

# IUMI 2010 ZURICH

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12 – 15 September

- SLOW STEAMING ON LARGE BORE 2 STROKES ENGINES
- LOW SULPHUR FUEL OILS



Ludovic GERARD, Vice President, CMA Ships

# CONTENT

- > CMA CGM and CMA SHIPS BRIEF PRESENTATION
- > SUPER SLOW STEAMING ON CONTAINER SHIPS
- > LOW SULPHUR HFO OPERATION
- > COMMON KEY ISSUES

## TOP 10 CONTAINER CARRIERS

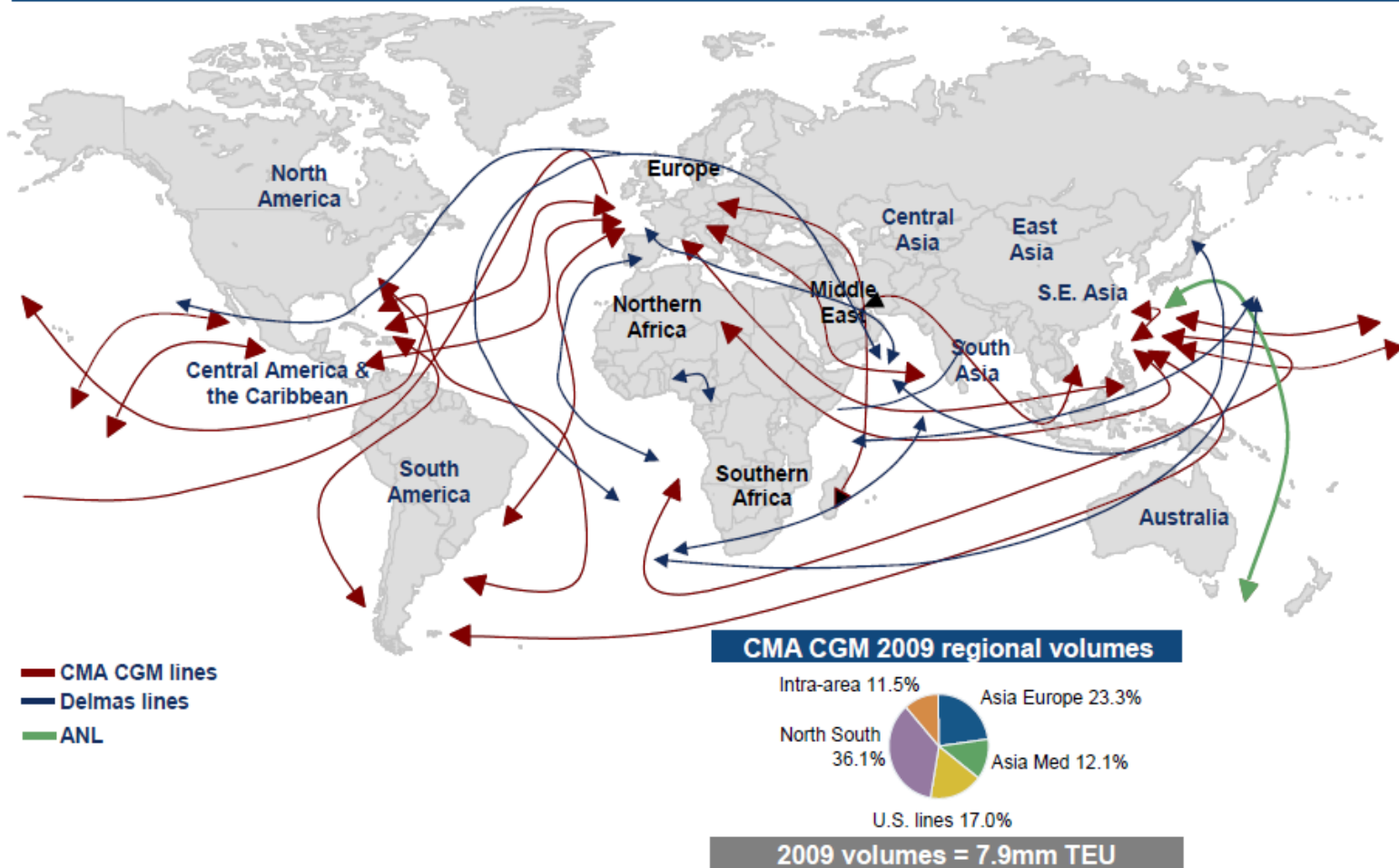
1. Maersk Line – Denmark	2 135 000	14.7 %
2. MSC – Switzerland	1 733 000	11.9 %
3. CMA CGM – France	1 145 000	8.0 %
4. Evergreen – Taiwan	612 000	4.2 %
5. Hapag Lloyd – Germany	602 000	4.1 %
6. APL – Singapore	602 000	4.1 %
7. COSCO – China	530 000	3.7 %
8. CSAV - Chile	529 000	3.6 %
9. CSCL – China	469 000	3.2 %
10. HANJIN – Korea	462 000	3.2%

Source: AXS – Alphaliner AUGUST 2010



# A leading, global container shipping company with a balanced geographical exposure

A global network of 162 container shipping lines





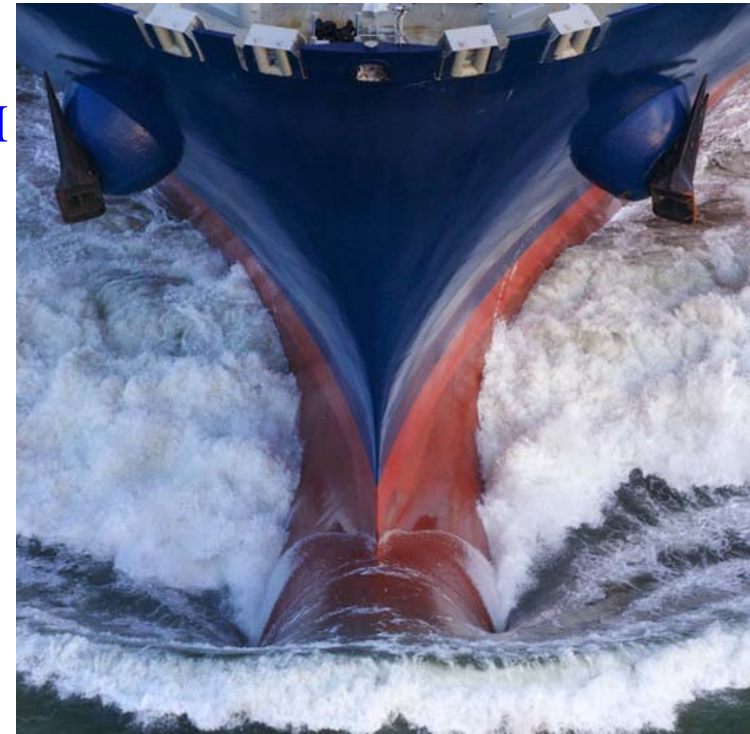


CMA Ships was created on January 1<sup>st</sup> 2008 as a wholly owned subsidiary of CMA CGM with the objective to manage all vessels' related operations.

## CMA SHIPS

### The Wheelhouse and the Engine Room of CMA CGM

- Managing the vessels
  - Crew & Fleet
  - Dry docks
  - Supply of spare parts and consumables
- Supervising New Buildings
- Providing CMA CGM with any technical advise



## As of SEPTEMBER 2010:

- CMA Ships manages **30%** of CMA CGM operated vessels
- **112** vessels (94 owned + 17 third party + Marion Dufresne)
- **35** Superintendents (HO, UK, Singapore, Morocco, Taiwan)
- **485 810** TEUS total managed by CMA Ships
- **3500** seafarers of all nationalities (2200 onboard our vessels)
- **277** employees within CMA Ships (210 in France)

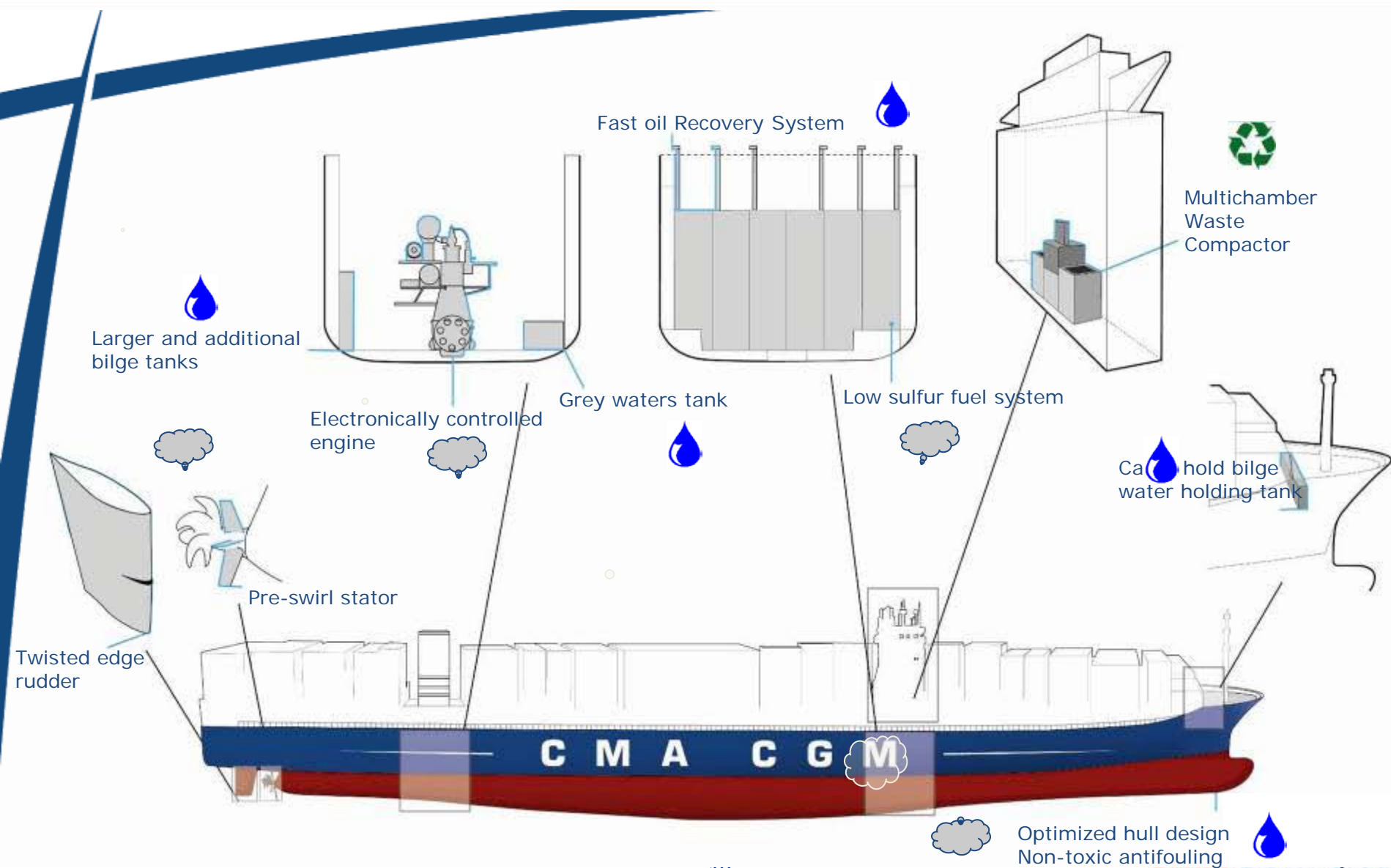


➤ **CMA CGM's** commitment for environmental protection and a sustainable development relies on 4 Major Commitments :



- Fight Climate Change
- Preserve the Marine Environment
- Develop Eco-friendly Solutions
- Promote an Environmental Culture





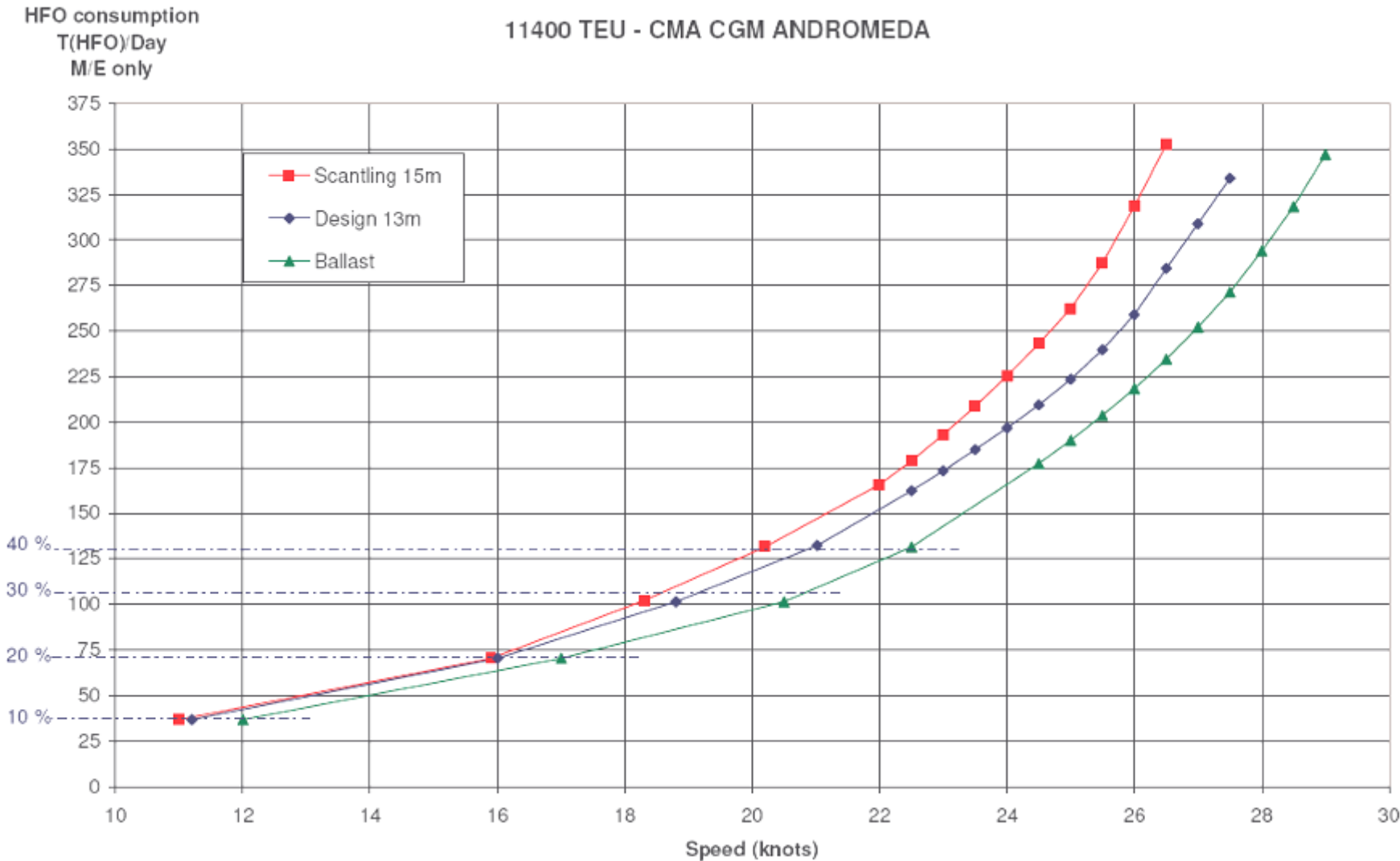
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- > CMA CGM and CMA SHIPS BRIEF PRESENTATION
- > **SUPER SLOW STEAMING ON CONTAINER SHIPS**
- > LOW SULPHUR HFO OPERATION
- > COMMON KEY ISSUES

# WHY SLOW STEAMING ?

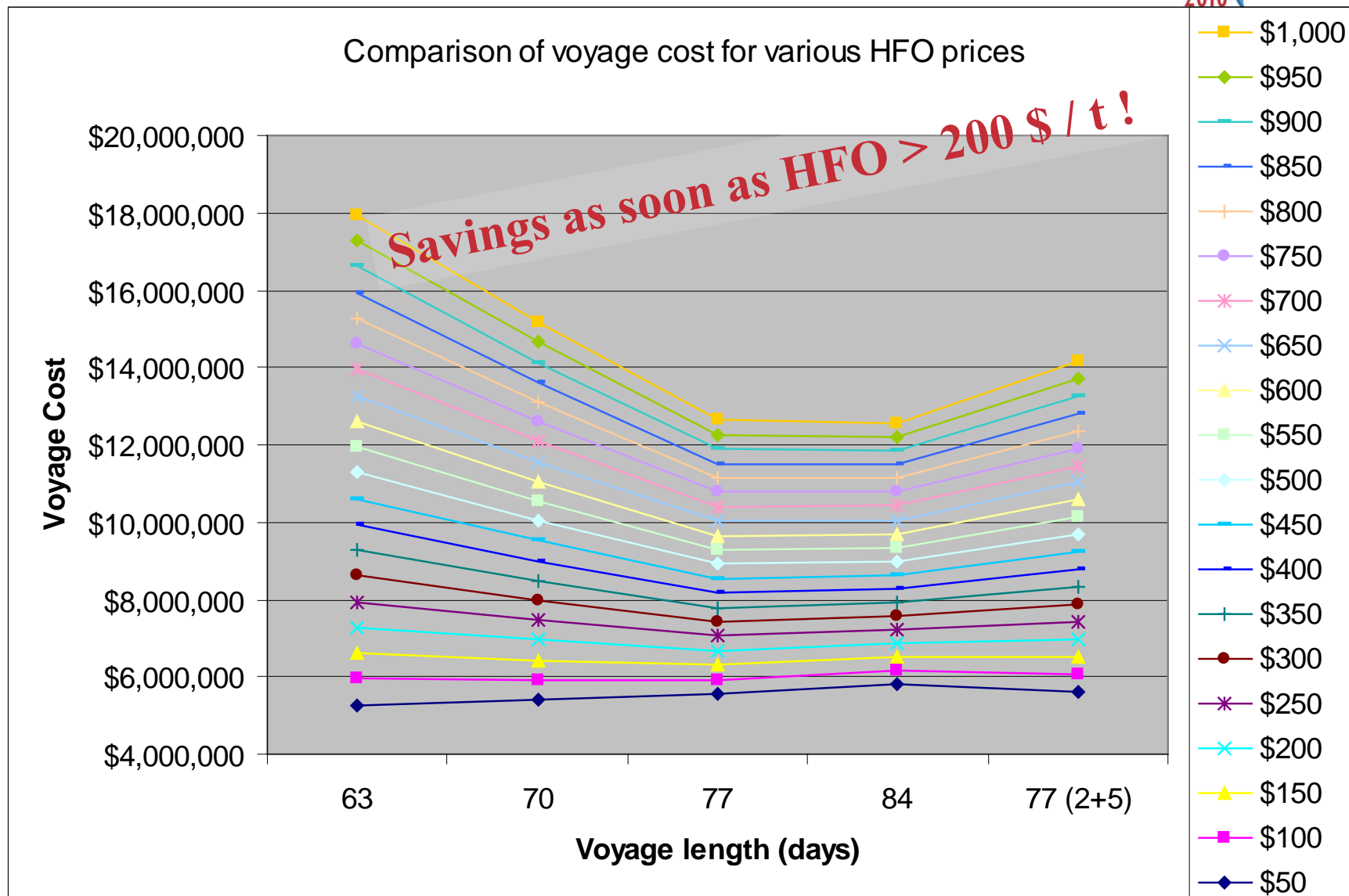


# WHY SLOW STEAMING ?



Typical fuel consumption curve for 11400Teu vessel, CMA CGM

# WHY SLOW STEAMING ?





## IMPLEMENTATION

- CMA SHIPS started Super Low Load tests in 2008
- Engines were closely monitored, related equipment as well
- All parameters need to be taken into account before SSL operation implementation on large scale



-Internal brain storming + engine designers involvement to review all operational risks.

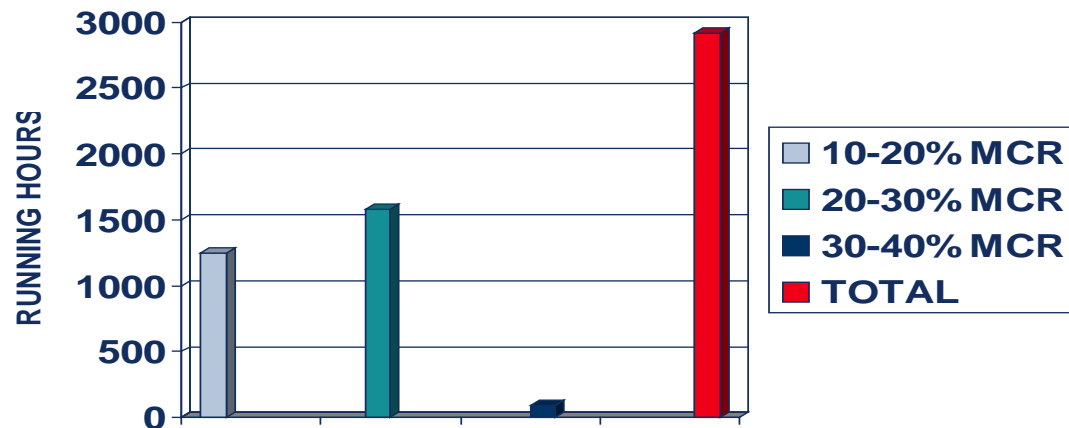
**Nothing abnormal has been found with operating the modern two strokes diesel engines**

# SUPER SLOW STEAMING

## ON LARGE BORE 2 STROKES ENGINES

At the end of 2008, 2900 running hours between 10 and 30 % of the MCR on following engines, without any damages:

- 12K98MC-C, 10K98MC
- 8S70MC-C



**Need to go further deep in the technical investigation and risk analysis**

Scavenge spaces fouling is slightly increased, but there is no influence on the cylinder condition which is found perfect.



Counter measure to minimize risk of fire : more frequent cleaning of Scav. Space.



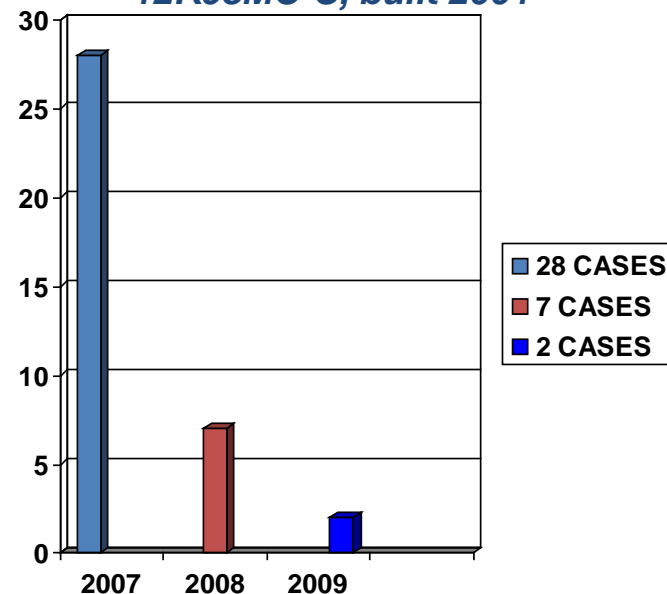
## SCUFFING ?



Since 2001 CMA SHIPS operates 4 sisters vessels (CC DEBUSSY CLASS, 12K98 MC-C) subject to scuffing. Since vessels are operated at low speed, scuffing cases reduction is remarkable.

CMA CGM has started vessel's speed reduction in 2008. First step was speed reduction to 40% MCR and then below 40%, down to 10%.

CC DEBUSSY CLASS VESSELS  
*12K98MC-C, built 2001*



## *SCUFFING ?*

Despite all good results and precautionary measures, some scuffing cases are still reported.

They are under close investigation with engine designers, lube oil suppliers and our technical dept.

Target is to get rid of these cases by end of the year by analysing :

- damaged rings and liners,
- lube oils (TBN evaluation, feed rate)
- liners scrap down oils
- HFO sulfur contents
- Engine parameters



# CYLINDER LUBE OIL CONSUMPTION

When engine is operated at slow steaming, cylinder lube oil savings are significant.

*For example, on a 12K98MC Engine, 68520 kW :*

-Lub oil feed rate, 0.6 g/kWh flat, whatever HFO sulphur content, 1.5 g/kWh below 25% engine load :

-75% MCR, 51390 kW : 740 kg / 24 hours

-10% MCR, 6852 kW : 247 kg / 24 hours

-Additionnaly, we have seen that there is still too much oil in the scavenge air space. We've tested with engine designers improvment of the lube oil system to better control the injected lube oil.



- No abnormal fouling on turbine side
- Dry cleaning (nut shells) is very efficient during loads carried out every 2-3 days



**12 K98MC**



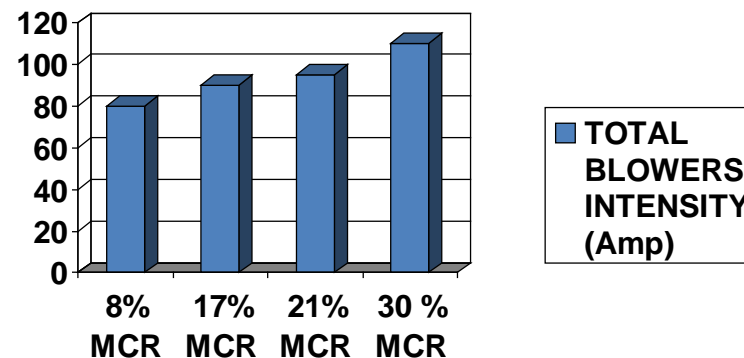
**12 K98MC**

# AUXILIARY BLOWERS ?

- We consider Aux Blower E-motor is designed for continuous operation.
- Operating the engine below 30% MCR reduces load on E-motor (no counter pressure in the scavenge pipe). Failure risk is reduced



8S70 MC-C INTENSITY PER BLOWER



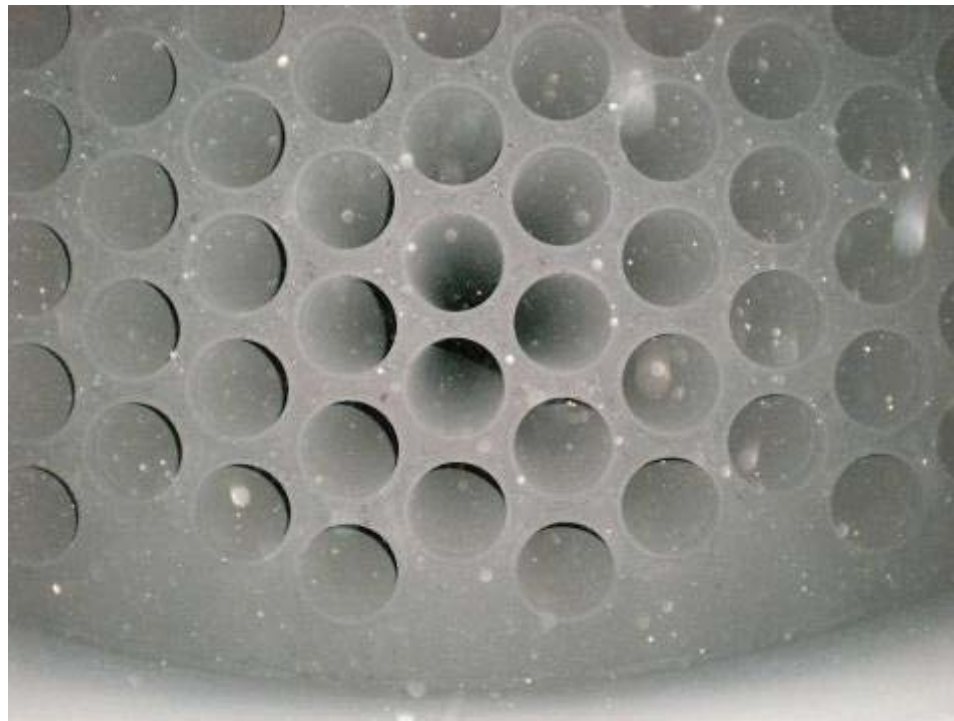
**Impeller remains in good condition**

**Preventive measure :**

**spare e-motor on board every ship**

# EXHAUST GAS BOILER CONDITION

**Very good EGB condition after 10 days at 15% of load  
and regular engine load up**



**-Fresh Water Generator kept in operation, whatever the engine load.  
Jacket Water preheater in operation if required.**

**-LINER cold corrosion is prevented, Jacket cooling water outlet is kept  
above 80°C (or 85°C), whatever the engine load is.**

**-Exhaust gas T° kept below 220°C after the EGB, above the SULPHURIC  
ACID dew point.**

**-When Engine is operated at slow steaming, number of HFO purifiers in  
operation is decreased. Maintenance costs are reduced.**

-SSL is now a standard for CMA CGM vessels under CMA Ships Management

-No abnormal failure detected for vessels operated at SSL, and preventive action have to be taken :

- Clear Instructions to ship's staff by means of Circular letters, in addition to engine designers and makers circular letters,

CMA SHIPS

CMA CGM group

FLEET MANAGEMENT CIRCULAR LETTER

TO	Vessels with Engines MC/MC-C, ME/ME-C		01-S-005-0-09
SUBJECT	MAN B&W – 2 strokes – Various load & Operations		Date: 03/07/2009
BASS code (if any)	000	Keyword	TECHNICAL

Reference: MAN Diesel – SL07-480/SBE  
 MAN Diesel – SL08-501/SBE  
 MAN Diesel – SL09-511/MTS  
 HYUNDAI – HD-B-0119  
 WARTSILA – Service Bulletin RTA-79 & RT-Flex-08 09.10.2007 - 08.01.2008 - 11.03.2009

- Regular engine load up to prevent engine and EGB fouling
- Spare Aux blower motor kept on board
- Close co-operation with engine designers and follow up by superintendants.

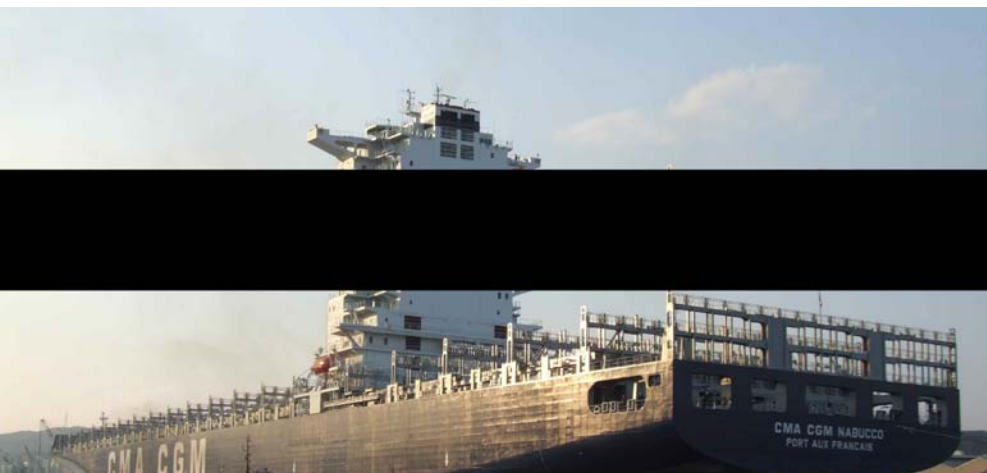
# SUPER SLOW STEAMING IN THE FUTURE

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- **Even if SSL has no negative impact on the engine condition, we are looking forward to improving Engine operation at super low load**
- **One of the improvement fields is the lubrication : better control and optimized injection. This is in progress with engine designers and lube oil suppliers.**
- **Another one is the Turbo Charger CUT OUT.**



**TWO tests performed, in close cooperation with MAN Diesel:**



**1/ CMA CGM NABUCCO :**  
**(12k98MC, 4 TCs)**

- engine parameters validation
- fuel consumption calculation
- TC N°3 blanked with “emergency” flanges

**2/ CMA CGM PUCCINI :**  
**(10k98MC-C, 3 TCs)**

- MAN DIESEL swing gates installation
- Long term running



- TC N°3 open in MALTA 13/05/2009 for condition check before trial

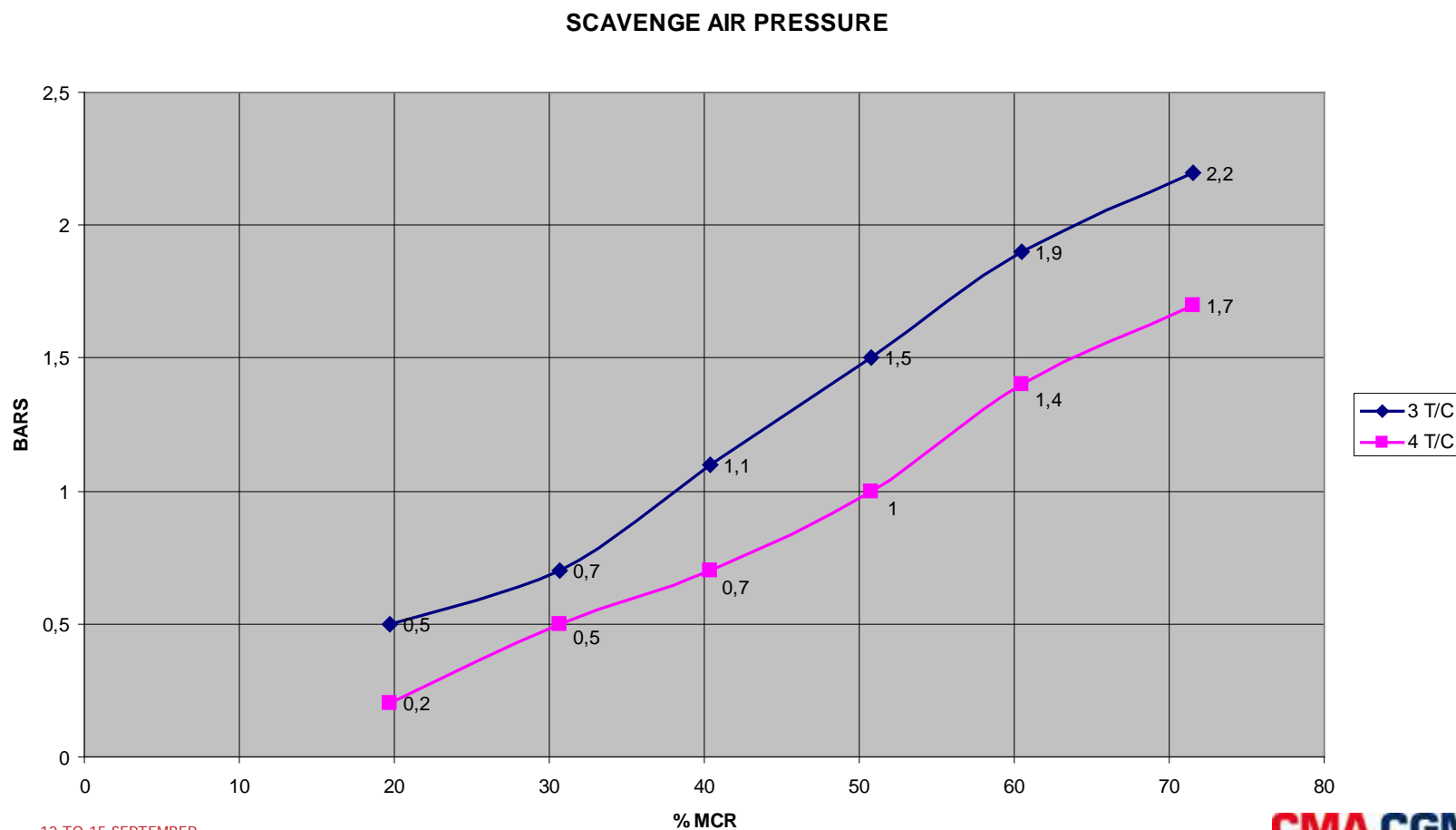
### ❖ FROM MALTA TO LE HAVRE :

- First trial with all TC, 20 to 70% MCR, two hours step at each load, consumption measurements, engine parameters recording
- Second trial with TC N°3 blanked, 20 to 70% MCR, two hours step by step at each load, consumption measurements, engine parameters recording.

### ❖ LE HAVRE 18/05/2009 : TC N°3 open for condition check

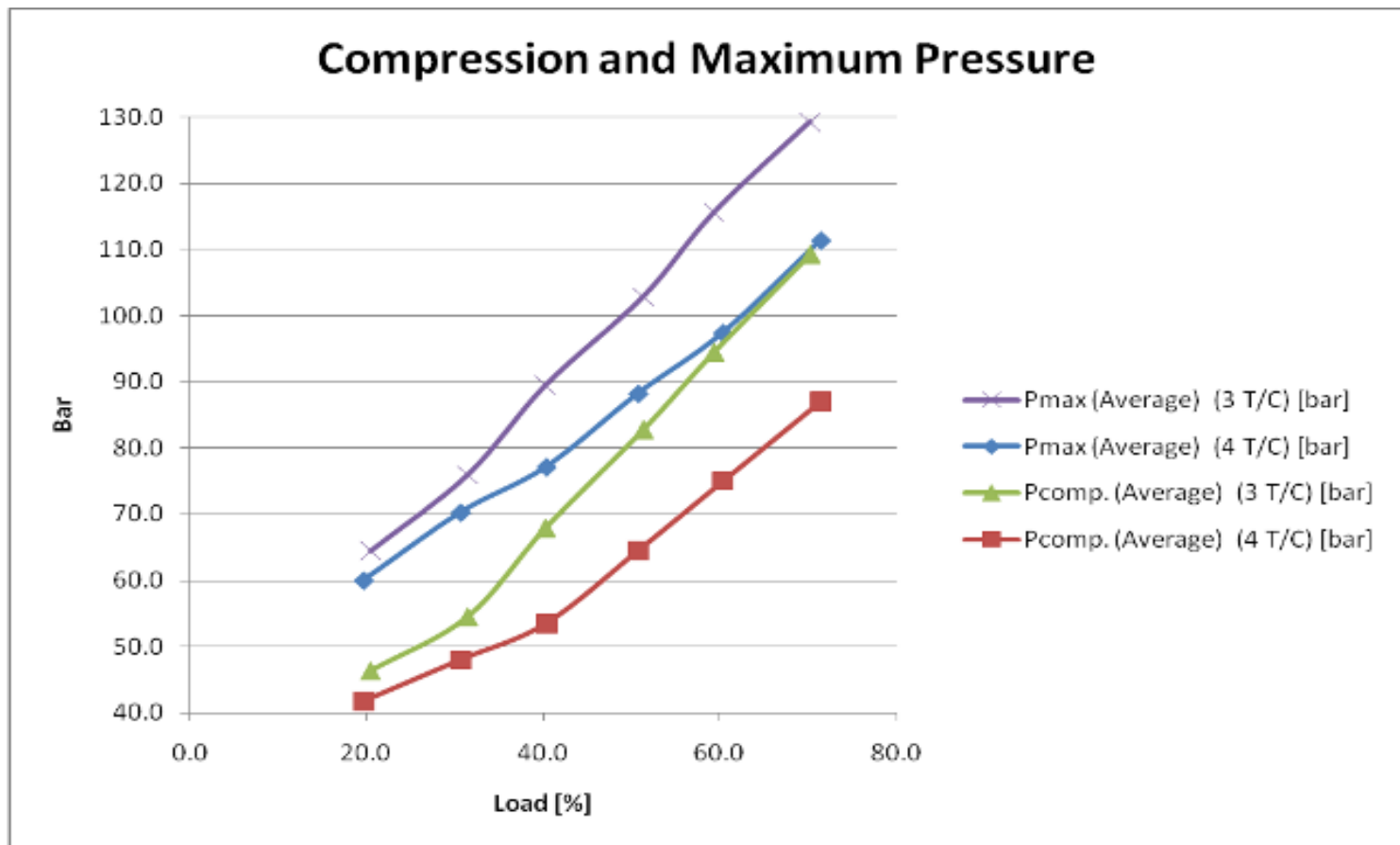
## CONCLUSION :

- GAIN in SCAVENGE AIR PRESSURE CONFIRMED



## CONCLUSION :

- Engine parameters are normal, P<sub>MAX</sub> reached at 75% MCR



**Installation was performed while vessel was in operation :**

**PUSAN 15/12/2009 :**

- **- AMS / BMS MODIFICATION (SAMSUNG + KONGSBERG) - TC MODIFICATION**

**VALENCIA 13/01/2010 to FOS 17/01/2010 :**

- **- GATES INSTALLATION**

**CHIWAN 21/02/2010 to YOKOHAMA 27/02/2010**

- **- GATES COMMISSIONING**
- **- PERFORMANCES MEASUREMENTS**

**BUSAN AUGUST 2010 :**

- **- TC N°2 opening for bearings condition check**

**Since February 2010, vessel is running almost permanently with closed valves (T/C #2 out of operation) with excellent results.**

## GAS SIDE



Gate



Support to be cut





## AIR SIDE



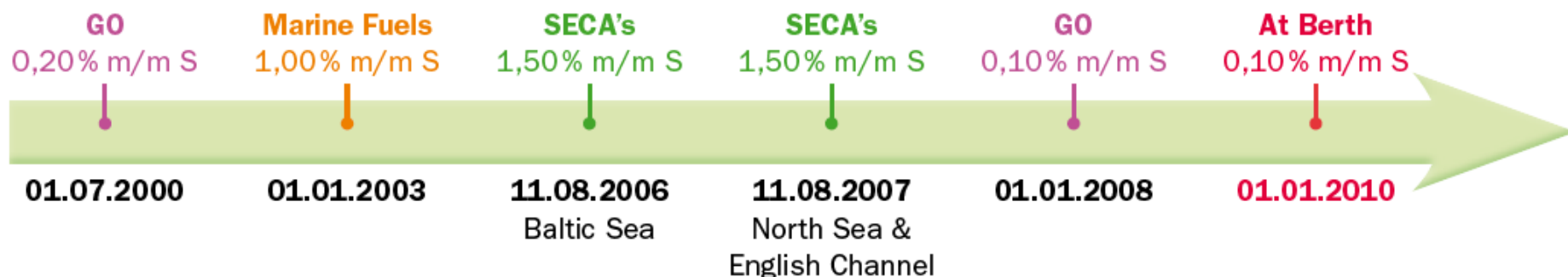
- Super slow steaming will continue in the future, we believe it is a clear shift in the container ship operation**
- Super slow steaming is not “something we shall be afraid of”. It is clearly feasible and sustainable.**
- However it requires a certain level of expertise in the Shipmanagement company , with close and good support from engine designers and manufacturers.**
- Technical solutions do exists – such as T/C cut out – to improve engine parameters at super low load, they shall be retrofitted among the engines in service. More over, the HFO savings are providing Owners with a pay back of less than a year.**

# CONTENT

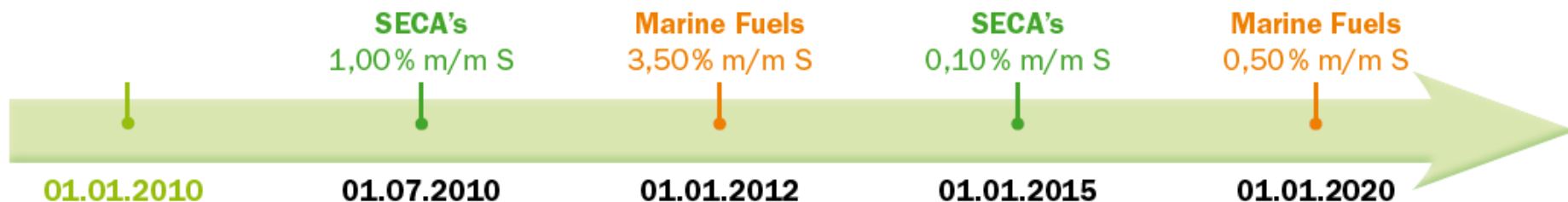
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**International and local regulations are becoming more and more stringent :**

**EUROPEAN COMMUNITY (EC)** EU Directives 1999/32/EC & 2005/33/EC



**INTERNATIONAL MARITIME ORGANISATION (IMO)** MARPOL 73/78 Annex VI



*Axa Corporate Solutions, 2010*

**And others such as : California waters 1.5% MGO or 0.5% MDO**

- Main Equipment concerned with LSHFO and MGO :
  - ❖ MAIN ENGINE
  - ❖ AUX ENGINES
  - ❖ AUXILIARY BOILER

And these combustion machines shall be able to burn everything :

- ❖ from 2cst up to 700 cst,
- ❖ from 0.1% to 4.5% sulfur content fuels,
- ❖ distillate or residual fuels,
- ❖ not even mentionning other parameters !





## MAIN ENGINE – Two stroke experience :

- Burning « natural » LSHFO is preferable
- Mixed fuel or additives to reach %S level can lead to ignition delay and then to scuffing
- Regarding use of MGO  
(longer experience thanks to CALIFORNIA)  
no failure reported
- MGO viscosity and lubricity are carefully checked by means of analysis





## AUXILIARY ENGINES : 4 stroke experience

➤ For engines burning LS HFO :

No failure reported

➤ For VESSEL Calling EU PORTS :

Only one dedicated engine is used for MGO and is running at ports in order to minimize change overs MGO / HFO

➤ For VESSELS calling CALIFORNIA :

The whole plant is switched to MGO. No failure reported.





## AUXILIARY BOILER : experience

- Using LSHFO on the auxiliary boiler has no influence on the boiler performances.
- Main concern is using MGO.
- Boiler has to be correctly ventilated before burning MGO.
- Minor issues with oil pumps leakage – solved with new seals or magnetic coupling.
- No major failure reported.

# PROCEDURES

## FLEET MANAGEMENT CIRCULAR LETTER

TO	<b>All Vessels</b>	<b>FMCL-017-0-10</b>
SUBJECT	<b>EC Directive 2005/33 Reduction of Sulphur content of fuels</b>	Date: 31.05.2010
BASS code (if any)		

**Strict Procedures have been implemented on board**

Reference:

- .1) **EC Directive 2005/33** – Amending Council to a reduction in the sulphur content of certain liquid fuels
- .2) **COMMISSION RECOMMENDATION** of 21 December 2009 on the safe implementation of the use of low sulphur fuel by ships at berth in Community

To be read in conjunction with: **DPA Letter 09/034**

Annexes to circular letter: *Nil*

- .1) **MAN Service Letter L28 32H** – Switching from Heavy oil to Gas oil
- .2) **MAN Diesel - SL2009-515** - Guidelines on Operation on Distillate Fuels
- .3) **WARTSILA** – Operation on low sulphur Fuel Oil
- .4) **WARTSILA** – Low Sulphur Guidelines – Revision III
- .5) **HIMSEN** – Guideline - Fuel oil control by EU Directive 2005/33-EC
- .6) **VISWA LAB** – Technical updates Nov 2009
- .7) **MAN Diesel** – GenSets operating on low sulphur fuel oil

**to cope with the identified risks :**

**-Fleet Circular letters**

**-DPA Letters**

**-Vessel's specific change over procedures**

**-Manufacturers circular letters**

**-Additional spare parts, in particular for boilers and fuel pump systems**

**-Reinforced safety device testing schedule for boilers**

**-And in accordance with Class requirements**

- New ships were and are designed and built taking into account multi fuels operation : additional storage tanks, dedicated piping systems, etc
- Prior to bunkering fuel testing to check in advance particulars and compliance
- MGO chillers installation ?
- Additives to compensate loss of lubricity
- Lube oils and lubrication systems for 2 Stroke engines to cope fully with all sulfur contents

**And of course, alternative power generation means : fuel cells, LNG, cold ironing for port stay.**

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# COMMON KEY ISSUES

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- Two technical matters : one driven by fuel costs and environment, the second by regulations and environment**
- Both do require high level of expertise on board and ashore**
- Both do require closest cooperation with manufacturers and engine designers**
- Both are manageable by current industry standard**
- However, more “relaxed” operation is sought for sustainable and long term operation of our vessels**



- Technical challenges are still ahead of the industry : more and more will be requested from us by the regulations.
- Accidents with spill (cargo, oil etc) as consequential damages are terrible for our industry with governments drafting more and more regulations.
- Training of seafarers is to be enhanced to be better suits our operational needs.
- Expertise and experience on board and ashore should be more widely shared between all stakeholders : shipowners, shipyards, engine and equipment manufacturers, but also classification society, which role is becoming more and more important for safe operation, and as well underwriters and surveyors.
- A problem for underwriters ? No with serious support and expertise !

# SLOW STEAM AHEAD !