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### Implementation Technology to Repair Pothole Using Waste Plastic

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**Abstract :** It describe the system for road repair using aggregate with waste plastic waste in different forms is found to be 9% to 12% in municipal solid waste, which is toxic in nature. Non-biodegradability of plastic in the environment has created numerous challenges for both urban and rural area of India. common problem are choking of drains, stagnation of water, release of toxic gases upon open incineration. Traditional methods have some loopholes, the life span of traditionally build road is less effective time span of that road is very less or time taking or required more man power.

This system is semiautomated where ultrasonic sensor is use to detect the pot hole and induction heater melt the agrigate material and pour through the hot runner . Feedback is taken from rescanning pot hole by the ultra sonic sensor .

**Keywords -** *Pothole, Plastic, Waste, Pollution, Repair, Road, Sensors Etc.*

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#### INTRODUCTION

India is one of the fastest developing countries today. India's road network is huge. We have to consider to road condition. India has some bad road. Be it a metropolis, a city or a village. Both ruler and urban India pothole filled roads are a common sight. Especially during monsoon. Road Authorities spend millions of rupees each year on major repair to potholes. He patches. Also, pothole repair requires a lot time, effort and human effort. The main causes of pothole. This can be causes by improper road design on certain surface such as spilled diesel, mechanical damage to vehicle wheel rims, animal hooves on the road surface in hot weather, and costly floor collapse or litter. May be triggered. Environmental cracks can be caused by ultraviolet radiation from the sun, thermal oxidation, or other caused that asphalt to shrink pothole not only cause vehicle damage, they can also cause serious vehicle accident, affecting ride comfort and vehicle suspension traffic jams due to pothole lead to wasted fuel, increased air pollution, emission of CO (Carbone monoxide) and other pollutant from overloaded vehicle lead to environmental and health problem.

The second big problem we all face is plastic waste. The amount of plastic waste generated is increasing significantly. single use item such as shopping bags, betel wrappers, cold drink bottle, and all from of plastic create significant environmental and economic problem. Pistic is everywhere in our lives today and its disposal is big problem. These are non-biodegradable product that cause environment pollution and problem such as breast cancer, reproductive disorders in human and animal, and genetic abnormalities. To overcome both of these problems, we are building machine that help reduce potholes in our roads and reduce the plastic waste around us.

By detecting pothole with water depth sensor and adding plastic waste to road pothole, pothole repair time material manufacturing coast are reduced. Plastic waste is effectively recycled, making the This project benefits society.

## 2. LITERATURE REVIEW

This Section describes the previous works on the pothole repair methods based on different technologies designed by other researchers around the world.

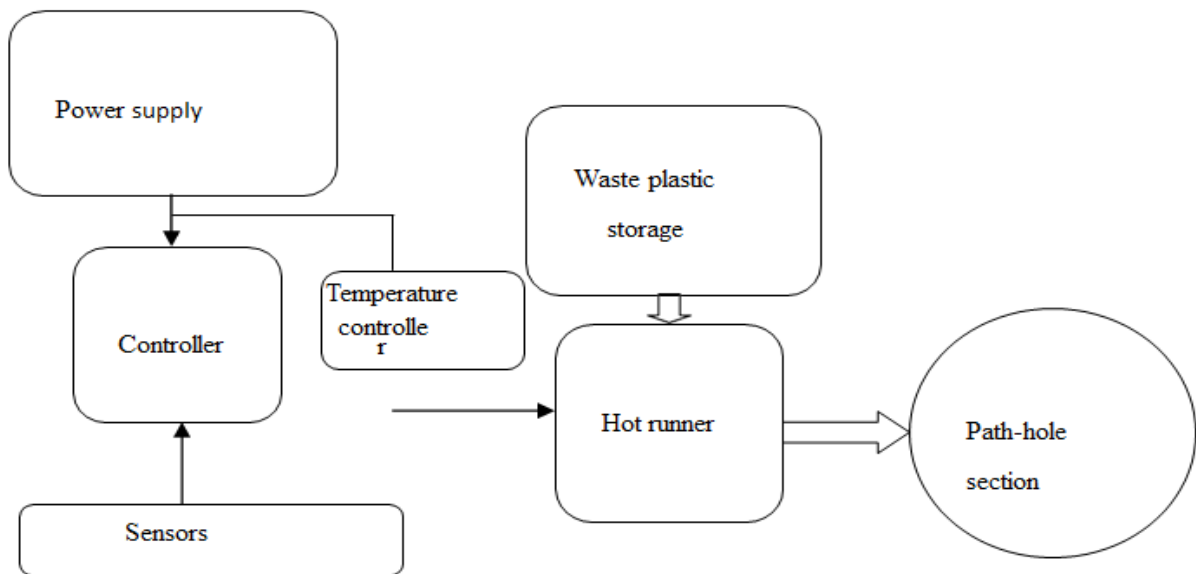
Amruta Nachivanekar, Aseem Majuwar, vikky Nagdeve “ Pathhol Filling Vehicle using waste plastic”, published in IJDRET 2019, In this paper Focused on proposed model which will detect the path-hole on road and fill up this path-hole by using waste plastic as a filler material. Due to heavy vehicle running on road and other environmental condition path-hole generated Which will filling vehicle detect path-hole on the road and fill up with waste plastic. Amit Patil, Kirti Goyal, Vighnesh salunke, Rituraj Jadhav, “Design and Fabrication of path-hole repairing Machine using plastic waste in mixes” published in IJSDR,2018, The design and development Automatic system based on Arduino Nano for filing path-hole on road is presented in this paper This paper presents thorite information similar to our concept based on path-hole repair using waste plastic. This was helpful in terms of designing our core concept

.Benedikt J. Knauf, D.Patrick webb, Changqing Liu paul, “Low frequency induction heating (LFIH)for the sealing of plastic microfluidic system" published in Loughborough university 2018, Analytical equations describing the heating of susceptor in an induction field were drive for a simplified, to provide the basis for process optimization and design a rule for low frequency induction heating plastic joining technique

### 2.2 Problem Identification

BMC generates 75-100 tons of plastic waste. 60-65 tonnes of plastic is recyclable, while the remaining. tonnes of plastic cannot be recycled, resulting in plastic that is harmful to marine life and ends up in the ocean 14,936 people lost their lives between 2013 and 2017, according to **the** Ministry of Road Transport and highway potholes, and 4,829 in 2019, with 4,444 accidents caused by potholes last year. and over 2,000 people died. About 4800 traffic accidents have accumulated due to improper road maintenance. About 4800 traffic accidents have accumulated due to improper road maintenance. Pass holes are a big problem in developing countries and so is plastic waste. scenario, but these techniques are time consuming, require more manpower, and are therefore costly. Many path hole repair techniques are used in the current Low percentage of road aggregations main reason for passage hole formation.

## I. METHODOLOGY



**Fig 3.1 :- Block Diagram of Implementation Technology to Repair Pothole Using Waste Plastic**

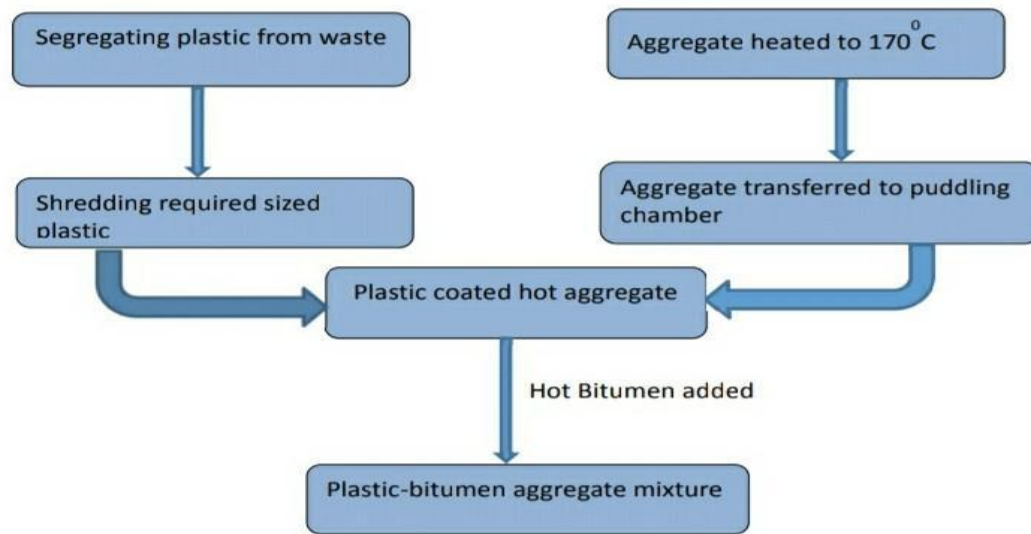
This system containing the main components controller is main part along that Temperature controller, induction heater, ultrasonic sensor, temperature sensor, hot runner and waste plastic storage tank etc.

Power supply is 230V ,50HZ generally this supply is taken from DG set, street light pole. Arduino UNO is using as main controller. This Arduino control the all process. Process starts with the ultrasonic sensor this sensor calculates the dimension and depth of pot hole. Induction heater used to melt the aggregate material of the plastic. Temperature sensor measure the temperature level of induction heater. Hot runner is mechanical component which flow the hot melted plastic toward the pot hole. Waste plastic storage is containing the aggregate material of plastic.

### 3.2 Working

Plastic waste collected from various sources such as apartments, schools and city workers, is put into the shredder. The crumbs are then stored in the bag for about a week to release moisture. A sensor can be used to detect potholes. The crumbs are then melted in a crucible and made to be poured into the pit to fill the pit. Now, when the potholes are filled with this molten plastic, a fan will be used to cool the molten plastic and harden it. After hardening, bitumen, bitumen like traditional road mixes can be poured in small amounts to form a layer on top. This will ultimately reduce the cost of filling potholes and reduce the dispersion of plastic waste into the surrounding environment, endangering the ecosystem. This type of filled pothole can not only withstand monsoons, but also withstand daily wear and tear. Normally, the lifespan of a road is about three years, but using plastic to fill potholes will increase the life of the roads. Indeed, the melting point of asphalt is 60 to 70 degrees while the melting point of plastic is around 130 to 140 degrees depending on the type of plastic used. Shredded plastic will be melted at low temperature to avoid emission of harmful gases to the environment. These harmful gases are released only when the plastic is burned or heated to very high temperatures. Styrofoam is toxic when burned, but when it softens, it makes an excellent pothole filler. So, through this project, we want to make the environment clean and also help reduce dangerous accidents.

**Fig. 3.2 Process of aggregate mixing**



## II. CONCLUSION

It concludes that the system is much more effective than the conventional technology. The result are occurred after using this technology for pot hole repair is less time taken. The effectiveness of this system on pot hole is much better and bonding material like plastic aggregate is used so that the repair road life is much longer and it is helpful to minimize the plastic waste. The problem of unhealthy road is solved

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## REFERENCES

### Journal Papers:

- [1] Berlin, M. and E. Hunt "Asphalt Concrete Patching Material Evaluation" Oregon DOT Report No. OR-RD-01-19, June 2001.
- [2] Flaherty, C.A., 1988, "Highway Engineering" Volume 2, Third Edition. Published in Great Britain.
- [3] IRC:82-1982 "Maintenance of Bituminous Surfacing of Highways" Indian Road Congress
- [4] Kandhal, P.S "A simple and effective method of repairing Potholes in India", Journal of the Indian Roads Congress, Volume 69-3, 2008.

- [5] Dr.Y. P. Gupta, Shailendra Tiwari & J. K. Pandey, "Utilisation of Plastic Waste in Construction of Bituminous Roads", NBM & CW MARCH 2010, p.92. FHWA, User guidelines for waste and by-product materials in pavement construction; 1997.
- [6] Wilson, T.P. "Strategic Highway Research Program Pothole Repair Materials and Procedures" TRB, Transportation Research Record 1392, 1993.
- [7] Punith, V.S. and Veeraraghavan, A., "Laboratory Fatigue Studies on Bituminous concrete Mixed Utilizing Waster Sherdded Plastic Modifier", Proceedings of 21st ARRB Transport Research (ARRB)and 11th Road Engineering Association and Australia (REAAA) Conference, Cairns, Australia, May19-23, 2003.
- [8] R. Vasudevan, S.K. Nigam, R. Velkennedy, A.Ramalinga Chandra Sekar and B. Sundarakannan,"Utilization of Waste Polymers for Flexible Pavement and Easy Disposal of Waste Polymers",Proceedings of the International Conference on Sustainable Solid Waste Management, 5 – 7 September 2007, Chennai, India. pp.105-111.S.
- [9] Rishi Singh Chhabra\*, Supriya Marik - A Review Literature On The Use Of Waste Plastics And Waste Rubber Tyres In Pavement – International Journal Of Core Engineering &Management(IJCEM) -Volume 1, Issue 1, April 2014.
- [10] AmitGawande\*, G. Zamare, V.C. Renge, SaurabhTayde, G. Bharsakale - An overview on waste plastic utilization in. asphaltting of roads - Journal of Engineering Research and Studies volume 3,2012/01-05