Hayes J.A. 1990. "The Marchetti Dilatometer and Compressibility" Paper presented to the Southern Ontario Section of the Canad. Geot. Soc. Seminar on "In Situ Testing and Monitoring" , Sept.

THE MARCHETTI DILATOMETER AND COMPRESSIBILITY

John A. Hayes, P. Eng., President,
Site Investigation Services Limited,
Peterborough, Ontario, Canada.

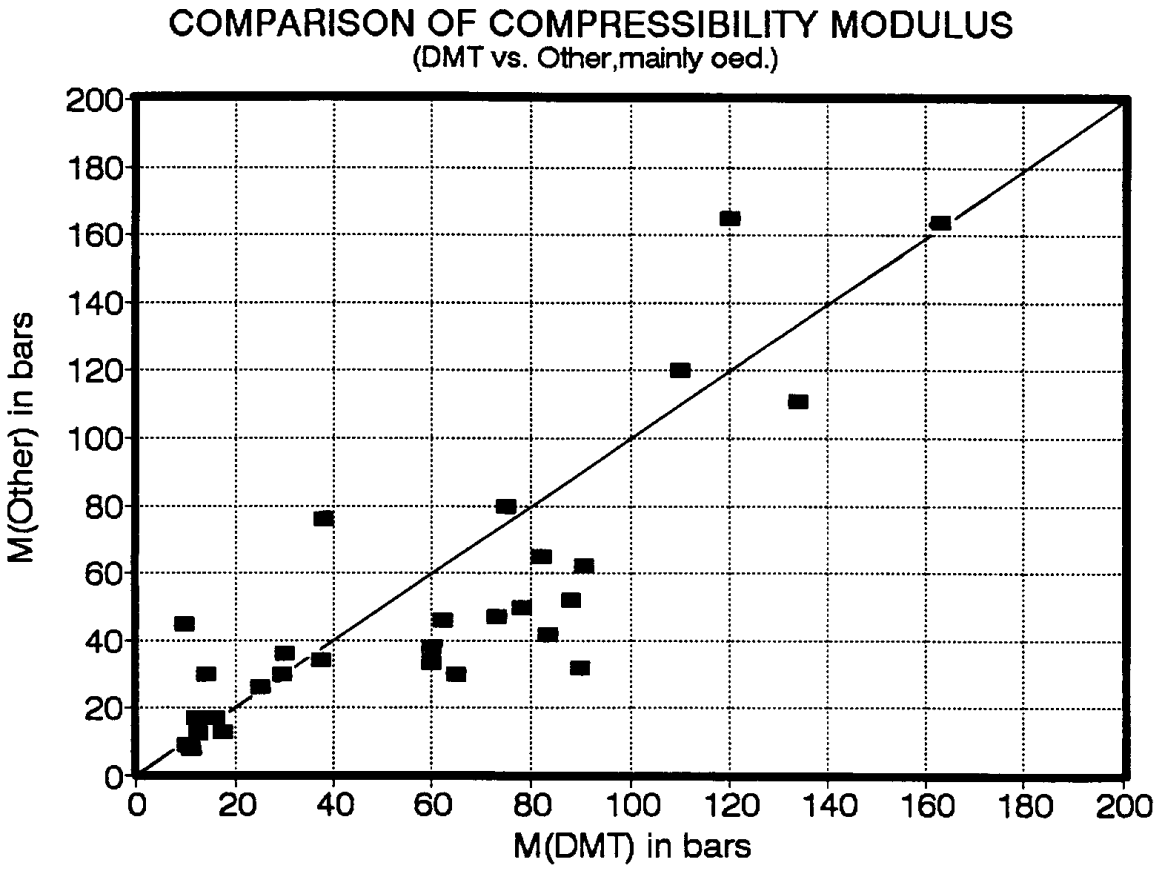
INTRODUCTION

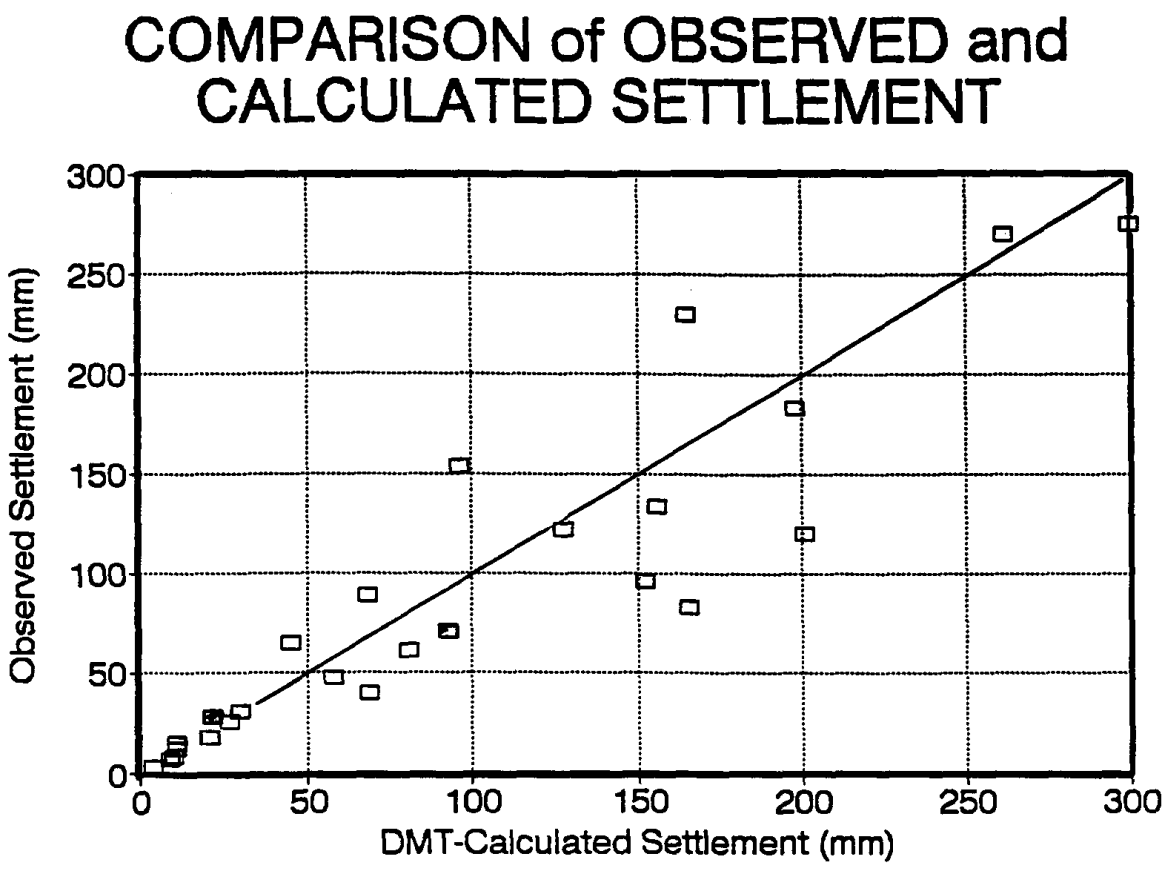
The dilatometer test (DMT) was initially conceived by Professor Silvano Marchetti as a method to get a lateral modulus response for laterally-loaded steel piles. He started developing an in-situ tool for horizontal modulus in 1974. The DMT was introduced at the ASCE Specialty Conference in Raleigh in 1975 and at the IX ICSMFE, in Tokyo, in 1977.

At the latter conference he was inspired by Burland's statement that "---it can be concluded that testing should be aimed at establishing the simple in-situ parameters. The most important appears to be the one-dimensional compressibility m_v, or the equivalent effective vertical Young's Modulus E_v and the variation with depth." (Burland, 1977). In the same year, Marchetti discovered that there was an apparent correlation between E_D and M, or $1/m_v$.

In 1979 an association between Marchetti and Dr. John Schmertmann resulted in the introduction of DMT equipment to North America, along with continuing research and development of equipment, procedures and interpretation. Major contributions to our understanding of the DMT have been made since then by Schmertmann, Jamiolkowski, Campanella, Robertson and others.

It is important to note that Marchetti provided not only a new device for in-situ testing but also a useful set of correlations that made the DMT immediately useful to practising engineers. In today's parlance the set of correlations amounts to an "expert system". This system takes the raw data from the DMT, computes the basic index parameters and then filters the information through a series of conditional statements to produce an estimate of several useful geotechnical parameters. When we are discussing the DMT it is important to distinguish between the basic data (index properties) which it provides and the interpreted information (conventional geotechnical parameters) which evolves from the "expert system".


COMPARISON OF COMPRESSIBILITY MODULUS
(DMT vs. Other,mainly oed.)
M(Other) in bars
M(DMT) in bars
0
20
40
60
80
100
120
140
160
180
200


COMPARISON of OBSERVED and CALCULATED SETTLEMENT
Observed Settlement (mm)
DMT-Calculated Settlement (mm)
0
50
100
150
200
250
300