Sample Abstract Format

Earthquake safer and climate responsive school building construction in Nepal

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ABSTRACT

This paper outlines the construction of a prototype school building in Nepal with environment friendly, climate responsive and earthquake safer features. Nepal needs to build 50,000 classrooms as part of the "Education For All" program which is one of the targets of the Millennium Development Goal. Each school is supported with NRs 650,000 by the Ministry of Education and the village has to contribute the rest of the funding. They can choose between DOE-approved school designs, which – due to budget constraints – are often buildings with a challenging indoor climate, being cold in winter, hot in summer and noisy in the raining season. On the other hand, there is a very low level of community engagement in educational issues. These two factors result in many children staying absent from classes in extreme seasons. Teaching is sometimes simply cancelled due to indoor climate difficulties without parents complaining. Furthermore international research shows that learning ability declines when temperatures are very high or low, so even when the children are present, they are often not working optimally. It is therefore very important to build schools that facilitate a good learning environment and help create pride, interest and participation in education among the village communities. Additionally, the school buildings need to be earthquake resistant buildings as Nepal lies in high earthquake risk zone. Realizing this fact, Institute of Engineering, developed a prototype of earthquake safer and climate responsive school building which is currently open for public exhibition.

The prototype include features which not only make it climate responsive and earthquake safer but also uses materials which are environment friendly. Brick production consumes a lot of energy which not only makes it expensive but also has been a source of environmental nuisance. The prototype uses compressed stabilized earth blocks (CSEB) instead of the commonly used burned bricks and roof is constructed using timber, bamboo and mud. The blocks use 95 percentage of soil and are produced using labour intensive techniques which make it cost effective as soil and labour are two of the most abundant resources in the developing countries. The blocks have strengths comparable to that of country fired bricks but use energy 15 times less than that of country fired bricks. CSEB not only reduces carbon di-oxide production and consumes less amount of energy for production but also has potential as a construction material for climate responsive buildings. The CSEB blocks have lower U-value, a measure of amount of heat flow through a material, which results in comfortable ambience inside a room irrespective of very warm or very cool environment outside. The prototype also has features which make the buildings earthquake safer. The finished prototype is a live exhibition product showing all the features - from foundation to roof - in cross section and any visitors can easily identify those features.

The project was carried out jointly with Department of Education with the financial support from MS Nepal. Currently, ActionAid Nepal and Department of Education are building 12 school buildings in three different districts of Nepal.

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