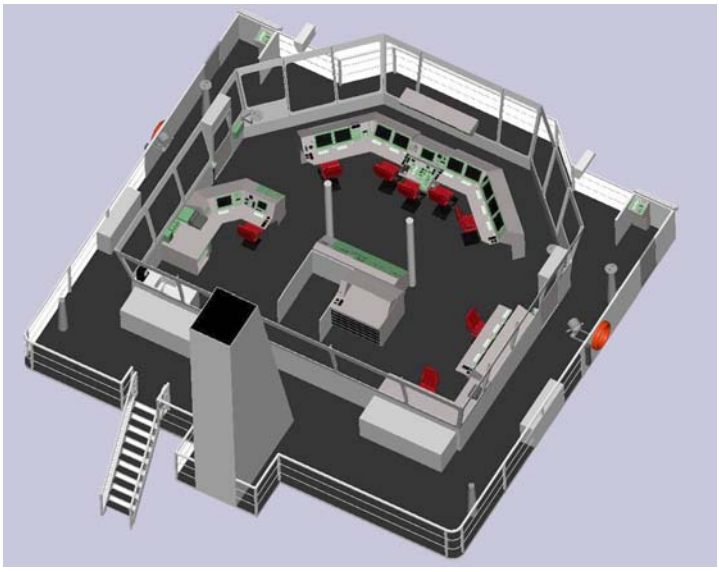
Ergonomic ship bridge design supports minimum manning

The Royal Netherlands Navy is designing a new hydrographic survey vessel to replace the currently used vessel. A key issue concerning the design is the question whether a task extension of the Officer of the Watch could be realised in order to support minimum manning of the vessel.

Bridge design



A task analysis has been carried out to investigate the possibility of the proposed task extension of the Officer of the Watch. Using results of existing research projects of TNO, we were able to predict whether the task extension was possible, and what design changes had to be made to ensure health & safety and to overcome too high mental workload. These design consequences concerned the bridge design and instruments itself, as well as the organisation of the tasks. The ship bridge has been designed based on the existing models of the Royal Netherlands Navy. The design meets the consequences of the task extension, as well as constraints on anthropometry, outside view, construction, etcetera. The design includes the arrangement of workspace and the detailed design of workplaces. Digital human models were used to check the anthropometric qualities of the design, and enables a fast and iterative design process. We anticipated the life-time of the vessel by modelling the expected user population in the year 2030. Virtual environments are suitable to draw the current users of the hydrographic survey vessels into the design process. Using the virtual environment, officers were immersed into the design and were able to evaluate outside and inside view, as well as the spatial arrangement of workplaces and instruments. Results of the evaluations were used to improve the design.

Conclusions

This project shows an integrated ergonomic design process in which wide range knowledge has been integrated. Using available results of research concerning task performance at ship bridges under several conditions, and in combination with modern design techniques and anthropometric databases, we were able to optimise the design of the ship bridge in order to meet the demand on minimum manning.

Information

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