

Control Structure Synthesis for Propane Precooled Mixed Refrigerant Refrigeration in Natural Gas Liquefaction

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This paper is aimed to configure the control structure for propane precooled mixed refrigerant refrigeration in natural gas liquefaction plant. The liquefaction on cryogenic exchanger involves process where cold streams have to be cooled by themselves, which causes strong interactions among the streams. This study is accomplished by conducting several disturbance identification tests on rigorous dynamic simulation as the first step. The steady-state gain matrix and transfer function models of the process are then obtained for measuring the interaction among variables. The interactions are measured both in steady-state and dynamic state, and analyzed to finally select the best pairings. As a result, the best control structure is proposed by utilizing temperature difference between hot and cold refrigerant. This research was supported by a grant from the Gas Plant R&D Center funded by the Ministry of Land, Transportation and Maritime Affairs (MLTM) of the Korean Government.