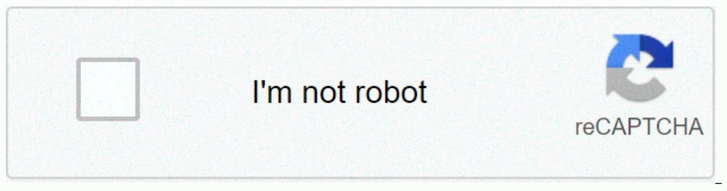

Continue

Steel fibre reinforced concrete project report pdf

You are reading a free preview pages 7 to 8 not shown in this preview. You are reading a free preview pages 12 to 17 not shown in this preview. You are reading a free preview pages 21 to 33 not shown in this preview. You are reading a free preview pages 42 to 45 not shown in this preview. You are reading a free preview pages 49 to 69 not shown in this preview. You are reading 77 to 86 free preview pages not shown in this preview. Slideshare uses cookies to improve performance and performance, and gives you relevant advertising. If you continue browsing the site, you agree to use cookies on this website. Look at our user agreement and privacy policy. Slideshare uses cookies to improve performance and performance, and gives you relevant advertising. If you continue browsing the site, you agree to use cookies on this website. See our user's privacy and agreement policy for details. 1. By Vital Verma 2. What's fiber...? 🔖 a small number of reinforcing materials that have certain characteristic properties. 🔖 can be circular or flat. 🔖 parameter used to describe fiber – aspect ratio. 🔖 is the ratio of the aspect of its length to its diameter. 🔖 typical aspect for fibers is from 30 to 150. 3. Is reinforced concrete fiber (FRC)? 🔖 fiber reinforced concrete (FRC) concrete contains fibrous materials that increase its structural integrity. 🔖 include short discrete fibers that are uniformly distributed and randomly directional. 🔖 steel fibers, glass fibers, synthetic fibers and natural fibers. 🔖 inside these different fibers that changes the character of concrete fiber reinforced with different concrete, fiber materials, geometry, distribution, orientation and density. 4. FRC History... 🔖 the concept of using fibers as reinforcement is not new. Fibers have been used as amplifieers since ancient times. 🔖, horse hair in mortar and straw were used in mud bricks. 🔖 the early 1900s, the concept of composite materials was used in concrete. 🔖 needed to find an alternative to the asbestos used in concrete and other building materials were discovered due to health risks associated with the material. 🔖 until the 1960s, steel, glass (GFRC), and synthetic fibers such as polypropylene fibers were used in concrete, and research on new fiber reinforced concrete continues today. 5. Fibers used... Although any type of fiber has been tested in cement and concrete, not all of them can be used effectively and economically. Each fiber has some features and limitations. Fibers used⚠ Steel fibers ⚠poli propylene, nylon ⚠ water, blind ⚠golas ⚠ carbon 6. Steel reinforced concrete fibers... 🔖 most commonly used fiber. 🔖 Round Qatar Up to 0.75 mm. 🔖 increase bending, impact and strength fatigue of concrete. 🔖 used for veneering roads, airport sidewalks, bridge decks. 🔖 and thin plates are also made using estel fibers. 7. Polypropylene/Nylon Fiber Reinforced Concrete... 🔖 suitable for increasing concrete impact strength. 🔖 high tensile strength, but the lower tensile modulus and higher elasticity do not contribute to flexural strength. 8. Reinforced concrete deer fibers... 🔖, the most successful of all as it can be mixed with Portland cement. 🔖 tensile strength of asbestos varies between 560 and 980 N/mm2. 🔖 cement production has considerably higher flexural strength than Portland cement paste. 🔖 for trivial concrete work, organic fibers such as coir, jute and canesplits are also used. 9. Reinforced concrete glass fibers... 🔖 recent introduction. 🔖 high tensile temperature is 1020 to 4080 N/mm2. 🔖-resistant alkali technology has been developed. 🔖 shows a comparable improvement in durability to conventional electronic glass fiber. 10. Carbon Fiber Reinforced Concrete... 🔖 Posses has a very high tensile strength of 2110 to 2815 N/mm2 and young's modulus. 🔖 composite structure composed of carbon fibers shows a very high modulus of tensile and flexural strength. 🔖 are used for cladding, panels and shells. 11. Factors affecting the

properties of reinforced fiber concrete... is the transfer of tension between matrix and fiber. fiber type. fiber geometry. fiber. orientation and distribution of fibers mixing and concrete compression technique. size and shape of agrgats. 12. Relative fiber rigidity matrix the stretching modulus matrix should be much lower than fiber for efficient stress transfer. nylon and propylene fiber convey a greater degree of toughness and impact resistance. , glass and carbon impart strength and rigidity to the composite. between active bonds also determine the degree of stress transmission. can be improved with a greater area of contact, improved frictional properties and degrees, and by treating steel fibers with sodium hydroxide or acetone. 13. The volume of largely depends on the amount of fibers used. tensile strength and toughness of composites are increased linearly by increasing the volume of fibers. of fibers is most likely to separate and rough concrete and mortar. 14. Fiber aspect ratio is important factors affecting composite properties and behavior. increase aspect rationing up to 75, increasing the final strength of linear concrete. is reduced beyond 75 relative strengths and toughness. 15. The orientation of is one of the major differences in conventional reinforcement and fiber strengthening. with 0.5% volume It was tested and showed that when the fibers aligned in parallel with the applied load, more tensile strength hardness was seen compared to random and perpendicular distributed fibers. 16. Working and compressed capability of concrete... the use of steel fibers reduces the ability to work. the external structure cannot compact the concrete. is also due to the non-uniform distribution of fibers. fiber level where this situation is reached depends on the length and diameter of the fiber used. workability and standard compaction can be improved with the help of a water-reducing mixture. 17. Coarse agrgate maximum size of seeds should be limited to 10 mm. fibers also act as agrgate. between particles and between fibers and between fibers and agrgates controls the orientation and distribution of fibers, which affects composite properties. friction reduction of amicions and amicions improving cohesion can significantly improve the mixture. 18. ming mixture is important to prevent the toping of agrgates, isolate and obtain uniform composites. increase in aspect rationing, the percentage of volume, size and quantity of agrgats exacerbates the stronger tendencies. a steel fiber content of more than 2% based on volume and aspect ratio of more than 100 is difficult to mix. of fibers before water is added is important to obtain uniform dispersion of fibers in concrete mixtures. 19. Typical ratios for FRC... Cement content ratio ingredients 325 to 550 kg/m 3 W/C ratio 0.4 to 0.6 sand/total total 50-100% maximum total size 10 10 mm air content 6-9% fiber steel percentage 1% for 78Kg/m3 glass 1% for 25Kg/m3 nylon 1% for 11Kg/m3 Fiber content: 20. Advantages of FRC over conventionally armed concrete... static and dynamic tensile strength. energy absorption and fatigue power is better. uniform structure of fibers throughout the concrete provides isotropic properties. 21. Applications... is a veneer of air fields. roads. flooring. Paul. channel. -resistant equipment. fireproof. manufacture of pre-made products such as pipes, boats, beams, staircase steps, wall panels, ceiling panels, manhole covers etc making pre-made molds of U-shaped molds for casting lintels and small beams. 22. Applications... Roadpavement Bridgedecks Precastcanallining Manholecover 23. Program... Firefighting location made of GFRC Airport Runway Square 24. Current development in frc:- High fiber volume microfiber system. Slurry fiber concrete penetration (SIFCON). of reinforced composites. 25. High fiber volume microfiber system:- can replace fiber asbestos. improves toughness and impact strength. these properties make it attractive for Pre-made products such as roofing sheets, cladding panels. are useful for repair and rehabilitation work. 26. Fiber concrete penetration slurry:- SIFCON was invented by Lankar in 1979. of steel fiber substrate and the cement slurry penetrates. microfiber can be achieved up to about 20% based on volume. in both bending loads carrying capacity and toughness. gain high pressure strength. Used for blast resistant structures & burglar proof safe vaults. 27. Reinforced compressed composites (CRC):- Consist of a very strong, dense cement matrix. is extremely expensive. Exhibits flexural strength up to 260Mpa & compressive strength of about 200Mpa. as strong structural steel. can be molded and dummy in place. 28. porous concrete is due to air vacuum ,water vacuum. impregnation of monomer & subsequent polymerization is the latest compatible technique to reduce porosity and improve strength. 29. Types: - reinforced polymer impregnated with concrete(PIC). polymer cement concrete (PCC). Polymer (PC). Polymer impregnated & surface coated polymer concrete. 30. Polymer impregnated concrete:- precast conventional concrete ,cured & dried in oven. is done using radiation, heat application or with chemical onset. monomers used are methyl methacrylate, styrene, acrylonitrile, t-butyl styrene. monomer loading depends on the quantity of weather that occupies the total empty space. monomer loading can be reduced using pressure. 31. Polymer cement concrete:- made of cement mixing, agrgate, water & monomer. monomers used in PCC are polyester-styrene, epoxy styrene, furans, vinylene chloride. superior PCC made by forfuryl alcohol aniline hydrochloride in wet mixtures is claimed to be particularly dense, non-shrinking, high corrosion resistance, low tropics capability & high resistance to vibrations and axial stretches. 32. Polymer concrete:- is limited by a polymer binder. the volume of vacuum in agrgate mass is minimized. obtained 140 Mpa with a short treatment period. graded seeds are pre-packaged & vibrated. Tend to be brittle & it is reported that dispersion of fibre reinforcement would improve the toughness & tensile strength of material. 33. Partially impregnated & concrete coating surface:- significantly in the strength of the original concrete. polymerization can be done by thermal catalytic method. of monomer penetration depends on the structure of hardened and dried concrete, the duration of wetting & viscosity of the monomer. excellent penetration can be achieved by pondering the monomer on the concrete surface. 34. Pic properties:- Tensile strength:- Concrete impregnated with 3.9 times the control sample is observed using Polymerization process. Flexural strength: - PIC with polymer loading of 5.6% MMA shows flexural strength of 18.8 Mpa compared to 5.2Mpa of control sample. 35- Strain-stress relationship:- Pressure strength: - has linear stress-strain relationship with failure. very little exit from the linear to 90% of the final power. is not a sudden change in proportion. use MMA as monomer & with polymer loading of 6.4% ,144 Mpa strength is obtained using radiation technique & 130 Mpa using thermal catalytic process. higher strengths are obtained with samples impregnated with MMA than polyester styrene. 36. Creep:- Shrinking:- after conventional initial movement during load application ,This concrete is expanded under stable compression. of creep is generally stabilized after 2 to 3 months. occurs through two steps called primary drying & polymerization. times greater than shrinking natural drying. shrinking for higher modulus is less stretching. 37. Water absorption: - Efficient cooperation of thermal expansion:- A maximum reduction of 95% in water absorption with concrete containing 5.9% polymer loading has been observed. pic is also more efficient than thermal expansion than conventional concrete. polymerized radiation has the thermal expansion efficiency of 5*6*10-6 and styrene-impregnated samples have shown a value of 5*10*10-38. Wear resistance:- Wear & skid resistance:- pic show an appreciated improvement in wear resistance. 5.5% of MMA-impregnated concrete was found to be 50 to 80% more resistant than the abrasion control sample. in the actual abrasion track test ,treated surfaces show excellent braking resistance to non-simple surfaces. abrasion after 50,000 simulated Wicholar passes was less than 0.025 cm 39. Fracture of PIC:- Impregnation improves the strength of mortar matrix & also the strength of paste-aggregate interface by elimination of cracks. the fragile nature of pic offers severe design constraints. the pic fracture mode can be changed by incorporating a small amount of fibers into the matrix. fibers serve to inhibit the release of cracks through mortar by acting as crack arresters. 40. Pic application:- Prefabricated structural elements:- Pre-stress concrete:- is used to solve urban housing storage problems, maintain quality, economy and speed ;p of construction techniques. can be used in building high rise due to easy handling and erections. PIC provides high pressure strength of 100-140 Mpa ,therefore useful for larger openings and heavier loads. creep down the PIC it prestressed good material for concrete. 41. Marine works:- Desalination plants:- PIC has high surface hardness ,very low permeability & greatly increased To attack chemically, the material is suitable for marine traces. the materials used in the manufacture of flash facilitating vessels in desalination of water should withstand the corrosive effects of facilitated water, brine and steam at temperature. Of the 143 C. can be seen that there is a cost saving over conventional concrete using pic. 42. Nuclear power plants:- Wastewater disposal works:- nuclear container ships needed to withstand high temp. & Provide shields against radiation. is used with high traming capability, durability and power as a result. sewage systems are deteriorating due to attacks on sewage. in sludge digestion tanks are attacked by corrosive gases. is suitable for such tasks due to its high phosphate and acid resistance. 43. Water proof structures:- Industrial applications:- Seepage and water leakage through the bath slab have not been completely overcome by conventional methods of water proofing. use of polymer-impregnated mortar provides better water proof, concrete has been used for foaming in tanneries.Chemical plants,dairy farms and in similar conditions to withstand chemical attack ,but performance is not satisfactory. PIC provides a permanent solution for durable flooring in such situations. 44. Impregnation of ferro cement products:- Ferro cement construction techniques are widely used in boat construction, fishing trawls, internal water tanks, grain storage tanks, cove manholes, etc. ferro cement products are generally thin & as responsible for corrode. application of polymer impregnated techniques should improve the performance efficiency of ferro cement products. 45. Thank you