VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELAGAVI

PROJECT REPORT

On

"STRENGTHING OF SUBGRADE USING PLASTIC WASTE"

Project Report submitted in partial fulfilment of the requirement for the award of the degree of

Bachelor of Engineering

In

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Submitted by

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1. INTRODUCTION

Strengthening of soil subgrade means the improvement of stability or shearing capacity of the soil by the use of controlled compaction, proportioning and the addition of suitable admixture or stabilisers. The basic principles of soil strengthening are:

- Evaluating the properties of given soil.
- Deciding the lacking property of soil and choose effective and economical method of soil strengthening.
- Using of waste materials such as shredded plastic, which provide the strength.

Strengthening of subgrade can increase the shear strength of a soil or control the bearing properties of a soil, thus improving the load bearing capacity of a sub-grade to support pavements and foundations. Strengthening can be used to treat a wide range of sub-grade materials from expansive clays to granular materials. The most common improvements achieved through strengthening include better soil gradation, reduction of plasticity index or swelling potential, and increases in durability and strength. In wet weather, strengthening may also be used to provide a working platform for construction operations. These types of soil quality improvement are referred to as soil modification. Benefits of soil strengthening are higher resistance values, reduction in plasticity, lower permeability, reduction of pavement thickness, elimination of excavation, material hauling and handling, and base importation, aids compaction, provides all-weather access onto and within projects sites. The determining factors associated with soil strengthening may be the existing moisture content, the end use of the soil structure and ultimately the cost benefit provided.

As good soil becomes scarcer and their location becomes more difficult and costly, the need to improve quality of soil using soil stabilisation is becoming more important. Soil stabilisation using raw plastic bottles is an alternative method for the improvement of subgrade soil of pavement. It can significantly enhance the properties of the soil used in the construction of road infrastructure.

2. LITERATURE REVIEW

A.K. CHOUDHARY, J.N. JHA AND K.S. GILL: Soil fiber composites have been found effective in improving the CBR value. These studies indicated that stress-strain-strength properties of randomly distributed fibre reinforced soil are a function of fiber content and aspect ratio. Considerable improvement in frictional resistance of fine grained soil was also reported by roughened HDPE. Strength and load bearing capacity of soil was enhanced considerably when the soil is stabilized mechanically with short thin plastic strips of different length and content. The feasibility of reinforcing soil with strips of reclaimed high density polyethylene has also been investigated to a limited extent. Although, few studies on the subject of engineering behaviour of HDPE reinforced soil as described earlier are available but a detailed study pertaining to its use in real life problems is still quite meagre. In view of the above limited studies, present study has been taken up with special reference to its feasibility for application in embankment road construction. Thus, it is the interaction between soil and strips which causes the resistance to penetration of the plunger resulting into higher CBR values.

SOBHAN, K. AND MASHNAD: The performance of paved and unpaved roads is often poor after every monsoon and, in most cases; these pavements show cracking, potholes, wheel path rutting and serious differential settlement at various locations. Therefore, it is of utmost importance considering the design and construction methodology to maintain and improve the performance of such pavements. Attempts have been made in the study to demonstrate the potential of reclaimed high density polyethylene strips (HDPE) as soil reinforcement for improving engineering performance of subgrade soil. HDPE strips obtained from waste plastic were mixed randomly with the soil. A series of California Bearing Ratio (CBR) tests were carried out on randomly reinforced soil by varying percentage of HDPE strips with different lengths and proportions. Results of CBR tests demonstrated that inclusion of waste HDPE strips in soil with appropriate amounts improved strength and deformation behavior of subgrade soils substantially. The proposed technique can be used to advantage in embankment road construction.

G.L. SHIVKUMAR BABU: Recycling plastic waste from water bottles has become one of the major challenges worldwide. The present study provides an approach for the use plastic waste as reinforcement material in soil. The experimental results in the form of stress–strain-pore water pressure response are presented. Based on experimental test results, it is observed that the strength of soil is improved and compressibility reduced significantly with addition of a small percentage of plastic waste to the soil. The use of the improvement in strength and compressibility response due to inclusion of plastic waste can be advantageously used in bearing capacity improvement and settlement reduction in the design of shallow foundations

.

K. SHYAM CHAMBERLIN:

Soil stabilization can be done in number of ways. But the stabilization using waste plastic strips is an economic method since the stabilizer used here is waste plastic materials, which are easily and cheaply available. This report presents the various tests conducted on fibre reinforced soil with varying fiber content and different aspect ratio and their results are analyzed such that it can be used in the fields. Therefore, it is of utmost importance considering the design and construction methodology to maintain and improve the performance of such pavements. In this paper, plastic such as shopping bags is used to as a reinforcement to perform the CBR studies while mixing with soil for improving engineering performance of sub grade soil. Plastic strips obtained from waste plastic were mixed randomly with the soil. A series of California Bearing Ratio (CBR) tests were carried out on randomly reinforced soil by varying percentage of plastic strips with different lengths and proportions. Results of CBR tests demonstrated that inclusion of waste plastic strips in soil with appropriate amounts improved strength and deformation behaviour of sub grade soils substantially. The proposed technique can be used to advantage in embankment/road construction, industrial yards etc.

3. MATERIALS USED

SOILS:

We selected two types of soil which are as follows, red soil & sandy soil.

We had selected the sample from white field & domulur for the conduction of the experiments. We are conducting specific gravity, compaction test and California bearing test ratio on soil. Soil is sieved with 450micron sieve. We had taken around 15kg soil sample of each type. Soil is oven dried before conducting the experiments.

PLASTICS:

The waste plastic material was sourced from a local market was used in this study for Laboratory testing of different percentage with different types of soil. The tests were conducted at various waste plastic contents of (0.0%,2%,4%,6%,8%, 10%).Plastic waste when mixed with soil behaves like a fiber reinforced soil. Plastic-waste materials are produced plentifully such as polyethylene terephthalate (PET) plastic bottles, polypropylene of plastic sack, and polypropylene of carpet. But such materials have been used little for engineering purposes. These plastic wastes in the form of randomly mixed with soil and the behaviour of the soil is similar to fiber reinforced soil. Soil reinforcement technique is one of the most popular techniques used for improvement of poor soils

Fig no. 1:

Fig no. 2:

4. SCOPE OF STUDY

In a country like India where the nasality rate is 3 per second, availability of proper land for shelter and clean drinking water is a bizarre demand and hence economic methods are more acceptable than healthier methods which in turn leads to excessive use of chemically manufactured plastics for all kind of day to day activities. The undesirable effects of plastic use which consecutively leads to pollution which must be eliminated or at least reduced. Rapid improvements in the engineering world have influenced a lifestyle of human beings in utmost extends but day to day activities of mankind are augmenting risk in the environment in the same proportion. Plastic wastes have become one of the major problems for the world. The harmful gas which is being produced during manufacturing and burning of plastics leads to carcinogenic pollutants. So, effective consumption of plastic waste in engineering application has become one of the challenging jobs for environmental, geotechnical engineers. Plastic is considered as one of the most hazardous pollutants of environment as it would not decay or can't be destroyed rather interferes with the decaying of other components. So the only way to reduce these hazards of this non- biodegradable materiel is to use it in different application in engineering field beneficially. With the huge demand of construction render the civil engineers to use the weak lands as construction site after treating the soil medium by different stabilizers. Nowadays the civil engineers are using non-traditional stabilizing agent in ground improvement technique. Application of plastic waste in various forms is one of the emerging area of ground improvement technique. The implementation of plastic waste as stabilizer is economic and eco-friendly. In this paper plastic strips obtained from polythene bags have been used as stabilizer of soil after carrying out a series of tests which is conducted on fiber reinforced soil with varying fiber content and different aspect ratio. A detail analysis of their results depicts that it can be used in the fields effectively and economically as reinforcing materiel. Plastic strips of varying aspect ratio are being mixed randomly with the soil and California Bearing Ratio (CBR) tests were performed. Aspect Ratio is determined by changing its length and width. From the CBR on soil with and without plastic reinforcements it was found that after reinforcement the soil gained its strength appreciably.

5. OBJECTIVE

This includes increasing the shear strength of an existing ground condition to enhance its loading capacity.

Achieve a desired improve permeability

Enhancing the durability of the soil to resistance to the process weathering, and traffic usage among others.

In wet weather, strengthening may also be used to provide a working platform for construction process, these types of soil quality improvement are referred to as a soil modification.

Thickness reduction, the strength and stiffness of soil can be improved through the additives to permit a reduction in design thickness of the stabilized materials compared with an unsterilized or unbound materials.

5.1 RESEARCH SIGNIFICANCE

For many years, road engineers have used additives such as lime, cement and cement kiln dust to improve the qualities of readily available local soils. Laboratory and field performance tests have confirmed that the addition of such additives can increase the strength and stability of such soils. However, the cost of introducing these additives has also increased in recent years. This has opened the door widely for the development and introduction of other kinds of soil additives such as plastics, bamboo, liquid enzyme soil stabilizers etc.

Soil strengthening using raw plastic bottles is an alternative method for the improvement of subgrade soil of pavement. It can significantly enhance the properties of the soil used in the construction of road infrastructure. Results include a better and longer lasting road with increased loading capacity and reduced soil permeability. This new technique of soil strengthening can be effectively used to meet the challenges of society, to reduce the quantities of waste, producing useful material from non-useful waste materials that lead to the foundation of sustainable society. It can be effectively used in strengthening the soil for road embankments and in preparing a suitable base for the upper pavement structure. Since it increases the bearing capacity of soil considerably, the land use can be increased. It can lower the road construction and maintenance costs while increasing the overall quality of its structure and surface. The promise that soil strengthening technology can actually improve the mechanical qualities of local road soil so that stronger, more durable roads can be built has prompted national road ministries around the world to conduct extensive testing to verify that this new technology is truly cost effective. The result is that this new advance in soil strengthening technology is increasingly being used in both constructing and improving and rehabilitating unsurfaced and paved roads worldwide.

5.2 THEORETICAL ANALYSIS

SPECIFIC GRAVITY

1. Clean and dry the Pycnometer. Tightly screw its cap. Take its mass (M_1) to the nearest of 0.1 g.
2. Mark the cap and Pycnometer with a vertical line parallel to the axis of the Pycnometer to ensure that the cap is screwed to the same mark each time.

3. Unscrew the cap and place about 200 g of oven dried soil in the Pycnometer. Screw the cap. Determine the mass (M_2).
4. Unscrew the cap and add sufficient amount of de-aired water to the Pycnometer so as to cover the soil. Screw on the cap.

5. Shake well the contents. Connect the Pycnometer to a vacuum pump to remove the entrapped air, for about 20 minutes for fine-grained soils and about 10 minutes for coarse-grained soils.

6. Disconnect the vacuum pump. Fill the Pycnometer with water, about three-fourths full. Reapply the vacuum for about 5min till air bubbles stop appearing on the surface of the water.

7. Fill the Pycnometer with water completely upto the mark. Dry it from outside. Take its mass (M_3)

8. Record the temperature of contents.

9. Empty the Pycnometer. Clean it and wipe it dry.

10. Fill the Pycnometer with water only. Screw on the cap upto the mark. Wipe it dry. Take its mass (M_4).

Fig No. 3:

5.3 COMPACTION TEST

1. Take about 20kg of air-dried soil. Sieve it through 20mm and 4.7mm sieve.

2. Calculate the percentage retained on 20mm sieve and 4.75mm sieve, and the percentage passing 4.75mm sieve.

3. If the percentage retained on 4.75mm sieve is greater than 20, use the large mould of 150mm diameter. If it is less than 20%, the standard mould of 100mm diameter can be used. The following procedure is for the standard mould.

4. Mix the soil retained on 4.75mm sieve and that passing 4.75mm sieve in proportions determined in step (2) to obtain about 16 to 18 kg of soil specimen.

5. Clean and dry the mould and the base plate. Grease them lightly.

6. Weigh the mould with the base plate to the nearest 1 gram.

7. Take about 16 – 18 kg of soil specimen. Add water to it to bring the water content to about 4% if the soil is sandy and to about 8% if the soil is clayey.

8. Keep the soil in an air-tight container for about 18 to 20 hours for maturing. Mix the soil thoroughly. Divide the processed soil into 6 to 8 parts.

9. Attach the collar to the mould. Place the mould on a solid base.

10. Take about 2.5kg of the processed soil, and hence place it in the mould in 3 equal layers. Take about one-third the quantity first, and compact it by giving 25 blows of the rammer. The blows should be uniformly distributed over the surface of each layer.

The top surface of the first layer be scratched with spatula before placing the second layer. The second layer should also be compacted by 25 blows of rammer. Likewise, place the third layer and compact it.

The amount of the soil used should be just sufficient to fill the mould ad leaving about 5 mm above the top of the mould to be struck off when the collar is removed.

11. Remove the collar and trim off the excess soil projecting above the mould using a straight edge.

12. Clean the base plate and the mould from outside. Weigh it to the nearest gram.

13. Remove the soil from the mould. The soil may also be ejected out.

14. Take the soil samples for the water content determination from the top, middle and bottom portions. Determine the water content.

15. Add about 3% of the water to a fresh portion of the processed soil, and repeat the steps 10 to 14.

Fig no. 4

5.4 CALIFORNIA BESRING TEST RATIO (CBR)

1. Normally 3 specimens each of about 7 kg must be compacted so that their compacted densities range from 95% to 100% generally with 10, 30 and 65 blows.
2. Weigh of empty Add water to the first specimen (compact it in five layer by giving 10 blows per layer)
3. After compaction, remove the collar and level the surface.
4. Take sample for determination of moisture content.
5. Weight of mould + compacted specimen.
6. Place the mold in the soaking tank for four days (ignore this step in case of unsoaked cbr.
7. Take other samples and apply different blows and repeat the whole process.
8. After four days, measure the swell reading and find %age swell.
9. Remove the mould from the tank and allow water to drain.
10. Then place the specimen under the penetration piston and place surcharge load of 10lb.
11. Apply the load and note the penetration load values.
12. Draw the graphs between the penetration (in) and penetration load (in) and find the value of cbr.
13. Draw the graph between the %age cbr and Dry Density, and find cbr at required degree of compaction.

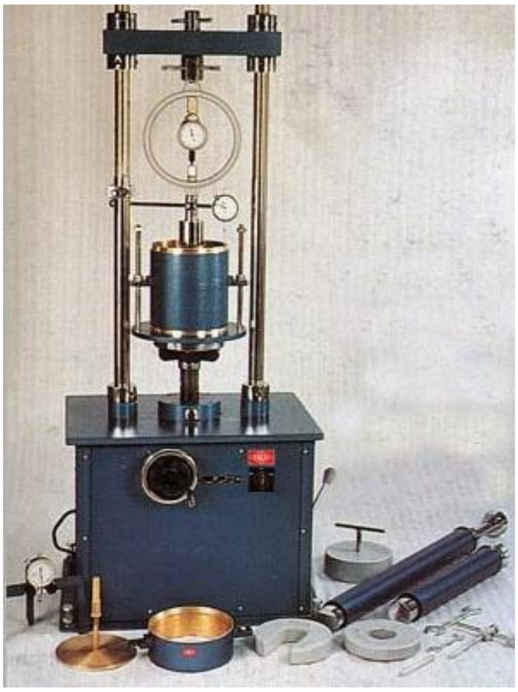


Fig no.5

6. MATERIALS AND METHODOLOGY

- In order to conduct this study, various materials such as red soil, shredded plastic, sandy soil and synthetic threads were used. The Standard Proctor Compaction tests were done to assess the amount of compaction and the water content required in the field.
- The water content at which the maximum dry density is attained is obtained from the relationships provided by the tests.
- The California Bearing Ratio test was conducted to determine the optimum amount of plastic strips in soil. This is done by mixing soil with varying percentages (0.0%,2%, 4%,6%,8%,10% etc.) of plastic strips in soil and the 4 day soaked CBR Value is obtained.
- Load-settlement graphs for each plate load test were drawn. For each load-settlement graph, the load corresponding to 4mm settlement was noted. The ultimate load and corresponding settlement of the plate is also determined from the load- settlement graph plotted for various test arrangements.

6.1 APPLICATIONS

The process of soil stabilization is useful in the following applications.

- Reducing the permeability of soils.
- Increasing the bearing capacity of foundation soils.
- Increasing the shear strength of soils.
- Improving the durability under adverse moisture and stress conditions.
- Improving the natural soils for the construction of highways and airfields.
- Controlling the grading of soils and aggregates in the construction of bases and sub bases of the highway and airfields.

6.2 PLASTIC AND ITS POTENTIALITY FOR RECYCLING

Plastic and materials made with plastic have become the integral part of our day to day life in various stages and also in various forms, but then, the disposal and dumping of the used and unwanted plastic has become a major threat for the civilized society, as the production and usage of new plastic and plastic associated materials are not in balance with its recycling recycled plastic products status.

Plastic bottle and plastic bags recycling has not kept pace with the dramatic increase in virgin resin polyethylene Terephthalate (PET) sales and the aspect of reduce / reuse / recycle, has emerged as the one that needs to be given prominence. The general survey shows that 1500 bottles are dumped as garbage every second. PET is reported as one of the most abundant plastics in solid urban waste whose effective reuse/recycling is one of the critical issue which needs immediate attention.

Fig no. 6

7. RESULTS & DISSCUSSION

7.1 SPECIFIC GRAVITY TEST (RED SOIL)

APPARATUS USED: PYCNOMETER, WEIGH BALANCE

FORMULA USED:

$$Sp.Gravity(Gs) = \frac{(W_2 - W_1)}{((W_2 - W_1) - (W_3 - W_4))}$$

TABULAR COLUMN (1):

Contents	Trial -1 (grams)	Trial -2 (grams)
Empty weight of pycnometer (**M1**)	623	623
Weight of pycnometer + soil (**M2**)	923	923
Weight of pycnometer + soil + water (**M3**)	1700	1698
Weight of pycnometer + water (**M4**)	1510	1509
Specfic gravity =(M2-M1)/(M2-M1)-(M3-M4)	2.7272	2.7027
Avg. Specfic gravity = 2.7149		

7.2 COMPACTION TEST (RED SOIL)

APPARATUS USED: COMPACTION MOULD, RAMMER, WEIGHING BALANCE, SPATULA

FORMULA USED: Bulk Density:

$$\rho = \frac{Mass}{Volume}$$

Dry Density:

$$\rho_d = \frac{\rho}{1 + w}$$

TABULAR COLUMN (2):

COMPACTION TEST

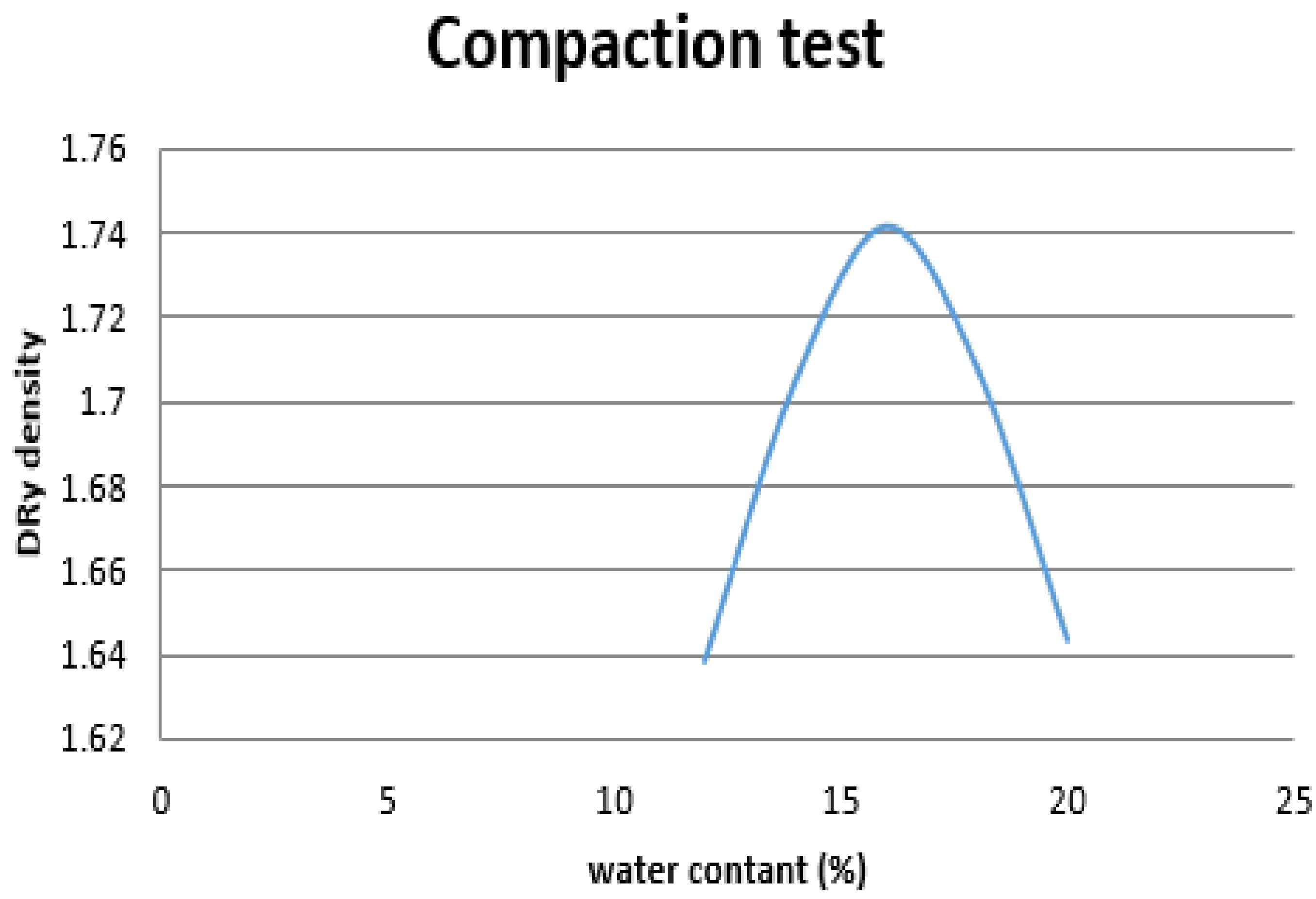
Observation :-

Height of the mould(**h**) =	13	cm
Diameter of the mould (**d**) =	10	cm
Volume of the mould (**V**) =	1021.01761	sq. cm
Empty weight of the mould (**M1**) =	3.872	kg

Trial No.	w/c (%)	Mass of mould + soil (**M2**)	Mass of soil (**M**)	P=M/V (g/cc)	Pd = P/1+w (g/cc)	Pd at Sr = 1	Pd at Sr = 0.9
1	12	5.746	1.874	1.83542377	1.638771227	3.758513432	3.658620255
2	14	5.856	1.984	1.94315943	1.704525814	3.822575935	3.709075155
3	16	5.934	2.062	2.0195538	1.740994656	3.822467773	3.698034413
4	18	5.93	2.058	2.01563614	1.708166221	3.675902952	3.546546656
5	20	5.886	2.014	1.97254188	1.643784899	3.470721557	3.340121522

GRAPH (1):

COMPACTION CURVE FOR RED SOIL



7.3 CALIFORNIA BEARING TEST RATIO (CBR) (RED SOIL)

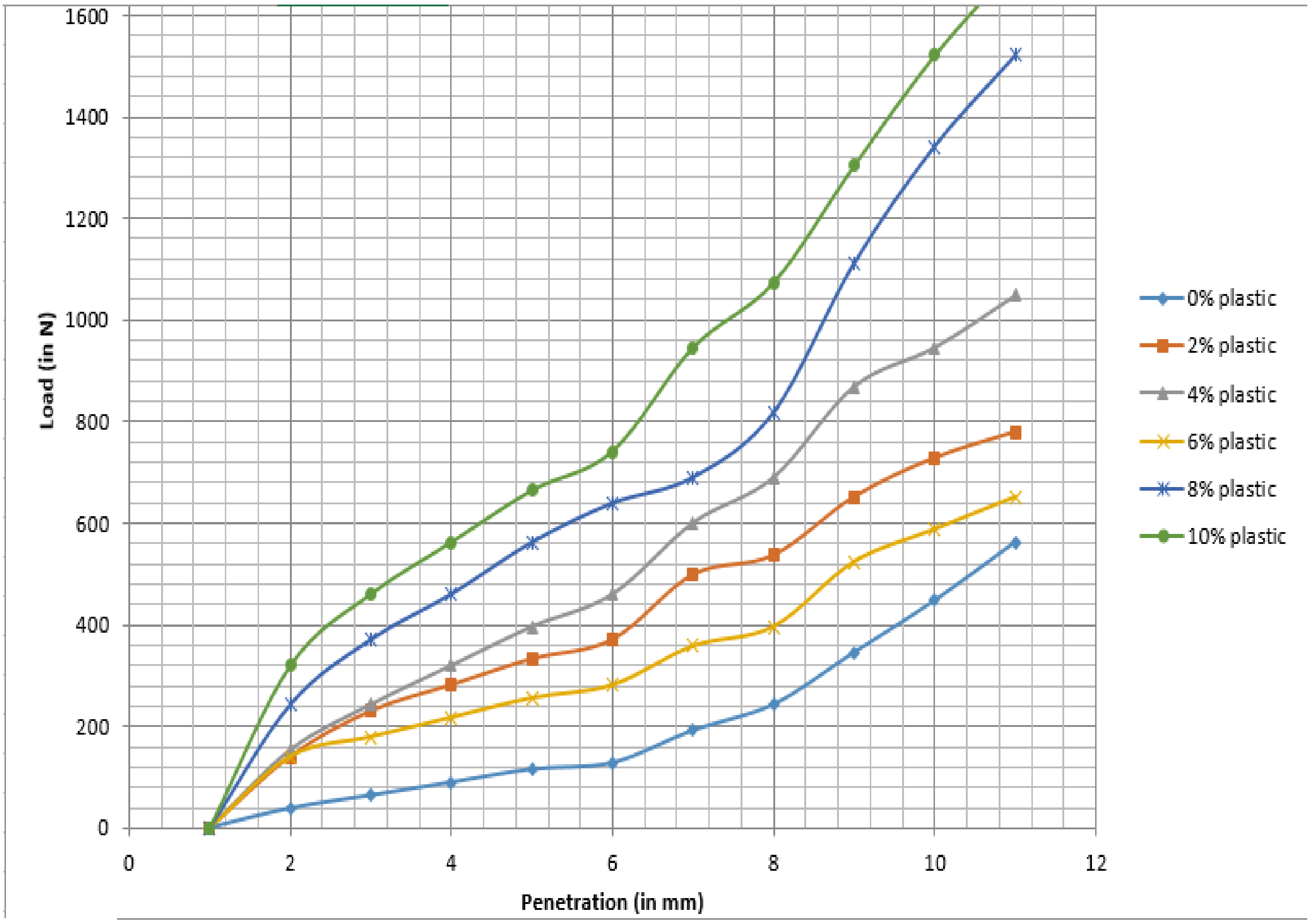
APPARATUS USED: MOULD, SPACER DISC, DIALGAUGES, SURCHARGE WEIGHT, PENETRATION PLUNGER

TABULAR COLUMN (3)

Pentration(mm)	For 0 % plastic		For 2% plastic		For 4% plastic		For 6% plastic		For 8% plastic		For 10% plastic	
	PRR	Load (in N)	PRR	Load (in N)	PRR	Load (in N)	PRR	Load (in N)	PRR	Load (in N)	PRR	Load (in N)
0	0	0	0	0	0	0	0	0	0	0	0	0
0.5	0.6	38.338658	1	63.8977636	1.4	89.456869	2.8	178.91374	2	127.79553	3.4	217.2524
1	1	63.897764	1.4	89.456869	2	127.795527	5	319.48882	4	255.59105	6.8	434.50479
1.5	1.4	89.456869	1.8	115.015974	2.8	178.913738	6.4	408.94569	6.2	396.16613	10	638.97764
2	1.8	115.01597	2.2	140.57508	3.6	230.031949	9.2	587.85942	9.2	587.85942	13.8	881.78914
2.5	2	127.79553	3	191.693291	4.8	306.709265	11.8	753.99361	12.8	817.89137	17.6	1124.6006
4	3	191.69329	4.4	281.15016	8.2	523.961661	19.8	1265.1757	22.8	1456.869	29.6	1891.3738
5	3.8	242.8115	5.6	357.827476	10.4	664.536741	25	1597.4441	29.2	1865.8147	37.4	2389.7764
7.5	5.4	345.04792	8.2	523.961661	17.2	1099.04153	37	2364.2173	45	2875.3994	57.8	3693.2907
10	7	447.28435	10.8	690.095847	24.2	1546.32588	49.2	3143.77	61.2	3910.5431	77	4920.1278
12.5	8.8	562.30032	13.4	856.230032	30.4	1942.49201	60.4	3859.4249	76.6	4894.5687	94.2	6019.1693

GRAPH (2):

CBR TEST FOR RED SOIL



RESULT & DISSCUSSION

7.4 SPECIFIC GRAVITY TEST (SANDY SOIL)

APPARATUS USED: PYCNOMETER, WEIGH BALANCE

FORMULA USED:

$$Sp.Gravity(Gs) = \frac{(W_2 - W_1)}{((W_2 - W_1) - (W_3 - W_4))}$$

TABULAR COLUMN (4):

SPECFIC GRAVITY

Contents	Trial -1 (grai	Trial -2 (grams)
Empty weight of pycnometer (**M1**)	623	623
Weight of pycnometer + soil (**M2**)	923	922
Weight of pycnometer + soil + water (**M3**)	1697	1692
Weight of pycnometer + water (**M4**)	1511	1510
Specfic gravity =(M2-M1)/(M2-M1)-(M3-M4)	2.6315	2.5555
Avg. Specfic gravity(	**2.5935**	

7.5 COMPACTION TEST (SANDY SOIL)

APPARATUS USED: COMPACTION MOULD, RAMMER, WEIGHING BALANCE, SPATULA

FORMULA USED: Bulk Density $$\rho = \frac{Mass}{Volume}$$

Dry Density $$\rho_d = \frac{\rho}{1+w}$$

TABULARCOLUMN (5):

COMPACTION TEST

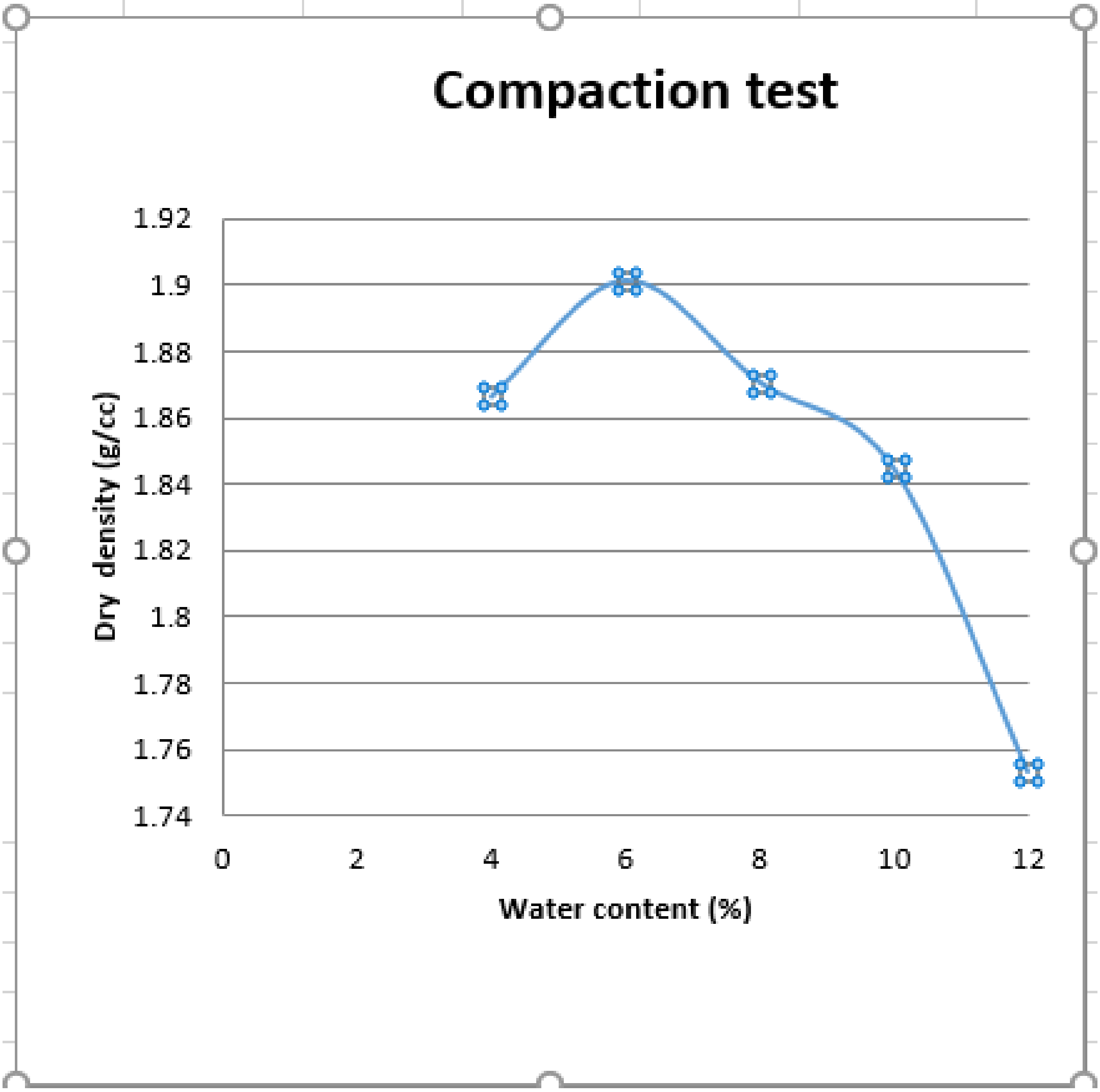
Observation :-

Height of the mould(**h**) =	13	cm
Diameter of the mould (**d**) =	10	cm
Volume of the mould (**V**) =	1021.0176	sq. cm
Empty weight of the mould (**M1**) =	2.363	kg

Trial No.	w/c (%)	Mass of mould + soil (**M2**)	Mass of soil (**M**)	P=M/V (g/cc)	Pd = P/1+w (g/cc)	Pd at Sr = 1	Pd at Sr = 0.9
1	4	4.345	1.982	1.941201	1.86653904	4.56131313	4.51417038
2	6	4.421	2.058	2.015636	1.90154353	4.52363023	4.45694631
3	8	4.426	2.063	2.020533	1.87086409	4.33982583	4.25852169
4	10	4.435	2.072	2.029348	1.84486177	4.17923049	4.08573987
5	12	4.368	2.005	1.963727	1.75332781	3.88411277	3.78431145

GRAPH (3):

COMPACTION CURVE FOR SANDY SOIL



7.6 CALIFORNIA BEARING TEST RATIO (CBR) OF SANDY SOIL

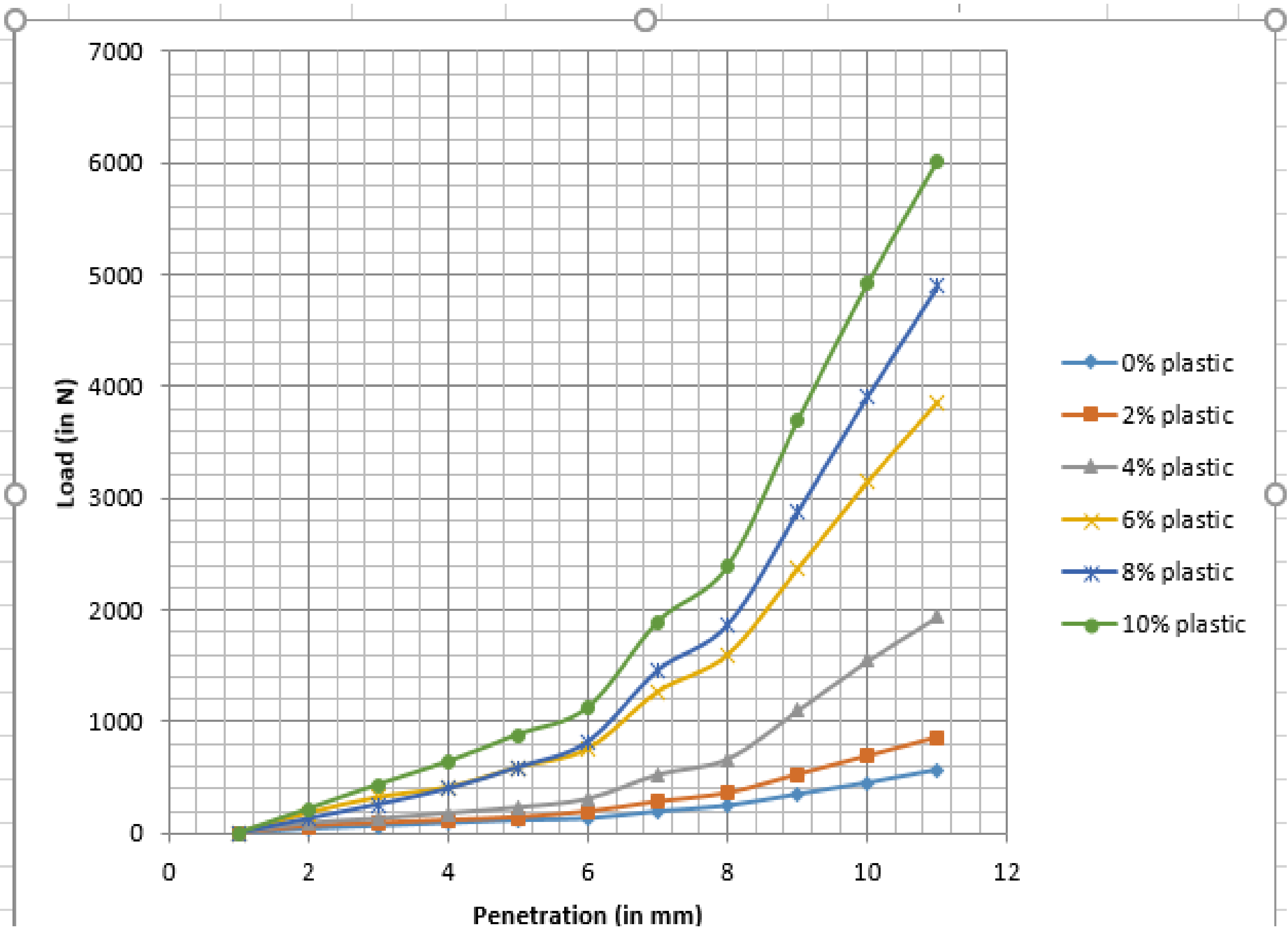
APPARATUS USED: MOULD, SPACER DISC, DIALGAUGES, SURCHARGE WEIGHT, PENETRATION PLUNGER

TABULAR COLUMN (6):

Pentration(mm)	For 0 % plastic		For 2% plastic		For 4% plastic		For 6% plastic		For 8% plastic		For 10% plastic	
	PRR	Load (in N)	PRR	Load (in N)	PRR	Load (in N)	PRR	Load (in N)	PRR	Load (in N)	PRR	Load (in N)
0	0	0	0	0	0	0	0	0	0	0	0	0
0.5	0.6	38.338658	1	63.8977636	1.4	89.456869	2.8	178.91374	2	127.79553	3.4	217.2524
1	1	63.897764	1.4	89.456869	2	127.795527	5	319.48882	4	255.59105	6.8	434.50479
1.5	1.4	89.456869	1.8	115.015974	2.8	178.913738	6.4	408.94569	6.2	396.16613	10	638.97764
2	1.8	115.01597	2.2	140.57508	3.6	230.031949	9.2	587.85942	9.2	587.85942	13.8	881.78914
2.5	2	127.79553	3	191.693291	4.8	306.709265	11.8	753.99361	12.8	817.89137	17.6	1124.6006
4	3	191.69329	4.4	281.15016	8.2	523.961661	19.8	1265.1757	22.8	1456.869	29.6	1891.3738
5	3.8	242.8115	5.6	357.827476	10.4	664.536741	25	1597.4441	29.2	1865.8147	37.4	2389.7764
7.5	5.4	345.04792	8.2	523.961661	17.2	1099.04153	37	2364.2173	45	2875.3994	57.8	3693.2907
10	7	447.28435	10.8	690.095847	24.2	1546.32588	49.2	3143.77	61.2	3910.5431	77	4920.1278
12.5	8.8	562.30032	13.4	856.230032	30.4	1942.49201	60.4	3859.4249	76.6	4894.5687	94.2	6019.1693

GRAPH (4):

CBR TEST FOR SANDY SOIL



8. CONCLUSION

Use of plastic products such as polythene bags, bottles, containers and packing strips etc. is increasing day by day. The disposal of the plastic wastes without causing any ecological hazards has become a real challenge to the present society. Thus using shredded plastic as a soil strengthening is an economical and gainful utilization since there is scarcity of good quality soil for embankments and fills. Thus this project is to meets the challenges of society to reduce the quantities of plastic waste, producing useful material from non-useful waste materials that lead to the foundation of sustainable society. From this study, we can conclude that plastic bottle strips can be used to increase the CBR value of a soil considerably. We can also state from this study that strips cut out of plastic bottles are a better option than the strips cut out of plastic bags, as the cutting of plastic waste from bags is too labourer’s and time consuming, to enhance the CBR value of the soil.

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