

HYDRAULICALLY OPERATED DRAINAGE CLEANING SYSTEM

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ABSTRACT

The proposal concept is to replace the manual work in drainage cleaning by an semi-automated system using mechanical techniques. Now a day's even through mechanical machine plays a vital role in all industrial applications, the proper disposal of open drainages were still a challenging task. Cleaning of open drainage has always been uses human labor and it seems unethical. Also throwing of bottles/plastics and other such objects into the drain lead to narrowing and eventually blockage in flow. This leads to overflow in many cases. These wastes when not removed end up settling-in and block the drainage systems thereby causing jamming issues. To overcome this problem we implement a design "hydraulically operated drainage water cleaner" and we designed our project to use this in efficient way to control the disposal of wastages and with regular filtration of wastages. The Drainage system cleaner is a machine which helps to protect the environment from different kinds of environmental hazards through the promotion of waste management by the removal of garbage from the drainage system.

Keyword – hydraulic, drainage cleaner.

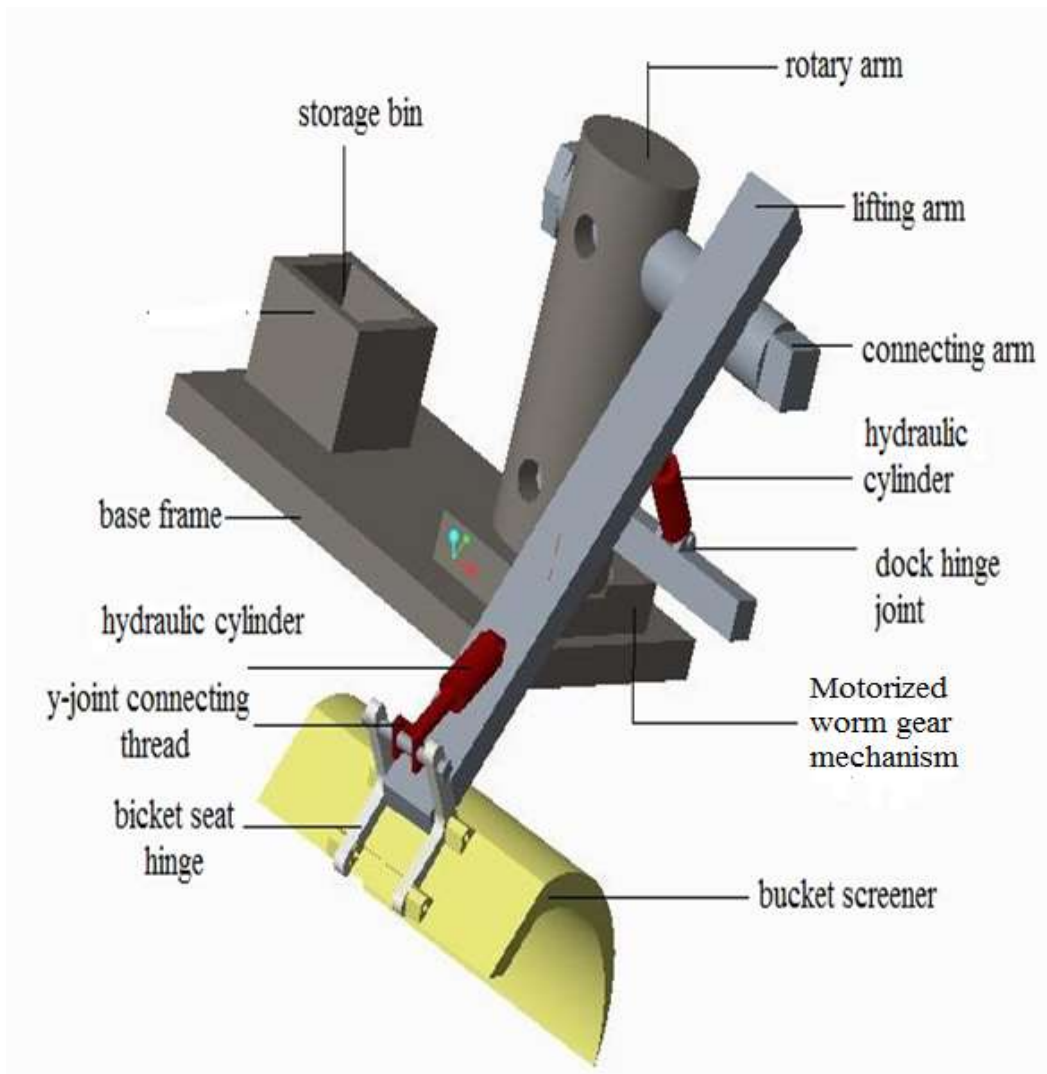
1. INTRODUCTION

As long as the draining system is considered the main function of the drainage system is to collect, transport and dispose of the water through an outfall or outlet. Impurities in drainage water can be only like empty bottles, polythene bags, papers etc... These impurities present in drainage water can cause blockage or the drainage system. The drainage system can be cleaned time to time manually or such a system can be designed that will automatically throw out wastages and will keep the water clean. This project is designed to keep clean the drainage system and helps the smooth working of the system. It cleans the water in the drainage system if any wastage appears and this form an efficient and easy way of cleaning the drainage system and preventing the blockage. Since the existing concepts are efficient but they having their own disadvantages such as deterioration and rusting of frame due to placing of cleaner permanently in drain flow area; clogging of wastes over chain drive; sudden failure due to chain drive struck etc.. To overcome such conflicts a new design of drainage cleaner is proposed. Thus it functions like wheeled excavators which is driven over the drain surface and accumulate the wastes in such a way using hydraulic and rotary mechanisms. Our proposal concept is a low cost automation and very simple, so as any person can operate and also efficient for the drainage waste accumulation process. Thus the fabrication of "Hydraulically operated drainage cleaner" project is proposed over the following methodologies in the project report.

2.COMPONENTS USED

Hydraulic Cylinder	Double Acting Bore :25mm; Stroke:125mm Max operating pressure :0 to 9bar Max operating temperature:-20°c to 80°c
Hydraulic Pump Motor	Hydraulic pump assisted with AC induction motor Voltage :230v; Rated Power:0.2Hp Speed :650rpm; Frequency :50-60hz
Valve	5/2 hand lever valve
Connecting tubes	Polyurethane Hose of diameter:8mm
T-connector	Diameter :8mm
Worm motor	D.C gear motor Voltage:12v; Speed :100rpm; Current:4A
Battery	Lead acid battery Voltage :12v; Current :1.3A
Frame material	Square cross-section bar (25*25*5)mm Length:1000mm; Width :600mm
Bearings	Type : stainless steel Ball bearing Inner diameter :15mm Outer diameter :35mm Depth :11mm
Wheel	Rubber made swivel wheel; Diameter: 50mm
Hydraulic fluid	Mineral oil; Density : 0.8 g/cm ³
Steel sheet	Stainless steel; Thickness:2mm

3. 3D-Modelling:



4. WORKING PRINCIPLE:

Our system is an automated drain cleaning system that lets fluids flow through it. The setup consists of a filter or screener which collects all the jamming and floating sewages, large solid wastes like bottles & plastic and accumulates it. Hydraulic cylinders are often used for the collecting and releasing motions of the end collector (screener) in upward and downward directions. Thus the cylinders are placed adjacent over the sides of the lifting arms and they are actuated by the hydraulic pump work. The required motion of the screener assembly is achieved by proper linkage of the cylinder piston to the link connectors at an appropriate angular position using the hinges and joints as like as the above part modelling. This screener element & lifting arms are fixed over the main frame rotates over the required regions using rotary actuators by motorized worm gear mechanism actuated using battery connections. The main frame which consist of the whole mechanisms also have the storage bin for dumping the collected wastes. It is movable on above the drain surface and the required movement of the system is achieved by the swivel wheels, and finally all these functions are carried out using a power assisted or power backup setup.

5.RESULT AND DISCUSSION:

- This model only immersed in drain flow only at the time of digging the wastes. So rusting of materials is very much decreased.
- Bucket collector is used to collect the wastes and so the amount collected per cycle is considerably high when compared to the existing system. Bucket collector is an enclosed part which collects and accumulates the wastes in a proper manner.
- It is portable and it is also assisted with any vehicles of effective operations by reducing the human work.

CONCLUSION:

Automation is a technology applied with the application of mechanical, electronic and computer based systems to operate and control production. This system is used to operate automatic drainage cleaning system. This project may be developed with the full utilization of men, machines and materials and money. The “Hydraulically operated drainage cleaning system” is working with satisfactory conditions. We hope that this will be done among the most versatile and interchangeable one even in future.

6. REFERENCES :

- [1]. Ganesh U L, et.al. “Semi-Automatic Drain For Sewage Water Treatment Of Floating Materials”, International Journal of Research in Engineering and Technology, Vol No- 05, Jul-2016
- [2]. Prof.NitinSall, Chougale Mohammed Zaid Sadique, PrathmeshGawde, Shiraz Qureshi and Sunil Singh Bhadauriya Vol.4 Issue 2, February 2016.
- [3]. Dr .K.Kumaresan., ph.d., Prakash S, Rajkumar. P, Sakthivel.C, Sugumar. GISSN: 2349 - 9362 (ICEIET - 2016)
- [4]. NDUBUISI C. Daniels, “Drainage System Cleaner A Solution to Environmental Hazards”, International Referred Journal of Engineering and Science, Vol No- 3, March 2014