

## KANSAI PAINT MARINE CO.,LTD.



### Paint *Sommelier*

#### CO<sub>2</sub> emission reduction support with the motto of utilizing real data

Mutually linked system utilizing bio-fouling data of vessels in service collected by Kansai Paint Marine, analysis of service profiles based on AIS information, and a propulsion performance analysis program created from the perspective of paint manufacturers.

##### - Data-driven approach

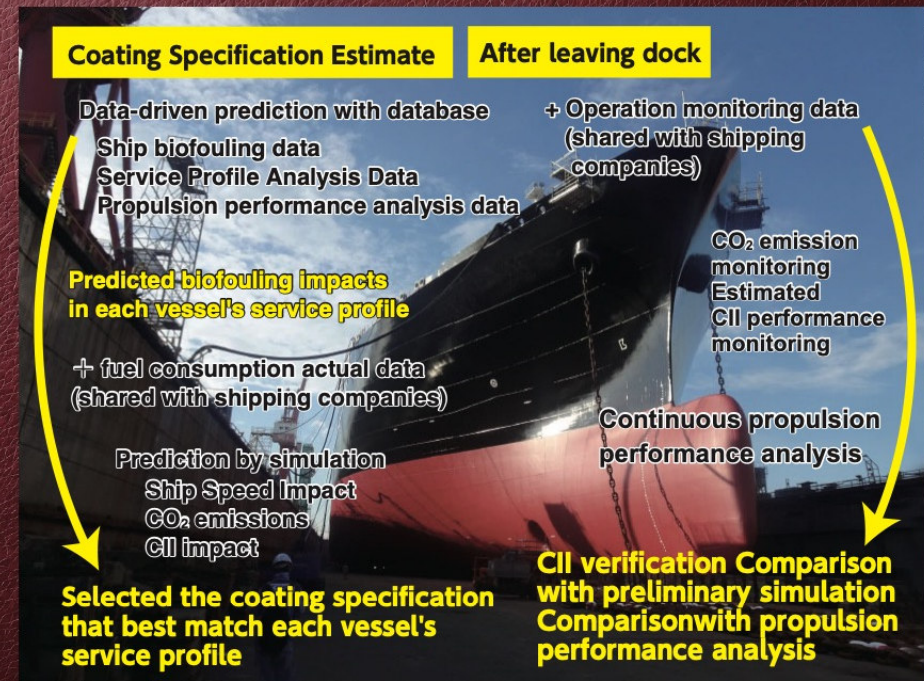
Analyze the service profile of the target vessel by using AIS information, biofouling performance is predicted for each candidate paint specification by cross-referencing with the biofouling database of vessels in service.

##### - CO<sub>2</sub> Emission Simulation

At the coating specification estimation stage, annual fuel oil consumption, actual voyage distance, data-driven biofouling performance predictions, and power curve information are input, and CII simulations are performed based on up to four cases of coating specifications and route setting conditions etc.

##### - CO<sub>2</sub> Emissions Monitoring

After leaving the dock, we will share the in-service data upon request, monitor estimated CII performances, compare them with the preliminary simulation results, and verify the impact of biofouling through propulsive performance analysis.



**Potential client :** Ship owner, Ship management company, Charterer, Cargo owner

**Contact detail**  
Please feel free to email us at Paint Sommelier  
[paint\\_sommelier@kp-marine.co.jp](mailto:paint_sommelier@kp-marine.co.jp)



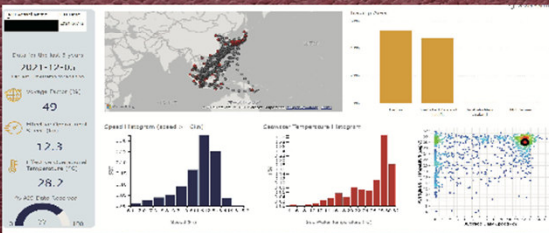
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## Paint *Sommelier*

### Paint *SLUT* CO<sub>2</sub> emission reduction support with the motto of utilizing real data

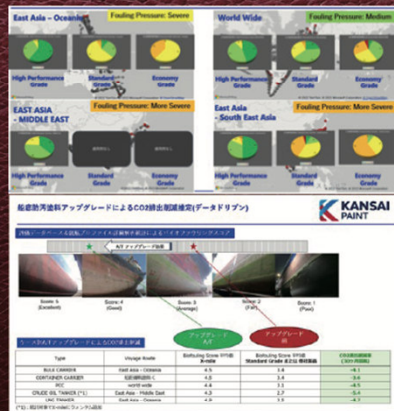
#### ① In-Service Profile Detailed Analysis



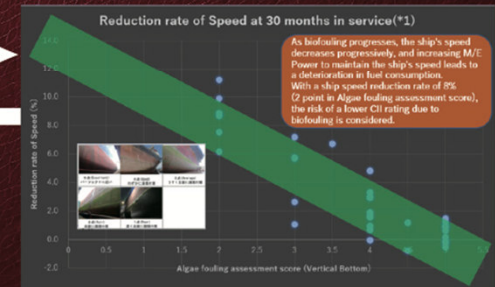
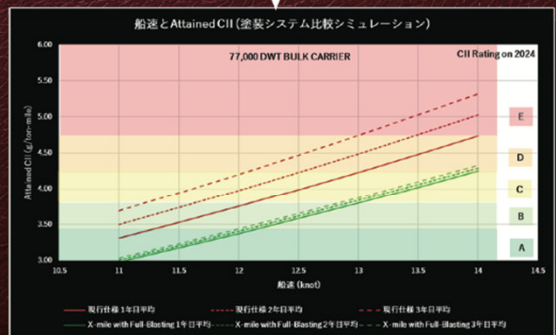
#### ② Biofouling database of ships in service



#### ③ Propulsion Performance Analysis (KPM-PASS)



#### ④ Biofouling Statistics and Predictions by Data Driven



#### ⑤ Trend Analysis Biofouling - Propulsion Performance

#### ⑥ CO<sub>2</sub> emission simulation and monitoring reflecting biofouling statistics and each vessel's propulsion performance


+ Data provided by shipping companies (operation logs, fuel consumption data, power curves for newbuildings, etc.)



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**Simulation Condition Setup Screen**

Parameters used for CII simulation: Average speed 13.3 Results in 2027, Voyage Distance 10,213 Results in 2022, CO2 Emission 10,497 Results in 2022, CO2 conversion coefficient 3.114 MFO, 3.226 MGO, DWT or GT 10,582.

5 CO2 emission allocation: main engine 14,022, main engine (at fouling free) 14,027, cover total M/E 2,475.

6 M/E FOI increase rate (Data driven 結果をコピー): Fouling free 0, Case 1 1.3, Case 2 1.2, Case 3 1.6, Case 4 4.4.

7 下船区間による影響率: Case 1 0, Case 2 0, Case 3 0, Case 4 0.

8 日数率(%): 70

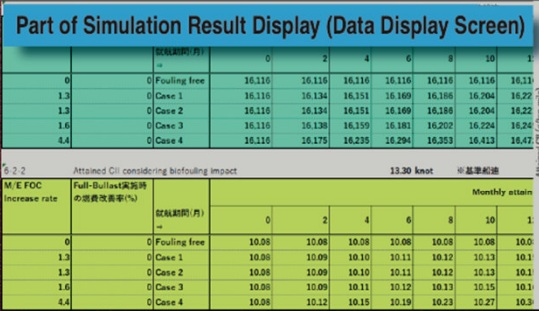
### CO<sub>2</sub> emission simulation

**Upper row: Condition setting screen**

Vessel's operating parameters, annual fuel consumption, annual voyage distance, and biofouling data-driven calculation results, power curve parameters, expected service route, and other profile conditions, etc.

**Lower row: Simulation result screen**

Simulation results are output for each service profile, including CO<sub>2</sub> emission calculations by ship speed, estimated attained CII calculations, and estimated CII ratings by year.



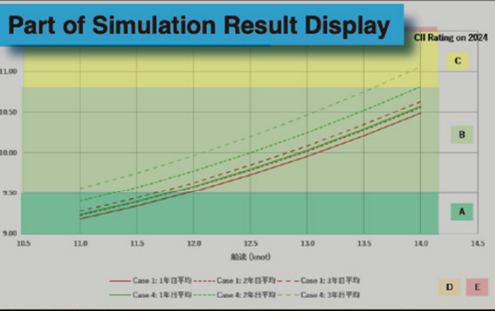
**Part of Simulation Result Display (Data Display Screen)**

船速(節)	0	2	4	6	8	10	12
0	Fouling free	16.110	16.114	16.116	16.116	16.116	16.116
1.3	Case 1	16.116	16.134	16.151	16.169	16.186	16.204
1.3	Case 2	16.116	16.134	16.151	16.169	16.186	16.204
1.6	Case 3	16.116	16.138	16.159	16.181	16.202	16.224
4.4	Case 4	16.116	16.175	16.235	16.294	16.353	16.413

6.2.2 Attained CII considering biofouling impact: 13.30 knot 基準船速

M/E FOI increase rate: Full-Bullnet換算時の換算係数(%)

船速(節)	0	2	4	6	8	10	12
0	Fouling free	10.08	10.08	10.08	10.08	10.08	10.08
1.3	Case 1	10.08	10.09	10.10	10.11	10.12	10.13
1.3	Case 2	10.08	10.09	10.10	10.11	10.12	10.13
1.6	Case 3	10.08	10.09	10.11	10.12	10.13	10.15
4.4	Case 4	10.08	10.12	10.15	10.19	10.23	10.27

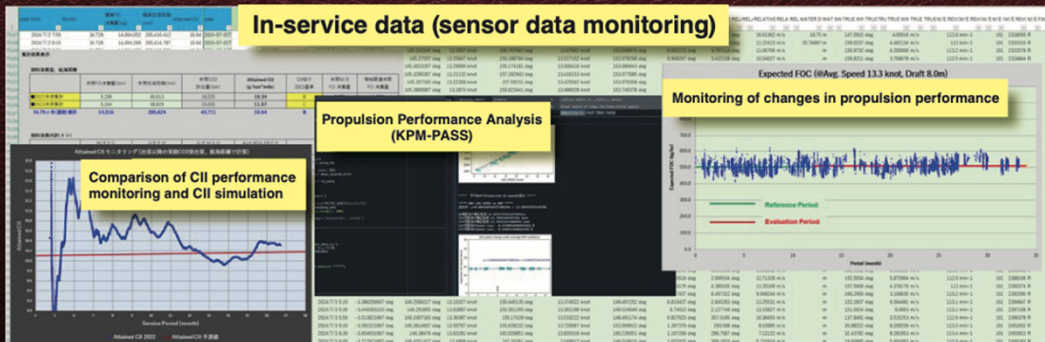


**Part of Simulation Result Display**

CII Rating on 2024

Y-axis: CII Rating (9.00 to 11.00), X-axis: 船速 (knot) (10.5 to 14.5)

Legend: Case 1: 1年日平均, Case 2: 2年日平均, Case 3: 3年日平均, Case 4: 4年日平均



**In-service data (sensor data monitoring)**

Monitoring of changes in propulsion performance

Propulsion Performance Analysis (KPM-PASS)

Comparison of CII performance monitoring and CII simulation

### CO<sub>2</sub> emission monitoring

**Statistics:** fuel consumption in main engine / generator and boiler, voyage distance, CO<sub>2</sub> emissions, estimated attained CII, estimated CII rating, etc.

**Monitoring:** fuel consumption in main engine / generator and boiler, voyage distance, CO<sub>2</sub> emissions, estimated attained CII.

**Propulsion performance analysis:** Monitoring for performance change.

**Validation of simulations:** Comparison of simulation and actual measured approximate values in attained CII.