



“The Future of Bunker testing; Real Time Quality Monitoring”

ARACON 2007

By Timothy Wilson CEng MIMarEST
Principal Specialist Engineer
Lloyd's Register FOBAS



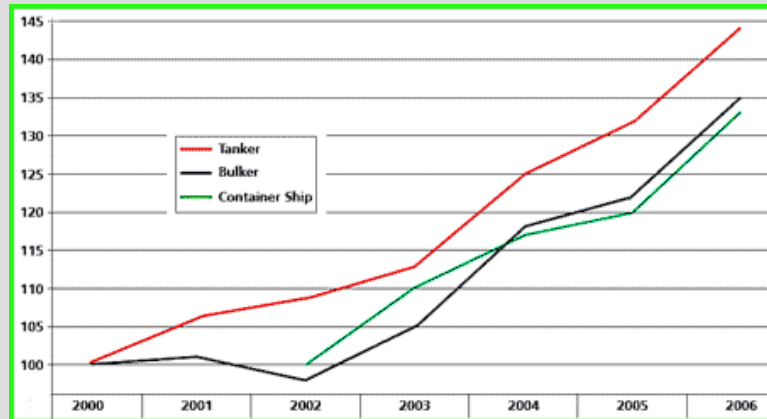
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The Future of Bunker Testing – Real Time Monitoring
ARACON 2007 -



Background drivers

1. Fuel Oil and Lubes the biggest variable cost and risk factors.
2. Tighter Environmental legislation
3. Burden of proof on ships
4. Human element - reduced crew size and skill base
5. Customers seek reliability centred maintenance
6. Historic bunker quality statistics do not guarantee a quality delivery.
7. Effective on board fuel management governed by fuel condition assumptions



Ref: Moore Stephens Index



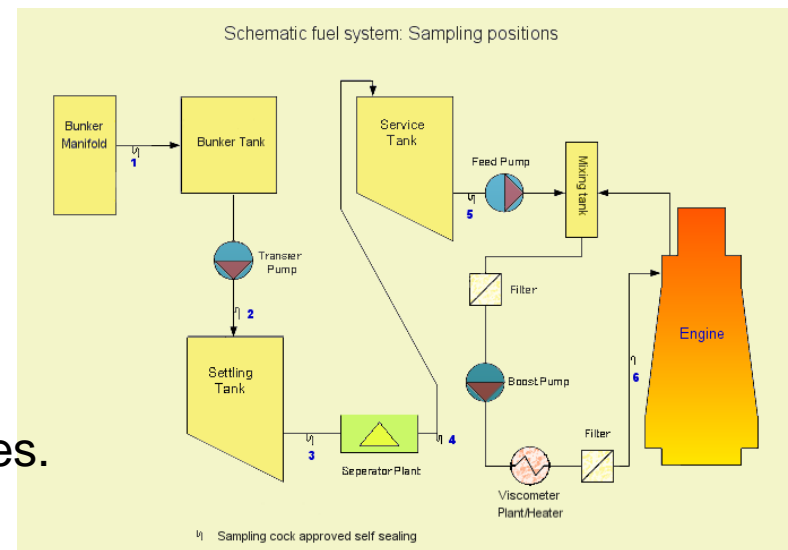
The missing link! –

You can't manage what you don't measure

- Fuel Management based on bunker manifold data.
- Fuel system audits limited by turn around time and frequency

**The Solution = Real-time on-line
Auto fuel quality measurement**

- Enabling more effective on board fuel management &
- opening up further reliability, maintenance and environment performance opportunities.



Principle of Condition Monitoring

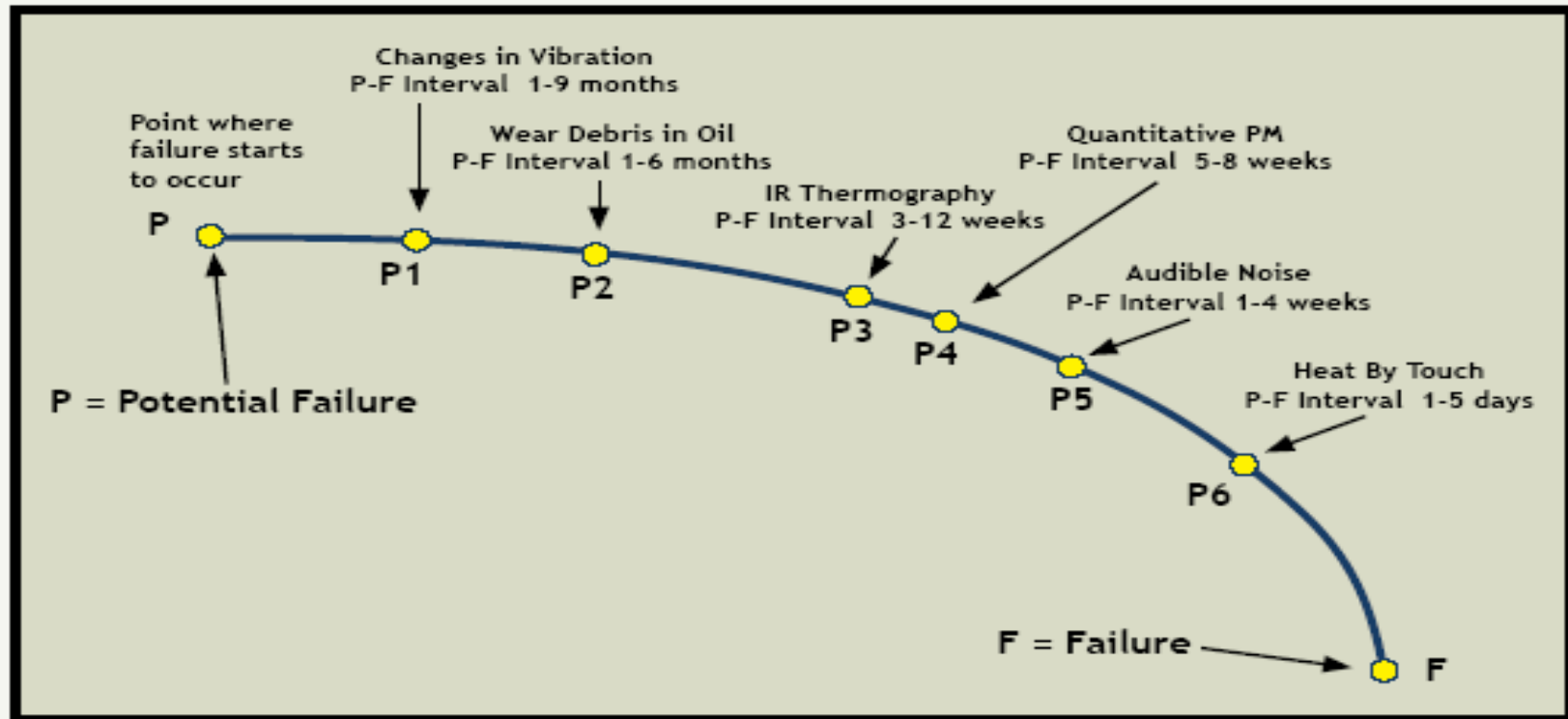
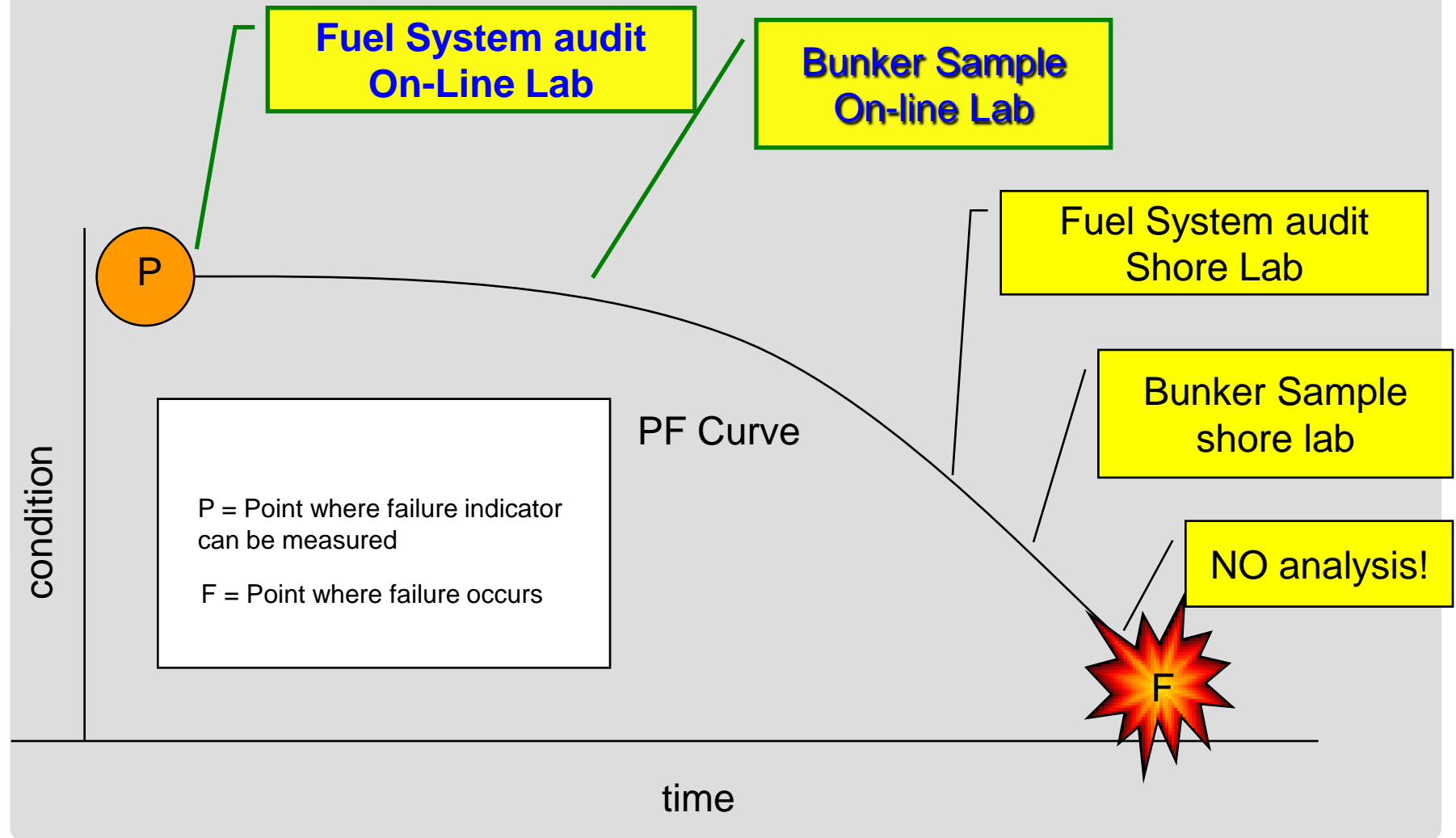


Figure 1 - The Potential Failure to Failure (P-F) Curve
(John Moubray: Reliability Centered Maintenance II)

Status of fuel oil condition on the potential failure curve



Real time at - The Bunker Station

Enhanced fuel management:

- Instant quality reporting for both Supplier and Purchaser
- Early alerts highlights any discrepancies
 - enabling speedy resolution and correction
 - prevent extended de-bunkering and costly delays to both parties
 - confirmation of legislative compliance
 - Identifies air entrapment for volume adjustment
 - avoiding over and under charging.
- Overcomes manual sampling errors
- Greater confidence in the early use of the fuel



Reducing risk, disputes and costs

Real-Time On-line for Storage, Handling and Use

Before and After Treatment Plant

- Alerts to water ingress during storage
- Alerts to stratification
- Demonstrates efficiency
- Enables performance governed maintenance



Engine Inlet

- Abrasives/water alert - preventing engine damage
- Demonstrates Sulphur emission compliance which limits risk of penalties
- Optimising use of LSFO avoids unnecessary burning of premium fuel
- Facilitating more effective energy and environmental management

Cylinder Lube Oil (CLO) optimisation

- Interfacing real time sulphur with CLO feed controllers i.e. alpha lubricators

Environment

- Sulphur content synchronised with GPS demonstrates SECA compliance
- Optimising CLO dosage - reduces particulate matter emissions
- Cleaner combustion through more effective management of fuel treatment
- Improved energy management

**Reducing emissions
Ensuring compliance**



Innovative Technologies enabling real-time on-line monitoring solutions of fuels, lubes and emissions

- Recent advances in condition monitoring enabling on-line technologies include:
 - On-line lube oil sensor suite (Kittiwake)
 - Up stack emissions monitoring (a number of providers)
 - Irrefutable bunker quantity measurement (BP Marine)-
 - On-line AUTO fuel and lube quality analysis (Lab-On-A-Ship™ FOBAS Onboard - under development.)



Lab-On-A-Ship™ FOBAS Onboard



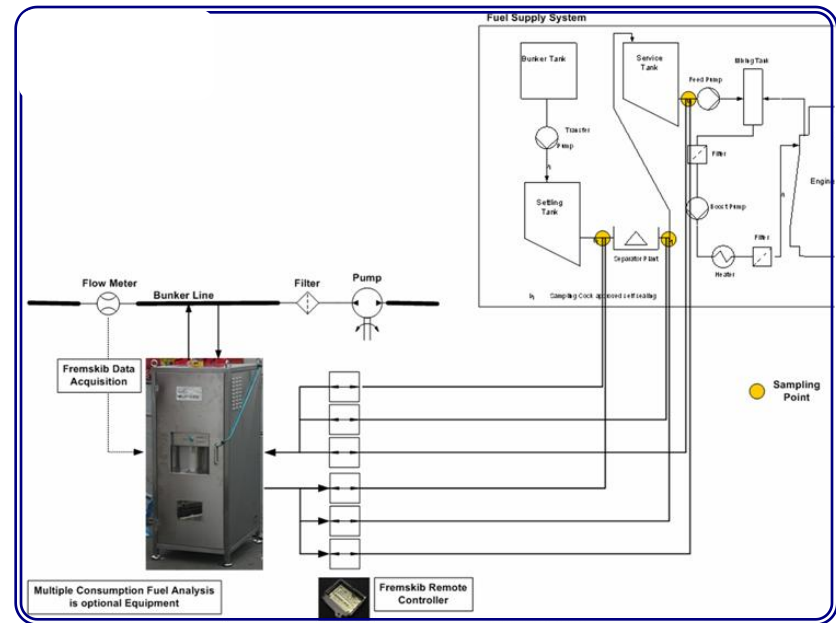
Lab-On-A-Ship™

- Automatic Sampling from multiple sample points. Fuel and Lubes.
- Tests fuels using acoustic, distillation and x-ray methods. Correlated against ISO 8217 Standards

FOBAS Onboard

- Software analyses the data providing ship specific interpretation and guidance against alerts
- Direct 24/7 advisory support

Designed by NanoNord A/S
in cooperation with Lloyd's Register



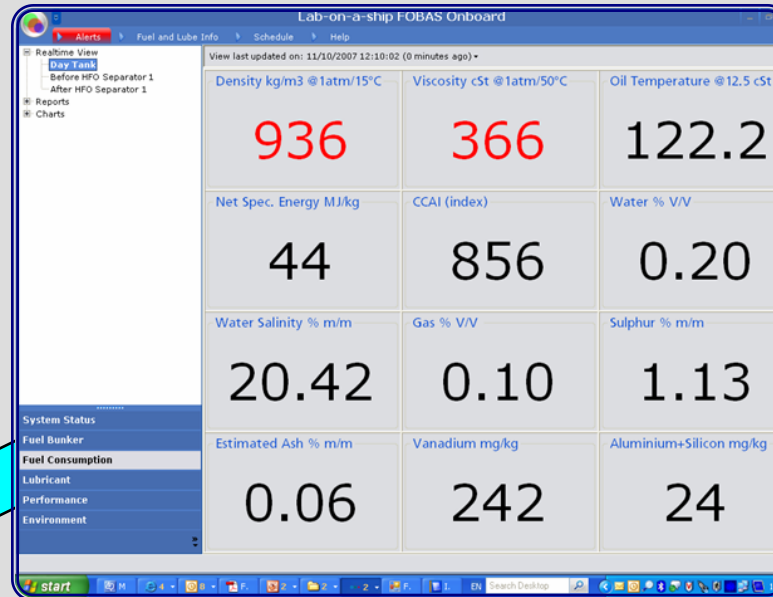
Lab-On-A-Ship – Development Roadmap

LR Type Approval
ASTM 6708 Correlation

2007

1st generation:

- Viscosity, Density, Gas
- Water
- Sulphur, Vanadium
CATFINES
- Lube Oil monitoring
- Engine-energy monitoring



2008 -2010:

- H₂S
- Cr, Ni, Pb, Fe, Ca, Cu, Ti, Na, Cl
- Salinity of water
- Fleet Access via WWW
- Fleet management
- New technologies
- Environmental accounting
- Ship energy analysis
- Fuel oil stability
- TAN, TBN
- Oil fingerprinting
- R&D


Instant Electronic Reporting

- Tamper proof data
- Instant bunker quality assurance
- SECA Compliance report
 - Replacing change over record
 - On demand PSC check

(UK MCGA supporting electronic on line reports)
- Voyage reports,
- WWW global data access
- Reducing crew workload
- Peace of mind
- Ship & fleet performance optimisation

FOBAS ONBOARD
Sulphur Compliance

Report ID: 9282481 / NA
Generated: 11/10/2007 15:39:25 (ship time)
By: Chief Engineer



GENERAL INFORMATION

Start: 11/10/2006 15:38:09
Stop: 12/10/2007 15:38:08

Ship Information:
Name:
IMO No:
Flag:


RECORDS

Area Name	Enter	Exit	LSFO Consumed	Sulphur Values (% m/m)			
				Required	Start	End	Average
Baltic Sea	15/03/2007 18:00:00 50°19'36" S 108°59'34" W	15/03/2007 18:00:00 50°19'36" N 107°59'34" E	1,000.00 MT	1.50	1.00	2.00	1.20
Baltic Sea	13/04/2007 00:00:00 50°19'36" S 108°59'34" W	13/04/2007 01:00:00 50°19'36" N 107°59'34" E	1,000.00 MT	1.50	1.00	2.00	1.54
California Shore	14/04/2007 02:00:00 50°19'36" S 108°59'34" W	15/04/2007 17:00:00 50°19'36" N 107°59'34" E	1,000.00 MT	2.50	2.00	3.00	2.01
Home Port	15/04/2007 17:00:00 50°19'36" S 108°59'34" W	15/04/2007 18:00:00 50°19'36" N 107°59'34" E	1,000.00 MT	4.00	1.00	2.00	1.10
English Channel	15/04/2007 18:00:00 50°19'36" S 108°59'34" W	15/04/2007 22:00:00 50°19'36" N 107°59'34" E	1,000.00 MT	0.90	1.00	2.00	1.49

AUTHORISATION

Signed By: Chief Engineer

11/10/2007 15:39:25



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The future of Bunker Testing

On-line quality measurement

Irrefutable quantity measurement (BP)

Phasing out of samples – (Max 5)

Speedy resolution and reduction
in costly to disputes

Reduced wear and risk to machinery
damage

Reduced work load

Empowering crew and operations
for Effective on board fuel management



For further information

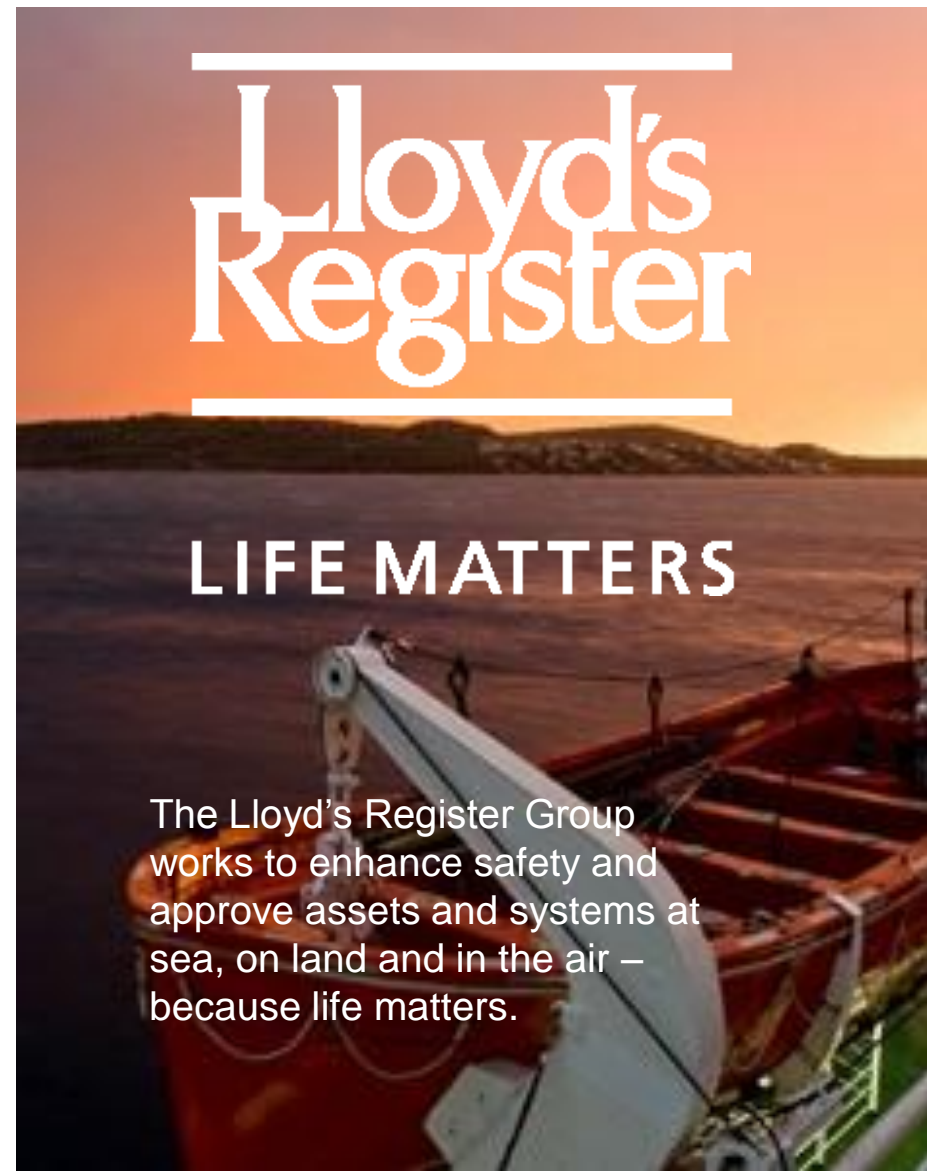
Please contact
Lloyd's Register Environmental Services

Tel: +44 (0)20 7423 2679

Fax: +44 (0)20 7423 1750

Email: fobas.onboard@lr.org

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