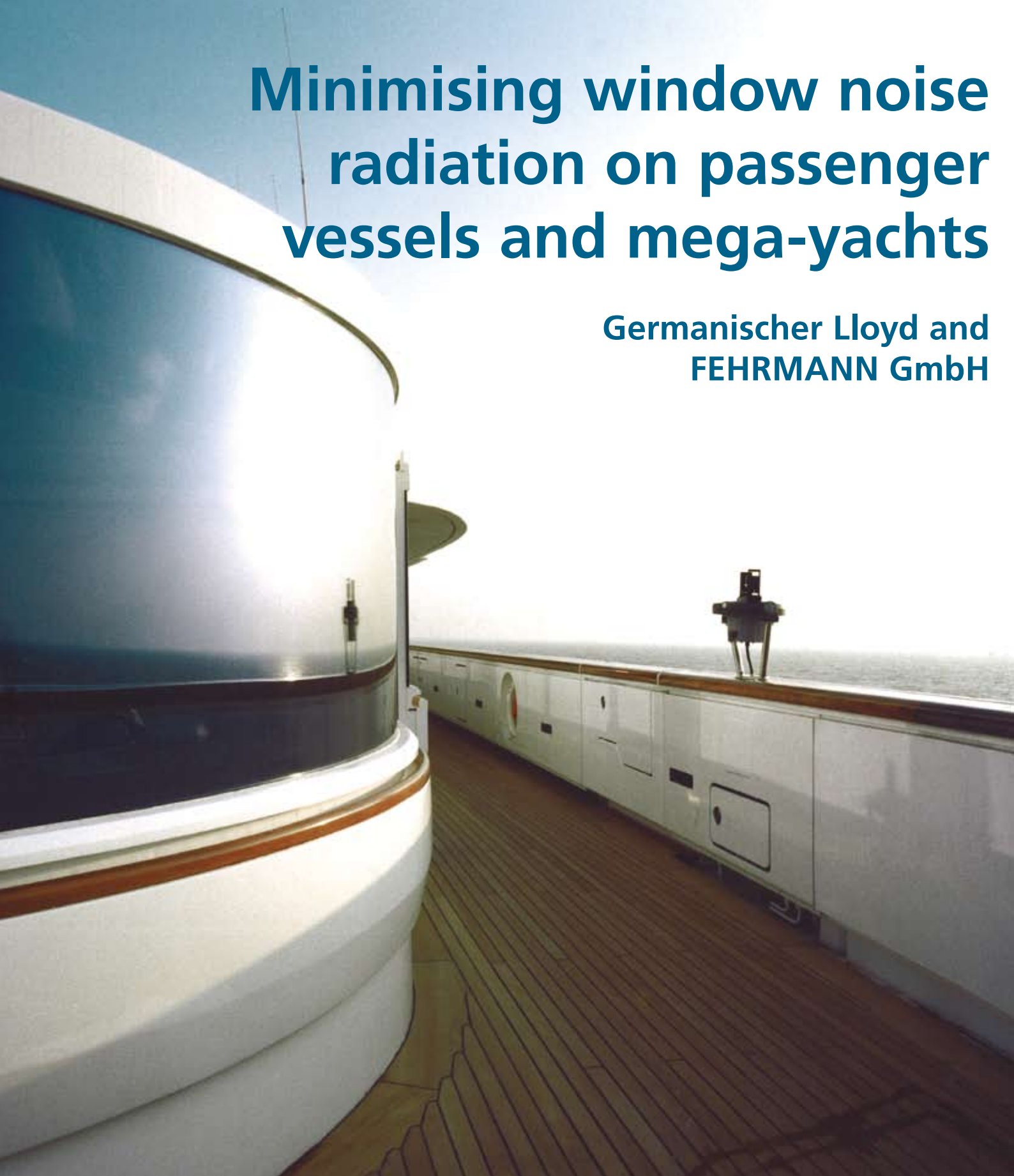


Minimising window noise radiation on passenger vessels and mega-yachts

Germanischer Lloyd and
FEHRMANN GmbH



FEHRMANN
Experience Engineering Excellence

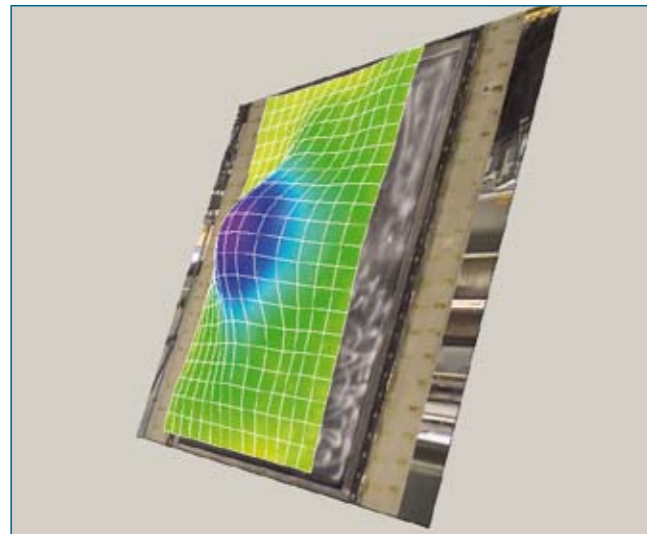


A powerful partnership – for your benefit

Glass accounts for an increasing proportion of the walls in large rooms on board passenger vessels. As a result of the structure-borne noise present in the ship's steel structure, these glass panes radiate noise into the passenger areas of cruise ships, ferries and mega-yachts. The measures used to reduce noise radiation on floors, walls and ceilings, e.g. mineral wool or visco-elastic damping treatment, are not applicable for window surfaces. Up to now, no method has been available for predicting the contribution made by windows to overall sound pressure levels in specific spaces on board ship.

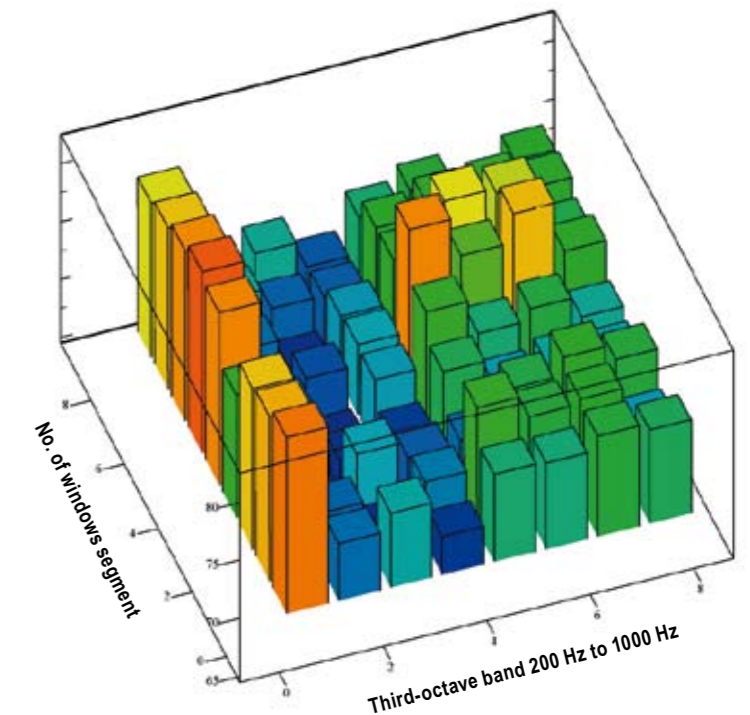
Pooling competencies

Since 2007, Germanischer Lloyd Aktiengesellschaft (GL) and FEHRMANN GmbH have been working together to investigate the radiation of ship windows induced by structure-borne noise and validate a calculation method. The two partners are ideally suited. GL's Acoustics Department provides engineering services and a comprehensive acoustics consultancy service for shipyards, owners and suppliers. FEHRMANN has been known for decades as the number one supplier of innovative, tailor-made yacht windows. GL and FEHRMANN have worked together to develop a test-rig and measurement procedure, construct and investigate window prototypes, and to validate the calculation procedure.



Investigating on windows

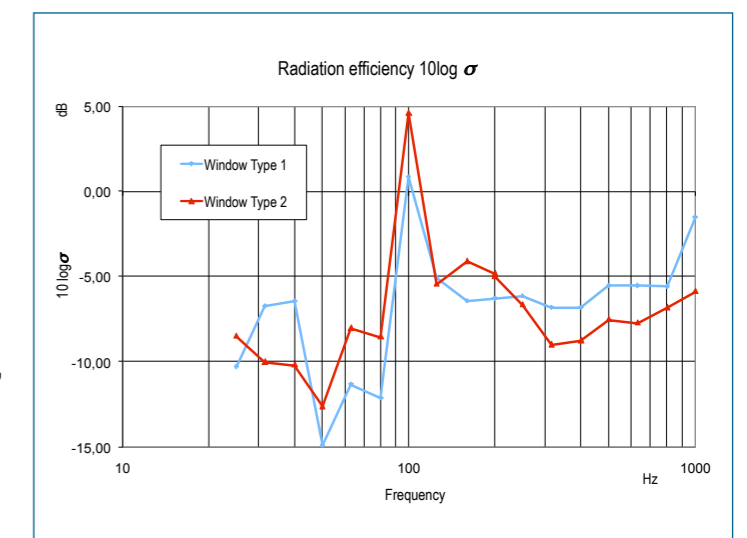
In the past few years FEHRMANN has been faced by a significant increase in the noise and vibration requirements forwarded by shipyards to their suppliers. GL had already developed a calculation method by which the noise radiation of a window system could be predicted for given structure-borne noise levels in the surrounding structure as well as the sound insulation of the window. Since no calculation method is accepted without being validated, a full-scale test-rig was developed to measure the noise radiation of typical ship windows under realistic conditions similar to those on board of passenger vessels and mega-yachts.



The investigation focused on four different prototype window systems designed and constructed by FEHRMANN. Structure-borne noise and the resulting radiated airborne noise were measured simultaneously, which allowed a direct comparison of the radiation efficiency of the four different window systems featured in the test. Such measurements had never been carried out before.

Validated calculation service

The results of the tests successfully validated the calculation method developed by GL. As a result, GL can now offer shipyards, owners and suppliers a service for calculating the sound radiation of ship windows caused by structure-borne and airborne noise. This service provides valuable support to shipyards, window suppliers and acoustics consultants in assessing whether a specific window design could cause acoustical problems. Moreover, FEHRMANN can not only check the feasibility of existing windows for low structure-borne noise but also provide tailor-made window designs that are optimised for noise reduction.



Fehrmann Metallverarbeitung GmbH

Stenzelring 19, 21107 Hamburg, Germany

Phone: +49 40 752463-46

Fax: +49 40 752463-11

windows@fehrmann-hamburg.de

www.fehrmann-hamburg.de

Germanischer Lloyd Aktiengesellschaft

Head Office

Vorsetzen 35, 20459 Hamburg, Germany

Phone: +49 40 36149-0

Fax: +49 40 36149-200

headoffice@gl-group.com

24-hour fleet in service hotline

+49 40 36149-1111

For more details of our acoustics services please contact:

Acoustics Department

Phone: +49 40 36149-958

Fax: +49 40 36149-7760

shipacoustics@gl-group.com

www.gl-group.com

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