Environmental Impact, Performance and Service Lifetime – Pillars of Sustainable Concrete Construction

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Key words: Sustainability, green concrete, service life design, reliability

ABSTRACT

Green concretes with reduced cement content may provide an alternative for improving concrete sustainability independently of supplementary cementitious materials. However, concrete sustainability is not merely a function of the absolute technical performance, durability and ecological impact, but also dependent on the degree to which these co-dependent properties are optimized and exploited within the design of concrete structures. The resulting uncertainties make an objective evaluation of concrete sustainability during mix design difficult. To aid in this process the Building Material Sustainability Potential is introduced, allowing a first estimate of the potential of a concrete mix to comply with the principles of sustainable engineering. Considering the low cement content of cement-reduced concrete, a proper prediction of the service life of structures made of this material is essential for the evaluation of the sustainability potential. The paper at hand outlines the service life prediction of cement-reduced concrete by probabilistic methods and discusses the subsequent evaluation of the sustainability potential of cement-reduced concrete.