ACKNOWLEDGEMENT

First of all I am thankful to Almighty Lord who enabled me to carry out this research work. His blessing at each and every step in my life has enabled me to perceive. This project is by far the most significant accomplishment in my life and it would not have been possible without my supervisor who supported me and believed in my potential. I would like to extend my gracious gratitude and sincere thanks to my honourable supervisor Dr. J. Rajesh Banu, Assistant Professor, Department of Civil Engineering, Regional centre of Anna University, Tirunelveli. I sincerely thank for his exemplary guidance and constant encouragement and support from the initial to the final level enabled me to develop an understanding of the subject and to improve my technical writing skills.

I sincerely thank the members of doctoral committee Dr. M.C. Sashikumar, Assistant Professor, Department of Civil Engineering, University Engineering College, Dindugul and Dr. A.G. Murugesan, Professor, SPKCES, Alwarkurichi for their valuable suggestion. I would like to express my sincere gratitude to my former supervisor Dr. K. Muthukumar, Associate professor, Department of Chemical Engineering, Anna University, Chennai for his help and guidance. Special thanks to my lab mate Ms. S. Kavitha for her help and support during the research work.

Last but not least, deepest and sincere gratitude goes to my beloved Father and Mother for their understanding, endless patience, prayers and encouragement when it was most required. My special thanks to my sister, husband and friends for their loving support and encouragement.

USHANI U