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Ground Improvement Techniques, By Stone Column Method

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Abstract - *Generally ground improvement techniques are use to increase soil properties. This method require in construction industry. In ground improvement the stone column technique is more efficient method due to stone column same soil parameter improve like bearing capacity and settlement reduction stone column method is use in project this paper is an attempt to disuses about stone column method in detail it include geogrids. Soil sample and saw dust. All results are taken in a laboratory.*

Keywords- *Vibrofloat, Reclamation, Stabilization, Soil*

INTRODUCTION

Ground improvement techniques are method used by geotechnical engineer for fixing the problem of poor soil to increase bearing capacity, reduce settlement and the type which it occurs, and reduce seepage. Stone Column is most popular simple, economical technique. It is use in India in city like Delhi, Bangalore, Jaipur, Rajasthan, etc. this method is suitable in any area like snowfall area, marsh area, etc.in this method different type stone can be used like natural stone, engineered stone, metamorphic stone, but we are use in practical ceramic beads. Out of several techniques available for improving the weak strata, stone columns have been used to a large extend for several applications. This necessitated the use of land, which has weak strata, wherein the geotechnical engineers are challenged by presence of different problematic soils with varied engineering characteristics. in view of the developments on coastal areas in the recent past, large number of ports and industries are being built.

The stabilization of soils by displacing soil radially, with the help of a deep vibrator, refilling the resulting space with granular material and compacting the same with the vibrator is called vibrostone columns or simply stone columns. In other words, stone columns are constructed where in the soft soil is strengthened by replacing a certain percentage of soil with aggregate.

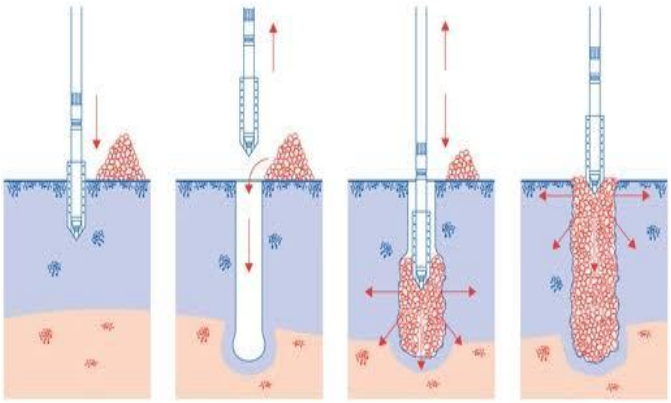


Fig. 1. Drilling Hole & Fill Stones

Fig. 2. Saw Dust

I. LABOROTORY TESTING

Case 1 :- Settlement of saw dust without stone column (0% Water Content)
Case 2 :- Settlement of saw dust without stone column (100% Water Content)
Case 3 :- Settlement of saw dust with stone column (0% Water Content)
Case 4 :- Settlement of saw dust with stone column (100% Water Content)
Apparatus: Weight, Weighing machine, Ceramic beads, Pan, Scale, Pipe (3 cm dia.), Geogrids, Saw dust.

Experimental Work:

1. Take the saw dust which is used as a replaceable soil to increase soil properties.
2. Load applied on a saw dust which have 0% water content.
3. Note down all reading as shown in fig. by using scale.

4. Drill hole 3 cm dia. and add marble and applied load on stone column .
5. Note down all reading of settlement stone column which contain 0% water content.
6. Add 100% water content in saw dust and apply load on it take reading of settlement of saw dust.
7. Drill the hole of 3 cm dia. and add marble in it and apply load on it.
8. Note down all reading of settlement of saw dust contain 100% water content.
9. Draw graph of reading and compare settlement of saw dust to each other.

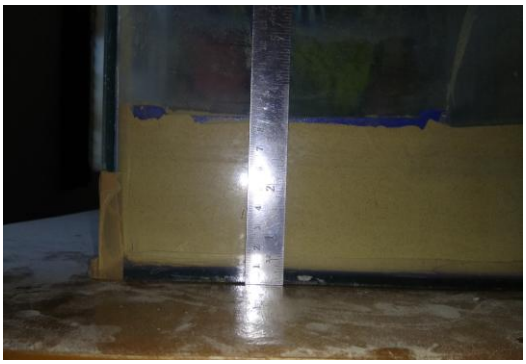


Fig. 3. Saw dust before applied load

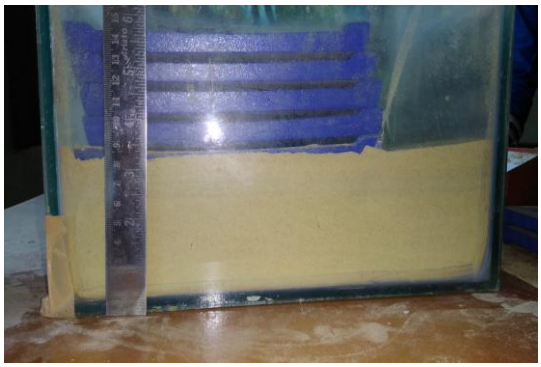


Fig. 4. Saw dust after applied load

Observation:

Saw Dust 0% Water Content (Without Stone Column)

Sr. No.	Height (CM)	Load Applied (KG)
1	9	No Load
2	7.8	1
3	7.5	2
4	7.4	3
5	7.3	4
6	7.2	5
7	7.1	6
8	7.1	7
9	7.1	8
10	7.1	9
11	7.1	10

Saw Dust 100% Water Content (Without Stone Column)

Sr. No.	Height (CM)	Load Applied (KG)
1	10.5	No Load
2	9.5	1
3	9.2	2
4	8.9	3
5	7.7	4
6	7.5	5
7	7.4	6
8	7.3	7
9	7.2	8
10	7.7	9
11	7.7	10

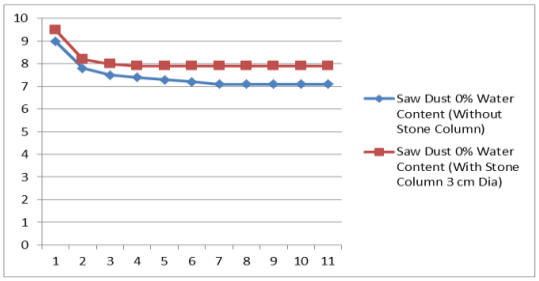
Saw Dust 0% Water Content (With Stone Column 3 cm Dia)

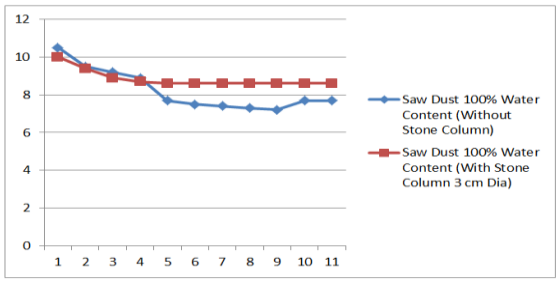
Sr. No.	Height (CM)	Load Applied (KG)
1	9.5	No Load
2	8.2	1
3	8	2
4	7.9	3
5	7.9	4
6	7.9	5
7	7.9	6
8	7.9	7
9	7.9	8
10	7.9	9
11	7.9	10

Saw Dust 100% Water Content (With Stone Column 3 cm Dia)

Sr. No.	Height (CM)	Load Applied (KG)
1	10	No Load
2	9.4	1
3	8.9	2
4	8.7	3
5	8.6	4
6	8.6	5
7	8.6	6
8	8.6	7
9	8.6	8
10	8.6	9
11	8.6	10

Result:





Conclusion:

1. Soil properties increase by using replaceable soil e.g. Saw dust.
2. Initially settlement of saw dust is more.
3. After introducing stone column settlement reduce to some extent.
4. Water content at 0% the settlement is more as compare to 100% water content.
5. Settlement remain same or constant after some load applied on it.

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