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Underground Waste Management Using PLC

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ABSTRACT- Underground waste management using PLC is a system in which underground trolley or dustbin inserted to transport the municipal/ industrial/ commercial waste to a designated dumping yard with a high speed. As we seen this waste affects human life and effect on animals too. Animals eat plastics as a food which may cause their death. This happens because we generate so much garbage in our day- to- activities like our grocery and some snack food are packed in plastic and it will come out as garbage and this waste spread all over the road side area. Safai Karamcharis collect the garbage daily, they spend their 8-9 hours in garbage and by dealing with garbage on daily basis they cause severe health issues. Also, the people in the slums are surrounded by garbage and this badly affects to their lives. Garbage is carried through rivers and mixed with ground water. Floods are caused by stagnant waste drains and toxic substances released from the waste can poison the environment. Also as said by waste experts, waste can be very dangerous to the environment health and safety. And these have an effect on the financial and social ramifications. So, the purpose of this report is to measure for waste management without harming human and environmental life. Waste management through underground developed infrastructure can be planned as a necessary development which will allow efficient and cost-effective handling of one of the more urgent needs of modern society. In this system we have tried to overcome the waste problems and to be pollution free environment with spreading cleanliness and greenery.

Key Words: PLC, Garbage, Safai Karamcharis, Greenery.

1.INTRODUCTION-

The process of dumping wastes in dustbins is good. But these things Doesn't Ends here, instead actual process begins here. Separating the dry and wet wastes is the first step. Then the processing separating of biodegradable and non- biodegradable wastes has been done. It is also recommended that separate dry and wet wastes to keep out the mixing of dry and wet wastes. Improper management of wastes leads to contamination in landfills causes serious issues in fertility of land as well as ground water. Most of the wastes are reused or recycles so that proper separations of segregation of wastes are really important aspect of it. Survey says that most of the disposal process involves rag pickers in urban areas. However, it is so Time consuming and during this process it may leads to cuts and bruises in bare hands. It also leads to severe infections and illness. Another method of segregation is by making use of microcontroller. Even this poses some serious problems like more time consumption, not suitable in all types of environments and unable to segregate medical waste, sanitary waste and e-waste properly failing to obey certain rules and regulations imposed by the government in their segregation. So, to overcome the problems from all these methods PLC based system is implies due to inherent advantages like modular design, provision to make required short-term adjustments without having a large impact on the whole system, flexibility, cost, less wiring etc. The proposed work presents automatic system using PLC where IR sensors, Buzzers, Motors, Relays are interconnected with PLC in such a manner so that they function in a proper sequence can detect the materials or wastes moving continuously on the conveyor belt. Where these components work as they programmed and move the waste as we want.

2. LITERATURE REVIEW-

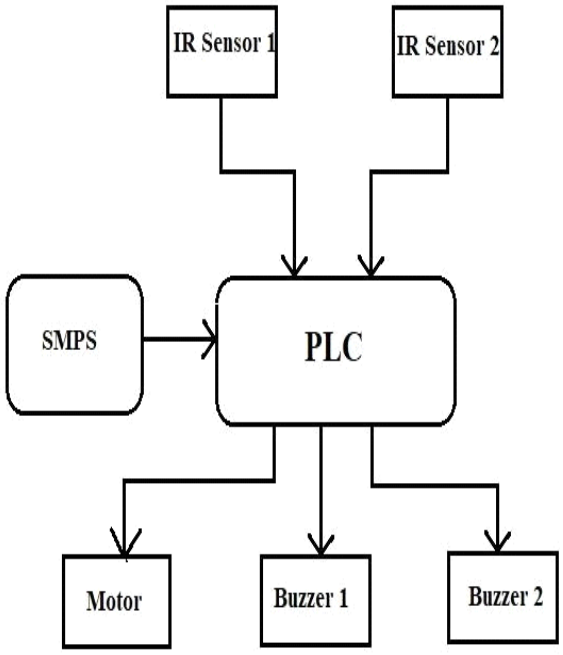
1)'Some Major Issues in Municipal Solid Waste Management: A Review', (2010) International Conference on Emerging Technologies for Sustainable Environment, Aligarh, India. A major part of the world today has a throwaway culture, producing huge amounts of solid wastes. Advancements in environmental measurement techniques clearly indicate that demand on earth's resources is not sustainable and should be addressed immediately. What should be the correct balance between environmental, economic, technical, social and regulatory factors, when one solid waste system designed and implemented? What must be the right fraction of the waste recycling, composing, reduction and recovery options in the scheme? All these questions need to be answered before the commencement of any solid waste management operation. To make such a scheme efficacious it is important that it is environmentally sustainable, economically viable and socially acceptable (Nilsson-Djerf and McDougall, 2000; Khan and Faisal, 2008).

2)Literature Review of Stakeholders in Solid Waste Management Shivi Khanna According to (Sujauddin, 2008) demographic factors like gender, number of members in a family, access to education for citizens, income determine quantity of waste generated. Waste collection fees charged on the basis of waste volume or weight also determines waste segregation attribute. If waste segregation is done at source preparation of compost at home is possible using kitchen and garden waste. In a few developing countries people are concerned about hazardous effect due to garbage but have a "Not in My Backyard" NIMB attitude. (CCD).

3)Underground Solutions for Urban Waste Management: Status and Perspectives Prepared by the Task Force Globalisation Lead Authors: Dimitrios Kaliampakos, prof. NTUA Andreas Benardos, Lecturer NTUA Today, the total waste generated worldwide in an annual basis amount to more than 4 billion tons. Almost 45% of these are considered as municipal solid waste, while the rest is industrial waste,

including hazardous one. The daily waste production per capita ranges from 0.6 kg to 1.4 kg, with people in highly developed countries producing more waste. In the coming year, both the increase of global population and growth or GDP per capita in developing countries is expected to create to boost in global municipal waste production. Only for the case of urban food waste it has been estimated that between 2005 and 2025 its generation will increase by around 45%.

METHODOLOGY –

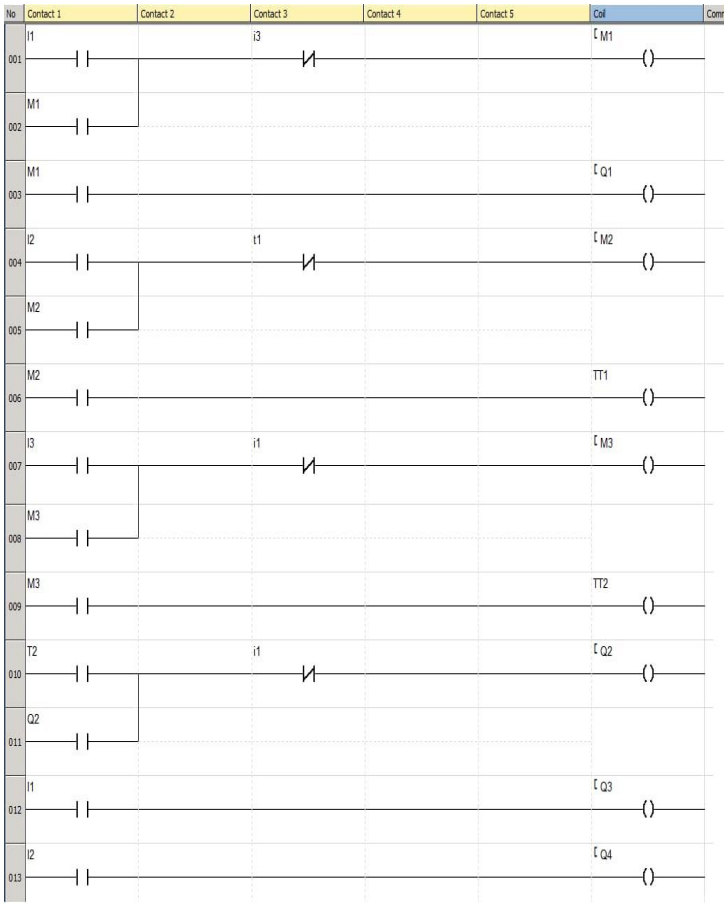


Block Diagram

In this system we designed underground trolley system to throw the garbage away from area so that we have used a pulley and rope system to move the trolley from area to another area and another area to dumping station. We have used some sensors to sense the trolley for a position below the building or on the position of underground so that whenever the trolley come to a building or to a area buzzer will beep for some time then the people of that building will throw the garbage in trolley by pipe inserted near to a building. After some time, trolley will move to another building and again the buzzer of another building beep for some time, so that people of another building can throw garbage in the trolley and after some time again trolley move toward the dumping station and the garbage will automatically put in that dumping station. The whole system runs by using sensor technology and PLC system. We have used PLC here to make decision where the trolley being stop and how much long the trolley will move.

PROGRAMMING –

First, we take I1 that is our sensor 1 actually we use here three sensors I1, I2, I3.so, when I1 is high it will ON M1 also latch M1. here M1 remains continuously ON. Then we ON Q1 by M1(here Q1=first motor), when second sensor I2 will ON then it will ON M2. When M2 of 6th line will ON it will ON Timer 1. after that I3 from 7th line will ON, then it will ON



garbage. After that from 10th line we take Timer 2 i.e., T2, from T2 we on Q2 (here Q2= motor reverse). when T2 ON next we take I1 and I2 when these both sensors will ON, on that time Q3 & Q4 will ON (here Q3= Buzzer 1 & Q4 = buzzer2).

ADVANTAGES –

1) Proper management of garbage.
2) It will reduce the efforts and man power.
3) Reduce service time.
4) 24/7 hours service availability.
5) Not affected by any traffic issue as it is underground.
6) Using this system, we can adopt the healthy lifestyle.
7) This system is helps in pollution free and odor free environment.

APPLICATIONS -

1) Applicable in flat system to collect waste.
2) It can be used in commercial buildings such as shopping mall, hospital, large shops.
3) It can also be used in local areas such as colony of bungalows and row houses.
4) It can be used in all over the area where peoples are situated like slum area too.

FUTURE SCOPE -

1) It helps in Reduction of gaseous emissions, solid residues, and pollution, contributing to the protection of climate and environment.
2) Recovery of materials from waste mediums and then turning them into reusable resources; and reducing the need for landfills.
3) It will help in our environment, safeguarding public health, and providing economic benefit through jobs and new industries.
4) The separation of bio-degradable & Non bio-degradable in which separated bio-degradable waste can be used for making compost.
5) Proper sorting and segregation, which later decreases greenhouse gases, also decreases risk to human health and environment.
6) This technology is evolving rapidly and very soon there will be an advanced and flawless waste segregation machine which will separate waste with unmatched efficiency.
7) It also provides economic benefit through jobs and new industries in waste management.
8) By using this proposed scheme will be helpful to easily achieve our mission clean India by decreasing soil pollution, water pollution & reduce carbon emissions which may also results in decreasing global warming issue.

RESULT –

Underground waste management using PLC is the system in which the method of collecting garbage from are to another area is get effortless and faster. As we know, garbage can hazardous health issues and it will create complicaion at the administrative level. When we burnt garbage in the open area it will increase air pollution. Thus, this system is the solution for all the problems caused by garbage. By adopting this system, we can survive in garbage pollution free atmosphere because it will avoid the direct contact of garbage with environment.

CONCLUSION –

Waste management can be defined as the “collection, removal, processing, and disposal of materials considered waste” (Ecolife Dictionary). Waste can be put into landfills, recycled, or composted. The best and most sustainable way to manage waste is by recycle and compost.
The separation and onsite effective utilization off waste using PLC is separate the Waste into bio-degradable waste and non-biodegradable waste. The bio-degradable waste is utilized for making compost, and Non-biodegradable waste is use for recycling. The tiny particles of glass and pebbles are not easily removed. The separation of waste can be achieving 70-80%.
Thus, we have performed the project on “Underground Waste Management Using PLC” under the guidance of one of the best project guide Mr. Sunil More Sir.

REFERENCES -

[1] Acharya Institute of Technology, Bangalore, Underground Waste Management System International Journal of Creative Research Thoughts (IJCRT), Volume-8, Issue-8, 2020, ISSN: 2320-2882.
[2] Rashmi Kittali, Ashok Sutagundar, Automation of Waste Segregation System Using PLC, International Journal on Emerging Technologies, Special Issue on ICRIET-2016, ISSN: 2249-3255.
[3] Durgesh Chaturvedi, Dr. Nagendra Tripathi, Automatic Seperation Of Municipal Waste Using PLC and Smart Hopper, International Research Journal of Engineering and Technologies (IRJET), Volume-6, Issue-3, Mar 2019, ISSN; 2395-0056/0072.
[4] Md. Atikur Rahman, Shafayat Hossain, Amran Hossain, Md. Iquebal Hossain Patwary, Design and Implementation of PLC Based Automatic Industrial Drainage System, International Conference on Information and Communication Technology for Sustainable Development (ICICT4SD), Issue-February-2021, ICICT4SD50815.2021.9396930.

PHOTOGRAPHS -