

**HEAT EXCHANGER NETWORK RETROFIT IN CRUDE DISTILLATION
UNIT**



Supachai Kosol

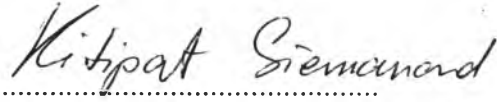
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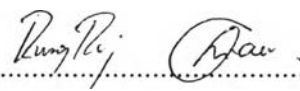
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ABSTRACT

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For refineries throughout the world, energy management is an important element for controlling total operating costs. Over the past decades, there appears to be an urgent need to retrofit the existing Heat Exchanger Network (HEN) of Crude Distillation Units (CDU) to reduce the current utility consumption. In this paper two different retrofit methods to perform retrofit are compared: Pinch technology, and MILP method (Nguyen et al., 2010). To make the comparison even more fair, retrofit using Pinch Technology is improved by the incorporation of an optimization step is presented. From the comparison of the above two retrofit technologies; it was found that the pinch technology with optimization software is a powerful procedure to do HEN retrofit based on ease of use and systematic approach. However, the accuracy of pinch technology extremely depends on the selection of the best network from all possibilities. The limitations of the MILP model, even with the one-step computational procedure, cannot get the global optimum HEN retrofit design.

บทคัดย่อ

ศุภชัย โกศล: การปรับปรุงเครือข่ายเครื่องแลกเปลี่ยนความร้อนในกระบวนการกลั่นน้ำมันดิบ (Heat Exchanger Network Retrofit in Crude Distillation Unit) อ. ที่ปรึกษา: ผศ.ดร. กิติพัฒน์ สีมานนท์ 152 หน้า

สำหรับโรงกลั่นน้ำมันทั่วโลก การจัดการพลังงานเป็นองค์ประกอบสำคัญในการควบคุมต้นทุนทั้งหมดในการดำเนินงาน กว่าทศวรรษที่ผ่านมา มีความจำเป็นเร่งด่วนในการปรับปรุงเครือข่ายเครื่องแลกเปลี่ยนความร้อนของหน่วยกลั่นน้ำมันดิบ เพื่อลดการใช้ยูทิลิตี้ ในงานวิจัยนี้จะนำเสนอการปรับปรุงเครือข่ายเครื่องแลกเปลี่ยนความร้อนที่แตกต่างกันสองวิธีคือ เทคโนโลยีพินซ์ และวิธีเอ็มไอแอลพี (เหงียน และคณะ, 2010) เพื่อการเปรียบเทียบที่ยุติธรรมมากขึ้น จึงนำเสนอการปรับปรุงเทคโนโลยีพินซ์ ในขั้นตอนของการเพิ่มประสิทธิภาพ จากการเปรียบเทียบของทั้งสองเทคโนโลยีข้างต้น พบว่าเทคโนโลยีพินซ์ร่วมกับซอฟต์แวร์การเพิ่มประสิทธิภาพ เป็นวิธีที่มีประสิทธิภาพในการปรับปรุงเครือข่ายเครื่องแลกเปลี่ยนความร้อน บนพื้นฐานของความสะดวกในการใช้งาน และระบบการคำนวณ แต่ความถูกต้องของเทคโนโลยีพินซ์ขึ้นอยู่กับทางเลือกเครือข่ายที่ดีที่สุดจากความเป็นไปได้ทั้งหมดอย่างมาก สำหรับข้อจำกัดของวิธีเอ็มไอแอลพีคือไม่สามารถออกแบบการปรับปรุงเครือข่ายเครื่องแลกเปลี่ยนความร้อนที่ดีที่สุด ถึงแม้วิธีการคำนวณจะเป็นแบบขั้นตอนเดียว

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