



A Review Paper on Use of Waste Glass Powder and Plastic Fibers in Concrete

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ABSTRACT

Goal of this have a look at is to lessen the fee of concrete and growth the energy of concrete by using waste materials inside the concrete blend. Usually glasses are used in creation and industries paintings and huge quantity of glasses are powdered each day. Also the plastic's use will increase every day and puppy (polyethylene terephthalate) bottle have increased emerge as essential a part of a commonplace guy life. Waste glass and plastic disposal are an environmental problem. Now a day's value of production is more with the use of fundamental cloth consisting of cement, sand and coarse mixture. on this look at 0%, 10%, 20% and 30%, cement is changed via glass powder and sand is changing with the aid of waste plastic fibers (like waste plastic bottle, plastic baggage, lengthy plastic fibers) with partly replacing glass powdered % of plastic sand by 1%, 2% and 3%, of plastic fibers and blended cement and sand are replaced by way of waste glass powder and fibers plastic consisting of above percent respectively.

All above proportional are mix layout for M30 concrete and examine residences of concrete with without alternative of waste cloth concrete blend. end result display that the compressive energy and flexural strength of modified concrete provide higher value with blended use of 20% glass powder as a place of partial replacement of cement and a couple of plastic fibers as a place of partial replacement of sand. And waste glass powder and plastic waste both are cheap and economics, that is why the price project of road and construction work may be reduced.

Keywords: -: waste glass powder, plastic fibers, and properties of concrete.

INTRODUCTION

For any creation in civil engineering concrete is fundamental cloth. All primary substances which can be used for concreting are natural. Concrete's homes may be trade by using including some plasticizer and other material. Brittle material inclusive of glass powder growth the compressive strength and fibers are also compressive energy boom and different houses. Because of environment pollutants and international warming pollutants the need to reduce down power consumption expanded. The impact of worldwide warming has impacted all people. In India because of domestic waste plastics and business glasses is giant harm to the environmental and subsequently currently required to use of waste cloth for enhancing houses of concrete.

Disposal of waste glass and plastic are environmental troubles. The usage of plastic has boom continuously all over the global and it creates massive portions of plastic based totally waste. Various glasses waste and non biodegradable plastic waste is one of the huge issues to dispose and manipulate as it is non biodegradable cloth which is dangerous to surroundings and human life. Pet bottle are broadly speaking used as container for uncooked cloth, water, family cleaner and oil and are thrown after single utilization. Disposed of puppy and waste plastic bottle are treated by way of landfill and burning which create surroundings trouble and create waste disposal and control issue. on this manner use of glass are also big problem for developing surroundings hassle. large amount of waste glass powder are produced by using manufacturing of glass body, glass home windows, bulb, and glass bottle and after harm of these waste cloth disposal are huge trouble. For lowering the environmental impact of waste glass and waste plastic recycling is best approach in concrete for increasing mechanical residences.

Therefore this examine addresses to reuse waste glass in powder for as cement and puppy bottle in their fibers like great aggregates in concrete to obtained improved mechanical houses over traditional concrete and there with the aid of resolve the disposal problem and control hassle of glass waste powder and puppy bottle and waste plastic.

LITERATURE REVIEW

Several research studies have been carried on the use of waste material on concrete for changing the properties of concrete. Initial studies find the effect of waste material on the workability of concrete then find out strength criteria. There are some studies are available for finding effect of a glass powder at the place of cement in concrete and some are effect of plastic waste at the place of find aggregate. Some developed the relation between waste product and strength and some are research on cost saving.

- **Yung and chin (2011)** find the optimum percentage of glass powder with partial replacement by cement. Cement. Various specimens are prepared for different percentage of concrete and compressive test was performed after 7 days and 28 days curing. And find that glass powder give more strength when fineness is greater than 4500 cm²/g. 10 % replaced glass powder give more strength.
- **Kumar et al. (2013)** in this study glass powder is used instead of cement as 10%, 20%, 30%, and 40% and flexural, compressive, and tensile strength is tested and compared with conventional concrete. He found that cement can be replaced by glass powder up to particle size less than 75 micron.
- **Malik et al. (2013)** study on concrete of m25 grade and use glass powder in varying proportion of 10%, 20%, 30% and 40% by weight of sand and study on compressive strength. Split tensile strength and durability and density test were performed after 28 days of curing and it is compared with normal concrete of without replacement from result it can be seen that 20 replacement of glass powder causes 15% and 25% increase compressive strength at 7 days and 28 days of curing.
- **Bhat and rao (2014)** in this research, studied the behaviour of concrete by using glass powder such as 5%, 10%, 15% and 20% on the place of cement and compared this concrete with without replacement glass powder concrete. He found that compressive strength of cube increase with increase replacement of cement by glass powder and decrease unit weight and porosity of concrete.
- **Hongjian and kiang (2014)** in this study use of glass powder for replacing cement in concrete. Proportion of glass powder was 0%, 15%, 30%, 45%, and 60% by weight of cement. Result found that if the glass powder is used up to 30% then compressive strength was not decreased after 7 days and 28 days because pozzolanic reaction between cement and glass powder. But after 60% replacement the compressive strength decrease.
- **Shilpa and kumar (2014)** in this experiment for changing the strength of concrete use of glass powder as the place of cement and find the behaviour of concrete properties. Glass powder is increased in same manner. Concrete was mix designed for m20 and ratio of constituent of concrete was 1:2.35:4.17 with water cement ratio was 0.45 and tested for compressive strength and flexural strength. Glass powder is replaced from 5% to 40% with increase 5% continuously. Specimens are tested for 7 days, 28 days and 90 days and compare with normal concrete. Alkalinity test was also performed for finding resistance to corrosion. After all test it was found that higher strength obtained at the 20% replacement. And slump value decrease with increase glass powder.
- **Nagar and sangle (2015)** in this literature cement is replaced by glass powder in varying proportional of 5%, 10%, 15%, 20%, 25%, 30%, 35%, 40%, 45%, and 50%. Flexural and tensile strength are compared with conventional concrete. Mix design of concrete was m20 with 0.45 water ratio replacement. He found that flexural strength is increased 6% as compared to normal concrete and at 25% replacement tensile strength is improve 5.5%.
- **Gahoi and kansal (2016)** in this experimental program, m20 and m30 grade is mix design for study. Glass powder replacement at the place of cement takes from 0% to 25 % with varying 5% percentage. Test is conducted after 3 days, 7 days and 28 days for compressive strength and flexural strength is checked after 28 days only. Glass powder is used as pozzolanic material. For each replacement slump value, water absorption and density also measured. And result is that 10% replacement of glass gives more positive result.
- **Sadiqul and ralmen (2016)** in this experiment concrete is mix designed for 35 mpa. And cement is replaced by glass powder from 0 to 25% in 5% varying percentage. And specimens are tested after 7, 14, 28, 56 and 90 days for compressive strength and chemical reaction. Replacement of 20% glass powder is economical as compare to cement and give more strength. 90 days compressive strength is slightly 2% more than conventional concrete.
- **Choi et al. (2005)** studied the polyethylene terephthalate bottle effect as a light weighted aggregate for compressive strength of concrete. Water cement ratio kept in concrete were 45%, 49% and 53% and the replacement ratio of plastic were 0%, 25%, 50% and 75% by fine aggregate volume. The result was found after replacing of plastic decrease compressive strength of concrete with increase in plastic light weight aggregate but for a particular pet aggregate proportion, compressive strength increase with the reduction in water cement ratio.
- **Batayneh et al. (2007)** researcher investigated the effect of plastic on the slump value and compressive strength of concrete in varying proportional 0%, 5%, 10%, 15%, 20% and 25% as a fine aggregate at 0.56 w/c ratio. It was observed that slump value is decreased with increased plastic waste. Slump value is decreased due to shape of plastic waste because edge of plastic is sharper than fine aggregate. And compressive strength is decreased with increased plastic waste. Reduction of strength was 23% with increase 5% plastic waste. Report was that plastic can be used in control way in concrete which is helpful for economical.
- **Frigione (2010)** finds lower values of splitting tensile strength in concrete containing pet aggregate prepared using high w/c value than in a similar mix prepared at low w/c value. 5% sand is replaced by pet aggregate by weight, which is manufactured from pet bottle. Specimens were manufactured by using different w/c ratio and cement content. This study shows the behaviour of the concrete mix by using recycled plastic waste. In this study, 10% to 25% of plastic waste replaced as place of sand. For study m20 grade of concrete cube casted. After the testing of 28 days, it was found that more plastic fiber decreases the strength of concrete.
- **Kandasamy and murugesan (2011)** in this paper, cement was replaced by polythene fibers and test for compressive and flexural strength of concrete. For testing grade of concrete was M20. Result was come after testing that compressive strength of concrete cubes increases up to .68% replacement.

- **Chavan and rao (2016)** researcher uses plastic waste as fibers form at the place of aggregate in plane and reinforced concrete. Mix designed is prepared for partial replacement of fibers was M20 and M30. A fiber is used varying percentage from 1% to 6%. For both grade aspect ratio of plastic 35 and 50 and various result are compared with conventional concrete which is compressive strength, flexural, split tensile strength, shear strength, modules of elasticity and bulk density. And after investigation reported proved that plastic fibers can be used for modified concrete and for modified concrete compressive strength was maximum at 2% and other strength is also optimum at 2% and then decrease continuously.
- **Bagde and wasnik (2017)** in this experiment used plastic fibers as the palace of fine aggregate in varying proportional. In varying proportional from 0% to 5%. Grade of concrete was M20 and M30. All specimens are tested after 28 days for compressive strength. Result is compared with normal concrete. By using fibers in concrete cracks arrested due to flexural properties of plastic.
- **Kumar and dual (2018)** in this studied cylindrical beam specimen with 1%, 1.5%, 2% fibers by volume, with .45% w/c ratio and compressive strength of 26 Mpa curing at 28 days. And he found that workability of concrete was good enough up to addition of 1.5 to 2% of fibers. Also the bond strength will be increases with increase in fibers content.
- **Maqbool and sood (2018)** in this investigation polyethylene terephthalate is replaced at the palace of fine natural aggregate in varying proportional of 2%, 3%, 4% and 5% and check the compressive strength and compared with normal concrete. M20, m35 and m30 grade of concrete are is mix design for study. Test is conducted after 7, 28 and 56 days. He found that compressive strength is increased till 3% then decreased continuously. And optimum compressive strength obtained at the 3%.

CONCLUSION

- From numerous studies it is clean that plastic fibers can be used as great mixture.
- From numerous works on glass powder its miles clear that tumbler powder can be used like cement in concrete.
- Higher ratio of plastic fibers decreases concrete's strength, but growth workability of concrete blend.
- With the aid of the use of waste material cost of concrete mix reduced.
- Because of use of glass waste powder and plastic fibers in concrete it can reduces the effect of waste in environment.

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