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SCIENTIFIC & RESEARCH PROJECTS

Project No.: 08 **Year:** 2008

Project Field: Heat Exchanger Networks (HENs)

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Project Title:

Pressure Drop Optimization in De-bottlenecking of Heat Exchanger Networks

Abstract:

Process integration technology is now widely applied in grass-roots design, energy saving retrofit and the debottlenecking of heat exchanger networks. This technology has been used in a variety of industries and proved to be reliable and applicable in engineering
design. Debottlenecking may apply to a specific part or entire unit, whether it is due to increased throughput or process modifications.
One of the advanced methods for debottlenecking that is currently used is based upon fixed allowable pressure drops, through which a retrofit can be achieved without a need for pump and/or compressor replacement. This research is trying to develop a new procedure for pressure drop optimisation in debottlenecking. This procedure enables the designer to study pump and/or compressor replacement whilst at the same time optimising the additional area and operating cost of the network. It deals with the problem of optimal debottlenecking of heat exchanger networks considering minimum total cost. Moreover, one can consider the possibility of the replacement of a given pump with a smaller one. The new procedure has been effectively applied to a crude oil pre-heat train, which was subject to some 20% increase in throughput, and the corresponding results proved to be accurate enough.