Development of Eco-Friendly, Sustainable, Self-Compacting Concrete Incorporating Ceramic Waste.

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Construction and demolition (C&D) wastes contribute the highest percentage of waste worldwide. Furthermore, ceramic materials, which include brick walls, ceramic tiles and all other ceramic products, contribute the highest percentage of wastes within the C&D wastes. The current option of disposal for this type of waste is landfill. Unavailability of standards, avoidance of risk, lack of knowledge and experience led to there being no active usage of ceramic waste in construction. In Gujrat district more than 100 pottery units are working. Almost 14 tons waste is produced by each unit. Disposal of this waste is a problem. During this project Ceramic wastes were used as partial replacement of natural aggregates in production of self- compacting concrete. Concrete is evaluated by using different destructive and nondestructive techniques. Natural aggregates were replaced up to 50% with ceramic aggregates. Results are encouraging as compressive strength of modified concrete was more as compare to ordinary concrete. Furthermore, ceramic waste aggregates increase the compact ability as unit weight of modified concrete was more as compare to ordinary concrete.

The key findings of this research included: Huge wastage of the ceramic industry will become hospitable, cost of the construction will be lowered by reduction in size of reinforced concrete members, cost of SCC will be reduced by replacing natural aggregates with crushed ceramic aggregate, protection of natural resources, protection of human health and environment by reducing adverse per capita environment impact, promotion of cottage industry, adequate, safe and affordable housing for every one.

This finding can be adopted by precast industry and NHA or PHA for construction of rigid pavements. It also gives a viable solution for disposal of ceramic waste. The project was displayed in "DICE-2017 Mega Innovation and Entrepreneurship Event" which was organized by MUST will the collaboration of DICE-Foundation, USA. It was pitched in front of industrialists during DICE Shock Session and funded by on of the industrialist participated from Islamabad. In future, work can be extended to partial replacement of sand and cement with ceramic waste.