

ACKNOWLEDGEMENT

My deep gratitude goes to Prof. (Dr.) K.K Sundaram, who guided me throughout my Ph. D. work, whose firm keenness kept me always focused to my work. His personal kindness also helped me to encourage myself time to time.

I would like to express my heartfelt gratitude to the Prof. H.G. Phakatkar (Head Mechanical engineering department, VIT) and Prof. (Dr.) Rajesh M. Jalnekar, (Director, VIT, Pune). My appreciation is also extended to Dr. R. R. Kulkarni, Dr. S. V. Joshi, Dr. Pavitran, Prof. Dr. M. B. Chaudhari and all faculty from VIT.

I am very grateful to Dr. V. M. Kale, Prof. B D Nelge, Prof. K D Devade, Prof. M G. Bhong, Mr. Sagar Chirde, Mr. Hemant Tambe, Mr. Manoj Sutar, Mr. Atul Kinkar and Mr. Sachin Gawade for their academic cooperation from time to time. My special thanks to Dr. R. V. Kulkarni, (Ex Principal, Indira College of Engineering and Management), for his endless inspiration from admission to concluding my work. I also wish to express gratefulness towards Dr. S. N. Sapali (HOD, Mech, COEP), Dr. Amit Agarwal (IITB), Dr. Ajay. V. Deshmukh (Principal, ICEM) and my all friends from Indira Group of Institute. I am gratified to BCUD Department of Savitribai Phule Pune University (Previously University of Pune) for their partial financial support to my work.

Above ground, I am indebted to my family, B. S. Ingole and Sunanda Ingole (my father and mother), Sadhana (my wife), Shruti, Sohan (my kids) for their honest care and boost throughout my learning.

I will remember helping hands of everyone throughout my life.

Ingole Sunil Bhimrao

31.7.2015