



WILH. WILHELMSEN HOLDING ASA

# ENVIRONMENTAL REPORT 2010

The Wilh. Wilhelmsen group aims to reduce the impact of its cargo-carrying operations and environmental footprint, as an operator and a product and service provider.

On the shipping side, our vision is to continuously improve operations to achieve zero emissions and thereby contribute to a cleaner environment globally. On the product and service side, we offer a wide range of environmental solutions that cover the entire vessel life cycle, from design to building, operation and green recycling.

- 1:** Friendly vessel operation
- 2:** Environmental account
- 3:** A solid green offering
- 4:** Useful links



# 1: ENVIRONMENTAL FRIENDLY VESSEL OPERATION 2010

The Wilh. Wilhelmsen group (WW) aims to reduce the impact of its cargo carrying operations. The group works on a broad scale, implementing environmental initiatives to reduce its emissions to air, sea and land. We are on the right track. An example of this is that fuel consumption measured in grams/tonnes/nautical miles (g/tonnes/nm) on our vessels has been reduced by 26% compared with 2009.

**1:** **Oil spills**  
In 2010, no oil spills to sea were reported from vessels owned or controlled by WW.

Oil spills from WW vessels are not acceptable. The group continuously works to reduce the chance of oil spill incidents.

**2:** **Antifouling**  
To ensure a smooth and efficient hull, all vessels have their underwater surfaces cleaned at least once a year.

WW evaluates new and more sophisticated low-toxic low friction coating systems. By contributing to a smoother hull surface, these products are expected to reduce fuel consumption by up to 5% compared with a vessel using conventional antifouling. As of end of 2010, 13 WW vessels were coated with advanced antifouling systems.

**3:** **Sulphur oxides**  
Vessels operated by WW's operating companies maintain sulphur content standards below international regulations.

Wallenius Wilhelmsen Logistics (WWL) was in 2005 the first worldwide merchant shipping operator with a 1.5% sulphur policy. EUKOR Car Carriers has practiced a 2.5% sulphur policy since 2007.

Currently, the sulphur content limit set by the International Maritime Organisation (IMO) is 4.5% worldwide. From 2012 it will become 3.5%. In addition, two Sulphur Emission Control Areas (SECAs) have been established covering northern Europe and the Baltic region. In these SECAs, use of bunkers with sulphur content higher than 1.0% is prohibited. From August 2012, North America will have similar areas.

The number of SECA areas is expected to increase in the future. Using low-sulphur fuel incurred an additional cost of approx. USD 2 million (WW's share) in 2010.

**17:** **Carbon dioxide**  
WW aims at reducing its carbon footprint by focusing on reduction in fuel consumption. WW is also involved in developing new carbon indexes for the industry.

In 2010, WW reduced its CO<sub>2</sub> emissions measured in g/tonnes/nm by 26% compared with 2009. Total CO<sub>2</sub> emissions increased by 5% however due to transporting more cargo because of the global economic recovery.

CO<sub>2</sub> emissions from shipping are not currently regulated by law. However, WW is engaged in the International Maritime Organisation's (IMO) work to create an Energy Efficiency Design Index (EEDI) and an Energy Efficiency Operational Indicator (EEOI). WW is also aligning its environmental management system with IMO's Ship Energy Efficiency Management Plan (SEEMP), all three aiming at having more efficient vessels in the future.

**16:** **Fuel**  
WW's overall goal is to reduce the amount of fuel consumed by its fleet. Several initiatives are being pursued that both reduce fuel consumption and emissions.

In 2010, the group reduced its fuel consumption measured in g/tonnes/nm by 26% compared with 2009. This was mainly driven by the global economic recovery which led to higher vessel utilisation, energy and fleet optimisation.

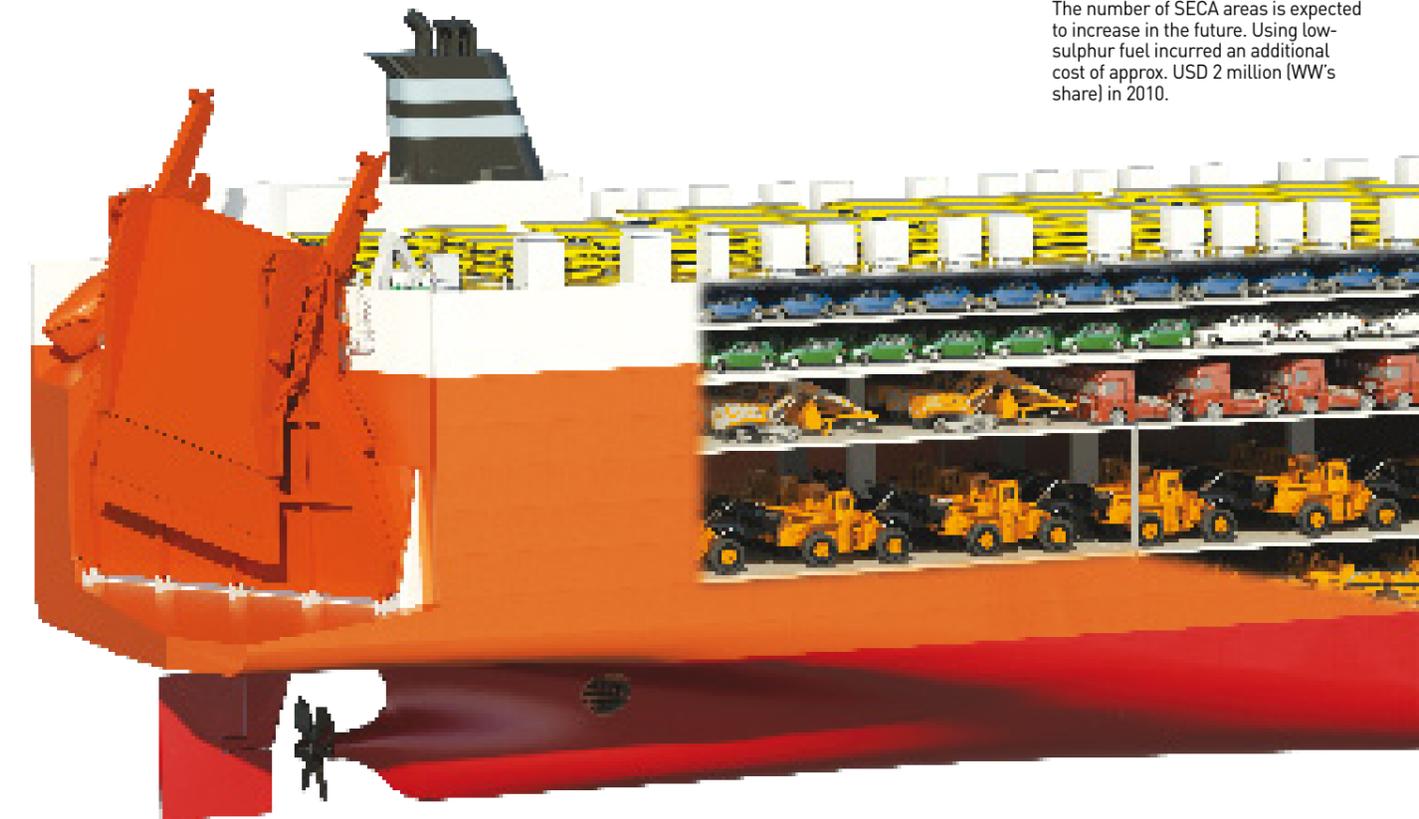
- Fuel-saving initiatives include:
- Choosing optimal speed whenever possible
  - Environmental awareness training courses for crew and vessel superintendents
  - Energy management systems that help the crew to identify optimum sailing conditions
  - Weather routing systems installed on board all our vessels to ensure efficient route planning and safe sailing
  - An extensive new building programme and design studies with fuel efficient vessels
  - Installing new equipment and solutions which will reduce fuel consumption
  - Upgrading existing equipment on board for providing better information regarding fuel saving

**15:** **Industry partnership**  
WW has taken the initiative to cooperate with major Norwegian shipowners such as Grieg, Klaveness, Høegh and BW Gas to encourage collaboration on R&D projects of common interest.

As a consequence, the project energy management in practice was kicked off in January 2010 after a pre-study the previous year. It has received support from The Research Council of Norway. All companies participating have test vessels with good energy management with respect to monitoring, recording and decision support systems. Crew environmental awareness is another topic of common interest that is being followed up.

**14:** **Chemicals and refrigerants**  
WW always seeks to use the least harmful chemical products available and to reduce consumption of refrigerants.

In cooperation with the Norwegian NGO Bellona, WW established an improved list of greener chemicals in 2007. The list is used on all vessels owned or controlled by WW. WW also aims to reduce the volumes of chemicals and refrigerants used, and keep statistics on purchases and consumption.



# 4:

## Nitrogen oxides

Emissions from WW's vessels are reduced through a combination of fleet renewal and technical improvements. New vessels are designed with lower NO<sub>x</sub> emissions compared with existing tonnage.

WW has in addition equipped some engines with more efficient fuel valves that optimise combustion and reduce NO<sub>x</sub> emissions.

Within its current fleet WW has reduced NO<sub>x</sub> emissions measured in g/tonnes/nm by 31% compared with 2000.

Yarwil, a joint venture between Wilhelmsen Maritime Services and Yara has adapted a new technology, NO<sub>x</sub> Care Marine, that reduces NO<sub>x</sub> emissions by 99%.

# 5:

## Solar power

WW took delivery of its first vessel equipped with solar cells in 2008.

Solar cells have been installed on one WW vessel. This is part of an R&D project being pursued with Mitsubishi Heavy Industries to gain experience with and learn more about operating a solar power system and the fuel-saving potential it can give.

# 6:

## Energy management system

An energy management system that guides the crew to identify optimum sailing conditions.

WW has installed a decision-support tool developed by Marorka on board Wilhelmsen-owned MV Tortugas and MV Tamesis. This system provides the officers with real-time decision support and guidance in identifying the trim, speed and energy consumption for optimum sailing as well as monitoring fuel consumption and savings. The system also serves as an excellent reporting tool and information bank for the vessels.

In 2011, WW will install a lighter version of this system on board all owned and controlled vessels.

# 7:

## Weather routing

To reduce fuel consumption and ensure safer sailing, WW has installed a weather routing system on all its vessels.

This system will assist crew in route planning in order to optimise a voyage with the assistance of weather forecasts and information on currents. This will reduce fuel consumption and ensure safer sailing.

The routing system is part of an advanced reporting tool that can also provide information related to hull cleaning and comparisons between sister ships.

# 8:

## Future vessel design

WW's ambitious newbuilding programme focuses on efficient vessels prepared for the future. The first vessel was delivered in 2011.

To secure more advanced vessels, WW has performed extensive model tests of ro-ro carriers designed to be more fuel and cargo efficient. Reduced fuel consumption combined with higher cargo capacity cuts emissions per unit of cargo by 10-15% compared with the latest generation of ro-ro vessels. A turbine steam generator on these vessels will also convert exhaust heat into electricity.

# 9:

## Environmental training

WW is developing courses in environmental awareness.

WW has together with a group of environmentally conscious Norwegian ship owners and the Norwegian Training Center in Manila (NTC), started to develop courses in environmental awareness. The first pilot course was conducted in 2010. The next step is to roll out the programme for all WW officers and superintendents.

# 10:

## Ship recycling

Four WW vessels were recycled in 2010 at green yards in China.

As an environmentally responsible ship owner, WW demands a recycling process that offers a safe working environment at the yard, together with safe removals and disposal of any hazardous materials on board. WW has searched the market and found several recycling yards in China that meet our demands for a green recycling of our de-commissioned vessels.

The European Commission and Norwegian NGO Bellona have acclaimed the use of these recycling facilities as being in the spirit of good corporate social responsibility.

# 11:

## Ballast water

WW's fleet satisfies the applicable regulations for ballast water exchange. In 2010 the Unitor Ballast Water System offered by Wilhelmsen Technical Solutions was Type Approved.

The Unitor Ballast Water Treatment System (Unitor BWTS) offered through Wilhelmsen Technical Solutions has very low energy consumption and footprint compared to its competitors. The type approved Unitor BWTS is a fully inline system that treats ballast water on intake only. The system is a flexible and economical solution for both newbuilds and retrofits. MV Tønsberg, the first Mark V vessel, is equipped with a Unitor BWTS.

# 12:

## Future vessel design

WW's ambitious newbuilding programme focuses on efficient vessels designed for the future.

The first vessel of the new Mark V class was delivered in March 2011. The new vessels incorporate 40 years of the company's experience in handling energy-related cargo utilising the roll-on roll-off concept. It is the most advanced ro-ro vessel ever built, with a ramp capacity of more than 500 metric tonnes.

Reduced fuel consumption combined with higher cargo capacity cuts emissions per unit of cargo by 10-15% compared with the last generation of ro-ro vessels. A steam turbine generator on these vessels will also convert exhaust heat into electricity. Installing a ducttail on its latest generation of car carriers and forthcoming ro-ro vessels will further improve the hydrodynamic performance of the hull when the vessel is heavily loaded. Model tests confirm a 1-5% fuel savings, depending on the ship's draught.

# 13:

## Bilge water

WW's new vessels have separators reducing the oil content in the bilge water to five parts per million (ppm).

International regulations require that less than 15 ppm oil remain when bilge water is discharged into the sea. WW's fleet is compliant with a good margin.



# 2: ENVIRONMENTAL ACCOUNT

## FUEL CONSUMPTION AND EMISSION

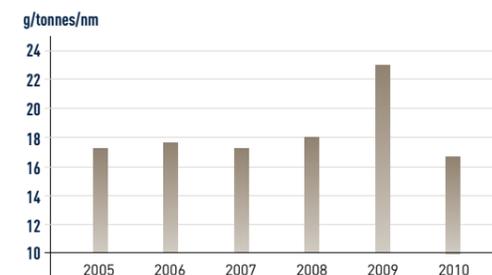
Fuel consumption and emission aspects	2007	2008	2009	2010
Number of vessels in the accounting <sup>1</sup>	24 1/2	30	35	34
Number of ro-ro vessels	8	8	8	8
Number of LCTC vessels	-	-	2	2
Number of PCTC vessels	14	19	22	22
Number of vessels owned 50%	5	6	6	4*
<b>Fuel consumption metric tonnes:</b>	<b>430 279</b>	<b>459 324</b>	<b>360 446</b>	<b>384 715</b>
<b>Fuel consumption gram/tonnes/nm:</b>	<b>18.23</b>	<b>19.25</b>	<b>24.04</b>	<b>17.78</b>
<b>Fuel consumption reduction gram/tonnes/nm<sup>2</sup>:</b>	<b>(1.7%)</b>	<b>3.8%</b>	<b>24.8%</b>	<b>(3.9%)</b>
<b>Average percentage sulphur content of fuel<sup>3</sup>:</b>	<b>1.36%</b>	<b>1.60%</b>	<b>1.75%</b>	<b>1.81%</b>
<b>SO<sub>x</sub> emission metric tonnes:</b>	<b>11 673</b>	<b>14 658</b>	<b>12 583</b>	<b>13 694</b>
<b>CO<sub>2</sub> emission based IMO voluntary metric tonnes<sup>4</sup>:</b>	<b>1 318 199</b>	<b>1 403 668</b>	<b>1 119 905</b>	<b>1 175 821</b>
<b>NO<sub>x</sub> emission metric tonnes:</b>	<b>36 411</b>	<b>39 227</b>	<b>30 330</b>	<b>32 096</b>
<b>Other environmental aspects</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>
Ballast water treatment system (BWT)	Selected	One test installation in 2008	IMO tests being carried out	IMO testing conducted, system type approved
Inventory list for hazardous materials	Two vessels got Green passport	No inventory lists in 2008	Three vessels recycled in 2009 received list of hazardous materials	Four vessels recycled in 2010, received list of hazardous materials
Alternative antifouling coating (AF) types tested	Tested Inter 900 on 2 vessels	3 vessels painted with Inter 900, await further experience	13 vessels have advanced AF coating	13 vessels have advanced AF coating
Ship dismantling and recycling - business case		Dismantling policy draft ready	Business idea taken over by Wilhelmsen Ship Management	4 vessels recycled using Wilhelmsen Ship Management

\* Number of vessels owned 50% are accounted as two vessels.

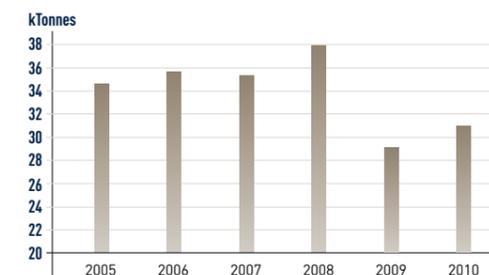
## FUTURE TARGETS

Future targets	Target 2010	Target 2011-2020
Maximum sulphur in fuel requirements	1.5% average for the WWL fleet	Further development to follow IMO towards 0.5% in 2020
Fuel consumption reduction g/tonnes/nm in % CO <sub>2</sub> emission reduction	2% reduction from 2010	50% reduction by 2020
Ballast water treatment (BWT) unit	All newbuildings delivered to have BWT installed	All newbuildings to have BWT installed. Implementation on existing vessels before ratification of regulation
Bilge water treatment system max 5 ppm (parts per million)	When replaced, new oily water separator to have 5 ppm	All newbuildings to have oily water separator with 5 ppm

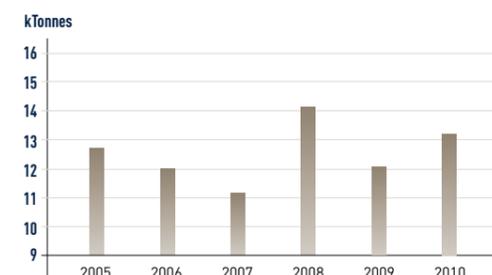
## TOTAL FUEL CONSUMPTION



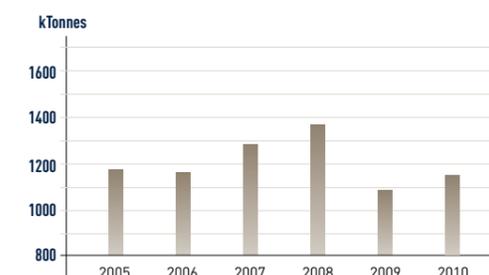
## TOTAL NO<sub>x</sub> EMISSION



## TOTAL SO<sub>x</sub> EMISSION



## TOTAL CO<sub>2</sub> EMISSION



### NOTE 1

Together with partners, WW's operating companies controlled 128 vessels by the end of 2010. However, WW owned or controlled 34 vessels at 31.12.2010 which are included in WW's environmental account.

Vessels included in the statistics (34-vessels):

- Mark II (ro-ro vessels) 3
- Mark III (ro-ro vessels) 1
- Mark IV (ro-ro vessels) 4
- Large car and truck carriers 2
- Pure car and truck carriers 22
- 50% of Mark I (ro-ro vessels) 2

Vessels not included:

- ARC vessels, externally owned and chartered by ARC
- Vessels operated by WWL, but not controlled by WW
- Vessels owned and controlled by EUKOR

### NOTE 2

The reduction in fuel consumption is measured against an average consumption in 2005-2006, which was 18.55 g/tonnes/nm for 24 1/2 vessels. A 6.4% reduction was recorded in 2007. In 2008, a slight increase was recorded as more vessels were included in the statistics and certain vessels had a higher consumption per g/tonnes/nm. In 2009, the consumption measured in g/tonnes/nm increased. The reason for this was the substantial drop in volumes as a consequence of the global economic recession. For WW this meant lower fleet utilisation and less cargo transported per nm. In 2010, this figure dropped to 17.78 g/tonnes/nm due to the global economic recovery and thereby higher vessel utilisation.

### NOTE 3

In 2010, the average sulphur content for vessels operated by WWL was 1.49% and in line with the company's 1.5% sulphur policy. In EUKOR, the average sulphur content was 2.46%. In sum, the average for the vessels in the account was 1.78%. The average for the industry is approximately 2.7%, while the target set by IMO is currently 4.5%.

### NOTE 4

The increase in CO<sub>2</sub> emissions are equivalent to the increase in fuel consumed by the fleet. The total CO<sub>2</sub> emissions increased by 5% in 2010 compared to 2009 due to several vessels being in layup in 2009 as a consequence of the global economic recession and the drop in volumes. However the consumption measured in g/tonnes/nm decreased by 26% compared with 2010 due to the global economic recovery which led to higher vessel utilisation.



### 3: A SOLID GREEN OFFERING

The three business areas of Wilhelmsen Maritime Services – Wilhelmsen Technical Solutions, Wilhelmsen Ship Management and Wilhelmsen Ships Service – offer a portfolio of environmental solutions and services that are both innovative and meet all the upcoming regulatory demands that the shipping industry is facing. Wilhelmsen Maritime Services is owned 100% by Wilh. Wilhelmsen Holding ASA.

Shipping is claimed to be the most environmentally effective form of transport, but it still faces significant environmental challenges. Air pollution from shipping contributes to acid rain and green house gases. Handling of oily water needs practical solutions. The results of transferral of ballast water have been seen across the globe where marine life in costal waters has been destroyed by invasive species.

**UNITOR BALLAST WATER TREATMENT SYSTEM**

**SUSTAINABLE MARINE CHEMICALS**

**GREEN SHIP RECYCLING**

**INVENTORY OF HAZARDOUS MATERIALS/GREEN PASSPORT**

# 3: A SOLID GREEN OFFERING

## UNITOR BALLAST WATER TREATMENT SYSTEM

Wilhelmsen Technical Solutions continued their efforts to offer environmentally friendly solutions to the maritime and offshore markets in 2010. Their environmental solution range include systems for reduction of Emissions to Air (ETA), both under operation and while docking, an innovative technology for energy management, an oily water pod to ensure oily water discharge of less than 15 parts per million (ppm), and the Unitor Ballast Water Treatment System (Unitor BWTS).

With the upcoming ratification of the ballast water convention, the Unitor BWTS was an important focus area for Wilhelmsen Technical Solutions in 2010.

The system, designed to meet the performance standards of the International Convention for the Control and Management of Ships' Ballast Water and Sediments, received Final Approval in March 2010, and type approval from the South African Maritime Safety Authority (SAMSA) in August 2010. The solution has

been extensively and successfully tested in shipboard tests onboard the WW owned pure car and truck carrier MV Toronto in the period of July 2009 to June 2010. These tests, combined with a comprehensive series of land based tests have proven compliance with the D2 standard set for the shipping industry.

The Unitor BWTS is a fully inline system that needs to treat ballast water on intake only. With a very small footprint and low power consumption, the system is a flexible and economical solution for both newbuilds and retrofits.

For more information about Unitor BWTS: [www.wilhelmsen.com/UBWTS](http://www.wilhelmsen.com/UBWTS)

## SUSTAINABLE MARINE CHEMICALS

Wilhelmsen Ships Service (WSS) is the market leader in marine chemicals for the merchant fleet. The company offers a comprehensive range of Unitor and Nalfleet branded marine chemicals, produced in-house at the ISO 9001 and 14001 certified production facility, located outside Tønsberg, Norway.

WSS's worldwide network provides an optimal distribution channel for the supply of chemicals to vessels. Within the network, highly competent marine chemical specialists provide application and technical support to vessels globally.

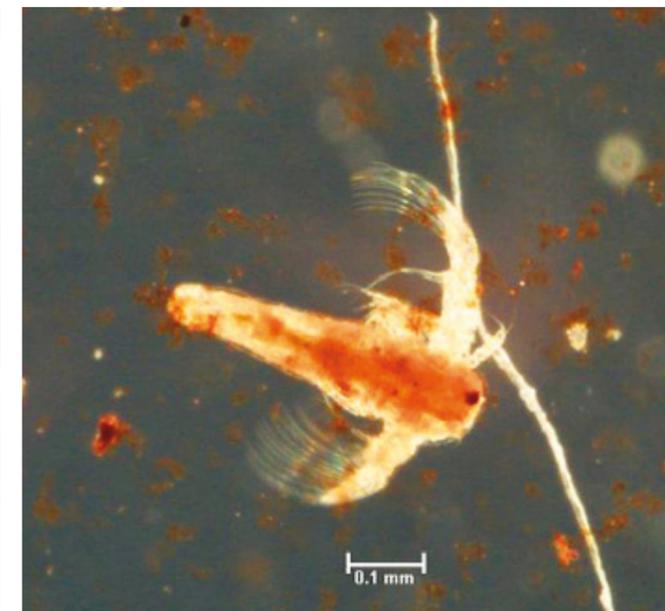
The marine chemicals range covers the following:

- Fuel oil treatment
- Cooling water treatment
- Boiler water treatment
- Cleaning and maintenance chemicals
- Tank and cargo hold cleaning
- Biochemicals
- Pool and spa products
- Test kits for water and fuel oil testing
- Dosing equipment
- Oil spill kits

WSS strives to develop the most efficient, safe and environmentally adapted products. The chemical range met the European REACH regulations already before these regulations came into force. Their quality standards are amongst the highest in the industry. WSS uses objective criteria to measure and



The Unitor Ballast Water Treatment System



Microorganisms before (above) and after treatment within the system reactor unit.

# 3: A SOLID GREEN OFFERING

evaluate their environmental management systems. Throughout the production process WSM is committed to reducing waste, transport volumes, hazardous substances and recycling materials. The company's aim is to keep increasing the effectiveness of its chemicals and, at the same time, to improve safety and reduce environmental impact.

## GREEN SHIP RECYCLING

Green ship recycling was the new and additional green product in the portfolio of Wilhelmsen Ship Management (WSM) in 2010.

Green ship recycling services are specially designed for ship owners who demand a demolition process based on a safe working environment at the yard and identification and safe disposal of all hazardous materials on board.

With green awareness in mind, WSM has signed agreements with several yards in China to carry out ship recycling work. The yards, which dismantle at the quayside, have been selected by WSM based on their compliance with the International Maritime

Organisation's new Hong Kong Convention (May 2009) on ship recycling.

The recycling process is monitored by site team members from WSM who have the authority to "stop work" in case of any deviation from established green procedures. The yards have agreed to be monitored against a set of Key Performance Indicators that will activate a previously agreed bonus incentive scheme for them.

WSM offers a complete turnkey solution including brokerage services, direct quotes from yards, drawing up contracts, ship pre-planning, ship advisory and on-site monitoring services, complete with a weekly report and a final demolition certificate.

## INVENTORY OF HAZARDOUS MATERIALS/GREEN PASSPORT

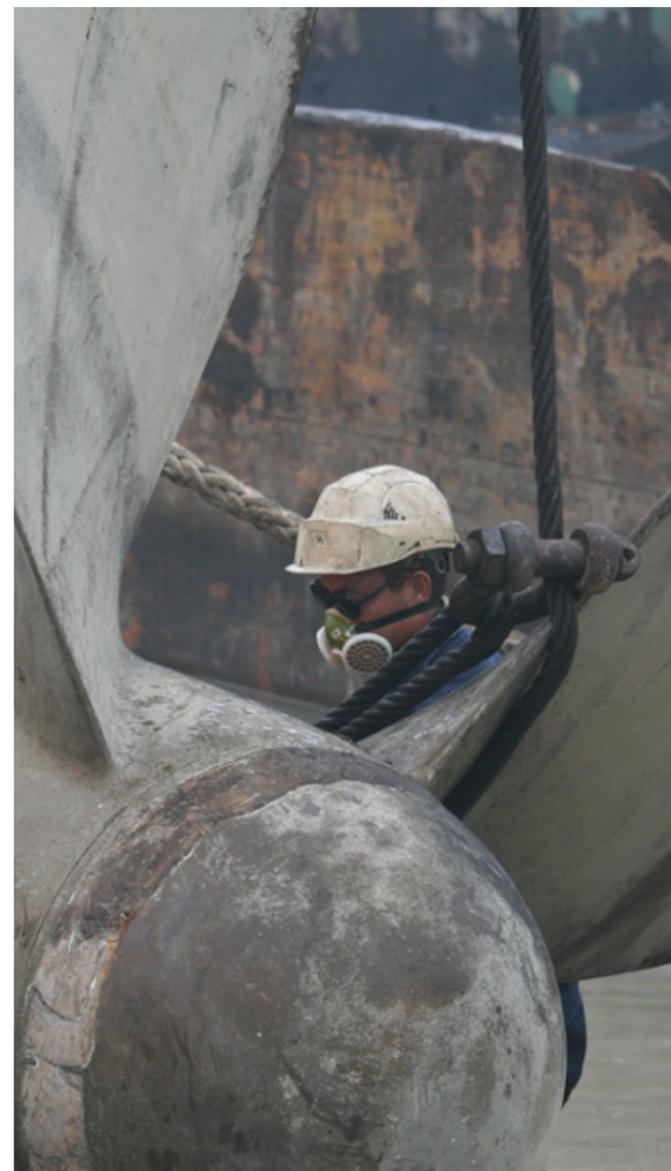
In 2010, WSM also rolled out its Inventory of Hazardous Materials (IHM), which is a requirement of the Ship Recycling Convention as adopted in May 2009.

When the Hong Kong Convention

on ship recycling enters into force, (expected 2013-2015) every ship greater than 500 gross tonnes will be required to maintain an IHM. This inventory identifies, locates and lists out all hazardous and potentially hazardous material onboard a vessel.

In preparation for the large demand that is expected, WSM has built an in-house expertise for developing IHM for their managed fleet as well as for independent owners. This is carried out by WSM's group of trained experts (trained and certified by class societies), sailing onboard for 2 - 3 days where records and manuals are consulted in detail and samples collected. After analysis results are received, the IHM is prepared and submitted to class for obtaining a statement of compliance - popularly known as the Green Passport.

For more information, see [www.wilhelmsen.com/shipmanagement](http://www.wilhelmsen.com/shipmanagement).



All vessels recycled by Wilhelmsen Ship Management are dismantled at environmentally friendly yards in China.

# 4: USEFUL LINKS



[Wilh. Wilhelmsen Holding environmental pages](#)

[Wilh. Wilhelmsen ASA environmental pages](#)

[Wilhelmsen Maritime Services environmental pages](#)