

Eco-Friendly Pavement

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Abstract – Coconut shell is one amongst the most polluters that contribute to the nation's pollution drawback. The common waste materials accustomed improve the standard of pavement construction square measure ash, scrap tire, iron, and steel dross, fly ash, and plastic waste. Coconut shells and coconut fiber square measure referred to as new waste materials employed in the main road business. this is often as a result of coconut shell has weather resistance therefore it's appropriate to use as construction materials. Besides, it's no quantity associate degreed its disposal method is expensive and can cause an environmental drawback. along side these the waste plastic and its disposal square measure a significant threat to the setting, which ends up in pollution and heating. this can not solely strengthen the pavement and conjointly will increase its sturdiness. The oxide is employed as a smoke absorbent, which is able to absorb the smoke from the vehicles. This innovative technology are going to be boon for the Indian hot-humid climate.

Key Words: Accustomed, Coconut shell, Coconut Fiber, Strengthen, Smoke absorbent, Innovative.

1. INTRODUCTION

Approximately 1.5-2 lakh individuals die due to road accidents each year simply because of potholes. Potholes are generated because of environmental condition behavior dogging on paved surface resulting in cracks and cement therein half becomes dehydrated & starts drying out and harm will increase. This project includes stuff not solely plastic however additionally coconut fiber and coconut shell along.

Coconut fiber has concerning 48% polymer that adds strength and physical property to the cellulose-based fiber walls. Since polymer resists bio-degradation, high polymer content additionally imparts longevity to out of doors applications. fiber nearly takes over twenty years to decompose. The disposal of plastic waste in Associate in Nursing atmosphere is taken into account to be a giant downside thanks to its terribly low biodegradability and presence in massive quantities. If plastic wastes will be mixed with the concrete mass in some amount or some kind, while not touching the basic and alternative properties or slight negotiation within the strength of concrete. The main aim of this project is so to extend the strength of the road that isn't solely economical however additionally eco-friendly, to eradicate potholes that lead to the reason behind accidents in massive numbers each year, correct utilization of Plastic waste, Coconut Shell, and Coconut fiber at the side

of hydrocarbon enhances the properties and additionally its strength. Thus, it reduces and obsessed with hydrocarbon by half-hour turning into efficient and eco-friendly.

RAW MATERIAL PREPARATIONS

The binder used for this study is hydrocarbon with a penetration grade 80/100. This hydrocarbon was heated at one 100 °C for one hour before being further to the mixture mixes. On the opposite hand, 2 combination sorts were employed in this analysis like granite and coconut shell. Granite is sort of invariably large (lacking internal structures), laborious and difficult, and so it's gained widespread use as a construction. They were preserved for 24 hours before the fiber was removed. The fibers were removed employing a cutter. a number of the shells area unit being crushed manually by mistreatment pestle and mortar. Then, different shells area unit being crushed mistreatment Associate in Nursing combination crushing machine. The coconut shells area unit sieved in line with the IS specification.

2. METHODOLOGY

1. Firstly, waste plastic are going to be sliced & coated over aggregates & mixed with hot hydrocarbon along side coarse Bitumen in correct proportion.
 2. Fiber could be a fibrous material that will increase stability & has skid resistance property whereas Shell has weather condition resistant property, improves indirect enduringness, static creep behavior of changed asphalt pavement, improves indirect enduringness.
 3. Plastic waste enhances the binding property of the fabric along side aggregates and so acts as an answer to environmental pollution to some extent.
 4. To cut back the emission of harmful gases whereas burning plastic & coconut waste it will be burnt in Associate in Nursing furnace that absorbs harmful gases & properly disposed of.
 5. The fiber is comparatively waterproof and is one in every of the few natural fibers proof against injury by water.
- Coir is that the fibrous material bound between the laborious, internal shell and also the outer coat of a coconut. The individual fiber cells area unit slender and hollow, with thick walls made from polysaccharide.

6. Once coconut fiber is extracted from matured coconuts, they're naturally brown having a powerful and thick nature and smart abrasion resistance. This fiber is termed Brown Fiber.

7. Combined material will increase the strength of the road to an honest extent.



Coconut Shell & Fiber



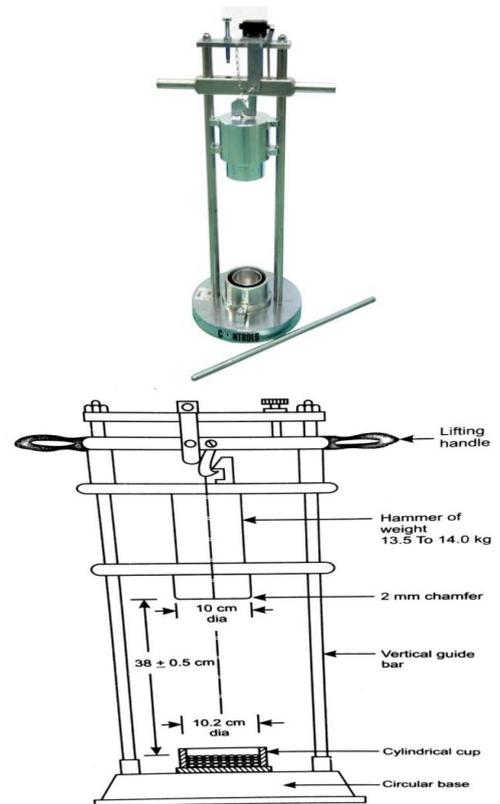
Shredded Plastic Waste



Bitumen Aggregate Mixture

3. PRACTICAL RESULTS

Aim: To determine the aggregate impact value of a given aggregate

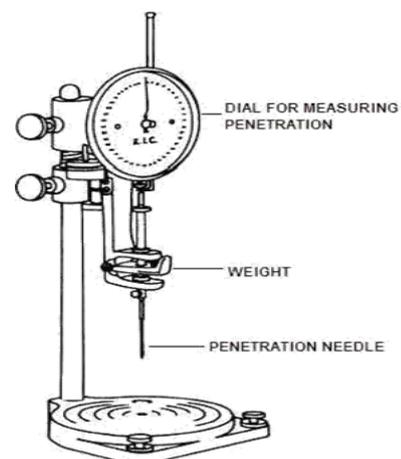


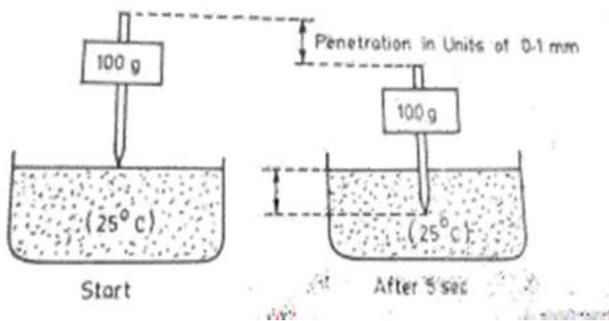
	Sample
Total weight of dry sample taken= W1 gm	356g
Weight of portion passing 2.36 mm sieve= W2 gm	39.5g
Aggregate impact= $(W2/W1) \times 100$ Value (percent)	11.1

Result:

As the calculated aggregate impact value is 11.1 which lies between the 11 - 20 range according to the recommendation for being a strong aggregate to use in road construction.

Aim: To determine the consistency of bituminous material.





Penetration Reading	Test 1	Test 2
Initial	0 mm	0 mm
Final	6.5 mm	6.7 mm
Penetration Value	6.5 mm	6.7 mm

Result:

The average penetration value is 6.6 mm of given sample material which is less than 10mm so suitable for practical use as per IS: 1203-1978.

4. ADVANTAGES

1. Plastic-bitumen composite roads have higher wear resistance than normal asphalt concrete roads. they are non absorbant water, have higher flexibility which ends up in less rutting and fewer cost for repair.
2. Coconut fiber is lightweight and it never shrinks, cracks or produces crust.
3. Coconut fiber is scentless, pleasant to handle, and uniform in composition.
4. Road surfaces stay swish, area unit lower maintenance, and absorb sound higher.
5. Scale back the requirement for hydrocarbon by 25-30%.
6. Reduces penetration and plasticity, a better softening purpose, less rutting, and cold cracking.
7. Increases strength & higher performance of the road.
8. Roads are lasting & repair-free for 10-15 years.
9. Construction of Road is economical.
10. Environment-friendly,

5. DISADVANTAGES

1. Cyanogenic in co-mingled plastic waste would begin Leaching.
2. It'll lead to issue whereas commixture all the constituents.
3. If there's improper burning of plastic material it'll generate harmful gases within the air.
4. Coconut is that the main bad polluter thus correct burning with superintendence is needed else it'll lead to cyanogenic fume within the air.

6. CONCLUSIONS

Polymer coated on combination beside plastic & coconut waste reduces voids & wet absorption.. It aspires to urge a better lastingness compared to the unremarkably used Combination of hydrocarbon & combination.

Benefit in price, because of the reduction of hydrocarbon Content. A Decrement within the Air Void magnitude relation and thus reduction within the Rutting impact because of Axial Loading. The decrease in Internal Cracks and Fracture. As per the references for creating a mean road of a unit Sq. m that price ranges around Rs. 2800-3000 /- bureau & can last 2-3 years solely. As per this Project, with the use of waste like Coconut Fiber, Coconut Shell, Plastic the value is within the range of 1500-1700 /- bureau for a unit Sq. m, additionally there's a clear sensible result for lastingness compared with the standard hydrocarbon mixes. Thus, its era is additionally inflated.

Thus the test value conducted of an aggregate on impact test machine and Consistency test on bitumen satisfies for road construction as per IS: 1203-1978.

7. FUTURE SCOPE

1. The road will face up to serious traffic and show higher sturdiness. the utilization of this technique won't solely strengthen the building however increase road life yet as facilitate to boost the surroundings and can also generate a supply of financial gain.
2. Plastic could be a harmful and non-biodegradable waste additionally coconut is that the main bad pollutant accountable chiefly for land pollution. Utilizing it for road construction can lead to its economical management.
2. It is an easy and straightforward technique that doesn't involve any advanced or new machinery.
3. The addition of plastic & coconut to hydrocarbon can facilitate in rising the strength and sturdiness of the pavement.

4. It will minimize heating, Greenhouse gases & pollution to an oversized extent.
6. Resultant of the correct method of disposal of plastic waste and coconut waste that could be a threat to environmental issues.

8. REFERENCES

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