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(1) SINTEF Manans





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"GATERS has an official sub-licence agreement with Wartsila Netherlands BV to utilise the Gate Rudder Patent (EP 3103715) at specific retrofit projects of vessels sizes below 15,000. DWT. GATERS is sponsored by the EC H2020 Programme (ID: 860337) with the aims and objectives independent of Wartsila Netherlands BV"



### **GATERS** - Gate Rudder System as a retrofit for the next generation propulsion and steering of ships

- Perfect companion for carbon neutral propulsion
- Superior sole energy saving device
- Enhanced steerability and manoeuvring
- More efficient and safer operations in waves \*
- Significantly reduced underwater noise & vibrations

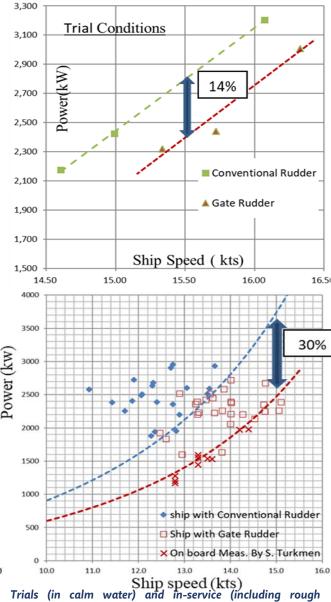




This project has received funding from the European Union's Horizon 2020 innovation action programme under grant agreement No 860337

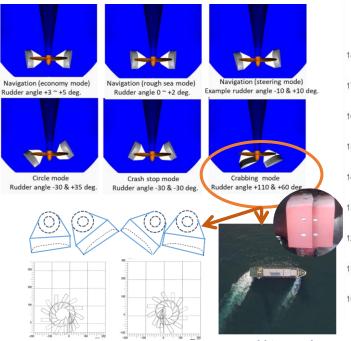


# Remarkable fuel saving (up to 14% in trials), especially in-service and rough weather (up to 30%)



Trials (in calm water) and in-service (including rough weather) powering performance comparisons of two sister ships: Shigenobu with Gate rudder system vs. Sakura with Conventional flap-rudder system

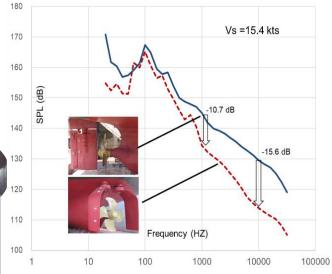
### Improved steerability and manoeuvring (especially in harbours) without stern thrusters



Crabbing mode Increased manoeuvring ability with Gate Rudder System

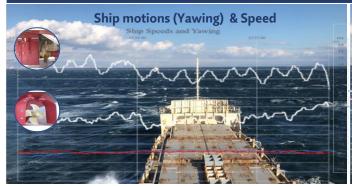
# Reduced underwater radiated noise (up to 15dB) and vibrations

Comparison of Propeler Noise measured by the hydrophone
(1/3 Octave Band Anaysis 20HZ- 31.5kHZ)



Comparative Underwater Radiated Noise (URN) levels of Sakura (CRS) and Shigenobu (GRS) from trials

#### Reduced vessel motions (in yawing and rolling) in waves



### **Sea conditions:**Wind speed: 12-24 knots

Wave height: 1.5 – 2.0m; Direction: 250-270°; Period: 30sec



#### Rolling motion recorded in trials:

With conventional rudder system With Gate Rudder System

→ 3-5<sup>0</sup>

→ 1-3<sup>0</sup>