ABSTRACT

Most of the hazardous incidents and accidents in liquid terminals occur during the cargo handling operations, i.e. tanker loading and discharging. The main reason of these incidents is lack of cooperation and communication between the terminal and the ship.

Kymenlaakson ammattikorkeakoulu, University of Applied Sciences (UAS) and the Kymenlaakso Region in Southeast Finland aim to improve the operational safety in tanker terminals. One example of this is the Liquid Cargo Handling Simulator located in Kotka in the Seafaring and Logistics Department of Kymenlaakso UAS. The simulator unit consists of two parts, the tanker and the terminal simulator, which are integrated together. In case of oil spill accidents it is possible to train oil combating with the help of PISCESII Oil Spill Management Simulator which is also on part of this unit.

The simulator enables the practice of the loading and discharging of different types of tankers and railway wagons. The training aims to teach routine practises as well as safety practises in certain risk situations.

It includes also the theoretical part and it is directed at all personnel and students of the field who deal with liquid cargoes in ports. The simulator will be used in the basic studies of Kymenlaakso ammattikorkeakoulu UAS, as part of course activities, and in the training of its personnel and interest groups.

The production of the Kymenlaakso University of Applied Sciences’ simulator programme is carried out by Transas from St. Petersburg, a world-leading developer and supplier of Information Technology solutions for the maritime industry. Neste Oil, Port of Porvoo, also contributed to the project.

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BACKGROUND

Historical statistics

According to statistics by the International Tanker Owners Pollution Federation Limited ITOPF the majority of oil spills from tankers result from routine operations such as loading, discharging and bunkering which normally occur in ports or at oil terminals. The majority of these operational spills are small and rarely exceeding more than seven tonnes.

Environmental and safety issues

The environmental and safety issues in Finland have been recognized and the Kymenlaakso University of Applied Sciences has established itself as a pacesetter of the training of safety issues in liquid cargo handling activities. Main object of the training is to improve communication and co-operation between the tanker/railcar and terminal personnel. The lack of communication and/or misunderstandings (verbal and cultural) is the main reason which will cause hazardous incidents in the ports. Also the wrong attitudes have been observed to affect negative influence to safety culture. The improvement of terminal safety has positive effects on the efficiency and environmental image of liquid bulk ports.

The arctic environment (in the high latitudes) sets special challenges for operating people as well as ships and terminals, which is an important fact in the transportation and handling of oil and chemical in the Baltic region. A decade ago the majority of the personnel working in ships and industry came from the Baltic States. Due to globalisation and change in the maritime industry and shipping, more and more sailors and workers come from outside from Baltic with no or limited knowledge of arctic conditions.

Operational environment

During the last years the transportation of liquid cargoes has increased rapidly on the Gulf of Finland and this trend will continue. The volumes of liquid cargoes have increased due to the growth of Russian export. The increase of the transport of dangerous unitized and bulk cargoes demand the Baltic States to build protective systems. Mandatory reporting systems in the Gulf of Finland and Baltic are expected to improve safety on open waters and fairways.

Also the protective affairs have been done i.e. by increasing the number and capacity of oil combating and spill recovery systems. In South-eastern part of Finland are located two active liquid bulk ports handling chemicals and oil products Kotka / Hamina and the Port of Porvoo/Neste Oil is only 100 km from Kotka. Hamina liquid bulk port with its railway terminal is the third largest in Finland. Next to the Finnish border are Russian oil harbours Vysotsk and Primorsk which are the main export ports of Russian oil. Because of the growth of liquid bulk traffic the environmental and safety issues have become more and more important in Finland and on the area of Baltic Sea.
Kymenlaakson ammattikorkeakoulu, University of Applied Sciences

Kymenlaakson ammattikorkeakoulu, University of Applied Sciences is one of the 29 universities of applied sciences authorised by the Ministry of Education in Finland. Finnish Universities of Applied Sciences offer a practical alternative to normal university-level education. Courses reflect the needs of businesses and industry. A degree takes 3.5 to 4.5 years of full time study and qualifies for planning, expert, and managerial posts which require a high standard of expertise.

The University is a multidisciplinary institute of higher education that produces high-quality professional expertise in close co-operation with working life as well as other organisations of education, training, and research with areas of expertise ranging from logistics, international business and health care. The total number of students is approximately 4,400 and the number of staff employed is about 400. Kymenlaakson ammattikorkeakoulu, UAS is owned by the City of Kotka and the municipalities of the Kouvola region. The turnover is around EUR 25 million a year. Students graduated from Kymenlaakson ammattikorkeakoulu, UAS are well employed. Kymenlaakson ammattikorkeakoulu UAS was the first to pass the auditing of the quality assurance systems of the evaluation council of Higher education in 2005.

The degree programme in Maritime Studies produces experts for versatile duties in all areas of seafaring, including professionals for boat building industry and trade.

Versatile simulators support learning in the various fields of maritime studies, and the students also have practical training under guidance on board the training ship and on merchant ships. The qualification in Maritime Studies follows the STCW-95 Convention, which guarantees competitive proficiency also internationally. Maritime Studies are networked with other educational establishments in Europe, and its partners include organisations both in the private and public sectors. The areas of special expertise in Maritime Studies are the environmental safety of seafaring, vessel technology, and composite and reinforced plastic structures within Boat Manufacturing.

The research and development of Kymenlaakson ammattikorkeakoulu, UAS is focused on the development of the Kymenlaakso region. Research and development activities include a wide variety of multidisciplinary research projects and commissioned work. Projects are completed in cooperation with research organisations, companies, municipalities and other partners.

Projects of Seafaring and Logistics Department:

- Developing Detailed Oil Combating Plan for Managing Shoreline Clean-up Procedures in Finland

The main objective of this project is to produce a detailed guidebook for oil combating authorities. This guidebook provides detailed information on how to conduct oil combating in the case of a massive oil accident in shoal waters of the Finnish archipelago. The guidebook is used as an action plan, a manual for the oil spill on-scene co-ordinator as well as for training both authorities and volunteers.

- STUUVA Port Safety Data Bank

Project’s aim is to improve safety of the employees in ports, increase cooperation with companies and raise awareness of all employees about safety matters at their workplace. In this project a data bank in which companies report accidents and near accidents will be developed. Through this database the involved companies and other partners share information and work together to improve safety. Special attention is paid on reporting the near accidents.

Unique Liquid Cargo Handling Simulator (LCHS)

The LCHS is situated in Kymenlaakson ammattikorkeakoulu, UAS’s Seafaring and Logistics Department in Kotka. Liquid terminal simulator has been developed in the Kymenlaakson ammattikorkeakoulu, UAS’s project, which is aimed to improve maritime environmental and terminal safety.

LCHS consists of two parts: the tanker and terminal simulator which have been integrated together. Oil Spill Management Simulator is also a part of this unit so the oil spill accidents can be trained also.

The LCHS has four terminals and each terminal has been integrated to two tankers and an instructor workstation. All liquid cargoes typically found on tankers can be handled in the simulator and all cargo handling activities and problem situations can be trained safely. The types of cargo handling to be trained are loading, discharging, inerting, tank cleaning and gas-freeing. The training courses have both theory and simulator training. The Simulator enables the practical training of discharging of different types of tankers as VLCC (Very Large Crude Carrier), LCC (Large Crude Carrier) and railway wagons. The training aims to teach routine practises as well as safety practises in certain risk situations. The expectations of participants will be taken into account and the training courses will be planned accordingly.

Interview study: Brief of safety dangers in the liquid bulk ports

The University carries out an interview study to find out the main environment and safety dangers during working procedures in the liquid bulk ports. The interview study is aimed to the ship and terminal personnel in the ports of Kotka and Hamina. The idea is to clear up the main risks both in the ship / terminal interface and terminal / tank truck and rail car interface. Additionally the educational background of each personnel group will be checked. As a result of this interview study the reports of main risks will be achieved. The results of reports will be utilized in the planning of new training periods.

CONCLUSION

There are currently no international competence requirements for liquid terminal personnel. The liquid cargo handling operations in the ports are not controlled by international laws. Naturally the oil and chemical terminals have their own safety regulations, policies and instructions. According to the statistics of ITOPF the major of incidents occur during the cargo handling operations in the ports. Therefore there is a need for the safety training of terminal personnel.

Our goal is to create new operating models at the ship / shore interface and terminal / tank truck and rail car interface. The main aim of the courses is to improve the safety in liquid cargo handling operations, environmental safety and occupational safety at terminal work and to create safer working procedures and attitudes. The effects on safety policy will happen very slowly. The main impacts of training courses are the awareness of the risks and dangers related to handling of liquids cargoes. The concrete impacts of training courses will come out just later in future.