

## ACKNOWLEDGEMENT

I wish to acknowledge and offer my sincere gratitude to my advisor, Assistant Professor Dr.Somchai Maneewan, co-advisors Dr.Chantana Punlek and Dr.Yothin Ungkoon. I greatly appreciated the guidance, support, and encouragement that was given throughout the length of the study. I also would like to give especial thanks to all thesis committee members, and profoundly grateful for their helpful comments.

Unforgettably, Mrs. Wanvisa Jetipattaranat, Mr.Decha Klabfang and all staffs of Research Development Center, INSEE SUPERBLOCK CO., LTD for their help in the parts of instruments, research laboratory, and convenience for collecting the research data, that made it possible for my full stay with much delight and happy moments. I wish to acknowledge Mr.Roy Morien for his helpful correction and contribution to this thesis.

Science Achievement Scholarship of Thailand (SAST) and the research grants for graduate students of fiscal year 2013 are gratefully acknowledged for the financial support.

Furthermore, I want to give thanks particularly to my parents, aunts and younger brother for their endless love, understanding and all support, and would like to reveal my appreciation to all others for all support to encourage and enable me to complete this thesis but are not named in this acknowledgement.

Finally, the value and usefulness of this study were hereby given to the parents, aunt and grandparents who were greatly loved and respected as well as all respected teachers, who endow as knowledge, and sponsors. If there are any mistakes or defects, I would like to apologize for the faults and defects in this study; they are all mine. And I hope that this study will be of great usefulness to interested parties for further study.

Atthakorn Thongtha