

A Review Paper on Properties of Concrete using Styrene Butadiene Rubber Latex in Concrete

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ABSTRACT

The use of Styrene Butadiene Rubber Latex in concrete as a construction material in structural applications has drastically increased in recent years. Polymer concrete possesses excellent strength and durability properties. An exhaustive literature survey has been carried out looking into the advantages of polymer modified concrete, so as to study its uses and effect on various properties of concrete. Here, an attempt has been made to present a review on polymer modified concrete and its application to concrete structure.

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INTRODUCTION

Polymer concrete is a modern composite material which results from the polymerization of a monomer / aggregate mixture. This polymerized monomer acts as a binder for the aggregates and the obtained composite is termed as "Polymer Concrete". There are number of growths in the field of polymer concrete date back to the late 1950s when these materials were settled as a replacement of cement concrete for some specific applications. Initial usage

of polymer concrete, as reported, was for building cladding and so forth. Later on, it was extensively used as repair material because of rapid curing, high strength, excellent bond to cement concrete and steel reinforcement, and high durability. Precast PC has been used to produce a variety of products such as highway median barriers, acid tanks, manholes, drains, and so forth.

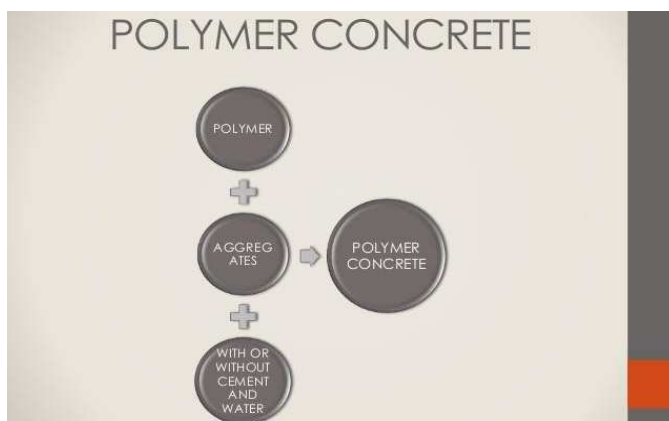


Fig.1 Polymer Concrete

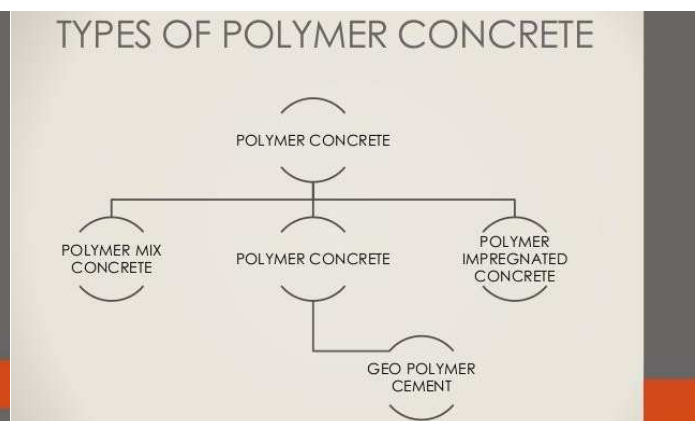


Fig 2 Types of polymer concrete

LITERATURE REVIEW

Literature survey was done related to the study which is given as:

1. Ola Adel Qasim 2022 Concrete address the different notable and widely worked material to have extremely high strength and sufficient usefulness qualities. This paper accentuates on polymer steel fiber concrete. Five different substantial blends were produced tentatively to concentrate on the results of Styrene-Butadiene Rubber (SBR) plastic with various doses proportion of (0, 5, 10, 15 and 20%) and steel fiber with various proportions of (0, 1 and 2% by volume) on properties of various substantial blend in with grade of cement (30, 35, 47, 60 and 85). SBR plastic polymer was taken on relying upon weight of concrete. 3D squares and chambers for the compressive strength test were ready, and examples were tried following 28 days of restoring. This paper commented that SBR plastic has the opposite impact at the early age while at 28 days, the joining of SBR plastic in substantial outcomes in escalation of compressive strength. The outcomes show that involving SBR in doses of (0, 5, 10, 15 and 20%) influences progressively on compressive strength up to (15%) after that at 20% SBR impact decreasingly and the outcomes is like proportion of 10%, that mean increment of SBR past 15% impact contrarily on concrete in light of its superplasticizer impacts. The connection of steel strands to substantial will foster the compressive strength. The outcomes show that for the five different substantial blends, SBR impact decline with the increment of substantial grade. announced by producers. It was resolved that the most imperative property for sturdy solid repairs are modulus of flexibility and bond quality. To choose a reasonable repair material, an architect must know about two variables: the repair material's similarity with the open cement, and the repair material application. Makers utilize a wide assortment of tests to decide the quality of their outcome; this data can frequently hoodwink engineers into utilizing a material that is not suitable for their conditions. In this way, it is important to comprehend the material properties that straightforwardly influence repairs and the tests used to decide them.
2. 2021 The paper concentrates because of doping polymer concrete with styrene-butadiene elastic (SBR) on its dynamic and mechanical properties. The exploration was separated into two phases. In the first place, exploratory modular examination was done in the time and recurrence area from 0 to 2000 Hz to expand on the unique properties of the polymer. The outcomes demonstrated that the example with 30% of SBR had the most reduced vibration adequacy esteem, while tests with 20 and 30% SBR had the most noteworthy qualities for the damping proportion. In the subsequent stage, the mechanical properties of the examples were explored - pressure and flexural tests were performed. In the two cases, the most noteworthy lessening of material strength was seen for the 30% SBR tests. Albeit, expanding how much elastic grind (SBR) in the polymer concrete better the damping proportion and decreased the vibration abundancy. In light of these examinations it isn't prescribe to dope polymer concrete with over 20% of SBR by volume.
3. Narain Das Bheel 2020 This exploration work was embraced to have the greatest strength of cement blended in with styrene-butadiene elastic (SBR) and to know the impact of SBR on the new and solidified concrete. Strategies/measurable examination: The substantial examples were ready to accomplish designated strength of 3000 lb/in². In this trial work, the combination of cement was ready by adding 0%, 5%, 10%, 15%, and 20% of SBR polymer-concrete proportion to really take a look at the properties of new concrete (droop test and compaction factor test), while bounce back hammer test, ultrasonic heartbeat speed test (UPV), compressive strength test, and rigidity test were seen at seventh, fourteenth, and 28th days, separately. Discoveries: Resultantly, the compressive strength and roundabout rigidity supported by 16% and 13% mixed with 15% of SBR polymer in concrete when contrasted with control concrete after 28th days, separately. The functionality of new cement dove with an ascent in how much SBR polymer in concrete. Application/enhancements: Both the quality and high strength of cement is improved by adding 15% of SBR in concrete.
4. Ola Adel Qasim 2019 Concrete address the different notable and widely worked material to have extremely high strength and sufficient functionality qualities. This paper underlines on polymer steel fiber concrete. Five different substantial blends were produced tentatively to concentrate on the results of Styrene-Butadiene Rubber (SBR) plastic with various doses proportion of (0, 5, 10, 15 and 20%) and steel fiber with various proportions of (0, 1 and 2% by volume) on properties of various substantial blend in with grade of cement (30, 35, 47, 60 and 85). SBR plastic polymer was embraced relying upon weight of concrete. Blocks and chambers for the

compressive strength test were ready, and examples were tried following 28 days of relieving. This paper commented that SBR plastic has the opposite impact at the early age while at 28 days, the joining of SBR plastic in substantial outcomes in heightening of compressive strength. The outcomes show that involving SBR in measurements of (0, 5, 10, 15 and 20%) influences progressively on compressive strength up to (15%) after that at 20% SBR impact decreasingly and the outcomes is like proportion of 10%, that mean increment of SBR past 15% impact contrarily on concrete in view of its superplasticizer impacts. The connection of steel strands to substantial will foster the compressive strength. The outcomes show that for the five different substantial blends, SBR impact decline with the increment of substantial grade.

5. S. K. Hirde and Omprakash S. Dudhal (2016) Utilization of polymer changed concrete as a structure material in primary applications has been expanded in ongoing presence. Polymer concrete has excellent intensity and solidness properties. Investigating the upsides of polymer changed concrete, a drained writing examination have been dropped to concentrate on its purposes and impact on different properties of the substantial and reachable in this exposition a work has been made to introduce survey on polymer adjusted concrete and its utilization to substantial development which will be exceptionally valuable to structural specialists to know its application in development business It is very notable that a couple of substantial designs built with elite execution materials begin to deteriorate some time before fulfillment their determined help life. In such cases breaks are caused after the design have been done for certain years. It prompts brings about the shortening of administration life and bringing down in sturdiness. Solidness modification in concrete must be estimated in development. In addition, different variables might be thought of as like breaking and debonding, which permit chloride, carbon dioxide or detoriative specialists enter through primary part. Polymers has been working like substantial admixtures. In view of the method of their expansion, polymer concrete cement is grouping as polymer adjusted concrete cement or mortars (PMC/PMM), polymer concrete or mortars(PC/PM), polymer impregnated cement or mortars (PIC/PIM).
6. Shivani R. Bothra &Yuvraj M. Ghugal (2015) Concrete assumes a significant part in the

development business yet it has a few disadvantages. To conquer this downsides, the chase after sturdy and supportable development materials is the need of time. This prompts the advancements of substantial composite in blend of different mixtures to be utilized in numerous applications in universe of concrete cement. A superior data of materials conduct, particularly in the field of admixtures, and a well comprehension of relieving processes permitted the development of profoundly performing mineral or changed mineral cements, mortars and grouts. The universe of cement with fiber's, and polymer has been going through major explores to improve the property of customary cement. Universes perceive, endeavor for and acknowledge each other's contribution to the synergic impacts that are acknowledge by the blend of conventional structure materials and polymers. This article momentarily surveys the utilization substantial composite in mix with polymer, where polymers are as a polymerized medium blended with the hydrated concrete glue. The miniature design and properties of composite polymer changed concrete are portraying and a few ongoing potential applications are referenced. It is seen that involving strands in mix with polymer show further improvement. An assortment of technique, arising pattern as well as varieties in relieving procedures for polymer altered concrete are seen. Likewise the ongoing fortifying methods utilized for socializing the quake conduct of designs, by help of fiber supported polymers (FRP) are examined for the utilization of examination of existing designs. A few newly distributed articles and specialized papers managing polymer changed concrete are basically looked into.

fibers (a polypropylene fiber and a blend polypropylene-polyethylene fiber), were included in the matrix to optimize a high performance concrete in terms of flexural toughness. The results show that the elevated strength concrete made with latex (HS-PMC) still futile in a brittle manner, although some ductility was observed. Synergistic effects between the fibers and the latex were observed in most of the composite over a wide range of deflections, as long as suitable polymer dosages were used. Though, steel fibers appeared .to be more attuned with the latex modified concrete in terms of both load-carrying capacity and toughness. The effect of fiber content and latex dosage are discussed, based on the results of analyses of stiffness tests carried out according to ASTM C1018 and JSCE SFS, as well as the post-crack strength (PCS) procedure.

It is concluded that a high show composite with steel fibers and polymers could be a promising material for both structural and repair purposes.

7. M. Barbuta (2009) Constant innovative work takes a shot at the utilization of waste (fly cinder and silica fume) for different beneficial uses have been passed out. In the building business, significant consideration has been committed to the utilization of fly cinder and silica fume in concrete as count to or as bond substitution. The usage of a strong waste, fly ash debris and silica fume, in polymer concrete was report in this paper including the impacts on the compressive quality, flexural quality, and split elasticity. The outcomes demonstrate the weight of fly ash remains and silica fume content on the mechanical properties of polymer concrete with epoxy resin. The fillers improved the mechanical qualities of polymer materials have been used in instrument construction also where the vibration damping property of polymer concrete has been oppressed. This assessment deals with the efforts of various investigators in selection of ingredients, processing parameter, curing conditions, and their effects on the mechanical properties of the resulting material.

8. Bing Chen & Juanya Liu (2007) In this investigation, styrene-butadiene elastic (SBR) latex as a polymeric admixture was apply in lightweight extended polystyrene (EPS) concrete. The impacts of curing condition and polymer-bond proportion on the compressive and flexural qualities of polymer-modified EPS cements were research. Subsequently, the quality development of the polymer-adjusted EPS cements unequivocally relies on upon the curing conditions. Joined dry and wet curing empower to become both the qualities of bond lattice and SBR movies together. Insertion of SBR latex at a specific polymer-concrete proportion in the EPS concrete enhances the bonds between the concrete framework and EPS molecule due to the SBR movies shaped in the concrete network. Also, SBR change can fundamentally enhance the flexural quality of the typical EPS concrete. Contrasted and the EPS concrete, the compressive quality of the polymer-modified EPS cements can increment continuously even following 28 days.

A. Momayez et.al.(2005) This study was aimed at studying the effect of test methods on bond strength between concrete substrate and repair material. Four test methods with cementations or modified- cementitious repair materials,

and two surface roughness's were studied. The methods used were succeed, slant shear, splitting prism and a new direct shear named Bi-Surface shear test. Though the coefficient of variation (COV) for every type of test was acceptable, the bond strengths from a few tests were up to eight times larger than those obtain from others. It is imperative that the bond tests be chosen such that they represent the status of stress the structure is subjected to in the field. The new test technique was easy to carry out and had rational results and can be developed by further investigations.

OBJECTIVES

- To study the properties of styrene butadiene rubber latex in concrete.

CONCLUSION

In above study, It can be accurately summarized that the addition of Latex polymers is an effective way of improving the overall properties of the conventional concrete.

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