

# Short Term Effect of Salt Contamination on Resistivity Change of Grouted Sand with 0.5% Conductive Filler

H.I. Kula and C. Vipulanandan, Ph.D., P.E.

Texas Hurricane Center for Innovative Technology (THC-IT)

Department of Civil and Environmental Engineering

University of Houston, Houston, Texas 77204-4003

E-mail: hikula@uh.edu, cvipulanandan@uh.edu Phone: (713) 743-4278

## Abstract

In this study the effect of salt contamination, on changing resistivity of acrylamide grouted sand was investigated at room temperature. The results showed that resistivity change of grouted sand that has 0.5% conductive filler decreased 90% of resistivity with 24 hours observing. Also, weight change for 0% CF and 0.5%CF grouted sand was similar in 3% Salt contamination.

## 1. Introduction

During a hurricane, based on the location there could be potential for contamination of the grouted sand. Acrylamide ( $C_3H_5NO$ ), is a monomer that is used as an aqueous solution in the grouting applications and it can be affected by salt. Catalysts, activators, accelerators and inhibitors are mixed together to obtain grout solution. (Vipulanandan, Ozgurel)

## 2. Objective

The objective of this study was to observe resistivity change of grouted sand under salt contamination.

## 3. Method and Materials

For this study, two fine sand samples were used for grouted sand with 0.5% CF and without it. (Fig.1) Molds were filled with sand, and then grout was injected into the sand. The grouted sands were cured in the molds till the time of testing. After 28 days, prepared fine grouted sands were soaked into 3% salt contamination. (Fig.2) Using LCR device, resistivity change was investigated with time.



Figure 1. Grouted Sand Samples



Figure 2. Change in Resistivity using LCR

### 4. Results

By adding CF decreased initial resistance of grouted sand around 6%. Because of fully grouted condition weight change was similar for both samples. It was around 3%. Furthermore, resistance for both samples decreased with time. (Fig 3.) Increasing weight change showed that resistivity change of grouted sands was 90% and 76% by adding 0.5%CF and 0% CF, respectively.

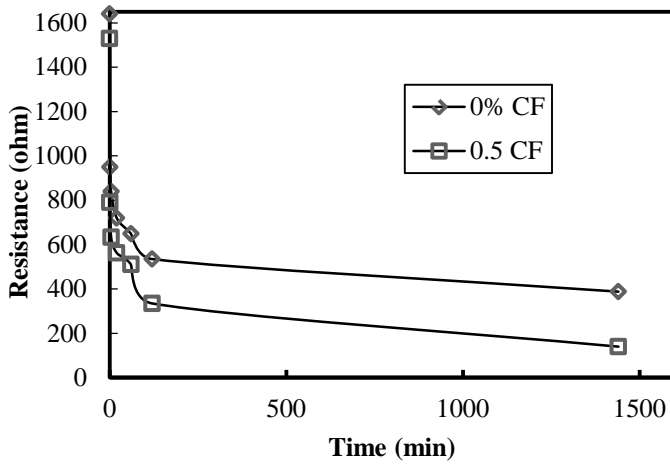


Figure 3. Resistance vs Time

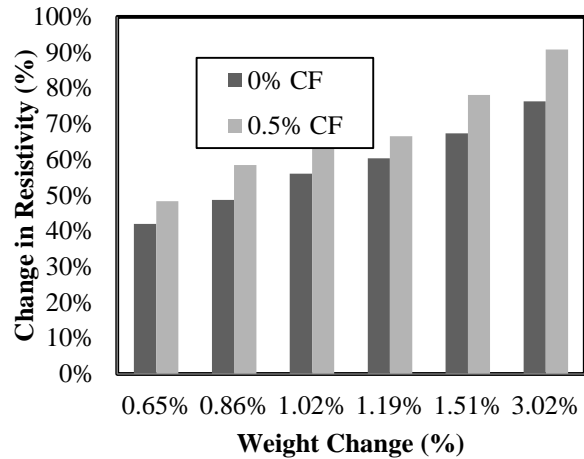


Figure 4. The effect of weight change in resistivity

### 5. Conclusion

By adding 0.5% CF into grouted sand affected resistivity more. Increasing weight change decreased resistivity change around 90% by using 0.5 % CF.

### 6. Acknowledgment

This study was supported by the Texas Hurricane Center for Innovative Technology (THC -IT).

### 6. References

1. Ozgurel, H. G., and Vipulanandan, C. “Effect of Grain Size and Distribution on Permeability and Mechanical Behavior of Acrylamide Grouted Sand.” Journal of Geotechnical and Geoenvironmental Engineering ASCE (2005): 1457-65.