Applying Radio Frequency Identification Tags to Improve Personnel Safety in Dredging Construction

Claire M. Gilbert, BSCS
Auburn University
Auburn, Alabama

The aim of this research is to evaluate the effectiveness of radio frequency identification tags (RFID) technology in providing individual personnel safety monitoring on a dredge. Using active and passive Radio Frequency Identification (RFID) tags, we will be testing our hypothesis that RFID will create a safer environment on a dredge, and determining which type of RFID tag is the most effective. The first test will be to compare active and passive RFID tags to determine which ones provide the most accurate reading of the workers onboard. The second test will be creating "no entry/ restricted hazard areas" and monitoring worker's attempt to access. This research study will use quantitative research methods. The literature review is already completed, and the next step will be to gathering information from the numerous heads of the dredging industry. The goal is to obtain permission from Great Lakes Dredging Company to travel to Savannah, Georgia where the company is dredging Savannah Harbor, to perform experiments utilizing the dredge crew. Once RFID tags are obtained, we will run a preliminary test before taking the tags to an operating dredge for further testing. Once aboard the dredge, we will conduct the following two tests.

The first test will compare the active RFID tags' and passive RFID tags' locating accuracy as workers are boarding the dredge, from the crew boats, to determine which tag provides the more accurate reading. To perform this evaluation, RFID tags will be attached to either the vests or hardhats of the worker and the readers will be mounted at the entrance areas of the dredge. Workers wearing the different types of tags will be monitored as they on-board and off-board the dredge, and this information will serve as a current log of all persons onboard the dredge at a given time. The second test will consist of monitoring restricted access control of the workers wearing the passive and active RFID tags. With the correct software, certain workers with limited access will be identified and as they try to on-board the dredge, an alert will go off. This research effort is in a very early stage. The graduate student was invited to present their research proposal at the Western Dredging Association Conference on October 26, 2016. Through the presentation, the graduate student was able to explain the objectives and methodology of the proposed research to the leading experts from the largest dredging companies in the United States. This research proposal was very well received by the dredge companies in attendance and led to two proposed offers of industry partnerships for the experiments. For the ASC 2017 conference in April, the proposed experiments will be complete and research project will be near completion.

By collaborating with the US Army Corp of Engineers and Great Lakes Dredging Company, we believe this study has the opportunity to open the door to better safety practices in the dredging industry. If, in the end, RFI tags do improve the safety of the dredging boat and the personnel on board, this innovative method of utilizing technology may also be applied to other industries, i.e. oil rigs, commercial fishing, and other marine industries.

Keywords: Dredging, Dredging Safety, RFID Tags, Location Tracking, Real-Time Location Systems