13 MARI

Increasing Energy Efficiency through Drag Reduction for Maritime Shipping

A simple, scalable solution from 13 Mari that reduces fuel consumption and environmental impact

THE MARITIME INDUSTRY IS AT A CROSSROADS.

While the world looks to a less petroleum-dependent future, for now, fleet operators remain dependent on carbon-based fuels to transport the world's goods around the globe. The industry is faced with new environmental regulations, such as the mandated switch to Very Low Sulphur 0.5% fuels. In addition, the International Maritime Organization (IMO), under its "Strategy on Reduction of GHG Emissions from Ships," now requires that vessels calculate their Energy Efficiency Existing Ship Index (EEXI) and Carbon Intensity Indicator (CII).

Fuel costs make up over 40% of ships' operating expenses, so beyond cutting vessels' carbon footprint,13 Mari's innovation will reduce fuel bills that significantly impact operators' bottom line.

By helping reduce vessel fuel consumption, 13 Mari's solution brings the shipping industry closer to its goal of decarbonization.

INNOVATION

13 Mari has created a method for blue water vessel owners/operators to reduce the energy their vessels need to move through the water – overcoming drag – and improve fuel efficiency.

The company's innovation reduces ships' drag coefficient by placing specially shaped and engineered composite passive elements onto the underwater part of the ship's hull. The optimal location of the passive elements along hull shape using 13 Mari's proprietary hull mapping and positioning software. Our small hull structures precisely manage turbulence of the water as it flows over the hull to reduce significantly the overall ship drag. This lowers fuel consumption, thereby cutting operating expenses and greenhouse gas (GHG) emissions, enabling compliance with ever-tightening regulations, while increasing profits.

BENEFIT

Our third-generation family of elements delivers a measured 6.8% drag coefficient reduction, with testing of next-generation elements promising substantially higher performance. The ease of device implementation and scalability makes our solution attractive to ship owners, operators, and builders. Because the elements created by 13 Mari have no moving parts and are durable, they can be attached to any commercial shipping vessel currently operating, or during new construction. The elements are bonded externally to the hull with epoxy, requiring no welding or drilling. Because hull integrity is not compromised in any way, the elements can be incorporated during any ship's scheduled maintenance window as a cost savings retrofit that benefits the environment. For demanding applications, for example, where vessels go into rivers and "not always afloat but safely aground" (NAABSA) ports, a steel version of the product is in development.

SIMPLICITY

Actual ship retrofit of 13 Mari's elements can be done at a scheduled five year dry docking repair and maintenance. 13 Mari will supervise the installation of the passive elements. The composite elements are attached to the hull using highly engineered and validated specialty marine epoxy. The installation protocol developed by composite professionals allows for uninterrupted voyaging in the unlikely scenario that an element detaches due to an unforeseen event, such as grounding. Should an element become detached, the underlying barrier hull coat, which possesses both anti-corrosive and anti-fouling properties, would remain.

The outer surface of the passive elements should be coated with an anti-fouling paint product to ensure the passive elements are equally protected against biofouling as the rest of the ship's hull.

The 13 Mari solution can be used in conjunction with many other fuel-saving measures, ultimately aggregating total cost savings.

NO RISK PRICING

Estimated annual fuel savings in the case of a 30,000DWT bulker, a small-sized ship in our target market, are expected to equal or exceed $130k USD per vessel based on a conservative 3.7% fuel savings estimate. 13 Mari can offer a low-risk solution based on these cost savings.

So, for this notional 30,000DWT bulker, 13 Mari can provide the mapping and installation of the devices for a one-time retrofit fee of $130K due at the time of retrofit. Similar "unit" pricing is available for larger ships of any type, based on the minimum expected fuel savings over one year of operation.

EFFECTIVENESS

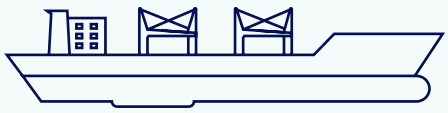
NAME	SAVINGS	ROI	COST
13 MARI	3 - 7%	1 Yr	Unit
POLYMER COATINGS	1/5 - 4%	2 Yrs	2.5x*
HULL CLEANING	7 - 12%	<1 Yr	~unit
ROTATING SAILS (FLETTNER)	6 - 12%	5 - 6 Yrs	10x
AIR LUBRICATION	5%	5 - 7 Yrs	10x
WAKE EQUALIZING	2 - 3%	1 - 2 Yrs	2x
BULBOUS BOW OPTIMIZATION	2 - 3%	3 - 4 Yrs	3x
PRE/POST SWIRL	2 - 5%	1 - 2 Yrs	2x

*multiple of 13 Mari's "unit" cost

SAVINGS BY VESSEL

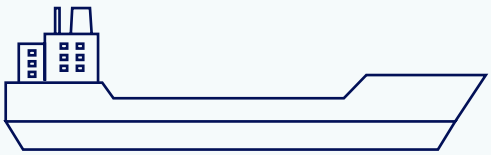
The savings below are estimated with a 3.7% drag reduction, $470 per tonne for heavy fuel oil and industry standard utilization

BULKERS



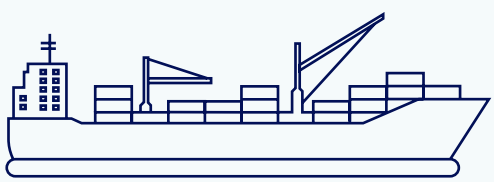
NAME	MEDIAN SAVINGS	UP TO SAVINGS
HANDYSIZE	$120,000	$200,000
HANDYMAX	$150,000	$240,000
SUPRAMAX	$160,000	$260,000
PANAMAX	$180,000	$310,000
POST-PANAMAX	$200,000	$350,000
CAPESIZE	$350,000	$430,000
VLOC	$430,000	$520,000

TANKERS



NAME	MEDIAN SAVINGS	UP TO SAVINGS
PRODUCT TANKER	$83,000	$140,000
COASTAL TANKER	$140,000	$170,000
AFRAMAX	$170,000	$340,000
SUEZMAX	$340,000	$560,000
VLCC	$560,000	$580,000
ULCC	$580,000	$680,000

CONTAINER CARRIERS



NAME	MEDIAN SAVINGS	UP TO SAVINGS
EARLY CONTAINERSHIPS	$250,000	$420,000
FULLY CELLULAR	$350,000	$520,000
PANAMAX	$420,000	$610,000
PANAMAX MAX	$560,000	$730,000
POST PANAMAX	$870,000	$1,200,000
VLCS	$1,400,000	$1,600,000
ULCS	$1,900,000	$2,100,000

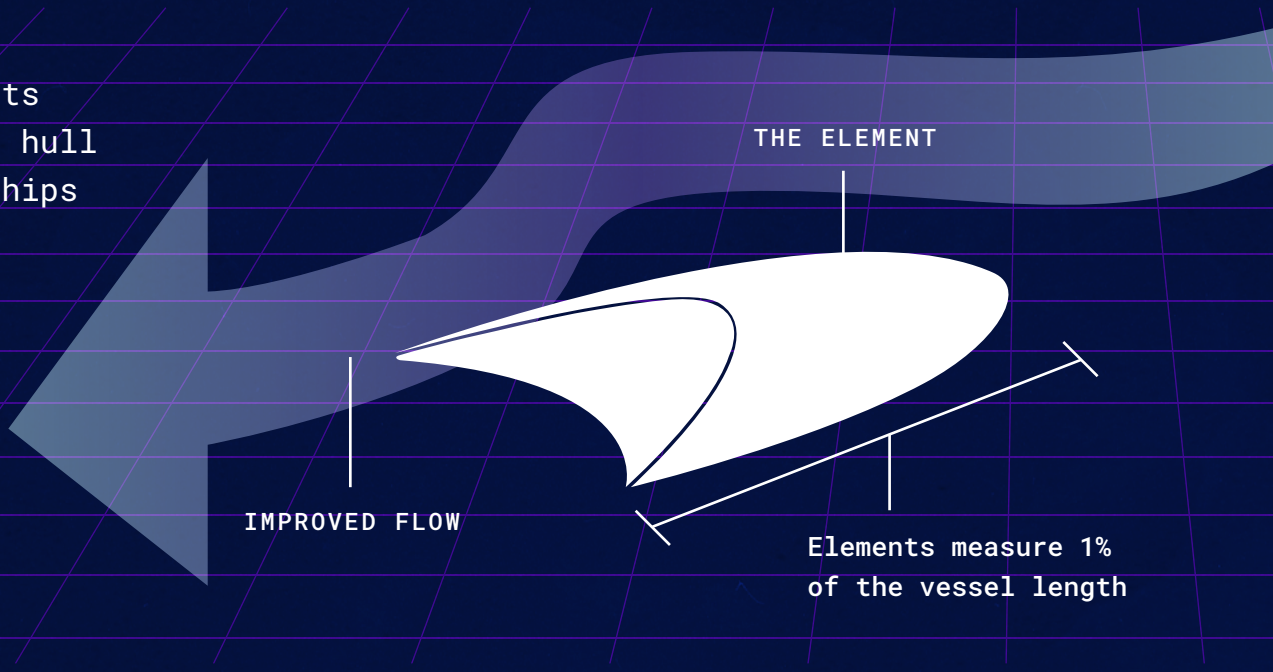
Smart maritime elements increasing fuel efficiency by up to 7%

40 - 60%
of operating expenses goes towards fuel

By 2030 CO^2 must see a cut of **40%. 50%** by 2050

A single 13 Mari element reduces drag locally by up to 20%

Composite elements "glued" onto the hull regulating the ships turbulent flow



STRENGTH IN NUMBERS

15-30 Elements reduce vessel drag by 3-7%

ROI

Pays for itself within 1 year, 4x ROI over 5 years

MARKET

850+ Vessels over 300m in length globally

For more information, please contact hi@13mari.com