

CII variation prediction (data-driven with tool ①+②+③)

Using the biofouling score and KPM-PASS, the predicted CII rating after upgrade (X-mile specification + full blast) can be compared.

In this example, the increase in the Attained CII value over time is significantly suppressed.

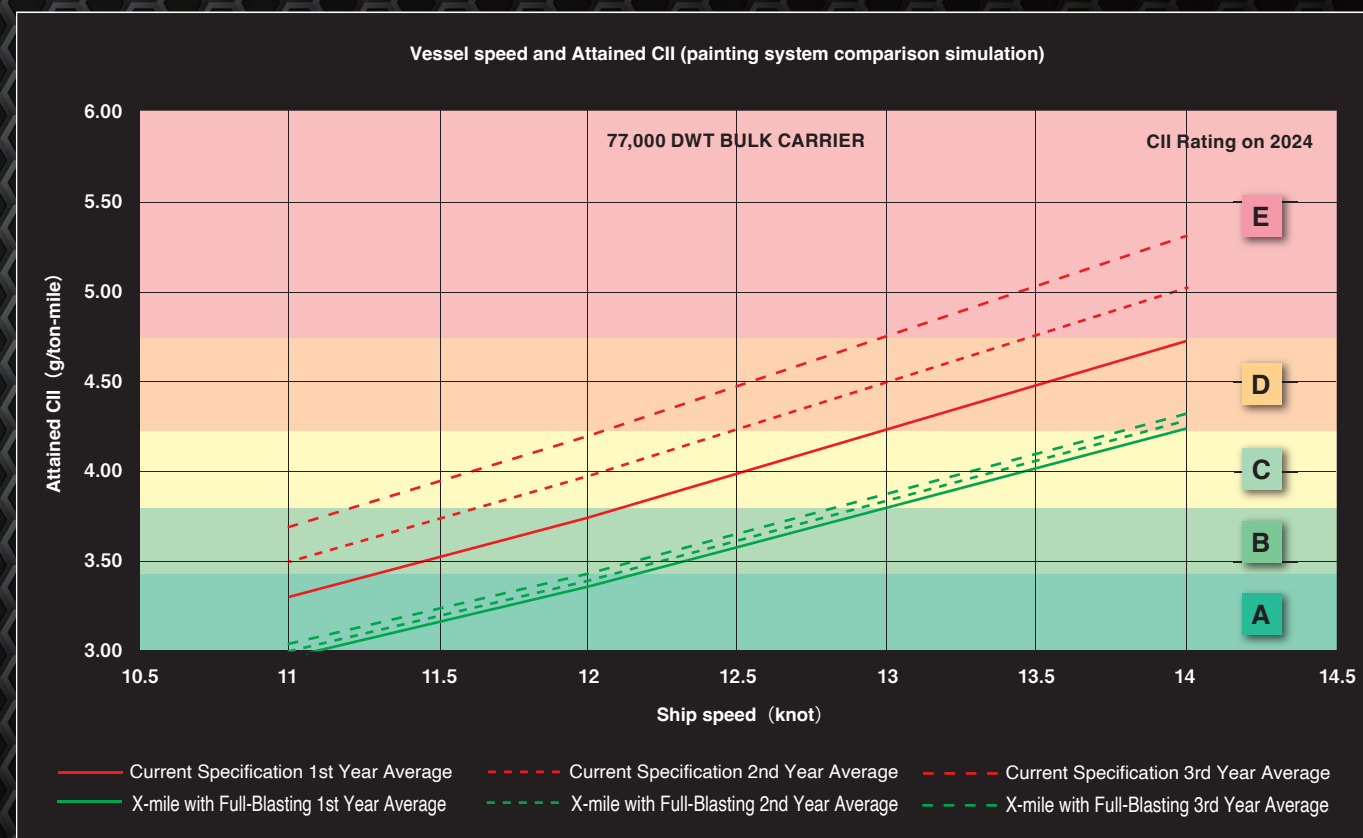
This reflects the antifouling performance of X-mile. In order to maintain a "C" rating for three years under the 2024 CII rating standard, the current specification requires a speed limit of 12.1 knots.

On the other hand, the upgraded specification has a margin of 13.8 knots, which is more than 1.5 knots.

Additionally, if sailing at 12.5 knots in current specification, the rating is expected to be "D" in the third year.

The synergistic effect of the upgrade (X-mile specification + full blast) improving the anti-fouling performance and smoothing the hull surface is expected to result in a "B" rating even in the third year based on the same year's rating criteria.

CII Fluctuation Prediction Simulation



[Movie]
Trends in environmental regulations for international shipping and performance evaluation of antifouling paint products

Part1 Study points



Part2 Challenge!



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TAKATA
QUANTUM
SERIES

KANSAI PAINT MARINE CO.,LTD.

Cumulative track record of over 20,000 vessels!

It has been about 30 years since its release, and the track record of success is proof of its reliability.

Do you know the globally recognized hull paint?

QUANTUM continues to be used as the highest grade by Jotun, the world's No. 1 manufacturer.



[Zebra pattern]

Takata Quantum continues to elute stably for a long time by hydrolysis from the surface layer, and a beautiful striped pattern (zebra pattern) appears on the hull.

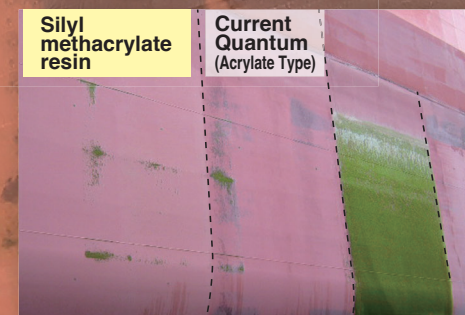
Performance on a real ship

《Ocean-going vessels》

Type : LPG

Sailing Route : Japan—PG

Dock Interval : 29 Months



《Ocean-going vessels》

36 months in service PCC



《Ocean-going vessels》

34-month service container ship





Features of the Takata Quantum Series

High antifouling performance ~ Proven by track records ~

- About 30 years! Applied on over 20,000 vessels since launch (including Jotun's track record)
- It has been very popular for a long time on LNG carriers owned by Japanese shipowners who have strict standards for fouling management
- Fuel efficiency reduction reduces operating costs and contributes to reducing CO₂ emissions
- Effective in maintaining and improving CII ratings

Stable and consistent elution ~ Proven by actual results ~

- Zebra pattern is the result of stable and consistent elution
- Hydrolysis from the surface layer continues to elute stably for a long period of time.

Surface smoothness - the result of advanced technology

- Rheology control technology cultivated in the development of automotive paints
- Stable and consistent elution improves smoothness after sailing.

Environmentally friendly - consideration for the environment goes beyond just reducing CO₂ emissions

- Contributing to preventing transboundary movement of marine organisms
- Low environmental impact in accordance with IMO/AFS conventions

Lineup introduction

Low-friction type / Fuel-efficient
AF rheology control technology

TAKATA
QUANTUM X-mile

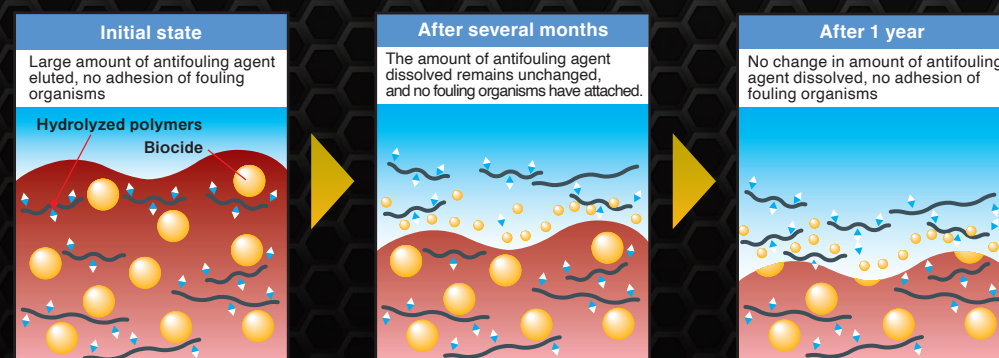
Low-friction type/ Fuel-efficient
AF Silyl methacrylate resin

TAKATA
QUANTUM PLUS(R)

Fuel-efficient AF Silyl resin

TAKATA
QUANTUM PLUS/CLASSIC

●Quantum Series Mechanism — Self-polishing type (ideal form) —



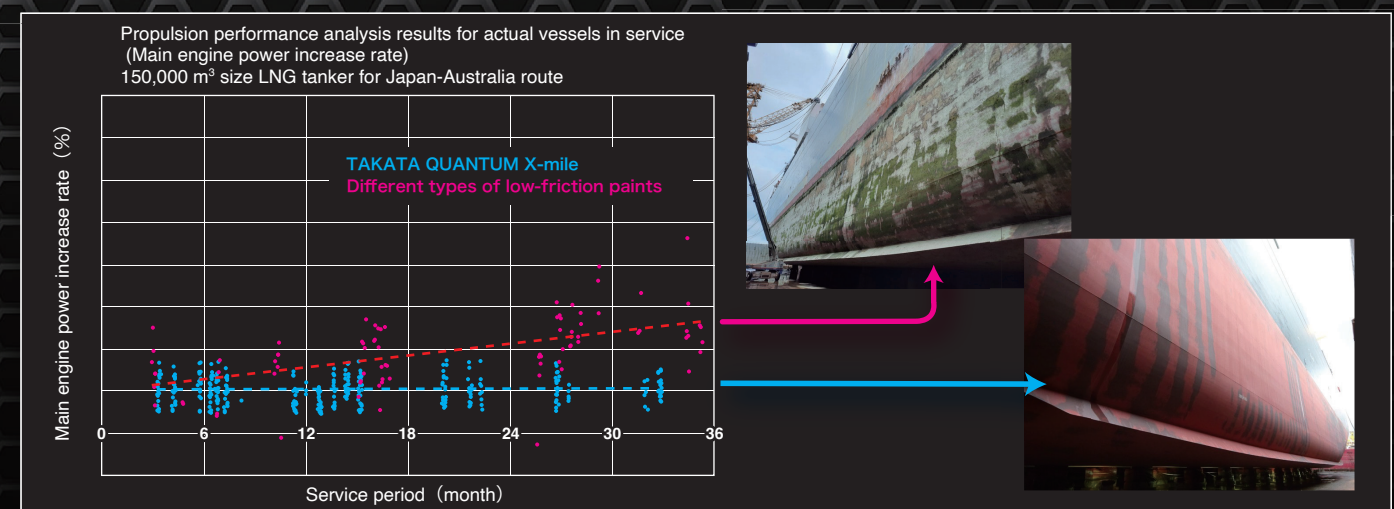
As long as the coating film remains, high antifouling performance can be maintained for a long time.

Environmental regulation trends are changing

Increased main engine power output due to biofouling

In a comparison of the increase in main engine power output of two LNG tankers of the same size (Japan-Australia round trip), the vessel applied with

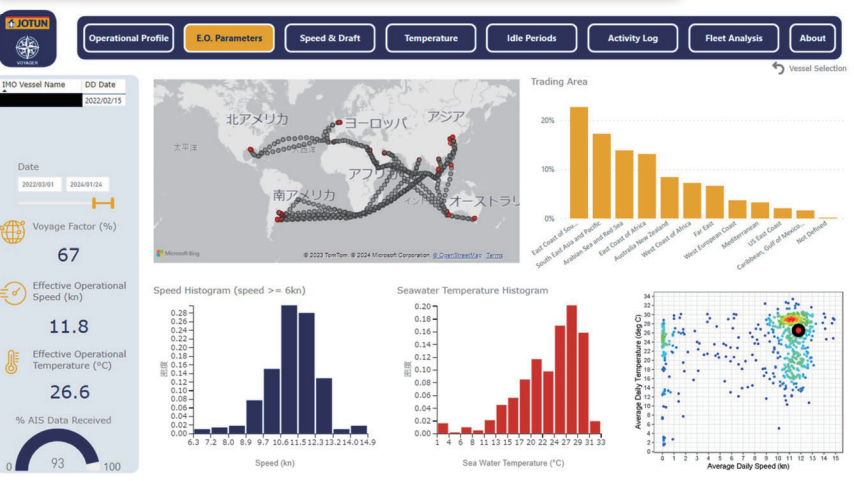
TAKATA QUANTUM X-mile showed no noticeable changes and no biofouling even after 30 months in service.



The occurrence of biofouling depends on various factors

It is important to select antifouling paints with high precision, taking into consideration the service profile (route, frequency of operation, water temperature, speed, anchorage, duration of stay, seasonal variation, duration of service, etc.). We use the following information tools.

① Jotun Voyager (Detailed service profile analysis)



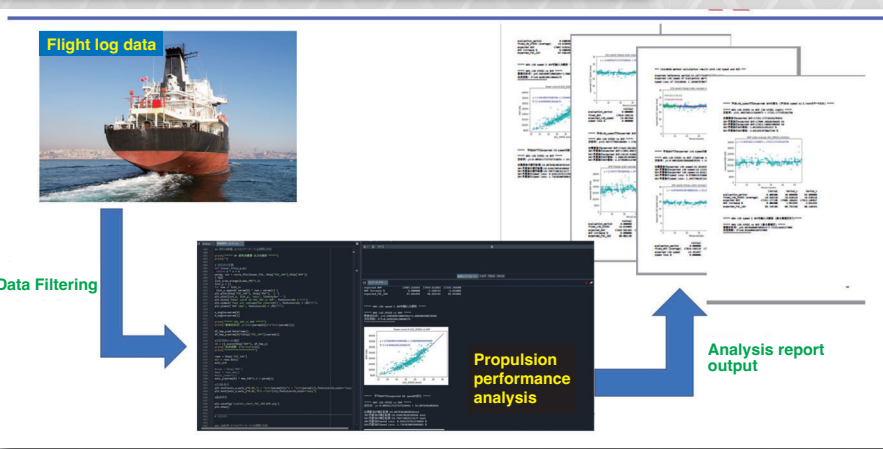
A detailed service profile analysis system based on AIS data and oceanographic data

② Biofouling assessment database

Biofouling assessment database for approximately 2,000 ocean-going vessels

The screenshot shows a web-based interface for a biofouling assessment database. It includes search filters for 'IMO No.', 'Vessel Name', 'Type', 'Route', 'Speed', 'Temperature', and 'Sea Route'. Below the filters, there are four small images showing the hull of a vessel with biofouling. To the right, there are fields for 'Voyage Factor', 'Speed', 'Temperature', 'Sea Route', and 'Link'.

③ KPM-PASS (Propulsion performance analysis)



Software for propulsion performance analysis using operational data

Using the evaluation database and Jotun Voyager, it is now possible to predict the impact of different paint products on biofouling. Furthermore, by analyzing the propulsion performance analysis data using KPM-PASS, you can compare and examine the fluctuations in CII depending on the vessel speed and paint product.

Biofouling score prediction (data-driven with tool ①+②)

Through statistical processing of differences in paint products using the evaluation database and Jotun Voyager, you can examine the effect of CO₂ emission reductions on each vessel by upgrading A/F products. This estimate is based on big data and is proposed with a high degree of reliability. For example, statistics on bulk carriers sailing between East Asia and Oceania show that upgrading from Standard Grade products to X-mile is expected to reduce CO₂ emissions by an average of 4.1% over a 30-month voyage.

Examples of Provided Materials

Estimation of CO₂ emission reduction by upgrading anti-fouling paint for vessel bottoms (data-driven)

Biofouling score based on database & in-service profile detailed analysis statistics

Case-by-case A/F Upgrades to Reduce CO₂ Emissions

Type	Voyage Route	Biofouling score average value X-mile	Biofouling score average value Standard Grade or other paint makers'	CO ₂ emission reduction rate (30 months in service)
BULK CARRIER	East Asia - Oceania	4.5	3.4	-4.1
CONTAINER CARRIER	Excludes short-distance routes	4.5	3.4	-3.6
PCC	World Wide	4.4	3.1	-4.5
CRUDE OIL TANKER (*1)	East Asia - Middle East	4.3	2.7	-5.4
LNG TANKER	East Asia - Oceania	4.9	3.5	-4.7

(*1) : Quantum added to X-mile for statistical purposes

