

**RETROFIT WITH EXCHANGER RELOCATION OF CRUDE PREHEAT
TRAIN UNDER DIFFERENT KINDS OF CRUDE OILS**

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A Thesis Submitted in Partial Fulfilment of the Requirements
for the Degree of Master of Science
The Petroleum and Petrochemical College, Chulalongkorn University
in Academic Partnership with
The University of Michigan, The University of Oklahoma,
Case Western Reserve University and Institut Français du Pétrole
2012

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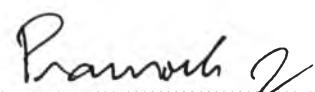
Thesis Title: Retrofit with exchanger relocation of crude preheat train
under different kinds of crude oils
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Program: Petroleum Technology
Thesis Advisors: Asst. Prof. Kitipat Seimanond

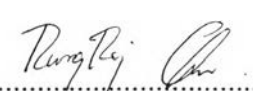
Accepted by the Petroleum and Petrochemical College, Chulalongkorn
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ABSTRACT

5373001063: Petroleum Technology Program
Bongkoch Yimyam: Retrofit with Exchanger Relocation of Crude
Preheat Train under Different Kinds of Crude Oils.
Thesis advisors: Asst. Prof. Kitipat Siemanond 103 pp.
Keywords: Heat exchanger network/HENs/Retrofit/Crude distillation
Unit/Mixed integer linear programming/Multiple crude

Energy management is important portion of controlling total operating costs for refineries throughout the world. For refinery, the crude distillation unit is one of the largest energy consumption units and also represents one of the most important areas for doing heat integration. The Heat Exchanger Network (HEN) of Crude Distillation Units (CDU) can be retrofitted to reduce the utility consumption. This research used the retrofit potential program to find the optimum point in targeting step and then a mathematical programming model using General Algebraic Modeling System (GAMS) called the stage model, using the mixed integer linear programming (MILP) of Yee and Grossmann (1990) was applied to develop the retrofit model and the simulation software (PROII) was used to validate the design and to perform the total utility consumption. With using the existing exchangers, the retrofit model with the exchanger relocation technique is applied. Example problems of HEN for a crude distillation unit with light, medium and heavy crude oil feeds for a period of 100, 150 and 100 days per year, respectively, were used to demonstrate the retrofitting with the aim of finding the optimal design that would yield the highest net present value (NPV).

บทคัดย่อ

บงกช ยิ้มแย้ม : การปรับปรุงเครือข่ายเครื่องแลกเปลี่ยนความร้อนของระบบให้ความร้อนของน้ำมันดิบต่างชนิดก่อนเข้าเตาเผาโดยใช้เทคนิคการย้ายเครื่องแลกเปลี่ยนความร้อน (Retrofit with Exchanger Relocation of Crude Preheat Train under Different Kinds of Crude oils)
อ. ที่ปรึกษา: ผศ.ดร. กิติพัฒน์ สีมานนท์ 103 หน้า

การจัดการพลังงานเป็นส่วนสำคัญในการควบคุมต้นทุนทั้งหมดในการดำเนินงานสำหรับโรงกลั่นน้ำมันทั่วโลก สำหรับโรงกลั่นน้ำมันหน่วยกลั่นน้ำมันดิบเป็นหน่วยที่มีการใช้พลังงานมากที่สุด และยังเป็นส่วนที่สำคัญที่สุดสำหรับการทำกระบวนการทางความร้อน เครือข่ายแลกเปลี่ยนความร้อนของหน่วยกลั่นน้ำมันดิบสามารถทำการปรับปรุง เพื่อลดการสูญเสียพลังงานวิจัยนี้ ในขั้นตอนการกำหนดเป้าหมายจะใช้โปรแกรมในการหาศักยภาพของการปรับปรุงเพื่อหาจุดที่เหมาะสม ต่อมาการเขียนโปรแกรมทางคณิตศาสตร์โดยใช้แบบจำลองลำดับขั้น และการเขียนโปรแกรมผสมระหว่างระบบจำนวนเต็มกับระบบเส้นตรงโดยใช้ระบบการสร้างแบบจำลองทั่วไปเกี่ยวกับพีชคณิตของอีและกร็อสแมน (1990) ถูกใช้ในการพัฒนารูปแบบการปรับปรุง และซอฟต์แวร์จำลอง (โปรแกรม) ถูกนำมาใช้ในการตรวจสอบการออกแบบและแสดงปริมาณการใช้พลังงานรวม แบบจำลองการปรับปรุงด้วยเทคนิคการย้ายที่เครื่องแลกเปลี่ยนความร้อนถูกนำมาใช้กับการใช้เครื่องแลกเปลี่ยนความร้อนที่มีอยู่เดิม ตัวอย่างปัญหาของเครือข่ายแลกเปลี่ยนความร้อนของหน่วยกลั่นน้ำมันดิบ ของน้ำมันเบา, ปานกลาง และหนัก โดยมีรอบการกลั่น 100, 150 และ 100 วันต่อปี ตามลำดับ ถูกนำมาใช้เพื่อแสดงให้เห็นถึงการปรับปรุง โดยมีวัตถุประสงค์เพื่อหาการออกแบบที่เหมาะสมที่จะให้ผลตอบแทนในรูปแบบมูลค่าปัจจุบันสุทธิสูงสุด

ACKNOWLEDGEMENTS

There are several individuals who have contributed to my work and made it possible for me to conduct this thesis.

Initially I am indebted grateful to my advisor Asst. Prof. Kitipat Siemanond for his guidance and support throughout this research work. His whole-hearted enthusiasm, constant support, integral view on research has made a deep impression on me. Also, I would like to thanks Assoc. Prof. Pramoch Rangsunvigit and Dr.Rungroj Chuvaree for being my thesis committee. Their suggestions and comments are very beneficial for me and this work.

I am deeply grateful to the Center of Excellence on Petrochemicals and Materials Technology for the Scholarship for my postgraduate degree. Furthermore I would like to express my sincere gratitude to the Ratchadaphiseksomphot Endowment Fund and the Petroleum and Petrochemical College, and the Center of Excellence on Petrochemicals and Materials Technology, Thailand for the funding of the thesis work provided. More, I would like to thank the members of the PPC for their kindness and support.

My gratitude to my colleagues at Chulalongkorn University for providing such a good studying atmosphere, I also want to thank them all for their help, support, interest and valuable suggestions. I wish to acknowledge all they made my time with them very pleasant.

To all friends, I am especially thankful. I was greatly helped by the encouragement of my friends. I hesitate to list them because I do not wish to leave anyone out. Thank you all for the sincere and warm friendship you gave me over the years.

Though, I would like to express my gratitude to my father, Bundit Yimyam, and my mother, Kulaya Yimyam. Thank you for being such wonderful parents. Thanks for your boundless love and encouragement, and so much more. I am simply happy and proud to be yours. Also, thanks for giving me great opportunity to study, support cost of living. To my brother, Gan Yimyam, I am touchingly thankful for your encouragement and love.

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