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Contribution at evaluation study of residual mechanical characteristics to reinforced concrete elements

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Summary

Evaluation of residual mechanical characteristics for reinforced concrete structures is a actual problem in Romania where, a lot of buildings were designed and erected before year 1963 when the first seismic norms appear.

For these buildings, it is necessary to check the level of structural safety because the structures take-over more earthquakes without any intervention for rehabilitation between earthquakes.

To establish the structural safety, first must be determined the mechanical characteristics of materials and the paper present the most used methods, destructives or non-destructives, to find the mechanical characteristics of material.

Second step is to evaluate the capable efforts for structural elements and, finally, for entire structure. This step is very difficult cu perform because, under the

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seismic actions, are developed a lot of damages, cracks, plastic hinges and the behaviour of the element is changed.

So, in evaluation of capable efforts for the structural elements must be included these structural damages. To solve the problem the author chooses to use the Finite Element Method because this method is very used in all engineering domains.

The most complicated problem is to insert the structural damages into the structural model. The author proposes a new approach of this problem with an original algorithm that permit to include in the structure damages specified for reinforced concrete elements.

This new original algorithm can be used in two ways. First way is to establish the capable stresses of existing damaged reinforced concrete elements; in this case the damages will be revealed from the structure and included in the model.

The second way is to find the yielding process for new elements with the simulation process. In this case, for a structural reinforced concrete element, the program shows the degradation process and the cracks and plastic hinges positions for any type of loads.

Keywords: residual characteristics, FEM, simulation, reinforced concrete elements.

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