

Ten percent lower emissions



The new harbour tugboat E3-Tug saves fuel and cuts emissions. IMARES Wageningen UR developed software for calculating an optimal combination of electric and diesel power.

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‘We estimate the fuel savings at 5 to 10 percent’



Harbour tugboats are extreme vessels. With their enormous engine capacity, four tugboats can tow a supertanker of 350,000 tonnes into a harbour. Rather as if four sturdy mice were towing a human being through the water. But these powerful diesel engines consume relatively large quantities of fuel, even when the boat does not have to tow anything heavy. ‘Measurements have shown that this top capacity is only used for 2 percent of the time,’ says Jules Verlinden, Innovation Coordinator for the Rotterdam company SMIT Harbour Towage, part of the Royal Boskalis Group. That is inefficient and means needless energy consumption and emissions of harmful substances. In anticipation of ever stricter environmental regulations, SMIT thought it was high time for a sustainable tugboat. Together with shipbuilder Damen Shipyards and IMARES Wageningen UR, the tug services company launched a project to develop the E3-Tug, a hybrid tugboat powered by both diesel and electric motors.

DEVELOPING SOFTWARE

Working with Damen, IMARES modelled the emissions from tugboats under a range of conditions, from diesel engines running on standby to tugging large tankers. Software was then developed for optimizing the use of the diesel and electric motors so that the boat could meet local environmental regulations. ‘The environmental effects of emissions de-

pend on what the local area is sensitive to,’ explains Chris Karman, maritime marketing manager at IMARES. ‘In densely populated areas you want to minimize the amounts of fine particles and nitrogen oxides, whereas in less densely populated areas you can focus more on reducing CO₂ emissions or underwater noise.’ This system gives the company a choice about which impact it wants to minimize.

PROFITABLE OPTIONS

Verlinden at SMIT is enthusiastic. ‘Electric power is especially useful for light work such as sailing without a load,’ he explains. ‘Only when there is heavy work to be done, such as tugging, does the software engage the diesel engines.’ These engines are therefore only used when they are really needed. The new model of tugboat delivers environmental benefits and sustainable and profitable options that can be applied anywhere. The boat will cost a lot more than a regular tugboat, however. ‘Our estimate is that the E3-Tug can operate with about 10 percent lower emissions and fuel savings of 5 to 10 percent,’ claims Verlinden. ‘With rising fuel prices, we expect that the boat will be cost-effective.’ The E3-Tug is a collaboration between SMIT Harbour Towage, Alewijnse Marine Technology, Damen Shipyards, TU Delft, Wageningen UR (IMARES) and the Port of Rotterdam company. ■