CFRP-RETROFITTING OF REINFORCEDCONCRETE FRAMES CONSIDERINGNONLINEAR SOIL-STRUCTURE INTERACTION

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ABSTRACT

New and existing structures should always satisfy the necessities of their contemporary codes. Continuous changes in design codes make it inevitable for existing structures to need to be rehabilitated every now and then so that they can fulfil the least expectable duty they are meant to. The method of analysis and results fetched from these analyses depend strictly on the shape and height of the structure. High-rise structures do not yield appropriate results in case analysed with ordinary pushover analysis and the best method of analysis for such buildings is to go through time-history responses. In this study, two frames of different heights are inspected and analysed in order to be retrofitted with CFRP, once considering nonlinear SSI and once supposing the supports to be placed on rigid ground. This phenomenon is assumed to exist in order to make the results as exact as possible. It is observed that for all cases SSI results in less expenditure, while causes the structure to behave rather differently from what it is expected. The place of plastic hinges may also vary when the nonlinear SSI is possible.

INTRODUCTION

To adjust existing structures with necessities of new versions of codes for safety of buildings against earthquake, several common methods can be taken up. One relatively economic and easy-to-perform way is making use of FRP composites, CFRP's to be exact. The reason of choosing this specific type of material is its reasonable price, accessibility in the region in addition to its proper workability. Structures need to technically satisfy regulations in local codes in order to be reliable and deemed safe in case an earthquake in the region happens.

In this work of study, two frames, namely a 5-story and an 8-story reinforced concrete (RC) frame, are inspected and analysed under pushover loading based on the Iranian no.360 Code of Retrofitting of Existing Structures. Plastic hinges are observed and tried to be retrofitted. Pushover curves and their bilinear representations are depicted in Fig. 1.