GREEN BUILDING

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Cover Story

Trends of Green Construction Materials in Asia

Green Building has become a global issue with the growth of environmental and ecological concern around the world. Countries across the globe now considering the green building as a tool of sustainable production and consumption. It is because building and construction industries consume most of the world resources including fossil fuel. The emergence of green building and green construction material has become crucial for the Asian region where more than sixty percent of the world's population (estimated 45.39 billion as of 2018, by United Nations) resides and more than two billion in total lives in urban areas. Consequently, high population, dense cities with limited areas for agricultural crop make a reality to the Asian countries to adopt an efficient way to live where green building can be a realistic option for them.

Asia is the largest producer and consumers of world's total brick production and it produces approximately 1.2 trillion bricks annually, at the same time brickmaking process in the Asian region is high energy and labor intensive. The Asian brick sector emits 1.2% of total global anthropogenic CO_2 emissions which is now a major concerned about brick kiln technology. Traditionally, Asian countries are mostly used to topsoil from the agricultural land in brick making.

In this context, Asian countries are now convinced to transform the traditional brick making industries. Despite many instances of positive changes like Singapore, Japan, and Korea, South Asian brick industry is facing a certain resistance to changes for four particular reasons - Labor patterns, brick quality, lack of government regulation and complex land ownership right.

In recent years, the region has seen a rapid growth of green building practices as well as availability of alternative construction materials because of its significant economic, social and cost benefits. Traditional building materials like fire-burn brick are becoming less popular due to government attempts to reduce its production. As the alternatives of clay bricks, different types of construction material like concrete blocks, wood, steel etc. are now playing the role as the dominant construction materials.

As the alternatives of traditional fire-burn brick, Asian market are now concentrated on alternative brick types such as: Concrete Block, Hollow Block, Cellular (CLC) Block, Fully Solid Block, Lintel, Thermal Block, Compressed Stabilized Earth Block (CSEB), Clay Brick, Sand Lime, Fly Ash Brick, Soil Stabilizer Block and AAC Block (Autoclaved Aerated Concrete), Coal Gangue Brick (CGB) etc.

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Inclusive Home Solutions: A Role Model of Social Business in Promoting Green Building

At present, Bangladesh faces the challenge to ensure food security for all 160 million people with a very limited amount of its arable land. In the 7th Five Year Plan, Bangladesh declared to reduce the usage of topsoil in the brick sector to 0% by the end of 2020. To achieve this goal, the private sector and brick manufacturers need to come up with a proper plan to produce alternative bricks to meet the huge demand for bricks in the construction industry of Bangladesh. Though the Government offered many incentives for the potential manufacturers, the response from the entrepreneurs was less impressive than expected. A recent statistics shows that at present, only 17 alternative brick manufacturers are working in Bangladesh and this number is nominal compare to 6,893 traditional brick kilns with 5.6% annual growth rate of its demand. In this context, Inclusive Home Solution (IHS) can be a good example for the potential manufacturers of alternative building materials.

IHS is basically a social business entrepreneur with particular mission to provide quality housing solutions with hygienic toilet and drinkable water supply for the poor people in the rural areas. Till now, IHS constructed 3,300 houses in rural areas, in collaboration with five local NGOs.

In 2013, IHS conducted a research on sustainable and eco-friendly low-cost housing to find an alternative for the CI sheets and the traditional Fired Clay Brick (FCB), which are commonly used in rural areas but which both are a source of heavy pollution. As such, IHS became interested to produce Compressed Stabilized Earth Block (CSEB) since CSEB is commonly used around the globe.

Prior to commercial production, IHS started this research, with the support of the Bangladesh University of Engineering and Technology (BUET), to analyze and verify the built-quality of CSEBs produced in Bangladesh. With not less than 55 different mixes of soil, sand and cement, 50 CSEBs were produced for each mix. From all batches, random samples were tested in the BUET Lab on compressive strength and water absorption. After many months of hard work and testing, IHS finally got approval from BUET. IHS has set a unique example where a commercial entrepreneur goes through such rigorous research and lab testing to produce alternative bricks in Bangladesh.

Based on the research report and the approval from BUET, IHS finally started its CSEB-production. To eliminate the weaknesses of the hand-made process, IHS imported a state of the art, semi-automated OSKAM press from the Netherlands in 2017. Now, this machine controls all parameters and improves the compressive strength by applying a heavy compression. With this technology, IHS is now making

The soil remains a mandatory element to produce any kind of brick and block. However, IHS uses only 30% soil and never uses the fertile topsoil from the agricultural land, but the river-bank soil or reuses ground soil where topsoil has already been taken. Now IHS started a new research to identify how dredged soil from river beds can be used to produce CSEBs.

Class-A category of CSEB in Bangladesh. Their production site is situated in the southern district Shariatpur. The ECO-footprint of the CSEBs is at least 9 times lower than FCB as no fire is needed during manufacturing, which means there is no use of fossil fuel, 10x lower embodied energy and 75% reduction of CO2 emission.

BUET certified that the compression rate of the CSEBs made with the semi-automated OSKAM press is 9 MPa, against 5-6 MPa made with the AURAM hand-press. It means that the load-bearing capacity of this material is sufficiently high. For example, a 130-storied building creates 9 MPa load on its base.

Moreover, as CSEB is very smooth and regular in shape, the wall does not need plastering. Furthermore, fewer CSEBs are needed per square feet of wall than FCB's, as the CSEB is larger in size. With a cost of almost 17 BDT, against 9-12 BDT for the smaller FCB, the construction cost is still cheaper and needs less time and labor. IHS is continuing its research to further reduce the cost of the CSEB to make it more popular.

At present, IHS is providing an inclusive construction solution, including the engineer, for clients who agree to use their blocks in building their home. More and more people accept their blocks, especially around the production site, where clients, witnessing the modern production method, now trust and rely on this product. The company intends to be at the frontline of mitigation of climate change and be a key player in the production of construction materials.

IHS is convinced of the importance of housing for public health, for protection against different kinds of natural hazards and for psycho-social aspects. Since, in many rural areas the poor housing impact on family's health condition, IHS continues its partnership with microfinance entities to assist poor families to build a healthy house. And it is the core mission of IHS to create new and unique opportunities of "ECO Low-Cost Sustainable Housing Solutions" especially designed for Low-Income Groups in the society which may help them to eradicate the spiral of generation-poverty and the challenge to mitigate Climate Change.

http://www.inclusivehomesolution.com/