Low cement concrete technology for sustainable construction

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This paper describes concrete production implementing Lower Cement Concrete Technology (LCCT) to reduce CO₂ emissions (green house gases) under the “Clean Development Mechanism”). The paper also deals with the measures taken for reducing cement consumption considering the minimum cement content given in the specification as the maximum cement content. The project successfully used the latest innovations of concrete technology such as high volume fly ash concrete and self-compacting concrete, at the Rajasthan Atomic Power Project (RAPP) Unit 5 and 6. The Clean Development Mechanism (CDM) Executive Board at Bonn, Germany has accepted the project for CDM benefit. This method has been hosted on United Nation Framework Convention on Climate change (UNFCCC) web site for public comments.

The successful implementation of this technology has resulted in: (a) completing research and development (R&D) to prove the reliability of new technology (LCCT), (b) establishing the guidelines for MIX designs of concrete using LCCT (c) conducting QA/QC checks for the replacement materials and concrete mixes using LCCT to establish confidence in this new technology, and (d) disseminating information on benefits of the new technology through seminars, conferences and workshops.

Infrastructure such as roads, water supply, waste disposal, power projects are major issues for a developing country. However, such projects should be carried out with the idea of sustainable development. Sustainability is the “Development that meets the needs of the present generation without compromising the ability of the future generations to meet their own needs.”

To meet the need of the present generation without harnessing the need of future generation, sustainable construction provides developments that are efficient and affordable, socially acceptable and less damaging to the environment. The sustainable construction is based on three principal areas: environmental, economic and socio-cultural aspects. The idea includes such traditional reasons as quality, cost, and time. Expended service life (durability) of structure is the key point in considering sustainable construction. In addition, carbon dioxide (CO₂) generated from construction materials, energy consumption, recycling are considered. A balance is sought to be achieved between the economic development and the environmental preservation. This means the projects should aim at improving the living standards and quality of life without adversely affecting the environment.