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Diagnosis of the inadequate disposal of construction and demolition waste in Vitória de Santo Antão, Pernambuco

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ABSTRACT

Construction and Demolition Waste (C&DW), also known as rubble, are increasingly frequent and visible in today's society, due to the large volume generated in construction and its irregular deposition. As potential polluters of the environment, C&DW directly affect the environmental conditions of water bodies and the sanitation of urban areas. In this context, the objective of this work was to diagnose by mapping the presence of irregular deposition of construction residues on urban roads in the city of Vitória de Santo Antão-PE. It was visited in the district of Matriz, totaling 44 streets in the month of June 2016, mapping the locations of irregular deposition by buildings and the size of the work. As a result, it was possible to diagnose the presence of 64 points of clusters of residues in front of the buildings, which are considered to be irregular, since there were no technical personnel responsible for the construction or license plate issued by the municipality in 95% of the points. The works were considered as small, mostly renovations. Likewise, the quantification and the georeferencing of C&DW become essential to enable effective measures in the final deposition and reduction of waste generation. The fulfillment of legal norms is also a factor that contributes to the conservation of the environment, guarantees the urban water flow and does not compromise the landscape of the municipality. As a result of this survey, there is an urgent need to implement a management plan for C&DW in the city of Vitória de Santo Antão.
Keywords: C&DW, environmental, residues.

Diagnóstico da eliminação inadequada de resíduos de construção e demolição em Vitória de Santo Antão, Pernambuco

RESUMO

Os resíduos de construção e demolição (C&DW), também conhecidos como escombros, são cada vez mais frequentes e visíveis na sociedade de hoje, devido ao grande volume gerado na construção e à sua deposição irregular. Como potenciais poluidores do meio ambiente, a C&DW afeta diretamente as condições ambientais dos corpos d'água e o saneamento das áreas urbanas. Neste contexto, o objetivo deste trabalho foi diagnosticar mapeando a presença de deposição irregular de resíduos de construção em estradas urbanas na cidade de Vitória de Santo Antão-PE. Foi visitado no distrito de Matriz, totalizando 44 ruas no mês de junho de 2016, mapeando os locais de deposição irregular por edifícios e o tamanho do trabalho. Como resultado, foi possível diagnosticar a presença de 64 pontos de cachos de resíduos na frente dos prédios, que são considerados irregulares, uma vez que não havia pessoal técnico responsável pela construção ou placa emitida pelo município em 95 % Dos pontos. Os trabalhos foram considerados pequenos, principalmente reformas. Da mesma forma, a quantificação e georreferenciamento da C&DW tornam-se essenciais para permitir medidas efetivas na deposição final e redução da geração de resíduos. O cumprimento das normas legais também é um fator que contribui para a conservação do meio ambiente, garante o fluxo de água urbana e não compromete a paisagem do município. É urgente implementar um plano de gerenciamento para a C&DW na cidade de Vitória de Santo Antão.
Palavras-chave : C&DW, meio ambiente, resíduos.

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Introduction

The disordered development originated in 1950 in Brazil, due to modernization and technological advances in agriculture, provoked the rural exodus (MARTINS, 2012), Generating a new scenario that also causes impacts to the environment, considering that changes occur in natural conditions to meet the basic demands of housing, infrastructure needs for productive activities and public services, which causes the generation of production of (NORDESTE, 2008), as well as the need for the use of natural raw materials (MESQUITA, 2012).

Considered by Siqueira (2015) as one of the biggest environmental problems of the century, solid waste generation is a direct result of the patterns of consumption, the way of life and the economic activities carried out in a given environment.

Construction in Brazil accounts for approximately 14% of the national GDP, is also one of the largest consumers of natural raw materials with an estimated use of about 20% to 50% of the total natural resources consumed by society (MESQUITA, 2012).

Because it is a major environmental problem, Construction and Demolition Waste (C&DW) accounts for 50% to 60% of urban solid waste produced in large cities (PINTO, 2005 apud ROMA; MOURA, 2011; GUSMÃO, 2008 apud SIQUEIRA , 2015).

It is estimated a total waste generation around 163 to 300 kilos per inhabitant / year (MESQUITA, 2012).

A large share of C&DW comes from building construction activities through waste of materials and non-rationalized productive activities and demolition services (SIQUEIRA, 2015), but can be generated by urban infrastructure activities, for example, paving (DIAS et al, 2008).

The definition of the area ofimplantation of an activity that requires the application of civil construction, must observe the environmental impacts related to the use of the local soil in compliance with the laws of zoning, land use and occupation (DIAS et al, 2008) and Preservation of forests and water bodies. A point to be observed in the identification of the area to be occupied is the verification if the area is not an area of risk of floods and landslides (DIAS et al, 2008).

In recent years, the interest in public policies and legislation approvals for the fate of waste generated by the construction industry has intensified with the discussion of environmental issues (SOUZA et al, 2004 apud KARPINSK, 2009). Given that waste materials, whether in the form of waste or otherwise, means wasting natural resources, which places the construction industry at the center of the discussions in the search for sustainable development in its various dimensions (SOUZA et al, 2004 apud KARPINSK, 2009).

Resolution no. 307 of July 5, 2002 CONAMA considers that the disposal of construction waste in unsuitable places contributes to the degradation of environmental quality (CONAMA, 2002).

Accordingly, according to resolution 307/2002, construction waste can not be disposed of in landfills of urban solid waste, or in areas considered to be pitted on slopes, bodies of water, vacant lots and in areas protected by law, Such as the Permanent Preservation Areas and ecological reserve (DIAS et al 2008).

Irregular depositions are usually the result of small works or reforms carried out by the most underprivileged urban population (KARPINSK et al., 2009) or who do not know the laws in force.

Based on this, the objective of this work was to map the presence of inadequate disposal of construction and demolition waste in the Matriz neighborhood of the city of Vitória de Santo Antão, as well as to classify the residues found and verify compliance with current legislation.

Materials and Methods

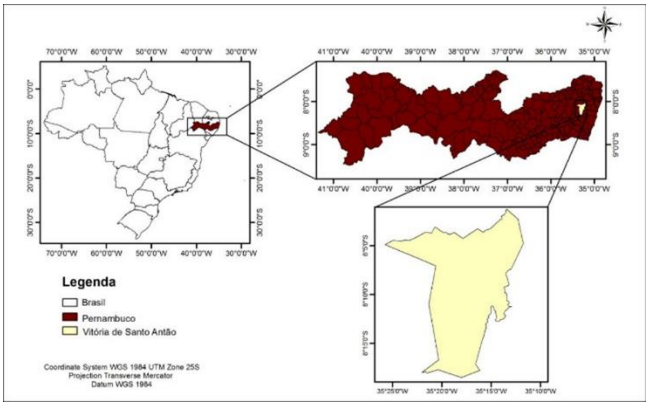
The municipality of Vitória de Santo Antão occupies 371,796 km² and represents 0.35% of the State of Pernambuco. The municipality is located in the mesoregion of Mata Pernambucana and in the Microregion of Vitória de Santo Antão in the State of Pernambuco, being limited to the north with the municipalities of Glória do Goitá and Chã de Alegria, to the south with Primavera and Escada, to the east with Moreno, Cabo de Santo Agostinho and São Lourenço da Mata and to the west with Pigeons (AZEVEDO, LOPES, MACIEL, 2016) (Figure 1).

It has a population of 129,974 inhabitants, of which 113,429 are in the urban area and 16,545 in the rural area, the municipality has an approximate altitude of 156m and the geographic coordinates of 08º 07 '05' 'south latitude and 35º 17' 29 " West longitude. Vitória is located 45.1 km from the capital, which is accessed by BR-232 (IBGE, 2010).

Initially, a bibliographic analysis was carried out on the central theme in order to base the research and allow relevant discussions. Next, a spatial recognition of the neighborhood was made through the Google Earth Pro program, where the locality was delimited and previously observed.

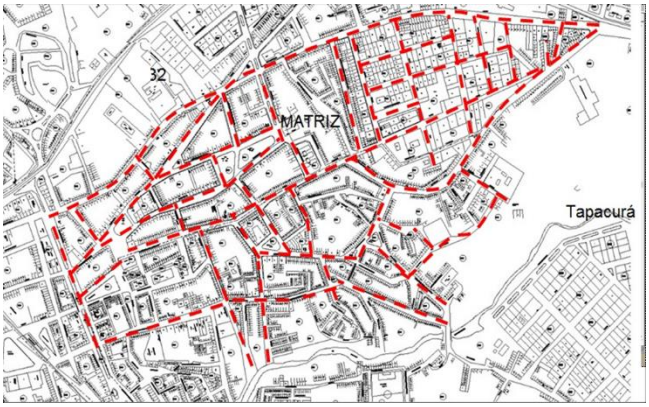
After that, 44 streets of the Matriz neighborhood in the municipality, located on the banks of the Tapacurá River (Figure 2), were registered in June 2016, registering and mapping the locations of irregular deposition of C&DW, the mapping was georeferenced by Etrex Vista-Garmin equipment.

Figure 1 - Location map of the municipality of Vitória de Santo Antão.



Source: Author, 2017.

Figure 2 - Location map of Matriz neighborhood in Vitória de Santo Antão.



Source: Author, 2017.

Following the diagnostic step, the main types of generated wastes and their generators, as well as the critical points (georeferenced in Google Earth®), were identified in a simple way. During the visits, it was also observed if there were any kind of buckets in the neighborhood for the placement of the C&DW and if the work was duly registered in the city hall.

Results and Discussion

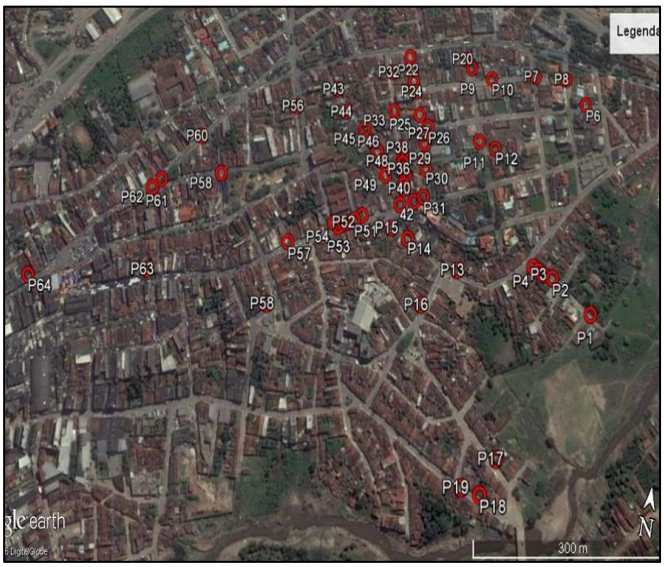
The state solid waste policy, in Pernambuco, Law No. 236/2010, requires that the municipality develops the solid waste plan (PERNAMBUCO, 2010).

But state law states that the responsibility to allocate the C&DW are:

> "II - the owner, in the case of solid waste produced in real estate, residential or otherwise, disposed of, disposed of or disposed of inappropriately in areas or land, in disagreement with the form established by this Law or by municipalities; III- Generating establishments, in the case of waste from construction, industry, commerce and service provision, including health, in relation to transportation, treatment and final destination for their products and packaging that compromise the environment and place At risk to public health".

Based on this, it was possible to diagnose the presence of 64 points of clusters of residues in front of the constructions or reforms (Figure 3).

Figure 3 - Points of agglomerates identified in the district Matrix.



Source: Author, 2017.

In 95% of the identified points, were considered as irregular because there was no presence of technical responsible for the construction or license plate of work issued by the municipality according to law No. 2,789 / 1998 of use and occupation of the ground of victory of Santo Antão determines The issuance of the Construction License and that no occupation of any part of public life is permitted (VITÓRIA DE SANTO ANTÃO, 1998).

The works were considered as small, mostly reforms and presenting the C&DW class A according to Table 1.

Table 1 - Classification and destination of the C&DW according to Resolution No. 307 of CONAMA, 2002. Source: Adapted CONAMA (2002).

Classification	Description	Destination
A	a)Infrastructure, including land from earthworks; b) construction, demolition, remodeling and repair of buildings: ceramic components (bricks, blocks, tiles, facing boards etc.), mortar and concrete; c) process of manufacture and / or demolition of precast concrete parts (blocks, tubes, medias, etc.) produced at construction sites;	They should be reused or recycled in the form of aggregates, or sent to landfill sites of construction waste, being arranged so as to allow their use or future recycling.
B	They are recyclable waste for other destinations, such as: plastics, paper / cardboard, metals, glass, wood and others;	They shall be reused, recycled or transported to temporary storage areas and disposed of in a way that allows them to be used or recycled.
C	These are the wastes for which no economically viable technologies or applications have been developed to allow their recycling / recovery, such as products from gypsum	They shall be stored, transported and destined in accordance with the specific technical standards.
D	Hazardous waste arising from the construction process, such as paints, solvents, oils and other contaminated or harmful to health from demolition, remodeling and repair of radiological clinics, industrial installations and others, as well as tiles and other objects and materials that Containing asbestos or other products harmful to human	They shall be stored, transported, reused and disposed of in accordance with specific technical standards.

Some mapped points show that these residues may well be reconditioned for other uses (Figures 4, 5 and 6).

Figure 4- Civil Construction Waste - Point 18. Source:

Author, 2016.

Figure 5 - Civil Construction Waste - Item 40.

Source: Author, 2016.

Figure 6 - Civil Construction Waste - Item 58.

Source: Author, 2016.

In figure 6, we can verify a classification different from the other figures, a C&DW class C from the plaster. What can be perceived is that one of the causes of difficulty in managing waste relates to its diversity by origin of its typology as construction, demolition, and rehabilitation (FERREIRA, 2013). According to the State Plan for Solid Waste of Pernambuco (2012), the municipality of Vitória de

Santo Antão participates in the COMSUL (Public Consortium of Municipalities of Mata Sul of Pernambuco), an environmentally correct solution for the management of solid waste shared between the municipalities of Mata South Pernambuco. With the consortia, the Municipalities and the State can provide better services to the population, in a systemic way, and cover all waste; Health services, industrial, mining, agrosilvopastoril, reverse logistics, as well as adjusting the criteria of control and regulation of the same. However, in remodeling in residential neighborhoods, such as the studied neighborhood, which does not have a city hall permit for the execution of the work, it is difficult to guarantee that these residues are properly disposed of or reused in other civil construction processes.

According to some researchers, the recycling of C&DW minimizes environmental degradation by reducing inadequate disposal to the environment (CARMO; MAIA; CÉSAR, 2012; SIQUEIRA, 2015). With reuse and recycling it is possible to reduce landfill, while encouraging other forms of recycling and other forms of recovery (FERREIRA, 2013).

As the Matriz neighborhood is near the Tapacurá River, probably some of these debris may end up being placed in some permanent preservation area, which only damages the quality of the aquifers.

Like the capital of Pernambuco, Recife, we have Law no. 17,072 of 2005 establishes penalties for noncompliance with the provisions of this law, through written warning notification, and subsequent application of a fine for cases of non classification and separation of waste, resulting in a fine for not submitting the Construction Waste Management Project Civil; Fine for disposal of waste in municipal public places, by disposal of waste in areas of environmental interest (riverbanks, lagoons, mangroves and others) and disposal of waste in private lands without previous authorization from the municipal environmental agency (RECIFE, 2005). A control point for compliance with the law for large generators is the presentation at the end of the work of the report, proving compliance with the waste management plan construction and demolition stipulated for the release of a permit for operation or use (RECIFE, 2005). A study by Silva, Ferreira and Oliveira Júnior (2014) found that at four construction sites in the city of Vitória de Santo Antão, it produced 9.2 tons / month and sent its RCD to a solid waste collection company at Works that leads to the landfill, costing R $ 1,074.56.

With this, it is verified that to direct this waste is necessary a capital, which in residential reforms, which was the case of this research, hardly has a correct destination.

Conclusion

In spite of all this, it is clear that even when legislation is in force with penalties, the lack of commitment or understanding of the population and inspection only increases the consequences to the environment.

Likewise, the quantification and the georeferencing of C&DW become essential to enable effective measures in the final deposition and reduction of waste generation. The fulfillment of legal norms is also a factor that contributes to the conservation of the environment, guarantees the urban water flow and does not compromise the landscape of the municipality.

As a result of this survey, it is urgent to update and implement a management plan for the C&DW in the municipality of Vitória de Santo Antão.

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