ACKNOWLEDGEMENTS

Guidance, support and help from many people have to be acknowledged for the completion of this thesis. During the period of research, I came across a great number of people whose contributions in various ways have helped in my field of research and they deserve special thanks. It is a pleasure to convey my gratitude to all of them.

In the first place, I would like to express my deep sense of gratitude and indebtedness to my supervisors Dr. K. Hemachandra Reddy, Professor, Department of Mechanical Engineering, JNTUA College of Engineering, Ananthapuramu, Andhra Pradesh, India and Dr. K. Elangovan, Country Head and Technical Director, NAFEMS India, for their advice and guidance from the early stage of this research and providing me extraordinary experiences throughout the work. Above all, they provided me unflinching encouragement and support in various ways, which exceptionally inspire and enrich my growth as a student and as a researcher.

I also express my sincere and humble thanks to Dr. H. G. Chandrakanth, Principal and Dr. H. B. Niranjan, Professor and Head, Department of Mechanical Engineering (DME), Sambhram Institute of Technology (SaIT), Bengaluru, for encouraging me to pursue my research work.

I express my thankfulness to all my colleagues, students and Managing Trustees of Sambhram Institute of Technology and Alpha College of Engineering, for having extended their continuous encouragement and support in completing my research work. I also
thank Dr. M. Yohan, HOD-Mechanical, and Prof. B. Uma Maheswar Gowd, Director of Admissions, and all the teaching and Non-teaching staff members of Mechanical Engineering Department of JNTUA for their moral support.

I also acknowledge Dr. B. J. Raghunath, Dean-Academics, Impact College of Engineering and Technology (ICET), Dr. J. N. Prakash, Professor and Head, DME, Raja Reddy Institute of Technology, Dr. Satish Babu Boppana, Associate professor, DME, East West Institute of Technology, Prof. Venkataramadu, DME, SaIT, Dr. Prashanth Banakar, Assistant Professor, DME, SaIT and Mr. Bheemappa, Foreman, DME, ICET, Bengaluru, who deserve special thanks for their kind cooperation and motivation during the research work.

I specially acknowledge Dr. U. Chandrasekhar, Director, Engineering Staff college of India, Hyderabad, Andhra Pradesh, for his guidance, supervision and vital support, as and when required, during this research. I am proud to record that I had the opportunity to work with an exceptionally experienced scientist like him. The time spent with him will remain in my memory for years to come.

Thanks are also due to my best friends, Mr. B. A. Manohar, Mr. L. R. Chandrashekhhar, Mr. A. E. Bopana, Dr. Naveen Kumar C. M, and Dr. N. Devaraju, for their whole hearted support and cooperation during the course of this work.

My parents and late grandparents deserve special mention for their inseparable support, prayers and blessings. They are the people
who have shown me the joy of intellectual pursuit ever since my childhood. I thank them sincerely for bringing me up with care and love.

Words fail me to express my appreciation to my brothers Ravi and Pavan, my wife Preeti and my little son Pratham for their understanding, patience and active cooperation throughout the course of my doctoral dissertation. I thank them for being supportive and caring.

It would be unfair if I do not express my sincere appreciation and humble thanks to Mr. Appana Bhide, Mr. Arun Bhide and Mr. Sanjay Bhide of Shrinidhi Plastics Pvt. Ltd, Mr. Shekhar, Swathi Chem. Electroplating Plastics Industry, Mr. Vinayaka Kulkarni, Mascot Industries Pvt. Ltd, Bengaluru, for their exceptional support in guiding me with crucial hints and helping me in carrying out the tests.

I also thank Mr. Girish. P. Kulkarni and Mrs. Deepa Kulkarni for their moral support.

Last, but not the least, I must thank the one above all of us, the omnipresent God, for giving me the strength during the course of this research work.

Mithun V Kulkarni