

Experiment and simulation of an absorption column under offshore conditions.

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There has been increasing attention to the offshore plant particularly for floating production and storage offloading (FPSO). In the topside of FPSO, there are many chemical processes including acid gas removal unit (AGRU) and liquefaction process to liquefy the natural gas to the liquid state for the transportation of the gas-based energy to be easily performed. The main challenge of designing chemical process in FPSO lies mainly on the offshore conditions incurred by the ship motions such as permanent tilt and dynamic motions. In this study, for AGRU, the effect of offshore conditions on the absorption performance was experimentally analyzed. Experiments were conducted using 400 mm diameter absorption column packed with structured packing. To understand the effect of offshore conditions, a simple system (NaOH/air) was used. Using the obtained experimental data, a rate-based model using Aspen Plus was developed, which can predict the experimental data with introducing the new correlation for the effective surface area and adjusting the interfacial area factor in the model. Based on the results from the experiments and developed model, the effect of offshore conditions on the absorption performance was quantified in terms of the effective surface area.