PREDICTION OF BEHAVIOR OF THE INFILLED R/C FRAMES UNDER LATERAL LOADS

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Abstract: Reinforced-concrete infilled frames are composite structures whose behavior under horizontal loads is difficult to predict. The evaluation of the infill effect is very difficult because stiffness and strength are conditioned by complex phenomena of interaction occurring at the frame-infill interface. These phenomena depend on numerous variables like mechanical properties of infill (masonry and mortar characteristics) and of frame members, details of frame members, frame-infill stiffness ratio and even vertical load transferred from the frame to the infill. In order to solve this problem we tested the applicability of neural networks, trained on the compiled experimental database, for prediction of the seismic behavior of infilled frames. An experimental database includes data from laboratory tests carried out on one story, one bay r/c frames infilled with unreinforced masonry. The inputs of the neural networks are geometrical and material properties of the frame, infill and loading. Output variables are deformation capacity in terms of drift, shear strength and mode of failure of infilled frames. The obtained results could be used for quantitative prediction of infilled frame behavior expressed in terms of shear strength and deformation capacity which is of vital importance for performance based design of the new buildings and evaluation of the existing ones.

Key words: r/c infilled-frames, neural networks, earthquake behavior prediction.

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