

# A STUDY ON INFLUENCE OF SOAKING ON CBR VALUE OF SOIL IN JAMMU AND KASHMIR SRINAGAR BANIHAL NATIONAL HIGHWAY NH44

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**Abstract**— Pavements are a conglomeration of materials. These materials, their associated properties, and their interactions determine the properties of the resultant pavement. Thus, a good understanding of these materials, how they are characterized, and how they perform is fundamental to understanding pavement. The materials which are used in the construction of highway are of intense interest to the highway engineer. This requires not only a thorough understanding of the soil and aggregate properties which affect pavement stability and durability, but also the binding materials which may be added to improve these pavement features. Soil is an accumulation or deposit of earth material, derived naturally from the disintegration of rocks or decay of vegetation that can be excavated readily with power equipment in the field or disintegrated by gentle mechanical means in the laboratory. The supporting soil beneath pavement and its special under courses is called sub grade. Undisturbed soil beneath the pavement is called natural sub grade. Compacted sub grade is the soil compacted by controlled movement of heavy compactors. The performance of pavements depends to a large extent on the strength and stiffness of the subgrade. Among the various methods of evaluating the subgrade strength, CBR test is important but quick estimate of CBR is very important for highway engineer so this study is focus on compression of soaked and unsoaked CBR value.

This Study is an attempt to understand the influence of soaking on CBR value subjected to different days of soaking and the corresponding variation in moisture content. It is observed that the CBR decreases and the moisture content increases for high degree of soaking.

**Keywords**—Pavements, conglomeration of maaterials, strength and stiffness

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## 1. INTRODUCTION

Damages of roads by floods are normal phenomena in J&K and a tremendous Expenditure is required almost after each flood for restoration of the roads. Thusly, inquire about going for finding the methods of damage to roads under flood has turned out to be essential. A few components may have all the earmarks of being in charge of such damages, which should be affirmed by examinations. This investigation went for deciding the impacts of profundity of submergence and term of submergence on the sub level quality of soil tests gathered from the srinagar-banihal National Highway. CBR tests were performed with various heights of submergence after ordinary soaking period and furthermore after delayed submergence. Record and distinguishing proof tests were performed for order and for assurance of the appropriateness of the contemplated soils as subgrade material.

## 2. OBJECTIVE & SCOPE OF STUDY:

It is common in state of J&k that the subgrade quality for expressway pavement configuration is dictated by CBR test estimation. This can be from the research facility CBR test or straightforwardly from field CBR test. The relationship between the aftereffect of CBR doused test and CBR splashed esteem is not really found. This Thesis objective is to get a neighborhood connection between the aftereffects of CBR research facility test without splashed and CBR doused esteem. The connection depends on the correlation CBR un soaked test results and CBR drenched esteem which has a similar division of sand and mud in soil. In Jammu and Kashmir, California Bearing Ratio (CBR) estimation of sub grade is utilized frequently for plan of adaptable pavements. CBR controlled by various methods according to rules of IRC: SP: 72-2007.

1) To gather a specific soil test and decide its essential physical property, for example, LL ,PL ,PI and grain size distribution.

- 2) To examination the soil under adjusted delegate compaction and decide the MDD and OMC for the soil sample
- 3) To do CBR Test for test absorbed various occasions

stiffness is the degree of resistance to deformation upon loading. The extent and time-dependence of, and the degree of recovery from, deformation is primarily dependent upon the soil's properties, existing stress conditions, and the stress history. . The CBR value is used to quantify the response of the pavement foundation and subgrade to loading.

3. IMPORTANCE OF CBR OF SOIL SUBGRADE:

The load bearing capacity of the soil supporting highways, airfield runways and other pavement systems is of immense importance to the integrity of the pavement. This load-bearing capacity, or soil stiffness, changes from time to time and can vary from place to place within a given area. Soil

Table No. 1  
Standard crushes rock from California value

Load (kN)	13.24	19.96
Penetration (mm)	2.5	5.0

### SOIL-GRAIN SIZE ANALYSIS

( as per IS :2720 Part (4) 1985 RA:2006)

<b>Date:</b>	:	1KM / 2019	<b>Date of Testing</b>	:	
<b>Sample ID No</b>	:		<b>Date of Sample Received</b>	:	
<b>Location</b>	:	NH 44A BANIHAL TO SRINAGAR	<b>Wt. of Soil Samle Taken</b>	:	3000 gm
<b>Type of Material</b>	:				

#### A. DRY SIEVING

S. NO.	I.S. SIEVE DESIGNATION	WEIGHT OF SAMPLE RETAINED (gm)	PERCENTAGE OF WEIGHT RETAINED (gm)	CUMULATIVE PERCENT OF WEIGHT RETAINED (%)	PERCENTAGE PASSING (%)
1	80 mm				
2	63 mm				
3	40 mm				
4	25 mm				
5	12.5 mm	0.00	0.00	0.0	100.00
6	10 mm	0.00	0.00	0.00	100.00
7	4.75 mm	0.00	0.00	0.00	100.00
8	PAN				

#### A. DRY SIEVING

S. NO.	I.S. SIEVE DESIGNATION	WEIGHT OF SAMPLE RETAINED (gm)	PERCENTAGE OF WEIGHT RETAINED (gm)	CUMULATIVE PERCENT OF WEIGHT RETAINED (%)	PERCENTAGE PASSING (%)
1	2.36 mm	214.00	7.13	7.1	92.9
2	1.18 mm	346.00	11.53	18.7	81.3
3	600 micron	704.00	23.47	42.1	57.9
4	425 micron	308.00	10.27	52.4	47.6
5	75 micron	186.00	6.20	58.6	41.4

<b>Clay/silt (-75 micron)</b>	<b>41.4 (%)</b>
<b>Sand (-4.75 mm, +75 micron)</b>	<b>58.6 (%)</b>
<b>Gravel (-40 mm, + 4.75mm)</b>	<b>0.00 (%)</b>

**CBR with 24 Hrs. Soaking  
Sample No. 1**

**TEST OBSERVATION SHEET**

**CALIFORNIA BEARING RATIO (CBR) TEST  
( as per IS :2720 Part (16) 1987 RA:2002)**

Date:

Sample No            **1**

Date of Testing

Value of one divn. in        =                    **102.04**

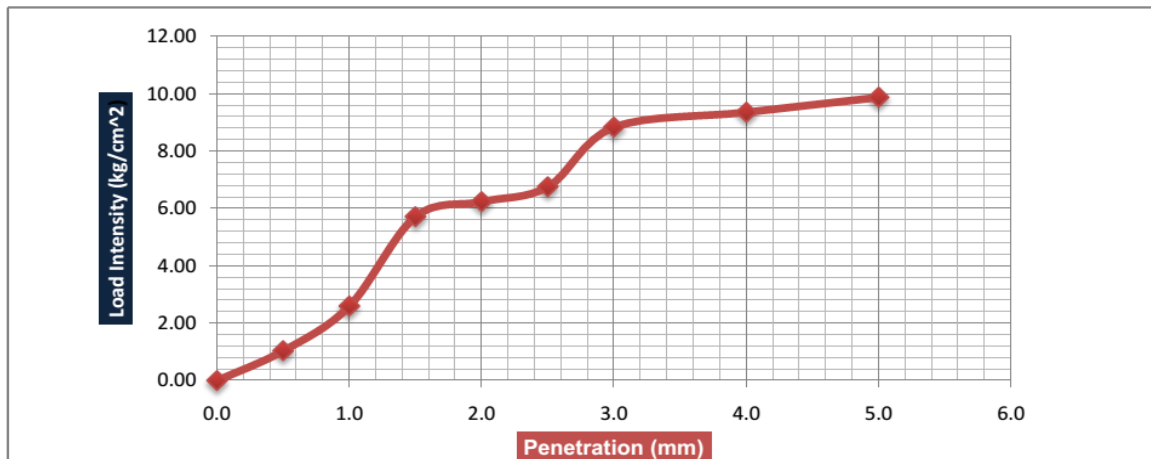
Plungeer Area =                                **19.625 CM<sup>2</sup>**

Time of Soaking 24 Hrs.

Capacity of Proving Ring :                    **50 KN**

Min.Sec	Penetration	Proving Ring Reading	Load Intensity (Kg/cm <sup>2</sup> ) (A) x one divn. Value/ Area of Plunger	Corrected Load Intensity (kg/cm <sup>2</sup> )	Standard Load Intensity (kg/cm <sup>2</sup> )	Unsoaked/Soaked C.B.R.(%) C x 100/D
		(A)	(B)	(C)	(D)	(E)
Min.Sec.	(mm)	i	i	i	Std	i
0-0	0.0	0	0.00			
0-24	0.5	0.2	1.04			
0-48	1.0	0.5	2.60			
1-12	1.5	1.1	5.72			
1-36	2.0	1.2	6.24			
2-0	2.5	<b>1.3</b>	6.76	6.76	<b>70.0</b>	<b>9.66</b>
2-24	3.0	1.7	8.84			
3-12	4.0	1.8	9.36			
4-0	5.0	<b>1.9</b>	9.88	9.88	<b>105.0</b>	<b>9.41</b>
6-0	7.5		0.00			
8-0	10.0		0.00			
10-0	12.5		0.00			

<b>CALIFORNIA BEARING RATIO (CBR) at 2.5 mm</b>		<b>9.66 %</b>
<b>CALIFORNIA BEARING RATIO (CBR) at 5.0 mm</b>		<b>9.41 %</b>



4. CONCLUSIONS & RECOMMANDATION FOR FUTHER STUDY

CONCLUSION

From the results and discussions described earlier, it is observed that the CBR value of the given soil sample decreases rapidly with time of soaking up to 24 hrs. and then decreases slowly. When soil samples are taken from different points of the CBR sample and tested This Study is an attempt to understand the influence of soaking on CBR value subjected to different days of

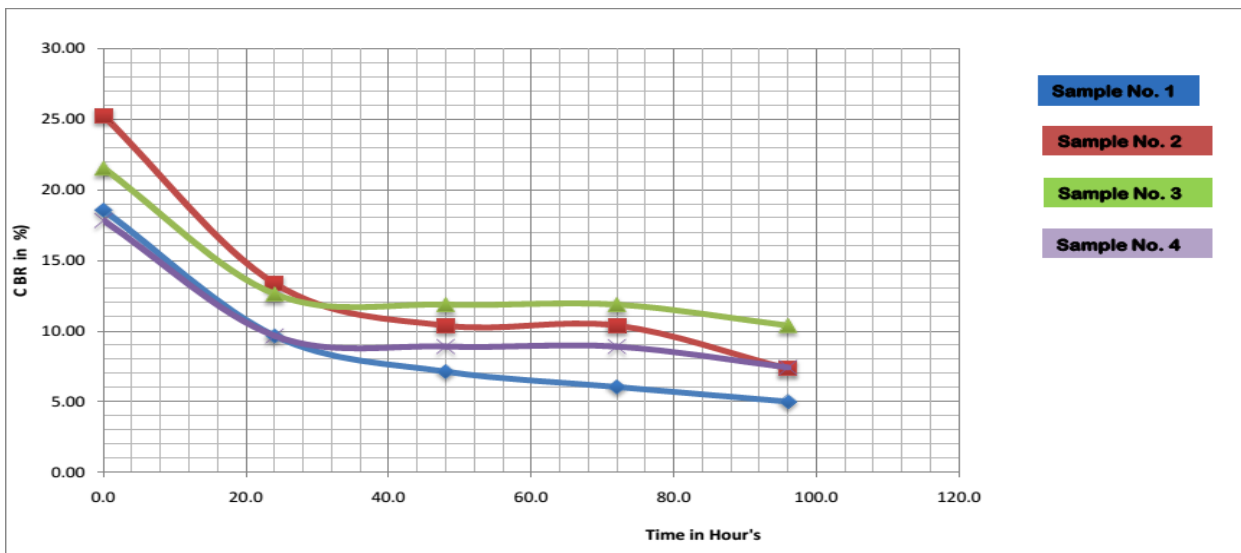
soaking and the corresponding variation in moisture content. It is observed that the CBR decreases and the moisture content increases for high degree of soaking.

5. RECOMMANDATION FOR FUTHER STUDY

It is recommended that more studies on different type of soil prevailing in studies to be conducted involving large number of samples

**Table No. 12**  
(Variation of CBR with time of soaking of sample no 1 to 4)

Sampl e No.	CBR result (0 Hrs.)	CBR result (24 Hrs.)	CBR result (48 Hrs.)	CBR result (48 Hrs.)	CBR result (72 Hrs.)	CBR result (96 Hrs.)
1	18.5 7	9.66	7.14	7.14	6.05	5.02
2	25.2 5	13.37	10.4	10.4	7.35	6.19
3	21.5 4	12.63	11.8 8	11.88	10.4	8.37
4	17.8 3	9.66	8.91	8.91	7.43	5.31



**Fig No. 30****(Variation of CBR with time of soaking of sample no 1 to 4****REFERENCES**

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