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To enhance the properties of rigid pavement by using the mixture of rubber tyre and fly ash

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Abstract:

This experiment study is aimed to investigate the important properties of fly ash and rubber tyre in the rigid pavement. From various research it has been observed that the use of rubber tyre scrap in the range of 0% to 40% by weight, as replacement of aggregates, while fly ash content is 30% by weight, as replacement of cement. The objective of this studied is to aware peoples and give a practical use of rubber tyres in rigid pavement, reduce the problem of pollution, disposal and handling of waste (fly ash and rubber tyres) and it also reduces maintenance cost & increase the age of rigid pavements .

Testing of the concrete specimen prepared under 30% of fly ash and rubber tyre (40%) waste was performed at 28 days of curing for workability, compressive strength, CBR value and flexural strength.

Keywords:

CTM, CBR, RUBBER TYRE, FLYASH, RIGID PAVEMENT.

Introduction:

Fly ash is the end product of coal and waste product of the thermal plants, every year around 100 millions tones of fly ash produced by NTPC and only 15% of them is being utilized. In these recent years fly ash concrete has become more popular as construction material. Fly ash is taking use in cement industry because it reduces the water requirement in concrete and also reduces the heat of hydration of cement and provides desired strength to concrete.

Recycling of the rubber tyre (None degradable waste) is become vast problem since banned land filling of these types of material. For highway constructions the plane rubberized concrete (PRC) containing up to 40 % weight of the aggregate replacement by rubber can be used.

Literature Review:

Vallabuni Vinay et. al. [1] investigated on the use of fly ash in cement concrete. In this investigation of the important properties of concrete at different levels of replacements were found. Fly ash from Vijayawada thermal power station, Vijayawada, A.P is used for this study. Very high strength above the normal required strength of concrete with Fly Ash replacement is obtained. The strengths of the concrete mix cubes are increasing fly ash up to 30% replaced in cement and then after further increase the strengths are decreasing when compared with normal concrete.

Challa Mounika & Chappa Damodhar Naidu. [2] Studied uses of fly ash, crusher dust and shredded tyre chips in Civil Engineering materials can reduces an alternative to disposal and handling problems. From these test results shows it is obtained that the high strength values of CBR and high value of dry density are observed. When compared with the Fly ash & tyre chips mixes; crusher dust & tyre chips have attained greater value of strength and higher % CBR value. Crusher dust has attained Maximum CBR at 6% tyre chips and the value of the CBR is obtained 13. The best mix obtained from the

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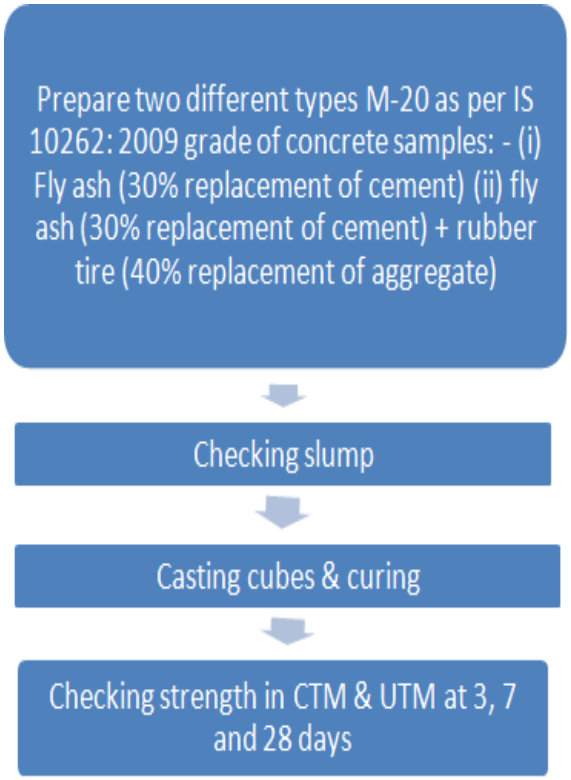
above studied is 60% of crusher dust & 40% of fly ash mixed with 6% of tyre chips.

Anjali Yadav & Nikhil Kumar Yadav. [3] Concluded that experimentally the investigation of the physical, chemical and mechanical properties of fly ash cement concrete for rigid pavement road construction. It has been observed that the use of 30% of the fly ash and 70% of the cement possess a superior performance in concrete. And it found that the amount of fly ash is increased, consistency is decreased. And as the amount of fly ash is increased in mix, it requires the less water as compare to the cement. And it also be seen that as the amount of fly ash is to be increased compressive strength is decreased, up to 30-40% is safe for use in concrete and 50% of the fly ash cement concrete has not enough to give compressive strength for use for road construction.

Experimental procedure:



Advantages:

- They provide excellent smooth surface for driving.
- Maintenance cost is almost negligible.
- There life span is very large (> 20 years).
- Cement handling is easier than bitumen.
- It can bear very heavy traffic loads.
- In high class cement concrete road heavy rollers are not required for compaction.
- They perform quite satisfactory when laid on poor types of sub-grades.

Disadvantages:

- Required heavy initial investment.
- 28 days of curing is required after completion before then can be opened to traffic.

Machine/equipments used for different tests:

CTM Machine

Slump test

Proportions used:

S. No.	Cement	Fly ash	Sand	Aggregate	Rubber tyre
1	1470gm	630 gm	4200gm	8400gm	-
2	1470gm	630 gm	4200gm	5040gm	3360gm

Result:

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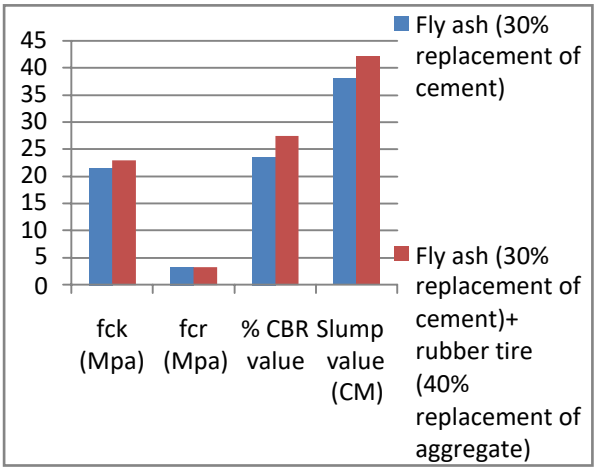

Conclusion:

- When up to 40% aggregates replaced by rubber tyre then compressive strength, flexural strength (modulus of rupture), % CBR value and workability increases but after further increase in % of rubber tyre these are decreases.
- Cost of aggregate reduced and scraped rubber tyres disposal & handling problem reduces.
- Life span of the road increases [with Fly ash (30% replacement of cement)+ rubber tyre (40% replacement of aggregate)] as compare to normal road work [with Fly ash (30% replacement of cement)].
- Maintenance cost of the rigid pavement reduced.

References:

i. Vallabuni Vinay, Kalyan, P.Sandeep Chandra & Mohammed Ibrahim (2018, February). Study and Analysis of Rigid Pavements Using Fly Ash. International Journal of Innovative Research in Science, Engineering and Technology (IJIRSET).

ii. Challa Mounika & Chappa Damodhar Naidu (2018, February). A Study on Flyash Ash, Crusher Dust and Shredded Tyre Chips as Sub graded Material. International Journal for Research in Applied Science & Engineering Technology (IJRASET**).**

iii. Anjali Yadav & Nikhil Kumar Yadav (2017, February). Study of Fly Ash Cement Concrete Pavement. SSRG International Journal of Civil Engineering (SSRG-IJCE).

