

Press release

Bremen,
April 2010

Fuel savings – “Sharkskin” riblet structures measurably reduce flow resistance

Practical trials carried out by the Fraunhofer IFAM as part of the HAI-TECH project (English: SHARK-TECH) confirm the effectiveness of riblet structures.

The trials carried out by the Fraunhofer Institute for Manufacturing Technology and Applied Materials Research (IFAM) at Hamburgische Schiffbau-Versuchsanstalt GmbH (HSVA) gave positive results. These trials formed part of HAI-TECH, a joint project funded by the Federal Ministry of Economics and Technology and coordinated by Project Management Jülich (PTJ).

The trials were carried out using the Hydrodynamic and Cavitation Tunnel (HYKAT) at HSVA. An approximately 8 meter long torpedo-shaped object specially made for the trials was tested in the HYKAT, first of all with a smooth surface and then with a structured surface. A flow of up to 10 meters per second was employed. Near-reality test conditions were realized due to the length of the object, the use of water as the medium, and the high flow.

The result: For the test object with a structured surface, a reduction in the frictional resistance of more than 5% was achieved at the maximum flow rate of 10 meters per second, compared to the test object with an unstructured surface. It can be concluded from this that surface structuring has enormous potential for reducing the fuel costs of the shipping industry.

Dr. Jörg Rembielewski, leader of the HAI-TECH project at the Fraunhofer IFAM, stresses that “these trials demonstrate that the use of riblet structures specially adapted for modern ships can potentially bring enormous fuel savings”. It means that engines can be throttled back – with concomitant fuel savings – or alternatively the riblet structures can be utilized to increase the sailing speed.

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This represents a milestone for the HAI-TECH project – on the way towards the development of a favorable-cost and qualified system solution for coating the hulls of ships with low-drag coating systems.

Based on these positive results, the project consortium – consisting of the Fraunhofer Institute for Manufacturing Technology and Applied Materials Research IFAM, Beluga Fleet Management GmbH & Co. KG, Fahrion Produktionssysteme GmbH & Co. KG, Hamburgische Schiffbau-Versuchsanstalt GmbH, and TKMS Blohm+Voss Nordseewerke GmbH – is currently developing a practically viable, industrial, total system for coating large container ships with riblet-structured coating materials.

Niels Stolberg, Managing Partner of Beluga Shipping GmbH, goes on to say: “We hope to integrate an active anti-fouling function into the system, to further increase the benefit for our modern special fleet”. Environmental protection is an integral part of the company philosophy of Beluga Shipping GmbH. “If shipping is included in emission trading, it is beneficial for shipping companies that do not have to purchase certificates or only have to purchase a few certificates”, says Niels Stolberg, and he goes on “in conjunction with the lower fuel costs that means a double saving.”

Background information

The section Paint/Lacquer Technology of the Fraunhofer IFAM is leading the HAI-TECH project. The section is responsible for developing a low-drag coating system, whose riblet-structured surface is akin to the scales of rapidly moving sharks. The work demonstrates that current concepts from bionics can be transferred to practical applications in advanced coatings.

The section Adhesive Bonding Technology of the Fraunhofer IFAM selected the adhesive that was used for the structured film for the test object. Within the whole project, this section is responsible for applicator development for applying riblet structures to ship hulls via a coating system.

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The Adhesive Bonding Technology and Surfaces Department at the Fraunhofer Institute for Manufacturing Technology and Applied Materials Research IFAM is the largest independent research organization in Europe working in the area of industrial adhesive bonding technology. The Fraunhofer IFAM has a workforce of 214 people. The focus of the work is R&D in the area of adhesive bonding technology, paint/lacquer technology, plasma technology, and adhesion and interface research. The goal is to provide industry with application-oriented system solutions.

JEC Composites 2010, Paris, 13-15 April 2010

We can be found at Stand T18 in Hall 1.

For further information about the Fraunhofer IFAM:

www.ifam.fraunhofer.de

Photo

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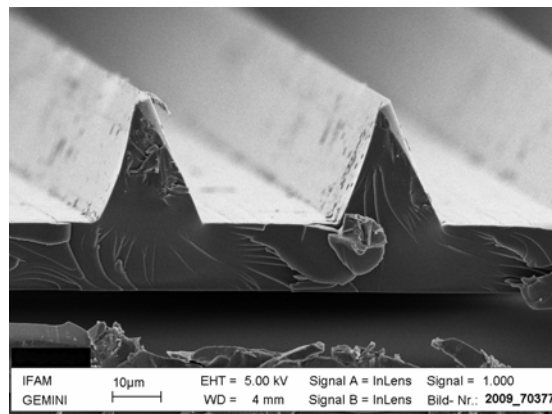


Figure caption

Scanning electron microscope image of the riblet-structured surface of a coating (© Fraunhofer IFAM).