APPLICATION OF NEURAL NETWORKS TO THE SEQUENTIAL ANALYSIS OF TALL BUILDINGS

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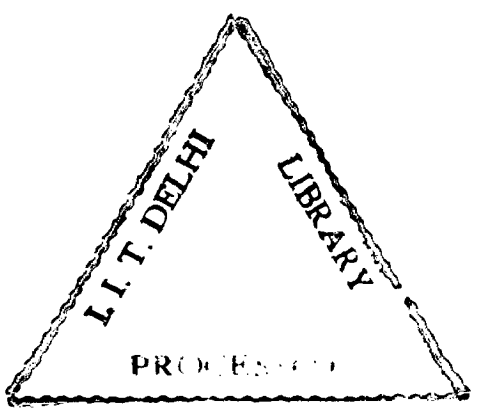

Dedicated to
Zamin Moradabadi
20th August, 1944 - 27th October, 1988

CERTIFICATE

This is to certify that the thesis entitled, **"APPLICATION OF NEURAL NETWORKS TO THE SEQUENTIAL ANALYSIS OF TALL BUILDINGS"**, being submitted by Mr. MANSOOR ALI KHAN to the Indian Institute of Technology, Delhi, for the award of the degree of **DOCTOR OF PHILOSOPHY** in Civil engineering is a record of bonafide research work carried out by him under my supervision and guidance. He has fulfilled the requirements for the submission of this thesis, which to the best of my knowledge has reached the requisite standard.

The material contained in this thesis has not been submitted, in part or in full to any other University or Institute for the award of any degree or diploma.

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ABSTRACT

The dead load on the building structure builds up sequentially as the construction proceeds. This effect of construction sequence is significant for tall buildings where a sequential analysis is appropriate. In this analysis, one floor at a time of a series of sub-structure is loaded, requiring large computational efforts. To reduce the computational efforts the correction factor method (CFM) is available in the literature in which the results of sequential analysis are evaluated from those of simultaneous analysis by applying the correction factors. These correction factors take into account the difference in differential shortenings of the adjacent columns and are obtained statistically from the results of a few practical buildings. They do not take into account the effect of dominant structural parameters. In this study, the dominant structural parameters which determine the difference in the behavior of sequential and simultaneous analysis, are identified and modified correction factors which take into account the effect of differential shortenings of adjacent columns as well as the rotations of adjacent joints, are utilized. Further the neural network approach has been adopted to compute the modified correction factors. The input to the neural network model consists of dominant structural parameters and the results of simultaneous analysis. The output of the model yields the corresponding results of sequential analysis. The neural network developed is particularly useful in planning/ initial stage when a number of sequential analysis trials are required to be made to arrive at the optimum size of the members. The validity of neural network has been demonstrated for a number of example buildings having a wide variation in their structural properties within the practical range.

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