

การประเมินสมรรถนะของโครงการเปิดเสรีพลังงาน
และโครงการควบคุมของโรงงานไฮโดรคิออลิเคชัน

นายปดิพร แสงมหาชัย

วิทยานิพนธ์นี้เป็นส่วนหนึ่งของการศึกษาตามหลักสูตรปริญญาวิศวกรรมศาสตรมหาบัณฑิต
สาขาวิชาวิศวกรรมเคมี ภาควิชาวิศวกรรมเคมี
คณะวิศวกรรมศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย
ปีการศึกษา 2550
ลิขสิทธิ์ของจุฬาลงกรณ์มหาวิทยาลัย

PERFORMANCE EVALUATION OF HEAT INTEGRATED
AND CONTROL STRUCTURES OF HDA PLANT

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A Thesis Submitted in Partial Fulfillment of the Requirements
for the Degree of Master of Engineering Program in Chemical Engineering

Department of Chemical Engineering

Faculty of Engineering

Chulalongkorn University

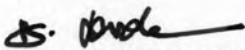
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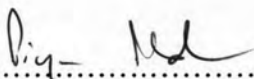
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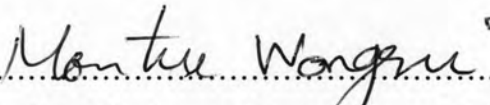
Thesis Title PERFORMANCE EVALUATION OF HEAT INTEGRATED
AND CONTROL STRUCTURES OF HDA PLANT
By Paditporn Saengmahachai
Field of Study Chemical Engineering
Thesis Principal Advisor Assistant Professor Montree Wongsri, D.Sc

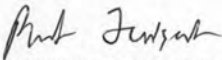
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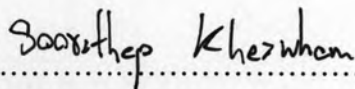
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ปดิพัทธ์ แสงมหาชัย : การประเมินสมรรถนะของโครงสร้างการเบ็ดเสร็จพลังงานและ
โครงสร้างการควบคุมของโรงงานไฮโดรดีอัลคิลเลชัน. (PERFORMANCE
EVALUATION OF HEAT INTEGRATED AND CONTROL STRUCTURES OF
HDA PLANT) อ. ที่ปริกษาวิทยานิพนธ์หลัก: ศศ. คร. มนตรี วงศ์ศรี, 304 หน้า.

การแลกเปลี่ยนพลังงานภายในกระบวนการจะทำให้เกิดผลกระทบซึ่งกันและกันภายใน
กระบวนการและยังมีความยุ่งยากต่อการควบคุมอีกด้วย ดังนั้นเพื่อให้ช่างงานบรรลุเป้าหมาย
(อุณหภูมิเป้าหมาย และการนำกลับคืนพลังงานสูงสุด)การออกแบบโครงสร้างการควบคุมจึงเป็นสิ่งที่
สำคัญ งานวิจัยนี้นำเสนอช่างงานเครื่องแลกเปลี่ยนความร้อนแบบยัดหุ่่น 3 ทางเลือกและ โครงสร้าง
การควบคุม 4 ทางเลือกสำหรับกระบวนการไฮโดรดีอัลคิลเลชันทอลูอินที่มีการเบ็ดเสร็จพลังงานแบบที่ 6
โดยใช้หลักการออกแบบโครงสร้างการควบคุมแบบแพลนท์ไวด์ของ Luyben (1998) กระบวนการที่มี
การเบ็ดเสร็จพลังงานถูกออกแบบโดยการใช้วิธีการส่งผ่านความแปรปรวนของ Wongsri (1990) ซึ่ง
เป้าหมายของงานวิจัยนี้มีวัตถุประสงค์เพื่อใช้วิธีการออกแบบโครงสร้างการควบคุมแบบแพลนท์ไวด์
พัฒนาโครงสร้างการควบคุมใหม่สำหรับกระบวนการไฮโดรดีอัลคิลเลชันที่มีการเบ็ดเสร็จพลังงาน
เพื่อให้ได้มาซึ่งเป้าหมายของการควบคุมและลดต้นทุนกระบวนการผลิต ช่างงานเครื่องแลกเปลี่ยน
ความร้อนและโครงสร้างการควบคุมที่ถูกออกแบบจะมีการประเมินสมรรถนะแบบจำลองโดยการใช้
โปรแกรมไฮซิส

ภาควิชา.....วิศวกรรมเคมี.....
สาขาวิชา.....วิศวกรรมเคมี.....
ปีการศึกษา.....2550.....

ลายมือชื่อนิสิต.....ปดิพัทธ์ แสงมหาชัย.....
ลายมือชื่ออาจารย์ที่ปรึกษา.....

4970419821 : MAJOR CHEMICAL ENGINEERING

KEY WORD : HEAT EXCHANGER NETWORK/HDA PROCESS / PLANTWIDE
PROCESS CONTROL

PADITPORN SAENGMACHAI: PERFORMANCE EVALUATION OF HEAT
INTEGRATED AND CONTROL STRUCTURES OF HDA PLANT. THESIS
PRINCIPAL ADVISOR: ASST. PROF. MONTREE WONGSRI, Ph.D.,304 pp.

The energy integration causes to the interactions and may make the process more difficult to control. Therefore, in order to achieve maximum energy recovery and keep target temperatures at their desirable value, the control structures of energy exchanger networks are important. This work presents the new heat exchanger 3 networks and 4 alternatives of control structure for the hydrodealkylation of toluene (HDA) process with energy integration schemes alternative 6 are simulated using Luyben's heuristics method. Various heat pathways throughout the network designed using Wongsri's disturbance propagation. The main objective is to use plantwide control strategies to develop the new control structures for the hydrodealkylation process with energy integration schemes that are designed to achieve the control objective and reduce the cost of production. In this work, the performance of the heat exchanger network and their control structures are evaluated via simulation using HYSYS.

Department.....Chemical Engineering...

Field of study...Chemical Engineering...

Academic year.....2007.....

Student's signature...*Padit.porn*.....

Principal Advisor's signature.....

ACKNOWLEDGEMENTS

First and foremost, I would like to express my most sincere thanks to my advisor, Assistant Professor Montree Wongsri, for his great guidance and support. Under his supervision, I learned a lot of process control and techniques, as well as the heuristic approach for control design. It has been a great opportunity and experience for me to work in his group. Special thanks belong to Professor Piyasarn Prasertdham, Dr. Soorathep Kheawhom and Dr. Pisit Jaisathaporn for kindly serving as my committee members.

Many thanks to Chulalongkorn University for financial supporting this work, Department of Chemical Engineering for financial supporting tuition fee, process control laboratory members, friends and all those who encouraged over the years of his study.

Most of all, he would like to express the highest gratitude to al of family for their love, inspiration, encouragement and financial support throughout this study.

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