

THE OVERVIEW OF FRACTURE MECHANICS MODELS FOR CONCRETE

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Abstract

Fracture mechanics of concrete is a complex matter still thoroughly researched from different angles. It is not an easy task to describe fracture process in concrete, as there are many factors affecting crack development and propagation. Practical applications of fracture mechanics could allow engineers to design concrete structures more effectively and safely. At the minimum, it could help estimate the “safe” period of time left before the unstable, dangerous crack propagation. This utilitarian goal was the reason for many researchers to invent numerous theoretical models in order to describe the crack occurrence better. However, dealing with various analytical problems was not a simple matter and thus existing models of fracture mechanics for concrete have different limitations. Over the years first fracture theories for concrete were reviewed repeatedly. All of these investigations lead to modifications of older models in order to overcome found drawbacks, which proved not to be an easy task. Recently, new approaches to fracture analyses seemed to produce promising results, like universal size effect law (USEL) or modified two parameter fracture model (MTPM) with alternative ways for evaluating fracture parameters. In the paper some of them will be discussed together with other fracture models, starting from some of the very first ones introduced for concrete, like fictitious crack model (FCM) and crack band model (CBM).

Keywords: Fracture mechanics; Fracture of concrete; Fracture models; Cracking of concrete; Fracture mechanics of concrete.