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Low carbon cement concrete: A holistic approach to slash the carbon emission

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Cement is the most massively produced and widely used and man-made materials which contributes around 8% to the global anthropogenic CO₂ emissions. In 2013, China produced 2.41 gigatonne cement (60% cement of the world) and share 12% of the carbon emission of the carbon emission of China. LCA (Life Cycle Assessment) method is employed to thoroughly estimate cement CO₂ foot prints of the cement concrete in China. Based on the research progress of the author's group, this presentation will give some brand new ideas and trial on low carbon cement concrete carried out recently, first a low carbon concrete named aggregate interlocking concrete is developed to prepared concrete with 8~30% lower cement content but higher strength and toughness, around 7.6~28% of carbon emission is slashed; then a new way to uses fine (0-5 mm) steel slag to prepare a low carbon Portland cement clinker is developed, it can save 15% of carbon emission and around 25% NOX to produce each ton of clinker; last but not least, a new type of Alkali Activated Cement with modified proportions are prepared to substitute the Portland cement in some projects and the frontier can be extended with the modification of its performance, this cement has just around 10% of the emission of Portland cement. Low carbon emission cement concrete can be a holistic and effective approach to slash the carbon emission.

Biography

Weiguo Shen is a Professor at State Key Laboratory of Silicate Materials for Architecture, Wuhan University of Technology where he received his BS, MS and PhD. He is an Executive Director of WUT-UC Berkeley Joint Laboratory on Concrete Science and Technology, Council Member of Portland cement branch of Chinese Ceramic Society Chairman of China Concrete Canoe Race Committee. He was a visiting scholar of Northwestern University and a visiting Professor of UC Berkeley. His research interests include low carbon cement and concrete, Life Cycle Assessment of carbon footprint of cement materials, nano structure of cement materials and solid waste utilization.

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