عنوان مقاله:

Environmental-Economic Scoring of Different Concretes Used in Construction: A Case Study of Iran

محل انتشار:

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خلاصه مقاله:

About one ton of concrete is produced each year for every human being in the world (some 6 billion tons per year), making concrete one of the world's most popular construction materials. Environmental impacts such as global warming, water pollution, acidification and resource depletion are for the most part economic externalities. That is, their costs are not reflected in the market prices of the products that generated the impacts. While environmental performance cannot be measured on a monetary scale, it can be quantified using the evolving, multi-disciplinary approach known as environmental life-cycle assessment (LCA). This paper evaluates three mix designs of concrete which have equal compressive strengths. In two of these mix designs about 7% of cement, by mass fraction of cement, is replaced by silica fume and rice husk ash the waste materials with less embodied energy and environmental impacts than cement. The influence of this replacement is assessed in both economic and environmental performance. Before combining the environmental and economic performance scores, each is placed on a common scale by dividing by the sum of corresponding scores across all alternatives under analysis. In effect, then, each performance score is rescaled in terms of its share of all scores, and is placed on the same, relative scale from 0 to 100. Then the two scores are combined into an overall score by weighting environmental and economic performance by their relative importance and taking a weighted average. Lower values are better and the "environmentally friendly" design can be distinguished.

کلمات کلیدی:

Scoring, Concrete, Embodied energy, Sustainable development

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