MODEL FOR CONTROL OF SOLID WASTES FROM VESSELS

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Abstract: - In spite of being regulated by international conventions and specific legislation, the disposition of solid wastes in the oceans is one of the major problems that the world currently faces. The pollution in the oceanic environment represents risks for the sea species (fauna and flora), damage to fishing and navigation, as well as economic losses with reflexes on the reduction of tourism and cleaning expenditures. This article presents a model for control of solid wastes from vessels.

Keywords: - Solid wastes, Scanning, Tracking, Monitoring, Garbage Management

1 Introduction
The production and destination of the solid wastes represent a global problem, especially when considering that a large portion of the wastes generated because of the miscellaneous human activities has an improper final destination. The impacts resulting from the improper final disposal of these wastes may be evidenced by the pollution of the hydric resources, the air, the soil, besides other environmental, economic and social problems.
The several solid wastes generated in areas with large flow of transportation means, cargo and people from other countries may represent a form of propagation of diseases that are important for public health. Therefore, the different types of wastes produced in the port area or from vessels (the garbage generated on board must be delivered to the management of the port) need to be properly managed, that is, they demand separation and final disposal according to a specific legislation, in order to avoid the propagation of diseases, protecting the population’s health and the environment.

According to Araújo, quoted by Philomena and Quintana (2007), the wastes generated in land or on board demand care as regards the environment. He highlights that the types of garbage generated by ships mainly correspond to: Domestic garbage (wastes of food, plastic, cans, bottles, dishes, paper, cardboard and infirmary wastes); maintenance garbage (oily oakum and clothes, wastes of parts, smut, package material, ashes and refractory material, rust and remainders of paints); and operating garbage related to the cargo (wedges and braces for cargo, canvas and cargo covers and belts for tying of cargo, among others).
The issue of management of solid wastes is a challenge for Brazilian ports, as regards the classification, collection, treatment and proper final disposal of the wastes, and, therefore, it is necessary to invest in measures that can minimize their negative effects and thus avoiding potential damage to the environment, introduction of diseases that are relevant for public health with risk of epidemic surges, as well as to fight smuggling and illicit drug dealing.

2 Legal Concepts
According to the International Convention for Prevention of the Pollution Caused by Ships - Marpol 73/78 (main international convention on the prevention of the pollution of the marine environment by vessels, completed in 1973, changed by Protocol of 1978 and later amendments, ratified by Brazil), the supply of facilities and services for reception of wastes in the national ports must be provided. The type and size of the facilities depend on the needs of the ships that visit the port. For the definition of a strategy for the management of wastes, the realization of a data survey, studies and evaluations of each port are required.

Exhibit V – Rules for Prevention of the Pollution by Ship Garbage – of Marpol 73/78, describes the rules for prevention of pollution for garbage of the ships in the oceans, and authorizes the pouring to the sea 12 miles away from the coast, the food wastes that have been crushed, and prohibits the pouring in the sea of plastic objects, including cables, fishing nets of
synthetic material, papers, clothes, glasses, metals, bottles, dishes and package material, among others. Consolidating the internalization of the principles of protection to the environment, Federal Law No. 9,966, of April 28, 2000, provides on the prevention, control and inspection of the pollution caused by the throwing of oil and other noxious or dangerous substances in waters under the Brazilian jurisdiction. It establishes that the organized port, port facility and platform, and its support facilities must have proper facilities or means for the reception and treatment of the several types of wastes and to fight pollution, subject to the norms and criteria established by the competent environment agency. It also prohibits the discharge of any kind of plastic, including synthetic cables, synthetic fishing nets and plastic bags in waters under national jurisdiction.

Resolution No. 005, of August 05, 1993, of the Brazilian Environment Council (CONAMA), applies to the solid wastes generated in the ports, airports, railway and highway terminals and health service providing establishments. In its article 5, it considers the obligation of presenting the Solid Waste Management Plan (PGR) to be submitted to approval by the competent agencies. Further, this Resolution contemplates a classification for identification of the different kind of solid wastes generated.

In the same line, Resolution RDC No. 217, of November 21, 2001, of the Brazilian Sanitary Surveillance Agency (ANVISA) approves the Technical Regulation aiming at promoting the sanitary surveillance in the Sanitary Control Ports installed in the Brazilian territory, of vessels that operate transportation of cargo or travelers in these places.

ANVISA-RDC Resolution NO. 56, of August 6, 2008, revoked RDC No. 342/02 and changed RDC No. 217/01, provides on the Technical Regulation of Good Sanitary Practices in the Management of Solid Wastes in the area of Ports, Airports, Border Passages, and Customs Areas. It establishes that the managing companies and its consignees, lessees, port lessees and the companies that provide service related to the steps of management of solid wastes must implement, based on scientific, technical and normative foundations, the Good Sanitary Practices in the Management of Solid Wastes. Further, it determines that, for the removal of solid wastes from vessels, the sanitary control ports must have procedures related to the collection, transportation, treatment and final disposal, in accordance with the provisions of the regulation.

In addition, ABNT NBR 10004/2004 establishes the classification of solid wastes as regards their potential risks to the environment and to public health, so that they can be properly managed.
2.1 Solid Waste Classification

According to CONAMA Resolution No. 005/1993, solid wastes can be classified as follows:

GROUP A: wastes that present potential risk to public health and to the environment due to the presence of biological agents. Blood and blood byproducts, animals used in tests, as well as the materials that have had contact with them, excretions, secretions and organic liquids, tissues, organs, fetuses and anatomic parts, filters for gases aspirated from a contaminated area, wastes from clinical tests labs, wastes from ambulatory service units, wastes from toilets of inpatient and outpatient units and animals that died in the transportation means, punching or cutting objects, razor blades, bistouries, needles, scalpel, broken glasses, among others are included in this group.

GROUP B: Wastes that present potential risk to the public health and to the environment due to their chemical characteristics. Chemotherapy drugs and products contaminated by them, pharmaceutical wastes (expired, contaminated, interdicted or unused medicines) and to the other products considered to be dangerous, according to the classification ABNT NBR 10004 (toxic, corrosive, flammable and reactive) are included in this group.

GROUP C: radioactive rejects: The radioactive materials or those contaminated with radionuclides, from clinical tests labs, nuclear medicine and radiotherapy services, according to CNEN Resolution 6.05 are included in this group.

GROUP D: common wastes are all those not included in the groups described above.

In accordance with ANVISA-RDC Resolution No. 56/08, the wastes can be classified as follows:

Group A: Wastes that present potential or effective risk to public health and to the environment due to the presence of biological agents considering their characteristics of virulence, patogenicity or concentration.

Group B: Wastes containing chemical substances that may present risk to the public health or to the environment.

Group C: This group covers the radioactive rejects.

Group D: Wastes that do not present biological, chemical or radioactive risk to health or to the environment, and may be put on a level with home wastes.

Group E: Piercing/cutting or scratching materials, such as razor blades, needles, glass ampoules, bits, endodontic files, diamond bits, bistoury blades, lancets; micropipettes; spatulas; glass utensils broken in the lab and other similar ones.

2.2 Solid Waste Destination

CONAMA Resolution No. 005/93 defines that the solid wastes must be properly stowed, in compliance with the applicable Standards of the Brazilian Technical Standard Association (ABNT) and other legal provisions in force. In case of solid wastes belonging to group “A” (potential risk to health and the environment), these must be stored in plastic bags with the symbology of infecting substance. The piercing or cutting wastes will be previously stored in a hard, tight closed, sealed container identified by the symbology of infecting substance.

ANVISA Resolution RDC No. 56/08 determines that the ports that do not have Solid Waste Management Plans – PGRS must comply with the Good Sanitary Practices in the Management of Solid Wastes (described in the Resolution); and the PGRS approved before such resolution, must be adequate to it.

Thus, for the proper management of the solid wastes, such resolution establishes that the wastes classified as “Group A” must be separated to assure the protection of health and the environment. These wastes shall be stored in milky white color bags, impermeable, made of a material that resists breaking and leakage of the wastes contained inside it. The identification of the group A wastes must be attached to the bags, the collecting vehicles, the storage containers and in the collecting vehicle, in a place easily visible, in a non-deletable manner using symbols, colors and texts, of infecting substance, according to the specification of the technical standards for identification of this group of wastes. These solid wastes cannot be disposed in the environment without prior treatment that assures the elimination of the characteristics of peril of the waste; the preservation of natural resources; and, the compliance with the standards of environmental quality and public health. The solid wastes of this group cannot be recycled, reused or leveraged. After the treatment, these solid wastes shall be considered for purposes of final disposal as wastes of group D.

For the separation of wastes classified as “Group B”, it must be carried out, according to its characteristics, for purposes of reduction of the volume of wastes to be treated and disposed, assuring the protection to health and to the environment. These wastes must pass through an appropriate process of reuse, recovery, recycling or treatment. Upon the impossibility of reusing, the wastes must be disposed in places determined by the environmental agencies, with a Certificate of Approval for Destination of Industrial Wastes – CADRI (or equivalent
3 Problem of solid waste in Brazilian ports

In Brazil the non-dangerous wastes from ships, must be destined to landfills. The dangerous wastes must necessarily be forwarded to safety warehouses and shall be submitted to an incineration process. According to ANVISA and ANTAQ (2007), there are some critical factors indicated in the management of wastes from Brazilian ports such as the insufficient number of companies that perform the collection, lack of knowledge of the generating agents, lack of use of IPE (Individual Protection Equipment), improper sizing of the collectors, improper storage of wastes, absence of adequate intermediate storage areas and lack of proper final destination to special wastes;

ANVISA and ANTAQ also propose a planning to facilitate sanitary control actions in Brazilian ports that are the disarticulation of the actions and the legislation of the intervening authorities, non-availability of financial and human resources to carry out the qualification, lack of knowledge by the port community of the actions of the intervening bodies, lack of financial and human resources for the effectuation of the sanitary control actions, difficulty of integration between the bodies and deficiency of the port municipalities to make an area available for the final disposal of the wastes.

The direction of Ports and Coasts of the Brazilian Navy proposes some solutions to provide higher agility and safety in the operation of removal of garbage in the vessels such as, delivering the prior notice of the wastes that will be unloaded, pay a mandatory fee to face the costs of the facilities for reception and deliver its wastes in the port facilities, before leaving the port.

4 Model of Solid Waste Scanning from vessels

The proper treatment of solid wastes must consider their legal disposal and the relevant regulations for each country. In Brazil, the non-dangerous wastes from vessels must be destined to landfills, whereas for the dangerous wastes they have to be forwarded to safe warehouses, and must be submitted to an incineration process.

- Scanning
- Inspection / Classification
- Screening Result
The sanitary landfill is an engineering facility without non-conformities or dangers to the public safety, health and contamination of underground waters, and must have in their environmental licensing specific systems that permit the disposal of solid wastes belonging to group “A” (CONAMA No. 005/1993). According to Klaus Ihssen, superintendent of ship-owners cargo published by magazine BNT transporte atual-2005, there is a problem that is the removal of wastes comprised by wood, paper and plastic, because most of Brazilian ports refuse to accept the collection.

The implementation of ISPS CODE contributed to the rigidity in the treatment and the pouring of wastes has improved in the Port of Santos. The solution for the separation of the garbage, and thus avoiding smuggling or even traffic of illicit drugs can be the scanning of the wastes taken out from the vessel. Today there is technology for the scanning of moving objects that performs the screening according to the type of material and color. Such technology is a system that permits a fast and safe screening of recyclable materials identifying materials, colors and forms with air valves that blow the desired portion, and the remaining portion falls over a conveyor belt that will be classified.

The resolution and accuracy of the system is determined by the number of scanning points of the object that will be submitted to the identification processing. Through such technology it is possible to classify up to 10 tons per hours, obtaining purities from 90 to 98%.

4.1 Proposal Model

The model for control of solid wastes from the vessel aims at integrating different technologies to perform a better management. Such technologies are scanning, electronic sealing and tracing, and the integration among them is fundamental, according to Dias EM et al, 2008. The proposal is to remove the solid wastes from the vessels, scan them and make the destination according to the classification.

Firstly the solid wastes from the vessels must be removed and placed in a box truck or container. Then, an electronic seal will be installed to assure that the wastes will not be defrauded along the way up to the place where they will be scanned. After arriving to the scanning place, the seal is checked and the content of the box truck or container is scanned. The Scanner will classify the solid wastes and according to the screening, the content is forwarded to the due destination, landfill or incineration. The correct final disposal of the wastes must be controlled and inspected by the competent environment, public health and sanitary surveillance bodies, according to the legislation in force.

5 Conclusion

Annually, three times more garbage is taken from the oceans than fishes. The solid wastes in Brazil many times are considered only as hospital garbage, once their origin is not known, and may cause serious consequences to the country. It is critical that the country creates procedures for reception of the garbage from the ships and vessels, not only because of the environmental issue, but also because of the health issue, as the wastes may give rise to some epidemics.

Foreign ships that arrive must present a document that shows where the garbage was discarded the last time. The problem is that there is not inspection. This is why the ports must be prepared to receive the garbage from vessels and give a feasible end to it. Considering that the service is paid, made by a company contracted by the Port, (Port Authority), the expenditures do not fall on the port, the ship owner company is the one who pays. In most European countries, without the consent of the inspection, the ship is not released, as there are penalties and fines. In Brazil, only some Ports have companies in charge of collecting the garbage. Thus, the garbage end up in the ocean.

When taking measures to prevent, reduce and control the pollution of the marine environment, one must act so as not to transfer, directly or indirectly, damages or threatens from one area to another or transform one kind of pollution into another. Although Marpol 73/78 demands the supply of facilities for reception, this does not mean that the responsibility of the parties ends with the supply of proper facilities to receive wastes from the ships, there is the responsibility of assuring treatment and proper disposal for these wastes, together with other wastes generated in land. This demands a proper management policy.

Anvia 2003 indicates the need of integration between the state environment bodies and the coordination of Sanitary Surveillance of ports, airports and borders making their representatives
aware of the need for an integrated joint action, and was a sample of such possibility.

References: