Strength of Rapid Repair of Grouted Sand after Disaster

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Abstract: Foundation stability is an important use for grout in geotechnical engineering and grout is a material that can be used in construction to fill voids, seal joints, embed rebar into masonry walls or to inject into the ground for foundation stability. After natural disaster like hurricanes, soil can be damaged tremendously. In this study, damaged two grouted sand samples were repaired using Acyrlamide grout.

1. Introduction

Acrylamide (C3H5NO), is a monomer that is used as an aqueous solution in the grouting applications. Catalysts, activators, accelerators and inhibitors are mixed together to obtain grout solution. Since soil is a construction material and easy to access, it can be used for constructing dams, roads, embankments and house. There are many attempts to improve strength properties of soil. In this study, damaged grouted sand samples will be repaired by acrylamide grout.

2. Objective

The overall objective was to investigate the compressive strength of grouted sand after repairs.

3. Materials and Methods

In this study, damaged grouted sand were repaired. In the beginning compressive strength of samples were 47 and 45 psi. After disaster, specimens were damaged and the compressive strength was undesirable. The damaged samples were soaked in grout for rapid repair. Repairing resulted in 5% weight gain in the specimens.

(a) **(b)**

Figure 1. (a) Damaged grouted sands, (b) Repaired grouted sand

4. Results and Analyses

After repaired, density of grouted sands was increased around 5% and It affected positively compressive strength of samples. Compressive strength of samples was 17 and 15 psi respectively. (Fig. 2)

Table 1. Summary of the results

Sample	Weight (gram)		Density (gr/cm3)		Strength (psi)	
	Before	After	before	after	before	after
#1	200	210	1.83	1.93	47	17
#2	202	212	1.85	1.95	45	15

5. Conclusion

Repairing resulted up to 38% in strength gain in the damaged grouted sands.

6. Acknowledgement

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7. References

[1] CIGMAT GR 2-04. Standard Test Methods for Unconfined Compressive Strength of Grouts and Grouted Sand Specimen. CIGMAT, University of Houston, TX, 2000

[2] Grouting: Compaction, Remediation and Testing. Ed. C. Vipulanandan. New York: American Society of Civil Engineers, 1997.