

## **DECEMBER 2007 MEETING**

Wednesday, December 12, 2007

### **TECHNICAL PROGRAM**

#### **Design of Structures to Resist the Pressures and Movements of Expansive Soils**

*Speaker:* [Dr. Robert L. Lytton](#) of Texas A&M University, Bryan TX, Tel. No. 979-845-9964

### **PRESENTATION SUMMARY**

To a room of about 80, Dr. Robert Lytton, Honorary FPA Life Member, Professor of Civil Engineering in the Zachry Civil Engineering Department of the Texas A&M University, a Licensed Professional Engineer with a Ph.D. in Civil Engineering from the University of Texas, and author of over 200 papers on expansive soils gave a presentation entitled, "Design of Structures to Resist the Pressures and Movements of Expansive Soils".

Dr. Lytton's presentation was based on research work by several associates and students of his at TAMU, including Gyeong-Taek Hong and Rong Luo, both of whom accompanied him at the presentation. With the more recent work by Mr. Hong and Ms. Luo, Dr. Lytton was able to demonstrate how suction can be used in the design of nearly all foundations and structures on expansive soil. While his past FPA presentations demonstrated the use of suction for the design of slab-on-ground, pavements, and embankments, this presentation detailed the same methodology in designing drilled piers and retaining walls.

Dr. Lytton reviewed the basics of suction, noting that movement due to swell is typically about twice the movement due to shrinkage, a phenomenon often observed in evaluating vertical movement of slab-on-grade, and that the active zone always ends at the point where  $pF$  reaches 4.5, since trees wilt at that point and roots will not grow there.

In designing retaining walls, Dr. Lytton showed how soil expansion pressures near the top of the wall can be as high or higher than the design active pressures near the base, instead of zero as usually assumed. In designing drilled piers, he demonstrated that un-balanced lateral pressures near the top of drilled piers can be substantial and can fail the pier shafts in bending if not accounted for in the design. The bending moments and shears in the piers and walls can be computed using BMCOL76 public domain software.

To download Dr. Lytton's slide presentation, click [here](#).

To read summaries of previous FPA presentations by Dr. Lytton, please click:

[December 2006](#)

[December 2004](#)

[August 2003](#)

[August 2002](#)

[August 2001](#)

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