

Acknowledgement

I express my sincere gratitude and indebtedness to my research supervisor *Dr. Pabitra Ranjan Maiti*, Department of Civil Engineering, Indian Institute of Technology (Banaras Hindu University) for his valuable guidance, encouragement and help throughout the tenure of this research work. I am extremely grateful to him for his keen interest in the investigation and the academic help. In course of time, he motivated, inspired and extended the necessary academic help in carrying out my research work. In spite of his busy schedule, he participated in each minute details of my progress of work and shared my pleasures and anxieties as well on the research findings.

I am grateful to my co-supervisor *Prof. Pramod Kumar Singh*, Department of Civil Engineering, Indian Institute of Technology (Banaras Hindu University) for supporting me. In the entire research tenure, his valuable discussions and encouragement helped this journey to a fruitful end. His careful effort in going through the manuscript, useful suggestions and cooperative behavior are gratefully acknowledged.

I am immensely rejoiced to owe my deep sense of gratitude to Prof. V. Kumar, Prof. S Mandal, Prof. Rajesh Kumar, Prof. Santosh Kumar and Dr. Brind Kumar for their constant encouragement during research work. I am thankful to Prof. Prabhat Kumar Singh, Head, Department of Civil Engineering, for giving me all the facility during my research work.

I am thankful to all non-teaching staff members of the Department of Civil Engineering for their kind cooperation and inspiration. I wish to express my deep gratitude to all those who have extended their helping hands in various ways during my tenure at Indian Institute of Technology (Banaras Hindu University), Varanasi, India.

In the last but not least I am very thankful to Prof. Prabhat Kumar Singh Dikshit for his help and encouragement.

Date: 10/06/2016

Place: Varanasi

Birajdar Harshad Subhashrao