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Please fill in your abstract title.	Dynamic Simulation of Floating Natural Gas Liquefaction Process via K-Spice	
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Abstract

FLNG (also known as LNG-FPSO) is one of the floating production device which includes natural gas production, liquefaction, storage and handling. Among them, the liquefaction process is preferred at the heart of offshore liquefied natural gas production, playing a crucial role on whether the floating liquefaction device can be operated safely and economically. Simulating the liquefaction process at sea through dynamic simulation software is an important method of process optimization. In this paper, K-Spice software is used to dynamically simulate the dual mixed refrigerant liquefaction process (DMR), and simulate the impact of ocean sloshing condition on the logistics parameters of the separator and heat exchanger outlet, as well as the impact on the liquefaction process and the flow in the pipe. Meanwhile, the related parameters of DMR related equipment are optimized by simulation, which provides a feasible prediction method for building large-scale experimental device and target gas field liquefaction plant.

In the study, it is found that the process of DMR is stable at full-loading condition, and the operating parameters of the pre-cooling system and the cryogenic system are all stable. The ratio of liquefaction and specific power will increase with the decrease of the gas under the loading-change condition of raw gas. DMR is sensitive to the change of pressure of feed gas, but it can basically resume its original working state after running for a period of time. The tilting condition has little effect on the liquid level in the separator, and the tilt angle has a slight effect on the mass flow of the gas-liquid phase flow out of the separator. With the increase of the inclination angle, the flow rate of raw-gas increases and the temperature of raw gas via all heat-exchangers retain invariant. Sloshing condition will cause the flow of feed gas to fluctuate in a certain range, and the liquid level of separator will decrease, and the mass flow rate of gas-liquid phase will fluctuate slightly. Furthermore, it will reduce the outlet temperature of the first & second stage heat-exchanger in pre-cooling, and the outlet temperature of the deep-cryogenic outlet will increase slightly. This paper will focus on the simulation and give the operation adjustment measures of the DMR process under various conditions in the whole life cycle, in order to ensure the efficient and stable operation of FLNG.

Keywords: FLNG; Dynamic Simulation; Maritime Adaptability; K-Spice