"LITERATURE SURVEY OF CONCRETE CONTAINING SULPHONATED PHENOLIC BIO RESINS AND POLYMERS"

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ABSTRACT

Concrete plays an important role in the construction industry, has some disadvantages. The durable, requires a search time for the sustainable building materials in order to overcome the disadvantages. It leads to the development of specific combinations of the various complex compounds used in many applications of a cement concrete world. In particular, the knowledge and understanding of the operation of the curing process than materials in the field of high admixture was allowed to perform the development of the mineral or minerals modified concrete, mortar and grout. As well as the fibers and the concrete world, the world of the polymer concrete is conducting a major research to improve the properties of existing concrete. Two of the world is trying to recognize and accept the contribution classical building materials and polymers with each other. This paper briefly review the concrete polymer composite used with the form of a polymer of the hydrated cement paste matrix comingled polymerization. Describe the characteristics of the micro-structure and synthetic polymer modified concrete, and may be a part of the current available applications. Using this technique the polymer modified concrete curing emerging, polymers show more enhancement. Various methodology and binding fibers are observed to be observed and the trend change. Also described is the use of modern technology, strengthening existing structures. Several recently published articles and technical papers dealing with the rehabilitation of polymer modified concrete to be used to improve the seismic behavior of the help of the Fiber Reinforced Polymer (FRP), a critical structures It will be reviewed

Keyword: *Polymer, SBR latex, Acrylic polymer, Steel Fiber.*

1. INTRODUCTION

Concrete is a popular building material in the past 170 years the world over. Concrete is used around the world, but the main disadvantage, such as cure delay, low tensile strength, low chemical resistance against shrinkage. The same takes place by modifying the polymer additives, cement concrete, such thermoplastic resin attempt to overcome the disadvantages, cured epoxy resin, elastomer or rubber, indigenous polymers cellulose, lignin, protein, etc. Thermo-set. Cement composite polymers are preferred for high-performance, multi-functionality and sustainability, because compared to conventional cement concrete. Polymer-modified cement matrix has a specific organic polymer gel matrix homogeneous monolith CO matrix. The various types of latex, water redispersible polymer powder, water-soluble powder, a liquid resin and the modified monomer as the polymer concrete is used. It is very important in the polymer and the monomer, but this composite cement to the formation of the hydrated polymer cement hydration of cement and polymer phase different from each other do penetrate well to give a monolithic matrix phase having a network structure; It is also bounded by the co-matrix phase as a result of the excellent quality of the total polymer modified concrete compound.

Styrene-butadiene polymer dispersion used in the form of an emulsion latex of rubber polymer as well. SBR is comprised of butadiene, styrene, water, it can be successfully bound to many materials. This tension is used as a replacement of cement binder to improve the compressive strength of the concrete and bending. SBR is a thick, wide appearance of the high-viscosity liquid water content 52.7%. 1 However, the polymeric acid alkali strength, adhesiveness, durability and with the reinforcing steel fiber is demonstrated the benefit in terms of excellent resistance [2]. Therefore, the substance is found to be used in corrosive environments to corrosive substances [3]. Concrete polymer composite is conscious environment, storage problems, makes the longetivity of its natural resources, infrastructure and environmental protection.

2. HISTORY OF POLYMERS IN CONCRETE

Polymers have been used in construction as long ago as the fourth millennium B.C., when the clay brick walls of Babylonia were built using the natural polymer asphalt in the mortar. The temple of Ur-Nina (King of Lagash), in the city of Kish, had masonry foundations built with mortar made from 25 to 35% bitumen (a natural polymer), loam, and chopped straw or reeds. The walls of Jericho were built using bituminous earth in about 2500-2100 B.C. Other historic applications of bituminous mortars in construction have been identified in the ancient Indus Valley cities of Mohenjo-Daro and Harappa around 3000 B.C., and near the Tigris River in 1300 B.C, Many natural polymers have been used in ancient mortar, including albumen, blood, rice paste, and others (Chandra and Ohama 1994). The earliest indication of the use of polymers in PCC was apparently in 1909, in the United States, when a patent for such use was granted to L. H. Backland; and in 1922, in France, when a patent was granted to M. E. Varegyas. In Britain, polymers in concrete advanced in 1923 with L. Cresson's patent for rubber-modified road surfacing material; in 1924 with V. Lefebure's development of natural rubber latex cement; and in 1925 by S. H. Kirkpatrik's innovation on that product (Ohama 1978; Chandra and Ohama 1994). Synthetic polymers were invented in the 1940s in response to the wartime decline in the availability of natural rubber and the increased demand of the war effort. Incorporation of synthetic polymers in portland cement mortars and concrete started in the 1950s (Dikeou 1978; Chandra and Ohama 1994).

3. MICROSTRUCTURE OF POLYMER

Polymer (PIC) and then impregnated with a monomer of oncrete, polymer concrete hydrated Portland cement concrete polymerization in the reaction system (PC) is impregnated with a composite material formed by polymerizing a monomer and a polymer composite concrete aggregate mixture are typically classified as. Polymerizing the monomer acts as a binder for the aggregate, polymer concrete (PMC) come highly polymer cement concrete (PPCC) is one of the monomers mixed material has been modified.

When mixing the first polymer, fresh concrete, latex suspension polymer particles are distributed throughout Ideally the cement paste. Adjacent to the total of the saturated solution of the hydrated cement probably begins to generate a lean and gayiteu Et CH determination of calcium silicate in the area to form the aggregate CH. Hydrated polymer gel products are sediment particles, particles of clinker, not. Growth of hydration products of water usage and hydrated, the polymer particles hydrate gradually be agglomerated to form a charged-up layer concentrated capillary pores on the surface of the silicate layer in a gel product variation cement particles. Accumulated polymer particles eventually be fully charged, and fills most of the interior surface of the capillary gap coating. When the water is recovered by the hydration or drying, it is a dense polymer particles are hydrated cement paste and gel and combined with each other or agglomerated voids continuous film hydrates the film bonding mixed joint matrix form. Some polymer composite cement hydration participates in the chemical reaction product damage.

4. APPLICATIONS

PMC are primarily used as overlays on roadway and bridges, both as new construction and as repairs of existing deteriorated structures[5]. PMC is being used in floorings , water tanks, swimming pools, septic tanks, silos, drains, pipes and ship decks [6]. Relatively new application which proved to be very promising are its use in combination with fiber reinforcing.

PMC cement glue, flagstone, tubes, panels, porous Eco Concrete, Mechanical basic elements and chemical substances, industrial floors and liquid applied water profing materials [11 prefabricated building components, such as are used in concrete and stone repair materials. Possible future applications include roller compaction concrete (RCC) for the runway, roads, parking lots and ductile concrete foundation, shear wall connections. Its use is also forecast for the marine and offshore structures.

5. EXAMPLES FROM THE LITERATURE

5.1 Review Paper 1

Y.M.Ghugal polymer modified cement mortars and sophisticated experimental research. Variable was considered the age of the polymer content, curing and curing. Tensile compression divided, they studied the effect of the polymer mixture of the flexural strength and processability. The dosage of the polymer is changed from 0 to 25%. The effect of the wet and dry cure was observed in the curing of all ages. The results were compared to a locally significant increase in bending, splitting tensile and compressive strength to the air cured sample was observed later age compared to control samples without mortar water treatment polymers. Optimum content of the polymer was found to be 20%. High initial adhesion strength and structure of the old building materials can be restored in a short time. Removing loose concrete and concrete buildings, filled with the void resulting crude material. R polymer modified mortar and concrete can be used in various techniques of reinforced concrete and masonary structures depending on the extent of the repair, restoration, and the type and damage caused by the earthquake.

Use of polymer in cement mortar make the mortar more workable with low water cement ratio improving strength. Air curing is preferd to increase higher rate strength at later ages. Materials due to its significant improvement in mechanical properties and durability were efficiently used as rehabilitation of distressed, damaged and deteriating concrete and masonary structures to be restored and strengthend in possible shortest time.

5.2 Review Paper 2

R. King (2009) Paper status cement material and the comparative behavior of micro and macro mechanical properties of SBR. In this study, the mechanical properties are nanoindentation (NI) to deal with while observing an SBR latex-modified cement paste identified by identified by standard test methods SBR latex-modified mortar macro mechanical properties of the product. In both cases the ratio of the experiment is identified by the NI and compared in terms of the average value of the compression hardness results for this purpose is a constant C is / w, while P / C ratio changes from 0-20% to 0.4%, by weight of the cement indentation modulus mortar flexural strength of the cement paste was confirmed by the dynamic modulus of the mortar. linier cooperation relationship is observed between the micro-mechanical and macro-properties of the cement composite material. Generating a linear relationship between the microscopic and macroscopic strength characteristics emphasizes the origins of fine-scale performance of SBR latex modified mortar. It is also observed to affect the elasticity of the dynamic modulus of SBR latex modified mainly caused, respectively, identified by the cement paste NI cementitious material with different length scales. The addition of aggregate will have an impact, such as the mortar. [12] [13]. According to the same result. I think the following observations say about the concrete composites. The beneficial effects of 10 P / C ratio, as well as was the% in terms of toughness, and is observed as a non-continuous reduction in the compression and bending strength ratio increased polymer cement. Increment the porosity was observed by addition of 10% SBR latex mainly had a great influence on the flexural strength for controlling the flexural strength

mortar. P / C ratio of 8-10% has been found as optimal SBR latex content in a real application.

5.3 Review Paper 3

V.M.Sautaraja et al (2013) present a study to analyse the properties of concrete that can be further improved by addition of SBR polymer along with steel fiber. This paper states that gain in strength due to combined addition of steel fiber and polymer SBR latex in normal concrete leads to increase strength, durability, toughness, resistance to cracking and crack propogation. Also the effect of curing condition on th strength gain properties of composite were observed. P/C ratio keeping constant steel fiber varied with increment of 0.75% and 1.5% bt wt. of cement:a tremendous increase in compressive strength and post cracking ductility is imported to concrete. Test results were observed in terms of flexure and compressive strengths, the increment in flexureal and compressive strength were more effective in dry curing while in wet curing the strength decreases. Hence it is suppose to be concluded that wet curing is detrimental to the strength of concrete. Decrease in workability due to addition of steel fibres is compensated in polymeric additives in dry curing condition.

5.4 Review Paper 4

Sivakumar.M.V.N(2011) study states the comparative effect of different polymers on structural properties of concrete. In this study a mechanical and flexural properties of polymer modified concrete were observed. Two different types of the polymers latex-styrene butadiene and styrene acrylic were used for varying dosages (0-20%) to modify concrete composites individually in each case. A graphical comparison of results were carried out for 7^{th} day as well as 28^{th} day. A significance of this experiment was wet curing process was carried upto testing date. It was also observe that the dosages of polymer in both the cases is optimal for 15% polymer. While justifying potence of each polymer it was interpreted that Acrylic styrene was proved superior over latex.

Structure for repair of existing concrete structures. Life possible way and the number of materials, but mainly depends on the method of application of the repair material right choice to recover the structure to improve the success of repair of concerte. Repair technique, mainly determined by the resistance to water penetration and tensile cracking of the structure. To study the effects of the cementitious material and the SBR latex. Mortar1 mixing ratio of: the weight of the cement was made by adding 3 SBR 20%. Comparative study was carried out repairs carried out between the cylinder compressive strength tests were added without splitting tensile strength of SBR SBR in terms of control specimens specimens. Also sorptivity test was performed with the effects of thermal cycling in the repair concrete. SBR has good tensile strength compared to silver adhesive cement mortar cement slurry in the research, as well as SBR has a very good moisture permeation analysis that corrected. SBR as modifiers and binding agents include cement mortar the needs satisfied by the ASTM standard. After the thermal cycle demonstrated the benefit of the structure of the tropical climate so modified SBR supports the better performance.

5.5 Review Paper 5

Z.A. Siddhiqi et.al.(2013) in his research states the effects of addition of polymer SBR latex in concrete in terms of compressive strength and water absorption. And observation is made that SBR latex improves the internal structure of latex modified concrete resulting in considerable reduction in the water absorption value at 28 days . A comparison was observed between SBR modified concrete in controlled concrete. From results it is concluded that enhancement in compressive strength and reduction in water absorption was observed on 28 days while on 7^{th} day the early compressive strength shows negative effects and at early age water absorption was adverse. Specimens are varied from 5%, 10%, 20% of polymer dosages. Modification of concrete by polymer leads to increase workability in comparison to control concrete max increase in compressive strength was observed to 72% as well reduction in water absorption was observed at 30%. Its concluded that thin polymeric film restored the water by hydration process and helps in reduction in water absorption.

5.6 Review Paper 6

Abdulkader Ismail A.AL.Hadithi et.al.(2009) explained the mechanical properties of steel fiber concrete in combination of acrylic polymers. In this study fiber percentage are varied 0.5% by weight of cement upto 1.5% as well as acrylic polymer content are varied as 3%,7% and 10% by weight of cement. Significant curing of specimens carried as total water immersed curing by Folic method.[13] Result observed showed an improvement in all properties of control concrete when steel fibers were added. While addition of acrylic polymers along with steel fiber showed agreater influence than steel fiber reinforced concrete. There was (14.2%-29.2%) increment in compressive strength of steel fiber reinforced concrete, while it was found (44.8-86.64%) increment in PMSFRC. Splitting tensile strength the increase upto(50-91%) was observed for steel fibres concrete which goes on increasing upto (102.4-124.7%) in case of PMSFRC. Similar increment was observed in flexural strength as (24.2-48.3%) for SFRC and (62-78%) for PMSFRC.7% of P/C was found to be optimal with 1% variation in the volume fraction.

6. CONCLUSION

There is a large variation in use of polymer in construction industry. the synergic action of polymers and cement mortars, concrete offer great improvement for wide range of new and innovative applications increasing tensile strength of composites , less water curing, resistance to cracking, impermeability high impact, good quality of sorptivity has proved polymer as best modifiers for the composites. The use of polymer should be well considered to guarantee better performance and improve sustainability.

Polymers are not only special construction materials that replace classical minerals or organic building materials but also allow new development of new and durable construction as well as new restoration and retrofitting techniques.

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