CHAPTER 5 CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

A steady state model of the pilot distillation column (T-7000) is developed to find the packed efficiency of the column. The proposed model is developed based on the test run data of separation of Benzene and Toluene mixtures. The steady state model is matched with the 50 theoretical stages and 0.6 Murphree efficiency of packing A. The differences of the Benzene purity operating conditions in the overhead stream between the simulation results and the test run data are less than 5 % of all cases. The difference of the temperature profile of the column (A-E) between the simulation results and test run data are less than 2°C. Therefore, this model can give a sufficiently accurate prediction in the process operation.

A dynamic model is developed to study the dynamic responses of feed location and reflux rate. As a result, a trend of temperature profile of the column (A-E), the sump and reflux drum level is similar to the test run data. All of the percentage differences between the dynamic model and the test run data are less than 5°C. Therefore, the dynamic model gives a sufficiently prediction of the dynamic responses under the range of operating conditions.

The best scenario for the start-up operation after the reflux is totally flowed is scenario 2 (Distillate > Bottom > Reflux) because this scenario takes a shortest time to reach a steady state by concerning the purity of Benzene in the overhead stream as a constraint.

5.2 Recommendations

The start-up procedure from the dynamic simulation should be tested in the actual operation pilot distillation column (T-7000) in order to validate the proposed start-up procedure.