ABSTRACT

Over the past decade, process managers have been forced increasingly to cope with the lack of a skilled workforce and increases in hazardous circumstances for human operations. Erection simulation systems have been widely proposed as alternatives to overcome these difficulties and to raise erection quality, enhance productivity, and improve safety. With the deterioration in the technical ability of process managers without enough erection simulation training and information to achieve low interference and saving time, the marine erection accidents in yard such as fatality, collision due to interference tend to increase gradually in erection process of ships and offshore platform. It may be considerably difficult to establish the methodology for a safety and accurate measures system for erection process. In this paper, to demonstrate the efficiency of an erection simulation system, introduce a point cloud based erection simulation method for planning erection process in offshore installations. This simulation method produces an optimized movement path of workforce and without interference for erection structures. As a practical example, the cost-benefit analysis for preventing erection process time and the background risk is investigated using the proposed method.

KEY WORDS: offshore installations; point cloud; cost-benefit analysis; erection simulation.

INTRODUCTION

In the field of construction planning in the ship-building and offshore industries, many attempts have been recently made to implement accurate process planning in less time by first simulating various design alternatives. As a part of these efforts, the designers of offshore construction yards are now developing and using in-house systems or using commercial simulation tools to plan their construction projects. However, these approaches are not efficient because of the time and effort required to develop each new system. It is difficult to use these existing systems without modification and to adopt the various requirements of the designers with the commercial simulation tools when an application object of the systems changes, and thus the development of a new system is required (Haertl et al., 2001).

In addition, in these approaches, it is difficult for designers to use the existing design and production information for simulation and scheduling. However, it is possible to set up accurate construction planning in advance of a consistent, integrated simulation environment, which can support the development of a new simulation system and make use of the existing design and production information independently of application objects.