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Review Article

Incorporation of Plastic Waste in Road Construction: A Review

Kasturima Das[1], Dr. Bikramjit Goswami[2] and Dr. Girija T. R.[3]

[1]*Department of Civil Engineering, Assam Don Bosco University, Guwahati, India.*

[2]*Department of EEE, Assam Don Bosco University, Guwahati, India.*

[3]*Department of Civil Engineering, Assam Don Bosco University, Guwahati, India.*

Email: Kasturimadas@gmail.com, Bikramjit.goswami@dbuniversity.ac.in and Girija.r@dbuniversity.ac.in

ABSTRACT: Plastic Pollution happens to be one of the most pressing issues in the present time. Plastics, even though has significant utilitarian properties, yet its highly imperishable nature has started causing havoc to men and animals alike. Together with soil contamination, underground water contamination is also taking place as a result of leachate percolation through the soil. However, after decades long research, people finally started recycling discarded plastics so as to incorporate them in everyday products. Doing so not only reduces the landfill load but also saves up a significant quantity of fossil fuels. It has also been found that shredded plastics waste can be successfully enmeshed with the various concrete and bituminous mixes to be used for road construction purposes. This review paper attempts to present a brief insight regarding the incorporation of plastic waste in manufacture of paver blocks as well as different bituminous mixes that not only helps fighting plastic pollution but also in bringing down the carbon footprint level to quite an extent.

KEYWORDS: Discarded Plastics, Road Construction, Bituminous mix, Paver Blocks.

INTRODUCTION

Plastics revolutionized medicine with life saving devices, made space travel possible, lightened cars and jets by saving fuel and pollution and saved life in all sorts of ways, it however had its own dark side. Presently, in most countries of the world, the garbage collection system happens to be either inefficient or non-existent. The plastic products so produced, of which, 40% accounts for single use plastics, they tend to persist for centuries in the environment once disposed. By the end of the 20th century, these plastic pollutants have been everywhere from the peak of Mount Everest to the bottom of seas and oceans. As per the reports of the trade association 'Plastics Europe', worldwide plastic production grew from some 1.5 million metric tons per year in 1950 to an estimated 275 million metric tons by 2010 which surged to 359 million metric tons by 2018. With passing time, however, awareness of the serious consequences of plastic pollution is increasing and new solutions, in the form of synthesizing alternative material as a means to replacing plastic as well as long lasting techniques of plastic recycling has been embraced by the masses. One such technique of recycling plastic is to incorporate waste plastic in the construction industry. The various structures that get constructed has a minimum shelf life of 30 years.

With incorporation of plastic waste, the resultant structure will not only be durable for centuries at a go but might also prove to be earthquake resilient as result of the added ductility. This paper makes an attempt to study the various ways and proportions in which plastic waste disposed-off at the landfill sites are being used to manufacture various kinds of building blocks.

Figure 1: Plastic Waste Recycling (Open Source)

LITERATURE REVIEW

Patel V, Popli S, Bhatt D (2014)[22] A study was conducted describing the various aspects of utilization of plastic waste in construction of roads with emphasis given to flexible road pavements. Various test such as the Stripping Test, Marshall Stability Test, Water Absorption Test were conducted on the plastic waste coated aggregate bituminous mix and it was found that for a certain optimum percentage of plastic incorporation, all the test values came out significantly better than ordinary bitumen. In addition to that, the roads won't suffer the adverse effects of UV radiation leading to a significant drop of the maintenance cost as well. It was thus concluded that use of plastic waste in construction of flexible pavements will result in superior quality roads together with efficient disposal of plastic waste

Subramani T, Pugal V. K (2015)[23] In this paper the behaviour of plastic as a coarse aggregate for structural concrete was recently researched by the authors. In this project, structural concrete was made from plastic waste materials and heated to a specific temperature in order to achieve the required brittleness. After extrusion, the molten plastic was cooled and gathered in boulders that were roughly 100 mm in size. Then, these plastic boulders were ground into aggregate size. Aggregate with a 20mm down size was employed. For coarse aggregates, plastic with 5%, 10%, or 15% replacement was employed. The experimental findings led to the conclusion that 20% plastic waste aggregate could be used as a replacement for coarse aggregate in concrete without having any negative long-term consequences and with acceptable strength development qualities.

Shafiq H (2016)[26] The researcher in another study experimented with shredded plastic of size ranging between 2.36mm - 4.75mm which was sprayed onto hot aggregates(170°C) which turned the aggregates into poly-coated aggregates which was then mixed with bitumen once the temperature dropped to 160°C. The Polymer Aggregate Bituminous Mix was then laid on the road once the temperature further dropped to 110°C - 140°C. Various Test like those of Aggregate Impact Test, Aggregate Abrasion Test, Softening Point Test, Ductility Test, Penetration Test etc. were conducted and it was found that incorporation of plastic waste in matters of road construction will not only strengthen the roads so formed but will also invariably increase the life span of the roads thus formed.

Nivetha C., et al. (2016)[27] In another work the researchers demonstrated the possibility of using plastic waste as a binding material as a replacement of cement in the manufacturing of paver blocks using 25-35 % PET, 25% fly ash and 40-50% quarry dust by weight. Test results show that PET- 30%, Fly-ash-25% and Quarry dust 45% gives maximum strength 52 N/mm^2, which is apparently greater than the strength of the conventional blocks used for heavy traffic conditions (50 N/mm^2).

Ahmed T (2017)[28] A research was conducted to find the fatigue strength of plastic infused bituminous roads. From the tests conducted initially, it was found that ordinary bitumen stays stable up to a temperature of 45°C. In countries like India, when heavy monsoons are accompanied by temperatures as high as 50°C, the bituminous roads get wiped away almost every single year. However, when plastic is incorporated in the bituminous mix at 8% by weight of bitumen, stability is seen to persist at temperatures as high as 55°C after which it is seen to drop drastically. This keeps the road intact for a considerable number of years. Also, Poly-Bituminous roads were found to have a fatigue strength 2.6 times the fatigue strength of ordinary bituminous roads.

Bhat S. M, Gupta R (2017)[29] In a recent study an attempt was made to find the optimum polythene content in bituminous roads by conducting experiments with a view to uncover the various Marshall properties like those of stability, flow value, unit weight, air void content etc. Clean and dried polythene was at first shredded to an approximate size of 2mm after which it was mixed with the pre-heated aggregates to form a poly-bituminous mix, there after the Marshall Stability test and the Marshall Flow Value test were being conducted. It was found that the Marshall Stability value kept on increases with increase in the polythene content upto 4%, thereafter it dropped drastically. The mix was also found to stay stable upto temperatures exceeding beyond 50°C which happens to be a major requirement in places with tropical climates like India.

Chougule R S, et al. (2017)[30] In a study on the utilisation of plastic trash, waste plastics were used to replace some of the fine aggregate in M30 concrete. Waste plastics were gradually substituted for the same amount of aggregate at 0%, 2%, 4%, 6%, 8%, and 10%. To ascertain the physical characteristics of waste plastics, cement, coarse aggregates, and fine aggregates, several tests were conducted. Solid and Paver blocks were cast and evaluated for durability during seven, fourteen, and twenty-eight days. The findings showed that the compressive strength of M20 concrete increases up to a maximum of 2% for solid bricks and 4% for paver blocks when sand is replaced with plastic waste, giving a compressive strength of 70 N/mm2 after 14 days.

Prasad M, Jayswal D (2017)[31] In a different study, the scientists looked into the inclusion of plastic garbage in concrete mix. The waste polyethylene is broken down into tiny pieces, ground into tiny grains, and combined with Portland cement, water, and various waste percentages, such as 0%, 5%, 10%, and 13%. The yield points for the materials with 5%, 10%, and 13% polyethylene were 970, 797, and 874 N for immersion for 7 days, respectively. After immersion for 28 days, the values for the 5% mix and the 10% mix were 1520 N and 1296 N, respectively.

Shanmugavalli B, Gowtham K (2017)[32] In a different study, the authors looked at the utilisation of plastic waste, fly ash, and quarry dust in paver blocks (2017). The plastic wastes were initially heated until they melted at a temperature of 150 ˚C. When the plastic is still molten, various components including quarry dust, gravel, and other materials are mixed in with it. Paver blocks constructed in this manner from quarry dust, coarse aggregate, plastic trash, and ceramic waste performed better in terms of heat resistance despite having a somewhat lower compressive strength than concrete paver blocks.

Singh L. B, et.al, (2017)[33] A study was done involving the manufacture bricks or building blocks from sand and waste plastics. The bricks are produced by mixing waste plastic and sand after heating at 200˚C. There were two kinds of bricks developed for the purpose, one comprising of sand and waste CDs; another comprising of sand and waste water bottles are produced and tested for some physical and mechanical properties. The sand-plastic bricks turned out to be lightweight and had a waxy surface. It was observed that sand plastic bricks have low water absorption (Plastic Bricks: 6.5%, CD bricks: 4.5% Normal Bricks: 9.42%), low apparent porosity (Plastic Bricks: 12.04%, CD Bricks: 7.98%, Normal Bricks: 22.24%) and higher compressive strength (Plastic Bricks: 10.6 MPa, CD Bricks: 10 MPa, Normal Bricks: 1.77 MPa).

Mahadevi R, et al. (2018)[35] A recent study showed the use of plastic in concrete without any admixtures. PVC plastic was used in the form of powder as partial replacement in M-Sand as fine aggregate in percentage of 0, 10, 20 and 30. Bone shaped paver block moulds of size 197x167x61mm were used for the purpose which was then followed by the weighing and batching and eventually by mixing, compacting, drying and curing (7 and 21 days). From test results, it could be concluded that PVC plastic can be used as a fine aggregate replacement for up to 20% and a 10% replacement by PVC plastic gives maximum compression strength of 54 N/mm2 and water absorption 4.49%.

Babafemi A. J, Savija B, Paul S. C, (2018)[36] In a further study, the researchers looked at the technical characteristics of concrete mixed with recycled waste plastic. According to the research, recycled plastic aggregates can be utilised to make non-structural concrete panels, temporary shelters, façade components, blocks (for protecting river banks), and concrete bricks for general uses. A specific percentage of plastic aggregates may be utilised in concrete for structural applications, such as constructions with lower imposed loads where the endurance of the structure is not as crucial. Instead of spending more money on expensive synthetic or steel fibres, concrete can be strengthened with plastic fibres to prevent cracks, shrinkage, and creep.

Mageshwaran A, et al., (2018)[37] A recent study aimed to utilise plastic waste materials and produce a precast paver block with addition of nylon grids and manufactured sand (M-sand is an alternative of river sand produced from hard granite stone by crushing, which is composed of mineral particles and finely divided material) in a controlled proportion. These blocks were prepared in five different ratios of Sand: Plastic Waste: Nylon Grid (1:0.14:0.05, 1:0.23:0.08, 1:0.28:0.1 (8.19 N/mm^2), 1.25:0.3:0.13 (8.8 N/mm^2), 1.15 :0.34: 0.15 (8.2 N/mm^2)) and tested. The compressive strength of three mixes of the Plastic Sand Paver Stone came out greater than the ordinary cement mortar blocks (7.17 N/mm^2). The paver blocks were able to sustain heat as high as 650˚C.

Bhargava P, Singh T (2018)[38] A study was conducted with a view to estimate the optimum dosage of LDPE grade of plastic in the Bituminous mix for highway road construction and thereafter the tests like those of Ductility, Penetration, Softening Point, Specific Gravity, Flash and Fire Point as well as Marshall's Stability test were conducted. As per the results, optimum binder content for DBC mix prepared with bitumen of grade 80/100 resulted with 5.5% having a maximum Marshall stability value of 905Kg. DBC prepared incorporating LDPE showed a significant increase in the stability value at a optimum mix of 4% LDPE in the bituminous mix. It was also seen that with an increase in the mix percentage there was a significant reduction of air voids.

Sai Raja C. H, et al., (2020)[39] A study was done on the incorporation of plastic waste (other than PVC) in bituminous mixes where in mixing of the discarded plastics in the bituminous mixes was carried out in two different ways. It was found that plastic infused bituminous mix has a higher melting point. The mix significantly increase the adhesive strength between the aggregates and bitumen together with eliminating the air voids which further helps in better resistance of bitumen against oxidation. This in-turn ends up making the roads far more durable than the ordinary bituminous roads. A cost analysis was also done at a later stage where it was found that construction of plastic infused bituminous road saves upto Rs 45000/km.

COMPARATIVE STUDY OF PLASTIC INFUSED ROAD WITH THE CONVENTIONAL COUNTERPARTS

Table 1 puts forwards a comparative study of the various kinds of building blocks are infused with plastic either partially or completely, sometimes as a binder replacement, yet other times as fine aggregate substitute.

Table 1: A comparative study of the various kinds of Plastic Blocks

Types of Blocks	Process Involved	Maximum Plastic Content for Max Strength	Strength Obtained	Degree of Complexity
By Subramani T, Pugal V. K	Melting -> Cooling-> Crushing (20 mm aggregate Size) (Plastic is used as a Coarse Aggregate replacement)	20%	Approximately equal to the conventional structural concrete	Moderate
By Nivetha C, et al.	Plastic (PET) here is used as a binding material, that is, as a cement replacement.	30% PET + 25% fly ash + 45% quarry dust	52 N/mm^2 (Greater than conventional paver blocks)	Moderate
By Chougule R. S, et al.	Plastic is used as a partial replacement of fine aggregate checked for M20 Grade	4%	70 N/mm^2 (Greater than conventional Concrete)	Moderate
By Prasad M, Jayswal D	Polyethylene Plastic is used as partial replacement of fine aggregate. Polyethylene waste are cut into small pieces and grinded into fine particles followed by mixing with Portland Cement and Water	5%	1520 N (Crushing Strength after 28 days)	Moderate
By Singh L. B, et al.	Attempt was made to incorporate waste plastics in structural bricks. Two variants were developed by heating the plastic waste with sand at 200˚C Type 1: Sand + Waste CDs Type 2: Sand + Waste Plastic Water Bottles (PET)	–	Type 1: 10 MPa Type 2: 10.6 MPa (> normal bricks, 1.77 MPa)	Moderate

By Mageshwaran A, et al.	Five blocks were prepared in five different ratios of Sand: Plastic Waste: Nylon Grid as Type 1: 1:0.14:0.05, Type 2: 1:0.23:0.08, Type 3: 1:0.28:0.1, TYPE 4: 1.25:0.3:0.13, Type 5: 1.15 :0.34: 0.15 and tested	–	Type 3: 8.19N/mm^2 Type 4: 8.8 N/mm^2 Type 5: 8.2 N/mm^2 (Ordinary cement mortar blocks, 7.17 N/mm^2)	Difficult
By Ghuge J, et al.	Plastic Waste is used as a binder without using water. The waste plastic is first burnt in a closed chamber and melted to liquid sate followed by its mixing with other ingredients	–	16.05 N/mm^2 (which is almost equal to ordinary concrete pavers, 19.54 N/mm^2)	Moderate
By Agyemana S, et al.	Here plastic waste is used a binder. 3 variants of the blocks were produced comprising cement, sand and quarry dust in the proportion of cement: Quarry Dust: Sand as Type 1: 1:1:2(without plastic); Type 2: 1:1:2 (high plastic content); Type 3: 1:0.5:1 (low plastic content)	–	Type 1: 6.07 N/mm^2 Type 2: 8.53 N/mm^2 Type 3: 7.31 N/mm^2	Moderate

Table 2 puts forwards a comparative study between ordinary roads and poly-bitumen aggregate roads where the plastic that is being incorporated ranges between 4% to 8% by weight of the bitumen.

Table 2: A comparative study between Ordinary and Poly-Bitumen Aggregate roads [12, 14]

Basis of Comparison	Ordinary Bitumen Roads	Poly-Bitumen Aggregate Roads
Binder Content	Excess of Binder: Bleeding at high temperature Deficient amount of Binder: Cracking, Loss of aggregates, Pot holes	The discarded plastic waste which acts as a modified binder eliminates the issue of optimum proportion due to its low ductility, high softening point and enhanced elastic properties
Strength	Significantly weaker as compared to roads formed using modified binder	Significantly stronger as compared to ordinary bitumen roads. Fatigue strength of roads formed using modified binder is found to be 2.6 times more than that of the ordinary bitumen roads
Cost Analysis	High initial and Maintenance cost	As the unit cost of plastic waste is approximately 30% less than that of bitumen, therefore partial replacement of bitumen with waste plastic brings down the initial cost. As far as maintenance cost is concerned, stronger roads indicate negligible maintenance cost.

PROPERTIES OF THE PRINCIPAL CONSTITUENTS TO BE CONSIDERED FOR ROAD CONSTRUCTION

- *Aggregate Crushing Strength*: It is defined as the resistance offered by the test aggregates against getting crushed when subjected to a specified load under standardized condition. It is represented by a numerical value which is nothing but the percentage of crushed particles by weight of the total weight. The lesser the numerical value, the stronger are the aggregates indicating a longer service life of the road surface. Table 3 shows the specified limits of the aggregate crushing value by IRC in percentage for different types of road surfaces.

Table 3: Aggregate crushing value (%) for the respective road surfaces.

Type of Road	Max Aggregate Crushing Value (%)
Soling	50
Water Bound Macadam	40
Bituminous Macadam	40
Bituminous Surface Dressing or Thin Premix Carpet	30
Dense Mix Carpet	30
Other than wearing coarse of Rigid Pavement	45
Surface or wearing coarse of Rigid Pavement	30

- *Abrasive Strength of the Aggregates*: In order to determine the abrasive strength of the aggregates the Los Angeles Abrasive Test is performed on the test aggregates wherein the test aggregates undergo rigorous rubbing in the presence of two standardized steel balls. The test values are represented in percentage of the stone dust that passes through the 1.7 mm IS sieve. Lesser the abrasion percentage, stronger the aggregates. Table 4 shows the specified limits of the abrasion value in percentage by IRC for different types of road surfaces.

Table 4: Ta**ble showing the different abrasion value (%) for the respective road surfaces**

Type of Road	**Max Permission Abrasion Value (%)**
Water bound macadam (sub base course)	60
WBM base course with bituminous surfacing	50
Bituminous bound macadam	50
WBM surfacing course	40
Bituminous penetration macadam	40
Bituminous surface dressing, cement concrete surface course	35
Bituminous concrete surface course	30

- *Aggregate Impact Value*: It is nothing but the measure of resistance offered by the aggregates against sudden impact or shock. This resistance generally differs from the resistance offered by the aggregates to gradually applied loads. Table 5 shows the aggregate impact values specified by IRC for the different types of road surfaces.

Table 5: Table showing the different Impact Values for the respective road types

Type of Road	Aggregate Impact Value
Wearing Course	30
WBM Base Course	35
WBM Base Course with Bituminous Surfacing	40
CC Base Course	45

- *Penetration Value*: It is a gauge for the bituminous material's consistency or hardness. Bitumen's suitability for various climatic situations and building types is evaluated by grading. IRC recommends bitumen grades 30/40, 60/70, and 80/100 for bituminous macadam and penetrating macadam. Lower penetration grades are favoured in warmer climates to prevent softening, whereas greater penetration grades, such as 180/200, are used in colder climates to prevent the development of excessive brittleness.
- *Softening Point Value*: It is measure of the temperature value to which the bituminous mix can be exposed without any damage to the road surface. In case the climatic condition surpasses the softening point temperature, the bitumen used will start melting causing the road surface to become sticky.
- *Viscosity of the Bituminous Mix*: The significance of measuring the viscosity of the bituminous mix is to ascertain if the mix will function well as binder along with its ease to work with. Viscosity of bitumen is measured at two different temperatures, once at 60°C, known as dynamic viscosity which is measured to indicate the resistance of bitumen to melting and flow and once at 135°C, known as kinematic viscosity that indicates the ability of bitumen to coat the aggregates well.
- *Marshall's Stability*: It helps us obtain the optimum binder content keeping in mind the aggregate mix as well as the traffic intensity. The test is applicable to hot mix design of bitumen with aggregates of size 2.5 cm at maximum. The stability of the mix is defined as the maximum load carrying capacity of the compacted specimen at 60°C. The test measures the flow rate of the asphalt specimen. It is extensively used in routine test programs for the paving job.
- *Skid Resistance*: Skid Resistance is defined as the force which gets developed when a tire which is prevented from rotating slides along the surface of the road. It is typically measured in terms of skid number. Skid resistance is of greater concern in places with monsoon climate (wet roads). Skid number is inversely proportional to skid resistance, that is, lower the skid number is, safer is the road surface. Skid number lower than 65 is considered to be well-performing road surface.

COMPARATIVE STUDY BETWEEN ORDINARY BITUMINOUS MIX VS MODIFIED BITUMINOUS MIX

As is known, several attempts were made to utilize the discarded plastic waste in a fruitful manner so much so that it stays away from the landfill sites for a considerable period of time. When it comes to the construction industry, numerous researches were done so as to employ the plastic waste for the purpose of road construction. The durable nature of plastics together with its highly elastic properties makes plastics a fine replacement of the bituminous binder. As of now, it has been estimated that with an optimum percentage of around 6% to 10%, partial incorporation of plastic waste in the bituminous mixture not only enhances the properties of the mix but also makes the road surfaces far more long-lasting than the ordinary ones. Table 6 and Table 7 presents a comparative study of all the principal parameters required for a well-performing road between the Ordinary Bituminous Roads against the Modified Bituminous Roads. [34]

Table 6: A comparative study between the Normal Aggregates V/s Plastic-Coated Aggregates

Parameter to be assessed	Normal Aggregates	Plastic Coated Aggregates
Aggregate Crushing Value	Comparatively more (23.32%)	Less (14.22%)
Abrasion Value	Comparatively more	Less by approx. 21%
Aggregate Impact Value	Comparatively more	Less by approx. 9%

Table 7: A comparative study between the Normal Bituminous Mix V/s Poly-Bituminous Mix

Parameter to be assessed	Normal Bituminous Mix	Poly-Bituminous Mix (10% plastic)
Penetration Value	Comparatively more	Less by approx. 18%
Softening Point	Comparatively less	More by approx. 14%
Stability	Comparatively less	More by approx. 16%
Stripping	2% after 72 hours	None
Distress	Pot-hole initiation starts early	Delayed Pot-hole initiation
Water Absorption		Significantly Less (0.4%)
Air Voids	-	Significantly Less
Combined Elongation and flakiness indices	-	Around 21.5% (Max permissible value: 35%)

Benefits of using Poly-Bituminous Roads with regards to Skidding

One of the most important parameters that finally decides the safety level of road is that of skidding. It often makes up for one major reason for occurrence of road accidents. Skidding is nothing but the slipping of tyre on the road surface having solely translational motion with any rotation. This phenomenon disrupts both the braking as well as the steering capacity of the vehicle. Road construction materials, pavement roughness, presence of moisture etc. has a significant contribution towards the skidding property of a road surface. Greater the resistance of the road against skidding, safer is the road surface. Skid resistance of a road in measured in terms of the Skid Number. The lesser the skid number is, more is the resistance offered. For a well-functioning road, the prescribed skid number should be less than 65.

Some of the factors that majorly contributes towards skid resistance are presented below.

- Micro and Macro Texture of the Road Surface
- Presence of Water on the Road Surface
- Tyre characteristic that includes the Adhesion and Hysteresis component

Below discussed are some of the methods to improve skid resistance of a road surface.

- Binder content of the wearing course must be limited to an optimum level
- Bleeding tendency of the wearing due to compaction under traffic as well as fluctuation temperatures must be kept in check.
- Angular aggregate chip must be used to ensure the road surface has sufficiently sharp projections to induce friction
- Sufficiently strong aggregated must be made use of so as to delay wear and tear due to traffic

Benefits of using Modified Bitumen for the purpose of inducing greater skid resistance

- Modified Bitumen has a lesser absorption capacity, as a result of which roads are far less slippery as compared to plain Bitumen roads
- The Aggregate Crushing Value, Aggregate Abrasion Value as well as Aggregate Impact Value are significantly less in case of poly-coated aggregates as compared to the normal aggregates. Stronger aggregates imply delayed wear and tear
- Bleeding of the wearing coarse also gets reduced significantly when the binder is infused with waste-plastic.
- Roads built using Poly-bituminous mix are well resistant to stripping

COST ANALYSIS

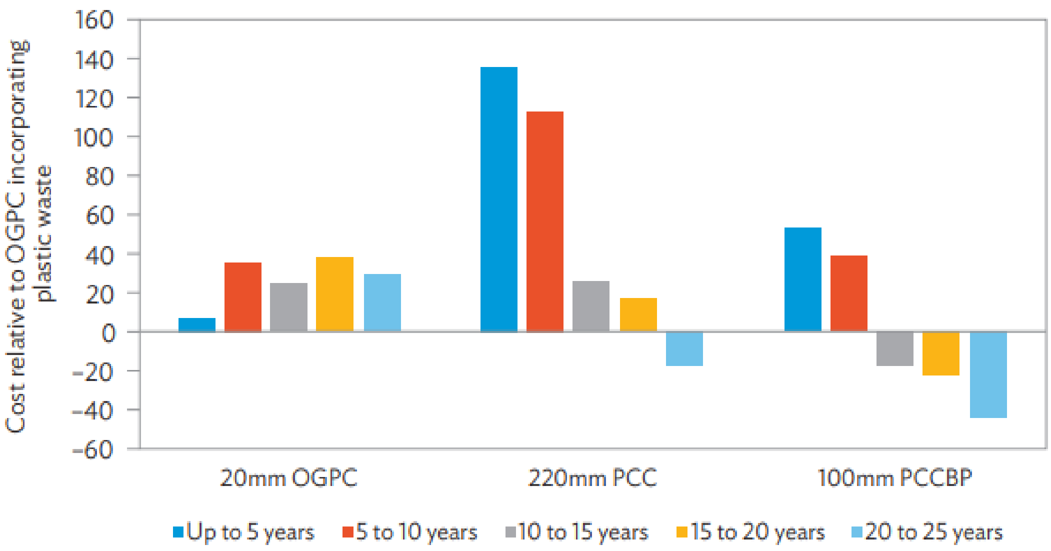

Figure 2: Cost Analysis Relative to Road Surfacing with OGPC Incorporating Plastic Waste

[Source: Asian Development Bank estimates]

OGPC = Open-Graded Premix Carpet, OGPC+P = Open-Graded Premix Carpet with Plastic Waste,

PCC = Portland Cement Concrete,

PCCBP = Plastic Cell-Filled Concrete Block Pavement

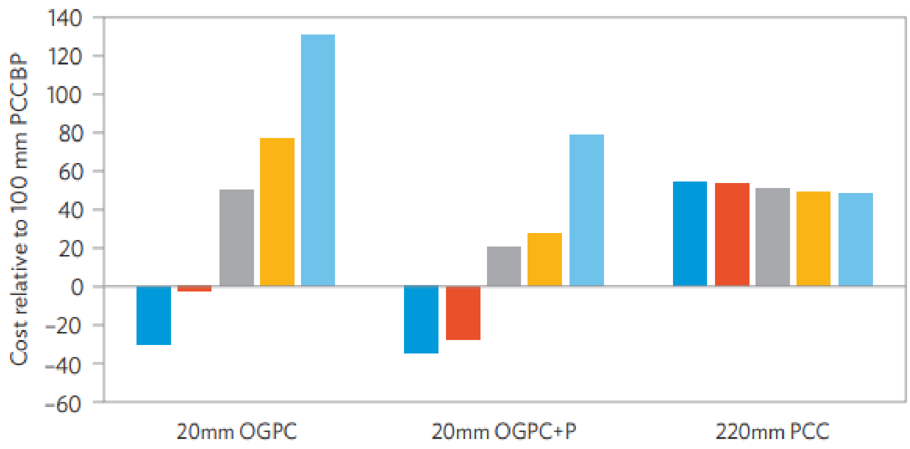

Figure 3: Cost Analysis Relative to Road Surfacing with PCCBP

[Source: Asian Development Bank estimates]

CONCLUSION

The recently published efforts on plastic waste-based filler, binder, and aggregate substitution in concrete mix were critically reviewed in this paper. The use of recycled plastic aggregates and fibres as a partial aggregate replacement is attracting substantial interest from many academics, according to numerous studies on these materials that have been reported in recent years. The review's findings also demonstrate that these materials can enhance concrete qualities when used with the right mix composition, with the primary goal being to identify new ways to recycle discarded plastic trash rather than letting it build up in landfills. This is due to the fact that a reduction of roughly 30% in the amount of solid waste disposed of overall is predicted if the best solution for plastic trash can be accomplished. It may be assumed that these materials could be retained inside concrete constructions for ages by using them as a partial aggregate replacement. These contemporary blocks will not only solve the problem of non-biodegradable waste disposal but also make waste plastics a national resource for constructing structures which are far more reliable, durable as well as ecologically sound and sustainable It can be seen from all the prevailing research works that manufacturing blocks by replacing some of the key ingredients in the existing conventional blocks is not farfetched dream anymore.

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