

Experimental study for liquid distribution in a packed 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). 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. To correctly design the column experiencing the offshore conditions, robust understanding for hydraulic maldistribution in a packed column is necessary.

For the purpose, experiment study for liquid distribution in a packed column under offshore conditions was performed in air/water system with liquid property-modifying additives. ID 400mm column packed with a structured packing similar to Mellapak 250X with 4 m packed height was used as a experimental column. ERT-EIDORS method was proposed to measure two-dimensional liquid distribution in a packed column. With this proposed method, liquid distributions under permanent tilt from 0 to 6 degree and roll motions with period of 15~30 s were analyzed. In addition, the effects of gas factor, liquid properties (surface tension and viscosity) under offshore conditions were identified.