

New fatigue model leads to more durable ships

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Heikki Remes at the Aalto University School of Engineering, Department of Applied Mechanics, has developed a model making it possible to determine how fatigue sets in with various welded steel materials. The model allows for the development of lighter structures, and as a consequence, more energy-efficient ships.

"By utilising modern manufacturing technology and new materials, it is possible to achieve more efficient structures than the ones that currently exist. In addition, better physical models are needed to ensure structural

strength," Remes says.

At present the [fatigue](#) measurements used by classification societies are based on the average quality of the weld. The same design guideline is used both with traditional and more advanced structures. However, through the development of manufacturing technology, it is possible to achieve characteristics for welded joints that are significantly better than average. With the models that have been developed, it is possible to consider the difference between traditional and advanced structural joints and the impact on fatigue resistance.

The study has been published in the *International Journal of Fatigue*. The findings of the study can be used extensively in establishing models for fatigue endurance of various developed welded [steel structures](#). The goal is to predict fatigue endurance more accurately and to utilise material in the final product more efficiently.

The work is linked with a project of the Academy of Finland on fatigue in thin sandwich panel structures and with the BESST EU project to promote the competitiveness of the European shipbuilding industry. Also under preparation are national development projects within the Finnish Metals and Engineering Competence Cluster (FIMECC). The work also supports the national maritime industry research strategy commissioned by the Federation of Finnish Technology Industries.

More information:

authors.elsevier.com/sd/article/S0142112313000856

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