raw material. Emissions arising from making bricks account for more or less 20 percent of total national emission. Studies reveal that emissions in Dhaka during the dry season make up as high as 58 percent of total emissions coming out of 1,200 brick kilns in and around Dhaka city. Emission of such huge amounts of carbon is one of the major causes of environmental pollution and use of fuel leads to deforestation which again has an adverse impact on the environment.

As a construction material, bricks are not a good engineering product. Soils from different sources and burning processes cause heterogeneity in the product quality. Bricks make construction immensely time-consuming and laborious. It is not suitable for earthquake resilient building structures. Furthermore, the foundation becomes expensive because of its heavy weight which increases the seismic load and building weight. Since bricks absorb water easily, it causes efflorescence when exposed to a humid environment. Because of the uneven surface and shape of bricks, thick mortar and plaster are required between two bricks and surface of walls, respectively. Because of high water absorption and shrinkage cracks, bricks require more maintenance. Also, it isn't suitable for production on site, when necessary. Use of red clay bricks in the construction industry is therefore morally, environmentally and socially harmful.

To ensure food security, prevent deforestation, reduce environmental pollution, reduce earthquake and structure load, and to get rid of efflorescence, and reduce construction cost, we don't have a choice other than adopting an alternative to bricks. During the last five years, the Housing and Building Research Institute (HBRI) innovated some alternative materials and technologies to bricks using river dredge sand and soil which are agro-friendly, environment-friendly, durable, sustainable and affordable for the common people. These technologies include Concrete Hollow Blocks, thermal block using expanded polystyrene sheet, Compressed Stabilised Earth Block (CSEB), Interlocking CSEB, Ferro-cement Wall Panel, and Ferro-cement Laminated Sandwich Panel. Moreover, some other alternative technologies are already available in the market. The most superior alternative to brick technology in the world, Autoclaved Aerated Concrete (AAC) Block, is about to enter the market.

Pre-cast Ferro-cement Panel

Cast-in-situ Ferro-cement

3D Panel

Thermal Block

CLC Block

Sandwich Panel

Considering the abovementioned facts, we have no other way but to adopt alternatives to bricks for sustainable food security as well as environmental conservation. We also need to ensure housing and construction practices become more affordable. The following might be considered as some alternatives for countries like Bangladesh.

1.Autoclaved Aerated Concrete Block (AAC)
2.Concrete Blocks (hollow and solid)
3.Compressed Stabilised Earth Block (CSEB)
4.Interlocking CSEB
5.CSEB reinforced with jute fibre
6.Thermal Block
7.Cellular Lightweight Concrete Block
8.Poly Block
9.Ferro-cement Panel (pre-cast and cast in situ)
10.Sandwich Panel (ferro-cement lined and metal laminated)
11.3D Panel
12.Stabilised soil bed to replace brick flat soling

Alternative materials have the following advantages over conventional burnt clay bricks:

1.Better functional efficiency
2.Cost effectiveness
3.Better durability
4.Ease of construction
5.Better finish
6.Minimum waste
7.Less maintenance cost
8.Minimum defects
9.Less energy intensive
10.Affordable
11.Better sound and heat insulation property
12.Lighter in weight which makes buildings earthquake resilient and economical
13.Waste management by making blocks from domestic and industrial waste
14.Utilisation of river dredged soil for concrete blocks and CSEB
15.Reduces agricultural land loss
16.Helps in reducing carbon emission and deforestation

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Efficient logistics key to boosting local trade, global competitiveness

STAFF CORRESPONDENT

Bangladesh should put in place efficient transport and trade logistics not only to ensure smooth transportation of goods but also to boost the country's competitiveness globally, analysts said.

"We have to ensure seamless connectivity," said Mustafizur Rahman, a distinguished fellow of the Centre for Policy Dialogue (CPD).

ASM Mainuddin Monem, deputy managing director of Abdul Monem Limited, the country's leading construction firm, said unpredictable logistics is very costly.

"Because of the unpredictability, you can't do real planning. Bangladesh is a small country but it is densely populated. We have many other challenges as well, so we have to go for a multimodal transport system."

In the latest Global Competitiveness Index, Bangladesh scored 34.3 out of 100 in the road connectivity index with 100 being the best and zero being the worst.

When it comes to the quality of roads, the score was 3.1 on a scale of 1-7 with one being the worst and seven being the best. The country scored 3.2 in the efficiency of train services sub-index.

Rahman of the CPD said logistics infrastructures have become an important element of the country's competitiveness as they are interlinked with the ease of doing business.

When it comes to trade logistics, businesses face delay at the borders because of a lack of a single window and an electronic data exchange and a huge amount of time is spent just on documentation.

Globally, three things are needed for competitiveness: price competitiveness, quality, and lead-time, according to the trade expert.

In case of lead-time, Bangladesh is falling behind. "This is not only about export competitiveness; because of weak trade logistics, imports get delayed and are more costly. Ultimately, it affects the consumers."

Rahman said producers, exporters and consumers pay a price because of weak trade logistics.

He said competitiveness at the enterprise level alone will not yield any results and there has to be competitiveness in the entire value chain.

Rahman said transport corridors within the country have to be developed further and run efficiently so that delays don't take place and costs don't escalate.

Mainuddin said the biggest challenge for Bangladesh is that a multimodal transport system has not yet been developed in the country in such a way.

Because of the lack of a multimodal transport system, fuel is being burnt by slow-moving vehicles on the roads unnecessarily, he said.

The transport system is still dependent on roads and this dependency is very risky. One mode of transport will not solve the problem, he said.

Mainuddin said that on the Dhaka-Chittagong highway, the biggest obstacle is the container-laden trucks, which account for 90 percent of all the traffic.

"If we can transport them through rivers, it will give us a huge advantage. But this is not the case in Bangladesh."

"We have to give importance to the river routes," said the industrialist, adding that ultimately, the rail, roads, and rivers have to be focused.

SK Masadul Alam Masud, a former chairman of the Bangladesh Auto Re-rolling and Steel Mills Association, said every month 2 lakh to 3 lakh tonnes of scraps are brought to steel mills in Shayampur, Narayanganj, Demra, and Kanchpur using the road network.

If the Pangaon Inland Container Terminal port in Keraniganj is made fully functional, those scraps can be brought through the river network which will cost much less in terms of freight charges and ease traffic congestion on roads, he said.

He said Gazipur-based industries can also use the Pangaon port for their import-export activities instead of using the congested highway.

Masud Khan, chief executive officer of Crown Cement Group, said cement companies are facing a number of challenges in delivering products across the country.

The challenges include congested roads that increase the costs of transportation; bazars on highways and regional highways impeding traffic and increasing fuel costs; poor road conditions leading to increased fuel consumption and maintenance costs; and poor quality of fuel which increases fuel consumption and reduces engine life.

The challenges can be resolved by improving road conditions and proper enforcement, said Khan.

He said ready-mix concrete (RMC) has very short duration; normally, the concrete has to be delivered within two hours of production.

"Any additional time has to be covered by admixtures that are expensive. If there are delays, which is what happens often, customers refuse to take delivery and companies take the hit for the wastage," Khan said.

Md Tarek Uddin, a professor of the civil and environmental engineering department of the Islamic University of Technology, said quality of concrete is very important for any infrastructure.

"If we can't ensure the quality, we will not get the required strength and durability."

Prof Tarek said sustainability has become an issue when it comes to building a structure. "We have to ensure that they are durable and last long."

He said quality of concrete is an issue if Bangladesh wants to make the most of the blue economy because the environment in Dhaka city and that of other areas in the coastal belts is not the same.

For example, in Khulna, where there is a problem with salinity, many structures get damaged faster than those in non-coastal areas, he said.

Prof Tarek recommended taking inputs from material engineers when structural engineers design a project.