

Human factors review of tugboat navigation displays



CLIENT: NAPIER PORTS

YEAR: 2020

Napier Port, wanted to conduct a review on the navigation display layouts across its tug fleet. All vessels were of different configurations and the customer was keen to establish some degree of consistency with the optimal layout for human performance during a range of critical manoeuvres. Following an initial review of the bridge layout a site visit followed to investigate further.

HfEx conducted a human factors assessment to include the following:

- Interviews with key personnel
- Observations during tug operations
- Eye tracking data acquisition of key personnel
- Videography

The following details how HFEx successfully conducted a human factors assessment in an operational environment.

HFEx Ltd's approach

A high-level view of the work activities involved are presented below:

1. Site visit to view the various tugboat layouts.
 - a. The site visit is to include meeting up and interviewing some of the tug masters and engineers who must use these displays. An operational demonstration to take place
 - b. Reviewing the details of previous incident investigations.
 - c. To understand relevant maritime rules around your area of operation
 - d. To understand the functionality of the display screens in question

2. Compile a report based focusing on
 - a. The best display configuration taking into consideration human factors, maritime regulations and operational performance

Challenges

Working operationally is quite different to working in a laboratory or simulated environment. HFEx had to work with numerous challenges including availability of employees and their rosters, and fitting into an operational environment so not to disrupt the personnel.

Working in an operational environment also challenges the scientific robustness of the work at hand as many elements are out of the team's control. Therefore, we maximised our opportunity to acquire as much data as possible given the constraints to ensure our findings were as powerful as possible.

Benefits and outcomes for the client

The findings provided the customer with the following:

- Increased confidence in the agreed layout.
- Information concerning Tug Master behaviour at critical moments.
- Awareness of the muscular-skeletal risks of a Tug Master.
- The level of risk associated with distraction and how to mitigate it

The customer collaborated and engaged closely with HFEx to work through the operational and human factors challenges and together a design was agreed. The tug fleet then commenced a retrofitting process to ensure all layouts were as consistent as possible, ensuring safe operations and improved human performance for the future.