

Issues on the Indoor Pressure Control for an Offshore Oil & Gas Platform

(Cooperated with Mærsk Oil & Gas A/S)



Fig.1 The Dan Bravo Oil & Gas Platform in Northern Sea (Mærsk Oil & Gas A/S)

Background

The indoor climate control often means to control the indoor temperature, the air pressure, the humidity, and the air quality as well, so as to provide the inhabitants with a comfortable and healthy condition. The offshore indoor climate control, especially for the offshore oil and gas platforms, is much more challenging compared with the similar problem for the on-ground facilities with respect to the fact that these platforms are often limited by specific offshore conditions, such as the relatively small indoor space, complicated geometric indoor structures, the hour-by-hour versatile sea weather etc.

Problem

Among all the indoor climate aspects, the indoor pressure control is one of the most critical factors due to the following two specific reasons:

- 1) According to the safety requirement, the indoor pressure for the accommodation and operation areas should be kept to a level of 50 Pa above the outside atmosphere pressure as all the time as possible. This high indoor pressure is used to prevent eventual gas escape or fire to enter the indoor areas;
- 2) According to the health requirement, the indoor air has to be exchanged several times per hour (depending on the size of the indoor area, the number of potential inhabitants, and the relevant indoor facilities as well) in order to keep a reasonable level of the air quality.

Thereby, the project will focus on the pressure control relevant topics, depending on the student's interests and background, such as

- Development of a pressure control system by taking the item 1) and 2) into consideration;
- Development of a simulation environment and user interface besides implementing some previous research results;

Furthermore, it is no doubt that it will bring huge benefits from both safety and economic perspectives once the indoor climate control system is offered by a kind of fault tolerant capability. Thereby, the project could also investigate the technical possibility to improve an existing indoor pressure control system to be fault tolerant system, by using some advanced model-based fault detection/diagnosis and fault tolerant control methods.

It is welcome to talk with project supervisor for further discussion/information.

Remarks

- This is the possibility to select some contents for a semester project, or for a long-term final project (combine the last two semesters), or two serial projects (e.g., one for the 9th semester, the other for 10th semester could base on the 9th project and go further)

References

- RenéM. Sønderskov and Kim H. S. Østerö, “Accommodation Pressure Control on Dan Bravo”, Master Thesis, AAUE, June 2008.
- Other materials

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