IJCRT.ORG ISSN : 2320-2882

INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

# Automated Drain Cleaner System

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## Abstract

This study proposes the development of an Automatic Drainage Cleaning System (ADCS), a novel solution designed to mitigate the inefficiencies and health risks associated with manual drainage cleaning methods. The ADCS aims to address the challenges of clogging, overflow, and environmental pollution by automating the cleaning process, utilizing a unique system that allows fluid flow while capturing large solid waste materials. The proposed system has the potential to significantly reduce labour risks, improve cleaning efficiency, and enhance environmental sustainability. This research contributes to the development of innovative solutions for urban drainage management, addressing the needs of growing urban populations and promoting sustainable development.

## Keywords

Automatic Drainage Cleaning System, Urban Drainage Management, Sustainability, Innovation.

## Introductions

Our final year project focuses on the development of an Automatic Drainage Cleaning System (ADCS), a innovative solution designed to address the challenges associated with traditional drainage cleaning methods. The ADCS aims to automate the cleaning process, reducing the risk of health hazards and environmental pollution. utilizing a conveyor belt system and strategically designed buckets, the ADCS efficiently collects and disposes of solid waste materials. This project seeks to mitigate the issues of manual drainage cleaning, promoting a safer and more sustainable approach to waste management.

## Objective of Automated Drain cleaner system

- *To design and develop an automated system* that can efficiently clean drainage systems and remove waste materials.
- *To reduce labour risks and improve cleaning efficiency* by automating the cleaning process.

- *To minimize environmental pollution* caused by drainage waste and improve sustainability.
- *To improve public health and safety* by reducing the risk of diseases and accidents caused by drainage waste.

## Working Principle

The Automatic Drainage Cleaning System operates by positioning a screen across the drain, allowing water to flow through while capturing floating waste materials, such as bottles and plastics. The screen is connected to a shaft driven by a DC motor via a chain mechanism. As the motor runs, the chain circulates, lifting the waste materials with the attached lifter. The waste is then transferred to a horizontal screening system and stored in a container.

## Process

1. When a current is supplied to the motor, it initiates rotation, which is then transmitted to the sprocket via a chain.

2. This rotary motion is subsequently transferred from the upper sprocket to the lower sprocket, utilizing another chain.

3. Strategically positioned between two chains, the lifter is designed to collect plastic waste from the drainage system.

4. Upon activating the motor, the two shafts begin to rotate, causing the lifter to rotate concurrently.

5. As the lifter enters the water, it collects plastic waste and transports it along with the rotational motion.

6. The collected waste is then deposited onto a separate assembly consisting of sprockets, chains, and shafts, which moves horizontally.

7. Ultimately, this horizontal assembly directs the waste into a container, facilitating easy removal by labourers.

## Components :

| SR. NO. | PART NAME | MAT | FUNCTION |
|---|---|---|---|
| 1 | Round bar | MS | Shaft |
| 2 | Square bar | MS | For supporting |
| 3 | Ball bearing | STD | Smooth running |
| 4 | Sprocket | STD | Engaging belt and revolution |
| 5 | Teeth gear | STD | For revolution support |
| 6 | Chain | STD | rotating |
| 7 | Belt | STEEL | Attached bucket |
| 8 | Bucket | STEEL | Collecting waste |

## Applications:

- Sewage and river cleaning
- All types of drainage systems
- Environmental conservation

## Advantages:

- Minimal maintenance requirements
- Cost-effective solution
- Reduced labour needs
- Simple, compact, and portable design

## Disadvantages:

- Requires continuous power supply
- Regular container cleaning necessary
- Risk of system rusting and corrosion
- Careful material selection and design required

## Conclusion:

The Automated Drainage Cleaning System (ADCS) offers a viable solution to the persistent issue of drainage blockages caused by plastic waste and other solid waste. Traditional gutter cleaning methods pose significant health risks to labourer's, exposing them to infectious diseases and toxic chemicals. To address this concern, our proposed system provides a fully automated mechanism for cleaning drains and gutters. By harnessing the power of automation, our system effectively filters out large solid waste, such as plastic bottles, while allowing fluids to flow freely. This innovative approach simplifies the cleaning process, requiring maintenance personnel to only clean the ADCS units installed at strategic points, rather than the entire gutter floor.

## Future Scope:

This project lays the groundwork for the development of an Automatic Drain Cleaning System (ADCS). Our research involved gathering essential information and equipment, as well as studying the construction and operating principles of ADCS. The next steps involve fabricating the ADCS and testing its efficacy. We envision this system to be a versatile and adaptable solution for cleaning, offering numerous benefits for human health, societal well-being, and national cleanliness initiatives. By integrating these benefits, our project has far-reaching implications, positively impacting various aspects of our daily lives and contributing to a cleaner, healthier environment.

## I .Industrial Implications:

Our innovative project offers entrepreneurs a unique opportunity to integrate technology with social benefits, tapping into a vast market potential. Aligning with the nation's focus on public welfare and sustainable development, this project provides a platform for employment generation and environmental conservation. By combining financial gains with corporate social responsibility, our project presents a lucrative and socially conscious business model for the industry sector.

## II. Societal Benefits:

Access to proper sanitation is a fundamental human need. Our project aims to address the deplorable sewerage conditions prevalent in many Indian towns and cities by providing an innovative, cost-effective solution. Furthermore, this initiative has the potential to generate employment opportunities through industry partnerships, ultimately benefiting the community and improving the overall quality of life.

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