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STUDY of MECHANICAL PROPERTIES of PERVIOUS CONCRETE USING RECRON-3S FIBRE

Apurva Suke[1], Dhanshree Wasnik[2], Neeraj Shetey[3], Pravin Sonwane[4], Raghav Songade[5], Varun Dhapodkar[6], Chetan Deshpande[7]

Student, Civil Engineering, St. Vincent Pallotti college of Engineering and Technology, Nagpur, India[1-6]

Project Guide, Head of Department, Civil Engineering, St. Vincent Pallotti college of Engineering and Technology, Nagpur, India[7]

Abstract: The large places covered with impermeable surfaces such as concrete and bitumen impart major impact on ground water table. In many developed nations, the utilization of pervious concrete for the development of vehicle parks and carports, is becoming popular. Moreover, pervious concrete has an important application for the sustainable construction. It is one of the many low impact development techniques and it has several environmental benefits as it allows surface runoff to infiltrate into the ground to replenish ground water. With the aim of development of material specification for pervious concrete, it is necessary to conduct tests to evaluate its performance of this new type of high-performance concrete. The pervious concrete is produced by using conventional cementitious materials, aggregates, and water. Laboratory tests were conducted for testing the performance of pervious concrete such as permeability tests, split tensile strength, density and compressive strength. The pervious concrete highly depends on its water permeability factor. In India, the rainfall intensity is less at some region and the evaporation losses are more. Therefore, the result of this investigational study provides a useful information about pervious concrete and its application as permeable pavement. Adding fibres into concrete mix enhances the properties of concrete. Short fibres manufactured from steel, glass and "synthetic" materials are used to enhance the cracking resistance of concrete. This is known as Fibre Reinforced Concrete Naturally happening vegetable fibres, including sisal and jute, also are used. Recron-3s fibre is a polypropylene fibre used in enhancing the tensile strength of concrete. Combination of polypropylene fibre and pervious concrete is a unique concept that we used in our project. Mix – concrete aggregate and concrete with variation in the Recron-3s fibre content. After investigation for varying percentage content of the fibres in the pervious concrete, with the increase in the fibre content, increase in the split tensile strength & compressive strength and decrease in its permeability have been observed.

Keywords: Pervious Concrete, Permeability, Porous Concrete, No-Sand Concrete.

I. INTRODUCTION

Normal Concrete is defined as homogeneous, multiphase material which is composed of binding material called cement along with aggregate particles. Here I have explained different types of concrete with advantages and disadvantages of concrete.

It is the widely used construction material and is obtained by mixing cementitious material, sand, aggregate, water, and admixture (if necessary) in the required proportion. It is prepared at site at the place of building structure or maybe pre-casted before to save time as well as space of working area at the site.

After preparing it, it should be cured for some days generally 28 days to get full strength. In a technical word, it has been given a name according to their state of formation. In the wet state, it is known as green concrete and when it gets matured it is known as hardened concrete.

Pervious concrete pavement is an opportunity paving surfaces that seize and briefly keep the Storm water Retention Volume (SWRv) with the aid of using filtering runoff via voids within side the pavement floor into an underlying stone reservoir. Filtered runoff can be accumulated and again to the conveyance system, or allowed to partly infiltrate into the soil. Pervious concrete is a zero-slump, open-graded material along with cement, coarse aggregate, admixtures and water. Pervious concrete carries very little satisfactory aggregates inclusive of sand; its miles occasionally noted as "no-fines"

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oncrete. Pervious concrete is the unique sort of concrete which includes interconnected voids and those voids or pores lets in hurricane water to percolate underground.

Figure 1:- Pervious Concrete

The applications of pervious concrete are as Pervious Concrete as a Road pavement, Low-volume pavements, Sidewalks and pathways, Residential roads and driveways, Parking lots, Noise barrier, Slope stabilization, Hydraulic structures, Tennis courts

Figure 2:- Pathway

II. RELATED WORK

Tejankar et.al (2016) studied the use of permeable concrete for ground water recharge. For this they use Portland Pozzolana cement (PPC), crushed limestone coarse aggregate with size passing through 12.5 mm and retaining on 10 mm and chemical admixture. For aggregate-cement ratios they use 4:1, 4.5:1, 5:1. And water-cement (w/c) ratio of 0.4. The samples were tested for compression test, splitting tension test, permeability and porosity for 3, 7, 14 and 28 days. For this 3-mix design were castes. Following are the observations: For Compressive test the curing period for 7 days mix proportion of aggregate-cement ratio of 4:1, 4.5:1 and 5:1 it is 1.35, 1.11 and 0.91 respectively. Similarly curing period for 28 days aggregate-cement ratio of 4:1, 4.5:1 and 5:1 it is 2.19, 1.66 and 1.39 respectively. For Tensile Strength of concrete curing period for mix design 4:1, 4.5:1 and 5:1 for 3 days it is 10.99, 7.54, 6.39 for 7 days it is 12.58, 10.32 and 9.87 for 14 days it is 15.65, 13.17 and 12.1 for 28 days it is 18.73, 14.51 and 12.93 respectively. Permeability for proportion 4:1, 4.5:1 and 5:1 it found 1.021 x 10^{-2}, 1.174 x 10^{-2} and 1.2 x 10^{-2}. For Void Content it found 15.96, 21.35 and 27.75 respectively. It concluded that with an increase in the aggregate/cement ratio there is a decrease in the compressive strength and the tensile strength of the concrete. [1]

Chaudhary et. Al (2016) this project initiates with the detailed study of various like advantages associated with Pervious Concrete. It uses various mixtures using various types of fine aggregates by varying the quantity of aggregates, use of Latex polymer, effects of gradation and aggregate size. The strength and permeability test, and performs different admixtures test in addition with the steel fiber and silica. The conclusion was found that pervious concrete can be used efficiently as building material. And by performing test such as Vebe, Slump test and Compassion Test accurate material for construction can be designed. Further plasticizer can also be used to increase the strength of the material. Since the mixture is porous in nature therefore strength issues are of main concern. Building cannot sustain unless the strength is present. Therefore, material such as steel fiber and plasticizer can be used to increase the strength. [2]

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Admute. et.al (2017) have made the detailed study on " Permeable Pavement: New Technique for Construction of Road Pavement in India". Permeable paving is a range of sustainable materials and techniques for making permeable pavements with a base and sub base that allow the movement of storm water through the surface. The goal was to control storm water at the source, improve rainwater quality by filtering pollutants within the layer thus the researcher helps us to find a method to harvest storm water. [3]

Tripathi et. al (2017) performed experiment on different concrete mix proportion such as 1:3.5, 1:4, 1:5, 1:6, 1:6.5, 1:7, 1:8 and 1:10 with 20 mm 12.5mm and 9.5 mm gravel size with PPC. They also casted concrete mix proportion 1:6 with 20 mm, 12.5mm and 9.5 mm gravel size with PPC, stone dust and admixtures. For compressive strength test, they casted 6 cubes of 150 mm X 150 mm X 150 mm and tested after 1, 3, 7 and 28 days of curing. The observed compressive strengths at 3 days of curing of the concrete cubes of mix 1:4, 1:5, 1:6, 1:6.5 & 1:7 was 14, 11.2, 6.5, 6 & 5.78 N/mm2 respectively & for 28 day it found 34.3, 27.78, 16.02, 15, 14.44 & 21.35 N/mm2. A water infiltration test was conducted for all the concrete mixes. For this, first the surface of pervious concrete was cleaned and dried. Thereafter, the water was allowed to pass through the specimen from top surface continuously for 1 minute and then the water flow was stopped. It was observed that 1:4 ratio specimen allowed lowest quantity water and 1:6.5 is pass maximum quantity. Following are the observations: When they mix pervious concrete in aggregate ratio 60-40 then strength increases and perviousness decreases, and when they mix in 80-20 ratio then strength decreases and perviousness increases. [4]

Waghmare et. al (2017) studied and experimented on feasibility of pervious concrete in pavement where he mentioned that first pervious concrete has been used in Europe and UK since 1930s and he also mentioned Pervious concrete is having high absorption capacity and high void ratio therefore it is having good sound absorbing property and it also helps in controlling pollution. Researcher mentioned about the applications like it is used for light duty pavement applications, such as residential streets, parking lots, pedestrian walkways, sound walls and greenhouses which allows to meet growing environmental demand by capturing rainwater and allowing it to seep into ground. In this paper researcher have done the experiment for testing compressive strength and permeability of the concrete by trial and error method .They casted the blocks with cement aggregate ratio of 1:4,1:6,1:8,1:10 for 7 days he observed that 1:4 gives maximum compressive strength and sufficient permeability .After that researcher casted 9 cubes for ratio 1:4 including polypropylene fibres(0.15%) , which was tested for 7,14,28 days where compressive strength of pervious concrete has been increased by 26% by adding 0.15 % of polypropylene fibres. Cost of pervious concrete was analyzed with respect to conventional concrete the results obtained where the cost of pervious concrete is 5.35% less than conventional concrete. Cost of pervious concrete block adding fibre is 23.2rs whereas cost of conventional concrete block is ₹ 25. [5]

Jadhav et. Al (2018) studied about benefits of pervious concrete and talked about usage of pervious concrete they studied about Cement: Ordinary Portland cement of 53 grade specific gravity of the cement was 3.15. The initial and final setting time was found as 40 min. and 340 min respectively. Coarse Aggregate as crushed granite aggregate was used 60% of aggregate passing through 20mm IS sieve and retained on 10mm IS sieve and 40% of aggregate passing through 10mm IS sieve and retained on 4.56mm IS sieve was used in pervious concrete. Use of silica fumes. They conducted compression test after curing period of 28 days. Average values obtained was wt. Of block was found out to be 7.19kg applied load 323.33KN C/S AREA 150X150 mm final test value 14.37N/mm2 these where the values for 14 days .28 days values were found to be the wt. Of block was found out to be 7.96 applied load 606.66 KN C/S AREA 150X150 mm final test value 29.96 N/mm2.Splitting tensile strength tests were carried out on cylinder specimens of size 150mm diameter and 300mm length. Permeability test was conducted the value found out was K=3.224 (cm/sec) x10-3. If the ratio of silica to cement if taken 1:9 than permeability as well as strength can be achieved. It is clearly seen from the experimental result that pervious concrete has very low compressive strength, so it cannot be used for structural application, but it can be significantly used for sidewalks, parking lots, sports surfaces, driveways, etc. Pervious concrete is considered as eco-friendly system. [6]

Shahet et al (2018) found that when the amount of fine aggregate is less or negligible than the concrete is considered as Pervious concrete comprises of concrete, the size of coarse aggregate is varying between 9.5 mm to12.5 mm. in the normal concrete the strength was recorded higher than pervious concrete because of fine aggregate fills the gap. Around 0.28 to 0.40 water to solid ratio is considered with 15 to 25 percent void ratio. Lower water and solid ratio will build the strength of the concrete, yet too little water may cause surface disappointment. The lower compaction of concrete reduces the compressive strength and vice versa due to permeability. Researcher has examined the property of conventional concrete with pervious concrete and he found in the further investigation that the porous concrete pavement system and offer a valuable stormwater management tool. And he also observed that addition of fibre by weight of cement in pervious concrete increase strength rather than replacing by weight of coarse aggregate and they find the fibre content has high effect on compressive strength. Research did several tests from where he observed that with increase in 100% fibre

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compressive strength decrease by 50% and permeability also increases. Come with the conclusion that the pervious concrete with fibre is more flexible than that of without fiber. [7]

Patidar et. al (2019)- studied on the topic Improvement in Properties of Porous Concrete Using Fiber. Individually the strength of permeable concrete is less as compared to the conventional concrete. So, to check that addition of fibers, this paper tells us about the experimental study of the fibers and whether it satisfy the requirements or not. Materials used for creating the mix is cement, coarse aggregate, fiber, fly ash and water. The desired strength of pervious concrete is equivalent to plain concrete of grade M15 (1:2:4) i.e., for pervious concrete proportion of cement and coarse aggregate used is 1:4 respectively. Fine aggregates are removed to make the no fine concrete i.e., pervious concrete. Proportion cement: coarse aggregate = 1:4 Water cement ratio = 0.3 Coarse aggregate size used 6mm to 10mm. Cement used is OPC53 grade (Ultratech), Sample one with fly ash content 20% of cement weight. Sample two with fiber content 3% of cement weight. Compressive and tensile strength tests are performed on the block of 150×150×150, and permeability test is also performed on the samples. From the results we can conclude that use of Fiber in the concrete gives better results than adding fly ash in the concrete. Permeability is also better with addition of Fiber. From the paper it can concluded that use of Fiber is beneficial than using the fly ash. [8]

Bhavin Shah et. al (2021) performed the effects of admixtures in pervious concrete. For mix design they used Pozzolanic Portland Cement, Ordinary Portland Cement (53 grade), Coarse Aggregate & Fine Aggregate size of 6.3, 8, 10 and 12.5 mm, having a specific gravity of 2.48, they also add super plasticizer and water. They performed various test such as aggregate crushing value test, sieve analysis, aggregate impact value test, compressive strength test, water absorption test, shape tests on coarse aggregates, specific gravity and aggregate, abrasion value of road. For this experiment they casted 3 mix design, as per the performance they get the values for Aggregate impact value test it is 17.41%, for Aggregate crushing value test, it is 27.41%, for Abrasion value test it is 12 % for water absorption and specific gravity it is 0.006. Following are the observations: The results of 7, 14 and 28 days the compressive strength of concrete of OPC cement cubes are very less in compare to PPC cement and OPC cement with admixtures. The compressive strength of concrete is increase in 1.5% to 2% in PPC cement than OPC cement. It found that the water content is 0.27% to 0.34% when mix design does not contain admixtures and when admixtures are used than water content should be 0.34% to 0.40%. The proportion of aggregate to cement by mass should be 4:1, 4.5:1 and valid up to 7:1. And the ratio of fine aggregate to coarse aggregate ratio should be 0:1 to 1:1. [9]

Patil et. al explained the Use of Pervious Concrete in Construction of Pavement for Improving Their Performance. Pervious concrete is also widely used in Europe and Japan for roadway applications as a surface course to Improve skid resistance and reduce traffic noise. However, the strength of the material is relatively low because of its porosity. The compressive strength of the material can only reach about 20 - 30MPa. Such materials cannot be used as pavement due to low strength. The subgrade should be properly compacted to provide a uniform and stable surface. When pervious pavement is placed directly on sandy soil it is recommended to compact the subgrade to 92 to 96% of the maximum density. With silty or clayey soils, the level of compaction will depend on specifics of pavement design and a layer open graded stone may have to be placed over soil. The voids can range from 18 to 35% with compressive strengths of 10 to 30MPa. [10]

After referring various papers on pervious concrete. We found that there are various categories such as

1. Changing of proportion
2. Adding/ Replacement of cementitious material
3. By adding fibers.

Generally, it was found that compression of pervious concrete is quite less as compared to conventional concrete. From the research we came to know that polypropylene fiber helps to increase the overall strength of concrete. As there were not many research papers present about pervious concrete with using polypropylene fiber. So, this was the scope for the research. So, we came up with the conclusion that Recron-3s fiber has good mechanical properties. It helps us to obtain our objective for this research.

III. METHODOLOGY AND EXPERIMENTATION

Pervious concrete is concrete which mainly consist of cement, coarse aggregate, and water. There is use of sand in pervious concrete as we need voids for the water to pass through it. Due to this reason as there no sand present in the mix the overall strength of the mix is less as compared to conventional concrete so we can use a reinforcing material to increase the strength of the concrete in this case it is recron-3s fibre.

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A. Cement

Cement is a fine, grey powder. It is mixed with water and materials such as gravel, and crushed stone to make concrete. The cement and water form a paste that binds the other materials together as to form a strong concrete. The Ordinary Portland Cement contains two basic ingredients namely argillaceous and calcareous materials calcium carbonate predominates. In this investigation, Pozzolana Portland Cement (PPC) conforming to IS 1489 (part 1) -1991 was used for Casting specimen for all concrete mixes. The cement was of uniform colour i.e., grey with a light greenish shade and was free from any hard lumps.

B. Coarse Aggregates

The broken stone is generally used as a coarse aggregate. The nature of work decides the maximum size of the coarse aggregate. Locally available different sizes of coarse aggregate having the maximum size of 10 mm were used in the work. The aggregates were tested per Indian Standard Specifications IS: 383-1970.

TABLE 1. Sieve Analysis of coarse aggregate**:**

IS sieve size in mm	Wt. of aggregates retained in gm	% Retained	Cumulative % retained
20 mm	2076	69.2	69.2
12.5 mm	200	6.66	75.86
10 mm	374	12.46	88.32
6.3 mm	326	10.86	99.18
Pan	24	0.8	99.98
Total	3000	99.98	99.98

C. Recron-3s Fibre

Recron-3s fibres are used in concrete as a secondary reinforcement at a rate of dose varying from 0.1% to 0.4%. It is a virgin polyester (Mono Filament Fibres). It is a building material that improves the compressive strength of the concrete. Recron-3s is a reinforcing material which is used to increase strength in a variety of applications like automotive battery, paper, filtration fabrics, asbestos cement sheets, cement-based pre-cast products and for improving quality of construction. [14]

TABLE 2. PROPERTIES OF FIBRE

Sr. No.	Property	Value
1	Specific gravity	1.34-1.39
2	Water absorption (%)	0.00

D. Water

Generally, water that is suitable for drinking is satisfactory for use in concrete. Water from lakes and streams that contain marine life is also suitable When water is obtained from sources mentioned above, no sampling is necessary When it is suspected that water may contain sewage, mine water, or wastes from industrial plants or canneries, it should not be used in concrete unless tests indicate that it is satisfactory. Water from such sources should be avoided since the quality of water could change due to low water or by intermittent discharge of harmful wastes into the stream. In the present experiment, potable tap water has been used.

CONCRETE MIX PROPORTION

IS 10262:2009 recommends the steps for the mix design of the conventional concrete in which the proportions of cement, fine aggregate and coarse aggregate are designed. This is being non-conventional concrete, considering the mix proportion are 1:2:4 of M15 grade concrete, fine aggregate component has been omitted and the pervious concrete has been designed as 1:0:4 with water-cement ratio as 0.4.

CEMENT: FINE AGGREGATE: COARSE AGGREGATE = 1:0:4

CASTING AND COMPACTION

For casting all the moulds were cleaned and oiled properly. These were securely tightened to correct dimensions before

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casting Care was taken that there are no gaps left from where there is any possibility of leakage out of slurry. The fresh concrete was filled in the moulds with the help of trowel. The care was taken to fill all moulds simultaneously to avoid segregation and to maintain uniformity. The mould was filed and placed on the vibrating table and vibrated. As needed, concrete was added and vibrations were stopped as soon at the cement slurry appeared on the top Surface of the mould. The moulds were cleaned from outside and weighted to determining density of green concrete. In total 24 cubes and 12 cylinders were casted.

Experimentation was performed in the initial process and after the casting of the cubes and cylinders. Mainly the experiments performed were

i. Initial Setting Time
ii. Final Setting Time
iii. Consistency
iv. Fineness
v. Slump Cone Test
vi. Compressive Strength Test
vii. Split Tensile Strength Test
viii. Permeability.

Figure 3:- Mixing Of Concrete

IV. RESULTS

TABLE 3. Average compressive strength 7th day of testing

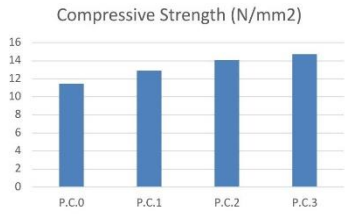
Cubes	Compressive Strength(N/mm^2)
P.C.0	11.47
P.C.1	12.88
P.C.2	14.08
P.C.3	14.74

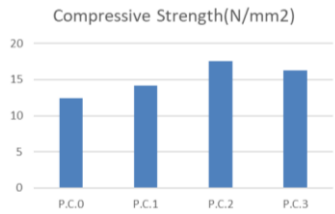
TABLE 4. Average compressive strength 28th day of testing

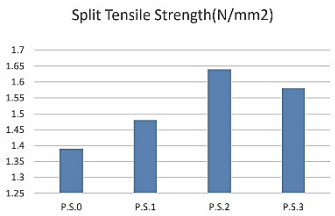
Cubes	Compressive Strength (N/mm^2)
P.C.0	12.42
P.C.1	14.19
P.C.2	17.56
P.C.3	16.27

TABLE 5. Average Split tensile strength 28th day of testing

Cube	Split tensile strength (N/mm^2)
P.S.0	1.39
P.S.1	1.48
P.S.2	1.64
P.S.3	1.58







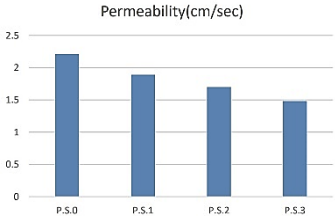


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TABLE 6. Average Permeability 28th day of testing

Cube	Permeability (cm/sec)
P.C.0	2.21
P.C.1	1.89
P.C.2	1.70
P.C.3	1.48

NOTE: - P.C Pervious Concrete for Compressive Strength
P.S Pervious Concrete for Split Tensile Strength
0 in **P.C.0 / P.S.0** indicates no fibre in pervious concrete similarly **1, 2, 3** indicates 0.1, 0.2, 0.3 % addition of fibre with weight of cement.

Figure 4:- Compressive Strength Test

Figure 5:- Split Tensile Strength

Figure 6:- Permeability

V. DISCUSSION

- Form the performance of the experiment conducted we can infer that the 7 days compressive strength increases as the percentage of fibre in the concrete increases.
- For 28 days the compressive strength increases till the 0.2% addition of fibre and then decrease at 0.3%.
- Permeability decreases uniformly as the addition of fibre is done.
- From the experiment performed we can say that at 0.2% of fibre addition with respect to cement, gives us the optimum strength and permeability of concrete.
- The average strength of 28 days compressive strength is 13.69% more than the 7 days compressive strength of the cubes
- The decrease in the average permeability of cubes with the addition of fibre is 12%.
- After referring IS 12727-1989 which mentions the optimum value of split tensile strength and the compressive strength, we get the optimum strength of the as mentioned in this code.

VI. FUTURE SCOPE

i. In pervious concrete different size of aggregate mainly of lesser size can be tested for better compressive strength and nature of permeability should also be checked.
ii. As pervious concrete takes more time to set, by adding the certain admixture, try to decrease the setting time of the concrete.
iii. Pervious concrete consists of cement and coarse aggregate, by changing the proportion of cement or by replacing it by other cementitous material to reduce the cost.
iv. By adding different fibres, different properties of the concrete can be assessed so trying new fibres and finding their optimum dose can be done.

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VII. CONCLUSION

From the performance of the experiment conducted we can infer that the 7 days compressive strength slightly increases as the percentage of fibre in the concrete increases. For 28 days the compressive strength increases till the 0.2% addition of fibre and then decreases slightly (7.35%) at 0.3%. For 28 days the Split Tensile strength increases till the 0.2% addition of fibre and then decreases slightly (3.46%) at 0.3%. Permeability decreases uniformly as the addition of fibre is done. The average decrease in permeability is 12% approximately, with respect to the addition of the fibre in the mix. From the experiment performed we can say that at 0.2% of fibre addition with respect to cement, gives the maximum strength and permeability of concrete.

REFERENCES

[1] AkshayTejankar, Aditya Lakhe, Manish Harwani, Prem Gupta, "The Use of Permeable Concrete For Ground Water Recharge", International Journal of Engineering Research and Application, Vol. 6, Issue 9, (Part -3), pp.60-63, September 2016.

[2] Himanshu Chaudhary, SangeetaDhyani "Analysis of pervious concrete on various parameters" International Research Journal of Engineering and Technology (IRJET) e-ISSN:2395-0056 p-ISSN: 2395-0072 Volume 8 Issue 5 Year 2016 pp 1030 -1033

[3] A. M. Admute 1, A. V. Gandhi 2, S. S. Adsul 3, A. A. Agarkar 4, G. S. Bhor 5, G. P. Kolte 6- Permeable Pavements: New Technique For Construction Of Road Pavements in India International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395 -0056 p-ISSN: 2395-0072 Volume: 04 Issue: 04 Apr -2017

[4] Dev Pratap Mani Tripathi, S. M. Ashraf Hussain, Praneet Madhav, "An experiment Study on Pervious Concrete", International Research Journal of Engineering and Technology (IRJET) Volume: 6 | Issue: 12, December 2017.

[5] Prof. Ashish P. Waghmare, Ms. Shweta K. Pachore, Ms. Shruti S. Padate, Mr. Pratik S. Rakshe, Mr. Vinod R. Mudawat, "Feasibility of Pervious Concrete in Pavement", Imperial Journal of Interdisciplinary Research (IJIR) Vol-3, Issue-5, 2017.

[6] D. Tarangini, B. RadhaKiranmaye, Dr. P. Sravana, Naveen, "EFFECT OF SIZE OF COARSE AGGREGATE ON PROPERTIES OF PERVIOUS CONCRETE", International Journal of Civil Engineering and Technology (IJCIET) Volume 10, Issue 01, pp. 914–921, January 2019.

[7] Sujeet Kumar Saha and ShaikNiyazuddinGuntakalb and Dr. S. SenthilSelvan - Experimental Study on behaviour of Pervious Concrete in Strength and Permeability by changing differentparameters. International Journal of Applied Engineering Research ISSN 0973-4562 Volume 13, Number 6 (2018).

[8] KarthikNavada, Dr.Mithun B.M., ShriramMarathe.,"Pervious Concrete for Transportation Application", International Research Journal Of Engineering And Technology (IRJET)e-ISSN: 2395-0056 p-ISSN: 2395-0072 Volume 5 Issue 5 Year 2018 pp 3461-3463.

[9] Bhavin Shah, Apurva Patel, "Experimental Study on Pervious Concrete", International Research Journal of Engineering and Technology (IRJET) Volume: 08 Issue: 03 | Mar 2021.

[10] Mr. V. R. Patil, Prof. A. K. Gupta, Prof. D. B. Desai, "Use of Pervious Concrete in Construction Of Pavement For Improving Their Performance", Journal of Mechanical and Civil Engineering, PP: 54-56

[11] Indian Standard code 383-1970

[12] Indian Standard code 10262-2009

[13] Indian Standard code 456-2000

BIOGRAPHY

1.		**Name: - Apurva Rajendra Suke**
2.		**Name: - Dhanshree Rahul wasnik**

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3.		**Name: - Neeraj Anil Shetey**
4.		**Name: - Pravin Rajaram Sonwane**
5.		**Name: - Raghav Vinay Songade**
6.		**Name: - Varun Hemantkumar Dhapodkar**
7.		**Name: - Chetan S. Deshpande**