

## EVALUATION OF ECOLOGICAL CONCRETE USING MULTI-CRITERIA ECOLOGICAL INDEX AND PERFORMANCE INDEX APPROACH

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### Abstract

**This paper proposes a new method of rational and quantitative assessment of ecological concrete in terms of the ecological impact and engineering performance. The concrete mix is evaluated through the multi-criteria Ecological Index (EI) and Performance Index (PI) approach. The EI accounts for the impact of the concrete on environment including the carbon emission and raw materials usage, whereas the PI accounts for the engineering performance of the concrete such as compressive strength and water sorptivity. Depending on the applications of the concrete, different criteria may be chosen for the evaluation. Concrete mixes reported in the literature comprising different types of cement, supplementary cementitious materials and aggregates are analyzed to illustrate the applicability of the proposed multi-criteria assessment method. It is shown that the proposed method is able to effectively reflect the concurrent ecological impact and engineering performance of concrete mixes, and hence facilitate rational design of ecological concrete to suit practical engineering applications.**

**Keywords:** Carbon emission; Ecological concrete; Ecological index; Environmental impact; Multi-criteria assessment; Performance index.