

MARCH 2005 MEETING

Wednesday, March 15, 2005

TECHNICAL PROGRAM

Intelligent Compaction - An Overview

Speaker: Jean-Louis Briaud, Ph.D., P.E., Spencer J. Buchanan Professor, Dept of Civil Engineering, Texas A&M University, ASCE National Chair of Shallow Foundations Committee 1989-94,

PRESENTATION SUMMARY

To an audience of about 55, Dr. Briaud presented his paper entitled, "Intelligent Compaction - An Overview." Dr. Briaud spoke about dry density measurements, saying that dry density is not related to design, not easy to measure in the field (takes 5 minutes per test), and since 911, nuclear density meters for compaction testing are not very welcome. He said for these reasons, there is an emphasis to move away from dry density control to modulus control.

Dr. Briaud described changes if modulus control is used for compaction testing: in the lab, we would need to perform modulus testing to get modulus vs. moisture content curves, then specify some percent of E_{max} within a range of optimum moisture content. Finally in the field, we would perform intelligent compaction to test while compacting.

Dr. Briaud said that unlike the dry density measurement, modulus is very sensitive to moisture content changes, which is good. However, there are still some things to work out such as which modulus to use (S_u , S_c , S_r , S_s , or S_t ?). He has devised a simple device with strain gauges to measure modulus in the lab (in the standard Proctor mold) called the Briaud Plate Test (BPT). He has also devised a field modulus measurement device to check compaction by just leaning on it with about 50 lbs. of force, enabling the operator to quickly measure soil modulus. This device is called the Briaud Compaction Device (BCD). At the bottom of the device is a 2 mm thick by 150 mm diameter plate with strain gauges.

Dr. Briaud spoke about the possibility of instrumenting vibratory compaction rollers that would measure roller acceleration as a function of time, calculate a soil modulus, and then automatically and instantaneously modify the force, amplitude and frequency settings to meet the target modulus value. This is what he referred to an intelligent compaction.

To download a copy of Dr. Briaud's slide presentation in Adobe Acrobat format (2.6 Mb), [click here](#).

To read a summary of Dr. Briaud's talk to the FPA in March 2002, [click here](#).

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