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Analysis of Solid waste from the Port of Manaus

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Abstract— *The concern with the waste generated by society can directly or indirectly affect the environment. search to maintain an ecologically conserved environment, without risks to human health and natural resources a relevant concern. Therefore, with the general objective of investigating how the disposal of material from the activities carried out in the Port of Manaus occurs and the specific ones are to highlight which materials, quantities and their final destination, propose the implementation of waste management and show the of impacts caused to the environment by its misuse. The intention advocated here is to provide a reflection and show how the management of municipal solid waste is quite complex and depends on a wide review of the in force, including those that concern capitalist progress itself and the ways of conquer happiness. Therefore, it necessary to carry out further studies on environmental management in the port sector, which according to a showing the lack of a sector that is responsible for the disposal of these waste.*

Keywords— *Solid Waste, Environmental Management, Environment.*

I. INTRODUCTION

Solid waste, called "garbage" by common sense, represents one of the major contemporary environmental concerns. This waste comes from industrial, domestic, commercial, agricultural and service activities, solid waste (ANDRADE and FERREIRA, 2011), and can directly or indirectly affect the environment.

In the greenest view, solid waste management may include the separation of waste at the source to which they are generated. Among these programs we can highlight the selective collection system, the direction of part of waste for recycling and composting programs. Thus, the basis would then be laid for the waste to have minimal interference in the environment and public health (MOTA et al., 2010).

The untreated disposal of waste generated daily has become a worldwide problem, as these discarded incorrectly can cause damage to soil, water and air. Soil contamination can alter its physicochemical characteristics, which poses a serious threat to public health by becoming the environment conducive to the development of disease transmitters (BARBOSA FILHO, 2011). On the other hand, water pollution can alter the characteristics of the aquatic environment by percolation of the liquid generated by the decomposition of organic matter present in waste, associated with rainwater and springs existing at the discharge sites waste. While air pollution can cause the formation of natural gases in the garbage mass, by decomposition of waste with and without the presence of oxygen in the environment, leading to risks of migration of gas, explosions and even respiratory diseases, if in direct contact with the Same.

The Port of Manaus, inaugurated in 1907, is considered the most original in Brazil. Built on a floating pier, it follows the level of the waters of the Negro River, in times of great floods. The Port of Manaus had its structure for reception of tourists recently renovated. In addition to serving for the boarding and disembarkation of passengers and goods that go and from the cities of the interior of the state, receives large transatlantic tourists from various parts of the world. Also disembarks products destined to the Industrial Pole of Manaus, as well as serves

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as a shipment for products manufactured in the city and that are intended for various parts of Brazil and the world (SILVA, 2012).

Seeking the path of environmental sustainability, integrated solid waste management can adopt as measures to reduce and reuse waste by composting and recycling processes, actions to be encouraged through educational actions aimed at more conscious consumer attitudes on the part of the population. Acting with market forces, promotion actions can be developed that lead to new forms of environmentally sustainable production, and can be carried out with less burning of fossil fuels, the main villain when referring to climate change global. Recycling, on the other hand, can be driven through selective collection and waste screening, although for this there are difficulties in most Brazilian municipalities (GOUVEIA, 2012).

In this article will be addressed specific aspects of the management of solid waste from the activities carried out in the Port of Manaus, with emphasis on the materials generated, quantities and their final destination. Furthermore, the implementation of waste management will be proposed and show the importance of impacts caused to the environment by its misuse.

II. METHODOLOGY

The present study was carried out in the Port of Manaus located on the west coast of the Negro River in the Center in the city of Manaus, capital of Amazonas. We chose to develop this study in the port of Manaus, due to this being the main Port existing in the city, which supplies other moorings and Private Use Terminals (TUPs) (Figure 1). Thus, technical visits were made during the period from August to September 2019, in order to obtain an overview of the current conditions of the port regarding the management of solid waste. As part of the analysis, photographic records of the area were performed, thus obtaining a diagnosis of the study area.

In addition, a survey of logistics information was carried out with the company responsible for the administration of the port.

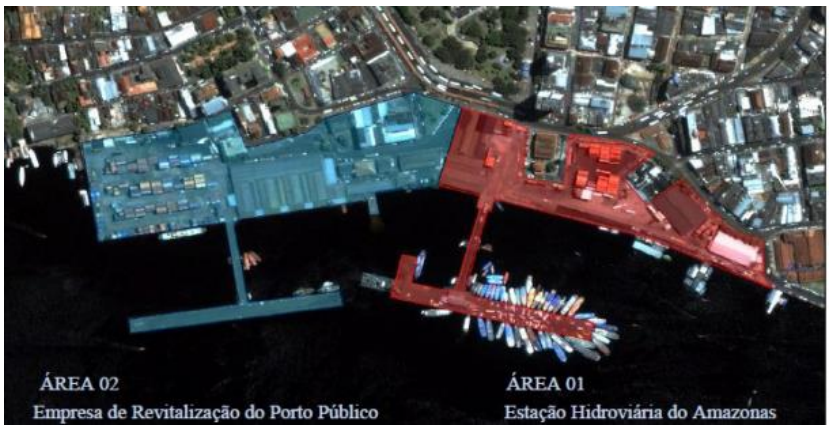

Fig.1: Place of realization of the search Port of Manaus.
Source: GOOGLE EARTH, 2019.

III. RESULTS

The port of Manaus located in the city of Manaus is one of the places responsible for the disposal of products and people in the city daily. The port structure of the state of Amazonas has the port of Manaus as the main intermunicipal and interstate access, connecting the Amazon municipalities to other states (Pará e Rondônia).

Through the visits it was possible to verify that solid waste is collected daily by public cleaning officials. According to employees, an average of 8 to 10 tons of waste is collected daily around the waterfront as it mortra table 1. To obtain this quantity, 70 employees assigned by the city for the task are required. It is worth noting that the waste was collected both on the shore and in the waters near the margins.

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Table 1. Amount of waste taken from the Port of Manaus.

Day	Weeks	Monthly
8 Tons	56 Tons	224 mil Tons

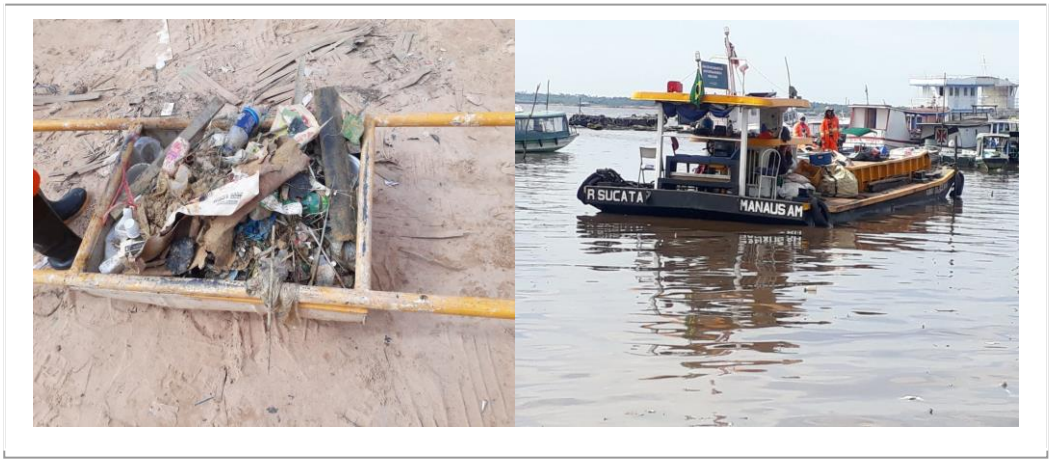

Fig.2. Solid waste collected in the Port of Manaus.

Figure 2 shows the presence of a very large variety of discarded waste, and even contaminant residues such as plastics, batteries, batteries, fish residues discarded by fishermen, among others. Despite this, the responsible officials signaled the absence of a separation of waste collected for further recycling or reuse. According to the information obtained on site by the cleaning team, all residue taken from the river and on the banks of the Port of Manaus, are taken daily to a ferry where the transfer is made and subsequently routed to the landfill of Manaus, as shown in the Figure 3.

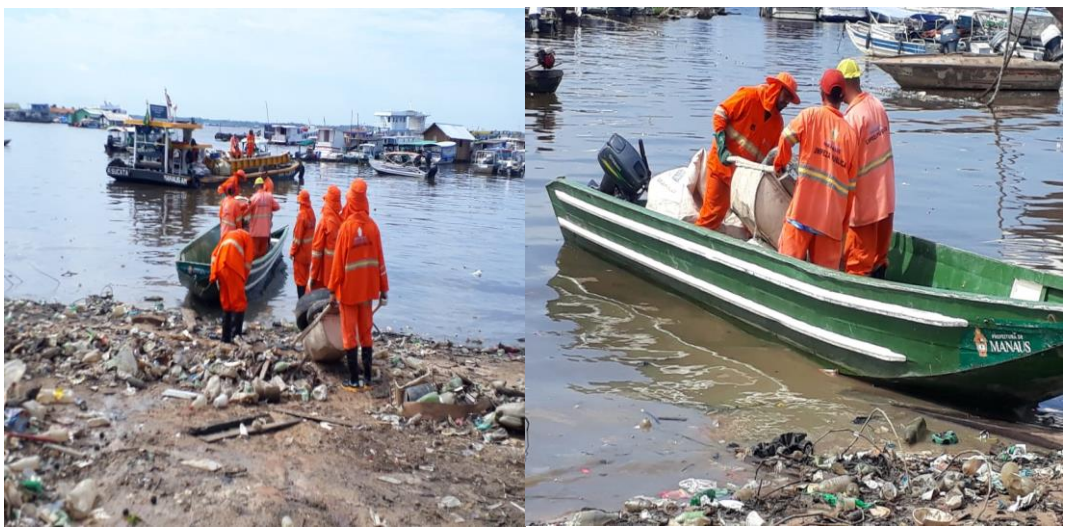

Fig.3: Collection and transport of waste on the banks of the river.

According to Table 2, it shows the amount of waste taken monthly from the Port of Manaus, thus generating risks to human health that live in its surroundings, as well as to the environment, because rivers end up being contaminated with this waste. Bringing serious damage to health and the environment.

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Table 2. Types and quantities of waste taken per month in the Port of Manaus.

Type	Amount
Cargo remains	20 thousand
Packaging (pallets, plastic blades, cards)	80 thousand
Household waste from the social sectors (canteens, workshops, laundries, toilets)	30 thousand
Lubricants and hydrocarbons used, filters, varnishes, paints, solvents and batteries maintenance machinery and infrastructure	40thousand
Debris from stowage goods	54

Due to Manaus's dependence on the port system ports are used constantly and therefore, it is necessary a Port Environmental Management, mainly as to the search for environmental adequacy. Given this scenario, we consider that, in practice, public environmental management (and particularly port environmental management) is done fundamentally through environmental licensing. This is due to the fact that environmental licensing is the main instrument in operation that the Brazilian state has to control polluting economic activities, and thus to guarantee diffuse rights (FILHO, 2011).

Some ports do not have any physical space for the storage of waste, which are dumped in Rio, so some alternatives of correct storage of this waste in the Port of Manaus, would be of great importance for separation, reuse and revitalization of these materials that could serve as recycled material according to Figure 4.

These alternatives would generate employment, health and improvements for the Port of Manaus, which could keep the place clean and with greater visibility in front of several vessels and ships that stop in Porto. Also generating, the environmental conservation of rivers and the waterfront.

Precariousness and lack of adequate equipment of the urban cleaning system in most Brazilian municipalities can be identified in the light of the available data and information, despite the poor quality of many of them (Figure 3). It is understood that the axis of the urban cleaning system is in the structuring of home collection, cleaning public laurels and in the proper destination of waste collected (ANDRADE and FERREIRA, 2011). The sector suffers enormous lack of technical training, particularly in smaller municipalities.

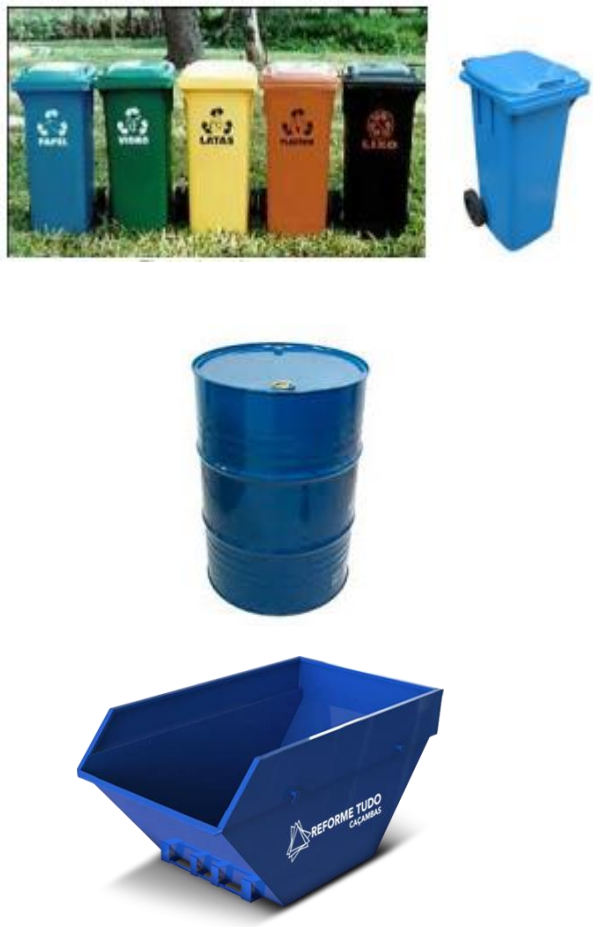

Fig.4. Types of collectors possible for use in the Port of Manaus.

According to Borges and Pinto (2010), aspects related to solid waste management is also a cultural issue. The cultural issue comes from the action of launching discarded waste into the river, but still the habit of valuing or perceiving the value of the garbage that is produced, such as waste with reuse potential or requiring differentiated handling.

An environmental waste management policy presupposes the adoption of Integral Waste Management

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systems - GIR, with the combination of generation flows with methods of collection, treatment and final disposition with environmental benefits optimized from an economic point of view and Social. This system must be environmentally, economically and socially sustainable, with market orientation, flexible and operated on a regional scale. (BARAKAT, 2009)

Many unmet wastes in these contraindicated sites could contribute to the generation of employment and income in the country if they had been preliminary segregated and referred, for example, to waste pickers' associations Recyclable. Even after the advent of PNRS, many Brazilian municipalities still have the financing of urban cleaning activities linked only to the Urban Land and Territorial Tax (ULTT) – manaus case – which hinders the development of policies, goals and financially viable treatment techniques (HENDGES, 2012).

It is perceived, then, the importance that water has for the regional population. "All the paths of the Amazon ultimately lead to the ports of Belém and Manaus. All who move through the region start or end 38 their journey son in one of these ports" (idem). In Manaus, through the Port of Manaus Moderna, arrive and leave not only passengers, but also the most diverse types of cargo, ranging between food, appliances and even cars.

Regarding the movement of vessels in the Port of Manaus, on average 330, transit through the port complex of Manaus, and their average stay in the different moorings is 2.79 days. According to the tenant data, in 2011, 67 vessels attended Roadway Pier, and their average stay was 3.3 days.

IV. FINAL CONSIDERATIONS

With the lack of environmental management in the Port of Manaus, the waste taken from the river daily is taken to the Manaus landfill, without proper separation and a process of reuse of these wastes. Until the present development of the study, it can be verified how important it is to implement an environmental management sector in the Port of Manaus, aiming at improving the correct disposal of these waste, which can generate jobs and environmental health to those who live in their Surroundings.

Incorrect waste management causes damage to the environment and influences the quality of life of people and other species. Some measures can mitigate environmental damage, including integrated solid waste management. Society and nature benefit from practical waste management actions.

3R's policy is a smart solution, being well implemented and within an integrated management proposal can provide many benefits for society in general. Organizes and gives better working conditions for garbage pickers, stimulates the organization and the waste reuse chain and provides population awareness of the rational consumption of goods and services.

Currently the organizational structure of the Port of Manaus does not have an environmental management unit, health and safety at work. The demands for management of this nature are outsourced, which is carried out through the operational licensing of the port complex.

Therefore, it is necessary to carry out further studies on environmental management in the port sector, which according to a study showing the lack of an environmental management structure that is responsible for the disposal of these waste.

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