ملخص البحث رقم (6)

العنوان باللغة الإنجليزية:

Performance of prestressed girders under blast loading: a probabilistic approach

الملخص باللغة الإنجليزية:

The Applied Element Method (AEM) and the Improved Applied Element Method (IAEM) are now recognized as efficient discretization procedures to follow through the stages of collapse of structures. Recently, the IAEM has been extended to study the collapse of post-tensioned bonded and unbonded concrete girders under various circumstances associated with blast loading. In this article, emphasis is given to study the effect of the probabilistic nature of blast loading as it acts on prestressed concrete girders, where analysis is carried out using IAEM. This is conveniently done by using the Monte–Carlo simulation technique from the statistical library of MATLAB mathematical software in order to predict and manipulate the statistical response due to probabilistic blast loading. The reflection overpressure is considered the random variable in the probabilistic analysis, whereas material characteristics and girder geometry are treated as deterministic variables. Formulations are given in case where other material or section parameters are of a probabilistic nature, in which case the performance function is expanded in the vicinity of the mean of the probabilistic parameters in order to predict the probability of failure. The established procedure paves the way to predict the probability of failure of girders due to blast loading affecting one or several components of the bridge.

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