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Assessment of Pavement Condition With Pavement Condition Index

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Abstract: *Large amounts of plastic are produced in India, and disposal of this garbage is a great difficulty. By the end of 2020–2021, India's plastic consumption is expected to be 15 million tonnes. Human health and the surroundings suffer from this attitude. Mostly Polyethylene Terephthalate (PET), High-Density Polyethylene (HDPE) and Low-Density Polyethylene (LDPE) make up the range of plastic trash. One fresh creative and environmentally beneficial approach to dispose of plastic garbage might be using it as binder material to fix the potholes. Usually, parent material like bitumen and concrete fills potholes on the roadways. Nevertheless, in this work aggregates and HDPE material help to fix the potholes. The potholes on bituminous roads are filled right away from HDPE plastic waste. This will make fixing potholes on the site far faster and easier. This study reveals that the potholes repaired with HDPE have rather higher durability than those filled using traditional techniques. This HDPE material filling potholes technique will be cost-effective and aid to lower plastic waste from the environment.*

Keywords: Plastic waste, Pothole, Eco-friendly, HDPE Plastic waste, Bituminous roads, Durability of Potholes, Aggregates

I. INTRODUCTION

India is an expanding country. Both in the cities and the villages, India has many appalling roads; potholes are not rare in either. Road officials mend potholes for millions of rupees. Using plastic to patch potholes not only saves a lot of time, labour, and human effort but also extends the lifetime of the road (Nachivanekar et al. 2019). Apart from damaging vehicles, potholes could lead to major mishaps. High traffic volume causes water pressure to rise in wet materials, which breaks them. Inadequate road maintenance also results in surface cracks expanding that let rainwater pass between layers (Naveen et al. 2018). According to Ministry of Road Transport and Highways' studies on its transport research wing, 3625 road accidents resulting from potholes occur and

In 2022, 3103 were hurt and 1482 were deceased. Solid waste management is one of the main environmental issues worldwide since population increase, urbanisation, development activities, and changes in lifestyle have greatly generated plastic waste. Getting the enormous volumes of plastic garbage generated in India disposed of presents a major challenge. Although India produces 15 million tonnes of plastic garbage annually, only one fourth of this is recycled because of a broken solid waste management system. Waste plastic is increasing in municipal solid waste (MSW) due to population increase, urbanisation, construction activities, and changes in lifestyle, so contaminating the environment widely. Globally, plastic garbage disposal is a hazard and a major issue because of their non-biodegradability and ugly look. These are not disposed of scientifically, hence they endanger the ecosystem and could contaminate the land and water. This work aimed to enhance the required mechanical characteristics for a particular road mix by partially substituting this waste plastic for the conventional materials.

1.1. Requirement of Use of Plastic in Road Construction

India is one of the fastest-growing countries right now. India has an extensive system of roads. No matter where you travel in India, you'll encounter numerous roads that are hazardous. No matter where you travel in India, you're certain to encounter potholes on the road, and the monsoons are no exception. Fixing potholes is an expensive process that costs road agencies millions of rupees every year. It takes a lot of time, effort, and human labour to patch potholes.

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Potholes can be caused by a variety of things, the most common of which being heavy cars, oil spills, heavy rain, and poorly constructed roads. The most common ingredient in potholes is water. The heat from animals' hooves on the road, diesel seepage, wheel damage from mechanical factors, and substandard road design on some subgrades (such as expensive, crumbly, or dispersive soils) can all play a role. Environmental cracking can occur when sunburn, heat oxidation, or any of a number of other variables can reduce bitumen's original size.

The second major problem that affects everyone is waste plastic. More and more plastic waste is being generated. There are major financial and environmental costs associated with single-use plastics, such as grocery bags, packaging, and water bottles. Nowadays, plastic is everywhere, and finding a way to eliminate it is a major issue. Environmental contamination, problems with human and animal reproduction, genital malformations, and breast cancer are all exacerbated by the fact that these materials are not biodegradable. So, to address both of these problems, plastic trash can be utilised for pothole repair. Roads made with recycled plastic survive longer, which is good for everyone.

II. LITERATURE REVIEW

In their article titled "An Experimental Study on Plastic Blended Bituminous Concrete Mix Roads," T. Sarada and G. Sreeja

According to [3], this new era has seen a great deal of change. Nevertheless, new methods and materials are not being created at the same rate. Partial bitumen and tar substitutions are made by some, and the outcomes are satisfactory. New evidence, however, suggests that not all of these materials exhibit the required properties in every way. At that time, scientists are concentrating on finding ways to recycle common household items like plastic and rubber. Both materials were found to have positive results. The pollution caused by plastic trash is on the rise due to the ever-increasing usage of plastic products such as polyethylene bags, pet bottles, and polystyrene.

While some trash can be easily disposed of, others constitute a constant threat to ecosystems, according to Sharma, Sahu, et. al. Trivedi's study "A Review of various methods of road construction using waste materials" [4]. Plastics are another sort of material that can be a pain to dispose of. To lessen the environmental toll that trash disposal has taken, researchers from many walks of life are devoting time and energy to finding safe ways to recycle plastic. One way it does this is by making use of used plastics in road construction. Plastic roads are in high demand since they are an eco-friendly way to enhance road quality while also using discarded plastic.

Numerous novel construction materials and methods have been developed, according to Supriya Marik and Rishi Singh Chhabra's article "A review literature on the use of waste plastics and waste rubber tires in pavement" [5].

created to prove their compatibility with pothole building, repair and upkeep. Possible examples are plastics and rubbers. Even when looking at it from an ecological point of view, the overuse of polythene in everyday activities causes substantial harm to the environment. The usage of plastics in everyday products, such as cups, tote bags, and more, is on the rise. The urgent need is to find beneficial uses for the remaining polythene, as it cannot be biodegraded. When utilised in road construction, these materials provide sub-base strength at a low cost and with little impact on the environment.

"Utilisation of waste polymers for flexible pavement and easy disposal of waste polymers" is the title of the article written by Vasudevan, Velkennedy, and others. According to their findings, the plastic waste coated aggregate (PCA) was initially employed as a raw material for flexible pavements after being coated with stone coated aggregate using plastic waste products such as carry bags, films, and foams [6]. Next, bitumen with a 60/70 or 80/100 ratio is combined with PCA. There were less voids, a higher marshal stability value, and improved binding and wetting properties in the PCA+bitumen mix. This method can boost the strength of a road by 100% without creating potholes, and it can be used on a 1 km long and 3.75 m wide road. The road can be filled with 100,000 carry bags.

An essential part of contemporary development and growth efforts is the reduction of trash, according to Sunil J. Kulkarni's article "A Review on Studies and Research on Use of Plastic Waste" [7]. Plastic has many practical and commercial uses. Bags and bottles made of plastic are widely used. Because plastic does not break down naturally, it poses a serious challenge when it comes time to dispose of trash. The plastic has potential as a raw material for ethanol-based compounds. Road building and other construction-related tasks can make use of it. This review compiles the available literature on recycling plastics.

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2.1. Research Gap

1. Plastic trash is mixed with bitumen during road building to promote stability, strength, durability, and fatigue life. Additionally, it is resistant to damages brought on by water and deformation.
2. The same bitumen and waste plastic mixture is used to fill potholes. In accordance with IRC guidelines, 8% of plastic should be mixed with bitumen before being applied to patch potholes. This method works well, but it may become damaged over time due to heavy traffic and constant water loads during rainstorms. The literature reviews mentioned above demonstrate the usage of plastic waste in conjunction with bitumen for road construction, but a more novel and creative way to dispose of plastic trash would be to utilize waste plastic in place of bitumen entirely.
3. The method of combining plastic trash with a full bitumen replacement could be a novel, creative way to deal with the pothole problem.
4. On-site melting and mixing of the plastic waste with aggregates. According to tests done on it, as indicated in Table 1, plastic coated aggregates provide greater strength than bitumen coated aggregates. [6]

Table- 1: Test on Aggregate

Sr. No.	Tests on Aggregate	Normal Aggregate result	Plastic Coated Aggregate result
1	Aggregate Crushing test	8	5.2
2	Los Angeles abrasion test	5.5	3.4
3	Impact value test	7	5.2
4	Specific Gravity test on aggregate	2.5-3.0	2.6-3.0

III. METHODOLOGY

Vehicular traffic has been rapidly growing over the recent years with more privately owned vehicles taking to the streets each day. The situation is further exacerbated by the decline of railroads. The collapse of railroads makes the situation even worse. Road damage in the form of potholes, as seen in Fig.1, is a significant burden for transportation authorities across the nation due to these factors and bad weather. In addition to seriously harming vehicle suspension systems, potholes can also result in serious accidents and life-altering injuries. Another significant factor in the reduction of state money is the need for ongoing pothole repairs. Therefore, the demand for pothole repair methods that are both affordable and durable is urgent.

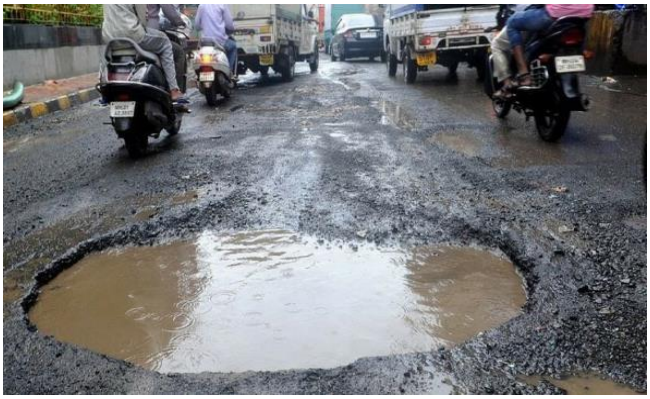

Fig-1: Pothole

3.1. Recycled Plastic waste

Plastic waste is processed into new goods through the recycling process. Recycling helps conserve resources, protect the environment from plastic pollution and greenhouse emissions, and lessen reliance on landfills.

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3.2. Waste plastic and its source

1. Low-Density Polyethylene (LDPE): Carry bags, sacks, milk pouches, bin lining, cosmetic, and detergent bottles.
2. High-Density Polyethylene (HDPE): Carry bags, bottle caps, household articles.
3. Polyethylene Terephthalate (PET): Drinking water bottles etc.
4. Polypropylene (PP): Bottle caps and closures, wrappers of detergent
5. Polystyrene (PS): Yogurt pots, clear egg packs, bottle caps. Foamed Polystyrene: food trays, egg boxes, disposable cups, protective packaging, etc.
6. Polyvinyl Chloride (PVC): Mineral water bottles, credit cards, toys, pipes and gutters; electrical fittings, furniture, folders and pens, medical disposables, etc.

3.3. Guidelines on use of plastic waste in road construction

The following are the guidelines published by Ministry of Railway (Government of India) in 2019[8]

1. This guideline (IRC: SP:98-2013) deals with the specifications and use of waste plastic in wearing course using dry process, their advantages, application, manufacturing, transportation, storages, and quality testing requirements.
2. Advantages and limitation of using waste plastic as modifier and binder: Laboratory as well as field performance studies/investigations carried out in India (In Tamil Nadu, Karnataka and Delhi) identifies following advantages in using waste plastic in bituminous mixes.

i. Higher resistance to deformation, water induced damages.
ii. Increased durability and improved fatigue life, stability and strength.
iii. Disposal of waste plastic and thereby environment friendly. However following need to be ensured in order to achieve the advantages of laid down specifications;
iv. The material shall consist of only low-density polyethylene (LDPE) or high-density polyethylene (HDPE), PU (available in limited quantity as waste) and PET.
v. Black colored plastic waste is a result of repeated recycling and should not be used.
vi. PVC shall not be used since they release lethal levels of dioxins.
vii. The Thermo Gravimetric Analysis (TGA) of thermoplastics has revealed gas evolution and thermal degradation may occur beyond 180°C. Thus, miss use or wrong implementation of this technology may result in release of harmful gases, premature degradation, if the temperatures are not maintained during construction.
viii. HDPE material can be used for road construction in accordance with the Guidelines on Use of Plastic Waste in Road Construction.

3.4. Materials used

3.4.1. HDPE Material

HDPE is a type of polyethylene, the most common plastic which accounts for over 34% of the global plastic market. The properties of HDPE are listed in Table 2.

Table 2. Properties of HDPE

Particulars	Values
Density	940 kg/m3
Melting point	130.8 °C
Temperature of crystallization	111.9 °C
Thermal conductivity	0.44 W/m °C
Specific heat capacity	1330 to 2400 J/kg °C
Specific heat (solid)	1.9 J/kg °C
Crystallinity	60%

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3.4.2. Aggregates

The primary materials used to produce pavement are aggregates, which make up the majority of the pavement's structure. Wheel loads on the surface course and the pavement cause stresses in the aggregates that must be supported. They must also withstand damage brought on by the abrasive action of traffic. The findings of the numerous tests performed on aggregates in the lab, including the Los Angeles test, crushing test, impact test, flakiness test, and elongation index, specific gravity, are listed in Table 3 below.

Table 3. Test Results of Aggregate

Sr. No.	Test	Property Determined	Results
1	Los Angeles test	Abrasion	24.58%
2	Crushing test	Crushing strength	27.5%
3	Impact test	Toughness	6.72%
4	Flakiness index test	Shape	13%
5	Elongation index	Shape	12.3%
6	Specific Gravity of Aggregates (20 mm)	Specific gravity	2.69%
7	Specific Gravity of Aggregates (6 mm)	Specific gravity	2.74%

3.5. Research work

These days, it is normal practice to employ plastic waste when building roads. Bitumen often has about 8% of plastic waste added to it to improve its characteristics. The advantages of putting plastic in bitumen include:

1. A 10% reduction in bitumen consumption.
2. Develop environmentally friendly technology.
3. Enhancements to the road's fatigue life.
4. Strengthen the road and improve its functionality.

Road potholes are a serious issue that needs to be fixed in order to reduce accidents. The typical plastic-blend bitumen is used to patch potholes. However, constant traffic and high-water pressure during the rainy season cause pothole damage. To solve this issue, plastic trash might be used with aggregates to completely replace bitumen, which could be a novel and inventive method of patching potholes. During this repair, the plastic is combined with aggregates and coated with aggregates. According to tests done on aggregates, these plastic-coated aggregates are stronger than the bitumen-coated aggregates.

According to IRC regulations, the material must only be made of low-density polyethylene (LDPE) or high- density polyethylene (HDPE), PU (which is only seldom available as waste), and PET. Thermogravimetric Analysis (TGA) of thermoplastics has shown that heat deterioration and gas evolution may take place above 180°C. Thus, melting HDPE material above that point is not advised.

3.6. Experimental work

This section comprises of two parts. The first part comprises the study on the preliminary binding capacity of PET and HDPE materials with aggregates for repair of Potholes. The second part comprises of the repair of potholes using HDPE plates.

3.6.1. Preliminary binding of PET and HDPE material

The pothole filling is done by using the PET material- Shredded plastic bottles are used to fill the potholes, and they are melted with the aid of a blow torch. Aggregates are then placed over the melted surface and properly bonded with a rammer. The same procedure was followed using HDPE material.

The experiment involving PET and HDPE material indicates that the HDPE material exhibits a greater bonding strength with aggregate and the existing bituminous surface. and after heating, HDPE material quickly becomes cemented, making potholes capable of withstanding the weight of moving vehicles right away. Whereas, the PET material lost its bond and got eroded off. Thus, repair material HDPE was chosen for preparation of HDPE plate. The product

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composed of HDPE material prepared for the simplicity of quickly filling potholes is called HDPE plate, shown in Fig. 2.

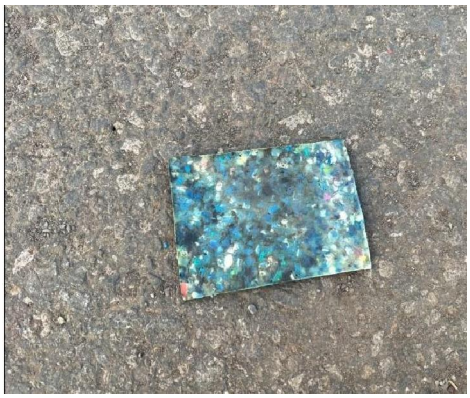

Fig-2: HDPE Plate

3.6.2. Process of Making HDPE Plate

1. Equipment: Gas Cylinder and Blowtorch assembly, Aluminum Mold, Gas lighter.
2. Material: HDPE in the form of Small Pellets
3. Procedure:

Take an aluminum mould that is the appropriate size for the pothole as shown in Fig. 3. Place the HDPE pallets uniformly inside the aluminum mold, being careful to distribute it evenly on a plate with a thickness of around 5 mm as shown in Fig. 4.

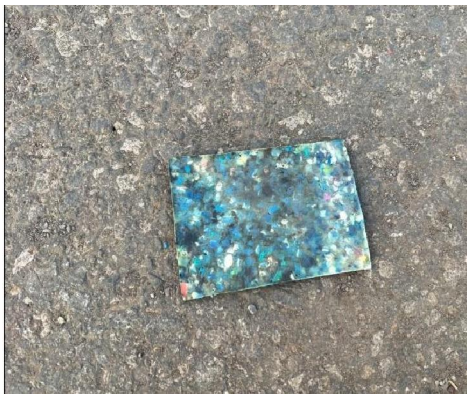

Fig- 3: Aluminum Mould

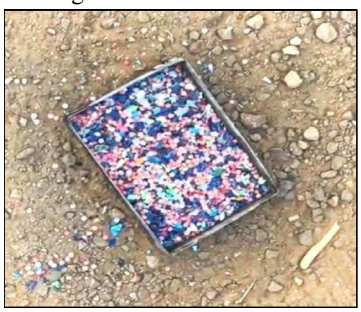

Fig- 4: HDPE in Mould

Use a blowtorch to melt the HDPE material; the temperature must not exceed 180°C as shown in Fig.5, making sure the material has melted all the way to the bottom of the mould. Permit it to cool for 15 to 20 minutes. After cooling, the

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HDPE plate should be carefully removed from the mould as shown in Fig.6. Depending on the type and size of the pothole, HDPE plates can be molded into a variety of shapes and sizes.

Fig- 5: Melting HDPE

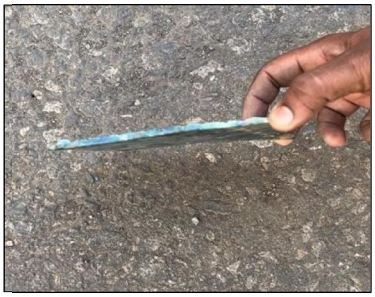

Fig- 6: Final HDPE Product

3.6.3. Procedure of Filling Potholes with HDPE Plate

1. Equipment: Blower, Gas Cylinder and Blowtorch assembly, Rammer, Gas lighter.
2. Material: HDPE material, Aggregates.
3. Procedure:

To remove large fragments of rock or soil, a blower or broom is used to properly clean the pothole as shown in Fig. 7. Then the proportions of the pothole are examined. To create a solid base for the layer of HDPE plate, the pothole is filled with a layer of aggregates of uniform thickness, which is then compacted as shown in Fig. 8. Put the HDPE plate in the pothole such that it covers nearly all of them as shown in Fig. 9.

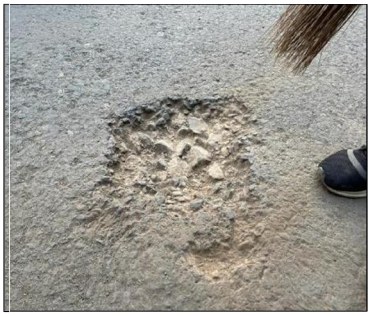

Fig- 7: Cleaning the Pothole

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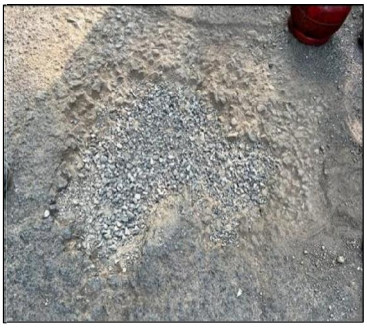

Fig- 8: Pothole Covered with Aggregate

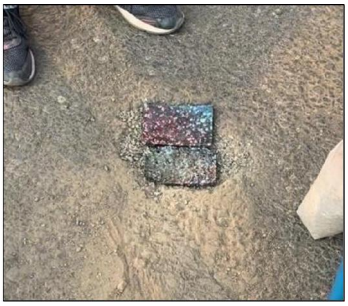

Fig- 9: Placing the HDPE Plate

HDPE plate is positioned over the aggregates and heated with a blowtorch equipped with a gas cylinder at 160°C to melt the plate as shown in Fig. 10. Heat the plate until a semi-solid condition is achieved. Spread heated aggregates over the melted surface, and then use a rammer to ram the pothole thoroughly as shown in Fig. 11. Spread some stone dust on the surface that has been mended, then let traffic pass over the pothole as demonstrated in Fig. 12.

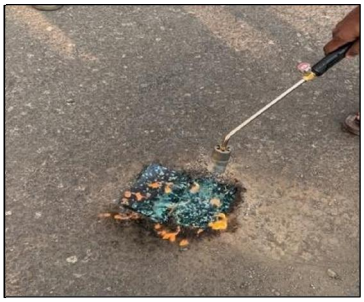

Fig- 10: Melting the HDPE Plate

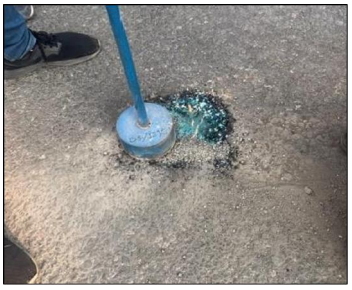

Fig- 11: Compaction with Rammer

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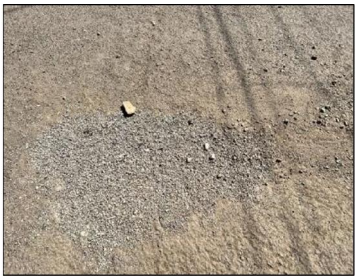

Fig- 12: Filled Pothole with HDPE Plate

IV. RESULT AND DISCUSSION

The results of the test were as follows:

Sr. No.	Normal Specimen (VG30)	10% plastic replace with Bitumen
Test 1	76	71
Test 2	63	74
Test 3	70	77
Average.	69.6 mm	74 mm

By comparing the test results of two different specimens there isn't any major differences in the average penetration values so we could conclude that it is safe to use plastic granules in flexible roads

4.2 Cost comparison

This section studies the cost comparison between Conventional Method & the method implemented by using HDPE material.

1. Cost Comparison between Bitumen & HDPE material:

i. Cost of Bitumen – INR 72 / kg.

ii. Cost of HDPE material – INR 30 / kg.

As per, Conventional method and method implemented using HDPE material on site, material required for 1m. X 1m. X 0.05m. of one Pothole is,

i. Bitumen- 0.5 kg.

ii. HDPE material- 0.2 kg

2. Cost of Bitumen and HDPE for repairing one pothole,

i. With Bitumen – INR 36

ii. With HDPE – INR 6

4.3. Discussion

1. In addition to ensuring safety, using high-density polyethylene (HDPE) material as a sustainable alternative for filling potholes supports an environmentally beneficial method of waste disposal.

2. The entire costs related to road repair can be greatly decreased, resulting in significant financial savings, by replacing bitumen with high-density polyethylene (HDPE) material, an inventive and cost-effective alternative.

3. By adopting this effective method of road repair, significant advantages can be realized, such as a notable decrease in the amount of time needed to fill potholes, a decreased demand for labor, and a decreased need for expensive equipment, streamlining the process of general road maintenance.

4. By utilizing the newly created high-density polyethylene (HDPE) plate, pothole filling can be done more quickly, and the repaired potholes can be put back into service more quickly, leading to better road conditions and greater overall transportation efficiency.

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5. This method of pothole filling has a number of outstanding advantages over more conventional ones, including its adaptability to be carried out successfully even during the rainy season. By utilizing the characteristics of the produced HDPE plate, road maintenance personnel may effectively repair potholes no matter the weather, providing ongoing road maintenance and reducing commuter aggravation all year long, regardless of bad weather patterns.

V. CONCLUSIONS

1. Compared to bitumen-filled potholes, those fixed using HDPE can resist heavy traffic and exhibit greater longevity.
2. A significant decrease in the resources and equipment needed from the beginning stage is accomplished by using HDPE pellets instead of bitumen.
3. The updated approach successfully does away with the need for a hot mix facility. As a result, substantial cost reductions are made from the very beginning.
4. Choosing bitumen requires a drawn-out and complex process before it can be used on site, which also necessitates ongoing heating. While using HDPE pellets offers a more streamlined method because only when filling the pothole do the pellets need to be heated.
5. Because this method can resist wet weather, it can be used to patch potholes during the rainy season.
6. HDPE plate manufacturing makes storage and transit easier. It can be effectively transported and stored because to its consistent shape.
7. In comparison, bitumen costs 72 rupees per kilogram, whereas HDPE costs only 30 rupees per kilogram, making the usage of HDPE economical.
8. By using this novel method, it is possible to totally replace bitumen with HDPE throughout the pothole repair procedure.
9. Kolhapur City can easily use this extremely efficient and environmentally friendly technology, which will undoubtedly help reduce plastic waste and improve the standard of road repair.

VI. FUTURE SCOPE

1. Future studies can be done to see whether additional plastic polymers can be used to patch potholes.
2. Research can be done on a substitute substance for the stone aggregate. The durability and sustainability of pothole repairs can be improved through the use of recycled materials.
3. To drastically shorten the time, it takes for the HDPE to melt during the pothole repair procedure, an ignitable material can be inserted into the HDPE plate. Replacement of the blowtorch assembly for melting the HDPE, which will alleviate the need of carrying the gas cylinder.

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REFERENCES

[1] Mathrubhumi (2023). 1481 deaths, 3103 injured: Pothole-related accidents on the rise, Mathrubhumi, 03 January 2023. Accessed March 2023, from, https://english.mathrubhumi.com/news/kerala/1-481- dead-3-103-injured-union-govt-report-shows-pothole- related-accidents-on-increase-1.8187782

[2] United Nations Development Programme, India (2023). Plastic Waste Management. Accessed 7March2023,from https://www.undp.org/india/projects/plastic-waste- management

[3] Sarada, T., & Sreeja, G. (2018). An experimental study on plastic blended bituminous concrete mix roads. International Journal of Engineering & Technology, 7(3.35), 37. https://doi.org/10.14419/ijet.v7i3.35.29144

[4] Sharma, M., Trivedi, A. S., & Sahu, R. (2016). A Review of Various Methods of Road Construction Using Waste Materials. International Journal of Civil Engineering Research, 7(2), 125–133. https://doi.org/http://dx.doi.org/10.13140/RG.2.2.17623. 27044

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[5] Chhabra, R. S., & Marik, S. (2014). A Review Literature on The Use of Waste Plastics and Waste Rubber Tyres in Pavement. International Journal of Core Engineering and Management (iJCEM), 1(1), 1-5. https://www.hindex.org/2014/p442.pdf

[6] Vasudevan, R., Velkennedy, R., Ramalinga Chandra Sekar, A., & Sundarakannan, B. (2010). Utilization of Waste Polymers for Flexible Pavement and Easy Disposal of Waste Polymers. International Journal of Pavement Research and Technology, 3(1), 34–42. ISSN 1997-1400. https://doi.org/http://www.ijprt.org.tw/reader/pdf.php?i d=86

[7] Kulkarni, S. J. (2015). A Review on Studies and Research on Use of Plastic Waste. International Journal of Research and Review, 2(11), 692–696. https://doi.org/https://www.ijrrjournal.com/IJRR_Vol.2_I ssue11_Nov2015/IJRR0118.pdf

[8] Guidelines on use of Plastic Waste in Road Construction (Provisional) Guideline no. RDSO/WKS/2019/1, May 2019. Research Design and Standards Organization, Lucknow. https://rdso.indianrailways.gov.in/works/uploads/File/W KS-G-16.pdf