Great Lakes Maritime Research Institute

A University of Wisconsin - Superior and University of Minnesota Duluth Consortium

Title Environmental Effects of Marine Transportation:
Develop an Environmental Management System Model
University No: 144 051038 4

Type of Report: Final Report

PI Name
Lynn A. Corson, Ph.D., Director

Clean Manufacturing Technology Institute
2655 Yeager Road, Suite 103
West Lafayette, IN 47906
Ph: 765-463-4749
Fax: 765-463-3795
E-mail: corson@purdue.edu
Web: http://www.ecn.purdue.edu/CMTI

Co-PI Name
Steven A. Fisher, Executive Director

American Great Lakes Ports Association
700 12th Street NW, Suite 700
Washington, DC 20005
Ph: 202-625-2101
Fax: 202-625-2104
E-mail: fisher@greatlakesports.org

Date of Report
October 30, 2008

PI's Host University, Department, and address
Purdue University
Center for the Environment
503 Northwestern Avenue
West Lafayette, IN 47907

PURDUE UNIVERSITY

This report represents the results of research conducted by the authors and does not necessarily represent the views or policies of the Great Lakes Maritime Research Institute. This report does not contain a standard or specified technique. The authors and the Great Lakes Maritime Research Institute do not endorse products or manufacturers. Trade or manufacturers' names appear herein solely because they are considered essential to this report.

Research funded in part by the Great Lakes Maritime Research Institute.
This study was supported by the U.S. Maritime Administration
Grant # DTMA1-G-06-005

Executive Summary

The American Great Lakes Ports Association partnered with the Clean Manufacturing Technology Institute (CMTI) at Purdue University in West Lafayette, Indiana to examine the environmental management aspects of port operations, including the oversight of tenant operations that could negatively impact the environment.

The research was conducted via two-day site visits to twelve American and Canadian ports and interviews with port and tenant personnel, tours of port/tenant facilities and internet and other document research.

The research and the analysis of operations at the twelve ports revealed:

- The form of governance (municipal unit, independent public authority, state/federal chartered) may influence the oversight of tenant operations;
- In some cases, the provisions of port lease agreements with tenants pertaining to environmental protection could be strengthened;
- The issuance of environmental permits to ports and their tenants are not uniform among the states/provinces;
- Ports would benefit from developing a "master" plan for controlling stormwater run-off and responding to spills/releases of hazardous materials, both of which are regulated activities;
- Ports have engaged in environmental projects of various types, individually and with partners, affecting their property and neighboring property;
- Community outreach programs to engage, involve and respond to the public vary considerably among the ports.

The research has produced an environmental management system "model" for adoption by small, public ports and a manual of best management practices to prevent or reduce negative impacts on the environment from port and tenant operations.

The major operations analyzed included:

- Dry bulk storage and handling
- Liquid Bulk storage and transfer (loading/unloading)
- Non-bulk chemical storage and handling
- Port cargo handling equipment and rail/truck operations powered by diesel engines
- Vehicle and equipment fueling
- Port authority oversight of tenant activities through lease agreements
- Management of hazardous and non-hazardous waste generated by port/tenant activities
- General operations that can impact neighboring areas: noise, light, odor, trash, dust
- Building and grounds maintenance

Each operation was analyzed in terms of its potential environmental impacts to air, water, groundwater and land. Over 180 best management practices (BMPs) are recommended for the nine operations; 40 regulatory citations supporting the BMPs are included and 40 sources (references) of information are provided to assist the ports/tenants with implementation of the recommended BMPs.

The “model” Environmental Management System (EMS) produced by the project used the ISO 14001: 2004 Environmental Management System Standard as the guide. All 17 elements of the Standard are included and tailored to port operations. An abbreviated EMS form was also prepared: the Environmental Management Program form allows port authority personnel to organize and manage their port operations with consideration given to the environment in which those operations occur.

The relationship between the port/tenant operations and the BMPs pertinent to those operations is strengthened by inclusion of both in the port’s EMS. The Best Management Practices Manual produced by the project can be used by ports seeking to implement operational controls (BMPs) to reduce the actual or potential environmental impacts resulting from an aspect of a port operation.

Introduction

As a component of the Great Lakes-St. Lawrence Seaway Maritime Industry's "Green Marine" initiative, the American Great Lakes Ports Association (AGLPA) approached Purdue University (CMTI) in 2006 to assist them in developing a project to: 1) survey environmental practices at Great Lakes ports, 2) compile a catalogue of best management practices for port operations, and 3) develop a simplified Environmental Management System tool that would help small port entities improve environmental performance.

Developed jointly by Purdue-CMTI in partnership with AGLPA, the project evaluated twelve U.S. and Canadian ports with regard to a host of environmental issues. The goal was to identify areas of opportunity at Great Lakes ports for environmental improvement. Perhaps of greatest use, the project developed a manual of best practices that will assist small ports in finding ways to manage environmental issues within limited budget and staff resources.

As the owners and stewards of considerable tracts of land in many Great Lakes cities, the ports are eager to address any environmental liabilities and, also, to identify opportunities for possible new restoration projects.

Background

The research project was conducted in two phases. The objective of the first phase of the project was to develop an environmental survey tool using information gathered from a series of two-day site visits at four Great Lakes ports. After receiving approval of representatives of the American Great Lakes Ports Association, project staff proceeded to use the tool for subsequent surveys, in the second phase of the project, at eight other American and Canadian Great Lakes Ports.

The aspects of the survey tool that comprised the focus of the site visits include:

- The form of governance of the port authority (e.g., independent public authority, unit of local government or state or federal chartered) and its influence on a port's oversight of environmental management;
- The legal (e.g., lease) and other forms of agreement between the port authority and its tenants governing tenant operations and the potential environmental impacts of such operations;
- The compliance and permit status of the port authority and its tenants, pursuant to local, state or provincial, and federal environmental regulations;
- The adequacy of the infrastructure and protective measures provided by the port authority for its tenants or by its tenants (especially those with "bare ground" leases) to prevent spills/releases of hazardous or potentially hazardous materials (e.g., salt, fertilizer, cement, petroleum products) that could contaminate port authority property and/or waterways;
- The relationship between the port authority and its tenants for clean-up and/or remediation of property contaminated by spills/releases of hazardous materials;
- The relationship between the port authority and rail lines and trucking companies serving the port authority and its tenants, as it pertains to environmental protection;
- The relationship between the port authority and neighboring private property owners/operators using common port facilities and waterways, as it pertains to environmental protection;
- Review of past and recent environmental accomplishments (e.g., wetlands restoration, brownfield redevelopment) and community outreach programs pertaining to environmental matters.

Each of these will be examined in the remainder of this report.

Research Approach

The research project involved a series of two-day site visits to twelve Great Lakes ports. The visits included interviews with port directors and other administrative staff, staff or consultants responsible for environmental matters, management staff at tenant operations, local planning officials, economic development officials and other government representatives and a driving and walking tour of port and neighboring property, including tenant operations.

Documents, including those provided by port personnel as well as annual reports and marketing brochures collected during the visit were reviewed. The environmental regulatory compliance and permit status of each port and its tenants was accessed via federal and state or provincial websites providing such information prior to the visits.

The Port Environmental Survey Form (Appendix A) was used to guide the interviews and the tours and record the information for the subsequent preparation of the port report.

Findings and Analysis

Governance

The ports visited differ markedly in governance and environmental management and the form of governance (e.g., independent public authority, unit of local government, state or federal chartered entity) appears to influence, but not totally determine, a port's authority and predisposition to exercise oversight of, for example, the operations of tenants that could have a negative impact on the environment. The resources available to the port - - staff, consultants and budget - - also influence the priority given to environmental management of port and tenant operations.

Tenant Lease Agreements

One obvious way of attempting to influence tenant operations, vis-à-vis environmental protection, is through the lease agreement offered by the port.

A review of lease agreements for the ports visited revealed a variety of provisions pertaining to tenant environmental responsibilities:

- Tenant must comply with all federal, state and municipal environmental laws, regulations, ordinances; agree to use the site consistent with its intended use; responsible for obtaining environmental permits;
- Tenant must comply with all environmental laws and regulations; indemnify port with respect to claims, orders, actions regarding pollutants or toxic substances; responsible for clean-up and solely responsible for damages;
- Tenant must comply with all local, state and federal laws and regulations; indemnify the port; provide notices of non-compliance; pay all costs associated with spills, clean-up and remediation of leased property (even if not required by a government agency); annually provide copy of emergency preparedness and response plan; annually provide list of hazardous materials; seek approval of the port to install USTs (Underground Storage Tanks); allow port to inspect the property and conduct environmental audits and site assessments, including at the termination of the lease; extend lease provisions to sub-lessee.

The range of provisions, from basic "boilerplate" to comprehensive oversight of tenant operations that could impact the environment, could reflect the port's form of governance and the environmental knowledge of the attorney who drafted the lease more than the management prerogative of the port authority or its administration. It is also apparent that the "landlord-tenant relationship" is crucial to achievement of the economic development goals of the port. Port management made it clear that they were not regulators and that other agencies of state, municipal and federal government had that role.

Tenant and Port Regulatory Compliance and Permit Status

Compliance inspections by state/provincial and federal agencies are and should be made and most of those interviewed thought regulatory oversight to be reasonable and useful.

With regard to permitting, some of the findings include:

- Air permits are most prevalent among tenants, followed by hazardous waste (RCRA) and water discharge (NPDES); Confined Disposal Facility permits for dredged material is most common among ports;
- Compliance enforcement by government authorities is not uniform and some tenant facilities that are not permitted should be;
- Larger tenants with regional or nationwide operations appear to be in full compliance;
- Control of fugitive dust from access roads and bulk product storage and handling is a challenge to ports and tenants, alike;
- Diesel emissions from ships, cranes, other heavy equipment, trains and trucks is not perceived as a problem, but is not uniformly monitored by government agencies.

Environmental compliance of the port authority, its tenants and adjacent non-tenant marine operators appear to be influenced by a combination of: management resources, community interest, local, state and federal regulatory oversight and corporate oversight.

Preventing/Controlling Stormwater Run-off and Hazardous Materials Spills

The water-side location of ports and most tenants poses a more significant environmental concern than for facilities located inland, especially with regard to stormwater run-off and hazardous materials spills.

Below are some of the findings from the port visits:

- Stormwater run-off from bulk storage piles, bulk tank secondary containment structures, piers and dredge areas is being addressed at some locations by the installation of infrastructure modifications (e.g., detention ponds, stormwater drains, catch basins, low-profile berms at the edge of piers, sloping the edge of piers away from the water); however, protections appear to be inconsistent depending on the age of the facility, the jurisdiction (state/province), and the type of cargo-handling activity taking place;
- At U.S. ports, liquid bulk tank farms and fueling facilities have federally-required Spill Prevention Control and Countermeasure (SPCC) Plans;
- Ports would benefit from efforts to develop a “master” environmental response plan addressing releases from the transfer, movement and storage of materials at or by tenant facilities, ship owners, rail lines, truck lines and adjacent property owners;
- Not all port authorities are on the “call list” or require “first call” status when a spill occurs on its property occupied by a tenant;
- Individual tenants or transporters may have a plan or procedures that exist independent of others;

- Emergency response organizations are either the local fire department or a contract spill response organization -- some of the latter are tenants of the port;
- With regard to spills in navigable waters, in some locations the Coast Guard is not considered a "first responder" organization;
- In general, spill response procedures seemed to differ by location, depending upon municipal and state/provincial requirements. Spill response notification procedures were not always commonly understood;
- In the U.S., stormwater regulations applicable to municipal and other public facilities were promulgated in 1999 and some Great Lakes states are only now issuing permits, so regulatory compliance and enforcement is generally lacking. Also, stormwater run-off doesn't have the same visibility or receive the same public scrutiny as air emissions and hazardous waste generation because of the general perception that it's a natural consequence of precipitation -- in other words, "it's always been there."

The Spill Prevention, Control and Countermeasure (SPCC) Plan required by the U.S. Environmental Protection Agency incorporates requirements that apply not only to petroleum production and petroleum storage operations, but to port operations, such as the transfer of petroleum and chemical products from vessels to storage tanks, trucks and rail tankers.

Some U.S. port operations and many tenant operations are subject to these rules and some of both groups have SPCC plans and conduct drills to "practice the plan," but more of both groups need to.

Past and Recent Environmental Program Accomplishments

It is apparent that ports are aware of the environment in which they are located. Their introduction to environmental concerns has usually been a result of community input or large projects such as contaminated sediment remediation, brownfield redevelopment, management of dredge material disposal, etc.

Ports have engaged in cooperative environmental projects with neighbors to restore wetlands; other ports have initiated marine recreation improvements (e.g., marinas), improved fish habitat and restored shorelines, some with walking trails for the recreating public.

The community outreach programs vary among the ports visited. Some ports have adopted a policy of inclusivity and may regularly meet with citizen groups, organize advisory committees, include representation on their governing board, establish a "hotline" for the public to report perceived environmental problems and other such measures. Other ports may only post the schedule of their Board or Commission meetings in the local newspaper, pursuant to public notification requirements.

Potential Economic Impacts of the Research Results

For large port businesses incorporating transportation, processing, storage, manufacturing and similar operations, many of which involve hazardous and polluting materials, the environmental impacts of incidents due to improper or inadequate management can be considerable, especially because of their location on the Great Lakes.

There are no environmental impacts -- negative or positive -- in the port or any other business sector that are not directly or indirectly linked to economic impacts. One port manager stated that "what is good for the environment is good for business."

The outcomes of this research, included below, need to be viewed from both the environmental and economics perspective:

- An increased awareness by port directors and staff as to the potential impact of their and their tenants' operations on the environment;
- An increased understanding of the role/responsibility of a port authority for the operations of its tenants that could impact the environment;
- Possible changes in the policies, procedures and practices employed by port authorities for improved management of port property and oversight of tenant operations;
- Most public ports surveyed operate as "landlord" ports -- leasing publicly-owned land to commercial businesses. The role of these ports -- as an engine of economic development -- is critical to the local economy and their success could be adversely affected if they adopted a quasi-regulatory role with respect to the oversight of tenant and lessee activities that have the potential to impact the environment. Consequently, the role of state/provincial regulatory officials remains critical.

(Page intentionally blank)

Appendix A

Port Environmental Survey Form

(Page intentionally blank)

Port Environmental Survey: _____
(Name of Port)

Date of Site Visit: _____ Survey Team Member: _____

1. General Information

   a. Description of port governance structure, staff, resources, budget:

   b. Physical configuration of the port:

   c. Types and tonnage of cargo handled at the port:

   d. Number of facilities and acres within the port authority's jurisdiction:

   e. Number of facilities and acres adjacent to the port authority's jurisdiction:

2. Names of Lessees	Activity/Product	Building/or Outside Area (*If bare ground)

3. Port Land Use (General Observations)

   a. Drums, tanks (including AST or UST) or other containers used for chemical or petroleum storage:

   b. Pits, ponds or lagoons for storage or treatment of wastewater or stormwater:

   c. Standing pools of water or wet areas not caused by weather conditions:

   d. Stained soil or pavement or dead or stressed vegetation:

   e. Random accumulation/storage of solid waste material (including recyclables):

   f. Transformers, capacitors or hydraulic equipment which may contain PCBs:

I. Stormwater runoff (with materials migration) from outside dry bulk storage areas:

   h. Secondary containment of liquid bulk storage tanks:

i. Wastewater discharged to a treatment plant within or outside port property:

j. Sensitive environmental resource (e.g., wetland) proximate to port-owned land:

k. Dredge material disposal/use:

l. Operations/activities that are obvious sources of air emissions (e.g., diesel, dust):
- tenants
- trucks, trains, ships entering and operating on port property
- truck, fork lifts, cranes and other port or tenant-owned equipment

4. Port Spill Response Operations

a. Material handling operations, such as dry and liquid bulk on-loading/off-loading and storage, are performed according to procedures that prevent migration of material or spills/releases to waterway:

b. The port authority and the rail lines and trucking companies serving the port have an agreement regarding response to and responsibility for spills and releases:

c. The port authority and neighboring private property owners have an agreement regarding response to and responsibility for spills and releases:

d. The port authority and its tenants have an agreement regarding response to and responsibility for spills and releases:

e. The port authority and ship owners serviced by the port have an agreement regarding response to and responsibility for spills and releases:

5. Port Environmental Management

a. Provisions of existing environmental policy:

b. Designation of staff with responsibility for environmental matters and description of tasks in pertinent job description(s):

c. Existence of a reporting system for environmental incidents: type of incidents recorded; fines paid; legal issues pending:

d. Estimated annual expenditures for environmental protection: personnel and non-personal categories:

e. Estimated annual research and development expenditures for environmental protection improvements:

f. Description of environmental training programs for employees:

g. Description of community outreach programs pertaining to environmental matters:

h. Description of how landlord ports work with tenants on environmental issues:

i. Provisions of lease agreements or other instruments with tenants governing environmental matters:

j. Description of the major environmental liabilities at each port area:
    a. on port authority land

    b. on land adjacent to the port authority

k. Description of the major environmental successes at each port:
    a. as a result of port authority action

    b. as a result of the action of others

l. Description of "brownfields" or other reclamation on port authority land:

m. Description of any port authority interaction with local government planning officials:

6. Compliance and Permit Status of the Port Authority and its Tenants:

(Remainder of page intentionally left blank)