

**APPLICATION OF NEURAL NETWORKS
TO THE SEQUENTIAL ANALYSIS OF
TALL BUILDINGS**

BY
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Submitted in fulfillment of the requirement
for the degree of
DOCTOR OF PHILOSOPHY

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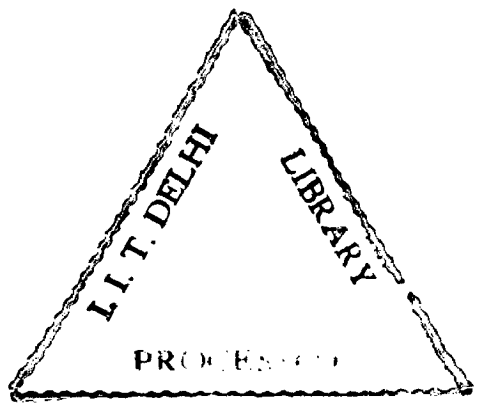
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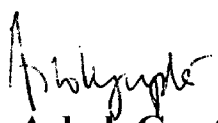
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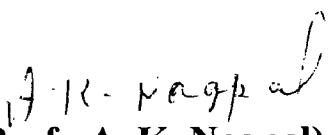


CERTIFICATE

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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MAKhan
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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.

LIST OF CONTENTS

| CHAPTER | DESCRIPTION | PAGE NO. |
|-----------|--|----------|
| | CERTIFICATE | |
| | ACKNOWLEDGEMENT | |
| | ABSTRACT | |
| | LIST OF CONTENTS | |
| | LIST OF NOTATIONS | |
| | LIST OF TABLES | |
| | LIST OF FIGURES | |
| 1. | INTRODUCTION AND LITERATURE REVIEW | |
| 1.1 | INTRODUCTION | 1 |
| 1.2 | LITERATURE REVIEW | 2 |
| | 1.21 Sequential Analysis Procedure | 3 |
| | 1.22 Neural Networks | 5 |
| 1.3 | OBJECTIVES OF THE PRESENT WORK | 10 |
| 1.4 | ORGANIZATION OF THESIS | 11 |
| 2. | ANALYSIS PROCEDURE AND BEHAVIOUR FOR SEQUENTIAL LOADS | |
| 2.1 | INTRODUCTION | 12 |
| 2.2 | BEHAVIOUR UNDERSIMULTANEOUS AND SEQUENTIAL LOADS | 13 |
| | 2.21 Differential Column Shortening | 13 |
| 2.3 | ANALYSIS PROCEDURES | 15 |
| 2.4 | MEMBER FORCES | 15 |
| 2.5 | GOVERNING PARAMETERS | 18 |
| 2.6 | SOFTWARES DEVELOPED | 19 |
| 2.7 | NUMERICAL STUDY | 19 |

| | | |
|-----------|---|-----|
| 2.7.1 | EBF1 | 19 |
| 2.7.2 | Effect of Stiffness Factors (Sf) | 21 |
| 2.7.2.1 | For Exterior Bay | 25 |
| 2.7.2.2 | For 1st Interior Bay | 36 |
| 2.7.3 | Effect of Bay Position | 45 |
| 2.7.4 | Effect of Variation of Sf Along the Height | 60 |
| 2.7.5 | Effect of Variation in Number Of Bays (NB) | 66 |
| 2.7.6 | Effect of Variation in Number of Storeys (NS) | 74 |
| 2.7.7 | Effect of Ratio, of Sf of Adjacent Bays | 81 |
| 2.7.7.1 | 60 Storeyed Building Frames | 81 |
| 2.7.7.2 | 30 Storeyed Building Frames | 81 |
| 2.8 | CONCLUSIONS | 106 |
| 3. | CORRECTION FACTOR METHOD | |
| 3.1 | CORRECTION FACTOR METHOD | 108 |
| 3.2 | DETERMINATION OF CORRECTION FACTORS | 109 |
| 3.3 | APPLICATION OF CFM | 111 |
| 3.4 | MODIFIED CORRECTION FACTORS | 112 |
| 3.5 | DETERMINATION OF MODIFIED CORRECTION FACTORS | 112 |
| 3.6 | VALIDATION OF MODIFIED CORRECTION FACTORS | 130 |
| 3.6.1 | EBF2 | 130 |
| 3.6.2 | EBF 3 | 131 |
| 3.6.3 | EBF 4 | 136 |
| 3.6.4 | EBF 5 | 139 |
| 3.7 | CONCLUSIONS | 147 |
| 4 | NEURAL NETWORKS | |
| 4.1 | INTRODUCTION | 148 |
| 4.1.1 | Definitions of Neural Network | 148 |
| 4.1.2 | Salient Features of Neural Networks | 148 |
| 4.2 | THE BIOLOGICAL ANALOGUE | 149 |
| 4.3 | THE ARTIFICIAL NEURAL NETWORK | 150 |
| 4.3.1 | The Basic Components of Artificial | 150 |

| | | |
|-----------|--|------------|
| | Neural Networks | |
| | 4.3.1.1 A Single Processing Element | 150 |
| | 4.3.1.2 Inputs and Outputs | 150 |
| | 4.3.1.3 Weighting Factors | 151 |
| | 4.3.1.4 Transfer Functions | 151 |
| | 4.3.2 Combining Elements | 154 |
| | 4.3.3 Combining Layers | 154 |
| | 4.3.4 Connectivity Options | 154 |
| | 4.3.4 Input and Output Patterns | 155 |
| | 4.3.6 Learning Mechanism | 155 |
| | 4.3.6.1 Learning Rate | 156 |
| | 4.3.6.2 Learning Laws | 156 |
| 4.4 | THE BACK-PROPAGATION NEURAL NETWORKS | 157 |
| | 4.4.1 Number of Hidden Layers | 160 |
| | 4.4.2 Number of Hidden Neurons | 160 |
| | 4.4.3 Number Distribution and Format of Training Patterns | 161 |
| 4.5 | MODULAR NEURAL NETWORKS | 161 |
| 5. | CONFIGURATION AND TRAINING DATA FOR THE PROPOSED NEURAL NETWORK | 163 |
| | 5.1 CONFIGURATION OF THE NEURAL NETWORKS | 163 |
| | 5.2 TRANSFER FUNCTION AND WRIGHTS | 169 |
| | 5.3 GENERATION OF TRAINING DATA | 171 |
| | 5.3.1 Exterior Bay | 171 |
| | 5.3.2 Interior Bay | 172 |
| 6. | TRAINING AND VALIDATION OF PROPOSED NEURAL NETWORKS | |
| | 6.1 TRAINING OF VARIOUS SUBMODULES | 229 |
| | 6.1.1 Outer End of Exterior Bay (Large Height Buildings) | 229 |

| | | |
|-----------|---|-----|
| 6.1.2 | Inner End of Exterior Bay (Large Height Buildings) | 231 |
| 6.1.3 | Outer End of Exterior Bay in Medium Height Building | 237 |
| 6.1.4 | Inner End of Exterior Bay in Medium Height Building | 249 |
| 6.2 | SUMMARY OF OPTIMUMMODELS | 265 |
| 6.3 | VALIDATION OF NEURAL NETWORKS | 266 |
| 6.4 | SUMMARY AND CONCLUSIONS | 290 |
| 7. | CONCLUSIONS AND RECOMMENDATIONS | |
| 7.1 | SUMMARY AND CONCLUSIONS | 291 |
| 7.2 | RECOMMENDATIONS FOR FUTURE WORK IN THE AREA | 293 |
| | REFERENCES | 294 |