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Stopping Water Pollution by Using Coconut Drainage Net

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ABSTRACT: Water is the basic need for the existence of life on earth. In spite of 70% water on earth majority of the water is not suitable for drinking purpose. Our proposed system is used to clean and control the drainage level using mechanical control technique include total or halfway sorting of waste material through flowing water by applying sock-like traps at the end of the drainage pipes. Plastic pollutants and floating trash in water resources is an ever-growing global problem. Not only is it dangerous for human being, but also for the wild life as well.

The worthy replacement of traditional water drainage system is drainage system with use of net made of coconut fibre. A general view looks like sock-like net that fits over s storm water drainage outlet to collect rubbish. It has been described as the "simple pollution control solution" over some areas outside India. We face daily problem with such a waste like plastic containers, bottles, paper and vegetation discharge into the city's waterways by storm water drains. With huge population like our country India, this idea could be more profitable than other countries as we are using coconut fibre as a mesh which has been placed on the outer mouth of the drainage pipes.

I.INTRODUCTION

Water pollution is the contamination of water bodies, usually as a result of human activities. Water bodies include for example lakes, rivers, oceans, aquifers and groundwater. Water pollution results when contaminants are introduced into the natural environment. For example, releasing inadequately treated wastewater into natural water bodies can lead to degradation of aquatic ecosystems. In turn, this can lead to public health problems for people living downstream. The net drainage system is a robust and modern filtration system for use where there are cost or space constraints or specialised cleaning equipment is not available. This system is designed to specially capture and retain large gross pollutants as well as small particles. This system has unique net release mechanism that eliminates any adverse hydraulic impact traditionally encounter with direct screen in trash racks.it contains stainless steel sleeve extension that is fitted into existing or new ,outlets and a removable polyethylene net. There are numerous techniques available for removing gross pollutants from water. The most effective strategies involve a combination of non-structural measures (e.g. education and waste management programs, and source controls) and structural treatments It is a subsurface structure that consists of a perforated pipe that is installed flat in a yard with a sloped trench that helps move water runoff from a highest point at the start to the lowest at the end, where it goes into a sewer, cistern, or swale. French drains help to redirect water from wherever the drain starts–usually close to the foundation of a structure to some sort of sewer or cistern. In general, French drains are used to help the natural flow of water from high to low. These systems are usually found around commercial buildings, including restaurants and loading docks. You can also find them on city streets and even pool deck.

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II.LITERATURE REVIEW

It is a subsurface structure that consists of a perforated pipe that is installed flat in a yard with a sloped trench that helps move water runoff from a highest point at the start to the lowest at the end, where it goes into a sewer, cistern, or swale. French drains help to redirect water from wherever the drain starts usually close to the foundation of a structure to some sort of sewer or cistern. In general, French drains are used to help the natural flow of water from high to low. These systems are usually found around commercial buildings, including restaurants and loading docks. You can also find them on city streets and even pool deck. Like the surface field drainage systems, the subsurface field drainage systems can also be differentiated in regular systems and checked (controlled) systems. When the drain discharge takes place entirely by gravity, both types of subsurface systems have much in common, except that the checked systems have control gates that can be opened and closed according to need. They can save much irrigation water. A checked drainage system also reduces the discharge through the main drainage system, thereby reducing construction costs. When the discharge takes place by pumping, the drainage can be checked simply by not operating the pumps or by reducing the pumping time. In north-western India, this practice has increased the irrigation efficiency and reduced the quantity of irrigation water needed.

[1] City of Kwinana. (2018). Sustainable Water Management Plan. City of Kwinana. Neumann, L. N., & Sharma, A. (2010). Literature Review on Performance Testing Approaches for Gross Pollutant Traps. CSIRO: Water for a Healthy Country National Research Flagship.: In the last 20 years, there has been increasing recognition in Australia and overseas of the need to manage urban strom water not only in its traditional quantity context, but also in terms of a quality context (Fletcher et al. 2004; Engineers Australia 2006). The traditional approach to strom waterworks focuses on the conveyance of strom water safely and economically from urban areas to receiving waters. Increased awareness of the need to mitigate the environmental impacts of urbanization, and more recently, interest in alternative water sources is driving a transition in the urban water industry from disparate management of functional areas (water supply, wastewater and stormwater) to integrated urban water management (Engineers Australia 2006). As part of the integrated management, there have been several advances in the treatment processes for urban strom water aiming to reduce pollutant loads before discharge to waterways. In recent years, the focus in strom water treatment has moved from concentration targets to load reduction targets. This literature review focuses specifically on gross pollutants traps. Gross pollutant traps are constantly evolving and performance data is scarce (Victorian Strom water Committee 1999), while detailed field monitoring is also very limited (Wong et al. 2000). In a review study on the performance of strom water treatment devices in the United States, the authors concluded that due to the inconsistency of study methods, lack of associated design information and reporting protocols, comparison of different systems is very difficult or impossible (Strecker et al. 2001). These studies often utilize different methods for data collection, analysis and reporting, resulting in significant differences in the range of treatment efficiency for similar devices. Thus it is difficult to apply the limited information to develop protocols for performance assessment.

Relevance to current Research

The report covers waste generated or managed in Australia. Different parts of the report cover different types of waste. Most of the report focuses on core waste – materials generally managed by the waste and resource recovery sector, comprising solid non-hazardous materials and hazardous waste including liquids. Core waste material categories and types are listed in Table 1. Many of the trend charts shown in the report also include ash from power generation, which is a large stream that could be recycled to a greater extent. Some data on waste from mining, minerals processing, agriculture and fishing is included in parts of the report, but is not comprehensive. A separate section addresses liquid waste. The report excludes data on forestry residues, pre-consumer waste that is recycled as part of a production process and uncontaminated soil.

Relevance to current Research

This study is part of the broader project to install GPTs in Herdsman Lake's drainage system and will assist the Corporation to determine the performance and the economic burden of the selected GPTS and to assess the possibility to broaden their use in the Corporation's drainage network. The project aims to achieve the following objectives:

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∟ Develop an understanding via a literature review of the performance, maintenance and operational requirements of drainage nets, floating litter booms and floating litter traps providing a point of comparison to the actual data that will be collected once the Herdsman Lake GPTs are installed.
∟ Standardize a feasible, cost-effective methodology for monitoring drainage nets based on the current maintenance methodology undertaken by the City of Kwinana.

III.METHODOLOGY OF PROPOSED SURVEY

Material Selection

Coir-Coconut fibre, is a natural fibre extracted from the outer husk of coconut and used in products such as floor mats, doormats, brushes and mat-tresses. Coir is the fibrous material found between the hard, internal shell and the outer coat of a coconut. Other uses of brown coir (made from ripe coconut) are in upholstery padding, sacking and horticulture. White coir, harvested from unripe coconuts, is used for making finer brushes, string, rope and fishing nets. It has the advantage of not sinking, so can be used in long lengths in deep water without the added weight dragging down boats and buoys. Coir fibres are found between the hard, internal shell and the outer coat of a coconut. The individual fibre cells are narrow and hollow, with thick walls made of cellulose. They are pale when immature, but later become hardened and yellowed as a layer of lignin is deposited on their walls. Each cell is about 1 mm (0.04 in) long and 10 to 20 μm (0.0004 to 0.0008 in) in diameter. Fibres are typically 10 to 30 centimeter's (4 to 12 in) long. The two varieties of coir are brown and white. Brown coir harvested from fully ripened coconuts is thick, strong and has high abrassion resistance. It is typically used in mats, brushes and sacking. Mature brown coir fibres contain more lignin and less cellulose than fibres such as flax and cotton, so are stronger but less flexible. White coir fibres harvested from coconuts before they are ripe are white or light brown in colour and are smoother and finer, but also weaker. They are generally spun to make yarn used in mats or rope. The coir fibre is relatively waterproof, and is one of the few natural fibres resistant to damage by saltwater. Fresh water is used to process brown coir, while seawater and fresh water are both used in the production of white coir. It must not be con- fused with coir pith, or formerly cocopeat, which is the powdery material resulting from the processing of the coir fibre. Coir fibre is locally named 'coprah' in some countries, adding to confusion.

Material properties

The breaking load of single fibres obtained from four localities of Kerala was deter- mined for the first time by using a modified Oniel's torsion tester of constant load type for grading purposes. There was no reference to the size of the fibres tested except that the strengths of the fibres were computed by using the fineness of the fibre (i.e. weight of the fibre in g of a km or 9 km length expressed as text or denier) in order to account for the non-uniform cross-section of the fibre. The fibres tested varied in their impurity content (pith and sand) and also in their colour, (golden yellow to black). One set of these fibres (which was found to be the best in terms of strength and colour) was also chemically treated individually with water, sulphuric acid, oxalic acid, bleaching powder, tartaric acid, chlorine water and SO s solution before being subjected to tensile load. No other details of the tests are available. From a statistical evaluation of the strength data it was reported that the tensile strength of the coir fibre varied from place to place. However, it is not clear whether the variation in the strength of the fibre is due to difference in retting process adopted in these places or due to the locality from where the husks were procured. Mathai et al (1948a, b) concluded that the quality of the fibres depends on various factors like size, maturity and variety of coconut, as well as the processing methods adopted. Similarly chemical treatments affected the strength considerably. However, no satisfactory explanation has been given for the observed variation in the strength of the fibres.

For our project we have use coconut rope and bind with each other so that it formed mesh. By making intertwining them so that the trash should sort by the mesh. This mesh has to make at approximately 10 cm .As the rope is readily available so we had brought from the market. Coconut rope [10-20- kg, 91rs per kg, four twist double type rope, 25mm diameter] and selected gutter underground concrete pipes [Thickness: 40 -70 mm, Diameter: 100 mm to 2000 mm]

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Drainage entrance treatments involve preventing entry into the strom water drainage system, or capturing the pollutants at drainage entrance points. This can be achieved by restricting the strom water entrance size, capturing pollutants as strom waterfalls into the drainage system, or retaining the pollutants in the entrance pit. Entrance treatments are free draining as collected pollutants are suspended above the base of a drainage pit. More recent designs use fine mesh bags or nets that can contain much finer material including gravel and coarse sediments. The site of the experimental site must be estimated before placing the experiment. The diameter of the pipe must be estimated first before placing. Before placing the mesh we must put placing holder inside the hollow pipe. These pipe holder must be big enough to withstand the flow of the water as well as the weight of the coconut mesh rope.

Now we have to place the mesh inside the holder as per the placing of the holler in the hollow site of the pipe. We can even place the iron sheet over the placing holder so that the mesh would not come out easily. As we are placing mesh make sure we have to be long boots for protection as the slag must be sticking over the body.

The length of the mesh must be too long so that trash stuck it will lead to the end of the mesh by the flowing water and the flowing water must not stop. Now as the strength of the mesh is high the maintenance will be done at approx. 6-7 months.

IV.CONCLUSION AND FUTURE WORK

The drainage nets effectively address the litter problem the City of Kwinana has in its bush reserves because of the effective and frequent maintenance the City performs on their devices. Additionally, the selected drain outlets were highly suitable for the nets given that the discharge basins are mostly dry systems with ease of access for maintenance vehicles. The remaining work of this study will endeavor to optimize/standardize the City's monitoring methodology based on the findings of this analysis. It is advisable to test the benefits of the proposed process by applying it to other local governments GPTs locations. It is also recommended to study the impacts of these GPTs on water quality and hydraulics to fully understand the implications of these devices and guide informed future decisions on their use and applications. From a disposal cost sense, GPTs are grouped into two main categories according to whether a dry or wet load is stored. This means that collected items are either stored above (dry) or below (wet) standing water levels.

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