ACKNOWLEDGEMENT

I wish to record my deep sense of gratitude and profound thanks to my research supervisor Dr. K. Subramanian, (Former Professor & Head, Department of Civil Engineering, Coimbatore Institute of Technology, Coimbatore – 641014) Principal, P.S.R.Engineering College, Selvalpatti, Sivakasi – 626140 for his keen interest, inspiring guidance, constant encouragement with my work during all stages, to bring this thesis into fruition.

I am extremely indebted to Dr. G. Sankara Subramanian, Professor & H.O.D., Department of Civil Engineering, PSG College of Technology, Coimbatore – 641014 and Dr. B. G. Vishnuram, Professor, P.S.R. Engineering College, Sivakasi – 626140, for their valuable suggestions and support during the course of my research work.

I also thank the faculty and non-teaching staff members of the Department of Civil Engineering, Coimbatore Institute of Technology, Coimbatore - 641014, for their valuable support throughout the course of my research work.

Special thanks to post graduate students of Structural Engineering in Coimbatore Institute of Technology, Coimbatore who helped in the testing program at various stages. The author expresses his heartfelt appreciation to friends who have been supportive.

The author is greatly indebted to his parents and family members for their loving support and encouragement without which this work would not have been possible.

ANBUVELAN. K