Quest Journals
Journal of Research in Mechanical Engineering
Volume 8 ~ Issue 8 (2022) pp: 01-14
ISSN(Online):2321-8185
www.questjournals.org

Research Paper

Design and Fabrication of semi-automatic drainage cleaning system

[1]P.Balashanmgam [2]N.Sivakumar
[1](Associate Professor, Department of Mechanical Engineering, Annamalai University, Chidambaram, India)
[2](Assistant Professor, Department of Mechanical Engineering, Annamalai University, Chidambaram, India)
Corresponding Author:P.Balashanmgam

ABSTRACT: *Water is one of the essential need for the existence of life on earth. In spite of 70% water on earth majority of water is not suitable for drinking purpose. There is a huge demand of clean water as it is used for a variety of purpose such as drinking, bathing, cleaning, cooking etc. Impurities present in water can cause serious health issues that can damage the life of human beings. The chief function of the automatic drainage system is to collect, transport, as well as dispose the solid waste in the waste bucket by the help of claws. Solid waste in drainage water includes empty plastic bottles, polythene bags, papers etc. Impurities in drainage water can lead to blockage of the drainage system. In order to avoid such situation these impurities are needed to be taken out time to time for the continuous flow of drainage water. Drain can be cleaned continuously by the help of model using the drive system to remove the solid waste and threw it into waste bucket collector. The main objective of this project work is to initiate the efficient working of system. This project automatically cleans the water in the drainage system each time any impurity appears, and claws which are driven by chain sprocket grasp the solid waste and threw it into the waste bucket to avoid blockage. It even reduces the effort of manual labor as well as reduces the threat to human life from infection disease caused by sewage water.*

KEYWORDS: *Double Pendulum, Numerical Solution, Simulation, Behaviors of the System*

R*eceived 23 July, 2022;* ***R****evised 04 August, 2022;* ***A****ccepted 06 August, 2022 © The author(s) 2022.*
P*ublished with open access at* ***www.questjournals.org***

I. INTRODUCTION

In this Chapter the requirement of automatically operated drainage cleaner is discussed and newly included features are discussed and their applications. The problem of flooding and climate change has become outrageous because of its recent trends in our environment today. This has become a cause of major concern to the world, especially the developing countries. Water running through a water drainage system mostly carries along waste materials most which are non-biodegradable which not only cause flooding but also climate change. Overflow of water drainage system occurs when there is a blockage of an end of the drainage system forcing the water to find its way elsewhere apart from the mapped-out drainage system, therefore the running water spills over the horizontal height of the drainage systems spreading to regions alongside the drainage system, thereby causing problems such as pushing down of structures such as fences, water logging of farm lands and residential building, etc.

The impurities present in water can cause hazardous and disease. As long as the draining system is considered the function of the main 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. The problem such as Environmental pollution and spreading of viral diseases are avoidable.

In today's era automation plays a very important role in all industrial applications. For the proper disposal of sewage from industries and household is still a challenging task.

Drain pipes are used for the adequate disposal of waste and unfortunately sometimes there may be a threat to human life during the cleaning of blockage in the drain pipes or it can cause serious health issues because of the pertaining problems like malaria, dengue, etc.

In order to overcome the drainage problem as well as to save human life we implement a design "Semi-Automatic Drainage Cleaning System".We designed our project in order to use it in an efficient way to

control the disposal of waste along with regular filtration of drains, removal of solid waste in order to avoid blockage in drains to promote continuous flow of drainage water which ultimately reduces the threat to human life.Automation of Drainage Cleaning System would reduce the risk of various diseases spread due to accumulation of waste. This Drainage Cleaning system will clean the waste at the surface of drainage which would allow the flow of water. The devices is place across drain so that only water flow through lower grids, waste like bottle, etc. Floating in drain are lifted by teeth which is connected to chain. This chain is attached by gear driven by motor. When motor runs the chain starts to circulate making teeth to lift up. The waste materials are lifted by teeth and are stored in waste storage tank..

Semisolid or solid matters that are created by humans and animal activities which are disposed because of their hazardous nature is known as solid waste. Solid waste include paper, plastic containers, bottles, cans and electronic goods are not biodegradable, which means they cannot be carried out through organic or inorganic processes. They cause health threat to humans, plants, animals etc. They also the fertility content of the soil. The impurities present int the drainage can cause instant blocks. The cleaning of drainage system is carried out by manually.

Fig. 1.1.Drinage cleaning

Safety is essential to any modern manufacturing environment, hence we implement automatically working drainage cleaner as shown in figure 1.1.. It can reduce the risk of the drainage cleaners. Automation offers huge potential to enhance safety at manufacturing sites of all sizes. By implementing automation, you have the opportunity to eliminate pinch points and other major hazards on the work floor.

II. LITERATURE REVIEW

S D Rahul Bharadwaj, et.al. [1] Proposed with the automatic cleaning of waste water in order toprevent global warming and melting of glaciers. The results emphasize the need of waste water treatment plants, through which the water is treated before suspending in rivers. Firstly power is generated and that power is used for waste water cleaning process.

Elangovan K., et.al. [2] Reviewed about drainage cleaning to replace manual work to automated system because manually cleaning system it is harmful for human life and cleaning time, is more soto overcome this problem they implemented a design "Automatic drainage water pump monitoring and control system using PLC and SCADA". PLC and SCADA were designed. In this project to useefficient way to control the disposal of wastage regularly, treatment of disposal in different way toxicand nontoxic gases. PLC controller from Siemens was used in the treatment system of drainage wastewater control by the stepper motor, compressor, gas exhauster, pressure valve and the liquid level, flow and other analog variables to achieve automatic control of sewage waste water treatment.

Ganesh U L, et.al. [3] Showed the usage of mechanical drainage cleaner to replace the manual work required for drainage cleaning system. Drainage pipes are very dirty. Sometimes it is harmful for human life while it is need for cleaning drainage system. To overcome this problem, they implemented mechanical semi-automatic drainage water cleaner and so the water flow is efficientbecause of regular filtration of wastages with the help of that project. Different kinds of environment hazards reduced with the help of Drainage system machine.

Dr. K. Kumaresan [4] explained manual work converted to automated system. Drainage pipe using for disposal and it may be loss for human life while cleaning the blockage in the drainage pipes. To overcome this problem, they implemented "Automatic Sewage Cleaning System". They designed their project different way clearance of gaseous substance are treated separately so the flow of water efficiently. This project may be

developed with the full utilization of men, machines, and materials and money. They made their project economical and efficient with the available resources.

They used automation technology related with his application of mechanical, electronics, computer-based systems to operate and control production.

R. Sathiyakala, et.al. [5] explained E bucket (electronic bucket) use for drainage cleaning system because E-bucket lifted a sewage and used evaporation treatment for this sewage wet sewage was converted into dry matters, with the of ARM board (ARDUINO) this process was performed. After this process they were add this waste a government bank without any kind of affection of the bacteria.

Nitin Sall, et.al. [6] explained flow of used water from homes, business industries, commercial activities are called wastewater. 200 to 500 liters wastage water are generated each person every day. So, using wastewater technology that removes, rather than destroys, a pollutant in a drainage system.

Gregor Burger, et.al. [7] described the concept and software design of an innovative general- purpose platform for network-based model development and look at some of crucial computational design issues. They developed the improvement in the design of very fast, easy to use, easy to integrate and extensible general purpose simulator platform. It was running up to 40 times faster than its MATLAB based predecessor and allowing it to be flexibly applied. They included features such as the hot-start mechanism and the extension interfaces have proven to be extremely useful when linking city drain 3 as a sub-model into larger software project.

NDUBUISI C. Daniels, et.al. [8] Showed the Drainage system cleaner machine used to remove garbage and sewage automatically which helped to protect the environment from different kinds of environmental hazards. The drainage system cleaner has three major parts which are the Propeller, the Cleaner and the Pan all makes up for its effective functioning.

Objective of the Project

1. The main objective of this project is to reduce the human effort in cleaning the drainage system.
2. The frequent blocks in the drainage system can be avoided which also offers the efficient flow of drainage water.
3. The plastic waste can be removed and allow only the water to pass through.

It also reduces the man labor.

4. To replace the manual system by semi-automated system.
5. The system should be portable.
6. The system should be able to segregate solid waste from the drainage water.

III. LITTER

Urban litter (alternatively called trash, debris, flotsam, jetsam, floatables, gross pollutants, rubbish or solid waste) has become a major problem in modern society. It typically consists of manufactured materials such as bottles, cans, plastic and paper wrappings, newspapers, shopping bags, cigarette packets and hypodermic needles, but it can also include items such as used car parts, rubble from construction sites and even old mattresses. It accumulates in the vicinity of shopping centres, car parks, fast food outlets, railway and bus stations, roads, schools, public parks, garbage bins, landfill sites and recycling depots. There it remains until either someone removes it, or it is transported by the wind and / or storm water runoff into the drainage system. Along the way, however, items frequently become entangled in the vegetation along the banks of the streams, rivers or lakes, or strewn along the beaches. Some of this debris picked up - often at great expense. Most of it is probably buried in the river, lake or beach sediments as shown in figure 3.1 and 3.2.

Fig 3.1. Litter in Canal

Fig3.2. Litter in river

3.1. Control of Litter

Drain cleaner machine includes set of vertical parallel rods forming filtering screen and it is mounted in frame with possibility of motion. Said rods are mounted with gaps normally relative to motion direction of liquid flow. Cross section of grid rods is in the form of wedge with rounded edges of its base turned towards flow of sewage water. Filtering screen of grid includes separate interchangeable sections secured to cross rigidity ribs of frame of grid. Two endless chains are driven to motion with use of sprockets at sides of grid together with rake arranged between them and being in the form of set of toothed plates whose teeth engage with said gaps. Rigidity rib arranged in sewage water is in the form of bent metallic plate to which rubber strip is secured. Lip of grid frame base is slightly raised over duct bottom by regulated height and it is in the form diffuser. Guides for changing motion direction of rake are provided with centering gaskets arranged upstream and downstream filtering screen. The invention relates to mechanical grates rake type and may find use in the purification of wastewater from mechanical impurities.

3.2. Planning controls

Planning controls are aimed at adopting land use policies which: Preserve existing valuable elements of the storm water system, such as natural channels, wetlands and riparian vegetation by restricting the use of such areas. Minimize the risk of litter reaching the drainage system by situating litter-producing activities in areas where it is easier to contain and control litter accumulation. Require pollution control measures as part of any development application.

3.3. Source controls

Source controls are aimed at reducing the litter loads entering the drainage system by dealing with pollution at source. There are numerous options: Upgrade cleansing operations by, for example; the better placement and design of litter bins, more frequent collections of litter, monitoring street sweeping methods to ensure that litter is not swept into catch pits, and ensuring that communal collection depots are appropriately

placed. The latter may also be a way of promoting jobs in recycling. Control construction activity by ensuring that site management plans are in place to prevent contaminant spills and rubble from reaching the drainage.

3.4. Reducing the litter load

Much can and should be done to reduce the quantity of litter that finds its way into the storm water drainage system. The most sensible way of going about this is through the development of an integrated catchment litter management strategy.

Two categories of litter reduction methods are available:

- Planning controls (restricting litter generating activities to areas where their impact can most effectively be controlled and reduced).
- Source controls (reducing litter loads entering the drainage system through inter alia education and enforcement programmed).
- A comprehensive integrated catchment litter management strategy will also include structural controls, i.e., the removal of litter from the drainage system.

IV. METHODOLOGY

Methodology used for whole processing of Semi-Automatic Drainage Cleaning Machine is givenbelow this Methodology gives way about how work is to be carried out in systematic way as shown in figure 4.1.. It is standard process of describing process, how it is done in simplest manner.

The device is place across a drain so that only water flows through the lower basement. Floatingwaste like bottles, plastic cans, covers... etc. is lifted by lifters which are connected to the chain. Thechain revolves with the sprocket wheel which is driven by the motor. The energy provided to the motor is electrical energy. When motor runs the chain starts to circulate making the lifter to lift up.The wastage material are lifted by lifter teeth and stored in storage or collecting bin. Once the collecting bin is full, the waste materials are removed from the bin.

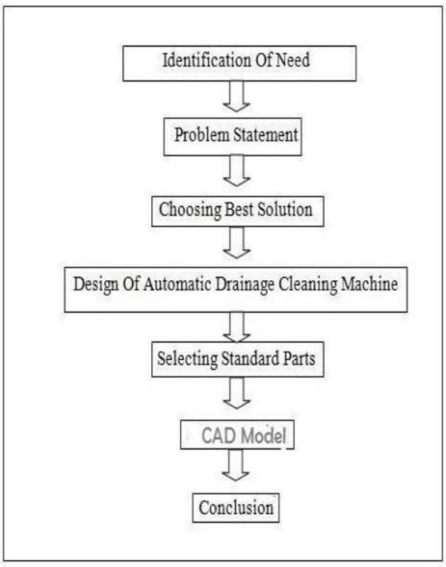

Figure4.1. quasiperiodic behaviour

If we turn on motor switch or if we supply current to the motor the motor starts to rotate. The rotary motion of the shaft is connected to the top shaft by chain and sprockets which is placed on tapper bars. From top shaft that motion is transferred to the bottom shaft by using sprockets and chains. The teeth which is used for lifting waste from drainage is placed or attached between two chains which are on top and bottom shafts. The dust bin which is used for collecting all the waste isattached to vertical bars behind the chains. There will be a mesh between the chains and dust bin which act as a barrier for stopping the waste without floating. When we switch on the motor the two shafts starts to rotate. Thus the teeth also starts rotate. Theteeth enters into water while rotating when it is coming up it also lift the waste present on the wateralong with it. It carries the wasted along with it and finally dumps that waste in dustbin during rotation.

V. COMPONENTS AND ITS DESCRIPTION

The various components required for the automated drainage cleaner are discussed below.

- DC Motor
- Chain Drive
- Shafts
- Box frame
- Bearings
- 12V Battery
- Lifter
- Collecting Bin
- Arc Welding

5.1.Dc Motor

Machines are a means of converting energy. Motors take electrical energy and produce mechanical energy. Electric motors are used to power hundreds of devices we use in everyday life. Motors come in various sizes. Huge motors that can take loads of 1000's of Horsepower are typicallyused in the industry. Some examples of large motor applications include elevators, electric trains, hoists, and heavy metal rolling mills. Examples of small motor applications include motors used inautomobiles, robots, hand power tools and food blenders. Micro-machines are electric machines withparts the size of red blood cells and find many applications in medicine.

5.1.1. Windshield Wiper motor

Windshield wipers are powered by a small electric motor, usually mounted on the firewall or under the cowl (the area under the windshield's base) as shown in figure 5.1. The motor activates linkage that moves the wiper arms back and forth. On vehicles with a rear window wiper, a separate motor powers the onein the rear. Signs that a wiper motor is about to fail include slow or intermittent operation, wipers that will operate at only one speed, or arms that stop in the middle of the windshield when turned off. If your wipers don't work, the fault could also lie with other parts of the wiper system. In the winter, for example, trying to use the wipers when the blades are stuck to the windshield because ofice or snow can blow the fuse for the motor or trip a circuit breaker.

Fig. 5.1. Windshield wiper motor

5.2. Construction

DC motors consist of one set of coils, called armature winding, inside another set of coils or a setof permanent magnets, called the stator. Applying a voltage to the coils produces a torque in the armature, resulting in motion.

Stator

The stator is the stationary outside part of a motor. The stator of a permanent magnet dc motor iscomposed of two or more permanent magnet pole pieces. The magnetic field can alternatively be created by an electromagnet. In this case, a DC coil (field winding) is wound around a magnetic material that forms part of the stator.

Rotor

The rotor is the inner part which rotates. The rotor is composed of windings (called armature windings) which are connected to the external circuit through a mechanical commutator. Both stator and rotor are made of ferromagnetic materials. The two are separated by air-gap.

Winding
A winding is made up of series or parallel connection of coils. Armature winding - The windingthrough which the voltage is applied or induced. Field winding - The winding through which a currentis passed to produce flux (for the electromagnet).Windings are usually made of copper as shown in figure 5.2.

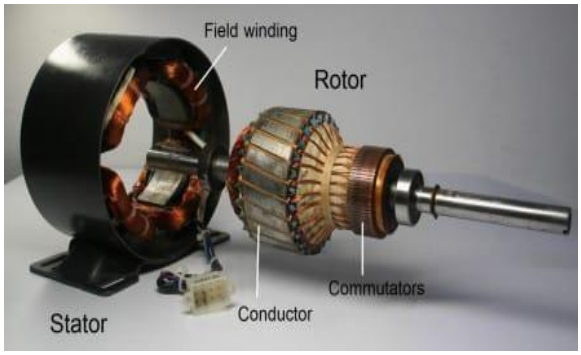

Fig. 5.2. Construction of DC motor

5.3. Chain DriveChain
A bike chain is a roller chain that transfers power from the upper shaft to lower shaft by DC motor runs. The conveyor which is connected to the chain through welding. Most chains are made from plain carbon or alloy steel, but some are nickel-plated to prevent rust, or for aesthetics as shown in figure 5.3.

Fig. 5.3. Chain

5.4. Sprocket
A sprocket or sprocket-wheel is a profiled wheel with teeth, cogs, or even sprockets that mesh with a chain (or) indented material as shown in figure 5.4. The sprocket wheel engage a chain and run over it. It is distinguished from a gear are never meshed directly, differs from shafts in this sprockets have teeth to another and pulleys are smooth. Sprockets and chains are also used for power transmission from one shaft where slippage is not admissible, sprocket chains being used instead of belts or ropes and sprocket-wheels instead of pulleys. They can be run at high speed and some forms of chain are so constructed as to be noiseless even at high speed.

Fig. 5.4. Sprocket

5.5. Shaft

A shaft is a rotating machine element, usually circular in cross section, which is used to transmitpower from one part to another, or from a machine which produces power to a machine which absorbs power as shown in figure 5.5. The various members such as pulleys and gears are mounted on it.

Fig. 5.5. Shaft

Fig. 5.6. Box frame

The material used for ordinary shafts is mild steel. When high strength is required, alloy steel such as nickel, or nickel chromium is used. Shafts are generally formed by hot rolling and finished to size by cold drawing or turning and grinding.

This mild steel box section, also commonly known as square tube, is supplied in a choice of 3 different grades offering different surface finishes as shown in figure 5.6. The range of box section types we stock ensure there is a product suitable for your needs.

Mild steel box section can be used for a huge range of various applications including construction, frames, structures, security grills, transport, and general fabrications.

5.6. Bearings

A bearing is a machine element that constrains relative motion to only the desired motion, and reduces friction between moving parts. The design of the bearing may, for example, provide for free linear movement of the moving part or for free rotation around a fixed axis; or, it may prevent a motion by controlling the vectors of normal forces that bear on the moving parts. Most bearings facilitate the desired motion by minimizing friction. Bearings are classified broadly according to thetype of operation.

Plain Bearing

- Ball Bearing
- Rolling-Element Bearing
- Roller Bearing
- Jewel Bearing
- Fluid Bearing
- Magnetic Bearing
- Flexure Bearing

A Plummer block bearing is a pedestal used to provide support for rotating shaft with the help of compatible bearings & various accessories as shown in figure 5.7. The assembly consists of a mounting block which housesa bearing. The block is mounted to a foundation and a shaft is inserted allowing the inner part of thebearing, shaft to rotate.

Fig. 5.7. Plummer block Bearing

A bush bearing, also known as a bushing or bush, is one classic type of independent plain bearing.It is a mechanical component which is designed to provide a bearing surface for rotary applications,reducing friction between the spinning shafts and stationary supporting elements.. Plain bearings are widely utilized in devices

that have rotating or sliding shafts. Without rolling elements, plain bearings are also called journal bearings, slide bearings or sleeve bearings. Plain bearings are the most cost-efficient type of bearings. Moreover, plain bearings are compact and light in weight, having ideal load capacity. These benefits make the bearing popular in industrial applications. For example, plain bearings are used in a wide variety of engines, turbomachines like steam turbines, compressors and so on. They are also preferred in applications that operate at relatively lower speed, such as propeller shafts of ships. Since the bearings can reduce the cost and are simple to add in the system, they are also suitable for a wide range of linear, intermittent motion applications

5.7.12V Battery

Battery used a rechargeable battery, storage battery, secondary cell, or accumulator is a type of electrical battery which can be charged, discharged into a load, and recharged many times, as opposed to a disposable or primary battery, which is supplied fully charged and discarded after use. It is composed of one or more electrochemical cells a shown in figure 5.8. The term "accumulator" is used as it accumulates and stores energy through a reversible electrochemical reaction. Rechargeable batteries are produced in many different shapes and sizes, ranging from button cells to megawatt systems connected to stabilize an electrical distribution network. Several different combinations of electrode materials and electrolytes are used, including lead-acid, nickel-cadmium (NiCd), nickel- metal hydride (NiMH), lithium-ion (Li-ion), and lithium-ion polymer (Li-ion polymer).

Fig. 5.8. 12V Battery

12-volt battery is used in this proposed system. It is help to run a DC motor and stores a power. Car battery (most batteries for vehicles are 12 volts) Lantern battery. A23 battery, a small battery (roughly 2/3 of an AAA battery in length) made for RF transmitters.

Lifting equipment, also known as lifting bin, is a general term for any equipment that can be used to lift loads a shown in figure 5.9. This includes sewages like polythene , plastic bottles , wastage which generally occurs in the water, thermocol, and other dusty and sewage partials which comes in the contact with that equipment. In our project we used two lifter for better performance, and it also help for balancing the model.

Fig. 5.9. Lifter

Collecting bin is the rectangular hollow box which is situated behind the model a shown in figure5.10. It is used for thepurpose of collecting the sewages which is comes in the contact of the lifter. When the lifter completes its cycle it reaches to the bin and removes all sewage in the collecting bin. The collectingbin made up from sheet metal.

Fig. 5.10. Collecting Bin

Arc welding is a type of welding that uses a welding power supply to create an electric arc between an electrode and the base material to melt the metals at the welding point. They can use either direct (DC) or alternating (AC) current, and consumable or non-consumable electrodes. The welding region is usually protected by some type of shielding gas, vapor, or slag. Arc welding processes may be manual, semi-automatic, or fully automated a shown in figure 5.11.

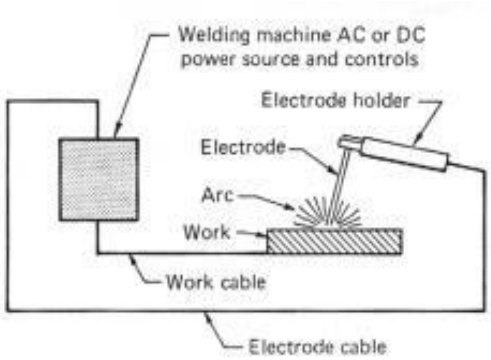

Fig. 5.11. Arc Welding

VI. FABRICATION OF SEMI-AUTOMATIC DRAINAGE CLEANING SYSTEM

6.1. Fabrication Process

- First of all, the title was chosen for the concept or object of the project.
- References are collected related to the project design and the design calculations for the project are done.
- Required material and component checked for available in the market.
- First the frame or base portions are made by welding using arc welding. Journal bearing is bolted on the frame.
- Cylindrical shafts are fixed to the bearings and also chain drive are also fixed to the shaft in order to fix theshafts the factor of safety of the chain is calculated.
- The two lifters are fixed to the chain by arc welding at an equal distance from each. Then thecollecting bin is fixed at backside by welding.
- Motor is connected to the upper shaft by using the spur gear.

6.2. Testing

Testing of the final project was conducted by nearby water reservoir. The side flaps provided were properly working and help the water to pass through the net only. The lifters were able to lift maximum weight of 500g at a time. The solid waste lifted by lifter was properly disposed in the collector bin during each rotation.

6.3. Mechanical Strength

Mechanical strength is primary criteria for selection of suitable materials for any Engineering application / product. Mechanical strength is the ability of materials to withstand with load or forces.Materials selected for any engineering application, should have appropriate mechanical strength to be capable to withstand with loads or

forces developed in structure of engineering product during operation.

6.4. Stability

Stability of engineering material is defined by the ability of engineering product manufactured by using that material to with stand with following operating conditions- 1. Temperature 2. Radiation
3. Fluctuations in temperature 4. Atmospheric Conditions 5. During of operation

6.5. Ductility

Ductility of engineering material is the property of material makes the material suitable for fabrication by rolling, drawing, extrusion and other mechanical processes. Basically, it is the abilityof material that how much the materials can be stretched plastically without breakdown or failure. Ductility of materials is related to the strength of material. Considerable ductility can be obtained ata sacrifice of strength or vice versa. For example, by increase of temperature ductility of material increased and strength decreased. By cold rolling the mechanical strength is increased whereas the ductility is decreased. It is not necessary the material being used for all product should have high ductility. But it should have suitable ductility.

6.6. Availability

Material selected for engineering product should be easily available in desired form and at appropriate cost. So that the product can be produced economically to make its price competitive in market. Material may be available in any form such as casting, forging, rolled sheets etc. But the availability of material in suitable form is necessary to facilitate the manufacturing the product withdesired quality.

6.7. Fabric Ability

Fabric ability of an Engineering material is the ability of material, which indicates that how easily it can be fabricated in desired form and shape in order to manufacture an engineering product. Fabric ability of material makes it suitable for mechanical processing to convert it in desired form and shape.

SEMI-AUTOMATIC DRAINAGE CLEANING SYSTEM DESIGN

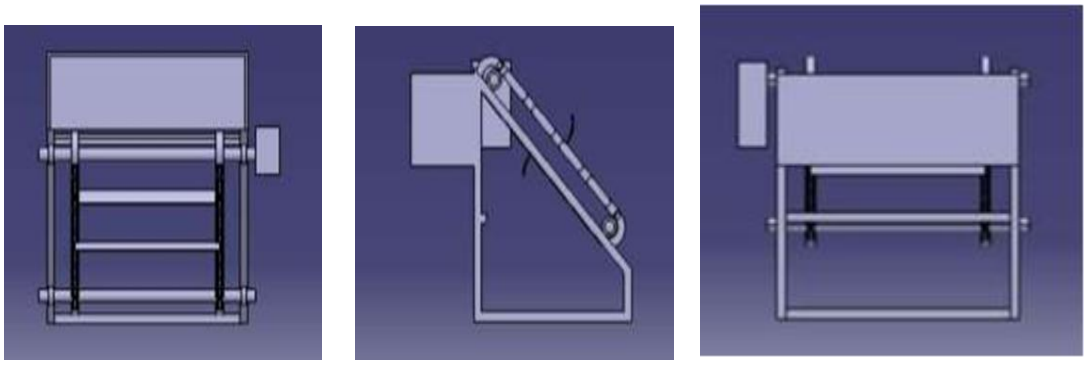

Fig 6.1.Semi-automatic drainage cleaning system

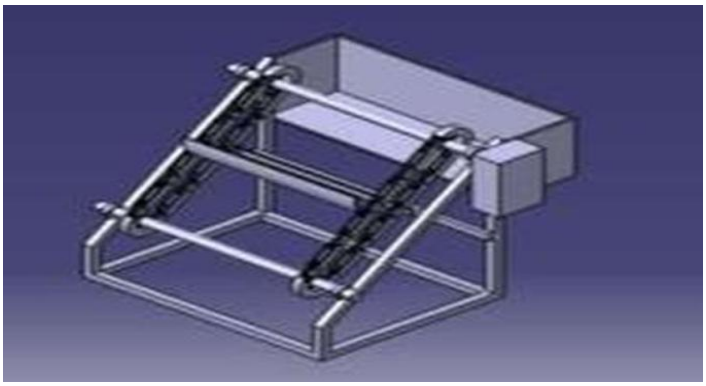

Fig 6.2.Semi-automatic drainage cleaning system

VII. WORKING PRINCIPLE

This chapter elaborates the working principle of Automated drainage cleaner.

7.1. Chain Drive Mechanism

In automatic drain cleaner the lifting pans are lifted by the chains which are in-line with the sprockets. This mechanism is known as chain drive mechanism.

7.2. Working

The drain cleaner machine helps us to clean small or big sewage through its mechanical design and functioning. This machine consists of parts such as motor, shaft, chain, sprocket, lifter, collectingbin etc. When we give power

to this machine then motor starts functioning which gives rotation to the shaft and through the help of shaft, the sprockets which are fixed to the shaft rotates. Due to the rotation of the sprocket, the chain connected to the sprocket rotates. As the chain rotates the two lifters which are connected to the chain at half length of the chain starts rotating as well. When lifter completes one round from down to upward direction, it takes all the garbage material like waste bottles, plastic, tins, etc., on the grid and drops it in the collecting bin attached atthe back. This is how this machine helps us clean sewage or any garbage from water.
The devices is place across drain so that only water flow through lower grids, waste like bottle, Etc. Floating in drain are lifted by teeth of lifters which are connected to chain. This chain is attachedby gear driven by motor. When motor runs the chain starts to circulate making teeth to lift up. The waste materials are lifted by teeth and are stored in waste storage tank.
The technical essence and the achieved effect are known technical the solution is closest to the claimed. The device is a prototype can be used for fine purification of wastewater from mechanical impurities, however, maintenance and operation process manifest a number of disadvantages.
. The basis of the invention is to create a mechanical grate rake type, allowing simplifying its installation, repair and maintenance. The problem is solved in mechanical grate rake type, fixed on the frame with the ability to move,including a set of vertical parallel rods forming a filter screen mounted with openings perpendicularto the direction of flow of waste water, two endless chains installed by asterisks on each side of the lattice can move together with placed between them with a rake, made in the form of plates with teeth coming in plot is, guide for changing the direction of movement of the rake; according to the invention the cross section of the rods of the lattice has the form of a wedge with rounded edges of the base facing towards the flow of waste water, filter screen grid recruited from separate interchangeable sections, mounted on the transverse ribs of the frame of the lattice as shown in figure 7.1.

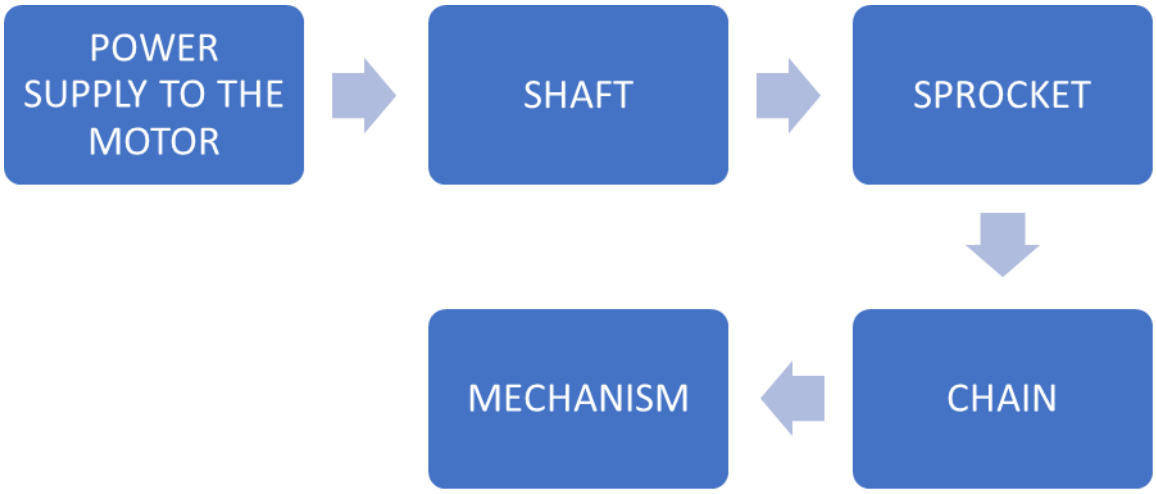

Fig8.7.1. Flowchart

With the rib being in water, made in the form of a metal plate attached to it with a welding, the threshold base frame grid elevated above the bottom of the channel at an adjustable height and is made in the form of a cone, each rake consists of a set of plates with teeth, and guides for changing the direction of movement of the rake supplemented centering plates installed before and after thefiltering screen.

7.3. Advantages

- Applicable in sewage cleaning
- Applicable in river, etc, …
- It is used in all types if drainage (large, small& medium).
- This machine is mainly used in cleaning system.
- Project to use this in efficient way to control the disposal of wastages and with regularfiltration of wastages.
- This device is suitable to hold flat type (maximum length 5 feet).
- Reduces threat to human life

- Manual assistance is not required
- Working principle is quite easy.
- Compact
- Portable.
- Highly Efficient

7.4. Disadvantages

- Disadvantages of electric drain cleaners include high relative cost and weight and the considerable physical effort that may be required to control.
- Small vibration will occur. In order to avoid vibration, the machine should be properlyfoundation with the floor.
- Iron Frame gets rust in water.

7.5. Applications

- It is used almost in all types of drainage (Large, Small, and Medium).
- Project to use this in efficient way to control the disposal of wastages and with regularfiltration of wastages.
- Cleaning and maintenance of sewer lines drains of mechanical drainer.

VIII. RESULTS AND DISCUSSIONS

In the treatment system of drainage Waste water control by the motor, roller chain and sprocket, lifter and the collecting bin to achieve semi-automatic control of sewage waste water treatment. Drainage from industries is treated through this project to meet the national emission standards, withstable operation, low cost and good effect. Drainage wastewater control is treated by this method toirrigate plants, clean toilets, etc. The cleaner functioned move effectively during the heavier rains which had more volume of running water with garbage and high velocity. By this proposed system,the men power will be reduced.

CONCLUSION

From this project, it is concluded that our project is helpful for separating solid waste from thedrainage water which will further avoid the blockage of drainage line and avoiding flooding**.**

- Separation of these solid waste helps in treating the solid waste and thus converting it into degradable waste.
- Being light in weight this kind of system can be placed at the junction points of the drainagesystem that are frequently subjected to blockages.

FUTURE SCOPE

Our project is simply a drainage water cleaner machine, which is automatically operated. Furthermodifications can be done to improve the performance of the machine.
Modifications are as follows:

- Instead of battery power, the motor can be run using solar power, by fitting solar panels to the setup.
- During the real time application, the size of the machine will be big so that more lifter pans can be fixed to the chain and a bigger motor can be used to increase performance and rate ofcollecting waste.
- A sensor can be placed in the collector bin. As the collecting bin becomes full, it gives an alert.
- The total system iron parts are completely separated by Thermostat plastic or high strength component materials for weight reduction and portability.

REFERENCES

[1]. Prof. Nitin Sall, Chougle Mohammed Zaid Sadique, Prathmesh Gawde,Shiraz Qureshi and SunilSingh Bhadauriya: "Drain
[2]. Waste Water Cleaner" "International Journal Of Research In Aeronautical And Mechanical Engineering" Vol.4 Issue 2, February 2016 Pgs: 38-41.
[3]. Neil Armitage, Albert Rooseboom, Christo Nel and Peter Townshend (1998). The Removal of Urban Litter from Stormwater Conduits and Streams. Water Research Commission (South Africa) Report No. TT 95/98, Pretoria.
[4]. Ganesh U L, Vinod V Rampur "Semiautomatic drain for sewage water treatment of floating materials "International Journal of Research in Engineering and Technology" Volume: 05 Issue:07 | Jul2016.
[5]. Dr.K.Kumaresan M.E, Ph.D., Prakash.S, Rajkumar.P, Sakthivel.C, Sugumar.G "Automatic Sewage Cleaning Equipment" "International conference on explorations and innovations in engineering and technology".
[6]. Rongsheng Zhu, Jiahong Li, Mingyuan Liu,etc. "Journal of Drainage and Irrigation Machinery"No.4, pp.220-223,2009.
[7]. Gaojing Zhang and Ling Wang, Journal of Gold, Vol.23, No.1, pp.22-25,2002.
[8]. Balachandra.G1, Karthikeyan.S2, Elangovan.K3, and Divya.N4. 1,2,3B.E/EEE Final year, Knowledge Institute of Technology,

Salem. "International journal of innovative research in technology" Volume 1. 2014.
[9]. S S Rattan Department of Mechanical Engineering Regional Engineering College Kurukshetra (2004). "Theory of machines" Publication: Tata McGraw-Hill Publishing Company Limited.
[10]. D.B. Bhandari "Design of machine elements (DME-II)" First edition 2015.
[11]. K Mahadevan and K Balaveera Reddy "Design and Data hand book for Mechanical Engineers"Fourth edition 2013.
[12]. R.K. Bansal Strength of materials" "Laxmi publications" Fourth edition 2007.
[13]. S.S. Ratan "Strenght of materials" "McGraw-Hill Publishing company Limited" 2008
[14]. https://en.wikipedia.org/wiki/Drainage_system