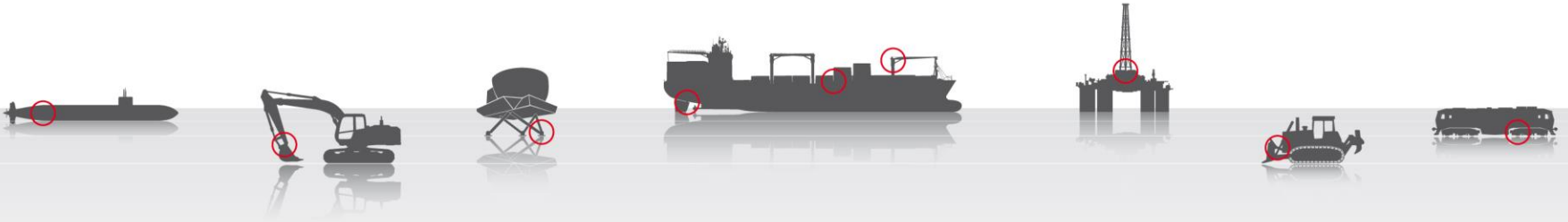
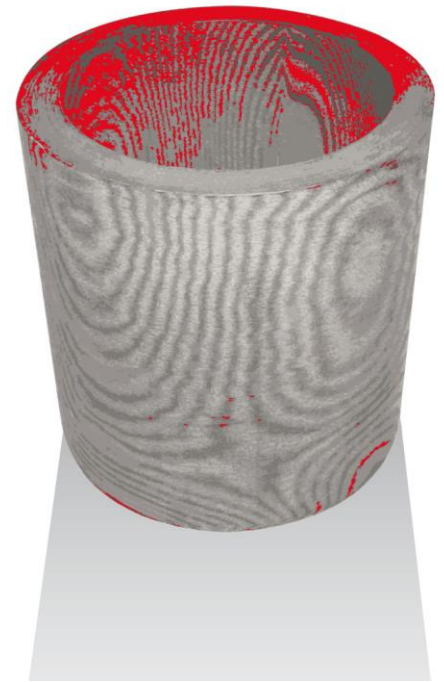


acm COMPOSITES

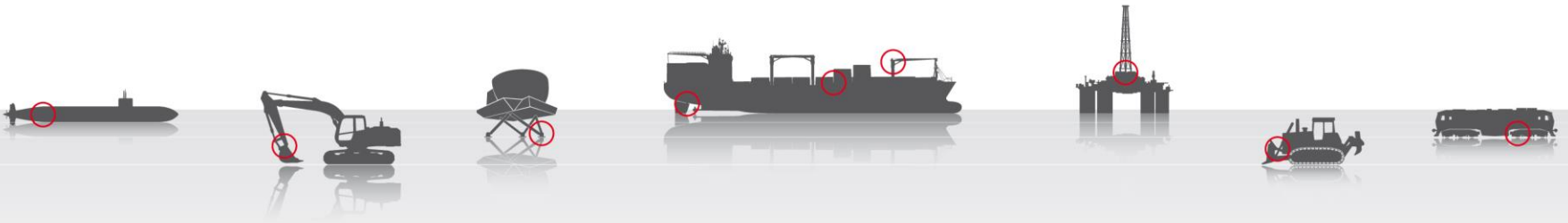


ACM Composites

L2 Marine Rudder Bearing Presentation



acm COMPOSITES



ACM Composites
ACM L2 Marine
Notable References

ACM Composites

L2 Marine Rudder Bearing Presentation

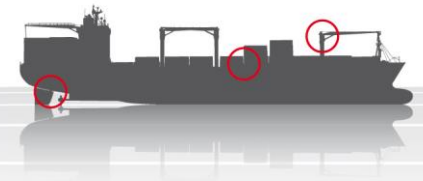
ACM Composites – History & Scope



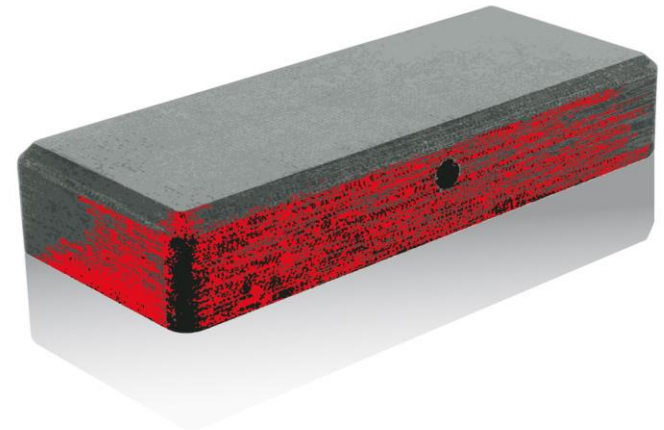
- ▲ Supplied marine market for over 25 years
- ▲ Have supplied over 7,500 vessels
- ▲ №1 marine composite
- ▲ Design, manufacture, after-sales
- ▲ Available 24/7



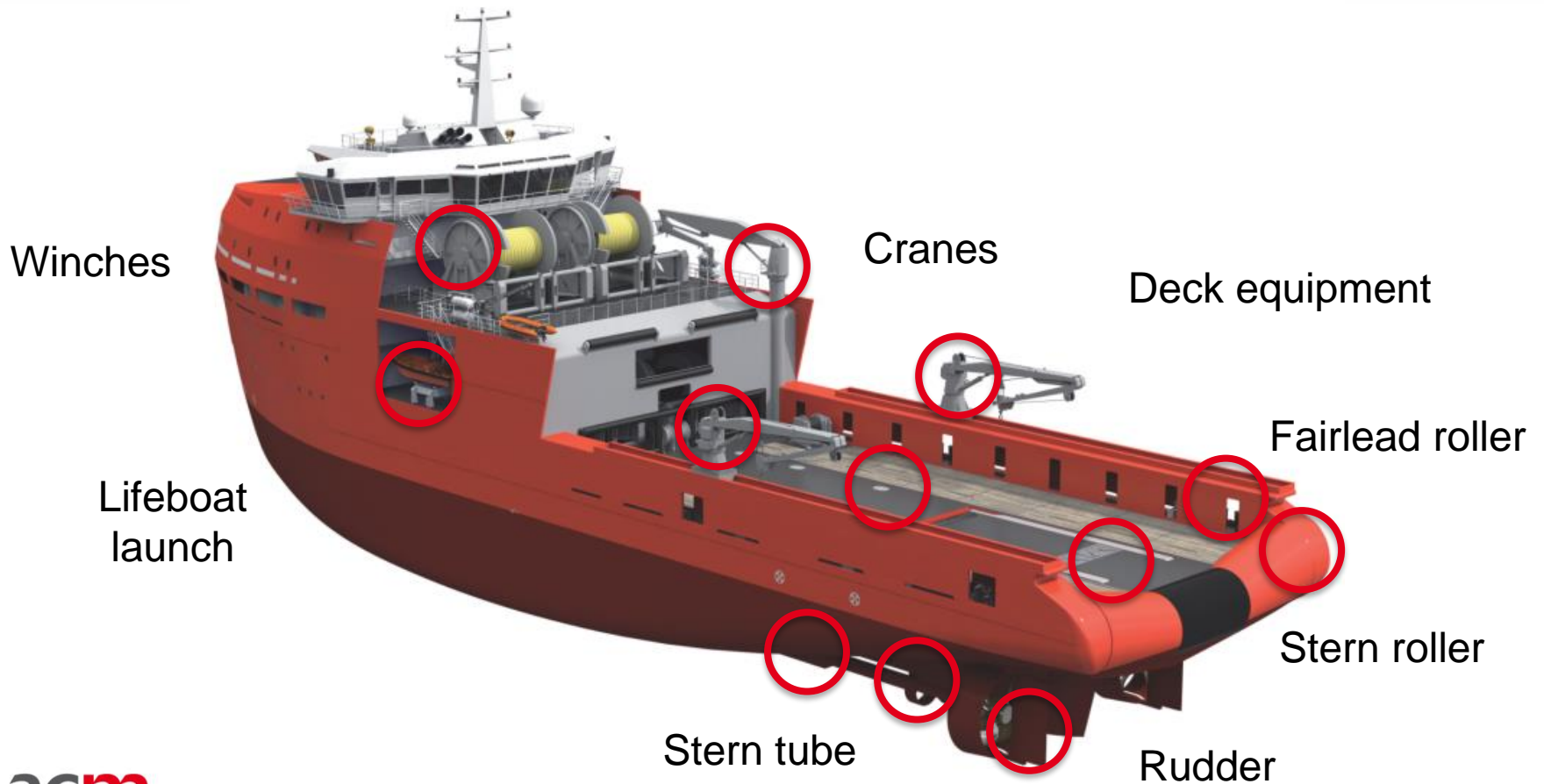
ACM Composites – Marine Applications



- ▲ Deck equipment
- ▲ Stern roller bearings
- ▲ Container support pads
- ▲ Hatch cover pads
- ▲ Fairlead rollers and winches
- ▲ Water lubricated stern tube bearings
- ▲ Retractable thrusters
- ▲ Rudder bearings
 - ▲ Upper/lower pintle, neck bush
 - ▲ Carrier bush & disk



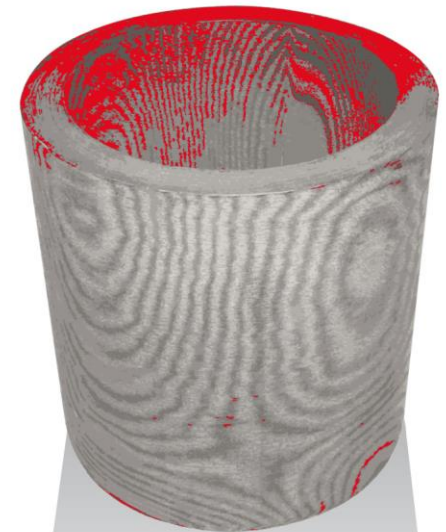
ACM Composites – Marine Applications



ACM L2 Marine



- ▲ Exclusively available from ACM Composites
- ▲ Result of extensive R&D
- ▲ Launched in 2001
- ▲ Semi-finished or finish machined
- ▲ Shaft diameter up to 1,250 mm
- ▲ Classification society approvals



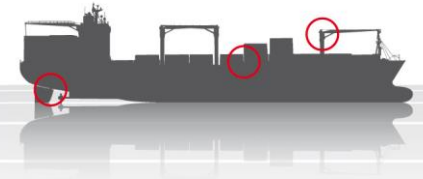
ACM L2 Marine – Advantages



- ▲ High load capability
- ▲ Very low swell
- ▲ Low wear characteristics – long life
- ▲ Can operate dry/grease/oil/water lubricated
 - ▲ EAL compatible
- ▲ Resistance to particle embedding
 - ▲ Shaft friendly



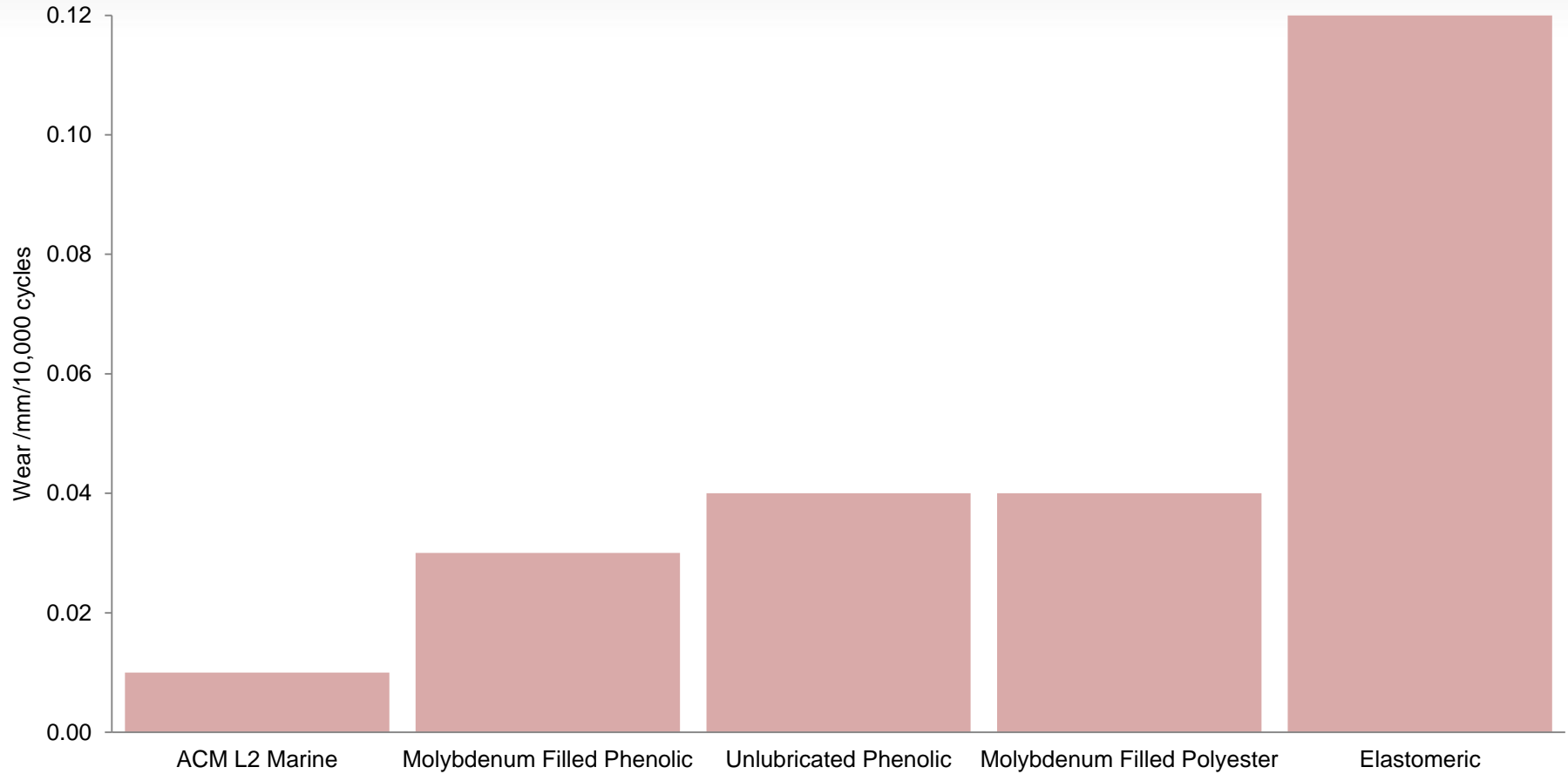
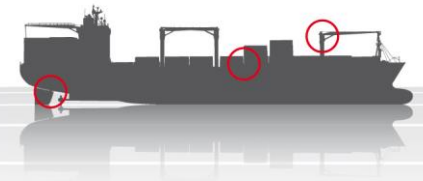
ACM L2 Marine – Advantages



- ▲ Can be freeze fitted
- ▲ Short delivery time (repair 48 hours)
- ▲ Stock
- ▲ Competitive price



ACM L2 Marine – Wear (Dry Operation)



ACM L2 Marine – Comparison



Property	Unit	ACM L2 Marine	Alternative Polyester Composite	Synthetic Elastomer	Cotton Phenolic	Thermoplastic Polymer	Bronze
Compressive strength	MPa	>375	300	-	120	92	850
Compressive modulus	MPa	2,750	3,200	440	5,600	2,290	110,000
Rockwell	M	100	90	43	53	50	70 (HB)
Density	g cm ⁻³	1.3	1.3	1.2	1.58	1.38	7.8
Swell in water	%	<0.1	0.1	1.3	1.0	0.5	0
Thermal expansion coefficient	x10 ⁻⁵ °C ⁻¹	5.0	5.0	23	4.0	6.0	1.8
Liquid nitrogen freeze fit capability	-	yes	yes	no	yes	no	yes
Max operating temperature	°C	140	130	100	100	70	315
Min temperature	°C	-150	-150	-60		-40	
Friction coefficient (dry)	-	0.15	0.15	0.10 - 0.20	0.80	0.12 - 0.20	0.22
Classification approval for dry running	-	yes	no	yes	no	no	no

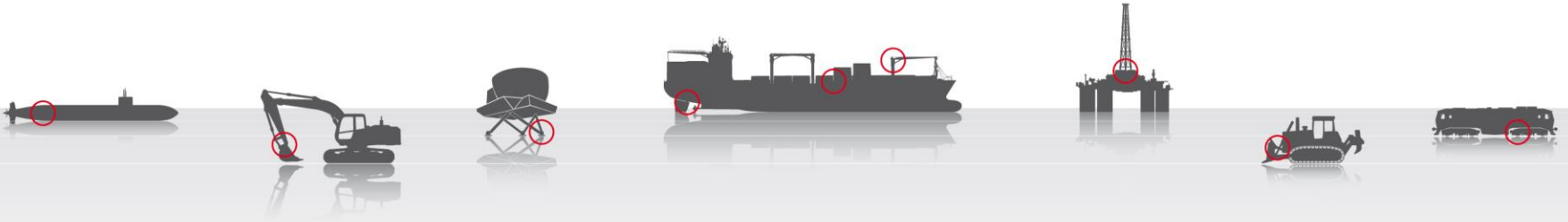
Above values are typical.

Values for ACM L2 Marine are tested according to the relevant BS EN ISO standard

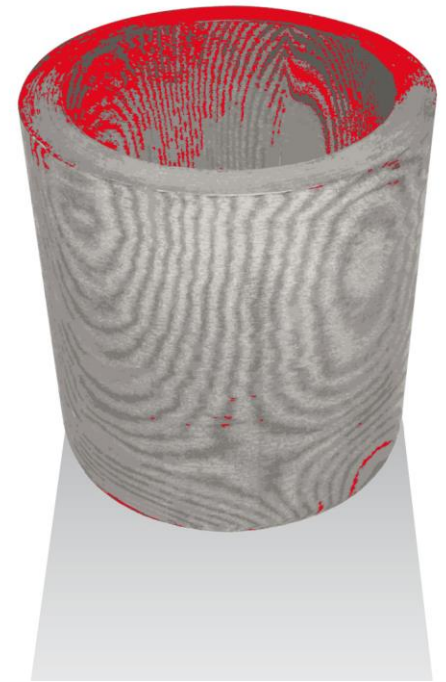
ACM L2 Marine – Rudder Approvals



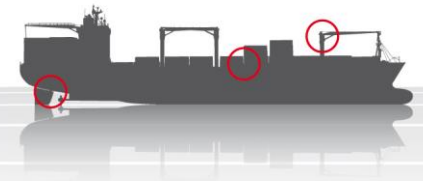
acm COMPOSITES



Notable References



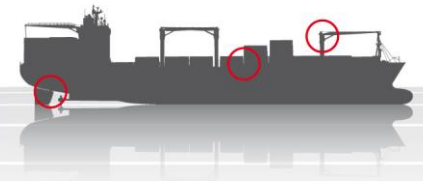
CMA CGM Explorer Class ULCV



- ▲ World's largest containership at launch
- ▲ 16,020 TEU
- ▲ Launched 2012



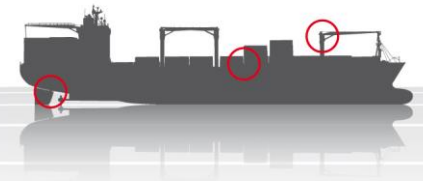
CMA CGM Explorer Class ULCV



- ▲ BV Class
- ▲ Twisted leading edge spade type
- ▲ Neck: 1267 x 1155 x 1195
- ▲ Carrier bush: 1003 x 923 x 450
- ▲ Carrier disk: 1300 x 1010 x 41



CMA CGM Explorer Class ULCV

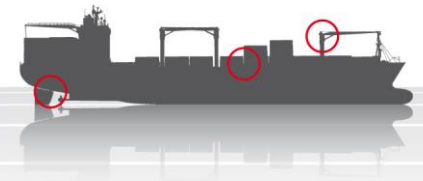


▲ Four vessels in class

- ▲ Marco Polo
- ▲ Alexander von Humboldt
- ▲ Jacques Cartier
- ▲ Jules Verne



CMA CGM Explorer Class ULCV

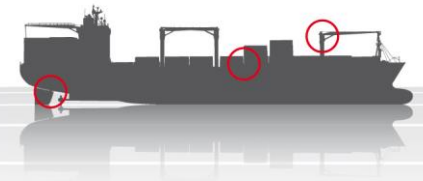


- ▲ DSME built
- ▲ 396 m long
- ▲ 54 m wide
- ▲ 16 m draft
- ▲ 175,343 GT

MARCO POLO's length : 396 m



Qatargas Q-Flex LNG Carrier

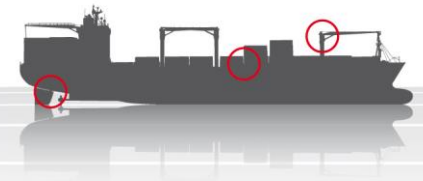


- ▲ Launched 2009
- ▲ LR Class
- ▲ 210,00 CBM
- ▲ 312 m long
- ▲ 49 m wide
- ▲ 12 m draft

- ▲ Twin rudder
- ▲ Neck: 770 x 705 x 700
- ▲ Pintle: 834 x 765 x 750



Qatargas Q-Flex LNG Carrier



▲ Four vessels

▲ Al Khatiya

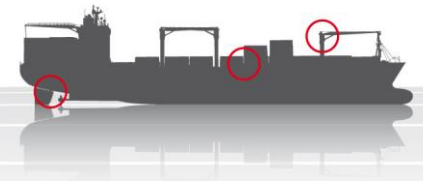
▲ Al Mirqab

▲ Al Wabra

▲ Al Bahiya



KOTC VLCC Oil Tanker



- ▲ VLCC oil tanker
- ▲ Double hull
- ▲ NK Class
- ▲ 162,000 GT
- ▲ 333 m long
- ▲ 60 m wide

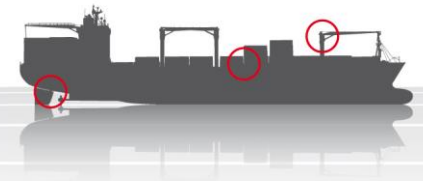


KOTC VLCC Oil Tanker



- ▲ Four vessels in class
- ▲ Launched 2014
- ▲ DSME built
- ▲ Neck: 976 x 891 x 850
- ▲ Pintle: 1026 x 936 x 950

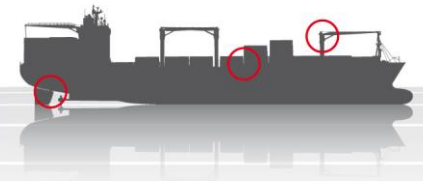
Deepwater Platform Supply Vessel



- ▲ Rolls Royce design
- ▲ Hyundai built
- ▲ Launched 2014



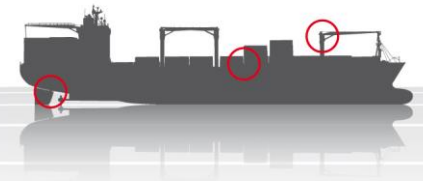
Deepwater Platform Supply Vessel



- ▲ Four vessels in class
- ▲ NK Class
- ▲ 97 m long



Vehicle Carrier



- ▲ Launched 2007
- ▲ 6 vessels in class
- ▲ 23,498 GT
- ▲ 148 m long
- ▲ 25 m wide

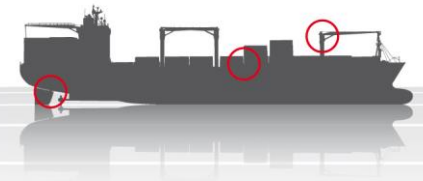


Cruise Ship



- ▲ Costa Fortuna (Carnival)
- ▲ Replacement bearings
- ▲ Fincantieri built
- ▲ 105,000 GT
- ▲ 271 m long
- ▲ 38 m wide
- ▲ 610 x 550 x 700

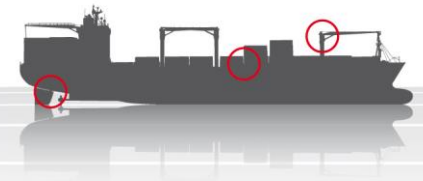
Cable Ship



- ▲ Niwa
- ▲ Launched 1991
- ▲ ABS Class
- ▲ 13,201 GT
- ▲ 147 m long
- ▲ 22 m wide



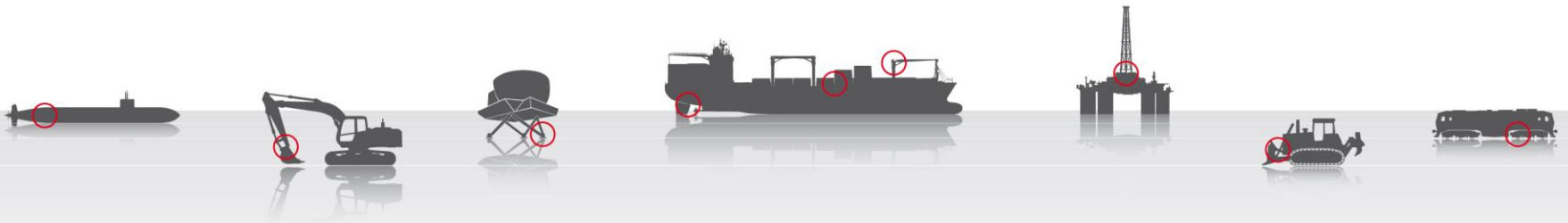
Bulk Carrier



- ▲ Triton
- ▲ Flap rudder
- ▲ 40,570 GT
- ▲ 225 m long
- ▲ 32 m wide

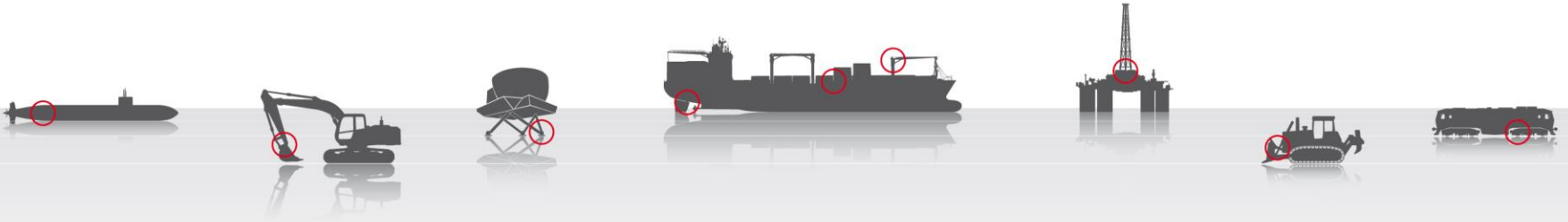


acm COMPOSITES



‘...the fit and forget
rudder bearing solution...’

acm COMPOSITES



thank you

ACM Composites

L2 Marine Rudder Bearings

