



# ICM Solutions

## Gateway to a Blue Economy: Port Safety, Health and Environmental Management in the Port Authority of Thailand— Bangkok and Laem Chabang Ports

- Ports and harbors are an integral part of most coastal communities in the East Asia region. Not only do they serve as centers of economic activity in the respective communities, they also provide the gateway to domestic, regional, and international markets.
- The safety of port facilities, port workers, and the surrounding communities, and the protection of the environment are interconnected and synergistic elements in the management and operation of today's ports. Ports have an ever-increasing responsibility locally, nationally, and internationally with regard to policy, legal instruments, and standards covering maritime safety, protection of the marine environment, and sustainable development.
- PEMSEA's Port Safety Health and Environmental Management System or PSHEMS provides ports with a procedure for improving operational safety, safeguarding workers and surrounding communities and protecting the environment and port installations, while enhancing the efficiency and quality of services being provided to customers.



Port authorities and operators face a number of challenges with respect to their role and impact in sustainable development of coastal areas. The development and adoption of international safety, environment and security standards by global bodies have emphasized that an effective management system must not only encompass operational activities, but also build quality, safety, health and environmental objectives and procedures into each process. It is with this challenge and opportunity that the Port Authority of Thailand decided to implement the PSHEMS in Bangkok Port and Laem Chabang Port.

## Box 1. Port Safety, Health and Environmental Management (PSHEM) Code.

The PSHEM Code specifies the requirements for an effective port safety, health, and environmental management system (PSHEMS) to enable an organization to develop and implement policy, objectives that take into account legal requirements and information about hazards associated with its activities, which have or can have significant risk or impacts to safety, health, and environment (SHE).

The PSHEM Code is aimed at providing port authorities or any other company operating within the port, whose activities may have an effect on the health and safety of people, environment, cargo, and port installation, with a voluntary standard against which to measure the performance of their operations with regard to quality, safety, health and the protection of the environment. The PSHEMS Code is structured using the PSHEMS Continual Improvement Process:



*PSHEMS Continual Improvement Process.*



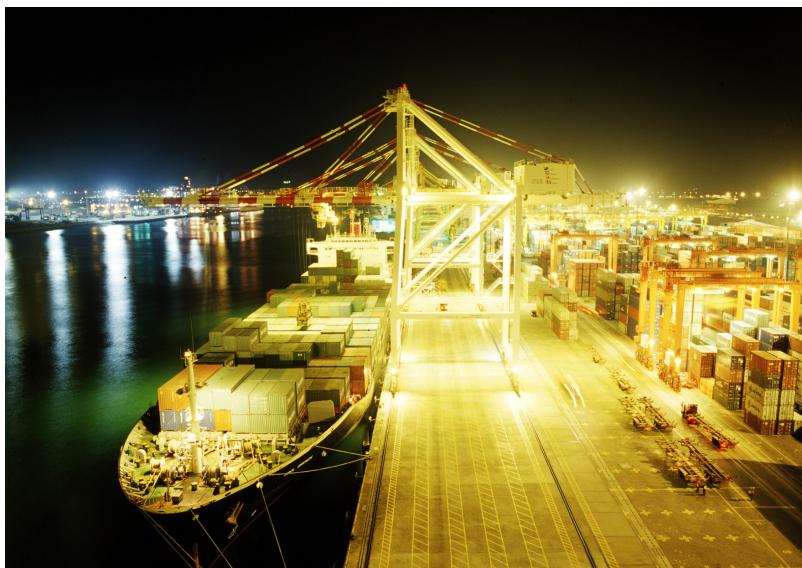
## Bangkok Port

**Explosion in the Dangerous Goods (DG) Warehouse:** An Abrupt Awakening for Bangkok Port. In March 1991, an explosion caused by an unidentified chemical occurred in the dangerous cargo warehouse of Bangkok Port. The accident caused losses of life, cargo, property and damage to the environment. Total damage was estimated at US\$ 8 million. The fire started in a warehouse for hazardous substances and spread rapidly via several large explosions. The unfortunate incident prompted the Port Authority of Thailand (PAT) to review the safety, health and environmental measures that were being used in managing port operations. Setting up of a new safety, health and environmental management system became a top priority of Bangkok Port.

## Laem Chabang Port

Laem Chabang Port (LCP) was encountering a number of challenges with regard to safety, health and environment (SHE) in the port, as well as conflicts with other coastal users in the area. Since the construction of the port, which involved dredging, land reclamation and construction of a breakwater, shore erosion and sedimentation were impacting on properties and users in the coastal area.

In addition, communities in the area were having issues with:



- trucks transiting, not just within the port area but also using all the roads connected to the port causing air pollution, increasing accidents, and economic losses (due to traffic jams);
- the volume of solid and hazardous wastes generated by the port's operations and the relatively poor waste management practices within the port;
- the perceived high risk due to the sheer volume of inbound and outbound dangerous goods cargo being handled each year (more than one million tons); and
- concern over the potential for targeted terrorism, involving, for example, destruction of property, port disruption, and environmental damage to the area.

**1. Organizing for the PSHEMS.** One of the first steps in developing the PSHEMS is to define the scope of the management system. For example, the initial scope of PSHEMS development and implementation in Bangkok Port was limited to DG handling since this is one of the core processes in port operations with the highest threat on safety, health and environment. Bangkok Port also took into consideration the availability of resources, manpower and time constraints in determining the scope of the PSHEMS. Later on, with the initial progress achieved in DG handling, the scope was broadened to include all other services in the organization.

The implementation of PSHEMS in Laem Chabang started with the management system of the Laem Chabang Port Authority focused on port governance. During the conduct of subsequent workshops for the PSHEMS, a private terminal operator agreed to develop a PSHEMS and be included in the pilot scope of LCP's PSHEMS. At present, other private terminal operators are expressing their interest and commitment to be included within LCP PSHEMS while other port operators are interested in obtaining their own PSHEMS recognition.

**2. Set up a representative PSHEMS Working Group.** To be able to effectively control and monitor the PSHEMS development and implementation activities, an Administrative Committee was established, headed by the Managing Director of Bangkok Port. To support the Administrative Committee, a working team composed of representatives from all concerned units in the port was established. The working team was subdivided into three groups: operational group, equipment handling group, and administrative group. Each group was assigned to review specific processes in order to determine their alignment with the PSHEM Code requirements (box 2). Bangkok Port also provided a working area to serve as a meeting room for PSHEMS-related activities. Apart from the working team, an internal audit team was also established and trained. The audit team was responsible for monitoring, control, and improvement of the PSHEMS.

**3. Build Capacity.** Several trainings were provided to the personnel of Bangkok and Laem Chabang Ports to equip them with the right tools and materials for the development and implementation of the PSHEMS. The first training provided to port personnel was on "Applicable International Regulations Concerning Port Operation and PSHEMS Design and Implementation." This training covered the major international regulations on port operations. The training facilitated the identification of international and national regulations relevant to the ports operations. Subsequent workshops were conducted to guide the local teams through the different phases of PSHEMS development and implementation (box 1).

## Box 2. PSHEMS Development.

A series of trainings on PSHEMS were conducted by the PEMSEA Resource Facility (PRF) and participated in by relevant departments of the port authority and operators. These trainings included:

- Phase 1: Understanding PSHEMS and Initial Status Review
- Phase 2: PSHEMS Strategic Planning
- Phase 3: System Development and Documentation
- Phase 4: Implementing and Monitoring
- Phase 5: PSHEMS Internal Auditing
- Phase 6: Continual Improvement of the PSHEMS

**4. Assess compliance with existing legal obligations.** The initial status review of the port management system required the port authority or operator to assess the existing management system of the port, including its compliance

with existing legal requirements. For example, the safe handling and transport of dangerous goods in Bangkok Port and Laem Chabang Port was assessed in relation to the International Maritime Dangerous Goods (IMDG) Code and Recommendations on the Safe Transport of Dangerous Cargoes and Related Activities in Port Areas. The specific provisions of these two international instruments were reviewed, and applicable provisions to both ports were identified. Action plans were then developed in the respective ports to address the gaps in the implementation of relevant and applicable provisions of these instruments.

# Results

## Bangkok Port

**Traffic management.** Traffic management was considered a priority concern for the port, as the solution to this problem would greatly enhance the management of safety, health and environmental concerns. With the support of the German International Cooperation (GIZ) under the Sustainable Port Development in the ASEAN Region project, the port undertook a Rapid Transport Assessment to study the existing traffic situation of Bangkok Port, prepared a streamlined emission inventory, and formulated a work program for the development and implementation of a Port Traffic Management Plan.

Short-term measures that were implemented included the introduction of traffic control policies and procedures at the gatehouse, the appointment of a Port Traffic Management Officer who cooperates with the Highway Authority to address offsite issues, and the introduction of a safety guidebook. Medium-term measures undertaken included the introduction of a Port Park and Ride scheme on a voluntary basis and the establishment of key routes as clearways. Long-term measures have been likewise initiated including the study for Bangkok Port's Land Use Master Plan and the program for the increased use of rail for the movement of goods within the port area. All in all, the aforementioned measures have yielded significant benefits and improved the traffic management capability of Bangkok Port resulting in faster turnaround time for equipment and the reduction of vehicle volume inside the port.

### Reduction of DG-related incidents

Several measures were undertaken to prevent accidents in the DG area. These included the strict regulation of access to the DG warehouse area for cargo trucks, which are now required to park in a designated area and can only enter the DG area when the dispatch process has already been completed. In addition, a safety sign was posted at the entrance showing the number of accidents that have occurred in the DG warehouse resulting in the increase in awareness for safety in the handling of DG and improvement in the compliance with DG control procedures.

In terms of capacity building, the DG training course has been revised based on the prescribed DG training course developed by GIZ. In particular, a dramatic reduction in the number of incidents/accidents related to DG handling has occurred and the zero incidents /accident related to DG handling was achieved.

**Improvements in the Overall Physical Environment.** With the implementation of the PSHEMS, Bangkok Port has likewise exhibited notable improvements in its physical environment, as shown in box 3.

## Laem Chabang Port

**Sustainable Waste Management Program.** In cooperation with the German International Cooperation (GIZ) for the implementation of the Sustainable Port Development in the ASEAN Region, the port improved the management of waste generated on board ships and cargo residues, and avoided daily illegal operational spillages and discharges.

## Box 3. Bangkok Port activities.

*Access area in front of the West Main Gate*



BEFORE



AFTER

The immediate outputs of the project were the development and implementation of the port regulations on waste management and the development of a Port Waste Management Manual.

**Reduction of greenhouse gases through LCP Green Port Program.** In 2010, Laem Chaebang Port initiated a Green Port program to address its carbon dioxide emissions. The port decided to set up a Wind Farm Power pilot project to increase the proportion of green energy to the port's total electricity consumption. Eighty-four units of 18-m high wind turbines designed especially for ports will be installed during the first phase of the project. The combined power generation capacity of all 84 units is around 840 kW/hr. The system is expected to generate electricity at an average of 2.5 million KW/yr, which will decrease CO<sub>2</sub> emissions to the atmosphere by about 1.4 million tons per year.

**Low Carbon Port Program.** It is now the policy of LCP that all new rubber tyred gantry (RTG) installations will be electric-powered in support of LCP's Green Port Program. Some private terminal operators, such as the LCB Container Terminal I Ltd, have started to modify their heavy-duty handling equipment (e.g., RTG crane) from diesel fuel to electrical power. After connecting the RTGs to the terminal electricity supply, it is expected that a reduction of about 1.80 ton of CO<sub>2</sub>/yr will be achieved for the 20 RTGs in this terminal.

In addition, since March 2009, Hutchison Laem Chabang Terminal Co., Ltd. has also started installing about 12 units of electric RTGs in container terminals C1 and C2.

LCP will likewise apply more electric supply for ships berthing at the quay wall.

**Natural Resources Conservation, Preservation of Mangrove Area within LCP.** Situated in a coastal area of a Laem Chabang village, the port has a natural mangrove forest covering an area of about 4.5 ha. To preserve its diversity, LCP, together with Laem Chabang Municipality and Kasetsart University, Sriracha campus, entered into a Memorandum of Understanding in the latter part of 2008 to collectively undertake activities to preserve and rehabilitate the mangrove forest.

This natural resources preservation program has also encouraged people to participate in many activities together such as collecting garbage, surveying types and density of mangrove plantation, replanting of the destroyed areas of the forest, monitoring sea water quality, etc. Moreover, academic activities around the port have been conducted to enhance knowledge about environment and natural resource preservation for the local communities and school and university students. Furthermore, the forest is used as a recreation site for the general public. LCP has likewise undertaken other activities related to natural resource rehabilitation, such as planting trees within and around the port.

## Lessons Learned

Most of the lessons learned by the Port Authority of Thailand with regard to Bangkok Port's and Laem Chabang Port's experience in the development and implementation of PSHEMS are management imperatives that can be applied in other ports and other port authorities and operators. Key lessons learned include:

- Securing top management and the port authority support was key to the sustainability of the PSHEMS, as top management provides not just the resources needed for PSHEMS but also the overall direction and strategy that would guide the whole organization.
- A working group and working teams composed of representatives from all concerned units ensured that the development and implementation of PSHEMS was relevant, well planned, and supported across the entire operation.
- With the limited available resources at the start of the PSHEMS project, the scope of work was focused on a small manageable area, namely the handling of dangerous cargo. This proved to be a good strategy not only in giving the port personnel experience in developing and implementing a new system cost-effectively, but also in addressing an area of the operation with greatest risk to health, safety and the environment.
- Although time consuming, proper and adequate training was essential in order to improve the competency of personnel tasked to develop and implement the PSHEMS.
- Internal audit and management review processes were necessary for the management system to remain effective and be continually improved, including adapting policies and procedures to applicable new or amended national and international regulations, and revising existing rules and regulations accordingly.
- The exchange of knowledge and experience and knowledge in safety, health and environment with other ports, port authority and port operators, local governments and universities was a mutually beneficial way to improve port SHE governance.

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