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Comparative Study on Fiber Rein Forced Concrete Using Various Fibers Form 60 Grade Concrete

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ABSTRACT
Inconventionalconcrete,micro-cracksdevelopbeforestructureisloadedbecauseofdryingshrinkageandothercausesofvolumechange.Whenthestructureisloaded,themicrocracksopenupandpropagatebecauseofdevelopmentofsuchmicro-cracks,resultsininelasticdeformationinconcrete.Fiberreinforcedconcrete(FRC)iscementingconcretereinforcedmixturewithmoreorlessrandomlydistributedsmallfiber.IntheFRC,numbersofsmallfibersaredispersedanddistributedrandomlyintheconcreteatthetimeofmixing,andthusimproveconcretepropertiesinalldirections. Thefibershelptotransferloadtotheinternalmicrocracks.Steelfiberscanimprovethestructuralstrengthtoreduceintheheavysteelreinforcementrequirement.Theadditionofthesefibersintoconcretecandramaticallyincreasethecompressivestrength,tensilestrengthandsplittensilestrengthoftheconcrete.Inthisstudy,testshavedonefortheconcretewithglassfiberof5%,10%and15%ofcementbyaddingasanadmixture.

Keywords: FiberReinforcedConcrete;Cocopit;GlassFiber;PolymerFiber;AspectRatio;MechanicalandStructuralProperties

I. INTRODUCTION

ConcreteIsACompositeMaterialConsistOfMainlyWater,Aggregate,AndCement.ThePhysicalPropertiesDesiredForTheFinishedMaterialCanBeAttainedByAddingAdditivesAndReinforcementsToTheConcreteMixture.ASolidMassThatCanBeEasilyMouldedIntoDesiredShapeCanBeFormedByMixingTheseIngredientsInCertainProportions.OverTheTime,AHardMatrixFormedByCementBindsTheRestOfTheIngredientsTogetherIntoASingleHard(Rigid)DurableMaterialWithManyUsesSuchAsBuildings,PavementsEtc., The Technology Of Using ConcreteWasAdoptedEarlierOnLarge-ScaleByTheAncientRomans,AndTheMajorPartOfConcreteTechnologyWasHighlyUsedInTheRomanEmpire.TheColiseumInRomeWasBuiltLargelyOfConcreteAndTheDomeOfThePantheonIsTheWorld'sLargestUnreinforcedConcreteStructure.AfterTheCollapseOfRomanEmpireInTheMid-18thCentury,TheTechnologyWasRepoweredAsTheUsageOfConcreteHasBecomeRare.Today,TheWidelyUsedManMadeMaterialIsConcreteInTermsOfTonnage.

II. METHODOLGY

ToStudyTheStrengthCharacteristicsOfConcreteWithTheFibersLikeCocoPitAndGlassFibresWithVaryingPercentagesOfMixAndFirstDesignMixDoneForM60Concrete.CollectAllMaterialsAndTestsShouldBeConductedForMaterialsToVerifyThePropertiesWithRespectToTheRespectiveIsCode.ThenByDoingWeightBatchingCastTheCubesOfSize150mm*150mm*150mmAndCylindersOfSize300mmDepth,150mmDiameter,

After 24 Hours Remoulding The CubesThen It Is Allowed For Curing In Water At7days,14days, And 28days.Then Conduct Tests On Cubes At 7days,14 Days, And28days And Compared The Normal Concrete With Fibers Concrete. Estimates TheCost Concrete And Compare Both Select The Which One Is The Cost EffectivenessAndEconomically.

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III. MATERIALSUSED

TheDifferentTypesOfMaterialsUsedInThisInvestigationGiveBelow.

Cement:ordinaryPortlandcement53gradecementsconformingtoIS:1691989.theresultoftestsincludedoncementareasfallow.

TABLE3.1.ResultsOfCement

Si.no	Property	RequiredasperIS 1489-1	VALUE
1.	Fineness	<10%	7%
2.	Specificgravity	3.1-3.16	3.16
3.	Initialsettingtime	30MINS	32MINS
4.	Finalsettingtime	<600MINS	500MINS

FINEAGGREGATE:Thesandobtainedfrom Saradhariverneararanakapalleisusedasfineaggregateinthisprojectinvestigation..Thesandused inthisconfirmationtozone-1accordingtoBiS.Sandwhichpassedon4.75mmsieve&retainedon150micronssieveareused.

GlassFiber

Glassfiberisamaterialconsistingofnumerousextremelyfinefibersofglass.

Glassmakersthroughouthistory have experimentedwithglassfibers,but massmanufactureofglassfiberwasonlymadepossiblewiththeinventionoffinermachinetooling.In1893,EdwardDrummondLibberexhibited adressattheWorld'sColumbianExpositionincorporatingglassfiberswiththediameterandtextureofsilkfibers.Glassfiberscanalsooccurnaturally,asPele'shair.

Glasswool,whichisoneproductcalled"fiberglass"today,wasinventedsometimesbetween1932to1933byGamesSlayterofOwens-Illinois,asamaterialtobeusedasthermalbuildinginsulation.Itismarketedunderthetradename Fiberglas,whichhasbecomeagenericizedtrademark.Glassfiberwhenusedasathermalinsulatingmaterialisspeciallymanufacturedwithabondingagenttotrapmanysmallaircells,resultingin thecharacteristicallyair-filledlow-density"glasswool"familyofproducts. Glassfiberhasroughlycomparablemechanical propertiestootherfiberssuchaspolymersandcarbonfiber.Althoughnotasrigidascarbonfiber,it ismuchcheaperandsignificantlylessbrittlewhenusedincomposites.Glassfiberreinforcedcompositesareusedinmarineindustryandpipingindustriesbecauseofgoodenvironmentalresistance,betterdamagetoleranceforimpactloading,highspecificstrengthandstiffness.

Picture:Glassfiber

COCOPIT

Coconutfiberorcoirisaproductwhichi sextractedfromtheoutershellofthecoconutfruit.Itisusedinavarietyofwaysworldwide,beingespeciallypopularforropeandmatting,andthere areanumberofsourcesfor coir and coir products.

Bothorganicandconventionallyproducedversionsareavailable,andsomefirmsspecializeincoirwhichhasbeenharvestedsustainablybywork

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erswhoarepaidafairwagefortheirlabor. Therearetwodifferenttypesofcoconutfiber:whitecoirandbrowncoir.Whitefibercomesfromyoungcoconuts,whilebrownfibercomesfrommoorematurespecimens.Inmaturecoconuts,alayerofligninhasbeendepositedinthecellulosewall softhefiber,causingittodarkeninappearance.Onceextractedfromthecoconut,thefibercanbespunormatted.Itcanalsobebleachedordyed,althoughsomeproducersprefertoleavethefiberasitisforamorenaturallook.

Picture:COCOPIT

IV. RESULTANDOBSERVATIONS

CompressiveStrengthOfCube

Thecubespecimensweretestedoncompressionmachineofcapacityof1800KN.themachinewascleanedandthespecimenwasplacedinsuchamanneritwasgivenloadonoppositesidesequally.Alltheconcretespecimensweretestedina1800KNcapacitycompressiontestingmachine.Concretecubeofsize150mm×150mm×150mmisplacedonthecompressivetestingmachineandgripfirmlybetweentopandbottomplates. Applytheloadattherateof140kg/sq.cm/minutetillthespecimenfailed.Notedowntheultimateloadatthefailureofspecimen,whentheloadisapplied.dividetheultimateloadbytheareaofspecimen,thencompressivestrengthhasbeencalculated.

Picture:CompressionTestingMachineWithCubeSpecimen.

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Compressivestrengthobservationsofconventionalconcrete,5%ofGlassfiber5%ofCocopit

s.no	AgeofSpecimen	Conventionalconcrete(N/mm2)	5%Glassfiber(N/mm2)	5%ofCocopit(N/mm2)
1	7days	44.54	47.69	46.12
2	14days	61.74	63.13	62.25
3	28days	67.04	71.91	71.15

Compressivestrengthobservationsofconventionalconcrete,10%ofGlassfiber10%ofCocopit

s.no	AgeofSpecimen	Conventionalconcrete(N/mm2)	10%Glassfiber(N/mm2)	10%ofCocopit(N/mm2)
1	7days	44.54	48.21	47.24
2	14days	61.74	69.24	63.09
3	28days	67.04	75.20	73.03

Compressivestrengthobservationsofconventionalconcrete,15%ofGlassfiber15%ofCocopit

s.no	AgeofSpecimen	Conventionalconcrete(N/mm2)	15%Glassfiber(N/mm2)	15%ofCocopit(N/mm2)
1	7days	44.54	46.63	46.16
2	14days	61.74	67.68	60.18
3	28days	67.04	71.23	70.38

V. CONCULUSION

Basedonexperimentalinvestigationadditionof GlassFiberinplainconcreteincreasesthestrengthanddurabilitycharacteristics10%of glassfiberreachesthestrengthat28daysof75.11 N/mm^2isobtained.Experimentalinvestigation wasdonetoevaluatethedurabilitypropertiesofc oncretereinforcedwithcocopitfiber.Thestreng thpropertyofcocopitFRCismorethanthatofpla inconcrete.10%ofCocopitreachesthestrength at28daysof73.03N/mm^2isobtained.Ithasbeen observedthattheworkabilityofconcreteincreas esatwiththeadditionofglassfibre.

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