

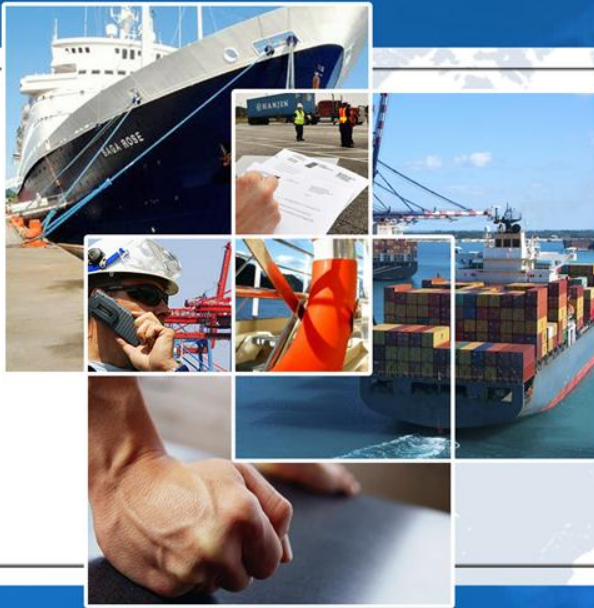
The 6th International Maritime Transport and logistics Conference

GLOBAL INTEGRATION IN PORTS

FUTURE OPPORTUNITIES



19-21 March 2017 Alexandria - Egypt



Sustainable Cost Effective Green Technology Towards Emission Reductions in Container Terminal & ports Operations

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M.E.N. Consulting Office Chairman





Agenda

1- Introduction

2- Ship Growth

3- Container Terminal Growth

4- Filtration

5- LED Lights

6- RTG Modifications

7- Recommendations



Introduction

- **Global demand has increased pressure on ports**
- **Ports must be competitive to retain clients**
- **Ports must be efficient in best practices applications to enhance service to clients and reduce operation costs**
- **Environmental Concerns- Emission Reduction**

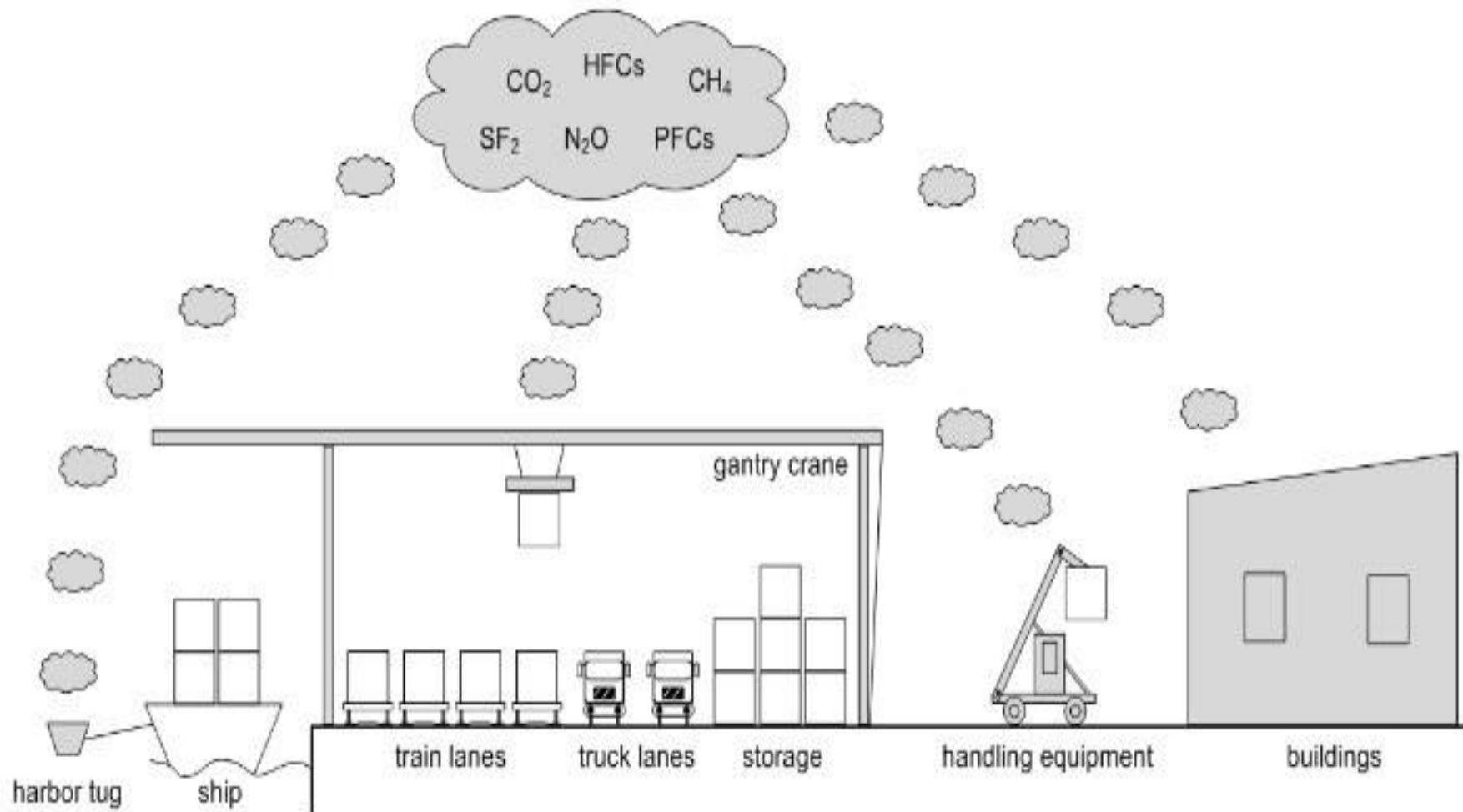


		TEU
Emma Maersk	2006	14,770
CMA CGM Marco Polo	2012	16,020
CMA CGM Vasco De Gama	2015	17,865
CMA CGM Benjamin Franklin	2015	18,000
Madison Maersk (EEE)	2014	18,270
Barzan (UASC)	2015	18,800
MSC OSCAR	2015	19,224





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Oil Filtration





Oil Contamination by Particles

The impact of small particles





The Issue

Clean oil is not only important to control wear, it is also important to reduce fuel consumption and emissions

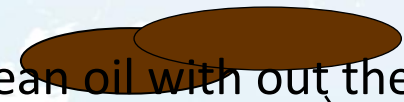
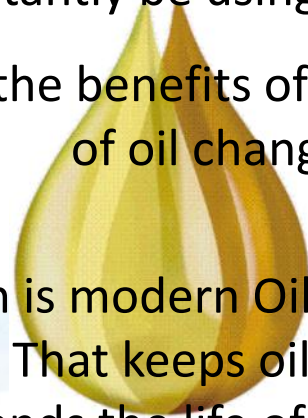
- It is neither economically or environmentally responsible to constantly be using new oil

Oxidation products:
 Resins, sludge and varnish

- The need is to have the benefits of clean oil with out the cost of oil changes



Moisture - water



Catalysts for oil degradation

- The solution is modern Oil Filtration Systems That keeps oil clean
- ✓ Extends the life of oil usage
- ✓ Reduces downtime for equipment maintenance
- ✓ Reduces CO2 Emissions



10 µm

5 µm

2 µm

Particles



Oil related Problems

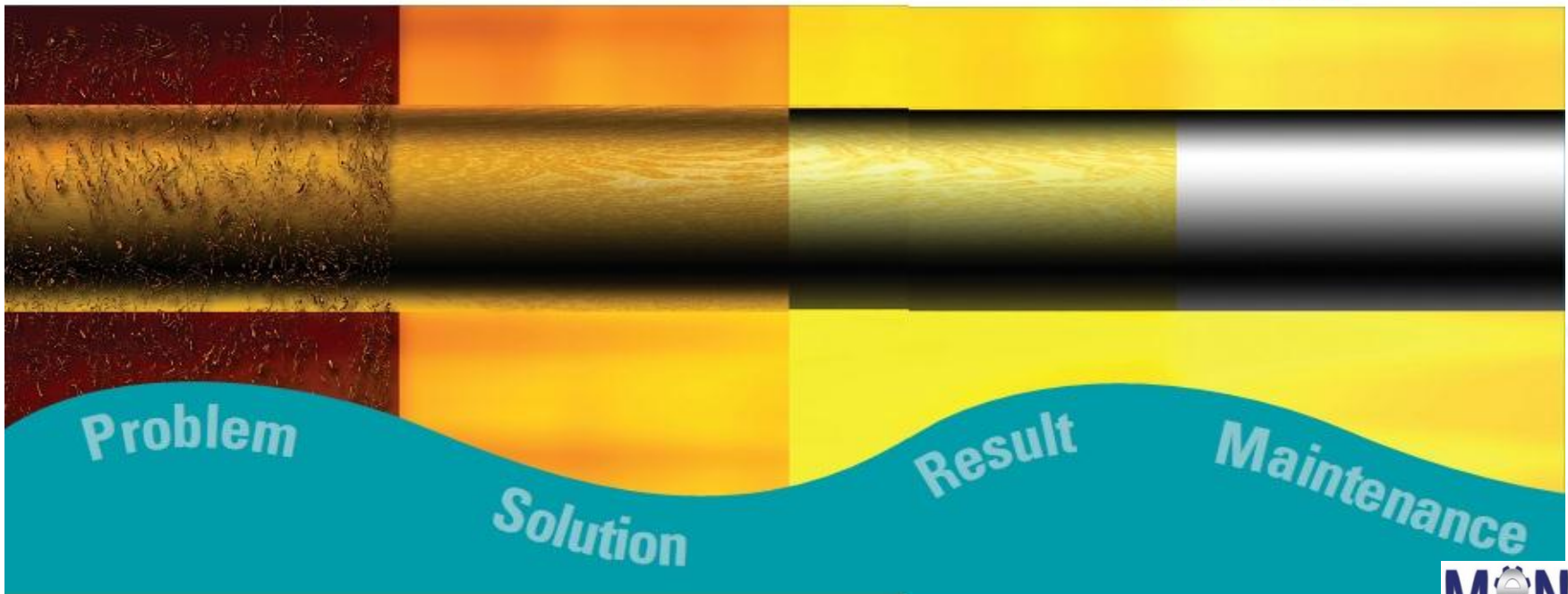


Filtration Benefits

Removal of Varnish Deposits



Hydraulic valve

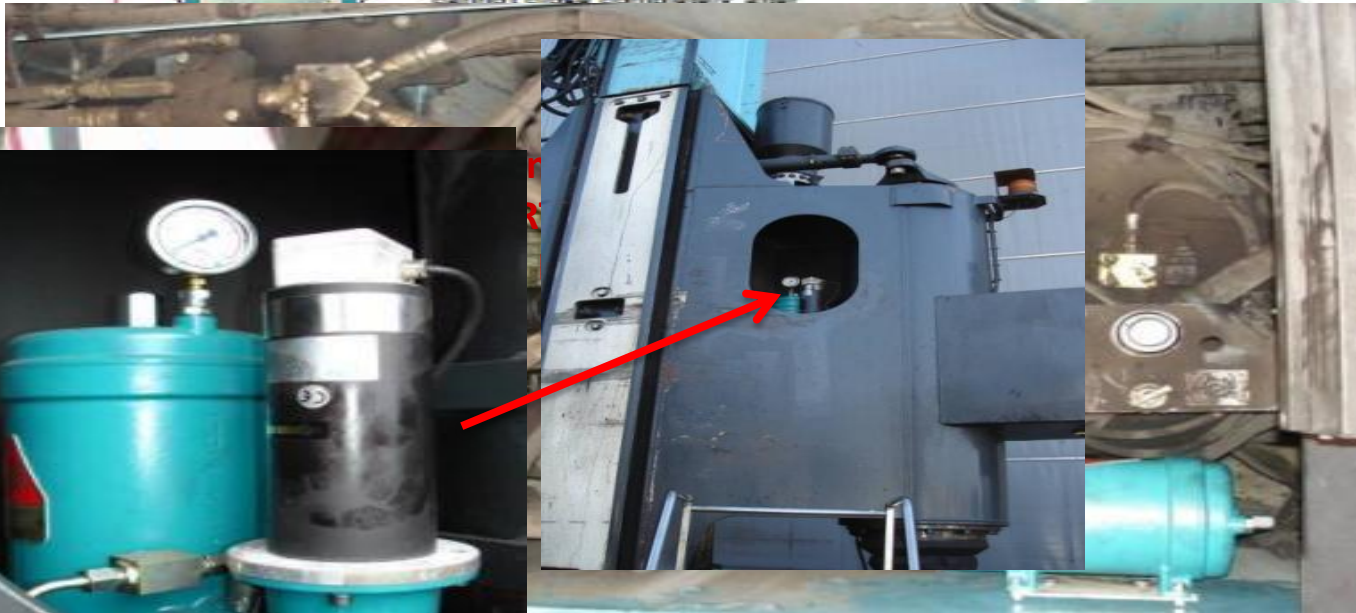




FILTRATION METHODS

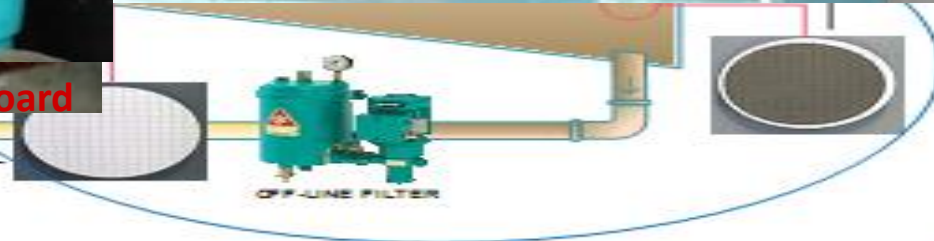
Engine room Reach Stacker

Contaminants can pass the filter when by-pass valves cannot close completely after



Off-line filter mounted onboard Straddle Carrier, Denmark

Misport
 S&P
 after off-line
 filtration.



Hydrostatic Drive



Case - Straddle Carrier, Greece

The Solution Financial savings achieved through

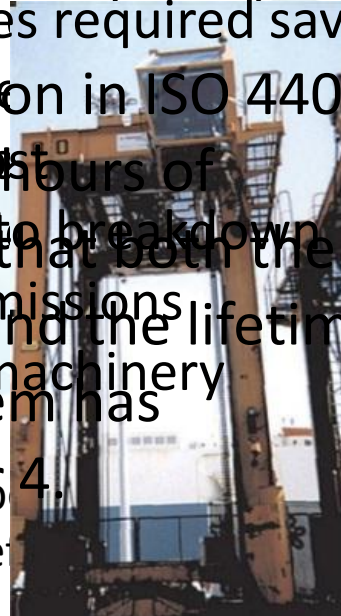
The filter GFTM Fine Filter 24V motor filter was installed on the hydraulic system of the straddle carrier. The GFTM Fine Filter was agreed to take oil samples with following intervals 24, 48, 72 and 150 hours and G-15/20 filter was for

This terminates the top particle of 2 litres of water from the oil.

The Results of oil changes required saves money

The oil change interval in ISO 4406 codes after only 150 hours of operation estimates that both the oil change intervals and the lifetime of the hydraulic system has improved by a factor 4.

Microscope sample be





“The world as we have created it is a process of our thinking. It cannot be changed without changing our thinking”

Advantages of LED

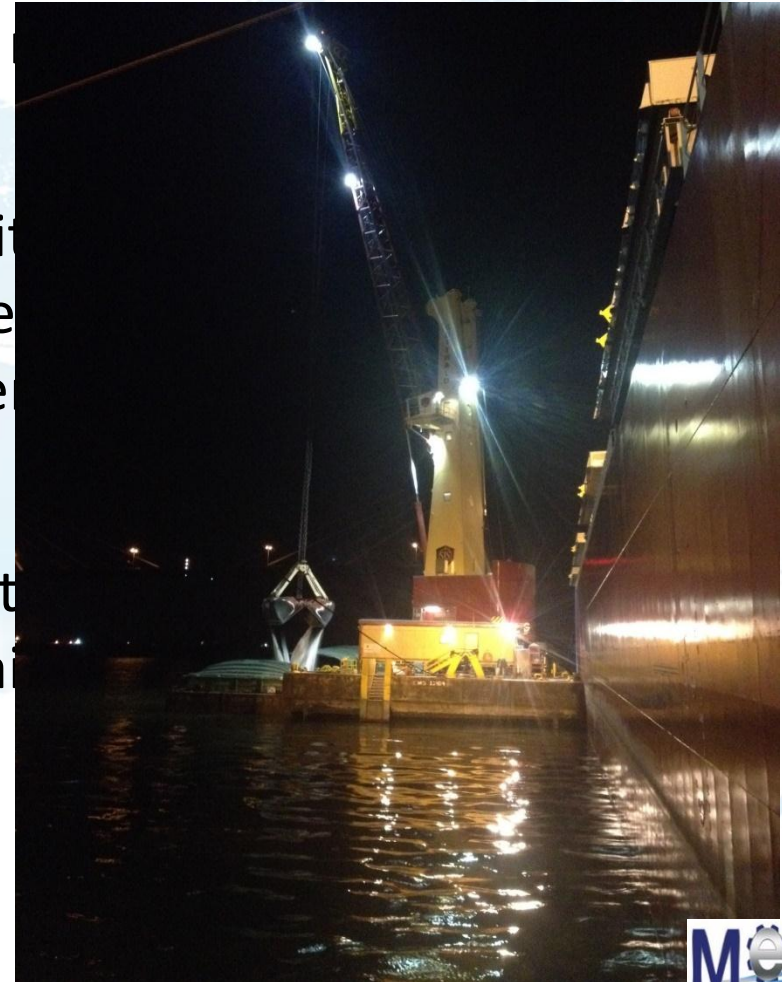
- On Container & Bulk Equipment





Lighting Challenge:

- Terminals operate 24/7, lighting is
- High vibration environment and pathways
- Corrosive environment
- Example: A standard STS Crane is lifted
- Rapid movements
- HID floodlights and over 150 fluorescent
- Decrease
- These lights require significant energy
 - Maintenance due to the greenhouse gasses emitted.
 - Energy Consumption
- The lighting also faces harsh conditions
- Improve Safety
- burnouts, demanding constant maintenance
- Improve operator visibility
- material and labour costs
- Improve productivity
- Traditional Lighting: start/warm up time 15 minutes





Lighting: Cost and Environment

LED Benefits

- Less CO2 Emissions
- Lower Energy costs
- More Durable than traditional lighting
- Reduction in Maintenance associated costs
- Elimination of Hazardous Waste
 - Lead
 - Mercury
 - Heavy Metals



Case- Jebel Ali Port Terminal 1

Reduces energy

Annual kWh savings

12,324,444 kWh

72%

Minimizes environmental impact

Projected Annual CO₂ Emissions Savings In Metric Tons

10,378 t

Annual CO₂
reduction

10K

Includes maintenance

Repairs and group lamp replacement provided by Musco for 15 years

Maintenance
for 15 years

Reduces operating costs

Projected annual savings:

- Energy
- Relamp and maintenance
- Total**

\$1,355,449

\$146,920

\$1,502,369

\$0

Annual savings

\$1.5M





RTG electrification retro-fit

- **RTG electrification retro-fit Systems** to be connected directly to the terminal electricity

Cable-reel



Bus-Bar



Overhead





Benefits of RTG Electrification

- **50-80%** reduction in repair costs for E-RTG's are over **30%** lower than for diesel RTG's.
- ✓ **50-70%** reduction in RTG fuel and maintenance costs².
- Refuelling frequency for E-RTG's **reduced by 90%**.
- ✓ **20%** reduction in overall terminal CO₂ emissions / TEU.
- Minimal infrastructure investment required
- ✓ Cost/benefit analysis of E-RTG retro-fit indicates short investment payback time
- Reliable – downtime, in cases of failure, is minimal
- Retention of the existing diesel generator on the RTG provides **LOW RISK** redundancy in event of electrical failure.
- ✓ Can be implemented quickly, with short lead time and minimal disruption to terminal operations.
- Diesel generator is still used for RTG transfer between blocks.
- Bus-bar electrification enables low cost, accurate and reliable, position **detection and auto-steering. (Low cost alternative to DGPS)**

¹ (Emission reductions are the result of even coal-fired power stations generate electricity much more cleanly and efficiently than diesel engines, also, E-RTG's feed energy back into the grid when lowering loads.)

² Cost-benefit analysis of E-RTG retro-fit indicates short investment payback time

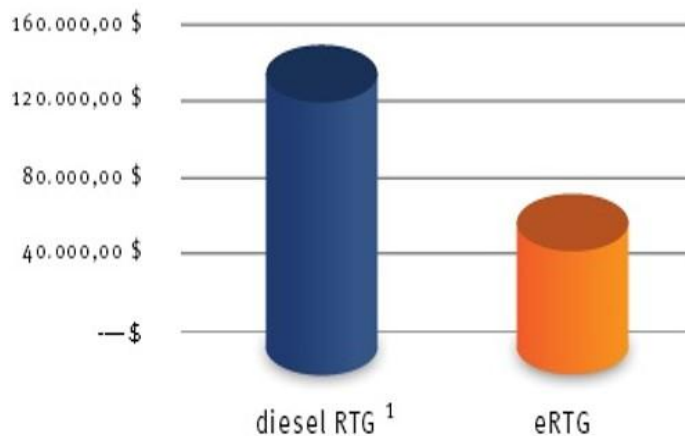
➤ **Bus-bar electrification provides a platform for future low cost RTG semi-automation.**



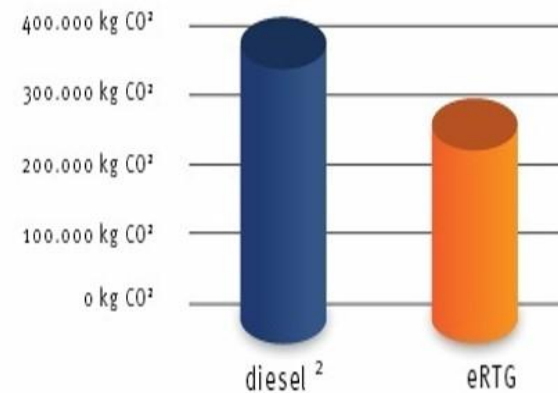
CASE – APM Terminals

RTG Electrification Makes Economic and Environmental Sense

Operational Costs - Monetary



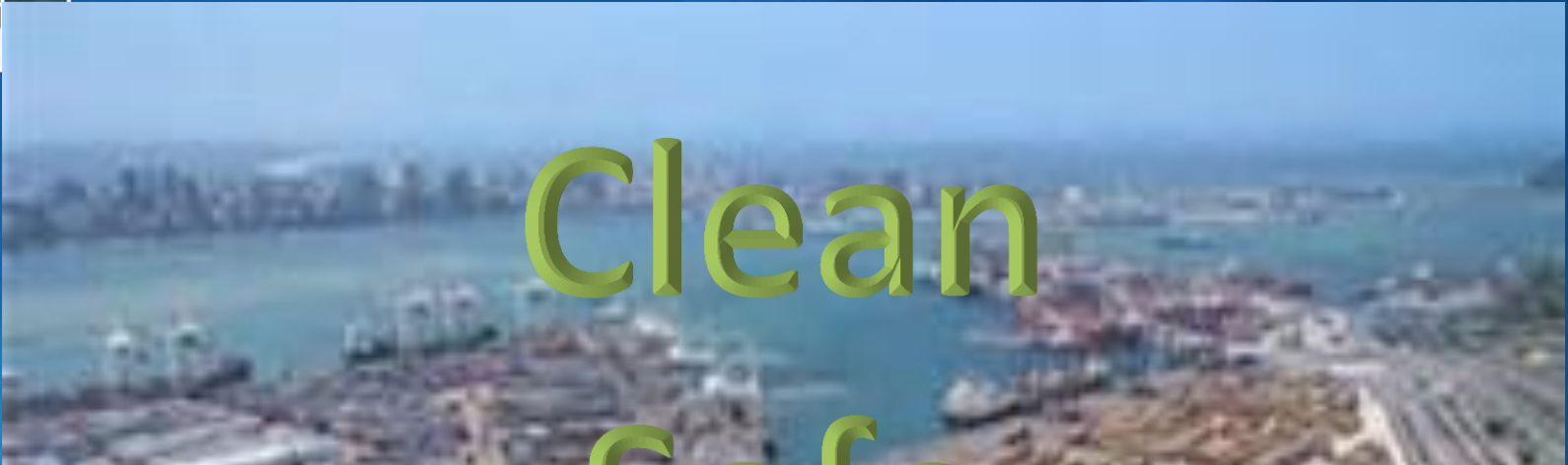
Environmental Costs - Emissions



¹131 diesel engine / 12 hours operation time



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International Consulting Engineers
PORT EQUIPMENT, MANAGEMENT AND LOGISTICS

Mustafa EL Nahass



TOGETHER WE CAN MAKE YOUR BUSINESS MORE RELIABLE, SAFER, FASTER AND COST EFFICIENT.