

# Tropical Coasts

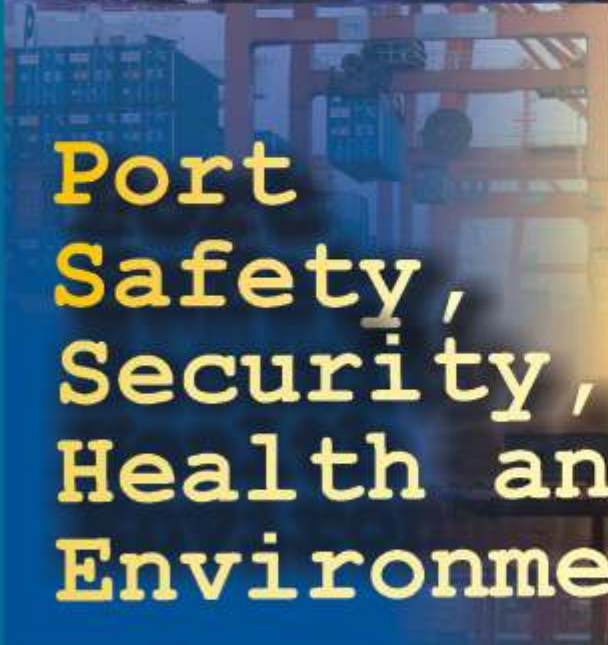
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Port  
Safety,  
Security,  
Health and  
Environment



# Towards Sustainable Port Management Practices

**Diane Factuar**

Issue Editor

Port organizations differ in management structure. Some ports are managed by the state, others by the local administration and some are managed by private enterprises. In view of the highly competitive and capital intensive nature of the port industry, it is important that ports are freed from the constraints of an overregulated, centralized and public sector-dominated commercial environment.

Likewise, for ports to compete in the global market, they have to invest in modern technology, particularly in cargo handling infrastructure and computerized systems or vessel information technology to be able meet the demand for operational efficiency and dynamism. The introduction of the containerized system in transport of cargoes by sea is another challenge that has recently emerged in the shipping and port industry. Recent statistics revealed that 90 percent of cargoes are now transported in containers and 64 percent of the world container traffic, in terms of TEU, is attributable to Asian ports.

Along with these developments in the industry, there is also an increasing concern among port authorities and port operators about achieving and demonstrating sound quality, safety, security and improved environmental performance. A number of international codes, guidelines, recommendations and standards are in place and provide guidance to port authorities and port operators towards improving and assessing their overall performance. However, it should be emphasized that most of these standards or instruments are voluntary.

International instruments such as the Recommendations on the Safe Transport of Dangerous Cargoes and Related Activities in Port Areas (IMO, 1995), Awareness and Preparedness for Emergencies at Local Level for Port Areas (UNEP/IMO, 1996), Code of Practice on Security in Ports (IMO/ILO, 2003), Code of Practice on Safety and Health in Ports (ILO, 2003) and the International Ship and Port Facility Security Code (IMO, 2002) are some examples of international instruments that serve as basis for putting in place good practices concerning safety, security and environmental protection in port operations. In addition, the ISO 9001 & 14001 and OHSAS 18001 standards provide a structured management system that enables the organization to meet its business goals without compromising the safety and health of personnel and the environment.

While all these instruments contribute to an effective and sustainable port management system, it should be emphasized that their adoption and effective implementation would require a systematic and strategic management framework.

This issue of the *Tropical Coasts* presents various port management practices, systems and approaches that have been applied in ports as a consequence of increasing pressures and challenges related to compliance with regulatory requirements, concerns about safety, security and health of port workers and environment, and enhancing port efficiency.

The Maritime and Port Authority of Singapore presents Singapore's experience on how a collective effort among the stakeholders contributed to the smooth implementation of the ISPS Code (page 4). Among the existing initiatives and best management practices in port areas offered in this issue is the adoption of an integrated catchment and coastal management approach, which was pioneered by the Port of Rotterdam in the 1980s. This ICM program served as a model for preventing port environmental problems by addressing them at source. In his article, Steve Raaymakers demonstrates how the ICM approach supports the principle that ecological sustainability leads to improved business efficiency (page 8). Kathleen Bailey's article (page 22) emphasized that continual environmental improvement can be achieved through the Environmental Management System (EMS) framework. She emphasized that environmental stewardship is everyone's job and needs to be an integral part of all business decisionmaking. Herman Journee and Christopher Wooldridge (page 12) present the European Sea Ports Organization's initiatives with regard to developing tools and methodologies to assist port managers in meeting regulatory requirements and in implementing best practices in environmental management. The Port Environmental Review System initiated in the European ports is also discussed.

The article on Port Safety, Health and Environmental Management System (PSHEMS), page 32, encourages port authorities/operators to implement an integrated port management system to streamline efforts in addressing quality, safety, security, health and environmental concerns of the organization, thereby promoting efficient use of limited resources. A systematic approach to implementing the PSHEMS is offered in the article of Othman Ibrahim (page 38). He also stresses on how the Port of Tanjung Pelepas (PTP) of Malaysia applied the business process methodology in establishing the integrated management system. The Bangkok Port of Thailand (page 48) underscored the impact of the workshops conducted during the development of the PSHEMS, which empowered the project team and promoted ownership in the system.

Recognizing that ports have varying levels of capacity and availability of resources, the success in the implementation of a sustainable port management system lies in the effectiveness of the process that is developed within the organization for continually improving the system. ■

## Tropical Coasts

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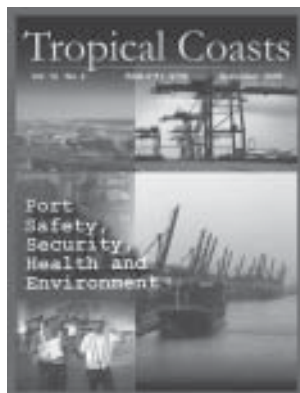
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### On the Cover

#### PSHEMS

In this issue of *Tropical Coasts*, special attention is placed on port management practices and the increasing concern about achieving and demonstrating sound quality, safety, security and improved environmental performance.

Port photos courtesy of Bangkok Port and Xiamen Port.



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### special feature

#### 30 PEMSEA PSHEMS Recognition Process

PEMSEA issues a certificate of recognition to a port authority or company whose PSHEMS has satisfied the requirements of the PSHEM Code and demonstrated that the system is properly implemented, maintained and improved. Ports implementing the PSHEMS can expect improvement in their operational performance, personnel relations, outputs and environmental protection. Read about the PSHEMS Recognition Process.

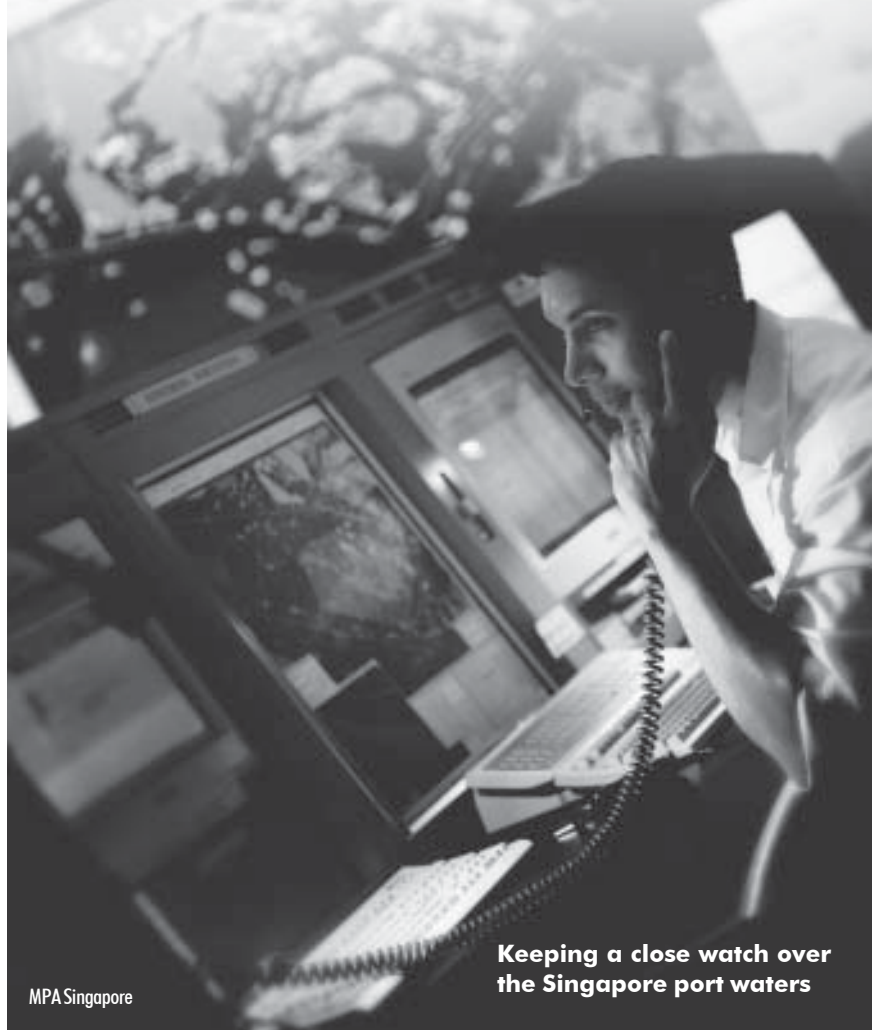


## Introduction

Shipping is the heart of global trade. About 90 percent of international trade by volume is carried by sea and about half the world's trade by value is transported in containers. One third of the world's trade and half its oil go through the Straits of Malacca and Singapore.

Singapore remains highly dependent on global trade, much of which is seaborne. It is an important hub port for container traffic as well as for liquid cargo including oil and chemicals and offshore marine activities. As a major port and flag state, Singapore faces concerns regarding the potential use of ships as weapons of destruction or the use of containers to smuggle any form of weapon by terrorists. It has to ensure that its terminal facilities are not crippled by terrorist acts, thereby putting its population and trade at risk. With such possible realities in mind, Singapore takes the maritime and port security concerns seriously and maintains a high level of maritime vigilance to safeguard its port and waterways. This is carried out through close co-operation between the Maritime and Port Authority of Singapore (MPA) and the Singapore law enforcement agencies, terminal operators and shipping lines.

# Staying Vigilant — Singapore's Experience in Maritime and Port Security



MPA Singapore

Keeping a close watch over  
the Singapore port waters

## A More Robust Maritime and Port Security Regime

Arising from the September 11 attack in the United States, the International Maritime Organization (IMO) adopted a set of maritime

security measures for ships and port facilities at its Diplomatic Conference in December 2002. These measures are contained in amendments to the International Convention for the Safety of Life at Sea (SOLAS), 1974, and the associated International Ship and Port Facility Security (ISPS) Code. The ISPS

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Code is applicable to ships engaged in international voyages, covering passenger ships, cargo ships of 500GT and above, mobile offshore drilling units, and port facilities serving such ships engaged in international voyages.

Key areas included the accelerated implementation of the carriage of the Automatic Identification System (AIS), the mandatory carriage on ships of a Continuous Synopsis Record (CSR), and the installation of ship security alert systems onboard ships. In addition, ships and port facilities are required to carry out security assessments and formulate security plans. Ships also have to carry the International Ship Security Certificates (ISSCs).

These international measures complement Singapore's other means aimed to safeguard sensitive port installations such as designating waters around its major oil and chemical terminals as prohibited areas, screening passengers and baggage at cruise and ferry terminals, targeting and screening containers, and stepping up surveillance of the port waters.

In a mere 18 months, the global maritime community took on the task of readying itself for the ISPS Code implementation by 1 July 2004.

In Singapore, MPA took early action and was among the first few countries in the world to comply successfully and on time with the Code. All 123 port facilities in Singapore and Singapore-registered

## **As a major port and flag state, Singapore faces concerns regarding the potential use of ships as weapons of destruction or the use of containers to smuggle any form of weapon by terrorists. It has to ensure that its terminal facilities are not crippled by terrorist acts, thereby putting its population and trade at risk.**

ships complied. This was in part a result of the good pre-implementation dissemination of information and proactive steps taken by MPA as the "Designated Authority" for the Code, and the support and co-operation from other security agencies and industry stakeholders.

MPA put in place the required legislation and amendment to Singapore's port regulations under the MPA Act to give effect to the IMO maritime security measures.

MPA ensured adequate training of port facility security officers for port facilities and accredited maritime security-training providers to conduct IMO Model Training courses for Port Facility Security Officers (PFSOs). MPA also appointed Recognized Security Organizations (RSOs) to approve security assessments and formulate security plans for ships and port facilities on its behalf.

An Interagency Working Group comprising various security agencies

was also formed to look specifically into port facility security matters including verification and physical audit checks of port facilities prior to approval of assessments and plans. Together with the security agencies, shipping lines and port operators, MPA conducted regular drills and exercises.

It also set-up shore-based equipment to receive ship security alerts and established five AIS-transponder base stations to receive identification signals from ships.

MPA also did its part to incentivize early compliance by shipowners and operators. Its contribution to this effort was to grant an additional five percent discount on port dues for all ships calling at the port of Singapore in the months of May and June 2004 with valid ISSCs onboard.

MPA also formulated procedures for Port State Control security inspections and imposed

# In Singapore, the smooth implementation of the ISPS Code was possible only because of the strong support and close co-operation among the security agencies and stakeholders like terminal operators and shipowners. It was a collective embrace of a shared responsibility in ensuring maritime and port security.

control measures on non-ISPS Code compliant ships visiting the Singapore port. For example, delay or detention of vessels, restriction of vessel operations, fines and denial of port entry.

It was a mammoth task but the maritime community met the challenge. The first of July 2004 came and went. The much anticipated delays, disruptions, chaos and mayhem that was predicted did not materialize.

There was no disruption to port and shipping activities on 1 July, nor was there any adverse impact on trade. Neither were there any unnecessary delays or disruptions to port operations post-ISPS Code implementation. Ships did not avoid the Singapore Port because of the strict enforcement of the ISPS standards. Clearly, early compliance benefited the maritime community.

## Multi-Layered Co-Operation

### International

The commendable outcome of the ISPS implementation was a result of IMO member states' resolve and close co-operation in safeguarding maritime trade and to prevent terrorists from exploiting it.

The IMO led the maritime world in delivering a global vision to address maritime threats. It recognized the potential consequences if member states did not have a robust maritime and port security regime and the adverse impact on world trade. Member states were quick to do their part in adhering to the IMO security measures. On this front, Singapore contributed to sharing its experiences at various IMO forums and played an active role in drawing up recommendations to give effect to the security requirements.

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### Trilateral

World trade passes through key waterways including the Straits of Malacca and Singapore. Singapore, together with Indonesia and Malaysia, straddles these Straits, a major international waterway between Europe, the Middle East, the USA and Asia. Any major disruption in the Straits would have an adverse impact on Asian nations. The littoral states of Malaysia, Indonesia and Singapore continue to actively explore possibilities to co-operate and enhance security in the Straits. The Trilateral Coordinated Patrol by the three littoral states is an example. Other efforts include greater information sharing and capacity building among the states.

### Bilateral

Concern that terrorists could use container shipping to mount a devastating attack on the United States prompted it to implement the Container Security Initiative (CSI). The CSI was first announced in January 2002. It is now operational in over 20 major seaports in Europe, Canada and Asia.

Singapore was the first Asian country to join the program. Given the more than 60,000 containers that flow through the port in a day, MPA recognized the value of supporting and instituting a layered screening system for containers. The CSI program identifies and checks a number of cargo containers for possible weapons of mass destruction or dangerous radioactive substances that terrorists

might try to place inside. This is based on intelligence profiling and is done at foreign ports, before the containers are shipped to America. The CSI became operational in Singapore on 11 February 2003, with one container scanning machine. The second, a mobile scanner, was introduced in September 2003. Under the Declaration of Principles, U.S. Customs officials are stationed in Singapore to undertake the risk-profiling and identification of containers to be scanned. The Singapore Immigration and Checkpoints Authority (ICA) handles about 40 referrals a month from U.S. Customs officials, and most of these containers are subjected to checks.

## Among Stakeholders

The smooth implementation of the ISPS Code was possible only because of the strong support and close co-operation among the security agencies and stakeholders like terminal operators and shipowners. It was a collective embrace of a shared responsibility in ensuring maritime and port security. MPA witnessed an unprecedented degree of commitment and enthusiasm among the local maritime community during security exercises, drills and audit checks. It was heartening.

## Going Forward

The fight against terrorism does not end with the implementation of the ISPS Code. While it provided the

world with a framework to minimize security threats to ships and port facilities, there remains a need to ensure the security and integrity of cargo along the entire supply chain. Singapore has made much headway in this area. It has adopted an intelligence-based and comprehensive approach to identify high-risk containers, the use of non-intrusive scanners and other forms of track and trace technology.

Another area of concern is the large number of small vessels and harbor craft that fall below 500GT and are not required to comply with the Code. These vessels interface often and directly with the larger vessels. The attack on the French tanker Limburg off the Yemeni coast in October 2002 was a stark reality that small boats loaded with explosives can be used by terrorists as effective weapons to cause significant damage to bigger ships.

In local waters, additional security measures such as the Harbour Craft Security Code (HCSC) to cover harbor craft were introduced. The HCSC ensures that harbor craft plying within port waters comply with general security standards. More importantly, it ensures that harbor craft do not undermine ISPS-compliant ships during interfacing and that such craft have measures to deter terrorists. Small vessels have to complete a 'Ship Self-Security Assessment Checklist' prior to entering port waters. This would ensure better security monitoring of such vessels entering the port.

Singapore is making greater use of technology to secure a better situation picture of vessels, both large and small, in and around its waters. With support of the security agencies, the MPA is testing a low-cost transponder system, which is called HARTS or Harbour Craft Transponder System, to be installed on small vessels. HARTS is the low-cost version of the AIS transponders that ships of 300GT and above need to install under IMO regulations. Together with the AIS, HARTS will enable the monitoring, identification and tracking of almost all craft and vessels that ply in the Singapore Port and allow the security agencies to focus their inspections and attention on those that do not carry an electronic identification code.

Maritime security training and audits in the form of realistic exercises and drills must continue. They will ensure continuous and effective implementation of the ISPS Code in the world's merchant fleet and port facilities. Readiness needs to be tested, shortcomings identified and gaps plugged, and best practices shared and disseminated globally. Singapore is committed to do so.

It is only through an effective web of layered defense and deterrence against maritime-related terrorism that the individual and collective interests of states can be safeguarded. Singapore is confident that with the security initiatives taken and the co-operation of stakeholders, its port will be safe and secure and remains a place where maritime trade can continue to grow. ■

Steve Raaymakers

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## The Importance of Ports

In the current age of economic globalization and ever-increasing global connections, the role and importance of ports as focal points for trade between nations and as engines for economic growth cannot be overstated. Without shipping and ports, the world today would exist very differently. Ports are the 'life-blood' of our modern economy and ever-improving material well-being.

The vital contribution made by ports to the global economy is set to increase, with nearly every major port in the world currently expanding and many new ports being developed at 'green-field' sites.

The economic importance of ports is highlighted in East Asia, where many of the world's largest and busiest ports are located, and where some of the world's most impressive port infrastructure projects are now underway or are being planned. In East Asia, the port and shipping sectors are experiencing unprecedented growth and development.

EcoStrategic Consultants is a coastal, marine and environment consulting service.

# Preventing Pollution for Profit: Environmental Management for Major Port Developments



**Ports and shipping are significant contributors to the flourishing trade between nations and their economic growth.**

The economies of East Asia require major port facilities to enable the importation of the raw materials that fuel their ever-expanding manufacturing industries, and to export their products and goods to global markets, as well as for trade within the region.

The economic future of the countries of East Asia is inexorably linked to the ongoing development of their port systems.

## Ports and the Environment

By their very nature, ports are located in the highly sensitive and valuable coastal zone, where both infrastructure development and environment protection come sharply into focus. This is no less the case in East Asia — where major port development projects must compete with increasing population pressures, urban expansion,



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fisheries access rights and expansion of aquaculture, increasing use of coastal and marine areas for recreation and tourism, as well as protection of habitat and ecological functions.

Important coastal and marine habitats, which include mangroves, seagrasses, coastal coral reefs, inter-tidal flats and fishery nurseries, can be directly and indirectly damaged and destroyed by the development of ports.

Ports invariably require the physical alteration of the coastline to build wharves, piers and jetties and the dredging of shipping access-channels, swing-basins and berths, and often involve the reclamation of land and the 'straightening' of the coastline. Such activities may cause direct physical destruction and disturbance of the original habitat as well as alter hydrodynamics and sediment flow, with indirect impacts on adjacent coastal and marine areas.

Ports are often significant sources of marine pollution, due to discharges and spillages from the ships that use them and, perhaps more importantly, from land-based sources, including the industrial facilities that are often closely associated with ports.

Land-based port activities, including cargo handling and storage, can be sources of land-contamination, and may cause noise, dust and other amenity impacts on neighboring users, including residential areas.



**Sustainable management practices in ports and shipping can help mitigate significant potential for serious environmental harm.**

While ports and shipping carry significant potential for serious environmental harm, they need not preclude a preserved and protected environment, so long as sustainable management practices are adopted and applied.

Modern ports can be developed and managed in an ecologically sustainable manner, recognizing their vital economic importance, while acknowledging that ports do not have exclusive

rights to limited coastal sites and marine areas. Innovative approaches for managing port planning, development and operation, so as to minimize unnecessary impacts on biological diversity, ecological processes, valuable marine resources such as fisheries and other uses of the coastal and marine environments such as tourism, recreation and traditional lifestyles, are available and have been applied successfully in many parts of the world.

# While ports and shipping carry significant potential for serious environmental harm, they need not preclude a preserved and protected environment, so long as sustainable management practices are adopted and applied.

## Placing Ports in Perspective — The ICM Approach

Traditionally, environmental protection activities associated with ports have tended to focus mainly on spills and discharges from ships, the provision of ship waste reception facilities and the environmental management of dredging and dredge spoil disposal.

Port environmental staff were then essentially marine pollution controllers — when standing on a wharf in their port, they would look outwards towards the sea and the ships using the port, as the focus of their efforts.

Today, port managers are adopting a more holistic view of environmental management, compatible with an integrated catchment and coastal management model.

The modern port environment manager looks both out to sea, and back towards the land, including beyond the port's immediate

boundaries to consider the port's neighbors, and even further to the limits of the port's hydrological catchments or watersheds.

By viewing the port as only one unit within a broader integrated coastal zone management scheme, and by considering the port as the 'end-user' of the hydrological catchment in an integrated catchment management approach,

port managers can more effectively prevent impacts on the port from 'upstream' activities, as well as minimize the impacts of the port on neighboring catchment and coastal zone resources and users.

## Reducing Costs at Rotterdam

The ICM approach to port management was pioneered by the Port of Rotterdam in the 1980s. Located at the mouth of the River Rhine, Rotterdam receives a continual supply of river sediments that requires regular and ongoing dredging, in order to keep the port open to navigable access by ships. The source of the Rhine is located at Lake Basel in Switzerland, and the River winds over 1,312 km from Switzerland, bordering Austria and



Liechtenstein then flowing through France, Germany and Holland before discharging its sediments in Rotterdam.

Since industrialization in Europe and particularly with economic development following World War II, major industries located along the Rhine discharged a bewildering array of highly toxic pollutants and contaminants into the River, happy that the river flow would carry their wastes out of sight and into somebody else's backyard.

As the end-user of the Rhine catchment, the Port of Rotterdam became the ultimate dump for the toxic wastes of major industries in upstream countries. Sediments dredged from the port were highly contaminated, and in addition to major ecological concerns, placed huge technical and cost burdens on Rotterdam's dredge spoil management program. This had significant economic impacts on the financial viability of the port.

The only solution for the Port of Rotterdam was to look beyond its own boundaries, upstream to the source of the pollution in the upper Rhine catchment. Since launching the Rhine Research Project more than 20 years ago, the Port of Rotterdam has worked not only outside its own immediate fence line, but also beyond the Netherland's national borders. This has included cooperation with the International Commission for the Protection of the Rhine (ICPR), to address the very

sources of pollution in the other countries in the Rhine catchment.

While some problems do remain, and more highly contaminated sediments dredged from the port are still placed in a specially-bunded and sealed containment area, today the entire Rhine system is far cleaner and the sediments that eventually deposit in Rotterdam are both less in quantity and less polluted. This reduces the overall need to dredge and reduces the need to apply sophisticated and

expensive measures to manage contaminated dredged material.

Another significant indicator of the success of ICM in the Rhine is the fact that in the 1880s, commercial fishers netted 250,000 Atlantic salmon yearly from this major river, and the hefty size and exquisite taste of the fish drew anglers from around the world. However, due to ever-increasing pollution and environmental degradation, by 1958 a fisher reeled in the last known salmon in the Rhine. Thankfully, as a result of

continued on page 53...



Map of the Rhine Catchment.

<http://www.rivernet.org/rhin/imgs/maprhin.jpg>

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## Introduction

The European Sea Ports Organization ([www.espo.be](http://www.espo.be)) has the primary responsibility of developing environmental policy on behalf of the port sector. Set up in 1993, it has produced benchmark policies and guidelines that have both influenced the development of the European Union (EU) Directives and assisted in its implementation. The declared policy of the ESPO towards the environment is that of compliance with legislation and regulation through voluntary self-regulation. A further aim of ESPO is to reduce the issue of the environment as a competitive factor between ports and to prevent wasteful duplication of research and development efforts.

The authors acknowledge with grateful thanks the collaboration of all the partners in the EcoPorts Project particularly Mr. Paul Bokdam of Lloyd's Register, Rotterdam, in this particular task. The Project was part-sponsored by EU under the Competitive and Sustainable Growth Programme.

# A New Standard for Port Environmental Management — A European Port Sector Initiative



## Policy and Partners

ESPO guidelines on the environment as expressed, for example, by the Code of Practice (ESPO, 1994), set in train a series of initiatives that over ten years have made a demonstrable contribution to continuous improvement of the port environment and sustainable development (Wooldridge, et al., 1998). Collaborative research and development programs such as Eco-Information (1997–2000) and EcoPorts (2002–2005), jointly

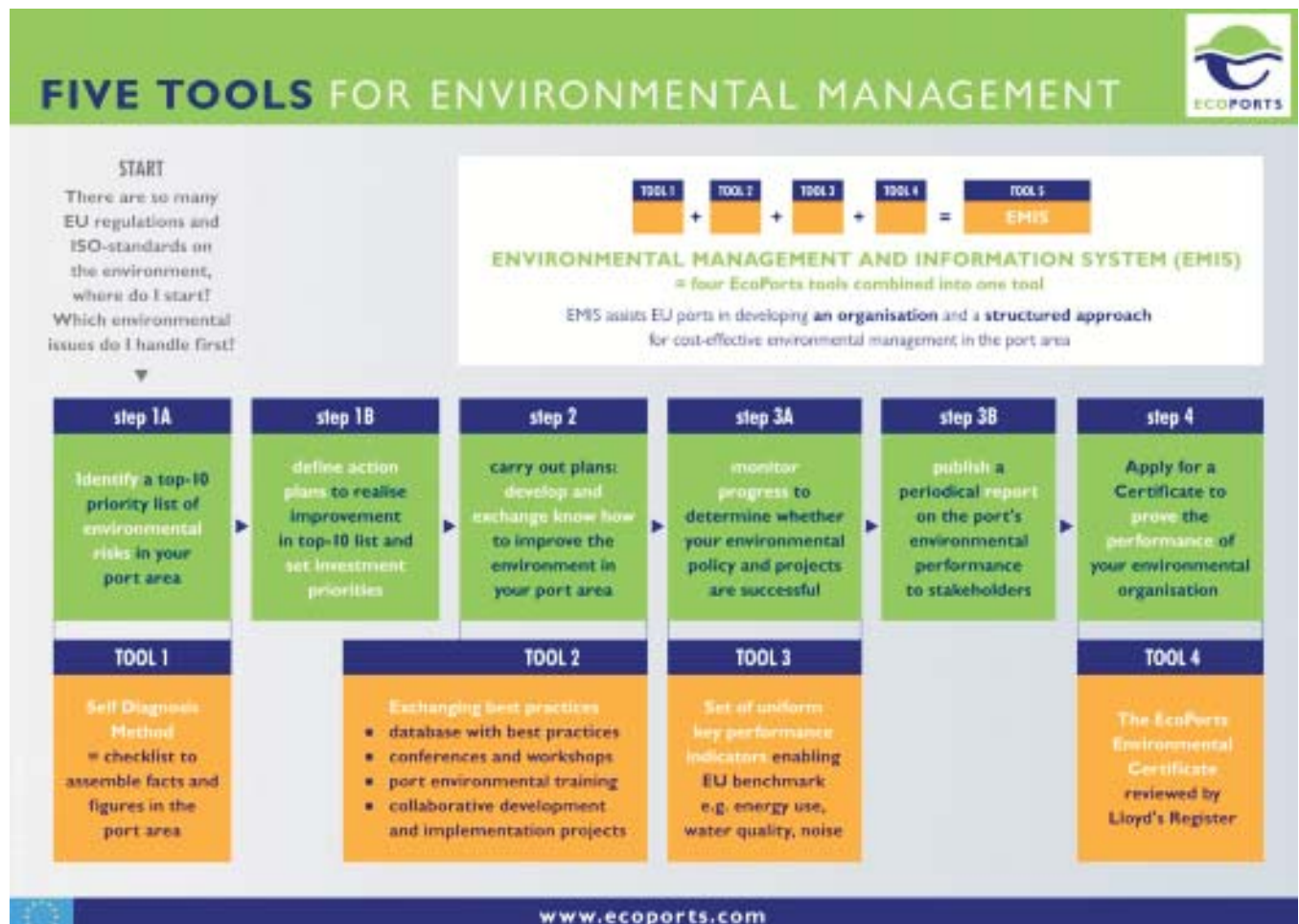
sponsored by the EU and port members, developed tools and methodologies specifically designed to assist port managers to deliver compliance with legislation and to implement best practices in environmental management (Wooldridge and Stojanovic, 2004). ESPO provides the communication network through which the results of such programs are promulgated to the port community.

The concept driving the programs was that of 'ports assisting

ports' on the basis of voluntary exchange of information and experience to develop cost-effective and practicable solutions to the common challenges facing the professional port manager. Such collaboration also helped establish baseline and benchmark performance indicators on environmental management for individual participant port members and the sector as a whole.

The EcoPorts project embraced two of the major priority areas for action identified in the EU's Sustainable Strategy agreed at the Gothenburg Council in June 2002, namely, sustainable transport and climate change. The 6th Environment Action

The concept driving the programs was that of 'ports assisting ports' on the basis of voluntary exchange of information and experience to develop cost-effective and practicable solutions to the common challenges facing the professional port manager. Such collaboration also helped establish baseline and benchmark performance indicators on environmental management for individual participant port members and the sector as a whole.





**PERS covers all the significant environmental aspects of a port.**

---

Programme launched in September 2002 set out an agenda based on self-assessment, monitoring and measuring progress, the involvement of stakeholders, and working from sound scientific principles. These objectives stimulated the preparation of a second ESPO Environmental Code of Practice that was published in September 2003 (ESPO, 2003). The Code contains 10 recommendations including those that ports should consider:

- Improvements to the port environment and port environmental management through adoption and application of appropriate tools and methodologies (such as those developed by EcoPorts);
- Extensive use of monitoring based on environmental performance indicators;
- Publication of an environmental report;
- Publication of port environmental plans and policies; and
- Increased communication about environmental practices and improvements.

Collaboration between port partners, universities and other specialized organizations such as Lloyd's Register, has proved effective in the development and delivery of a networked package of management options and useful support services designed to assist in the implementation of such guidelines and directives. With 12 Primary Port Partners providing the professional input and guidance for the associated university and specialist research activities, the EcoPorts Project ([www.ecoport.com](http://www.ecoport.com)) drew on a wide range of port-specific experience that was harnessed to develop the following tools and methodologies:

### **Self-Diagnosis Methodology (SDM)**

SDM is a concise checklist against which port managers can self-assess the environmental management program of the port in relation to the performance of both sector and international standards (Paipai, 1999). The structured approach can be used to assist ports to establish the position and status of their endeavours from an initial review to

establish their own baseline, to the point of implementation of a comprehensive Port Environmental Review System (PERS). It can also be used as a periodic review of performance over time, either against the port's own baseline or in relation to European port sector benchmarks. Although designed as an internal procedure, SDM can be submitted for independent analysis on an entirely confidential basis through the EcoPorts Foundation. The manager then receives a report and recommendations based on a SWOT (strengths, weaknesses, opportunities, and threats) and Gap analysis of the responses to the checklist. With the agreement of the port, the responses are entered anonymously into the database and thus contribute to the build-up of the port sector's benchmark performance. This latter point has been particularly well received by managers as it defines the port's position relative to best practice guidelines and the performance of the sector as a whole. SDM also identifies priority objectives for future action and

**Collaboration between port partners, universities and other specialized organizations such as Lloyd's Register, has proved effective in the development and delivery of a networked package of management options and useful support services designed to assist in the implementation of such guidelines and directives.**



## ALL EU PORTS FACE A COMMON CHALLENGE

All European ports face the challenge to combine port expansion with evolving European legislation aimed at protecting the environment. All European ports share the same key environmental issues but they **do not share** uniform local environmental regulations.

For the benefit of the port sector, the environment and society, it is of major importance to remove the environment as a competitive factor between ports.

Low-tech solutions often mean low costs and major results.

EcoPorts is about 'ports helping ports'.  
EcoPorts is exchanging best practices and experiences.  
EcoPorts is finding simple solutions that work in practice.  
EcoPorts is **not** about developing complex procedures, theoretical processes, diagrams and reports.

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# It is widely reported that carefully focused training schemes and dedicated workshops can be particularly cost-efficient and effective techniques to assist with the implementation of environmental management programs.

profiles the potential PERS components of the port's existing organization. This has proved to be particularly helpful in assisting the port authority in its decisionmaking with regard to a phased pathway of EMS development.

## Strategic Overview of Significant Environmental Aspects (SOSEA)

SOSEA provides practical advice on how to identify and assess the significance of the key elements for which the Authority is legally responsible or can reasonably be expected to bring influence to bear (as in the case of its tenants and operators). It also prompts consideration of issues that are of particular local or national interest. The overview is a useful tool in the preparation of SDM and PERS.

## Environmental Performance Indicators (EPI)

Identifiable measures of the performance of the management system and the quality of the environment itself are necessary components to track continuous improvement and to demonstrate the attainment of targets. The EPI document is a concise document of examples and explanations developed

specifically for port operations and feeds directly into sections of PERS.

## Environmental Management Information System (EMIS)

The EcoPorts programme produced an integrated package of environmental support tools and methodologies focused on environmental improvement and sustainable development. (A basic part is EMS, the so-called Environmental Management System guidelines for integration of environmental management of a port authority and port-based companies.) EMIS represents a comprehensive, networked approach for both the individual port and the sector as a whole.

## Decision-Support System (DSS)

This approach offers the port manager a structured guide and applied examples of decisionmaking when faced with a range of management response options. It demonstrates evaluation and assessment of the complex of issues that can face the environmental manager on both a day-to-day basis and in the case of port development.

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## Training

It is widely reported that carefully focused training schemes and dedicated workshops can be particularly cost-efficient and effective techniques to assist with the implementation of environmental management programs. The training of port personnel helps raise awareness on crucial issues, build internal capability and smooth implementation. EcoPorts Foundation has a network of approved trainers who can deliver validated courses (ranging from a general introduction to port environmental issues to specific methodologies including SDM and PERS) appropriate to the port authority's requirements.

## Port Environmental Review System (PERS)

A new standard for port environmental management review procedures, PERS is part of the above suite of interrelated management tools and is discussed in this context in the following section.

All of the above tools and methodologies are available to members of the EcoPorts Foundation. This non-profit organization was established by the port sector as the coordinating framework for the long-term provision of the mentioned tools, methodologies and environmental support services as well as the focal point for research and development projects. The Foundation retains close links with the EU and ESPO and thus occupies a





**Port certification and validation are important parts of the shipping world. Some of PERS certified ports are (from top) the ports of Valencia, Tyne, Marseille and Piraeus.**

pivotal position for the dissemination of techniques to fill the critical gap between policy and practice — that of implementation. Membership details can be obtained by e-mail request to [foundation@ecoports.com](mailto:foundation@ecoports.com)

### **A New Standard – PERS**

During the EcoPorts Project, port partners identified the requirement for a form of basic environmental management program that would encourage port authorities to work towards a fully functioning PERS. The specification given to the development team by

the EcoPorts Foundation was that the new system should be:

- Relevant to port operations and activities;
- Appropriate to the wide diversity of types of ports in terms of profile (commerce, geography and hydrography), size and nationality;
- Sufficiently generic to allow evolution towards more comprehensive international standards such as ISO 14001 and EMAS (Eco-Management and Audit Scheme);

# PERS supplies the basis for developing an environmental management system by identifying significant aspects, policy and performance criteria. A review, as part of PERS, assists ports in setting objectives to improve performance on environmental issues as well as environmental management.

- As 'user-friendly' and cost-effective as possible in implementation commensurate with a professional, and credible system;
- Designed to assist in the implementation of ESPO Environmental Code of Practice;
- Capable of being adopted in a phased sequence of procedures on a voluntary basis at a pace determined by the port authority; and
- Configured to allow external validation and the award of a Certificate as a voluntary option if desired by the port authority.

Lloyd's Register, Rotterdam, was designated as the initial validating authority on behalf of EcoPorts Foundation. By July 2005, 17 European port authorities had demonstrated compliance with the standard and had Certificates of Validation approved.

The benefits of adopting a management approach are widely

reported and well accepted by many leading industrial companies and organizations (PIANC, 1999). Overviews of the pressures and responses are provided, for example, by ABP (1999), Couper (1992) and Townsend I, (2002). PERS supplies the basis for developing an environmental management system by identifying significant aspects, policy and performance criteria. A review, as part of PERS, assists ports in setting objectives to improve performance on environmental issues as well as environmental management.

## Structure and Specification

The PERS document consists of seven sections, each having the following components (Box 1):

1. An introduction describing the purpose of the specific section;
2. A specification on how to complete the specific section;
3. Accompanying guidelines; and

4. An example and/or format to facilitate completion of the specific section.

Port managers complete each section using the guidelines, examples and format provided. Additional reports, photographs and relevant documentary evidence may be appended in support of the statements made in the submission. Completion of each section and compilation with all the support material produces the final review document. The activity of assembling the required information has proved a useful exercise in itself for several port authorities. It has identified and consolidated data and information from a wide range of often disparate sources, instigated internal communication and information exchange as a necessary step to ensure a comprehensive response, and acted as a catalyst for action to introduce or enhance certain elements of the management's environmental activities. On the other hand, it is true to say that all port authorities that have embarked on the review process have ultimately applied for the Certificate of Validation. Although the assessment procedure is rigorously applied by Lloyd's Register, Rotterdam (on behalf of EcoPorts Foundation) there is a reasonable level of initial screening and discretion built in. Port authorities are encouraged to 'fine-tune' their submissions and respond to the assessor's 'observations' of minor deviations from conformity.

## Box 1: PERS Document Structure

|   |   |   |
|---|---|---|
| <p><b>Section 1. Port Profile</b><br/>General information on legal status, geographical characteristics and commercial activities</p>   | <ul style="list-style-type: none"> <li>• Introduction</li> <li>• Specification</li> <li>• Guidelines</li> <li>• Port profile format</li> </ul>                                | <p><b>Section 1.</b> Port Profile summarizes the port's major characteristics and can be used for both internal review and as background briefing for the external assessor. The Scheme acknowledges that as each port is unique, it is important for purposes of validation that the local circumstances are known and taken into account as appropriate.</p>  |
| <p><b>Section 2. Environmental Policy Statement</b><br/>Port's intentions with regard to environmental performance and its framework for action</p>   | <ul style="list-style-type: none"> <li>• Introduction</li> <li>• Specification</li> <li>• Guidelines</li> <li>• Example</li> </ul>  | <p><b>Section 2.</b> Environmental Policy Statement is, of course, fundamental to the development of any form of EMS or program. It is reported that Authorities that have no text on policy at the start of PERS (or had an incomplete document), found the specification, guidelines and examples most useful in defining their own statement.</p>  |
| <p><b>Section 3. Register of Environmental Aspects and Legal Requirements and Performance Indicators</b><br/>Documented Evidence of environmental aspects, impacts and relevant legislation</p> | <ul style="list-style-type: none"> <li>• Introduction</li> <li>• Specification</li> <li>• Guidelines</li> <li>• Aspect register format</li> <li>• Example register</li> </ul> | <p><b>Section 3.</b> The Register of Environmental Aspects and Legal Requirements is also fundamental to any worthwhile review. Experience from the series of training courses on PERS organized by EPF in several different countries confirms that the compilation of these registers is one of the principal tasks where port managers appreciate explanation and guidance. The identification of significant environmental aspects so that they can be managed in line with policy and legal requirements is essential for the adoption of best practice and demonstration of compliance. The specification in this section also calls for the monitoring of between 5 and 10 indicators applicable to the environmental aspects so that performance can be reviewed.</p> |
| <p><b>Section 4. Documented Responsibilities and Resources Related to Environmental Aspects</b><br/>Identification of key personnel and structure of organization</p>                           | <ul style="list-style-type: none"> <li>• Introduction</li> <li>• Specification</li> <li>• Guidelines</li> <li>• Format</li> <li>• Example</li> </ul>                          |   |
| <p><b>Section 5. Conformity Review on Legal Requirements and Policy</b><br/>Review of legislative compliance and formulation of action plans</p>  | <ul style="list-style-type: none"> <li>• Introduction</li> <li>• Specification</li> <li>• Guidelines</li> </ul>   |   |
| <p><b>Section 6. Environmental Report</b><br/>Requirements for preparation of annual reports</p>  | <ul style="list-style-type: none"> <li>• Introduction</li> <li>• Specification</li> <li>• Guidelines</li> </ul>   |   |
| <p><b>Section 7. Selected Examples of Best Practice</b><br/>Successful management options or solutions to environmental challenges</p>  | <ul style="list-style-type: none"> <li>• Introduction</li> <li>• Specification</li> <li>• Guidelines</li> <li>• Solution format</li> </ul>                                    |   |

## Box 1 (con't.)

**Section 4** requires a formatted response to Documented Responsibilities and Resources. Several port authorities have initially found the specification for this section to be potentially daunting, but are then pleasantly surprised by the amount of information already existing within the port. The exercise of completing this section has been judged to be worthwhile itself in terms of identifying designated personnel and providing an overview of the environmental management structure.

**Section 5.** Conformity Review specifies that the port authority should provide information to identify improvement actions that are necessary to achieve, maintain or restore compliance with legislation (Section 3 provides valuable input to the port's response).

**Section 6** calls for the production of an Environmental Report to provide environmental information to senior port management, the public and other parties interested in the port's environmental performance. As such, it may be regarded as a major communication tool and much of the information required will have been compiled as part of the PERS exercise.

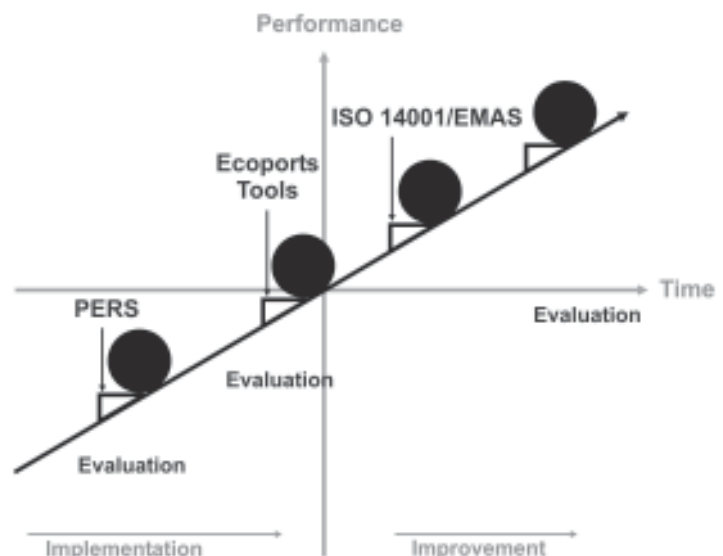
**Section 7** provides a template for the recording of two examples of current Best Practice or Management Solutions to environmental issues within the port. The selection is left to the discretion of the port itself. It provides the opportunity to demonstrate existing competence in environmental protection and can be shared with other ports via the EcoPorts database on a voluntary basis as part of the ethos of free exchange of information and experience.

PERS has been designed as an introductory step to establish good practice and provides port authorities with the option of evolving to higher standards that include operational control of aspects (**Figure 1**). The relationship between PERS and ISO 14001 is summarized in **Box 2**.

For port authorities just starting out to develop some form of environmental management program, a useful pathway of action that has proven successful with several ports is as follows:

- Contact EcoPorts Foundation (foundation@ecoports.com) for details of membership and national points of contact.
- Consider attending EPF Workshop or Training Scheme for guidance and familiarization with PERS requirements.
- Complete the SDM as described. This provides a really cost-effective overview and greatly assists with the efficiency of completing the PERS.
- Organize a series of internal briefings and consultations with colleagues (in conjunction with external EPF trainers if so desired) in order to explain the objectives, information requirements, procedures and benefits of PERS.
- Set up an internal Working Group so that port personnel are adequately informed and

**Figure 1. Steps to Establishing Good Practices including Operational Control of Aspects.**



## Box 2: Summary of the Relationship between PERS and ISO 14001.

| PERS Requirement                               | ISO 14001 Clause  | Specific part of the clause   |
|--|---|---|
| 1. Port profile                                | Not applicable  | –   |
| 2. Policy statement                            | 4.2 Policy  | All elements (and more)   |
| 3. Environmental Aspects and legal requirement | 4.3.1 Environmental Aspects<br>4.3.2 Legal and other requirements<br>4.5.1 Monitoring and measurement | 4.3.1/2 Procedures are not compulsory only the output (registers)<br>4.5.1 Part 1 |
| 4. Responsibilities and resources              | 4.4.1 Structure and responsibility  | Part 1 and 2  |
| 5. Conformity review                           | 4.5.1 Monitoring and measurement<br>4.6 Management review   | 4.5.1 Last part<br>4.6 Partly   |
| 6. Environmental report                        | 4.4.3 Communication (voluntary)   | 4.4.3 Last part   |
| 7. Best practices                              | Not applicable  | –   |

involved to implement the system.

- Compile the necessary information in the required format. Port Authority decides whether or not to proceed with external validation. If 'yes,' submit draft version of PERS to EcoPorts Foundation for initial screening in terms of completeness and format.
- Respond to feedback and advice (as necessary) and apply for formal validation and recognition.

## Conclusion

EcoPorts Foundation's PERS has provided port authorities with a tested, voluntary scheme that provides an ideal starting level from which to work towards a more

comprehensive EMS. It offers a low-cost phased approach that can be completed at the authority's own pace. It helps put in place the recommendations of ESPO and gives a strong, positive signal to regulators and stakeholders that both individual participant ports, and the sector as a whole, can demonstrate high quality and transparent credentials for the execution of their environmental liabilities and responsibilities. Expressions of interest from other ports worldwide are welcome in order to encourage sector-wide exchange of experiences in the management of environmental challenges that are fundamentally international and transboundary in nature. ■

## References

- ABP (Associated British Ports). 1999. Humber Ports, Estuary and Strategy, Southampton, ABP.
- Couper, A.D. 1992. "Environment and Port Management." *Maritime Policy and Management*, 19:165-170.
- ESPO (Environmental Code of Practice). 1994. Environmental Code of Practice, European Sea Ports Organization, Brussels.
- ESPO. 2003. Environmental Code of Practice, European Sea Ports Organization, Brussels.
- Paipai, E. 1999. Guidelines for Port Environmental Management, Chap. 5, Environmental Tools for Ports and Harbours. Report SR 554, DETR, July.
- PIANC, 1999. Environmental Management Framework for Ports and Related Industries. International Navigation Association, Report of Working Group 4.
- Townend, I. 2002. "Marine Science for Strategic Planning and Management: The Requirement for Estuaries." *Marine Policy*, 26:209-219.
- Wooldridge, C. and T. Stojanovic. 2004. Integrated Environmental Management of Ports and Harbours. The European Experience – From Policy to Practice. In: Shipping and Ports in the Twenty-first Century. Globalisation, Technological Change and the Environment. D. Pinder and B. Slack (Eds). Ocean Management and Policy Series, Routledge.
- Wooldridge, C.F., B.S. Tselentis and D. Whitehead. 1998. Environmental Management of Port Operations – The Port Sector's Response to the European Dimension. In: Maritime Engineering and Ports. G. Sciotto and C.A. Brebbia (Eds), Water Studies, WIT Press.

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## Introduction

The United States Environmental Protection Agency's approach to working with U.S. public port authorities is to work in voluntary collaboration with them to prevent pollution and foster continuous improvement in their environmental performance.

Regulatory compliance is an expectation, and a strong foundation, but not the final goal. The goal is to have ports practice environmental stewardship as part of their business strategy. This will help lead to the development of sustainable port communities, i.e., economically viable, environmentally and socially responsible, safe and secure. It is important for U.S. ports to be exemplary environmental stewards because they are experiencing unprecedented growth at the same time coastal populations are growing. The total volume of foreign trade moving through U.S. ports by 2020 will be more than double 1996 tonnage levels (AAPA, 2005). Currently, over 53 percent of the population lives in estuarine and coastal watersheds which comprise just 17 percent of the U.S. land area, with the coastal population growing to more than 127 million people by 2010 — an increase of more than 60 percent in only 50 years (U.S. Department of Commerce, 1990).

# EPA's Approach to Improving the Environmental Performance of Ports



Because of these growth trends, ports and their business partners are challenged to find ways to minimize their impacts on human health and the environment. The largest U.S. public port authorities, with strong leadership from the American Association of Port Authorities (AAPA), are collectively showing they are up to the challenge.

Beginning with several laws passed by the Federal government in the 1970s, all levels of government

have sought to reverse decades of environmental negligence and establish and implement policies leading to broad environmental responsibility, protection, and restoration. Over the past decades, port authorities, like other public agencies and private industries, have incorporated environmental values into their organizations and in decisionmaking and have become more attentive to the environmental impacts of their plans, decisions and operations (Urban Harbors Institute,

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2000). For example, since the 1970s, an increasing number of public ports have hired environmental specialists, and in some cases, teams of specialists. Also, as more ports are developing formal environmental management systems (EMS), it is becoming increasingly evident that environmental stewardship is everyone's job, especially senior managers, engineering, operations and risk management staffs, and needs to be an integral part of all business decisionmaking. This is gaining acceptance as people learn that the innovative facility design and technology solutions used to maximize productivity and improve security can also be the best to protect the environment.

The United States is served by more than 360 commercial ports that provide approximately 3,200 cargo and passenger handling facilities, according to the U.S. Coast Guard. Depending on individual port facilities, they may accommodate anything from ocean-going cargo and passenger ships to barges, ferries and recreational watercraft. Governance of these ports is a function of various districts and municipal port departments. Currently there are 126 public seaport agencies located along the Atlantic, Pacific, Gulf, and Great Lakes coasts, as well as in Alaska, Hawaii, Puerto Rico, Guam, and the U.S. Virgin Islands. Many of these seaport agencies are governed by an elected and/or appointed body, such as a port commission. The 86 largest U.S.

**As more ports are developing formal environmental management systems (EMS), it is becoming increasingly evident that environmental stewardship is everyone's job, especially senior managers, engineering, operations and risk management staffs, and needs to be an integral part of all business decisionmaking.**



Kemer Nelson, Aequalis Aerial Photography, Tacoma, WA.

**The Port of Tacoma, Washington shows how ports can grow and be good environmental stewards.**

# In order to more assertively address the environmental impacts of port growth, in June of 2003, EPA's Sector Strategies Program, formalized a collaborative, voluntary partnership with AAPA, the trade association that represents the largest ports in the United States.

## Box 1: American Association of Port Authorities.



Alliance of the Ports of Canada, the Caribbean, Latin America and the United States

Founded in 1912, the American Association of Port Authorities is a trade association which represents more than 150 public port authorities in the United States, Canada, the Caribbean and Latin America. In addition, Association members include more than 300 sustaining and associate members, which are businesses and individuals with an interest in the seaports of the Western Hemisphere. AAPA is dedicated to serving deep draft public ports by enhancing port management professionalism and advocating issues critical to public seaports.

AAPA promotes the common interests of the port community, and provides leadership on trade, transportation, environmental and other issues related to port development and operations. AAPA also works to educate the public, media, local, state and Federal legislators about the essential role ports play within the global transportation system.

For further information, visit: [www.aapa-ports.org](http://www.aapa-ports.org).

public seaports are members of the AAPA (Box 1).

U.S. ports are handling rapidly increasing amounts of imports, and a high percent of it is container trade from East Asia. In 2003, the Ports of Los Angeles and Long Beach, California, together ranked No. 3 in the world for container trade, after Hong Kong and Singapore. Interestingly though, it would take the Top 15 U.S. container ports to equal the container volume of Hong Kong (Vickerman, 2005). According to the U.S. Department of Transportation forecasts, the total volume of foreign trade moving through U.S. ports by 2020 will be more than double 1996 tonnage levels, significantly impacting the coastal and Great Lakes ports. In 2002, ports invested nearly \$1.7 billion to update and modernize facilities, almost equaling the record set in 2001, including: \$140 million for general cargo; about \$942 million in investment related to containers; \$241 million on infrastructure improvements; and \$145 million relating to dredging. During the 5-year period between 2003 and 2007, public ports predict they will spend \$10.4 billion (a record level), compared to actual expenditures of \$7 billion between 1998 and 2002 (U.S. Department of Transportation, 2004).

In order to more assertively address the environmental impacts of port growth, in June 2003, EPA's Sector Strategies Program (Box 2), formalized a collaborative, voluntary



partnership with AAPA, the trade association that represents the largest ports in the United States. The simple partnership agreement states that the parties will work collaboratively to:

1. Promote the implementation of environmental management systems;
2. Address regulatory and non-regulatory barriers that are in the way of improving their performance; and
3. Measure progress.

EPA began working with AAPA and their member ports by focusing on the environmental issues they view as priorities and have the most control over, and are also working with them to expand their influence. For example, several ports are now developing EMSs for the facilities they operate and expanding their influence with tenants by engaging them in EMS projects and other voluntary programs to minimize environmental impacts. They provide incentives, like reduced fees, for tenants who 'do the right thing', and strengthen lease and contract language to better articulate expectations for environmental stewardship. Also, ports are increasingly involved in development of state air quality improvement plans, transportation improvement programs and other regional and coastal zone management efforts.

## Ports EMS Assistance Project:

An EMS is a formal system for managing the environmental footprint of a port or other organization in a way that builds on regulatory compliance programs. Until about two years ago, only three U.S. ports had, or were developing, EMSs: The Port of Houston Authority in Texas,

Massachusetts Port Authority (MASSPORT) for the Port of Boston, and the Port of Portland, Oregon. An EMS incorporates environmental considerations into the day-to-day operations and provides a structured framework designed to achieve continual environmental improvement. While each EMS is unique, most follow a Plan-Do-Check-Act Model (Box 3).

### Box 2: EPA Sector Strategies Program.



Sector Strategies seeks industry-wide environmental gains through innovative actions taken with a number of manufacturing and service sectors. EPA staff liaisons work with participating trade associations, EPA programs and regions, states, and other groups to find effective solutions to sector-specific problems and promote environmental stewardship. Some solutions involve the implementation of environmental management systems, the identification and removal of regulatory barriers to improve environmental performance, and the advancement of performance measurement.

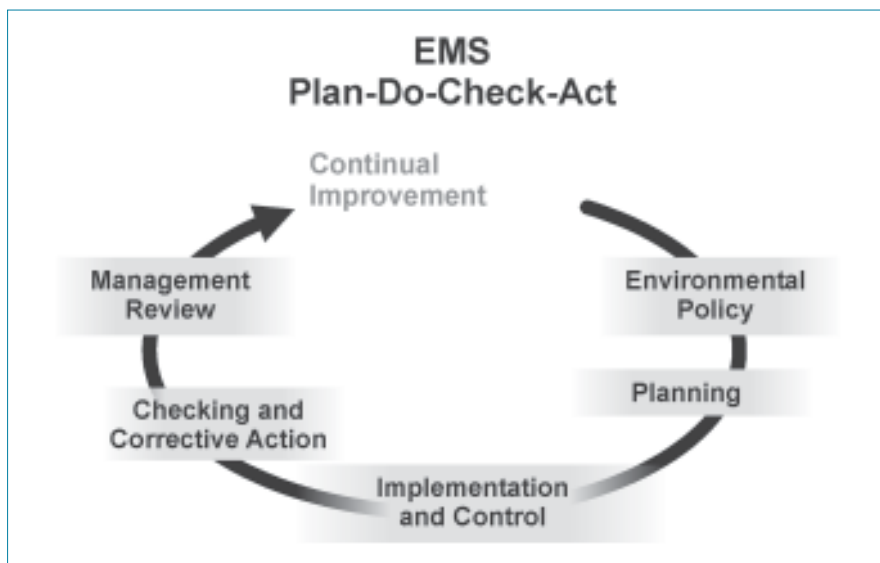
Sector Strategies works not only with ports, but also the agribusiness, cement manufacturing, colleges and universities, construction, forest products, iron and steel manufacturing, metal casting, metal finishing, paints and coatings, shipbuilding and ship repair, and specialty-batch chemical manufacturing sectors.

For further information, check: [www.epa.gov/sectors](http://www.epa.gov/sectors).

# In January 2004, EPA, in partnership with AAPA and the Global Environment and Technology Foundation (GETF), launched the Ports EMS Assistance Project, through which nine ports and two federal maritime facilities have been working together to develop their EMS.

In January 2004, EPA, in partnership with AAPA and the Global Environment and Technology Foundation (GETF; [www.getf.org](http://www.getf.org)), launched the Ports EMS Assistance Project, through which nine ports and two federal maritime facilities have been working together to develop their EMS. GETF has provided the training and coaching of staff. Port participants have had four, 3-day training sessions, biweekly port-specific technical phone calls, monthly group conference calls, and two site visits by GETF. Participating ports include The Port of Corpus Christi, Texas; Port Everglades, Florida; The Port of Los Angeles, California; The Port of New Orleans, Louisiana; The Port Authority of New York and New Jersey; Virginia Port Authority; Port of Vancouver, Washington; and Port of Houston, Texas.

## Box 3: Plan-Do-Check-Act Model.



An Environmental Management System (EMS) is a set of processes and practices that enable an organization to reduce its environmental impacts and increase its operating efficiency. It involves developing an environmental policy; planning, through examination of the environmental aspects and impacts, then developing goals and objectives for improvement; implementing plans; monitoring and making corrections where necessary; and doing management reviews to track goals, reassess priorities and promote continuous improvement. The development of an EMS is a recognized way for ports and other organizations to actualize their commitment to environmental stewardship. Many ports already have components of an EMS in place that they can build upon, such as regulatory requirement programs and best management practices. Ports can also decide whether it is in their business' best interest to have their EMS audited by a third party, e.g., Houston and Boston's EMSs are International Standards Organization (ISO) 14001 certified. In addition, The Port of Houston Authority is a member of EPA's Performance Track Program for top environmental performers.

Further information is available at [www.epa.gov/ems](http://www.epa.gov/ems).

A final report on the EMS Assistance Project will be available in early 2006, but discussions of EMS benefits among participants are strongly encouraging, and include improved communication and accountability among managers and operations staff on environmental issues; better measuring and monitoring of wastes; consolidated record keeping; documenting institutional knowledge of employees nearing retirement; placement of spill kits in maintenance shops and trucks, increased recycling, reduced losses of potable water, environmental

review of new projects via a construction checklist, and increases in purchases of wind power and low sulfur diesel fuel. While US ports compete with each other for business, EMS Assistance Project participants have enjoyed learning together and sharing information that can improve them all.

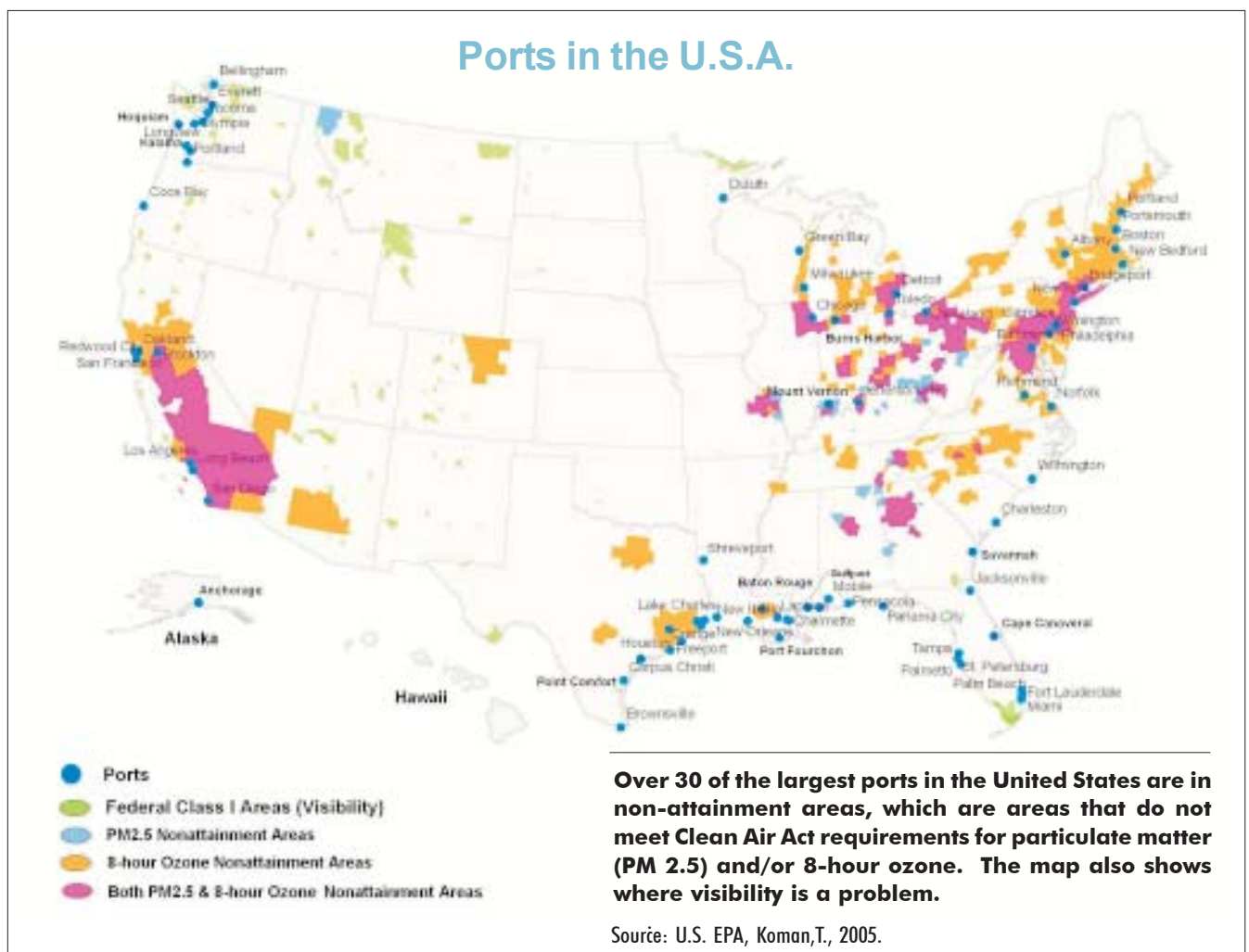
A second 'flight' of the EMS Assistance Project is scheduled to begin in January 2006. This time, ports are also being invited to develop security management

systems (SMS) through use of a similar plan-do-check-act approach to address the complex array of new security regulations and operations, which in many ways link to environment, health, and safety concerns. EPA has developed an EMS business case brochure entitled "EMS: Systematically Improving your Performance" (U.S. EPA, 2005a) to help ports understand how an EMS (or SMS) can help them reduce risks and costs, and improve internal communication, public image, regulatory compliance and environmental performance.

## Addressing Barriers and Improving Air Quality

At the beginning of the partnership with EPA's Sector Strategies Program, AAPA was asked what barriers were getting in the way of ports improving their environmental performance, and AAPA asked EPA for help in addressing air quality issues. Many ports are unclear about how their operations contribute to air pollution and what to do about it. As ports grow they must minimize their air emissions, especially from diesel

**Figure 1: Ports and Air Quality Non-Attainment Areas (Particulate Matter 2.5, 8-hour ozone).**



# EPA is helping ports understand and characterize their air emissions, as it is only when ports understand their specific sources, types and quantities of air pollution that they can develop and then implement comprehensive emission reduction strategies, and measure progress over time.

engines — landside and marine. Reducing emissions from diesel engines is one of the most important air quality challenges for the whole country. Even with more stringent heavy-duty highway engine standards set to take effect over the next decade, millions of diesel engines already in use continue to emit large amounts of nitrogen oxides and particulate matter (PM), both of which contribute to serious public health problems. EPA is helping ports understand and characterize their air emissions, as it is only when ports understand their specific sources, types and quantities of air pollution that they can develop and then implement comprehensive emission reduction strategies and measure progress over time.

There have been several activities, including:

- **Development of Port Emission Inventories:** EPA and AAPA are encouraging ports to develop emission inventories, as ports are a source of several hazardous air pollutants. Over

30 of the largest U.S. ports are in air quality non-attainment areas (Figure 1), where ozone and PM levels are too high. While emission levels for these two pollutants have been estimated for all ports through national modeling, more ports are becoming aware that it is in their business' best interest to develop their own inventories. To support this, EPA has developed a report called, "Current Methodologies and Best Practices in Preparing Port Emission Inventories" (U.S. EPA, 2005a). This report focuses on mobile emissions sources at ports, including oceangoing vessels (OGVs), harbor craft, and cargo handling equipment (CHE), as well as other land-side mobile emission sources at ports such as locomotives and on-highway vehicles. For this report EPA reviewed current information on port emission inventory preparation, including those done at seven U.S. ports, and summarized the most current practices. More than a dozen U.S. ports plan to do

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inventories in the coming year. Ports such as Corpus Christi Texas and those in the Greater Puget Sound Region in the northwest corner of the continental U.S. (including the ports of Seattle, Tacoma, and Everett, Washington) are proactively conducting emission inventories even though they are located in areas that are currently in attainment with national air quality standards. U.S. ports are also sharing inventory information with Canadian ports that share air sheds and air quality concerns.

- **Clean Ports USA/The National Clean Diesel Campaign:** Through Clean Ports USA, EPA's Office of Transportation and Air Quality (OTAQ), is providing forums for education, technical assistance, and sharing of best practices for implementing technical and operational strategies to reduce diesel emissions. This work is enhanced by regional multi-stakeholder collaborations, i.e., the West Coast, Northeast and Mid-Atlantic Diesel Collaboratives. EPA is also providing grant money to ports, and investigating other incentives, like tax credits, to encourage businesses to reduce diesel emissions. Similar programs are being developed for the construction industry. In addition, EPA's Smartway Transport Partnership is working with the freight industry, primarily trucks and trains, to save money by improving fuel efficiency (U.S. EPA, 2005b).

## Measuring Progress

Ports are coming under increasing pressure from surrounding communities and environmental groups to explain and quantify their environmental stewardship activities and outcomes. In June 2004, EPA published the first Sector Strategies Performance Report, which provided a snapshot of the environmental performance of ports and 11 other sectors in the Sector Strategies Program (U.S. EPA, 2005c). In December 2004, AAPA sponsored its first survey of its U.S. membership that measured interest and activities relating to a variety of environmental issues and identified indicators for environmental activities that ports are undertaking, primarily on a voluntary basis. Forty-eight ports responded, representing roughly 60 percent of its U.S. membership. Survey highlights, plus case studies, will be included in the second Sector Strategies Performance Report, which will be available in early 2006. Air quality highlights include that 11 of 48 ports responding to the AAPA survey indicated they have conducted an air emissions inventory, and 13 other ports anticipated conducting an inventory in the coming year. Twelve ports indicated they have an emission control or reduction strategy, and 14 ports indicated they use low-emission fuel types.

Case studies on air quality include the ports of Los Angeles, Long Beach, and Seattle which have installed shore-side power for

vessels, dramatically reducing diesel emissions by reducing the use of the auxiliary engines that ships use to keep lights, refrigeration and other facilities operating at dock. Long Beach has quantified environmental outcomes by articulating that they have reduced total annual emissions by more than 14 tons of diesel PM and 43 tons of nitrogen oxides, and they have set goals for greater reductions. Also, the Port Authority of New York and New Jersey recently updated a 2001 cargo handling equipment emissions report, which compared 2004 air emissions generated by five terminals at the port. They were able to quantify drastic reductions (NO<sub>x</sub> – 31 percent, VOC – 32 percent, CO – 32 percent, PM<sub>10</sub> – 32 percent, SO<sub>2</sub> – 35 percent) in emissions even though the number of equipment in the fleet had increased by 19 percent, average

operating hours had increased by 5 percent, and the total number of containers had increased by 25 percent. These results were accomplished through voluntary actions undertaken by the terminal operators to modernize their cargo handling equipment, which provided them with the benefits of improved operational efficiency (U.S. EPA, 2005a).

U.S. ports are indeed becoming more keenly aware of the environmental impacts of their own operations and those of their business partners, and taking actions to reduce those impacts. Through leadership from AAPA, and in voluntary partnership with EPA, they are benchmarking performance, sharing best practices and lessons learned, and improving the ways they explain and quantify progress. ■

## References

- AAPA. 2005. America's Ports: Gateways to Global Trade, American Association of Port Authorities. American Association of Port Authorities (AAPA). [www.aapa-ports.org/industryinfo/americasports.htm](http://www.aapa-ports.org/industryinfo/americasports.htm)
- Global Environment and Technology Foundation (GETF). 2005. [www.getf.org](http://www.getf.org)
- Koman, T. 2005. U.S. EPA, Presentation at the January 2005 Clean Ports USA Workshop. [www.cleanfleetusa.net/cleanports/presentations/02.KOMAN.pdf](http://www.cleanfleetusa.net/cleanports/presentations/02.KOMAN.pdf).
- U.S. Department of Commerce. 1990. Fifty Years of Population Change Along the Nation's Coast: 1960-2010. Washington: U.S. Department of Commerce, National Ocean Services.
- U.S. Department of Transportation. 2004. "United States Port Development Expenditure Report." Maritime Administration, U.S. Department of Transportation.
- U.S. EPA. 2005a. "EMS: Systematically Improving your Performance"; "Current Methodologies and Best Practices in Preparing Port Emission Inventories." U.S. Environmental Protection Agency. [www.epa.gov/sectors/ports](http://www.epa.gov/sectors/ports).
- U.S. EPA. 2005b. U.S. Environmental Protection Agency. [www.epa.gov/cleandiesel](http://www.epa.gov/cleandiesel).
- U.S. EPA. 2005c. U.S. Environmental Protection Agency. [www.epa.gov/sectors](http://www.epa.gov/sectors).
- U.S. EPA. 2005d. U.S. Environmental Protection Agency. [www.epa.gov/ems](http://www.epa.gov/ems).
- Urban Harbors Institute. 2000. Green Ports – Environmental Management and Technology of U.S. Ports, p.14. Urban Harbors Institute, University of Massachusetts, Boston, U.S.A.
- Vickerman, J. 2005. Transystems, Global and National Perspectives of the Freight Landscape, September 12, 2005, slide 20. [www.transystems.com/so\\_presentations.asp](http://www.transystems.com/so_presentations.asp)

# PEMSEA PSHEMS Recognition Process

## Step 1

### Application for Recognition

The PSHEMS recognition process starts when PEMSEA receives a completed standard application form and questionnaire from an interested organization. The information provided therein will be the basis for the resource requirements needed for the recognition process.

## Step 2

### Document Review

Offsite review of the organizations' documents and records relating to the establishment and implementation of its PSHEMS. The review aims to ensure that clients have addressed the key areas of the specifications against which they seek recognition and thus ensures that the recognition audit will be of value.



### Step 3

## Recognition Audit

The **recognition** audit will consist of two stages, namely, Stage 1 (onsite systems audit) and Stage 2 (verification of the effectiveness of implementation of the PSHEMS).

### Stage 1

Onsite audit focusing on the systems' adequacy in terms of the requirements of the PSHEMS Code, including the audit of the methodologies used to compile the registers of hazards, environmental aspects and regulations and an audit of internal audit methodologies. The purpose is to ensure that the PSHEMS is based on the evaluation of hazards and risks and environmental impacts, is aimed at controlling and improving safety, health and environmental performance and is auditable and complete. Improvement actions should be completed by the organization prior to the conduct of the second stage of the recognition audit.

### Stage 2

Onsite audit focusing on the assessment of effective implementation of the system and verifying the organization's adherence to its procedures and on whether the organization's PSHEMS policy and objectives are achieved. Any non-conformity, corrective action must be completed prior to recognition.

### Step 4

## Certification Issuance and Maintenance

A certificate of recognition will be awarded provided all corrective actions agreed between the requesting organization and the audit team have been implemented. The PSHEMS Governing Board will issue the certificate of recognition, which is valid for three years. To maintain the recognition, PEMSEA will monitor the organization's compliance by carrying out routine surveillance visits on an annual basis. At the end of the three-year certification period, a complete re-assessment will be made by PEMSEA if the organization wishes to continue with the recognition.



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## Introduction

A study conducted jointly by the United Nations Environment Programme (UNEP) and the International Maritime Organization (IMO) in 1994-1995 revealed a shortcoming in local capacity to safely handle dangerous goods in various ports of the East Asian seas region. A common deficiency in ports was the lack of an integrated port management system, which would ensure safety in port operations, protection of human life and property, health of port workers, and the protection of the environment.

In response to the findings of the study, the GEF/UNDP/IMO Regional Programme on Partnerships in Environmental Management for the Seas of East Asia (PEMSEA) embarked on a project entitled, "Strengthening Chemical Spill Prevention and Response Levels in Selected Ports of the East Asian Region." The major outputs from the project were the two-volume Port Safety Audit Manual, a demonstration of local implementation of port safety audits in two ports in the region (i.e., Port Klang, Malaysia, and the Port of Manila, Philippines), and a decision by PEMSEA to proceed with a follow-on stage. The follow-on stage of the port safety audit project involved the development of the Port Safety, Health and Environmental Management (PSHEM) Code and the Port Safety, Health and Environmental Management System (PSHEMS).

# Port Safety, Health and Environmental Management System: An Integrated Management



## A Voluntary Standard for Ports

The PSHEM Code is aimed at providing port authorities or any company operating within the port, whose activities may have an effect on health and safety of people, environment, cargoes and port installations, with a standard against which it can measure the performance of its operations with regard to quality, safety and health of port workers and environment. The Code (Box 1) is based on the methodology of Plan-Do-Check-Act or PDCA, which ensures continual improvement of the port

management system. It integrates the key elements of recognized international standards, namely ISO 9001, ISO 14001 and OSHAS 18001. Similar to the ISO standards, it can be applied voluntarily by either a port authority or a company operating within the port, or both.

## An Integrated Port Management System

Ports authorities and operators face a number of challenges with regard to port planning, development and operation. The



increasing use of the containerization system has triggered the introduction of sophisticated cargo-handling machineries and operations. This situation has resulted in new safety and health concerns for port personnel.

At the same time, the development and adoption of international safety and security standards has emphasized that an effective management system must encompass not only operational activities but also build quality, safety, health and environmental objectives and procedures into each process. In response to this emerging need, the PSHEMS, which enables the integration of all requirements of various standards into only one management system, was developed.

The PSHEMS as an integrated approach, provides a structure of policies, procedures, documentation, records and continual assessment for the measurement of performance over time. The system is not intended to replace or duplicate any other legal or administrative requirement, but integrates the key elements of other recognized international standards, such as ISO 9001 (Quality Management Systems or QMS), ISO 14001 (Environmental Management Systems) and OSHAS 18001 (Occupational Health and Safety Management Systems), into one system to make their application easier for the benefit of the port

### Box 1: The PSHEMS Initiative: What It Offers...

|                                 |   |
|---------------------------------|---|
| <b>PSHEMS Code</b>              | <b>A voluntary standard that enables ports to measure the performance of their operations with regard to quality, safety and health of port workers and the environment.</b>                  |
| <b>PSHEMS training modules</b>  | <b>A training program to enhance capacities of project teams and port personnel to support the establishment and implementation of PSHEMS</b>   |
| <b>Port Safety Audit Manual</b> | <b>A guide to assist internal and independent auditors in identifying relevant regulations, policies and practices, and to evaluate the organization's conformance with such requirements</b> |
| <b>PSHEMS Handbook</b>          | <b>A step-by-step process to assist port personnel in establishing and implementing the PSHEMS</b>  |
| <b>PSHEMS Auditors</b>          | <b>A qualified auditor team to assist ports in undertaking a pre-assessment audit and assessing readiness for PSHEMS recognition</b>  |
| <b>PSHEMS Recognition</b>       | <b>An external audit and recognition system for ports that have successfully implemented the PSHEMS</b>   |

industry. If the Port Authority or company operating in the port has a management system in place, such as ISO 9001, it is important that the PSHEMS is integrated and not used as a "stand alone" system.

The PSHEMS adopts the business process methodology, which enables the company to develop and implement improvement programs that are based on their customer requirements. This approach involves the mapping of the processes that are key to the company's business and to define inputs, outputs and controls for

each process, their interaction with other processes and key performance measures, and documenting them in the PSHEMS manual.

Like any other management system, the PSHEMS can be certified. A certificate of recognition is issued by PEMSEA to a port authority or company whose PSHEMS has satisfied the requirements of the PSHEM Code and demonstrated that the system is properly implemented, maintained and improved. The maintenance of the certificate of

recognition is subject to a periodic audit.

Ports implementing the PSHEMS, can expect improvement in their operational performance, improved personnel relations, outputs and environmental performance, while also realizing cost savings for more efficient use of people and equipment, reduction in personnel accidents and damage to cargo, and reduced regulatory liability.

The PSHEMS provides a framework that enables the port authority/port operator to proceed with certification for ISO 9001, ISO 14001 and ISO 18001 if desired.

## PEMSEA's Approach to Building Capacities for PSHEMS Implementation

To test and demonstrate the application of the PSHEM Code, PEMSEA provided assistance to two ports (Port of Tanjung Pelepas, Malaysia and Bangkok Port, Thailand) in the region.

A 10-step process was employed during the testing and demonstration program.

### Step 1. Preparing the PSHEMS Project Team and Conducting an Initial Assessment

#### *Preparing the PSHEMS Project Team*

The most prevalent concern among port authorities and port

personnel is the lack of awareness and understanding on applicable international and national regulations, codes and guidelines concerning port operation. It is recognized that knowledge of these regulations is a critical element in establishing management programs aimed at improving port efficiency and in developing a safe and environment-friendly culture in the port organization.

Hence, as a first step, a training program on "Applicable International Regulations Concerning Port Operation" was developed and conducted at the two pilot sites. The training workshops resulted in an enhanced understanding of the requirements of relevant international and national regulations and an initial assessment on the port's compliance with relevant legal requirements. It was evident that after the training, the increased understanding by port personnel on relevant regulations enabled them to effectively proceed to the next phase, namely, to assess the strengths and shortcomings of the existing management system with regard to safety, health and environmental (SHE) requirements .

#### *Conduct of Initial Assessment*

The initial assessment stage covered the review of current system practices and evaluated the deficiency against the requirements of the PSHEMS Code. Safety, health and environmental risks emanating

from the facilities situated within the port area and from activities carried out in the port were identified. A review of all applicable legal requirements and their compliance status was undertaken. This was facilitated with a training workshop on the "Conduct of Initial Status Review, " using PEMSEA's *Port Safety Audit Manual* as the primary resource document.

### Step 2. Establishing the Safety, Health and Environmental Policy

Top management has the primary responsibility for developing the SHE policy. The setting of policy involved six steps, namely:

1. securing commitment of the top management;
2. consulting with personnel in the formulation of the policy;
3. assessing the appropriateness of the policy to the nature of the organization's activities;
4. defining the policy objectives;
5. communicating the policy to internal and external parties; and
6. reviewing and updating the policy.

### Step 3. Defining Responsibilities and Authorities

The objective of defining responsibilities and authorities in the PSHEMS was to ensure that everyone concerned with the implementation of the system knows what is expected of them. Responsibilities and authorities were defined including their interrelation at every

organizational level and between personnel who manage, perform and verify work related to and affecting safety, health and pollution prevention.

#### **Step 4. Strategic Planning**

This step involved: conducting a detailed risk assessment based on the results of the initial assessment; setting of process objectives; establishing programs to address the objectives; identifying significant hazards and intolerable risks; allocating resources to facilitate the implementation of the programs; developing an action plan for implementing the PSHEMS; and monitoring the performance with regard to achieving the defined objectives.

At this stage, a training workshop on PSHEMS Strategic Planning was conducted for the project teams. The workshop facilitated the development of objectives, targets and improvement programs in each of the ports.

#### **Step 5. Process Development and PSHEMS Manual Development**

The development of the "working" PSHEMS started with the identification of different processes covered by the system. In the case of PTP, the scope of the system covered three core processes: terminal operations; marine services; and free zone; as well as support processes. In the case of Bangkok Port, the scope of the PSHEMS was limited to the dangerous cargo

services and its support processes. At this stage, project teams were trained on business process mapping and process description preparation.

#### **Step 6. Procedure Development**

To enable the port to comply with the requirements of the PSHEM Code, systems procedures were developed by the project teams and management representatives. These procedures described how the system has to be managed and who has to do what, where, when, why and how to ensure that the system is working properly.

Operational procedures were also developed for all activities that have safety, health and environmental implications.

#### **Step 7. Personnel Training**

To provide the necessary knowledge and skills for implementation of the PSHEMS, procedures for identifying training needs and development of training plans were put in place. To enable the port to establish the PSHEMS, the following training courses were conducted by PEMSEA:

1. Training on Applicable International Regulations Concerning Port Operation
2. Understanding and Implementing the PSHEMS
3. Port Safety Auditing/PSHEMS Internal Audit Training
4. PSHEMS Strategic Planning
5. PSHEMS Design and Documentation

#### **Step 8. Implementing the PSHEMS**

One of the most important steps in the PSHEMS is the implementation of procedures and improvement programs. Orientation of all personnel on the procedures' existence, their purpose and requirements, along with training to meet these requirements, were conducted. The two ports implementing the PSHEMS engaged the "process owners" (department managers and staff) in the development of procedures to ensure a strong commitment and feeling of ownership.

#### **Step 9. Developing Measurement and Reporting System**

Developing a measurement and reporting system for the established PSHEMS enabled the port authority/port operator to follow the progress of system implementation and assess its performance, which included progress on the implementation of the programs, critical process parameters, performance indices, compliance with regulatory requirements and system compliance with applicable codes and standards.

#### **Step 10. Final Assessment**

As part of this process, PEMSEA provided training to the ports in developing a core team of internal auditors who are capable of conducting an internal assessment of their PSHEMS. The internal audit team

# The PSHEMS initiative was able to demonstrate a strategic framework that will enable the port to improve its operational efficiencies.

conducted a performance audit to verify that the developed PSHEMS was being properly implemented and was achieving the objectives defined by the organization.

The results of the audit enabled the ports to make adjustments on the systems and prepare for the recognition audit by PEMSEA.

The training-led technical support program extended to the two ports facilitated the full implementation of the PSHEMS. Each step was undertaken through the conduct of training workshops to build the awareness and capacities of project teams in the design and implementation of the PSHEMS. As mentioned, onsite and offsite technical assistance were provided, which included the conduct of initial assessment, training of internal auditors, the conduct of performance audit for PSHEMS recognition, and provision of recognition services. It was evident that such process have empowered the project team and promoted ownership of the system.

## Lessons Learned from the Implementation of PSHEMS

At this early stage of PSHEMS implementation (barely four months)

in the pilot sites, a number of lessons were identified, as follows:

1. Top management commitment played an important role in ensuring that the required support and resources to establish the system were provided, and this motivated port personnel in developing and implementing the PSHEMS;
2. Leadership and membership on the project team was critical to the successful development and implementation of the integrated management system;
3. A thorough review of regulatory requirements, both international and national regulations, provided the ports with a clear indication of their level of compliance and prompted the updating of programmes, procedures and practices; and
4. A participatory approach involving supervisory and technical personnel in identifying safety, health and environmental objectives, targets, and improvement programs, prompted an

improved safety, health and environmental consciousness among port personnel.

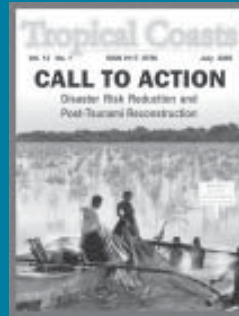
The pilot testing of the PSHEMS has gained positive and encouraging results from both ports. Consistent with PEMSEA's capacity-building program, the PSHEMS initiative was able to demonstrate a strategic framework that will enable the port to improve its operational efficiencies while meeting its commitment to safety and health of personnel and protection of the marine environment. A core group of skilled port personnel, with the capacity to implement the PSHEMS program and transfer these newly acquired skills to other ports in the region, is now in place. ■

## References

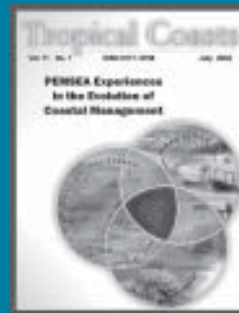
- BSI 2002. OHSAS 18001:1999, Occupational Health and Safety Management Systems – Specification.
- Captain Hans-Juergen Roos, et. al. 2003. *Port Safety, Health and Environment Management System: An Integrated Approach.*
- ISO 2000. ISO 9000:2000, Quality Management Systems – Requirements.
- ISO 2004. ISO 14001:2004, Environmental Management Systems – Requirements with Guidance for Use.
- Port Safety, Health and Environmental Management Code. GEF/UNDP/IMO Regional Programme on Partnerships in Environmental Management for the Seas of East Asia.
- Port Safety, Health and Environmental Management Manual. GEF/UNDP/IMO Regional Programme on Partnerships in Environmental Management for the Seas of East Asia. To be published.

# Tropical Coasts

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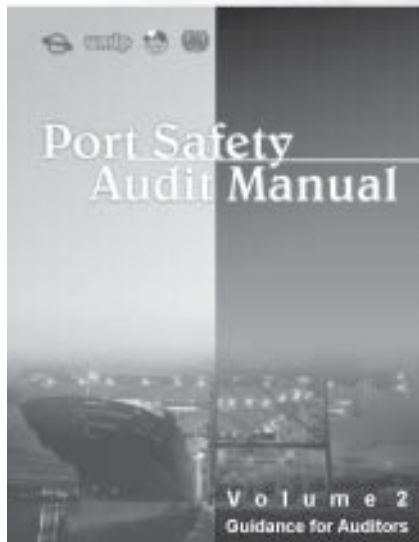
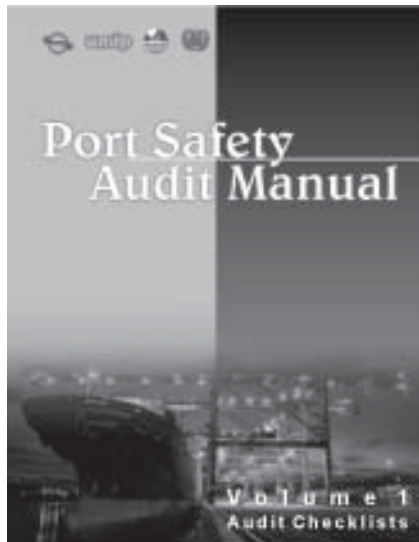
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The two-volume Manual is a reference material for local auditors who are tasked to assess regulatory and port authorities, port management, terminal operators vis-à-vis their compliance with their policies and national and international requirements and recommendations. Volume 1 provides an introduction to auditing, along with a 19-step approach to completing an audit. Volume 2 provides more technical information on the handling of dangerous cargoes and checklists for use by port safety and environmental protection auditors.

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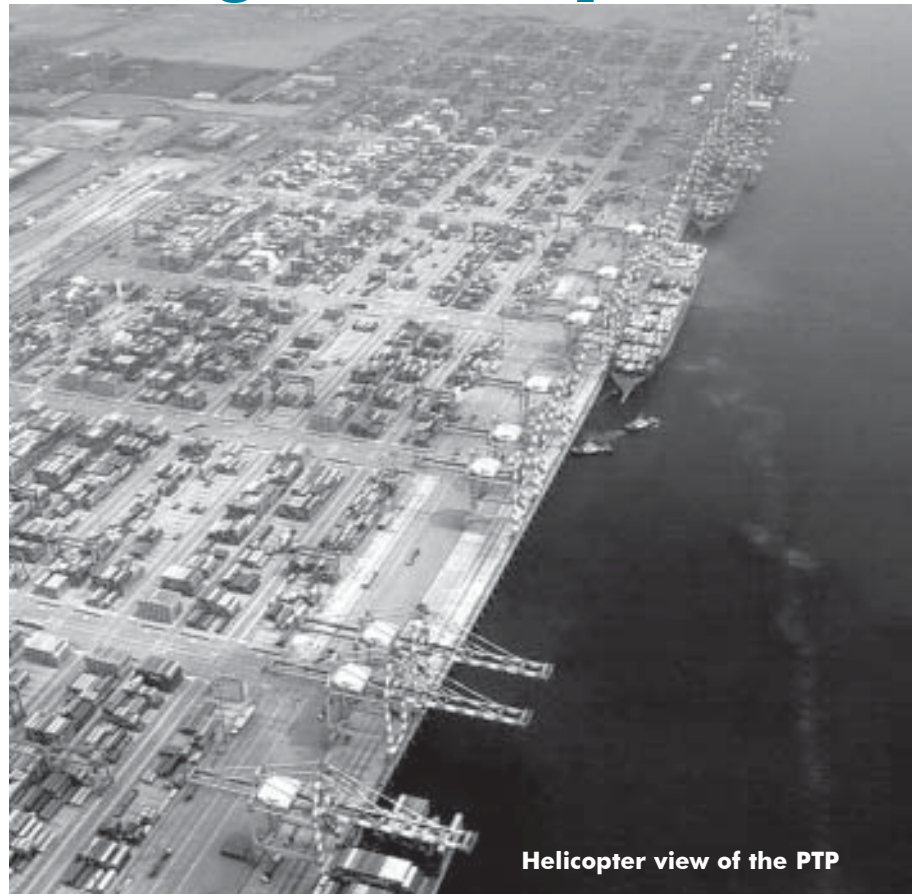
Integrated Management  
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Malaysia

## Introduction

The Port of Tanjung Pelepas (PTP) has gained a reputation of being Southeast Asia's Fastest Growing Transshipment Hub. In 2004, PTP achieved a record volume that has grown by 15.2 percent to reach 4.02 million TEUs compared to the 2003 figure of 3.49 million TEUs. In May 2004, it handled its 10 millionth TEU since operations began. PTP, the current world record holder in berth productivity of 340 gross berth moves per hour, offers first class infrastructure backed by world-class operations.

The port maintained its position as Malaysia's No.1 container terminal with a new throughput record of over 4 million TEUs in 2004 (Figure 1) and was recognized as "Container Terminal of the Year" at the Asia Logistics Awards 2004.

# PTP's Experience in Establishing a Port Safety, Health and Environmental Management System



Helicopter view of the PTP

## The Adoption of an Integrated Management System

Having successfully obtained certification in ISO 9001:2000 in October 2003, PTP is currently in the process of implementing the Port Safety, Health and Environmental Management System

(PSHEMS). This is to provide PTP with a strategic management framework which will enable the port to effectively establish and implement policies and operational procedures to ensure compliance with the Port Safety, Health and Environmental Management (PSHEM) Code and obtain certification for ISO 14001 and OHSAS 18001.

The PSHEM Code is a voluntary standard that enables port authorities / operators to measure the performance of their operations. The Code was developed by GEF/UNDP/IMO Regional Programme on Building Partnerships in Environmental Management for the Seas of East Asia (PEMSEA), which is a regional project of the Global Environment Facility. The development of the Code was supported by International Maritime Organization and participated in by a number of industry organizations and associations. PTP was selected as a pilot site for the PSHEMS project of PEMSEA.

The introduction of an integrated management system in PTP has proven to be positive for the port, not only in promoting and enhancing a culture of safety, health and environmental protection into the business process of the port, but also facilitating the advancement of the corporate image of PTP in achieving the title of being one of the best ports in the region that is committed to adopting an internationally recognized management system.

## The Implementation of PSHEMS

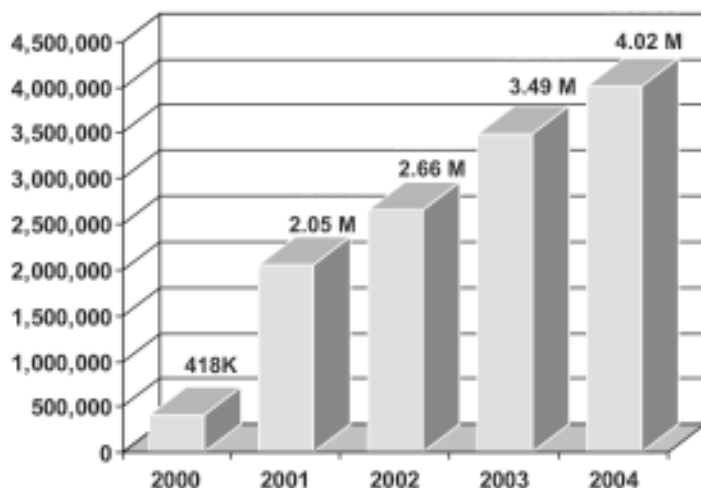
The objective of the PSHEMS is to develop an integrated management system that will improve operational performance through a comprehensive and coordinated approach to safety in port operations and protection of human life, property and the environment. The principal advantage of the PSHEMS is the fact that it incorporates the various quality, occupational safety and health, and environmental management systems into one standard, which can be applied across the core business and operational processes of PTP. The second main advantage is that the PSHEMS facilitates a comprehensive assessment of the individual processes that comprise PTP operations, identifying existing and potential activities and occurrences that could impact on business performance, health and safety in the port area, and protection of our surrounding environment. This results in a change of culture within the organization. No longer are quality, health, safety and

environmental measures considered "add-on" programs that managers and staff must implement. Rather, they are viewed as value-added procedures in existing process operations, improving operational efficiencies, achieving better prioritization and use of resources, and facilitating coordinated solutions across processes.

## A Systematic Approach in Developing PSHEMS

The development of PTP's integrated management system, the PSHEMS, is quite unique in the sense that vertical and horizontal approaches are being applied. The vertical approach is similar to the top-to-bottom approach whereby the top management is committed to ensuring that all aspects of PSHEMS are effectively implemented and adhere to all requirements of the standard. The top management commitment involves ensuring that quality, safety, health and environment aspects of PTP's operation are addressed and supported by adequate resources.

**Figure 1. Port Volumes for Malaysia and PT (2000–2004).**



| Port Name    | TEUs ('000)  |              |               |               |
|--------------|--------------|--------------|---------------|---------------|
|              | 2001         | 2002         | 2003          | 2004          |
| PTP          | 2,050        | 2,678        | 3,490         | 4,020         |
| Northport    | 2,304        | 2,483        | 2,510         | 2,690         |
| Westport     | 1,456        | 2,050        | 2,300         | 2,510         |
| Johor Port   | 639          | 684          | 750           | 806           |
| Penang Port  | 600          | 634          | 688           | 770           |
| Bintulu      | 47           | 105          | 144           | 144           |
| Kuantan      | 76           | 91           | 108           | 123           |
| <b>Total</b> | <b>7,479</b> | <b>8,900</b> | <b>10,000</b> | <b>11,000</b> |

Source: PTP Marketing Resource Research

**Figure 2. Road Network for the Port of Tanjung Pelepas.**



Likewise, the horizontal approach involves an integration process between departments or functional areas covered by the system. This can be demonstrated through the management review system whereby the internal measurement and profiling standard is undertaken through the monitoring of department objectives and targets vis-à-vis corporate objectives. The regular assessment and checking process provide high quality assurance levels and directly reflects PTP's consistency in maintaining and continually improving its integrated management system.

## PSHEMS Development Process

The PSHEMS is based on the PDCA (plan-do-check-action) cycle. This approach was first adopted in the development of quality

management systems, and was applied for the entire port operation and corporate support activities. In general terms, the concept of the PDCA approach was effectively implemented across the entire company.

It should be emphasized that the existence of a quality management system (QMS) facilitated the development and implementation of the PSHEMS.

PSHEMS development focused on the following areas:

- a. Hazards and environmental aspects register resulting from the port safety, health and environmental review process using the Task Risk Assessment – HAIRA process;
- b. Establishment of a corporate health, safety and environment (HSE) legal register;
- c. Provision of training related to

- safety, health and environment;
- d. Identification and documentation of improvement objectives and targets;
- e. Refinement of the existing auditing methodology to cover safety, health and environment;
- f. Review and modification of procedures; and
- g. Establishment and implementation of a strategy for the improvement of supply-chain safety, health and environmental performance.

## Scope of the PSHEMS

The scope of the PSHEMS and its certification is for the provision of port services carried out by PTP.

The overall PSHEMS covers three core business processes of PTP:

- a. Terminal Operation Services;
- b. Marine Services
- c. Free Zone Services

These core processes are linked with each other in order to provide total port services to the customers. To ensure smooth and efficient operation, there are nine support processes that interface with the three core processes. These are:

- a. Corporate Planning
- b. Human Resources
- c. Administration
- d. Health, Safety, Environment Services
- e. Security and Emergency Services
- f. Information Technology
- g. Project Division
- h. Maintenance and Repair
- i. Finance



One important element in PSHEMS strategic planning is the establishment of procedures for the preparation of improvement plans for any operation having an impact on quality, safety, health and environmental protection of the port and installations. To ensure conformance to the PSHEM Code, the following tasks were undertaken:

1. Developing the procedure for Hazard Identification and Risk Assessment (HAIRA);
2. Establishing the legal register and reviewing applicable laws and other requirements concerning the activity, process, aspects and hazards;
3. Establishing an integrated management policy and procedures covering quality, safety, health, and environment;
4. Developing an integrated management system manual that covers all standards, i.e., PSHEM Code, ISO 9001:2000, ISO 14001:2004 and OSHAS 18001:1999. The PSHEMS Manual describes the overall processes, objectives and targets together with specified ISO standards and requirements;
5. Documentation of the integrated management system including the structure and layout specifically control of documents and records; and
6. Developing the mandatory procedures as specified under the standards, such as Internal Audit, Operational Control, Management Reviews, Management Program, among others.

## Box 1: PTP Health, Safety and Environmental Policy

"PTP is committed to provide high quality port services to meet the needs and expectations of customers, shareholders, employees and regulatory and statutory authorities. PTP is committed to conduct its services in a safe, reliable and efficient manner to prevent pollution and harm in compliance with the national legislation and other requirements related to the environment and occupational health and safety. PTP is committed to continually improve its performance using the Integrated Management System."

### Project Management Team Setup

Project management teams were established for the PSHEMS implementation, namely the Steering Committee, Working Committee, Sub-working committee and Project PSHEMS Team. The setting up of various committees demonstrates PTP's high commitment towards ensuring a reliable, efficient and effective PSHEMS implementation process (Figure 3) from the top to bottom levels. Both committees were required to guide and monitor the overall business unit as specified in their policies, procedures and processes. The Steering Committee is represented by Top Management while Working Committee levels represent the departmental level and shall ensure that departmental processes are aligned with the project implementation plan. The PSHEMS Project Team served as focal point to ensure that all related subjects or issues regarding departmental processes, operational control, management program, documentation structure, manual system or programs were effectively implemented in accordance with the specified standard under the PSHEMS requirements.

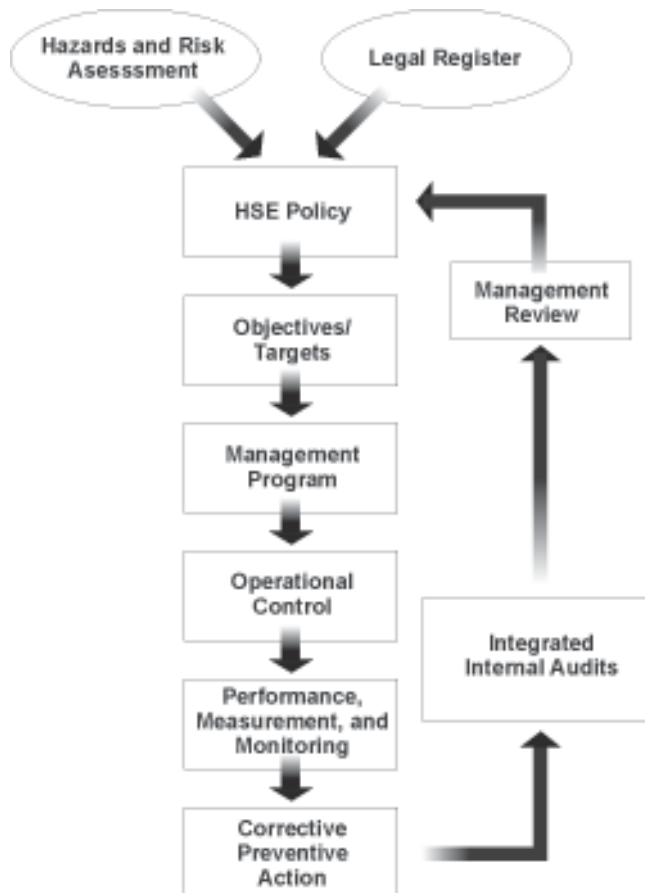
In meeting the objective, the project team met every week to monitor the progress of work and subsequently reported to both Working and Steering Committees. These meetings were documented and recorded as part of evidence to prove that the monitoring and controlling processes were emphasized in the overall implementation plan.

### Redefining the Quality Objective and Targets to Support the QSHE Policy

The establishment of objectives and targets, both at corporate and departmental/functional levels, were done in accordance to the following guiding principles:

- a. Top Management shall ensure that objectives including those needed to meet both customers and legal requirements for port services are established at relevant functions and levels within the company through the use of an Integrated Management Review Meeting or other means deemed pertinent and applicable.
- b. The objectives shall be measurable and consistent with

**Figure 3. PSHEMS Implementation Process.**



through active involvement in resource planning, business planning as well as service planning. The outputs of this process shall be subsequently channelled to the core processes and corporate support processes for execution.

### **Risk Assessment and Hazard Identification**

Another strategic approach to PSHEMS development is the identification of hazards associated with the organization's activities or services that have or can have significant risk and impact to safety, health and environment. PTP has also determined the potential risk and impact to safety, health and environment of the identified hazard and assessed the adequacy of the available controls. At PTP level, the distinction between evaluation of impacts during Initial Review and during Planning is not clearly defined in the standard. In this regard, PTP adopted a phased approach to evaluating environmental aspects and impacts. The following methodologies were identified and implemented across PTP's business functional areas on risk assessment model:

- a. Initial identification of the effects of operations and ancillary activities;
- b. Evaluation of the significance of the identified impact/effects;
- c. Detailed analysis of significant issues;
- d. Identification of existing and required controls to address significant issues;

the Quality, Safety, Health and Environmental Policy.

- c. Each department must have documented departmental objectives and measure for achieving its targets.
- d. Each department shall develop an action plan to ensure the departmental objectives were achieved in an appropriate manner. The progress of the action plan towards achieving targets set shall be tracked and reviewed periodically for continual improvement.

### **Defining Core Business Processes and Corporate Support**

Defining the core business processes and corporate support

activities is another platform for PTP to ensure that the complete cycle of PSHEMS is met. With the inputs from customers, users, employees, government/authorities and periodical review and improvement activities, the corporate planning process shall be triggered in ensuring the adequacy of planning activities within the organization.

All information concerning customer requirements including any statutory and regulatory requirements relating to port services shall be reviewed to ensure consistency with top management policy and business objectives. Top management together with the respective process owners shall provide evidence of its commitment

- e. Establishment of management programs to address significant issues or concerns; and
- f. Establishment of objectives and targets for the priority management programs.

## PSHEMS Documentation Structure and Layout

The PTP PSHEMS documentation covered the requirements of standards which include:

- a. Description of PSHEMS policy, objectives, targets and programs;
- b. Description of the PSHEMS, its processes and interaction and reference to related documents; and
- c. Documents, including procedures and records necessary for the effective implementation and maintenance of PSHEMS.

### PSHEMS Manual

The PSHEMS Manual outlines PTP's framework for quality, environmental, occupational safety and health policies and programs to achieve the desired results in daily work. It describes PTP's PSHEMS policy statement, objectives, organization and all elements established according to the PSHEM Code, ISO 9001, ISO 14001 and OHSAS 18001 System. This serves as a total commitment of PTP in providing quality products and services to its customer, as well as achieving environmental, occupational health and safety performances respectively.

The PSHEMS's Manual is intended to express PTP general quality, environment, safety and health management responsibilities, requirements and procedures for the establishment, implementation and maintenance of the integrated management system.

The maintenance and operation of the PSHEMS is under the responsibility of the Head of Corporate Planning Unit, who is also the Integrated Management Representative (IMR) and reporting directly to the Chief Executive Officer.

The IMR is tasked to ensure that the PSHEMS is implemented and maintained in accordance with international standards and requirements. The IMR shall periodically report to the top management on the performance of the PSHEMS.

The Senior General Manager, Terminal Operation heads the Steering Committee consisting of Heads of Departments, in developing, implementing and periodically reviewing the PSHEMS. The organization structure of Steering Committee, Working Committee as well as PSHEMS Project Team (Figure 4) is illustrated in the PSHEMS manual, which defines PTP's policies complying with the requirements of the international standards, business process and responsibilities of the management staff. The system procedures detail PTP's operational processes that support the policy statement and

objectives. Supporting documents were developed to provide the step-by-step instructions to carry out tasks specified in the PSHEMS system procedures, which includes work instructions, departmental operating procedures, technical manuals, code of practices, etc.

QMS documentation provides benchmarking evidence in relation to integrated management and application towards policy and objectives as well as customer requirement. The companies' IMS has been established and structured in three levels of documentation (Figure 6).

## Documentation

The IMS documentation is structured as follows:

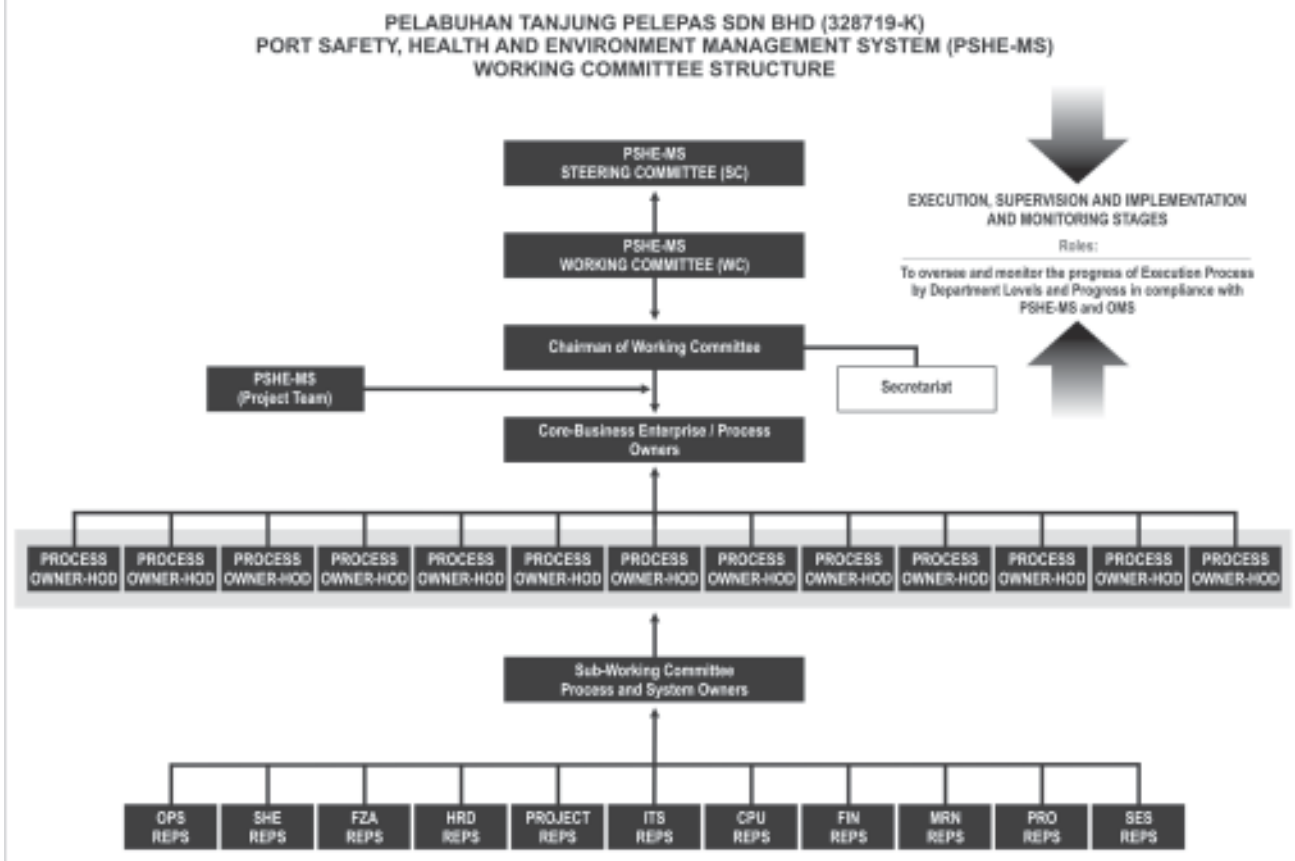
### Integrated Manual (IM) – Level I

This provides a summary of the quality system and defines the operating policies as established by the Chief Executive Officer of PTP. It also defines the company's commitment to meeting the PSHEM code, ISO 9001, ISO 14001 and OHSAS 18001 requirements.

### Standard Operating Procedure (SOP) – Level II

SOP describes the specified and detailed activities of the organization. It also defines the manner of operation of the organization and how the policies in the Quality Manual are carried out.

**Figure 4. The Working Committee Structure.**



**Supporting Document (SD) – Level III**

These consist of work instructions, forms, drawings, standard practices, external documents and departmental roles that contain detailed information or data. Level III (SD) supports Level I (IM) and Level II (SOP) documentation. The SD can be accessed by PTP personnel and used for internal purposes only.

Documentation of the PSHEMS was facilitated by the existence of a well-established QMS documentation.

**In-House Training and Awareness Program**

The in-house training and PSHEMS competency program was designed to promote awareness and

quality improvement needs for all PTP employees. The awareness training programs were divided into categories and management levels such as top, middle and lower management. The training is conducted in dual languages to make sure all PTP employees can fully understand and be familiar with the PSHEM Code and ISO requirements including procedural needs within departmental operations. The training efforts of PTP are based on both vertical and horizontal approaches, where all Heads of Department and key assigned personnel are required to carry out the required training effectively across the functional areas.

Besides introducing awareness training on ISO standards, training on specific or mandatory SOPs, processes, cross-functional activities,

policies and standard instruction are also carried out. All employees at different levels of the organization were briefed and coached on understanding and using the system, which has been developed under specific ISO standards.

**PSHEMS Auditing Team Set Up**

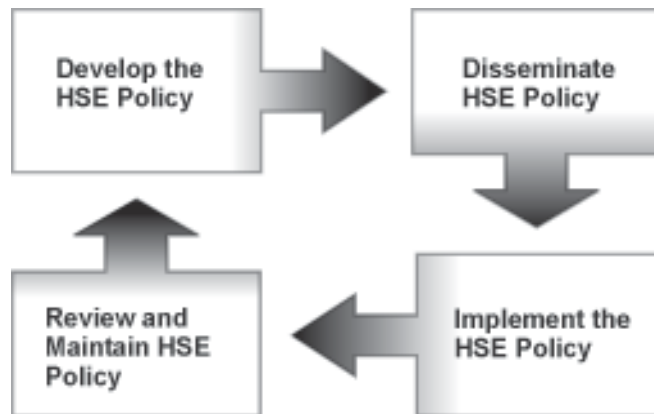
At this point, PTP has 16 qualified lead assessors who have gone through the overall process of the ISO 9001:2000 system standards and compliance. These auditors were trained and coached through provision of specific professional courses related to quality management system. With the introduction of the PSHEMS, the auditors were also provided with additional training to further enhance their knowledge and skills

in ISO 14001:2004 and OSHAS 18001:1999 Occupational Safety, Health Assessment Series. Routine auditing and systems review are the keys to the continuous improvement of the auditors' skills. PTP is carrying out internal safety, health and environment protection audits at regular intervals to verify whether the safety, health and pollution prevention activities are consistent with objectives and targets of the IMS standard. IMS auditing should be periodically evaluated. To ensure the continuing effectiveness of the PSHEMS, management needs to regularly review and evaluate information such as the results of audits, corrective action, current and proposed legislation, results of monitoring and complaints.

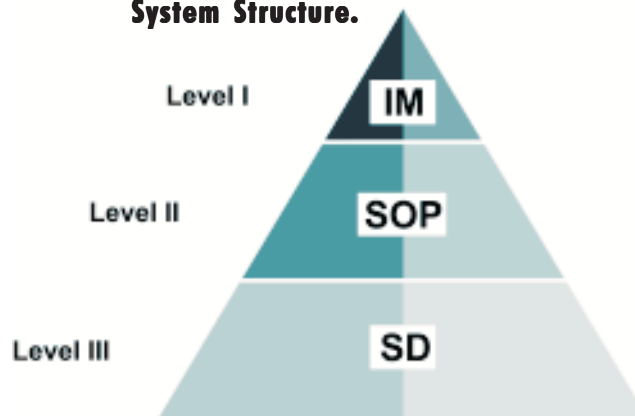
### Top Management Commitment and Leadership

PTP top management support has been very evident from the start of the project and is committed to support this initiative until the next phase of implementation. The Management has actively participated in the development of the HSE policy and is committed to provide a reliable and efficient service coupled with advance technology. The PSHEMS policy has been developed and derived from the review of business processes, task risk identification and legal requirements, both local and international. This policy will provide guidance for PTP to continually improve its operational efficiency, business development and organizational improvement.

**Figure 5. Process of HSE Policy Establishment.**



**Figure 6. Integrated Management Documentation System Structure.**



PTP's Top Management has committed to ensure that PTP would offer the best working environment to its employees in various aspects including their health, safety, job security and compensation and benefits. It is also PTP's policy to ensure, among others, the following:

- a. All potential and current employees are treated equally with respect to recruitment, hiring, training and promotion;
- b. A safe, healthy and environmentally friendly atmosphere and culture at all times; and
- c. HSE department has been established to advise Top Management on safety, health and environment related concerns.

PTP Management has also defined and documented the responsibility, authority and interrelation of all personnel who manage, perform and verify work relating to and affecting safety, health and the environment. PTP PSHEMS policy has clearly defined the ISO requirements in order to meet both stakeholders and shareholders expectation while complying with legal or applicable laws as specified under both local and international regulations.

### Challenges – Process Implementation

In achieving the integration process in PTP, one of the primary challenges faced by the project and implementation team was to achieve a

standardized and consistent approach to management across the company. This problem is obviously common in large companies or even in multinational companies. In PTP, the key difficulties were to match and interface between one process to another, which requires a standard model to eventually tie up with the overall management system. In addition, the general observation is on matching ISO interpretation and legal requirements with PTP's practices and standard needs.

Evaluating the significance of PTP's operation in relation to environmental aspects is another major challenge in implementing the PSHEMS. A wide range of values and parameters should be considered, encompassing perspectives of the main parties with an interest on PTP and its performance. Commonly referred to as stakeholders, such parties may include, for example, workers, shareholders, customers, regulators, the adjacent community and public interest groups.



## Ensuring Continual Improvement

The success of the PSHEMS implementation is highly dependent on its ability to integrate across functional areas within the organization. For example, since PTP obtained certification in ISO 9001:2000, the organization is always looking forward to increasing its ability to improve the existing system and practices especially when it comes to customers and other related business such as legal requirements and standard rules. The success of the PSHEMS relies heavily on both top management and bottom levels (personnel) to ensure that PSHEMS implementation is effectively adopted across all levels in the organization.

## Conclusion

The PSHEMS project served as a cornerstone for PTP to further enhance its operational efficiency, increasing production capacity, human capital development and performance standard. With this integration process, PTP shall move forward in ensuring best quality services and focus not only with customer satisfaction but also comply

with national and international laws and standards related to occupational safety and health and protection of the environment.

The PSHEMS project is a driving force for PTP to eventually project a higher corporate image and cost-effective operation in a more appropriate manner. A series of compliance processes on monitoring and surveillance assessment by the third parties would further ensure that PTP is committed to continuously improving its performance through process efficiency and value-added services and more importantly promote corporate responsibility through caring for the environment. ■

## References

- Carter, Adrian. 1999. *Integrating Quality, Environment, Health and Safety Systems with Customers and Contractors*.
- Integrated Management System Manual. Port of Tanjung Pelepas.
- Lim, T. E. and B.S. Niew. 1999. *Total Quality Management*. Simon & Schuster Asia Pte. Ltd.
- Mc Callum, D. and I. Fredericks. 1996. *The Utility of Risk Assessment and Risk Management in the ISO14001 Environmental Management System Framework*. [www.mgmt14k.com/96.thm](http://www.mgmt14k.com/96.thm).
- Port, Safety, Health and Environmental Management Code. GEF/UNDP/IMO Regional Programme on Partnership in Environmental Management for the Seas of East Asia.
- Quality Management System Manual Document. Port of Tanjung Pelepas.



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Aunporn Poopetch

and

Yawalak Haridamrong

PSHEMS Project Team,  
Bangkok Port

## Introduction

The Bangkok Port, one of five main public ports in Thailand, is located on the east side of the Chao Phraya River in Klongtoey District, Bangkok. Its area is divided into two parts: the Offshore Area, which is under the jurisdiction of the Port Authority of Thailand, begins from the Memorial Bridge of the Chao Phraya River downstream to the Gulf of Thailand and is about 66 km long; and the Inland Area, which covers about 930 acres, 340 acres of which are inside the customs fence and used for operational purposes. The remainder comprises 51 acres of operational area outside the customs fence, 30 acres for future expansion, 340 acres rental area for commercial use and housing projects, 100 acres of informal settlers, and 74 acres used for access roads.

# The Development of Port Safety, Health and Environmental Management System in Bangkok Port



Port network map of Bangkok Port.

Bangkok Port, which currently mainly serves feeder ships, will be developed to provide faster, more convenient and more economical services. With the twin objectives of attracting new business and increasing customer satisfaction, PAT introduced several new value-added services as well as standardized the existing services according to the Thai

Industrial Standard (TIS) 18000, ISM Code and other relevant regulations.

In addition, Bangkok Port has developed computer systems which are applied in various work processes such as the Container Terminal Management System (CTMS) electronic-based information system for the importation of cargoes and



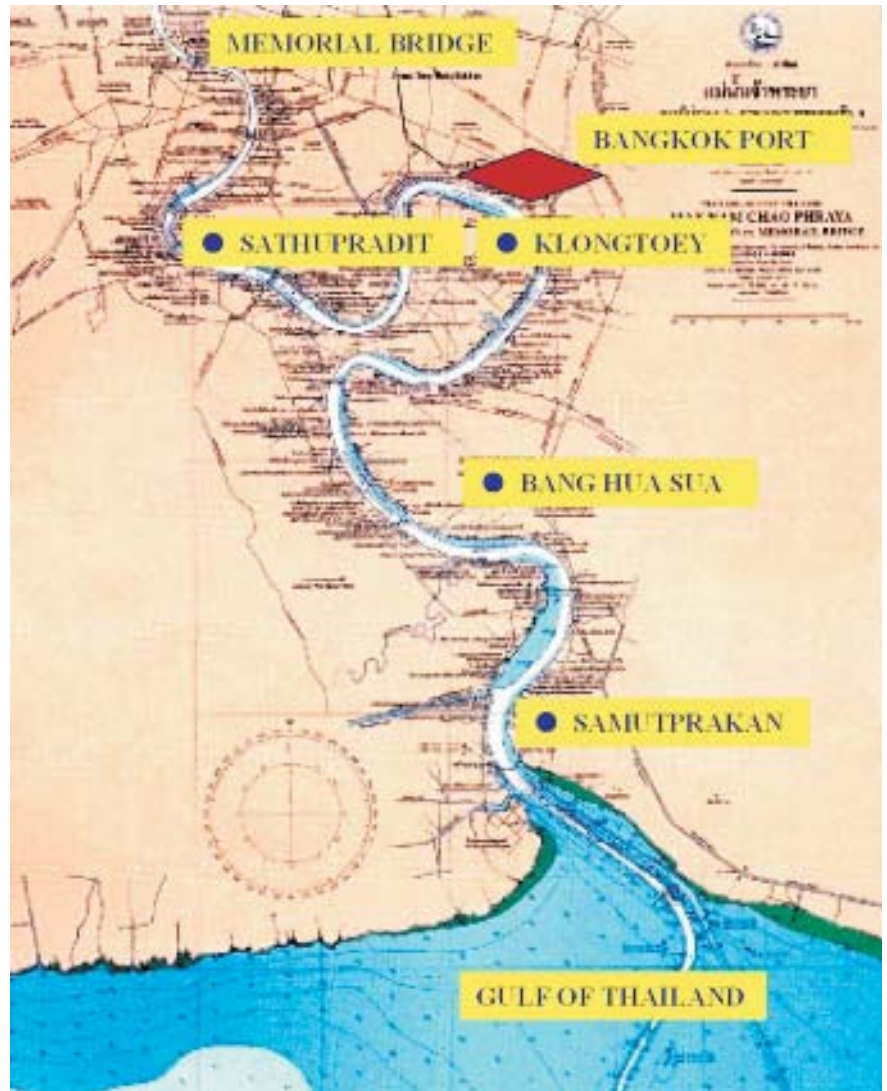
billing of port services, a Vessel Information Technology Center and an Electronic Data Interchange (EDI) to communicate with ship agents on the Inward Container List and Cargo Manifest. Bangkok Port has introduced the One-Stop Service to facilitate port customer procedures.

With the above initiatives in progress, Bangkok Port is continually searching for an effective port management system that will allow it to compete in the global market and achieve its business goals without compromising the safety and health of its employees and the environment.

In March 2005, the Global Environment Facility/United Nations Development Programme/International Maritime Organization Regional Programme on Partnerships in Environmental Management for the Seas of East Asia (PEMSEA) introduced the Port Safety, Health and Environmental Management System (PSHEMS) to PAT. Recognizing that the PSHEMS is an integrated management system designed to provide port authorities or individual port operators with a management framework for enhancing efficiency, cost-effectiveness and profit for their operations, the top management decided to implement the system in Bangkok Port.

## Top Management Support

A critical step in PSHEMS implementation is securing top management support. The PSHEMS Administrative Working Group (AWG) was established immediately after the

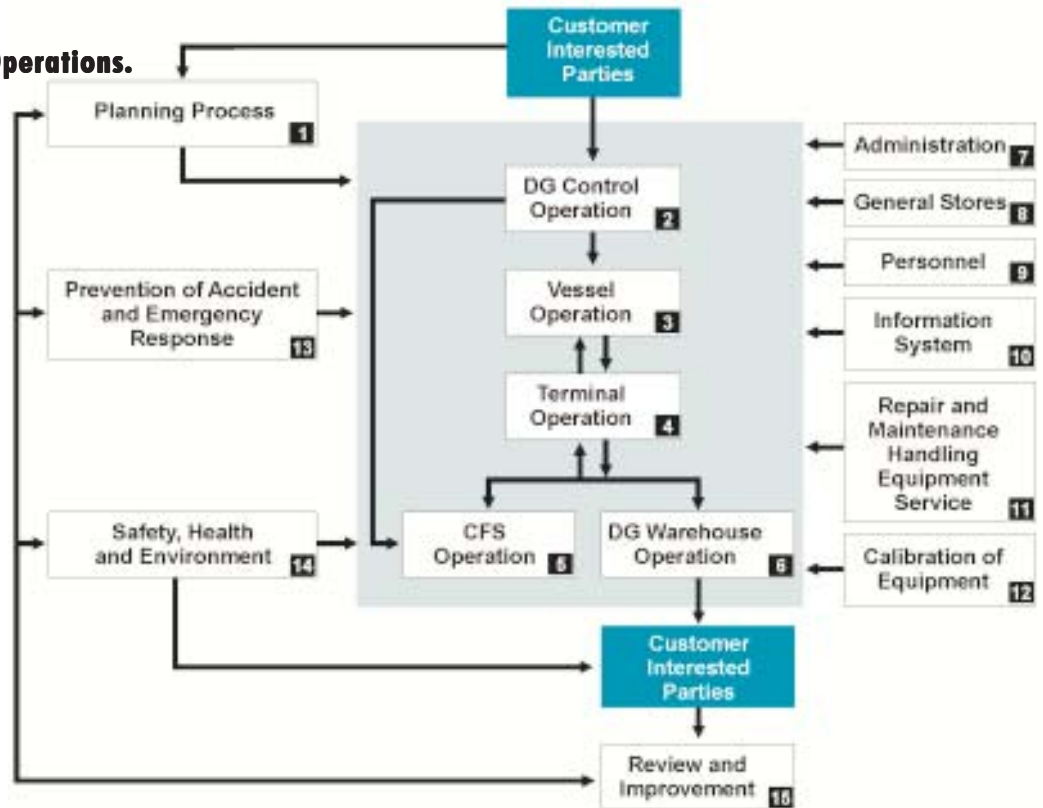


**Bangkok Port offshore area.**



**Bangkok Port inland area.**

**Figure 1: Bangkok Port Operations.**



PAT accepted the invitation of PEMSEA for Bangkok Port to be a pilot site of the PSHEMS project. The AWG is tasked to oversee the development and implementation of the PSHEMS. The Deputy Managing Director of Bangkok Port was appointed as the Project Leader of the Project Administrative Working Group.

To support the AWG, a working team composed of representatives from all concerned units was established to ensure that the development and implementation of the PSHEMS is well planned, monitored and supported by management. The units represented in the working team are the Dangerous Cargo Control Section, Dangerous Cargo Warehouse Section, Container Terminal, Port Environmental Division, Occupational Health Division, Handling Equipment Division, etc. Moreover, this working team was further sub-divided into three groups: operational, handling of

equipment and administrative. Each group was assigned a certain process to meet the PSHEM Code requirements. A PSHEMS working area was established at the Dangerous Cargoes Section to serve as the meeting room for the working team. The working team would spend one day in a week to undertake PSHEMS-related activities. These administrative arrangements facilitated the establishment of the PSHEMS in Bangkok Port.

## Defining the Scope of the PSHEMS

Since 1993, PAT has emphasized the importance of proper handling of dangerous cargoes in the port area. Hence, PAT considered the Dangerous Cargo Operation Services as the priority area for implementing the PSHEMS. Recognizing the manpower and financial resources required for

the implementation of the PSHEMS, PAT decided to limit the scope of its PSHEMS to the Dangerous Cargo Operation Services. This particular service is also considered as the core process in port operation which poses the greatest risk. Likewise, the port authority believed that starting with a smaller section of the organization was more manageable.

## Building Capacities

An important step in the PSHEMS Project was the training of port personnel on “Applicable International Regulations Concerning Port Operation and PSHEMS Design and Implementation.” The training on applicable international regulations covered the major international instruments concerning ports such as Recommendation on the Safe Transport of Dangerous Cargoes and Related Activities in Port Areas (IMO,

1995), SOLAS Chapter VI and VII (IMO, 1992), Code of Practice of the Safe Loading and Unloading of Bulk Carriers (IMO, 1998), APELL for port areas (IMO/UNEP, 1996) and Guidance Concerning Chemical Safety in Port Areas (OECD, 1996). Such training facilitated the identification of relevant international and national regulations relevant to Bangkok Port's operation.

In addition to increasing awareness and understanding of the project team on the relevant regulations, practical exercises enhanced their auditing skills and enabled them to assess the strengths and weaknesses in their port operation and identify areas for improvement. The result of the audit exercises were used as baseline information for the PSHEMS development of Bangkok Port.

The project team has underwent a series of training workshops to facilitate the establishment of the PSHEMS. Thirty key personnel comprising the PSHEMS project team were actively involved in the training and related activities. Furthermore, the training of internal auditors was an important component of the PSHEMS initiative in order to meet the requirements of the PSHEM Code, which requires the organization to carry out an internal audit at regular intervals to verify whether Bangkok Port's activities conform to the established management system. To date, Bangkok Port has 30 internal auditors who have undergone the required training and have the capacity to perform internal audits.

## Port Activity Related to IMO Safety , Security & Environment

Port Authority of Thailand joined in Port Safety and Environmental Management System Project under the support of GEF/UNDP/IMO Regional Programme on Partnerships in Environmental Management for the Seas of East Asia (PEMSEA) Bangkok Port was selected to be the demonstration site for implementation of Port Safety, Health and Environmental Management System (PSHE-MS)

Project Aims : To develop and demonstrate a strategic management framework for the safe transport and handling of dangerous cargoes and for the prevention and combat of accidents in ports located in the region

**10 STEPS FOR IMPLEMENTING A PSHE-MS IN PORTS**

- 10 - Final assessment
- 9 - Personnel Training
- 8 - Measurement & reporting
- 7 - Company procedures
- 6 - Port Authority procedures
- 5 - Project team
- 4 - Responsibilities and authority
- 3 - H & EP policy
- 2 - Strategic planning
- 1 - Initial assessment

 **Port Authority of Thailand**

## Responding to Applicable Legal and Regulatory Requirements

As a result of the initial status review, risk analysis and comparison between national and international regulations, Bangkok Port is now in the process of revising the procedure on Port Notification concerning the handling of dangerous cargoes in

order to comply with relevant national and international regulations. Some preventive measures were set up to reduce the risk identified from the risk analysis.

The setting up of objectives and targets provided Bangkok Port an opportunity to review and establish programs for significant aspects and hotspots in its port activities.

**In addition to increasing awareness and understanding of the project team on the relevant regulations, practical exercises enhanced their auditing skills and enabled them to assess the strengths and weaknesses in their port operation and identify areas for improvement.**

## PSHEMS Implementation

The PSHEMS manual development and implementation process adopted by Bangkok Port follows six steps, which ensures a properly and systematically planned system to control the process effectively. These are:

**Step 1** – Review documentation for functional adequacy. To check that procedures are complete and adequate to get the task done.

**Step 2** – Review documentation for compliance with ISO 9001, 14001, OHSAS 18001 and PSHEM Code requirements, include checking on document formatting, identification and control mechanisms.

**Step 3** – Revise if necessary to correct any inadequacies. In revising, incorporate documents arising from the document review by the procedure owner.

**Step 4** – Test procedure in operation. Issue controlled copies of procedures for implementation piloting. Test the procedures to

verify their work. Process owners and interface managers shall be involved.

**Step 5** – Make any final adjustments and implement controlled copy. Issue controlled copies for implementation.

**Step 6** – Update PSHEMS Main Manual and Process Manual accordingly.

Full implementation of the PSHEMS in Bangkok Port started in September 2005. This was supported by training of other support units, awareness building of port operators on the PSHEMS Main Manual and Process Manual and conduct of internal audit to ensure that the system is properly implemented, maintained and continuously improved.

The Project Administrative Working Group was tasked to implement the Management Review Procedure. It is their responsibility to ensure that the results of the audits and reviews have been brought to the attention of all personnel responsible

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in the area involved. They also have to make sure that all the corrective actions on deficiencies or non-conformities found are corrected and improved.

## Expected Benefits

Through the effective implementation of the PSHEMS, the management of Bangkok Port is confident that the following benefits will be derived:

- Improvement of the safety consciousness of personnel;
- Higher motivation of the port personnel;
- Reduction of accidents;
- Reduction of complaints;
- Building an environmental culture;
- Improving the port image; and
- Opening new potential commercial opportunities.

Likewise, with the PSHEMS, the Bangkok Port and the Port Authority of Thailand is assured that it can take a large step forward toward creating a safe and environment-friendly port in Thailand. ■



[www.pcq.com.au/2004/environment.cfm](http://www.pcq.com.au/2004/environment.cfm)

### Preventing Pollution for Profit: Environmental Management for Major Port Developments...

continued from page 11

both the Port of Rotterdam's efforts and the ICPR's Rhine Action Plan, in 1990 scientists landed a large Atlantic salmon in a tributary of the Rhine, marking the return of this iconic fish species to the now much cleaner river.

This ICM program is a classic model of working intelligently to prevent port environmental problems, by addressing them directly at their original source. In recognition of this success, in 2000 the Port of Rotterdam launched the second phase of its Rhine Research Project, and in parallel the ICPR launched its Programme Rhine 2020 — setting the wheels in motion for even cleaner and productive river and port environments for future generations.

## The Need for Action in East Asia

Many East Asian ports are located in estuaries and river mouths, and are facing huge environmental threats and costs from the activities of other

catchment users located upstream. Like the ports themselves, port-catchments in East Asia are also undergoing massive economic and industrial development. The ports of East Asia therefore stand to gain significant benefits from adopting an ICM approach in their environmental and overall port management systems.

Many other port managers in various parts of the world have now adopted the ICM approach. One example of geographical relevance to East Asia is the Ports Corporation of Queensland (PCQ) in Australia, which administers 12 ports including several within the ecologically sensitive Great Barrier Reef World Heritage Area.

The PCQ runs a comprehensive and responsible environmental program called EcoPorts ([www.pcq.com.au](http://www.pcq.com.au)) and is based on the concept of ICM. The PCQ has mapped the hydrological catchment boundaries for each of its ports on a geographic information system (GIS) and works through multi-stakeholder ICM Coordinating Committees at each port, to undertake pro-active ICM activities. These include, inter alia,

water and sediment quality monitoring, riparian revegetation, stabilization and erosion-control schemes, fisheries enhancement programs, habitat mapping and mangrove and seagrass monitoring and protection.

The PCQ approach may be of particular interest and relevance to ports in East Asia, as the tropical environments and ecosystems of Queensland, Australia are very similar to those in East Asia.

## Preventing Pollution for Profit

Perhaps one of the most striking features of the ICM approach to port environmental management is that it demonstrates the principle that ecological sustainability leads to improved business efficiency, a core objective of any port.

Traditionally, many port managers view environment protection as an unwanted cost-burden that impacts negatively on the port's bottomline. In reality, properly planned and implemented environmental activities, such as preventative, source-focused ICM programs that reduce the need for port dredging, and prevent the costly need to manage contamination and pollution after they have occurred, highlight the link between improved environmental protection and long-term port profitability. ■

# NEWS

## PEMSEA-Plymouth Partnership to Enhance Knowledge Sharing in Coastal and Marine Management

**QUEZON CITY, PHILIPPINES** — PEMSEA, Plymouth Marine Laboratory (PML) and Plymouth Marine Applications Ltd. (PMA) recently signed a memorandum of understanding (MOU) to enhance collaboration and share experiences and knowledge in the sustainable use and management of coastal and marine areas.

The new partnership includes mutual collaboration on organizing conferences, seminars, workshops and site visits to build awareness and understanding in integrated coastal and marine planning and management; share experiences and lessons learned with national and local government agencies of PEMSEA participating countries; identify opportunities for staff exchange; and build awareness through website linkages. The MOU was signed by PEMSEA Regional Programme Director, Dr. Chua Thia-Eng; Plymouth Marine Laboratory Director, Mr. Henry Durowse; and Plymouth Marine Applications Ltd. Director, Professor Nicholas J.P. Owens.

Based in the United Kingdom, PML is a collaborative center of the Natural Environment Research Council and was created to carryout fundamental, core strategic and applied research on issues of global change and sustainability. PMA is PML's wholly owned trading subsidiary. ■

## PEMSEA Works for Enhanced Port Safety, Health and Environment

**JOHOR BAHRU, MALAYSIA** — PEMSEA recently conducted a recognition audit for the Port of Tanjung Pelepas in Malaysia. The audit is part of a series of steps required for ports to attain recognition under PEMSEA's Port Safety Health and Environmental Management System (PSHEMS) initiative.

The audit, which was conducted in two stages from 26-27 September and 9-12 October respectively, found that the support and commitment of the top management of Port of Tanjung Pelepas was the driving force for the port's PSHEMS development and implementation. The audit produced good results as it was able to identify several areas for improvement towards the full scope implementation of the PSHEMS Code.


The PSHEMS recognition initiative is part of PEMSEA's efforts to build the capacity of port authorities and operators in the region in the safe handling and transport of dangerous cargoes in port areas and to demonstrate a comprehensive management framework to enhance the quality and safety of operation and pollution prevention of ports in general. The system uses the same fundamental system requirements as the ISO 9001-Quality Management System, ISO 14001-Environmental Management Systems, and OHSAS 18001-Occupational Health and Safety Management Systems, but is focused specially on port operations.

The Port of Bangkok in Thailand and the Port of Tanjung Pelepas in Malaysia were chosen as pilot sites for the PSHEMS initiative. The two ports have been undertaking a series of activities towards the full implementation of the PSHEMS. The project teams for the PSHEMS project of both ports have undergone a series of training workshops organized by PEMSEA in cooperation with the International Maritime Organization, which built both teams' capacities in designing and implementing a PSHEMS. The development and implementation of a PSHEMS is advantageous as it provides the framework to enable ports to obtain certification for ISO 9001, ISO 14001 and OSHAS 18001. ■


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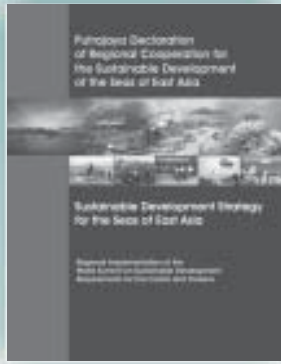
**Integrated Information Management System for Coastal and Marine Environment (User Manual, 62pp, with CD-Rom; and Guide to Establishing IIMS, 169pp).**



**Framework for National Coastal and Marine Policy Development, 75pp.**



**Sustaining Benefits, 38 pp.**



**Putrajaya Declaration of Regional Cooperation for the Sustainable Development of the Seas of East Asia — Sustainable Development Strategy for the Seas of East Asia, 111 pp.**

## University Students Practice Civic Consciousness with Manila Bay Cleanup

**MANILA, PHILIPPINES** — Over 3,500 officials, faculty members and students of the Polytechnic University of the Philippines conducted a coastal cleanup along the Baywalk area of the Manila Bay on 26 August. The cleanup was organized as an activity under the National Service Training Program (NSTP), a government-enacted program conducted in all tertiary schools aimed at enhancing civic consciousness among the youth.

Equipped with rakes, shovels and collection sacks, the volunteers collected a significant amount of shoreline garbage enough to fill six dump trucks. The cleanup was also a preparatory activity conducted in line with the Annual International Coastal Cleanup held every 3rd Saturday of September.

The cleanup was conducted with the support of the City Government of Manila, the Department of Environment and Natural Resources, Galing Pilipino Movement, the Philippine Coast Guard, the 106th Squadron of the Philippine Coast Guard Auxiliary, and PEMSEA's Manila Bay Environmental Management Project.

The activity serves as a good start in nurturing volunteerism, a sense of ownership and awareness among the youth on the need to improve the environmental condition of the Manila Bay. ■

## Nine Municipalities in China to Pursue Sustainable Coastal and Marine Development

**SIEM REAP, CAMBODIA** — Nine municipalities in PR China will be developing their own integrated coastal management (ICM) parallel sites in pursuit of sustainable coastal and marine development. In the Memorandum of Agreement (MOA) signed 2 August, between PEMSEA, the State Oceanic Administration (SOA) of China and the coastal municipalities of Dongying, Fangchenggang, Leling, Lianyungang, Panjin, Qingdao, Quanzhou, Wenchang and Yangjiang, the municipalities will implement the ICM framework and processes developed by PEMSEA through ICM parallel sites.

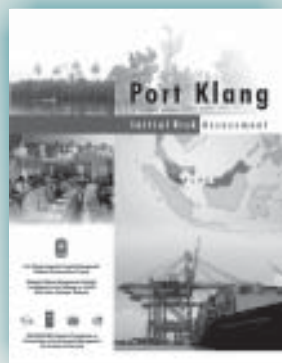
The MOA was signed by the SOA International Cooperation Department Director-General, Mr. Li Haiqing, and the PEMSEA Regional Programme Director, Dr. Chua Thia-Eng, in a ceremony held as part of the 11th PEMSEA Programme Steering Committee Meeting. Mr. Li Haiqing also represented the nine participating municipalities during the ceremony. The MOA aims to address the coastal and marine environmental and resource problems as well as the need for innovative management approaches in the nine municipalities. The municipalities recognize ICM as an effective approach to resolve multiple coastal and marine use conflicts, minimize adverse impacts on environment and ensure the sustainable socioeconomic development of coastal areas. The new agreement would serve as a means for PR China to enhance its ICM efforts. The agreement also has regional implications as the Sustainable Development Strategy for the Seas of East Asia calls for the scaling up of ICM programs across the region.

PR China is also home to Xiamen Municipality, one of PEMSEA's ICM demonstration sites. Xiamen has been an active ICM site for nearly a decade and has met with success in achieving sustained economic growth without compromising its environment. Xiamen's ICM experiences are expected to provide a good learning-base for the nine coastal municipalities as they start their own ICM sites. The nine coastal municipalities now join Quang Nam in Vietnam, Shihwa in the Republic of Korea, Sukabumi in Indonesia, and Bataan and Cavite in the Philippines as PEMSEA ICM Parallel Sites in the region. ■

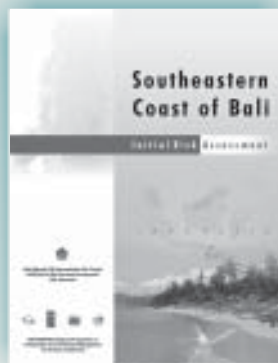
Visit the PEMSEA Media Center or the online bookstore at [www.pemsea.org](http://www.pemsea.org).



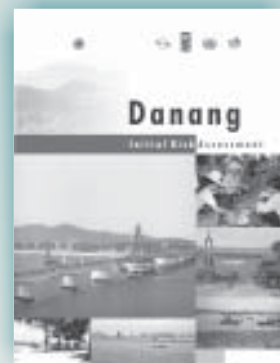
Bohai Sea Environmental Risk Assessment, 114 pp.



Port Klang Initial Risk Assessment, 96 pp.



Southeastern Coast of Bali Initial Risk Assessment, 100 pp.



Danang Initial Risk Assessment, 130 pp.

# NEWS

## Cities Share Sustainable Development Experiences in Xiamen Forum

**XIAMEN, PR CHINA —** Mayors and other local leaders from more than 20 coastal cities worldwide as well as international organization representatives participated in the 2005 International Forum for Coastal Cities held from 8-9 October, with the theme, "Intensifying Prevention and Treatment of Pollutants from Land-Based Activities and Protecting and Improving Marine Environments."

Over 300 participants attended the Forum which provided an efficient platform for exchanges on management practices and global cooperation to improve awareness of ocean environment and protection among people in China and the world at large. The conduct of this conference is considered an important first step towards the establishment of a stronger alliance of coastal cities worldwide.

The Forum was organized into three main sessions: the Special Report Session, the Experts Forum; and the Mayors Forum. During these forums, speakers and representatives from various coastal cities and regional and international groups shared their experiences and delivered special reports regarding the sustainable management of coastal cities.

Discussions in the forum focused on the following issue-areas: coastal management, management of land-based pollutants, protection of marine ecology, marine economy, near-sea economy, protection and development of islands, and the local implementation of the regional and international agreements on coastal and marine governance. The highlight of the forum was the signing of the Xiamen Declaration on Coastal Cities.

The Forum was jointly organized by the United Nations Environment Programme, State Environmental Protection Administration of China and the Municipal People's Government of Xiamen, in collaboration with Local Governments for Sustainability (ICLEI) and PEMSEA, and technically supported by the Sino-Europe Technology Promotion Center, Wageningen University of the Netherlands and Xiamen University.

The forum is set to become an annual event, with the next Forum to be held in October 2006. ■

# EVENTS

## Training Workshop on Integrated Environmental Impact Assessment for Coastal and Marine Areas

City University of Hong Kong  
4-9 June 2006



Organized and Sponsored by:

- Coastal Management Center (CMC)
- City University of Hong Kong (CityU)
- GEF/UNDP/IMO Regional Programme on Partnership in Environmental Management for the Seas of East Asia (PEMSEA)

The Training Workshop on Integrated Environmental Impact Assessment for Coastal and Marine Areas aims to train officials/administrators handling environmental impact assessment (EIA), coastal planners, academicians and other stakeholders in the concept, scope, implementation and benefits of IEIA so they can in turn integrate the practice of IEIA in the development of planning schemes for their respective countries.

The practice of IEIA is seen as a significant enhancement in coastal management in the region. Currently, the ecological and social consequences of proposed development plans within countries are determined by EIAs. However, EIAs are often conducted based on individual development projects, as and when they arise. An IEIA approach or "Strategic Environmental Assessment" considers the combined impacts of various development projects within the environment and permits a clearer understanding and appreciation of cumulative, synergistic and antagonistic impacts not easily detected or predicted through separate-based EIAs. Equally important is that integration effectively reduces or avoids duplication of efforts in information gathering.

The training workshop shall be held at the Centre for Coastal Pollution and Conservation of the City University of Hong Kong. The organizers are likewise making available a limited number of fellowships for interested participants from developing countries.

For more information interested parties can visit the workshop website at: <http://www.pemsea.org> or contact the Coastal Management Center at [coastal\\_mgt\\_ctr@yahoo.com](mailto:coastal_mgt_ctr@yahoo.com). ■



From: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



## **The Congress Secretariat**

P.O. Box 2502, Quezon City 1165  
Philippines



December 12 - 16, 2006  
Haikou City, Hainan Province, PR China

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- Information on Workshop Themes
- Information on Side Events
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- Letter of Recommendation
- Others (to be answered via e-mail):

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- All entries should be original, unpublished works. The Congress Secretariat shall not be held liable for claims of plagiarism or copyright infringement.
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- All entries must be in English. The author shall take sole responsibility for translation and proofreading / editing.
- Other provisions and guidelines to be announced.

For further information or if you have comments/ suggestions, please visit the EAS Congress 2006 website ([www.pemsea.org/eascongress](http://www.pemsea.org/eascongress)) or send an e-mail to the Secretariat through [congress@pemsea.org](mailto:congress@pemsea.org).

# The East Asian Seas Congress

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# Container Traffic in the East Asian Seas

The East Asian Seas region has been a center of considerable economic growth for the past two decades. Feeding this growth is a dynamic and fast-growing maritime trade industry which has made the East Asian Seas one of the busiest in terms of maritime shipping and port development.

In seaborne trade, cargo is transported using containers in a system known as containerization. Today approximately 90 percent of world cargo transported by ships is containerized. This page attempts to illustrate the container traffic growth of countries in the East Asian Seas region and to illustrate the relative sizes of its top container ports. The growth is significant.

The rise in containerized cargo traffic in the region is posing serious challenges as ports scramble to cope with the increasing demand. Concerns such as the safe handling and transport of cargoes in port areas, pollution prevention and enhancing the quality and safety of port operations are making themselves felt. For countries in the region, addressing these challenges would not only facilitate economic growth but help sustain the coastal environment, which plays host to this highly intense human activity.

### Sources:

AAPA. 2005. Port Industry Statistics. [www.aapa-ports.org](http://www.aapa-ports.org)

Cambodia International Seaport Sihanoukville Autonomous Port. 2005. [www.pas.gov.kh](http://www.pas.gov.kh)

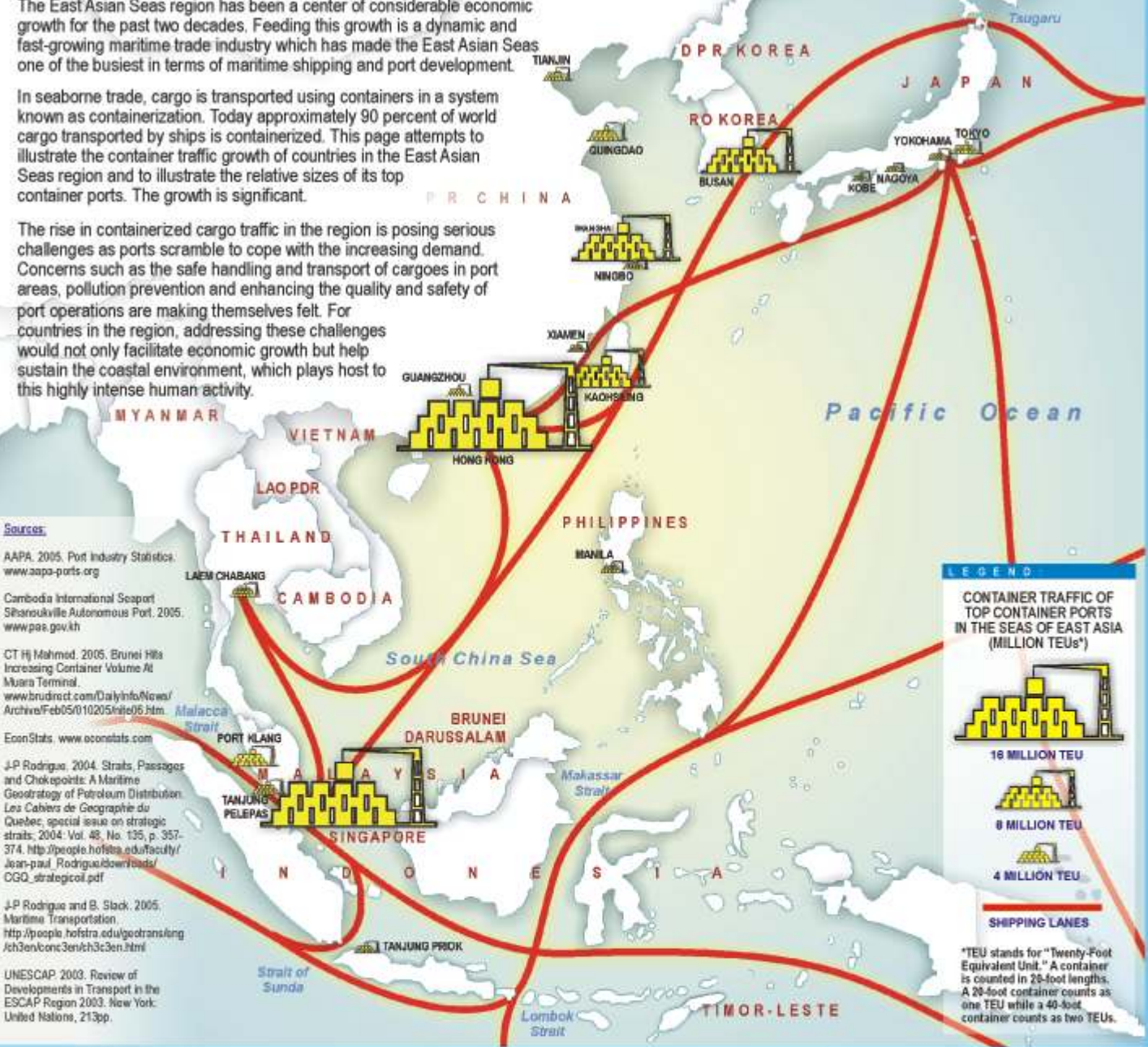
CT Hj Mahmed. 2005. Brunei Hiti Increasing Container Volume At Muara Terminal. [www.brudirect.com/DailyInfo/News/Archive/feb05/10205hit05.htm](http://www.brudirect.com/DailyInfo/News/Archive/feb05/10205hit05.htm)

EconStats. [www.econstats.com](http://www.econstats.com)

J-P Rodrigue. 2004. Straits, Passages and Checkpoints: A Maritime Geostategy of Petroleum Distribution. *Les Cahiers de Geographie du Quebec*, special issue on strategic straits, 2004. Vol. 48, No. 135, p. 357-374. [http://people.hofstra.edu/faculty/Jean-paul\\_Rodrigue/download/CGQ\\_strategicoil.pdf](http://people.hofstra.edu/faculty/Jean-paul_Rodrigue/download/CGQ_strategicoil.pdf)

J-P Rodrigue and B. Slack. 2005. Maritime Transportation. <http://people.hofstra.edu/geodtrans/eng/ch3en/conc3en/ch33en.html>

UNESCAP. 2003. Review of Developments in Transport in the ESCAP Region 2003. New York: United Nations, 213pp.



### LEGEND

CONTAINER TRAFFIC OF TOP CONTAINER PORTS IN THE SEAS OF EAST ASIA (MILLION TEUs\*)



18 MILLION TEU

8 MILLION TEU

4 MILLION TEU

SHIPPING LANES

\*TEU stands for "Twenty-Foot Equivalent Unit." A container is counted in 20-foot lengths. A 20-foot container counts as one TEU while a 40-foot container counts as two TEUs.

## ASIA PORT RANKING - 2003

| TOTAL CARGO VOLUME, METRIC TONS (000s) |            |             |         | CONTAINER TRAFFIC (TEUs, 000s) |            |                 |        |
|--|------------|-------------|---------|--------------------------------|------------|-----------------|--------|
| RANK ASIA                              | RANK WORLD | PORT        | TONS    | RANK ASIA                      | RANK WORLD | PORT            | TEU    |
| 1                                      | 1          | Singapore   | 347,694 | 1                              | 1          | Hong Kong       | 20,499 |
| 2                                      | 3          | Shanghai    | 316,210 | 2                              | 2          | Singapore       | 18,411 |
| 3                                      | 4          | Hong Kong   | 207,812 | 3                              | 3          | Shanghai        | 11,290 |
| 4                                      | 7          | Chiba       | 169,000 | 4                              | 4          | Shenzhen        | 10,615 |
| 5                                      | 8          | Nagoya      | 168,378 | 5                              | 5          | Busan           | 10,408 |
| 6                                      | 9          | Guangzhou   | 167,720 | 6                              | 6          | Kaohsiung       | 8,843  |
| 7                                      | 10         | Kwangyang   | 165,089 | 7                              | 12         | Port Klang      | 4,840  |
| 8                                      | 11         | Busan       | 162,490 | 8                              | 14         | Qingdao         | 4,239  |
| 9                                      | 12         | Tianjin     | 161,820 | 9                              | 16         | Tanjung Pelepas | 3,487  |
| 10                                     | 13         | Ningbo      | 153,960 | 10                             | 17         | Tokyo           | 3,314  |
| 11                                     | 14         | Ulsan       | 146,940 | 11                             | 19         | Laem Chabang    | 3,181  |
| 12                                     | 16         | Qingdao     | 140,900 | 12                             | 21         | Tianjin         | 3,015  |
| 13                                     | 17         | Kaohsiung   | 138,832 | 13                             | 22         | Ningbo          | 2,772  |
| 14                                     | 19         | Incheon     | 131,018 | 14                             | 23         | Guangzhou       | 2,762  |
| 15                                     | 20         | Dalian      | 126,020 | 15                             | 24         | Tanjung Priok   | 2,758  |
| 16                                     | 21         | Yokohama    | 125,943 | 16                             | 25         | Manila          | 2,552  |
| 17                                     | 22         | Qinhuangdao | 125,620 | 17                             | 27         | Yokohama        | 2,505  |
| 18                                     | 26         | Osaka       | 89,687  | 18                             | 29         | Xiamen          | 2,331  |
| 19                                     | 27         | Kitakyushu  | 88,890  | 19                             | 31         | Nagoya          | 2,074  |
| 20                                     | 28         | Port Klang  | 88,888  | 20                             | 32         | Kobe            | 2,046  |

## Container Port Traffic Growth of Countries in the East Asian Seas (2001-2003)

