

Study on dynamic characteristics of small-scale BOG (Boil-off gas) re-liquefaction process

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Utilization of LNG (Liquefied natural gas) as a fuel to ship is environment-friendly as its exhaust gas contains less SO_x and NO_x than conventional fuel. In the LNG-fueled ship, re-liquefaction and re-use of vaporized LNG in the fuel storage tank can enhance safety as well as profitability. Reverse Brayton cycle is widely applied for small-scale shipping, due to its low possibility of explosion in offshore environments.

In this study, dynamic model is developed, and control logic is proposed to ensure robust liquefaction of BOG. Several control logics are proposed, while controllability and effectiveness of each option are assessed in a systematic manner. Operation procedures for startup and shutdown is designed for achieving improved applicability of control logic and better process safety. The methodology established in this study can systematically analyze the system-wide dynamic characteristics of BOG re-liquefaction process.

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