ACKNOWLEDGEMENT

First and foremost, the author offers his sincere gratitude to his supervisor, Dr. A.S.S. SEKAR, M.E., Ph.D., Professor, Department of Civil Engineering, Alagappa Chettiar College of Engineering & Technology, Karaikudi, who was abundantly helpful and offered invaluable assistance, support and guidance throughout the thesis.

The author is also grateful to Prof. A. Mala, Principal, A.C. College of Engineering & Technology, Karaikudi, for permitting to carry out this research work.

The author would like to wholeheartedly thank the Doctoral Committee members Dr. C. Natarajan, Professor of Civil Engineering, NIT, Trichirapalli and Dr. K. Subramanian, Professor & HOD, CIT, Coimabatore for their encouragement, advice, support and constructive ideas during the course of the research.

The author expresses his heartfelt thanks to Dr. U. Natarajan and all his colleagues of A. C. College of Engineering & Technology, Karaikudi and Thanthai Periyar Government Institute of Technology, Vellore for their support throughout the duration of his research.

Finally, the author is thankful to his wife Mrs. M. Karpagam for her help, prayers and moral support during the research work.

SUBRAMANIAN C