



FAST OIL RECOVERY SYSTEMS
INNOVATION IN THE PREVENTION
OF OIL SPILLS



2012

FOR SYSTEMS : ESSENTIAL EQUIPMENT FOR SAFER AND MORE SUSTAINABLE SHIPPING

- METHOD FOR DRASTICALLY REDUCING MARITIME POLLUTION IN CASE OF ACCIDENTS AT SEA
- STRONG SYNERGIES WITH CIVIL LIABILITY ISSUES
- PATENTED, SAFE AND COST-EFFECTIVE TECHNOLOGY, IMMEDIATELY AVAILABLE
- TECHNOLOGICAL ADVANCE SUPPORTED BY ENVIRONMENTALIST ORGANIZATIONS

The French company JLMD Ecologic Group is paving the way in maritime safety with its Fast Oil Recovery Systems (FOR Systems), the world's first on-board solution for recovering pollutants from distressed ships.

The creation of FOR Systems stems from an alarming report: 20 000 large vessels are in constant circulation on the world's oceans without any sort of planned system on board for quickly evacuating pollutants. This situation poses a threat to the marine environment, especially considering that the size and number of ships on the world's oceans only continues to increase. FOR Systems put an end to this precarious situation by ensuring permanent accessibility to all of the ship's tanks and predefined lightening procedures that are simple and safe, which greatly speeds up the time needed to recover pollutants.

FOR Systems are permanently installed on-board circuits that salvors connect to in order to rapidly recover pollutants located in the ship's bunker tanks. The speed and efficiency of salvage operations has improved so much that development of these devices is being supported by several marine environmentalist organizations. One study conducted in partnership with the CEDRE (Center of Documentation, Research and Experimentation on Accidental Water Pollution) revealed that the use of FOR Systems for the last five large oil spills could have sped up rescue operations by an average of 50 %.

Following 10 years of research and development, backed by a certification by Bureau Veritas and holder of four international patents, FOR Systems offer a safe and reliable solution for the prevention of maritime pollution. Cost-effective, quickly and easily installed on existing or newly constructed ships, FOR Systems have already won-over many ship owners wishing to promote their commitment to cleaner maritime transport.

At a time when decision-makers are tackling questions about the environment, FOR Systems offer solutions which correspond to actions taken in the framework of the future IMO and European guidelines and regulations. FOR Systems give maritime transport players the unique opportunity to support the development of safer and more sustainable navigation, while providing them with an unique asset to reduce their civil liability.



SUMMARY

✓ I. FOR SYSTEMS: THE ANTI-OIL SPILL SOLUTION

1. Rapid response: first challenge of avoiding an oil spill
2. FOR Systems: prevent oil spills by making it easier to recover pollutants
3. A universal system, cost-effective and certified by Bureau Veritas

✓ II. FOR SYSTEMS: PARTNERS FOR SAFER AND SUSTAINABLE SHIPPING

1. Environmental safety at sea, a growing concern among ship owners
2. A new trend: Maritime Passive Safety
3. An ecological indicator of civil liability
4. Leading-edge technology supported by environmentalists
5. Improved ship safety, a substantial impact on a market in crisis

✓ III. DOUBLE HULL PARADOX

✓ IV. 42 VESSELS ALREADY EQUIPPED BY JLMD ECOLOGIC GROUP

✓ V. JLMD COMPANY PROFILE



I. FOR SYSTEMS :
THE ANTI-OIL SPILL SOLUTION

300 000
TONS OF
SHIP-SOURCE
POLLUTANTS
DISCHARGED
INTO
THE OCEAN
IN 10 YEARS

20 000
VESSELS
IN
CIRCULATION

800
ACCIDENTS
EACH
YEAR



1. RAPID RESPONSE

FIRST CHALLENGE OF AVOIDING AN OIL SPILL

More than 20 000 large vessels constantly cruise the oceans, without any sort of planned access on board for quickly emptying cargo and fuel tanks in case of ship distress. Each year, about 800 accidents occur during which pollutants flow out into the sea, resulting, in the worst cases, in substantial environmental disasters.

For maritime safety actors, rapid reaction time is crucial to preserve the environment. In fact, once submerged, the ship discharges large amounts of pollutants which leak out from the tanks' ventilation systems. And yet the lack of accessibility to these bunker tanks considerably slows down operations. Decision-making is long, and the only solution for recovering the pollutants is to drill through the ship's hull, a complex task which requires time and planning at a moment when rapid action is crucial to preventing an oil spill.



2. FOR SYSTEMS

PREVENT OIL SPILLS BY MAKING POLLUTANT RECOVERY OPERATIONS EASIER

FOR Systems are emergency pollutants recovery devices for cargo and bunker tanks, installed directly on board ships. They ensure permanent accessibility to all tanks. In practical terms, each cargo or bunker tank of the ship is equipped with a minimum of 2 security circuits, ended by specific connectors. These circuits are immediately accessible through dedicated connectors located on the on the ship's deck thanks to a corresponding marker, to quickly identify them in case the ship should sink in great depth.



In order to evacuate the polluting cargo from the vessel, the salvage team simply and rapidly connects two hoses to the connectors. Through one of the circuits, sea water will be injected by the salvage team. Following Archimedes' buoyancy principle, the oil, which is lighter than water, is propelled towards the top and entirely recovered via the other circuit. If the fuel oil is too heavy, then dispersants will be injected to liquefy them, facilitating their evacuation. The same connectors and circuits will be used to pump out any other liquid chemical pollutants.

3. A UNIVERSAL SYSTEM

COST-EFFECTIVE AND CERTIFIED BY BUREAU VERITAS

FOR Systems allow the recovery of pollutants without drilling the ship's hull, within a short time, and with no depth limit. The circuits can be installed on the tanks of any type of ship whose main function is to transport pollutants, but also on fuel oil tanks of today's large ships, whose capacities often equal to the load of a small oil tanker. In the simplest cases, it only takes around 1H30 to install the circuit onto a tank, for a price of anywhere from 50 000 Euros to several hundreds of thousands of Euros depending on the complexity of the vessel.

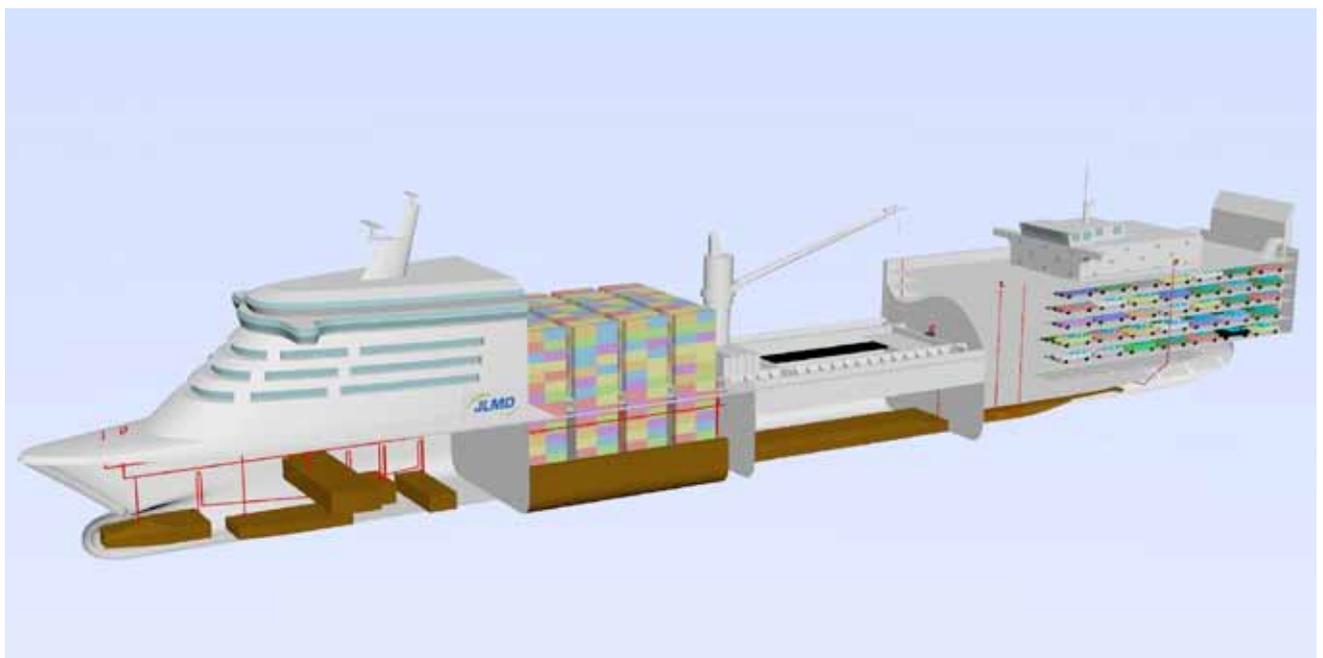
FOR Systems hold four patents, and since January 2010 have a certification by Bureau Veritas. This certification establishes the installation and utilization procedures for FOR Systems aboard ships. Additionally, going forward ships equipped with FOR Systems will have a certified «FOR notation » from Bureau Veritas, which guarantees maritime professionals efficacy of the installed technology and standardization of intervention procedures. The Bureau Veritas certification guarantees the quality of the system and implies an important development of FOR Systems in the near future.



STARTING
FROM **50 000€**
PER VESSEL



**42 VESSELS ALREADY
EQUIPPED**





ADVANTAGES OF FOR SYSTEMS IN CASE OF ACCIDENTS AT SEA

APPLIED STUDY OF RECENT SHIPWRECKS RESULTING IN OIL SPILLS

Vessel	Actual duration of rescue operations	Estimated duration of rescue operations using FOR Sytems	Estimated time gained	Estimated savings in Euros
Prestige	352 days	127 days	64 %	29 600 000
Erika	187 days	84 days	55 %	19 500 000
Levoli Sun	43 days	8 days	84 %	1 400 000
Peter Sif	37 days	9 days	76 %	460 000
SelendangAvu	46 days	9 days	80 %	460 000

Adopted methodology : in partnership with CEDRE (Center of Documentation, Research and Experimentation on Accidental Water Pollution), JLMD Ecologic Group grouped recent shipwrecks resulting in oil spills and estimated for each incident the impact of a FOR system on the time and cost of rescue operations.

FOR SYSTEM GUARANTEES

SAFETY

A ship equipped with FOR Systems cruises with permanently installed equipment for the fast recovery of pollutants in case of an accident.

RAPID RESPONSE

FOR Systems make rescue operations much faster, since it is no longer necessary to drill through the ship's hull to recover the pollutants. Decision-making by maritime safety actors is also easier and faster when a ship in distress is equipped with FORs.

EFFICIENCY

FOR Systems make it possible to fully recover pollutants contained in the ship's tanks, in case of grounding or sinking, with no depth limit.

SAVINGS

FOR Systems make rescue operations less expensive, since the pollutant recovery device is already installed on board.

REPUTATION

Embodies ship owners' commitment towards a more sustainable shipping. A key asset when discussing civil liability.

SECONDARY USES ATTRACTIVE TO SHIP OWNERS

FOR Systems provide for better management of incidents involving cargo and bunker tanks.

ERRONEOUS LOADING OF OIL

FOR Systems make it easier to recover the tanks' contents in case of spécification oil loading.

TANK GAS FREEING AND CLEANING

FOR Systems circuits facilitate cleaning and ventilating of tanks used to eliminate toxic gases while avoiding risks of explosion.

SHIP SCRAPPING

FOR Systems play a part in simplifying and accelerating ship dismantling procedures; an advantage at a time when there are fewer ship breaking yards.



II. FOR SYSTEMS :
PARTNERS FOR SAFER
AND SUSTAINABLE
SHIPPING

1. ENVIRONMENTAL SAFETY AT SEA

A GROWING CONCERN AMONG SHIP OWNERS

The Erika (1999), levoli Sun (2000), and Prestige (2002) accidents sparked awareness among sea actors about the importance of restating the objectives and means in place for avoiding oil spills. French and European legislation has been strengthened to expand and improve controls in order to prevent accidents at sea.

Maritime safety must be ensured by all, and the notion of « zero risk » does not exist. While complementing other systems in place to prevent accidents, FOR Systems offer a unique opportunity to ship owners to demonstrate their commitment to safer and more responsible navigation.

Accordingly, ship owners have already chosen FOR Systems. Forty-two merchant ships have already been equipped, and since 2011, the French Navy has also assessed FOR Systems aboard its flagship 'Marne'.

SHIPS OWNERS
ALREADY EQUIPPED:

BROSTRÖM
CG MORBIHAN
CMA-CGM
LDA
MONTANARI
SOCATRA



2. A NEW TREND: MARITIME PASSIVE SAFETY

A RISK-BASED-APPROACH- ORIENTED TECHNOLOGY

For decades, ships have been equipped with mechanisms for active security, such as radars, whose goal is to prevent accidents. Today, following the example of the automobile in the 1980's, the maritime industry is now turning towards passive safety, with equipment such as FOR Systems, to mitigate the consequences of an unavoidable accident.

Systems for recovering pollutants from accidents, as well as anti-leakage systems installed on security valves and on ventilation systems: the innovations continue to multiply in the new on-board passive safety sector.

Consequently, a progressive change in thinking is occurring among maritime transporters: “the Risk Based Approach”, as they take into account the possibility of an accident during the lifecycle of a ship. Until now, in case of an accident at sea, the means for managing an oil spill were deployed solely from the coast, the ship taking a passive role during the management of the crisis.

With on-board passive safety, the ship itself becomes an active player in environmental prevention, providing salvors with an active solution for a quick and sustainable end crisis.





3. AN ECOLOGICAL INDICATOR OF CIVIL LIABILITY

When an accident occurs at sea the owner is put in the dock and has to defend itself in order to limit its civil liabilities, meaning its obligation to repair the damage caused to others. Civil liability depends on its ability to demonstrate good faith and, as far as possible, to prove that the causes of the accident are not of its making. In the best of cases the owner invokes force majeure, the only factor capable of entirely disproving blame.

Under the terms of directive 2005/35/EC, concerning international law and the jurisprudence of the Court of Appeal, «illicit emanations» of liquid pollutants or an oil slick can mean criminal liability and the payment of damages by the owner or even the charter company. However, an on-board passive safety system can result in a reduction to the extent of civil or criminal liability if the owner has been able to prove his intention of reducing his ship's impact on the environment in case of an accident, by installing a FOR system.

During the court case, the owner whose ship is equipped with an FOR system can also emphasise his eco-friendly attitude by proving, through the installation of the equipment, his intention of reducing his ship's impact on the environment in case of an accident, even in the most extreme circumstances. With ecological infringements now being recognised as crimes and treated as such in many countries, the issue is becoming increasingly important.

In this respect, an FOR system is a very real indication, in the same way as the training of crews and the development of adequate emergency planning, that the owner has committed to taking a responsible approach. This aspect can have a considerable influence on the final verdict of a court case and thus for the owner on the final impact of the accident in terms of cost and cost to reputation.

Civil and ecological liability can be insured against. It is then the insurance company, which replaces the liable party, meaning the perpetrator of the damage, to compensate the victim. Insurance companies like Groupama Transport which work to ensure that the benefits of the FOR system are passed on in the policies provided to owners are clearly right to do so.



4. LEADING-EDGE TECHNOLOGY SUPPORTED BY ENVIRONMENTALISTS

As a decisive step towards better protection of the oceans and coastlines, FOR Systems is generating enthusiasm in environmental organizations. The environmental consequences of oil spills to ecosystems are too important to leave to chance and to assume “zero risk”.

Jean-Paul Hellequin, Président of Mor Glaz, an association of marine environmentalists, claims: « the shipping industry has innovated very little in the area of environmental security these last few years despite the disasters that have devastated the ocean and coastlines. The ships were not prepared to effectively manage the accidents. This is what led JLMD to take action. We support FOR Systems because it is destined to play an important role in the preservation of the oceans ».

« WE SUPPORT FOR SYSTEMS BECAUSE IT IS DESTINED TO PLAY AN IMPORTANT ROLE IN THE PRESERVATION OF THE OCEANS »

Other environmental organizations, such as Robin des Bois or the Prince Albert II Foundation, have also given their support to FOR Systems.

5. IMPROVED SHIP SAFETY, A SUBSTANTIAL IMPACT ON A MARKET IN CRISIS

FOR Systems offer a state-of-the-art solution beneficial to all, by ensuring safety before accidents occur and by promising reduced costs in case of an intervention. For this reason, FOR Systems, and more broadly new « green » technologies, could change the balance of supply and demand and lead to fluctuations in freight charges. Recall that, in the months following the Erika accident, pressure was felt by freight carriers as bonuses were awarded to high quality ships and vessels were “regionalized” according to their level of quality. With FOR Systems, ship owners exemplify their commitment to safe and environmentally responsible shipping, and gain a competitive advantage which can make the difference at a time of market crisis.



The multiple advantages of FOR Systems may allow them in the future to benefit from incentives from different maritime players, with the goal of reinforcing security at sea and allowing for cleaner shipping, more respectful of the environment. For this reason, several insurance underwriters covering the maritime industry are taking a close interest in FOR Systems, which assure an average savings of around 29 000 000 Euros for example in the case of the Erika accident. Strengthening the trend by recent legislation, France adopted in February the Bunker Convention, allowing victims who suffer damage from both bunker and cargo oil pollution to claim compensation.

Additionally, FOR Systems respond perfectly to the challenges of marine pollution that France has set for itself, as part of the “Livre Bleu sur la Mer”, notably «the establishment of suitable intervention measures and the development of anti-pollution technologies». As the world’s second greatest maritime power, France is finding a way with FOR Systems to strengthen its example and leadership, by adapting its maritime industry to the increasing demands of environmental protection of the sea.



LAPEROUSE



III. DOUBLE HULL PARADOX

DOUBLE HULL PARADOX

It's over eleven years since the US adopted the Oil Pollution Act (OPA 90) following the Exxon Valdez supertanker grounding incident, which resulted in 11 million gallons of oil being spilled into Prince William Sound, Alaska.

As a result, the International Maritime Organization (IMO) introduced global double hull standards in 1992 under the International Convention for the Prevention of Pollution from Ships (MARPOL) to further protect the environment. In 2002, the European Commission adopted regulation 417/2002 making the IMO's now accelerated phase out schedule for single hull tankers mandatory.

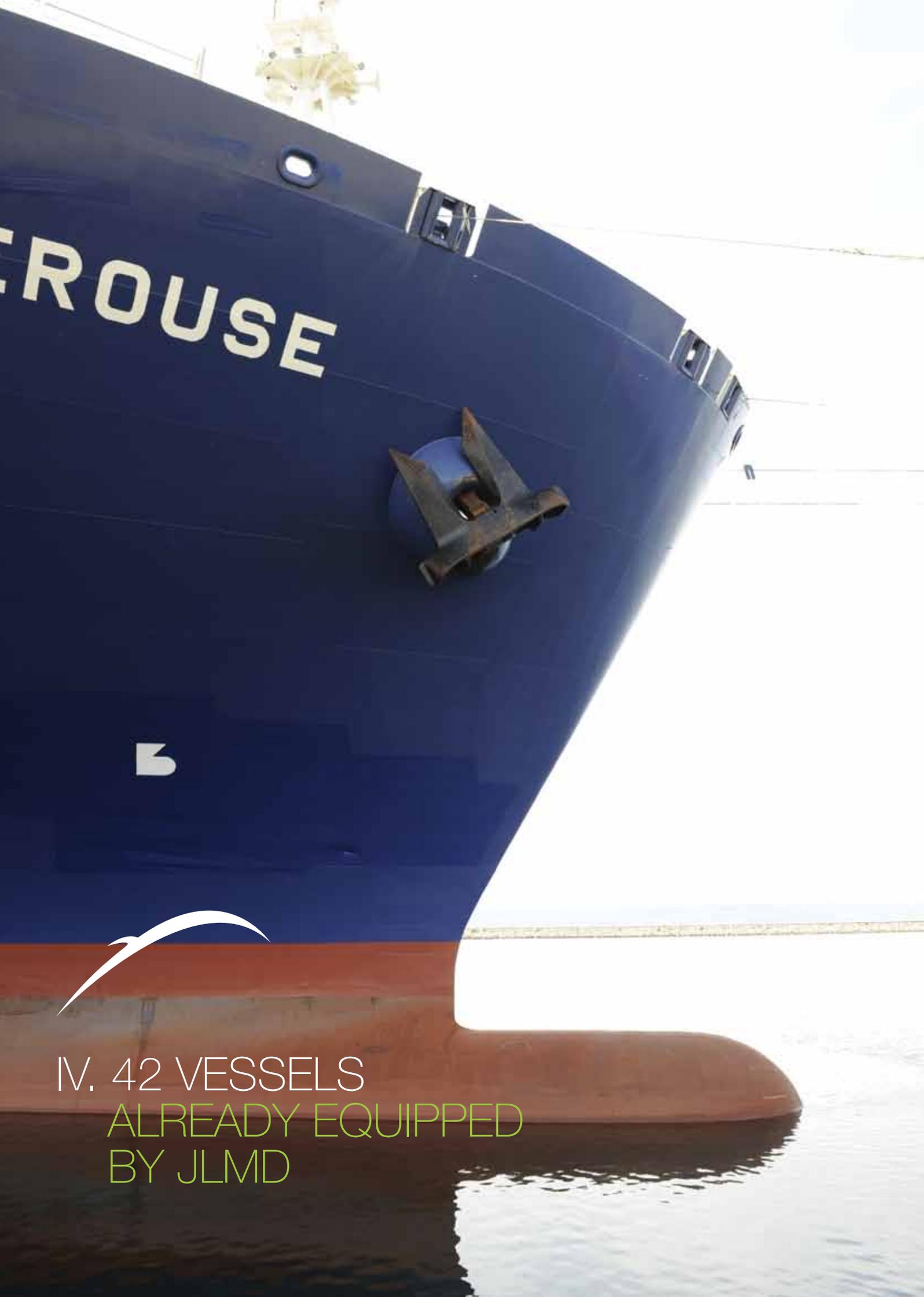
Despite these measures, in 2010 the International Tanker Owners Pollution Federation Ltd (ITOPF) reported that the number of large spill (considered to be > 700 tonnes) saw a slight increase when compared to the previous ten years. The total amount of oil lost to the environment in 2010 showed an increase against figures for 2008 and 2009.

As the IMO looks to strengthen its ability to prevent pollution from ship operations through the development of regulations including the International Code of Safety for Ships in Polar Waters (the Polar Code), the designation of special areas where mandatory methods for the prevention of sea pollution are required, and the accelerated phase out of single hull tankers, the fact remains that double hulls present a number of challenges and are not a panacea.

While the amended double hull regulations plan to increase the protection of the environment, an unexpected side effect is that some double hull vessels have become more susceptible to operational and maintenance issues. One of the main challenges has been accessing the cargo and bunker tanks following an accident to remove the fuel and cargo onboard in a timely manner.

The current trend for giant ships has resulted in a re-design to maximise cargo capacity. As a result, on many modern giant ships the bunker tanks are located under areas such as the accommodation block – an excellent location in the event of a collision as it provides additional safety, however in the event of a wreckage the tanks become extremely difficult, if not impossible, to access.

European-based JLMD Ecologic Group's FOR and ORA Systems address this weakness in a ship's design by increasing the cargo and bunker tanks connectivity and speeding up lightering operations. Recovering pollutants from the cargo and bunker tanks reduces not only environmental damage but the financial damage to the shipowner.



EROUSE



IV. 42 VESSELS
ALREADY EQUIPPED
BY JLMD

42 VESSELS ALREADY EQUIPPED BY JLMD

Ecologically responsible shipowners have chosen JLMD Ecologic Group to secure and value their ships

Vessel name	Type of Vessel	Ship owner	System Type	Installation Type
MAERSK CHRISTIANSBRO(Ex-Gilaos)	Chemical/Product tanker	Broström	FOR	Retrofit
Anatife	Bunkering tanker	CG Morbihan	FOR	Retrofit
CMA CGM Almaviva	Container ship	CMA CGM	ORA®	New Building
CMA CGM Amerigo Vespucci	Container ship	CMA CGM	ORA®	New Building
CMA CGM Andromeda	Container ship	CMA CGM	ORA®	New Building
CMA CGM Aquila	Container ship	CMA CGM	ORA®	New Building
CMA CGM Callisto	Container ship	CMA CGM	ORA®	New Building
CMA CGM Cassiopeia	Container ship	CMA CGM	ORA®	New Building
CMA CGM Cendrillon	Container ship	CMA CGM	ORA®	New Building
CMA CGM Centaurus	Container ship	CMA CGM	ORA®	New Building
CMA CGM Christophe Colomb	Container ship	CMA CGM	ORA®	New Building
CMA CGM Columba	Container ship	CMA CGM	ORA®	New Building
CMA CGM Corte Real	Container ship	CMA CGM	ORA®	New Building
CMA CGM Gemini	Container ship	CMA CGM	ORA®	New Building
CMA CGM Laperouse	Container ship	CMA CGM	ORA®	New Building
CMA CGM Leo	Container ship	CMA CGM	ORA®	New Building
CMA CGM Libra	Container ship	CMA CGM	ORA®	New Building
CMA CGM Lyra	Container ship	CMA CGM	ORA®	New Building
CMA CGM Magellan	Container ship	CMA CGM	ORA®	New Building
CMA CGM Marco Polo	Container ship	CMA CGM	ORA®	New Building
CMA CGM Pegasus	Container ship	CMA CGM	ORA®	New Building
CMA CGM Titan	Container ship	CMA CGM	ORA®	New Building
CMA CGM Titus	Container ship	CMA CGM	ORA®	New Building
CMA CGM Vasco de Gama	Container ship	CMA CGM	ORA®	New Building
CMA CGM Zheng He	Container ship	CMA CGM	ORA®	New Building

Vessel name	Type of Vessel	Ship owner	System Type	Installation Type
CMA CGM Dalila	Container ship	CMA CGM	ORA®	New Building
CMA CGM Figaro	Container ship	CMA CGM	ORA®	New Building
CMA CGM La Scala	Container ship	CMA CGM	ORA®	New Building
Faouet	Chemical tanker	Socatra	FOR	Retrofit
EDITH KIRK (Ex-Kerlas)	Chemical tanker	Socatra	FOR	Retrofit
LD Jean	Bulk carrier	LDA	FOR	Retrofit
LD Pierre	Bulk carrier	LDA	FOR	Retrofit
Maohi	Chemical tanker	Socatra	FOR	Retrofit
Nizon	Chemical tanker	Socatra	FOR	Retrofit
Valtamed	Crude Oil	Montanari	FOR	Retrofit
NB007-1	Bulk carrier	LDA		New Building
NB006-1	Bulk carrier	LDA		New Building
NB007-2	Bulk carrier	LDA		New Building
NB006-2	Bulk carrier	LDA		New Building
NB007-3	Bulk carrier	LDA		New Building
NB007-4	Bulk carrier	LDA		New Building
Non Merchant Ship	Military Ship		FOR	Retrofit





V. JLMD
ECOLOGIC GROUP

JLMD COMPANY PROFILE

World class leader of FOR Systems, JLMD Ecologic Group, an engineering company, researches, develops, and markets pre-installed equipment on board all types of ships, securing cargo tanks containing environmentally-harmful products as well as fuel bunker tanks.

*These systems allow the fast recovery of pollutants in case of an incident at sea. They guarantee ship owners a control of accidental pollution and limit the consequences. FOR Systems also promise faster crisis resolution in case of a minor breach in a tank, while limiting the ship's downtime and related operational losses. JLMD is in growing demand and belongs to the emerging Maritime Passive Safety systems market.

ESTABLISHMENT

2001

HEAD OFFICE

Paris

PATENTS

Four international patents protect JLMD's FOR System

SHAREHOLDERS

JLMD is owned by a pool of French investors whose objective is to support and develop projects offering concrete and sustainable solutions for the protection of the environment..

NUMBER OF SHIP INSTALLATIONS COMPLETED OR IN PROCESS

42 Vessels

AUTHORIZED REPRESENTATIVES

Brazil, Greece, Korea, Sweden

MANAGEMENT TEAM

General manager : Gilles LONGUEVE
Technical: Roch Hallopeau
Sales: Fernando Guiles Santamaria
Prospective clients: Giuliana Dario
Legal, finance, media: Angelina Mendes

KEY DATES

- 1999** - Sinking of the Erika
 - Establishment of JLMD System
- 2000** - Erika I Package adopted
 - Erika II Package adopted
- 2002** - Sinking of the Prestige
- 2003** - Creation of the Agence de la Sécurité Maritime (AESM)
- 2009** - Installation of FOR Systems on 35th vessel
- 2010** - Delivery of the Certification Véritas
- 2011** - First Discussions at IMO about possible inclusion of Maritime Passive Safety equipment in Polar Code
 - 55th Session of the IMO's Design&Equipment subcommittee
 - Contract's signature with Tianjin Xingang Shipyard (XGSIC) of China – 42th vessel to be equipped
- 2012** - 56th Session of the IMO's Design&Equipment subcommittee

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