

PORTS BECOMING GOOD NEIGHBOURS TO RESIDENTIAL AREAS

Abstract

The research project EFFORTS (effective operations in ports) is not restricted to environmental issues, however, it is understood that the port environment is a crucial production and image factor of a port. Therefore "port environment" is one of the three thematic columns of the project. Energy management, ships' ballast water, diluted aluminium from cathodic protection of port steel constructions, port air quality tackling VOCs and noise annoyance are the key words to describe EFFORTS work related to the port environment. The paper provides a brief overview to explain the course of activities and expected results which will allow ports to strengthen their role as environmental protagonists and to improve trust in residents in the vicinity of ports taking their environmental responsibility very seriously.

Introduction

The attribute „sea view“ is not just raising the price of accommodation at a seafront hotel but also the price of a house or flat. Obviously the view out to water is attractive. So it is no surprise that owners of land in and around ports convert old warehouses into new flats to sell them at high prices. The surprise comes for buyers who, having dreamed of blue water covered with sailing boats, seagulls displaying their air acrobatics and the sky's white clouds passing by, are instead confronted with a view onto gantry cranes, the noise of vancarriers and the smell of a tanker berth. One could argue they should have known better but when reality does not comply with dreams, it is always others who are guilty. So the conflict between residents and the port is pre-programmed.

There is no escape, ports must work hard to establish a good relationship with residential areas in the vicinity. This theatre has various plays, ranging from Sunday children's parties in the port in order to improve the social relationship, to communicating the key economic role a port plays and the need for close co-operation to minimize annoyances.

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Some of these annoyances have an environmental aspect and need to be considered under various green port initiatives that most European ports meanwhile have on their agenda.

The European Commission co-funded some model approaches amongst which EcoPorts is one of the most popular. Within the research project "Effective Operations in Ports EFFORTS" protection of port environment became one of three thematic columns.

Effective Operations in Ports EFFORTS

Effectiveness and efficiency are the key words for EFFORTS, a project co-funded by DG Research within the 6th Framework Programme on Research, Technical Development and Demonstration to become concluded in October this year. The three thematic areas are

- "Navigation in Ports" led by the Port of Dublin
- "Port Environment" led by the Port of Le Havre
- "Port Organisation" led by the Port of Gijón.

As a cross-project activity "Training, Education and Human Resources Development" elucidates the significance of further development of skills, knowledge and attitudes to realize advanced port operations.

Besides those ports consisting of just a jetty and a warehouse, medium and large ports are a kind of industrial city of an extremely heterogeneous nature, hosting terminals, storage and production facilities, cargo consolidation and distribution centres and railway stations for cargo trains. In order to allocate project activities to the overall port system in a rational way so as to allow transparency for those who are not port experts and to ensure sustainability of results to be further amended by follow-up projects, administrative and industrial activities, a process-oriented system approach was developed.

This taxonomy follows the process standards of ISO CEN 19439 and 19440 which allows treating processes as objects, allocating attributes and defining systems relations, thus also allowing the integration of environ-

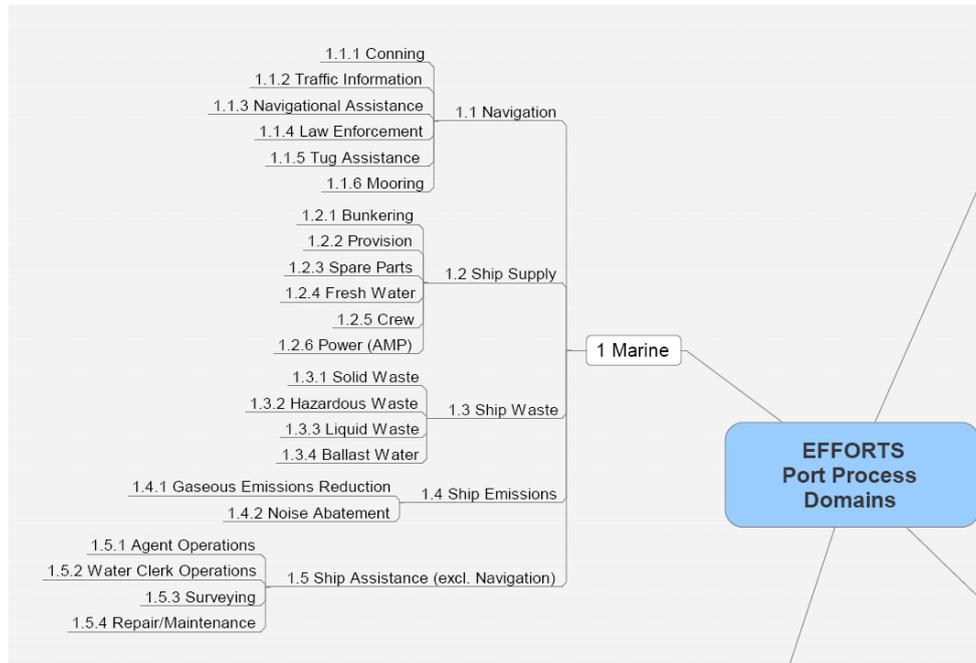
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mental process aspects into the overall system. Operational, safety, security and environmental issues can be captured, processed and managed under the same umbrella. It is frequently found that a comprehensive process view, integrating all aspects at the end, results in increased productivity and hence partly or even fully compensates additional costs for safety, security and environmental efforts.



Port Processes organized in Domains

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Some Processes for the Marine Domain

EFFORTS Port Environment

The overall topic for the environmental tasks in EFFORTS is “better prevention than cure” which means to pro-actively investigate all possible environmental threats before others find out, forcing re-active measures, which are always more expensive than prevention. The port industry is well advised to become an environmental protagonist instead of fighting the image of an industry trying to hide environmental problems. Certainly this must be communicated to the public to build mutual trust and confidence between society groups, especially nearby residents, and the port industry.

The EFFORTS project activities are based on existing knowledge and aim at improving the state of the art. The financial restrictions and project schedule force us to focus on a few issues selected by the participating ports:

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Energy Management

Advanced terminal operations, especially those of container operations including large numbers of reefer containers, consume high quantities of energy, which is not only a cost factor but also a question of CO₂ and emissions in general. Under the EFFORTS umbrella, a team works to model the port energy consumption and to map the consumption level and costs per type of operation and of site. In order to locate energy production as close as possible to consumption, renewable energy sources compatible to ports will be investigated and by means of sophisticated simulation, correlated to the port energy consumption related to time and operation. Unexpected consumption peaks is one of the main problems in energy management and this will become even more difficult once cool ironing, which means to plug ships into the port power net, comes into practice.



The Port of Bremerhaven (Photo Sabine Nollmann)

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Ballast Water

The background of this research task is the International Convention for the Control and Management of Ships' Ballast Water and Sediments (International Maritime Organisation) focusing on

- Identifying harmful aquatic (micro)organisms in ballast water
- Solutions to eliminate these or at least reduce negative consequences on the port environment.

A sampling campaign provided the material for laboratory tests in order to specify organisms and to investigate effects of biocides.

Sampling campaign				
7 samples (December 2007 and January 2008)				
Sample name	Port	Type of ship	Sampling procedure	Origin of ballast waters
S1	La Rochelle	Sister-ships bulk carriers	Overflow on the deck	Mix Amsterdam, NETHERLANDS / La Rochelle, FRANCE
S2	Rochefort	Sister-ships bulk carriers	Overflow on the deck	PORTUGAL
S3	Le Havre	Containers carriers	Manhole	South-east Asia
S4	Rochefort	Bulk carriers	Overflow on the deck	Pasajes, SPAIN
S5	Le Havre	Containers carriers	Checking valve of ballast pump	South-east Asia
S6	Le Havre	Containers carriers	Manhole	Mix mid-Atlantic Ocean / Anvers
S7	Le Havre	Containers carriers	Ballast valve	Water exchanged in Atlantic Ocean (The Bermuda)



Sub-project 2: Ports & Environment / WP 2.2: Water Pollution
1st December 2008 – Le Havre

Sampling Campaign in the Ports of Le Havre, La Rochelle and Rochefort

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(Micro)organisms identification and numeration:

1- Bacteria

SAMPLE	ORIGIN OF BALLAST WATERS	IDENTIFIED BACTERIA	TOTAL VIABLE AND CULTIVABLE BACTERIA	TOTAL BACTERIA
S3	South-east Asia	<ul style="list-style-type: none"> ▪ <i>Vibrio alginolyticus</i> (h), <i>Vibrio fluvialis</i> (h) ▪ <i>Enterococcus faecalis</i> (h) ▪ No coliforms 	3,1.10 ³ CFU/ml	nd
S6	Mid-Atlantic Ocean / Anvers mixed waters	<ul style="list-style-type: none"> ▪ <i>Vibrio vulnificus</i> (a-h) ▪ <i>Aeromonas caviae</i> (h) ▪ <i>Enterococcus faecalis</i> (h) ▪ <i>Escherichia coli</i> (a-h) ▪ <i>Pseudomonas fluorescens</i> (a-h) 	No colony on marine agar	1,3.10 ⁶ bacteria/ml

CFU: colony forming unit potential animal (a) or human (h) pathogen
nd: not determined



Sub-project 2: Ports & Environment / WP 2.2: Water Pollution
1st December 2008 – Le Havre

Examples of Bacteria from 2 Samples (Port of Le Havre)

(Micro)organisms identification and numeration:

1- Bacteria

2- Phytoplanktonic species

SAMPLE	ORIGIN OF BALLAST WATERS	IDENTIFIED GENERA	Cells/L
S3	South-east Asia	None	
S6	Mid-Atlantic Ocean / Anvers mixed waters	<ul style="list-style-type: none"> ▪ <i>Pseudonitzschia</i> ▪ <i>N. longissima</i> ▪ <i>Thalassiosira</i> ▪ <i>Navicula</i> ▪ <i>P. Marina</i> 	<p>100</p> <p>500</p> <p>200</p> <p>200</p> <p>1300</p>



Sub-project 2: Ports & Environment / WP 2.2: Water Pollution
1st December 2008 – Le Havre

Examples of Phytoplanktonic Species from 2 Samples (Port of Le Havre)

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First results for the efficiency of biocides (PeraClean Ocean, Mexel and Seakleen) are available but will be published after conclusion of laboratory tests and large scale experimentation.

Aluminium from Cathodic Protection of Port Steel Constructions

In ports, aluminium sacrificial anodes are frequently used to prevent excessive corrosion of steel constructions. The objective of the investigation is to assess the aluminium concentration in the port water and in the sediment and to determine its toxicity against marine organisms.



Sacrificial Anodes to protect Port Steel Constructions

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Preliminary results are mostly good news:

- No significant influence of Aluminium sacrificial anodes dissolution in water was detected
- A low Aluminium contamination in sediments was observed due to port activities, however, this contamination significantly increased close to Aluminium anodes in non-dredged areas.

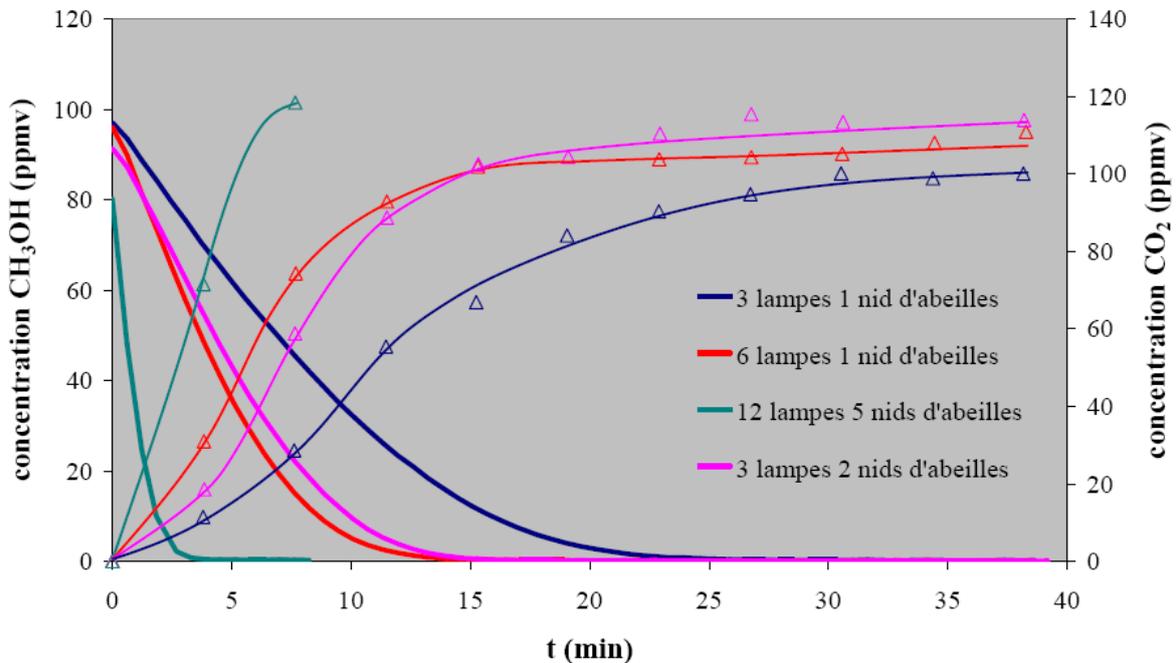
Ecotoxicological tests with mussels (*Mytilus edulis*) to determine the toxicity against marine organisms and the potential environmental impact of the use of Al sacrificial anodes are still going on. Conclusions are expected for September this year.

Port Air Quality

This task tackles the problem of volatile organic compounds (VOCs) and sulphur compounds which are emitted as gases through loading or discharging operations of petroleum products and being considered as carcinogenic. It is the objective to reduce the global impact of port operations on air pollution.

A prototype air treatment unit for on-site application under restrictive operational conditions (explosive atmosphere, saline mist, high humidity), based on photocatalysis technology will be developed and tested aboard a bunker boat.

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Example of Removal of Methanol with various Equipment Configurations
(Number of UV-Lamps and Honeycomb TiO₂-Catalysts)

Noise Annoyance

Alert signals of vancarriers and the bumping of containers on top of one another or on the ground, together with the wide variety of port noises can really become a pain in the neck for nearby residents. It will, however, not be very efficient to combat all kinds of noises in the same way and with the same priority. Further knowledge needs to be gained about the annoyance factor of port-specific noises. The difficulty is that this factor is subjective rather than objective. So rather than just measuring, one must conduct empiric studies to identify annoyances due to noises, their sound power level, frequency and regularity or irregularity. Because the amount of annoyance sensed is subject to individuals, their condition and mood, the results can only match a majority of a certain collective rather than all individuals at all times under all conditions.

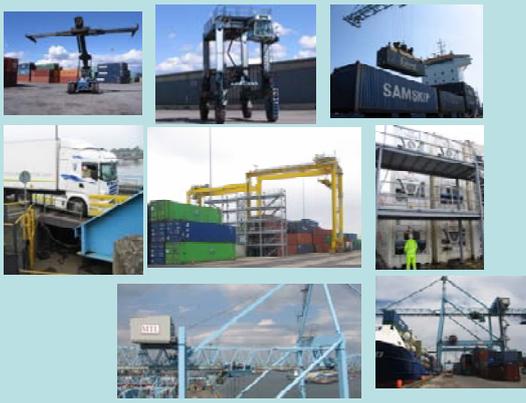
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Noise Annoyance of Ports

- Typical sources:
 - Ships
 - Straddle carriers
 - Reach stackers
 - Gantry cranes
 - Terminal tractors
 - Container handling
 - Ship to shore ramps
 - Reefers
 - Traffic



Typical Sources of Noise from Container and RoRo-Terminals

Currently field tests are being conducted in the Port of Dublin. Results are expected for September this year.

Conclusion

Whilst research in port water and air quality and in annoyance due to port noises without doubt will contribute to making ports a better neighbour to nearby residents, the port energy issue may become ambivalent because wind parks for producing clean energy are not always welcome and are often considered visual pollution. However, wind parks are not the only source of clean energy. It is expected that intelligent management of energy will have a larger effect on the carbon-dioxide footprint of a port than that from new sources of energy. The question, however, is not what method to select but to exploit all possibilities to achieve the maximum effect.

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The topic of this paper “ports becoming good neighbours to residential areas” provides immediate guidance on how to proceed: by early involvement of residents affected by port operations and by comprehensive and transparent information about all issues of relevance including those which are not welcome. Neighbours support and trust each other and they need to accept also those peculiarities which do not contribute towards comfort but cannot be avoided when operating and living close to each other.

A port environmental office needs to act more stringently than any other party. The port must be the first to recognize environmental impacts and immediately initiate measures to investigate and to improve. Those waiting until they are blamed by others are in a defensive position which requires more effort to overcome than taking an early initiative and not impairing the public image.

As a conclusion it can be stated that environmental issues must be placed at the top of a port CEO’s list of tasks and be timely and comprehensively communicated to residents living in the vicinity of the port. The benefits of clever terminal contracts can rapidly become irrelevant once residents succeed in e.g. restricting night operations and a port can seriously become constrained by communities when planning an extension. Talking to each other does not solve the problems but it prepares the ground for coming closer to shaking hands.

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