

Advancement of a Virtual Training System for Marine Engineers

Suresh Pattabhiraman

Department of Marine Engineering, University of AMET, Chennai, India

Abstract: A full mission engine room system module which simulates the engine room has been developed by marine engineers. This will enable students to understand the working of all engine room systems virtually. It will also enable students to ascertain the defects and rectify the same. This module can be used for under graduates of the marine engineering stream. Going for the lack in the field of marine specialists preparing at present, a whole virtual preparing framework for marine architects has been outlined and created which is made out of the full mission marine motor room test system module and three-dimensional virtual marine motor room module, individually going for developing the working capacity for marine motor room framework and marine motor hardware, cognizing the genuine workplace in marine motor room. This preparation framework has as of now been connected in the showing errand of undergrad and postgraduate in a few oceanic schools in China and University of Dar es Salaam in Tanzania and accomplished great impacts.

Key words: Virtual training, marine engine room simulator, virtual reality, marine engineers, cognizing, impacts

INTRODUCTION

The improvement of PC innovation, interchanges innovation and other related advances, different sorts of preparing frameworks in view of virtual reenactment innovation are broadly utilized as a part of the field of designing instruction and achieve the normal target. In the field of marine designers preparing, preparing frameworks in light of virtual recreation innovation is likewise generally connected (Laskowski *et al.*, 2015). Then it is likewise furnished with the three-dimensional virtual marine motor room programming. However, the three-dimensional virtual scene just contains a piece of the marine motor framework and the scene substance is constrained and the virtual scene must be seen in a few settled visual point which makes the continuous meandering and whole operation of marine motor framework incomprehensible. Going for the present circumstance that the VLCC (Very Large Crude Carrier) marine motor room test system in China is absence of the preparation program of the payload turbine framework, Gan *et al.* (2014) built up the equipment recreation stage and programming reproduction arrangement of the load turbine framework. In any case, the preparation framework is not outfitted with three-dimensional scene programming with the outcome that the learners can't ace the structure highlight of the payload turbine. The virtual reality preparing arrangement of marine motor room created by Sun *et al.* (2007) can actualize the elements of meandering and capacity in the virtual marine motor room be that as it may, the quantity of hardware in the virtual scene is restricted and the virtual scene is

unpleasant which has an extraordinary hole with the genuine marine motor room condition. Cwilexiez (Sun *et al.*, 2007) built up a virtual marine motor room programming which can execute the virtual operation of valves, catches and switches be that as it may, it is not outfitted with relating two-dimensional marine motor room test system and all the estimation undertakings of marine motor framework are done in the virtual marine motor room programming which will build the weight of PC and limit the advancement of virtual scene illustrations by expanding the precision of the model of virtual scene (Lee and Oh, 2013).

This study is reviewed from following research papers, study on the ideal ways of enhancing the quality of maritime education (Thiruvasagam, 2016) explains the marine engineers must trained using a virtual training system for improving quick learning ability of every engineer. Analyzing the motivational spirit of employees after training period in Mahanagar Telephone Nigam Limited (MTNL); An evaluation (Rajasekar and Aruneshwar, 2017) from this study, the engineer employee should train according to the virtual management system will be effective to shape advanced skill for marine engineers.

MATERIALS AND METHODS

System structure: As the Fig. 1 appears, the virtual preparing framework is made out of full-mission marine motor room test system module and three-dimensional virtual marine motor room module, going for developing the working capacity for marine motor

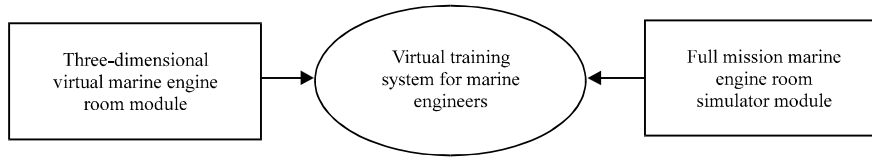


Fig. 1: System structure

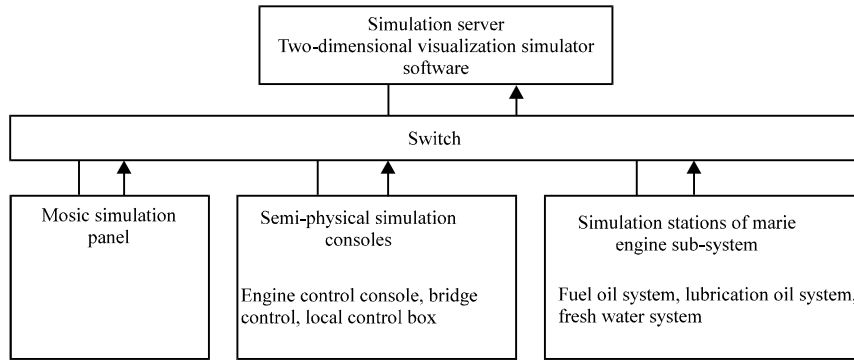


Fig. 2: Module structure of FMMERS

room framework and marine motor hardware and cognizing the genuine workplace in marine motor room.

Full Mission Marine Engine Room Simulator Module (FMMERS): Full mission marine motor room test system module fabricates a recreation operation stage which is exceedingly reliable with the real marine motor framework by utilizing the semi-physical reenactment strategy which can procure the framework reaction technique like the genuine ship while mimicking the marine motor framework (Cao and Zhang, 2011; Bao-Zhu *et al.*, 2012). This module concentrates on the investigation of marine motor framework standards, the acing of the hardware operation method, appraisal and assessment. In the interim, it likewise concentrates on the development of the correspondence and company capacity. As the Fig. 2 appears, the full mission marine motor room test system module is worked as brought together recreation structure which utilizes one single reenactment server as the center unit. This module is made out of two-dimensional perception recreation programming, marine motor framework mosaic board, semi-physical reproduction consoles and reenactment stations of marine motor sub-framework. The two-dimensional representation reenactment programming keeps running in the recreation server and it is responsible for the continuous figuring of marine motor framework. To actualize the state synchronization among each part, this part is associated with the others by setting up correspondence convention.

Two-dimensional Visualization Simulation Software (TVSS): The UI of two-dimensional Visualization Simulation Software is composed and created in light of the guideline graph of every marine motor framework. The interface plainly shows the marine motor framework as well as gives a review stage to acing the operation strategy for marine motor framework. In fundamental interface of the two-dimensional perception recreation programming, the students can enter the operation interface by tapping the comparing name with the name of marine motor framework. About 77 human-machine intelligent interfaces of marine motor frameworks altogether are produced in this product which contain most parts of the principle and helper frameworks. So, it can give whole preparing substance to the learners.

In the interface of HTFW (High Temperature New Water) framework, the catches, valves and switches can be worked by the learners to actualize different preparing assignments. The weight marks, temperature names and stream names will change progressively by perusing the framework running parameter computed by the math show, so, the students can watch the changing pattern of each running parameter to ace the execution attributes of every marine motor system, for case, the Fig. 3 plainly shows the running condition of PID controller for low temperature crisp water framework.

Marine engine system mosaic simulation panel: The marine engine system mosaic simulation panel altogether shows the marine motor frameworks. The connection between every framework can be watched plainly. The

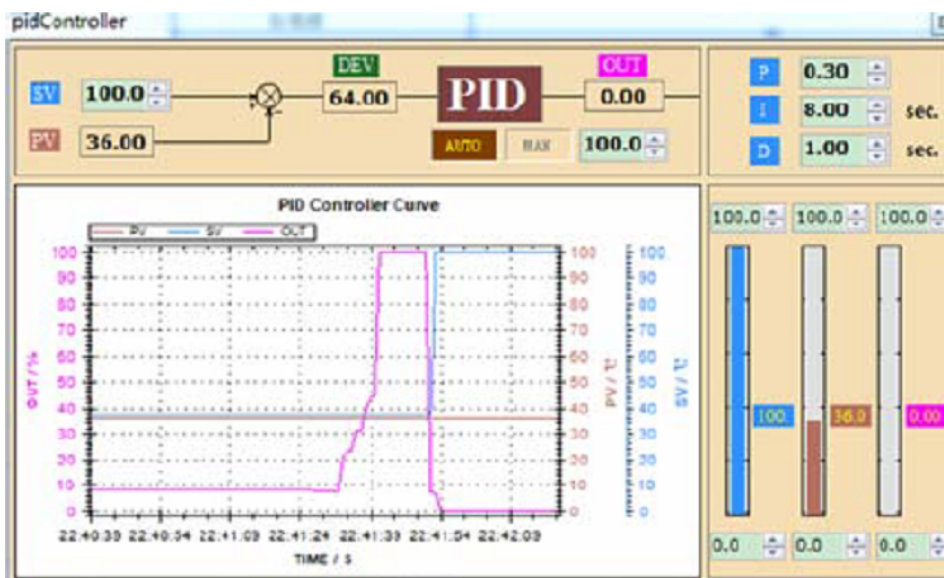


Fig. 3: Interface of PID controller

valves in the reproduction board can be opened or shut and a few pumps, helper gear can be likewise begun or ceased. Marine motor framework running parameters, for example, temperature, weight and fluid level can be obviously shown by pointer-sort reproduction meter and bar graph meter. This mosaic recreation board can enable the learners to ace the standards of marine motor framework, the connection between every framework and the operation and administration key purposes of marine motor hardware.

Simulation stations of marine engine sub-framework: To execute the cooperation communitarian preparing mode, the entire marine motor framework is grouped into a few sub-frameworks including fuel oil framework, oil framework, new water framework and different frameworks by the capacity of every marine motor framework and each sub-framework individually keeps running in autonomous reenactment station. So, to complete the whole operation of the marine motor framework, the students must impart and collaborate with alternate learners.

As practice affirms, setting of this part can viably enhance the capacity of correspondence, collaboration and initiative for the learners.

Three-dimensional virtual marine engine room module: The advance and improvement of PC innovation in the field of building instruction advantage the end-client incredibly. Meanwhile, they additionally give more abundant execution measures to designers to assemble all

the more effective and functional instruction preparing framework. Among them, virtual reality innovation is broadly utilized as a part of the fields of instruction, logical research, tourism and so on. Contingent upon its component of having the capacity to furnish virtual operation condition with life-like vision, sound-related and touch sense, virtual reality innovation has accomplished fulfilled impact. In the field of marine motor instruction and preparing, the vast majority of the customary marine motor room test systems is worked as semi-physical reproduction and could just give the review and preparing of the rule of marine motor room framework and the operation technique. In any case for the greater part of the students the earth and course of action of real marine motor room are new.

RESULTS AND DISCUSSION

Figure 4 shows the difference between virtual and real environment. To explain the disagreement, the three-dimensional virtual motor room module is manufactured in view of virtual reality innovation in this study. In this three-dimensional virtual motor room, the learners can meander and work the hardware and marine motor framework. The advancement of three-dimensional virtual motor room module makes advantageous supplement for advancing the preparation impact in light of customary marine motor room test system.



Fig. 4: Comparison of virtual and real environment

CONCLUSION

This study makes full utilization of virtual reenactment innovation to outline and build up a whole virtual preparing framework for marine architects which is made out of full-mission marine motor room test system module and three-dimensional virtual marine motor room module, separately going for developing the working capacity for marine motor room framework and marine motor hardware and cognizing the genuine workplace in marine motor room. This preparation framework has as of now been connected in the showing assignment of undergrad and postgraduate in a few oceanic schools in China and University of Dar es Salaam in Tanzania and accomplished great impacts.

REFERENCES

- Bao-Zhu, J.I.A., C.A.O. Hui and J.D. Zhang, 2012. Marine engine room simulator and its key technologies. *Navigation China*, 1: 36-39.
- Cao, H. and J. Zhang, 2011. Design and implementation of upper layer computer network in marine engine room simulator. *Proceedings of the International Conference on Information Science and Technology (ICIST)*, March 26-28, 2011, IEEE, Nanjing, China, ISBN:978-1-4244-9440-8, pp: 1119-1122.
- Gan, H.B., J.D. Zhang, D.Y. Jiang and Q. Yong, 2014. Simulation study of VLCC cargo pumps turbines system. *Shipbuilding China*, 55: 164-174.
- Laskowski, R., L. Chybowski and K. Gawdzinska, 2015. An Engine Room Simulator as a Tool for Environmental Education of Marine Engineers. In: *New Contributions in Information Systems and Technologies*, Rocha, A., A. Correia, S. Costanzo and L. Reis, (Eds.). Springer, Switzerland, pp: 311-322.
- Lee, K.W. and M.K. Oh, 2013. Skill of improving quality and loading speed of virtual reality software. *Intl. J. Multimedia Ubiquitous Eng.*, 8: 179-186.
- Rajasekar, D. and D.K. Aruneshwar, 2017. Analyzing the motivational spirit of employees after training period in Mahanagar Telephone Nigam Limited (MTNL): An evaluation. *Intl. J. Econ. Res.*, 14: 307-320.
- Sun, J., C. Lu and S.W. Pang, 2007. Realization methods of marine engine room visual simulation system. *J. Syst. Simulation*, 15: 1-25.
- Thiruvassagam, G., 2016. Study on the ideal ways of enhancing the quality of maritime education, training and research. *Intl. Assoc. Maritime Univ.*, 2016: 272-275.