Comparative Analysis of the Constructive Process with the Drain Manual in a Project in Manaus City

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Abstract

This paper aims to make a comparison of the construction method of the drainage implanted in the Peace Alley, between Raimundo Saraiva Street and Santa Helena Street, in the Cidade de Deus neighborhood, Manaus-Am, with manuals and urban drainage rules in which their The objectives are to verify the constructive way of the device implanted there, to make comparisons with norms and manuals of urban drainage and to present the proper way to implant the urban drainage device in the place. To this end, searches were conducted based on bibliographic sources, with data collected through research in libraries and current legislation and searches in digital sources and consultations to academic articles, in order to describe the installation procedures and equipment involved in microdrainage, method used is associated with the development of these works, in order to define the correct form for proper installation of drainage devices according to the Urban Drainage standards and manuals.

Keywords: Urban drainage; Micro drainage; Devices;

1. Introduction

Currently, in Brazil, many cities suffer from flooding problems, due to some factors that contribute to this, in which we can mention the disordered growth of cities, the lack of urban planning and occupations. But the biggest problem is not this phenomenon, but the works executed to contain this problem, which does not follow established norms for this type of construction.

The problems generated by urban drainage can be solved through a feasible urban drainage policy, a policy that determines the occupation of floodplains, financial resources and technical solutions, that chooses a qualified and capable company to set up the work, that creates and meets criteria, laws and standards; Finally, a policy that encompasses entities capable of developing social communication activities and promoting collective participation. (CARDOSO NETO, 2014)

Urbanization is one of the anthropic actions that generate the greatest environmental impacts, especially from the consequences of changes in occupation and land use. Cities suffer from flooding, accumulating various economic and social losses: damage to infrastructure and housing, degradation of the natural environment and devaluation of buildings built, spread of water-borne diseases, impoverishment of the population with successive losses, among others, (MIGUEZ, VEROL AND PRAY, 2016).

In making a list of infrastructure projects and works, it can be seen that many are no longer being as efficient at solving the flow issue, due to the lack of study of the site, the collection of data and adequate materials for this type of work, even for the irresponsibility of not following the parameters established by law that aim to ensure the buildings and facilities, minimum conditions of safety, hygiene, harmony, aesthetics and accessibility.

According to Canholi (2014), most developing countries, including Brazil, have experienced in the last decades an urban expansion with poor drainage infrastructure, consequently bringing flood problems mainly due to the rapid expansion of the urban population, the low level of awareness. the problem, lack of long-term plans, poor use of non-structural measures and inadequate maintenance of flood control systems.

In the Cidade de Deus neighborhood in Manaus, specifically in the peace alley, located between Raimundo Saraiva Street and Santa Helena Street, this execution problem will be evaluated and some collections made to report errors during the placement of the devices. drains in the area for stormwater runoff.

2. Methodology

To reach the proposed objective, a case study was performed. The case study is characterized by the thorough and exhaustive study of one or a few objects, in order to allow their broad and detailed knowledge, a task practically impossible through the other types of designs considered (GIL, 2007).

In the search for a brief analysis of the collected data, as previously mentioned, the information was collected through published printed works related to the subject and comparing the actions observed in the Peace Alley, in the stretch that corresponds between St. Raimundo Saraiva and Santa Helena Street, in the Cidade de Deus neighborhood, Manaus - Amazonas, where one of the authors performed his internship period.

The following research is bibliographic in nature, with its objectives developed descriptively, involving

bibliographic technical procedures, with a qualitative approach to the problem. The information was attributed to this work through internet searches, books, magazines, newspapers, articles, among other existing media and safe and reliable content.

During the research, about the data of the area needed for the elaboration of a project of micro drainage network, that the responsible for the work did not have the necessary information to know about flows that flow the network, dimensioning of the duct network and no measures. of control. May waste materials and major problems with housing, such as: repression of soil causing collapse of nearby structures and also causing greater flooding.

This lack of data was stated during the site visit, with the person in charge of the work, who asked that most of the time the works happen without projects and even without a concrete study of the area, as he says that he has many years of experience. experience with this type of loose work, ensuring to do the work only empirical.

Table 1 - Steps chart.

DATA FOR THE PREPARATION OF A PLUVIAL NETWORK PROJECT
SITUATION MAPS; CONTRIBUTING BASIN PLANT; PLANIALTIMETRIC PLANT.
TOPOGRAPHIC SURVEY.
REGISTRATION OF EXISTING WASTE NETWORKS.
SELECTION OF THE FOLLOWING ELEMENTS CONCERNING THE URBANIZATION OF THE CONTRIBUTING BASIN.
RECEIVING WATER COURSE DATA.

Source: Elaborated author.

According to the drainage manual (TOLEDO, 2017), the main data necessary for the elaboration of a micro drainage rainwater project are those listed in the table above, which provides the basic details for an efficient micro drainage system for the population.

Jabor (2012) says that drainage has the function of promoting the adequate flow of volumes from the precipitations that fall in urban areas, ensuring public transit and the protection of buildings, as well as avoiding the harmful effects of flooding and flooding.

For this comparative micro drainage study, the peace alley, located between St. Raimundo Saraiva and Santa Helena street, in the Cidade de Deus neighborhood located in the new city, Manaus - Amazonas, will be studied, according to Figure 1.

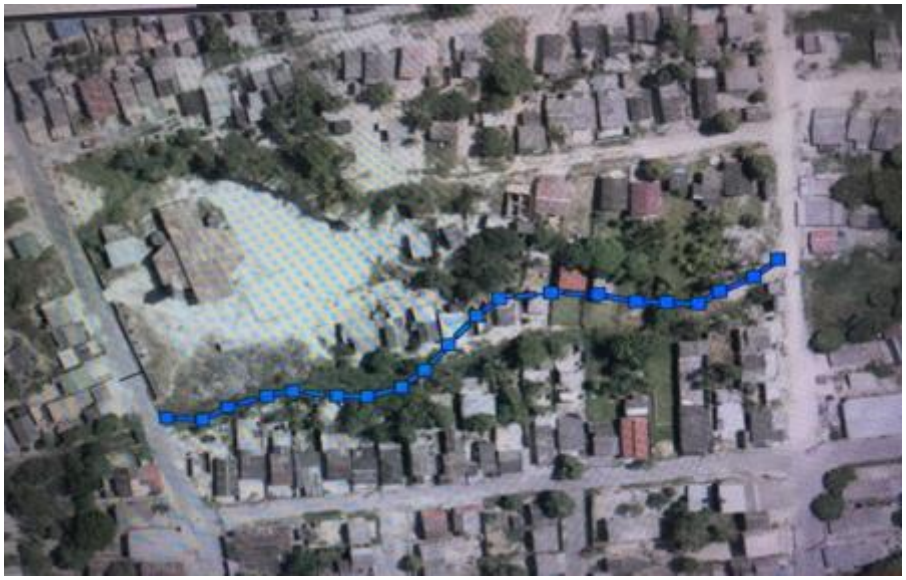

Figure 01: Alley of peace highlighted.
Source: Google maps, 2019

Although already established as a neighborhood, Cidade de Deus still suffers from the precariousness of effective infrastructure in many of its streets.

The site under analysis has an area of 1489, 79 m2. For channeling the extension area is 180 m, located in the peace alley, between Raimundo Saraiva and Santa Rosa streets, in the Cidade de Deus neighborhood, Manaus-Am. The neighborhood is cut by the Tarumã-Açu basin, which has its springs coming from the Ducke Reserve, which also cuts other neighborhoods in the city of Manaus-Am. During surveys to improve analysis, the lack of topographic surveys of the area was found, with insufficient basin and spring information for a flow study that is essential for the proper and satisfactory implementation of an urban drainage network. pipes that do not meet the demand for rainwater in the area.

It was verified that those responsible are excavating the site and placing the shackles directly in a humid place, without any base for the pipes, which may cause the misalignment of the shackles, compromising the piping annealing, in addition to the excavation without lateral spacing of 60cm. established by the norm, which may damage the nearby structures, with sliding of the slopes and consequently collapse of structures in the place, as can be observed in figure 2.

Figure 2: Laying of drainage pipes.
Source: Elaborated author

It was found installation errors that do not follow urban drainage norms and manuals, which can cause a result of precariousness in the place. As for example, we can mention the flooding of the area due to clogged shackles, because the pipes are being grounded with inadequate soil, composed of many types of waste and utensils that take time to degrade. In addition, it is ascertained on site that the landfill layers do not comply with the specifications provided by the standard.

3. Results and Discussions

The main focus of this work is to show the step by step and the correct way to build the microdrainage system, specifically the pipes, so that it will not cause damage and will not have the possibility of larger losses by the inhabitants of the area that is located. getting the solution.

It was found that for the beginning of a constructive process there must always be a preliminary study to survey some information, in which we can mention that there is a need for a topographic survey of the area, information of the basin that cuts the site and also have a site visit to survey the contribution area, where it is this contribution area that will determine the amount of water that the pipeline will drain to an appropriate location.

When excavating, it is necessary to calculate the exact amount to be excavated as it must take into account the thickness of the pipeline laying cradle, the diameter of the pipes and the thickness of the landfill so that the amount excavated will not cause problems in the excavation. plumbing. A very common example that happens is that workers have little digging so that they have to have little landfill on top of the pipes, which can cause ruin and lead to pipe clogging, which will require rework to correct these problems, that could be avoided.

A not less important stage, but that has been ignored by the drainage managers, is the settlement cradle, because it will be the one who will support so that the piping does not come to ruin, it is necessary that the bottom of the excavation be mechanically compacted and then the laying cradle can be placed, in which the DNIT 030/2004 standard states that the laying of the pipes will be done on the concrete cradle with mortar base with 30% of hand stones thrown over the natural terrain when it presents adequate

characteristic resistance conditions, adopting the (minimum fck) at 28 days of 15 mpa, which can be seen in figure 6 below. An important observation to be made in which would explain, but not justify, the lack of this base layer is the number of days to be expected to fully cure this layer, in addition to the increased cost of the work.

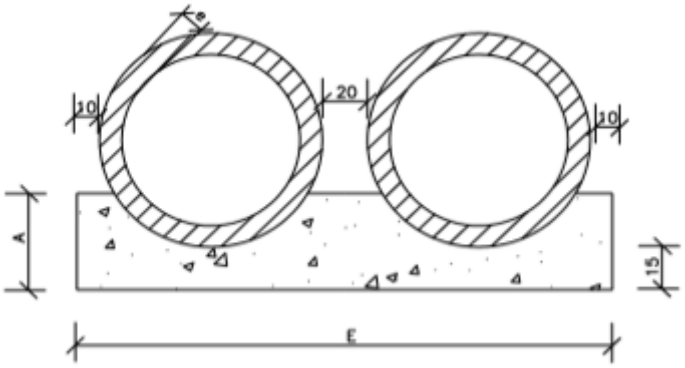

Figure 3: Pipe Laying Model
Source: DNIT, 2006.

To make grouting is necessary that the pipe is completely free of water, so that the mortar will have its full cure and that there are no leaks, the standard says that this mortar must be in the 1: 4, and For pipes larger than 900 mm in diameter, this grout must be made inside and outside the pipes for a better connection between the pipe.

The last step of this process is the landfill, in which the DNIT 030/2004 standard has been clarifying everything that should be done in this pipeline grounding and the first step it says is that a manual compaction of 15cm by 15cm should be done. reach the height of 60cm high, so that only thereafter there can be a mechanical compaction, in which this mechanical compaction must be done carefully so that it will not damage the pipe. This problem was soon observed at the beginning of this landfill as the material was not of good quality and was not sufficiently grounded as described in the standard.

4. Conclusion

To finish the study, it was verified that the execution of the drainage stages in Brazil still has much to evolve regarding the subject addressed in this work, especially when it is a service that is primordial for the population, an area was defined. to do this study, in which the Peace Alley was chosen, in the stretch between Santa Helena Street and Raimundo Saraiva Street, which is an area that was being piped, and so a case study was made of the construction process that was being implemented there.

It was necessary to consult the DNIT (National Department of Transportation Infrastructure) standard to make a comparison and to conclude if the way drainage was being performed was in accordance with the specifications stipulated by the standard. It was found that many things did not agree, practically all steps were being performed incorrectly.

Therefore, it is suggested that the public authorities continue to do this kind of work, but it should be done correctly, so that people in the area involved will not have this type of problem with rainwater runoff in the future. cannot suffer the loss of material goods, etc.

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