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RESEARCH ARTICLE

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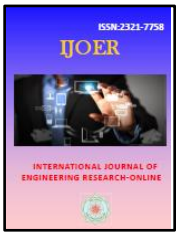
STRENGTH & SORPITIVITY GEO CHEMICAL COMPOUND

P. ANJALI[1], G.GANESH NAIDU[2]

[1]M.Tech student, IV semester, PACE Institute of technology and sciences, Ongole
[2]HOD(Ph.D,), Assistant Professor, Department of Civil Engineering, PACE Institute of Technology and sciences, Ongole



ABSTRACT

Reducing the greenhouse gas emissions is the need of the hour. Five to eight percent of the world's manmade greenhouse gas emissions are from the Cement industry itself. It is an established fact that the green house gas emissions are reduced by 80% in Geopolymer concrete vis-a-vis the conventional Portland cement manufacturing, as it does not involve carbonate burns etc. Thus Geopolymer based Concrete is highly environment friendly and the same time it can be made a high-performance concrete. In the present study, fly ash, blast furnace slag and catalytic liquids have been used to prepare Geopolymer concrete mixes. This study is continued to investigate the behaviour of such Geopolymer concrete under high temperatures. Cubes of size 15cm×15cm×15cm are tested for their residual compressive strengths after subjecting them to these high temperatures. The impact of accelerated corrosion on geopolymer concrete was conjointly studied and therefore the results were compared with management concrete

Keywords: Geopolymer concrete, fly ash, compressive strength, management concrete, water absorption, sorptivity

I. INTRODUCTION

The name geopolymer was fashioned by a French academician Davidovits in 1978 to represent a broad vary of materials characterised by networks of inorganic molecules (Geopolymer Institute 2010)1, 2 & 3. The geopolymer rely upon thermally activated natural materials like Meta mineral or industrial By Products like ash or dross to supply a supply of semi conducting material (Si) and Al (Al). This semi conducting material Associate in Nursing metallic element is dissolved in an alkali activating answer and afterward polymerizes into molecular chains and become the binder. Professor B. Vijaya Rangan (2008), Curtin University, Australia, declared that, "the polymerisation chemical change chemical action} process involves a well quick chemical change below alkali conditions on silicon-aluminium minerals that leads to a three-dimensional chemical compound chain and ring structure…." for the final word structure of the geopolymer depends for the most part on the quantitative relation of Si to Al (Si:Al), with the materials most frequently thought of to be used in transportation infrastructure generally having Associate in Nursing Si:Al between two and three.5 5 &6 . The reaction of ash with Associate in nursing solution containing caustic soda and water glass in their mass quantitative relation, leads to a fabric with 3 dimensional chemical compound chain and ring structure consisting of Si-O-Al-O bonds7. Water isn't concerned within the chemical change of Geopolymer concrete and instead water is expelled throughout solidification and succeeding drying. this can be in distinction to the association reactions that occur once Portland cement is mixed with water, that turn out the first association merchandise Ca salt hydrate and

hydroxide. This distinction contains a important impact on the mechanical and chemical properties of the ensuing geopolymer concrete, and conjointly renders it additional proof against heat, water ingress, alkali–aggregate reactivity, and alternative sorts of chemical attack 3&5. In the case of geopolymers made of ash, the role of Ca in these systems is incredibly vital, as a result of its presence may result in flash setting and so should be rigorously controlled five. The supply material is mixed with Associate in Nursing activating answer that gives the pH (sodium hydroxide or potash square measure usually used) required to liberate the Si and Al and presumably with a further supply of silicon oxide (sodium salt is most ordinarily used).

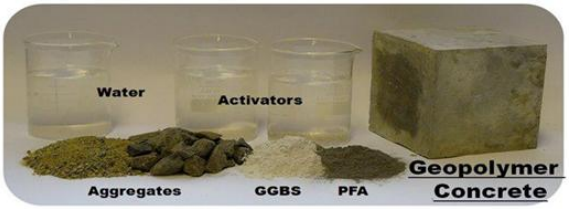


Figure 1: shows the Geopolymer Concrete

The temperature throughout solidification is incredibly vital, and relying upon the source and activating answer, heat usually should be applied to facilitate chemical process, though some systems are developed that square measure designed to be cured at temperature 2&3. The necessity of Geopolymer Concrete, the Constituents, Properties, Applications and Limitations square measure mentioned very well during this paper. Construction is one in all the quick growing fields worldwide. As per the current world statistics, each year around 260,00,00,000 loads of Cement is needed. This amount are exaggerated by twenty fifth inside a span of another ten years. Since the Lime stone is that the main supply material for the normal Portland cement Associate in Nursing acute shortage of stone could return once twenty five to fifty years. additional over whereas manufacturing one ton of cement, just about one ton of carbon did compound are emitted to the atmosphere, that could be a major threat for the surroundings. additionally to the higher than vast amount of energy is additionally needed for the assembly of cement. thus it's most essential to search out another binders

2.MATERIALS OF GEOPOLYMER CONCRETE

2.1Fly Ash

The fly ash used in the production of geopolymer concrete at Curtin University is Class F fly ash sourced from the coal fired power station approximately 200 km south of Perth, Western Australia. The results of X-ray fluorescence testing (XRF) are shown in Table 1 for the fly ash used in the research program. The class F fly ash is characterized by high silicon and aluminium contents and low calcium content, and a loss on ignition of 0.46.

2.2 Alkaline solutions

Sodium primarily based alkali solutions were wont to react with the ash to supply the binder. Sodium-silicate answer sort A53 was used for the concrete production. The chemical composition caustic soda answer was ready by dissolving caustic soda pellets in water. The pellets square measure business grade with ninety seven purity therefore fourteen molar solutions were created by dissolving 404 grams of caustic soda pellets in 596 g of water. The caustic soda answer was ready one to 2 days before the concrete batching to permit the exothermically heated liquid to chill to temperature. The water glass answer and also the caustic soda answer were mixed simply before the concrete batching. this can be a special method thereto that had been used antecedent at Curtin University wherever the 2 alkali solutions were mixed twenty four hour before casting.

Cement kind	Class	Strength min./max in MPa after days				Addition, %
		2	3	7	28	
Portland	I		12.4	19.3	27.6[a]	0
	IA (with air entraining agent)		10.0	15.5	22.1[a]	0
	II } (with moderate heat of hydration)		10.3	17.2	27.6[a]	0
	IIA } (with moderate heat of hydration)		6.9	11.7	22.1[b]	0
			8.3	13.8	22.1[a]	0
			5.5[b]	9.3[b]	17.7[a, b]	0
	III } (with high early strength)	12.4[c]	24.1			0
	IIIA } (with high early strength)	10.0[c]	19.3			0
	IV (with low heat of hydration)			6.9	17.2	0
	V (high sulphate resistance)		8.3	15.2	20.7	0
Portland with slag addition[d]	J (SM)		12.4	19.3	24.1	25
Portland with pozzolana addition[d]	J (PM)A[e]		9.9	15.5	19.3	15
Pozzolanic	JP or P			10.3	20.7	15–40
Metallurgical	JS		8.3	13.8	19.3	25–65
Slag	S			4.1	10.3	70

[a] On special demand.
[b] Lower strength concerns cement with imposed heat of hydration or limited value of $C_3S + C_3A$.
[c] After one day of hardening.
[d] Clinker can be replaced by Portland cement, all kinds of cement with additions can be also produced in subclass with air entraining agent, additionally the variety: resistant to sulphates and limited heat of hydration can also be produced.
[e] Additionally the strength of cement with air entraining agent, but without mineral addition is as for J(SM). Clinker can be replaced by Portland or slag cement.

2.3 Aggregates

Coarse aggregates with nominal sizes of 7mm, 10mm and 20mm granite and dolerite, were sourced from 2 native quarries. The aggregates had a particle density of two.6 tonnes/cubic metre for the granite and a couple of.63 tonnes/cubic metre

for the dolerite. The dolerite mixture was employed in one series of trial mixtures to assess the impact of mixture sort on workability and strength gain of the geopolymer concrete. Fine sand was sourced from an area provider. The sand contains a low clay content (less than 4%)and fineness modulus of one.99.Previous geopolymer analysis had been performed with aggregates being ready to surface saturated dry (SSD) condition, a state of mixture saturation during which the mixture won't absorb to any extent further wet however no surface water is gift (Australian Standards AS 1141.5-2000 and AS 1141.6-2000). In geopolymer concrete the requirement for SSD was because of eliminate the absorption of the alkalic answer by the aggregates therefore reducing the chemical process of the ash. Conversely the presence of excessive water could compromise the compressive strength of the geopolymer concrete. The preparation of mixture to surface saturated dry condition is achieved by soaking the mixture in water for 24hours, draining, and air drying on trays to get rid of surface wet. Preparation of serious quantities of mixture is time overwhelming (4 to seven days) and inconsistent with business production techniques. the particular wet content of aggregates ready to SSD condition was tested with the read to substitution SSD aggregates with aggregates sourced from stock piles with variable wet contents. The results of wet content determination on aggregates ready to surface saturated dry condition. the overall amount of free water was adjusted within the mixture by the addition or reduction of further water to the mixture; in winter once the mixture stockpiles were generally saturated, the aggregates were left to dry within the laboratory for up to a few days before casting. this method was used for many of the mixtures delineated during this paper, unless otherwise noted.

3. GEOPOLYMER CONCRETE PROPERTIES

3.1 Fresh concrete tests

The slump take a look at was wont to assess workability of the geopolymer mixtures as delineated in AS1012.3-1988. additionally, some mixtures were assessed victimisation the compacting issue take a look at AS 1012.3-1988.

3.2 Hardened Concrete Properties

Hardened properties of the geopolymer concrete that were assessed were the compressive strength victimisation one hundred millimetre diameter by two hundred millimetre high cylinders in line with AS 1012.9-1999, and indirect enduringness victimisation one hundred fifty millimetre diameter by three hundred millimetre cylinders for the Brazilian or cacophonous tensile take a look at in line with AS 1012.10-2000.

3.3 Aggregate Tests

Tests were performed on a number of the aggregates. These were the mixture crushing worth AS1141.21-1997, flakiness index AS 1141.5 – 1999, particle size distribution and wet content. The results of the mixture testing square measure given in Table.

3.4 Curing Regime

Thermocouples were placed in 3 completely different sized samples throughout one in all the geopolymer concrete trials to live the particular temperatures reached within the concrete samples; little compression cylinder, an outsized tension cylinder and a compaction beam; a little beam 350 millimetre long by 85mm sq.. Thermocouples to regulate the steam were situated two hundred millimetre higher than the room floor with within the b steam tent in line with earlier analysis (6,7,9,12). The steam solidification regime was notionally eighty co for twenty-four hours. Figure one shows the results of the Nicolet knowledge feller readings taken at 10second intervals in these samples over the solidification amount. The close temperature within the concrete laboratory was recorded as an impact, indicating temperatures outside the room were concerning seventeen to 20°C. The thermocouple junction readings within the compression, tensile and compaction beam samples within the steam tent were around fifty to 70°C. The variations in temperature correspond to the to the boiler system cutting in and bent on come through an approximately constant temperature within the steam tent of 80°C. At although the steam tent thermocouple junction was set at 80°C, the common temperature within the samples was solely around 60°C. this can be constant because the minimum room temperature found to be optimum

for steam solidification of geopolymer concrete (6,12).

3.5 result of respite

Three mixtures of geopolymer concrete victimisation the mixture proportions shown in Table we reproduced to look at the impact of delayed steam solidification (rest period) on the strength gain of the geopolymer concrete. The trial mixtures had seventy fifth mixture by mass consisting of twenty millimetre and seven millimetre coarse mixture and fine sand, and ranging quantities of further water as shown in Table four. All mixtures were cured at eighty co {for twenty four for twenty-four} hours with or while not a 24 hour delay or day of rest before solidification. The compressive strength knowledge at twenty eight days is shown in Figure two. It may be seen that the in collusion of a twenty four hour amount before solidification, or day of rest, exaggerated the compressive strength of all the mixtures. The compressive strength for Mixture one with no day of rest was 37.5 Map, whereas one day of rest exaggerated this worth to 46.4MPa. Mixtures two and three achieved compressive strengths of 55.8 MP and 63.1MPa with one day of rest.

3.6 Effect of mixture on Workability and Strength

Four trial mixtures were wont to assess the influence of the proportion of fines on the plastic and hardened properties of the geopolymer concrete. The mixtures used a most mixture size of either10 millimetre granite or twenty millimetre dolerite, the essential mixture was derived from the nominal forty MPa mixture shown in Table 3; all mixtures were cured at sixty oC for twenty-four hours. Comparison of the 3 mixtures forged with granite with a most mixture size of ten millimetre found that the decrease in fines from thirty fifth to twenty seventh of the overall mixture mass resulted in a rise of slump of lower than ten and a rise within the compaction issue of lower than five-hitter (from zero.93 to 0.97). No segregation of the mixture was evident with the low fines proportion but there was a discount within the compressive strength. The impact of the angularity of the mixture on workability was assessed by examination four trial mixtures. The mixtures displayed increasing slump and compaction issue with ablated seven millimetre angular mixture content, just like the behaviour of contemporary Portland cement concrete. Density the geopolymer mixtures with completely different mixture sorts and grading were wont to assess density at twenty eight days for mixtures that were cured for twenty-four hours at 60o C. The density of the geopolymer concrete was 2360 ±60 kg/m3.

3.7 Strength Gain with Age

For thirteen geopolymer mixtures, knowledge was obtained on compressive strength gain with age by testing compressive strength at ages of one day, 3 days, 7 days, fourteen days and twenty eight days for mixtures that were cured for twenty-four hours at 60oC (in one instance for thirty six hours). Compressive strength values at twenty eight days aranged from twenty MPa to fifty MPa. a spread of mixture sorts and grading were used. The mixtures were supported the mixture proportions of Table three. The quantitative relation of compressive strength at completely different ages to the compressive strength at twenty eight days was

3.7.1 Tensile – Compressive Strength Relationship

From the information bank of compressive, tensile and modulus tests from 2007-2008 a complete for 41 values for compressive strength and enduringness were obtained. Compressive strength values ranged from nineteen MPa to sixty three MPa. a spread of mixture sorts and grading were used. The mixtures were supported the mixture proportions of Table solidification regimes varied with no day of rest or one day of rest and temperature was 60^{o}C or 80^{o}C within the room

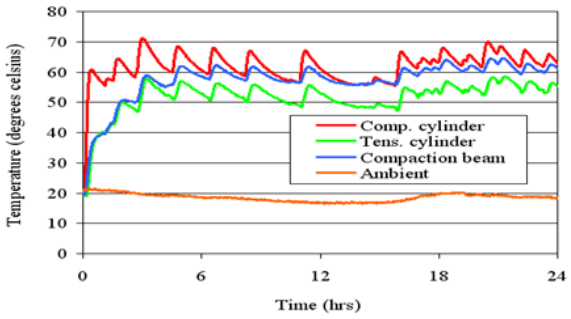
3.7.2 Geopolymer property chance

Coal is usually employed in the generation of a significant proportion of the ability not solely in Australia however conjointly in several alternative components of the globe cherish Asian country, China, and also the USA. the massive reserves of excellent quality coal accessible worldwide and also the low value of power made from these resources cannot be unheeded. Coal-burning power stations generate vast volumes of ash; most of the fly ash isn't effectively used. because they would like for power will increase, the amount of ash would increase. in addition, concrete usage round the globe is on the rise to fulfil infrastructure

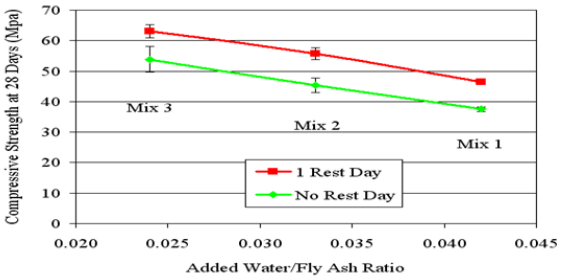
developments. A crucial ingredient within the standard concrete is that the Portland cement. the assembly of 1 ton of cement emits just about one ton of greenhouse emission to the atmosphere. Moreover, cement production isn't solely extremely energy-intensive, next to steel and metallic element, however also consumes important quantity of natural resources. For property development, the concrete trade must explore various binders to Portland cement. Such another is obtainable by the fly ash-based geopolymer concrete, as this concrete uses no Portland cement; instead, utilises the ash from coal-burning power stations to form the binder necessary to manufacture concrete. the employment of fly ash-based Geopolymer Concrete contributes to the potential for reduced heating. A recent life cycle assessment of geopolymer concretes indicates that the worldwide warming potential (GWP) of geopolymer concretes is between twenty six and forty fifth lower compared to normal Portland cement concrete but, once alternative ecological impact factors square measure thought of, geopolymer concrete doesn't rate as favourably as Portland cement concrete. this can be for the most part ascribed to the water glass and caustic soda production The impact of every depends upon the process used. the employment of alkalic solutions type waste streams of alternative processes, cherish metallic element process, could offer potential reduction within the environmental impact of geopolymer concrete.

3.7.3 Geopolymer Economic chance

Heat-cured low-calcium fly ash-based geopolymer concrete offers many economic edges over Portland cement concrete. the value of 1 ton of ash is barely a little fraction of the value of 1 ton of Portland cement. Therefore, once allowing the value of alkali liquids required to the build the geopolymer concrete, the value of fly ash-based geopolymer concrete is calculable to be concerning ten to 30percent cheaper than that of Portland cement concrete. Additionally, the acceptable usage of 1 ton of ash earns just about one carbon-credit that contains a important redemption worth. One ton low-calcium ash may be used to manufacture just about 3 cuboids meters of top quality fly ash-based geopolymer concrete, and thus earn financial edges through carbon-credit trade. more additional, the little drying shrinkage, the low creep, the wonderful resistance to salt attack, and sensible acid resistance offered by the heat-cured low-calcium fly ash-based geopolymer concrete could yield extra economic edges once it's used in infrastructure applications.



Graph 1:Shows the Heat curve



Graph 2:Shows the compressive strength

4. GEOPOLYMER FORMED CONCRETE MERCHANDISE

High-early strength gain could be a characteristic of geopolymer concrete once dry-heat or steam cured, though close temperature solidification is feasible for geopolymer concrete. it's been wont to turn out formed railway sleepers, sewer pipes, and alternative prestressed concrete building parts. The early-age strength gain could be a characteristic that may best be exploited within the formed trade wherever steam solidification or heated bed solidification is common observe and is employed to maximise the speed of production of parts. Recently, geopolymer concrete has been tried within the production of formed box culverts with eminent production in an exceedingly business formed yard with steam solidification [Siddiqui, 2007; Cheema et al, 2009]. Geopolymer concrete has wonderful resistance to chemical attack and shows promise within the use of aggressive environments wherever the sturdiness of Portland cement concrete is also of concern. this can be significantly applicable in aggressive marine environments, environments with high greenhouse emission or salt made soils. equally in extremely

acidic conditions, geopolymer concrete has shown to own superior acid resistance and will be appropriate for applications cherish mining, After casting, the cylinders were coated with plastic luggage and placed below the drainpipe moulds. A plastic cowl was placed over the drainpipe mould and also the steam tube was inserted within the quilt. The culverts and also the cylinders were steam-cured for twenty-four hours. Initially, the specimens were steam-cured for concerning four hours; the strength at that stage was adequate for the specimens to be free from the moulds. The culverts and also the remaining cylinders were steam-cured for an additional twenty hours. The operation of the formed plant was such the twenty hours of steam-curing has got to be split into 2 components. That is, the steam-curing was clean up at eleven p.m. and restarted at half-dozen a.m. next day. In all, the overall time taken for steam-curing was twenty four hours.

Figure 2:shows the steaming of cylinders

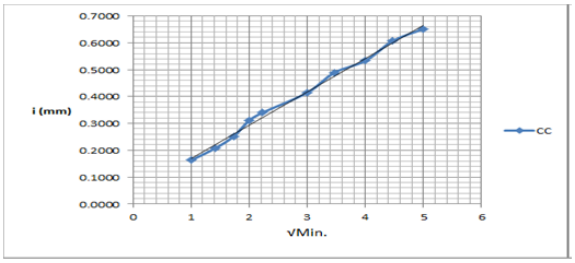
Figure 3:shows the concrete culvert

4.1 CONTRIBUTIONS OF GEOPOLYMER CONCRETE TOWARDS SUSTAINABLE DEVELOPMENT

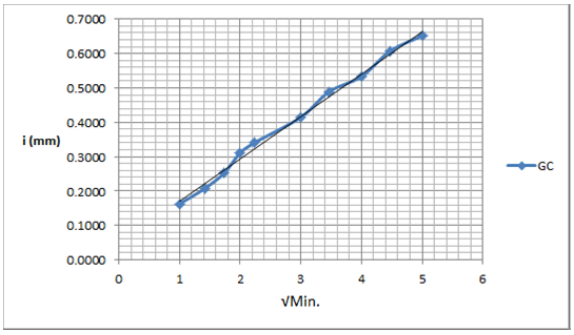
Coal is usually employed in the generation of a significant proportion of the ability not solely in in several components of the globe cherish Asian country, China, Australia, and also the USA. the massive reserves of excellent quality coal accessible worldwide and also the low value of power made from these resources can not be unheeded. Coal-burning power stations generate vast volumes of ash; most of the fly ash isn't effectively used. because the would like for power will increase, the amount of ash would increase if we tend to still for the most part deem coal-fired power generation. On the opposite hand, concrete usage round the globe is on the rise to fulfill infrastructure developments. a crucial ingredient within the standard concrete is that the Portland cement. the assembly of 1 ton of cement emits just about one ton of greenhouse emission to the atmosphere. Moreover, cement production isn't solely extremely energy-intensive, next to steel and metallic element, however conjointly consumes important quantity of natural resources.

4.2 ECONOMIC EDGES OF GEOPOLYMER CONCRETE

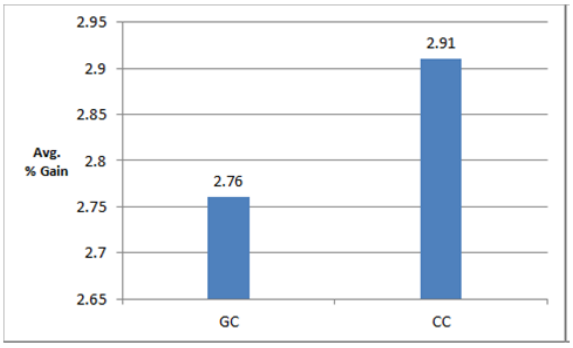
Heat-cured low-calcium fly ash-based geopolymer concrete offers many economic edges over Portland cement concrete. the value of 1 ton of ash is barely a little fraction of the value of 1 ton of Portland cement. Therefore, once allowing the value of alkali liquids required to the build the geopolymer concrete, the value of fly ash-based geopolymer concrete is calculable to be concerning ten to thirty % cheaper than that of Portland cement concrete. additionally, the acceptable usage of 1 ton of ash earns just about one carbon-credit that contains a important redemption worth. One ton low-calcium ash may be used to manufacture just about 3 cuboid meters of top quality fly ash-based geopolymer concrete, and thus earn financial edges through carbon-credit trade. What is more, the little drying shrinkage, the low creep, the wonderful resistance to sulphate attack, and sensible acid resistance offered by the heat-cured low-calcium fly ash-based geopolymer concrete could yield extra economic edges once it's used in infrastructure applications



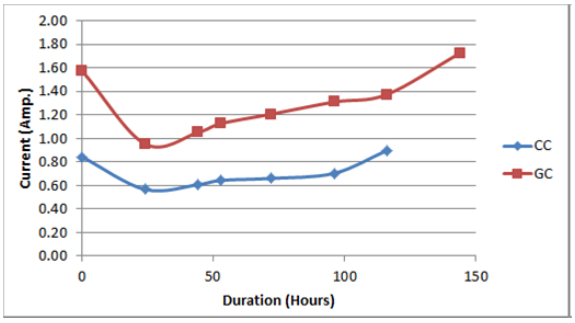
Graph 3:Economic Edges Of Concrete



Graph 4:Economic Edges Of Geopolymer Concrete



Graph 5: Water Absorption of Concrete



Graph 6:showing Pulse rate Readings for Accelerated Corrosion

Table 1: Properties of class F fly ash

Sr.No.	Particulars	Unit	Specification	DIRK POZZOCRETE60
			(IS:3812-1981)[24]	(Fly ash)
1	Color	-	-	Light gray
2	Specific surface area (blaine)	*m*2/kg	320	340
3	Lime reactivity	N/*mm*2	4.5	5.48
4	Loss on ignition(max)	%	5	1.6
5	SiO_2+Al_2O_3+Fe_2O_3	%	70 min. by mass	92.49
6	SiO_2	%	35 min. by mass	57.3
7	MgO	%	5 max. by mass	2.13
8	SO_3	%	3 max. by mass	1.06
9	Na_2O	%	1.5 max. by mass	0.73
10	Total Chlorides	%	0.05 max. by mass	0.029

Table 2: Sieve analysis of fine aggregate

Fine Aggreg				
Sieve Size	Mass retained(gm)	Cumulative mass retain(gm)	Cumulative mass retain(%)	Cumulative Mass passing(%)
4.75mm	0	0	0	100
2.36mm	135	135	15.00	91
1.18mm	24	154	17.9	87.1
600m	91	239	26.5	78.5
300m	512	746	77.3	28.7
150m	184	925	95.3	9.7
Below 150m	69	999	110.7	0
		Total	319.7	
Fineness Modulus=323.7/100=3.23 and Zone III				

5. RESULTS AND DISSCUSIONS

5.1 Sorptivity

Sorptivity property of each form of concrete has been study by acting the at one, 2, 3, 4, 5, 9, 12, 16, twenty and twenty five minutes quantity and alter in weight of the specimen once every interval. The Table four and Table five show the readings and calculations for every interval for management concrete and geopolymer concrete severally. The Sorptivity curve was found to be less lineardurability property of concrete, was found less in compared thereto of management concrete. the speed of geopolymer concrete than the management concrete. absorption, that has significant effect on sturdiness property of concrete, was found less in geopolymer concrete than the management concrete.

5.2 Water Absorption

Water absorption characteristics of the concrete plays a crucial role for the sturdiness of the structure. Ingress of water detoriates concrete and in concrete structure, corrosion of the bars befell which ends it no cracking and spalling of the concrete and ultimately scale back the generation of the structure. take a look at re RESULTS: the bars befell which ends it no cracking and spalling of the concrete and ultimately scale back the generation of the structure. take a look at results of water absorption take a look at square measure shown in Table half-dozen. The result indicates that the water absorption of geopolymer concrete is a smaller amount compared to regulate concrete. though the distinction another way of gain in weight is very less results of water absorption take a look at square measure shown in Table half-dozen. The result indicates that the water absorption of geopolymer concrete is a smaller amount compared to regulate concrete. though the distinction another way of gain in weight is very less.

Table 3: Sorptivity Readings and Calculations of Control Concrete

Time (Min.)	Weight (kg)	Gaining wt.(kg)	Cumulative gain inWt(kg)	Vol.of water(mm^3)	Surface area(mm^2)	i(mm)	Time ($min^{0.5}$)
0	8.403	0	0	0	22500	0	0
1	8.407	0.004	0.004	3666.667	22500	0.163	1
2	8.408	0.001	0.005	4666.667	22500	0.207	1.41
3	8.409	0.001	0.006	5666.667	22500	0.252	1.73
4	8.41	0.001	0.007	7000	22500	0.311	2
5	8.411	0.001	0.008	7666.667	22500	0.341	2.24
9	8.413	0.002	0.009	9333.333	22500	0.415	3

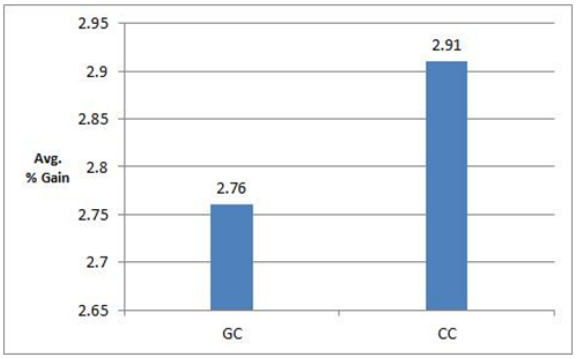
12	8.414	0.002	0.011	11000	22500	0.489	3.46
16	8.415	0.001	0.012	12000	22500	0.533	4
20	8.417	0.002	0.014	13666.667	22500	0.607	4.47
25	8.418	0.001	0.015	14666.667	22500	0.652	5
			Sorptivity=0.124mm/$min^{0.5}$				

Table 4: Sorptivity Readings and Calculations of Geopolymer Concrete

Time	Weight	Gaining	Cumulative gain	Vol.of	Surface	i(mm)	Time
(Min.)	(kg)	wt.(kg)	inWt(kg)	water(mm^3)	area(mm^2)		($min^{0.5}$)
0	8.403	0	0	0	22500	0	0
1	8.407	0.004	0.004	3666.667	22500	0.163	1
2	8.408	0.001	0.005	4666.667	22500	0.207	1.41
3	8.409	0.001	0.006	5666.667	22500	0.252	1.73
4	8.41	0.001	0.007	7000	22500	0.311	2
5	8.411	0.001	0.008	7666.667	22500	0.341	2.24
9	8.413	0.002	0.009	9333.333	22500	0.415	3
12	8.414	0.002	0.011	11000	22500	0.489	3.46
16	8.415	0.001	0.012	12000	22500	0.533	4
20	8.417	0.002	0.014	13666.667	22500	0.607	4.47
25	8.418	0.001	0.015	14666.667	22500	0.652	5
			Sorptivity=0.124mm/$min^{0.5}$				

Table 5: Water Absorption Test Results

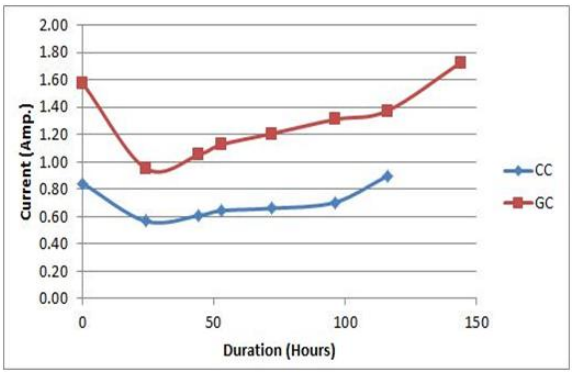
Type of Concrete	Notation	Initial Wt.(kg)	Oven Dry Wt.(kg)	Wt. after immersion	Gain %	Avg.gain%
GC	GC-1M	8.35	8.27	8.51	2.9	
	GC-2M	8.3	8.22	8.44	2.68	2.76
	GC-3M	8.25	8.17	8.39	2.69	
	CC-1M	8.6	8.47	8.68	2.48	
CC	CC-2M	8.59	8.46	8.69	2.72	2.91
	CC-3M	8.47	8.23	8.52	3.52	



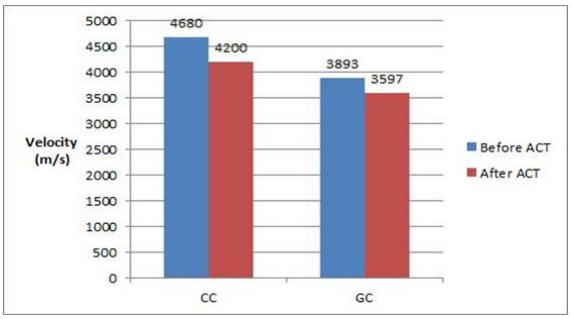
Graph 7: Water Absorption of Concrete

Table 6: Showing Current Readings

Unit	Current(Amp.)	
Specimen	CC	GC
Hours	-	-
0	0.84	1.58
24	0.57	0.95
44	0.61	1.05
53	0.64	1.13
72	0.66	1.21
96	0.7	1.31
116	0.9	1.37
144	-	1.73



Graph 8: Specimen Current Readings



Graph 9: Half Cell Potential Meter Readings for Accelerated Corrosion Test

6. CONCLUSION

The mix style of M25 geopolymer concrete was employed in the study. The results were compared thereto of management concrete. it had been found that The Sorptivity curve is a smaller amount linear as compared thereto of management concrete. which means the speed of absorption of geopolymer is a smaller amount. take a look at results of water absorption take a look at shows that the body of geopolymer concrete is a smaller amount as ash is ok than OPC and leads to to less water absorption than the management concrete. Accelerated Corrosion take a look at was conjointly performed on cylinders of one hundred fifty millimetre diameters and three hundred millimetre height with chrome steel bar and HYSD bar embedded in it. affected current technique was adopted with 30V constant power offer. Corrosion resistance was evaluated by modification in current, cell potential meter readings, UPV results and visual examination. The results showed that the corrosion prevalence in geopolymer concrete takes longer time than control concrete

REFERENCE

1. Anjan Chatterjee, K. Indian Fly Ashes: Their Characteristics and Potential for Mechanochemical Activation for increased Usability, Journal of Materials in applied science, Vol. 23, No. 6, pp.783-788, 2011.
2. Anuradha, R., Sreevidya, V., Venkatasubramani, R. and Rangan, B.V. changed pointers for geopolymer concrete combine style victimisation Indian commonplace, Asian Journal of applied science (Building and Housing) Vol. 13, No. 3, pp. 353-364, 2012.
3. Anurag Mishra, Deepika Choudhary, Namrata religion and Manish, result of concentration of alkalic liquid and solidification time on strength and water absorption of geopolymer concrete, ARPN Journal of Engineering and Applied Sciences,Vol. 3, No. 1, pp.14-18,2008.
4. AS 3972- Australian Standards for General purpose and emulsified Cement, 2010.
5. ASTM C150/C150M-11, commonplace Specification for Portland cement.
6. ASTM C-150-Standard specifications for Portland Cement: Annual Book of ASTM standards (Philadelphia).
7. ASTM C-494-Standard specifications for Chemical Admixtures for Concrete: Annual Book of ASTM standards (Philadelphia).
8. Bakharev, T. sturdiness of geopolymer materials in metal and sulfate solutions, Cement and Concrete analysis, Vol. 35, pp. 1233-1246, 2005.
9. Bakharev, T. Geopolymeric materials ready victimisation category F ash and elevated temperature solidification, Cement and Concrete analysis, Vol.35, pp.1224-1232, 2006.
10. Balaguru, P., Kurtz, S. and Rudolph, J. Geopolymer for Repair and Rehabilitation of concrete Beams, St Quentin, France, Geopolymer Institute, 1997.