Development of 270k cbm LNG-FSRU Operator Training System

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ABSTRACT

This paper is about the development of Operator Training System (OTS) to be applied to 270kcbm LNG FSRU. In order to give the same feeling like operating the real plant, it has been repeatedly conducted to compare the simulation result with real equipment's performance. OTS consists of dynamic process simulation, automatic control system, operator module, instructor module and interface module. It is expected through this study that LNG FSRU OTS can reduce the time and cost during changing the conceptual stage to the basic design stage because engineers can understand the overall process more easily by operating the OTS.

KEY WORDS: LNG FSRU; Operating Training System; DCS; HYSYS; Dynamic Simulation; OPC.

INTRODUCTION

In general, plants in the industry, the individual operating the equipment or the integrity of the entire equipment to operate the safety is very important. However, if the plant operators don't know about the whole system configuration or do not have much experience in driving, they can have much higher risk of accidents.

Especially, in the LNG plant to deal with explosive substances, to make a small mistake is likely to have a big accident. So the experienced expert understanding the overall system is to drive the LNG plant in accordance with the provisions. Even in the Shipyard, in order to build the new LNG plant, experienced professionals at the LNG handling system are required to participate in the stage of engineering, construction and commissioning.

But, in recently, experienced engineers related to LNG operation are not enough according to the development of LNG industry.

Thus, the virtual simulation training system is being considered as one of efficient way to make a lot of experienced operators and engineers to make a new system for a short period.

Virtual simulation training system has the following advantages:

a) Many of operators or engineers can be educated effectively with low investment.
b) The same effect as the actual plant operation can give.
c) The operator can experience an unstable state resulting in a malfunction and learn the procedure dealing with accident.
d) Loss of plant facility and personnel risk during training can be eliminated.
e) It is possible for the operator to understand the overall process without expert through the Individual lesson or self-study.

STX Offshore & Shipbuilding (hereafter STX) developed 270k cbm LNG FSRU. LNG FSRU is a floating facility to store LNG and gasify and send the gas to shore.

Early in the development of LNG FSRU, STX could not optimally design because they had no experience about the gasification plant and was too lack of manpower to find an optimal design condition. Thus STX made the initial concept of LNG FSRU and would like to create a virtual simulator, and used it to find the problem in design stage and tried to achieve the concept of operation.

Thus STX made the initial concept of LNG FSRU and created a virtual simulator. And STX has used it in order to teach the inexperienced engineer about the LNG handling in the initial design stage and to achieve the concept of LNG operation.

STX had tried to train process engineers and instrument engineers so that they have sufficient engineering capacity about the LNG FSRU through this study.

LNG FSRU has been proposed as alternative to conventional LNG import terminals of onshore because that risk to the public is negligible and it could be remobilized at any time.

LNG FSRU is equipped with a high safety monitoring and control system because it has many equipment dealing with hazardous gas. Most of LNG FSRU equipments are remotely monitored and are controlled with the complex computer system from the main center. Therefore, the operators working in the main center of LNG FSRU