Acknowledgements

It gives me immense pleasure to express my deep sense of gratitude to Dr S.S. Bhatti, Former Principal Chandigarh College of Architecture, Chandigarh, for his initiation into an unprecedented enterprise, constant help and encouragement in its formulation, and holistic stewardship and guidance at all stages of the development of this study. Indeed, but for his keen supervision during the progress of the work, this highly complex project (sustained with dynamic efforts under an inexorable web of destiny) could not have been accomplished.

The author is also grateful to Dr S.C. Dhawan, Professor-in-Charge, Post-Graduate Structure Engineering Department, Punjab Engineering College, Chandigarh, for his continuous help and encouragement at all stages of this work, especially pertaining to the testing of structural scale-model under laboratory condition along with the development of geometrical simulated models on computer. Also, special thanks are due to the Computational Engineering Laboratory (Centre for Computational Engineering, now) for providing me an opportunity to work from the beginning until the completion of the project. And also to Mr Vinay Mehta (Officer On Special Duty, Projects), who helped me in computer-related applications at all stages, in developing research data, and the results, thereof.

I am indebted to Er G.S. Gill, Professional Consultant, for his valuable suggestions and timely consultations during the progress of the work. Particularly noteworthy is his life-time-experience-based contribution in the development of the text on quality control of built structures from the design-stage to their realisation on the site of construction. It is, indeed, sad and unfortunate that he did not live to see this thesis in its final shape owing to his sudden demise on 14.07.1999.

I must also put on record my indebtedness to the following:-

Chairman: Department of Fine Arts, Panjab University, Chandigarh for help at all stages of this thesis.

Principal, Punjab Engineering College, Chandigarh — for his encouragement.

Central Buildings Research Institute, Department of Architecture, and Earthquake Engineering Department, Roorke— for the help extended from time to time in laboratory-connected issues.

Indian Institute of Technology, Kanpur: Dr S.K. Jain for his valuable suggestions during the initial stages of the project.

Panjab University, Chandigarh: Mr S.S. Sidhu, Mrs Jyoti and Mr T.S. Rawala, Mrs Khurana (P.U. Staff Members)— for their kind assistance in enrolment, registration, and related matters.

Chandigarh College of Architecture Librarian: Mrs Bhupinder Kaur— for allowing the use of library references, without which this work could not have been completed.
Library Staff Members: Mr Mohinder Kumar, Mr Puran Singh, and Mr Jaidev — for the help in locating rare references, and the services rendered for photostats, etc.

Indian Institute of Technology, New Delhi: Library Staff Members — for their help in providing relevant literature.

Punjab Engineering College: Chandigarh, and School of Planning and Architecture, New Delhi: Library Staff Members — for providing necessary help.

Department of Architecture, Haryana: Ms Neelam Jain and Mr Vijay Kumar — for getting the necessary literature issued, whenever needed.

To Mr Jaswant Singh and Mr Surinder Singh for providing necessary help during the fabrication of model-work, and Mr S.D. Sharma and his team members for help during the instrumentation work of experimental results. Timely help, provided by field-engineers of M/s Blue Star, Sector 26, Chandigarh, Mr Surjit Singh, Mr Vinod Guglani and Mr Balbir Kumar, is duly acknowledged. I am also grateful for the help extended by Mr S. Bhatnagar of Roorkee, in supplying strain guages and for participating experiment-related discussions; including Mr Harish Saini and Mr Surjit Singh Bhullar for their extended support.

Computer Graphics: Important support was provided by a team of: Vimal, Rajesh and Ram.

Financial Aid: Timely help extended in the form of loan-money by banks, relatives and friends is noteworthy.

Financial Support: (Though in a limited capacity) provided by Mr A.K. Goel, IAS, Mr Praveen Setia, and Mr Gurkirtan Chauhan is gratefully acknowledged. Mr Gurkirtan also helped me in resourcing photographic material in the name of Mr Manjit Singh, who provided valuable support.

I would like to apologise in advance to anyone, who recognises a phrase or illustration or data which he originated, and which has/have been used by me in this thesis inadvertently, without any due acknowledgement or source-credit and prior permission, for which I hereby request for a post-facto permission, now.

Finally mention must be made of the forbearance and patience of my family members during the long period of preparation of this thesis.

Chandigarh

Ashok Kumar