

Geotechnical Aspects of Pavements

Problem:

Many groups within a State Highway Agency are involved with different aspects of definition, design use and construction verification of pavement geomaterials. These groups include pavement design engineers, geotechnical engineers, specification writers, and construction engineers. These various personnel should develop a better understanding of the geotechnical aspects of pavements and work closer together as a team to enhance current procedures to build and maintain more cost efficient pavement structures. The geotechnical aspects are particularly important today as longer pavement performance (analysis) periods are being used in design.

Putting it in Perspective:

Pavements with asphalt or concrete surface layers have been used in the United States since the late 1880s. Although pavement materials and construction methods have advanced significantly over the past century, until the last decade, pavement design has been largely empirical, based on regional experience. There is a need for using more sophisticated design methods considering that there are more than twenty variables just for the geotechnical features that influence the design in a modern pavement system. Newer, more sophisticated design models for flexible and rigid pavements, better methods for subsurface exploration, resilient modulus test method that allows for direct modeling of the dynamic response of subsurface soils and base course aggregate materials, and more rapid technique that allows for real time evaluation of each pavement layer as it is constructed are now available.

Better design and construction quality and reduction in project costs can be achieved by providing knowledge and training to the State Highway Agencies so they can apply state of the art technologies in their design and construction of pavements.

Solution:

An NHI Course 132040 - GEOTECHNICAL ASPECTS OF PAVEMENTS is being developed and will be offered to the State Highway Agencies beginning Fall 2004. It will assist pavement design engineers, geotechnical engineers, specification writers, and construction engineers in understanding the latest methods and procedures to address the geotechnical issues in pavement design, construction and performance including:

- A review of the geotechnical parameters of interest in pavement design and construction.
- The influence of climate, moisture, and drainage on pavement performance.
- The impact of unsuitable subgrades on pavement performance.
- The determination of the geotechnical inputs needed for pavement design and construction.
- Evaluation and selection of appropriate remediation measures for unsuitable subgrades.
- The geotechnical aspects of pavement specifications and inspection requirements.
- Subgrade problems during construction and recommended solutions.

The course will cover the latest methods and procedures for:

- new construction,
- reconstruction, and
- rehabilitation projects (e.g., widening, overlays and treatments).

The course will cover designing and constructing pavement subgrades and unbound materials for paved and unpaved roads with emphasis on:

- the current AASHTO, 1993 design guidelines, and
- the mechanistic-empirical design approach being developed under the NCHRP 1-37A.

Benefits:

- Provides state-of-the-art tools concerning geotechnical aspects of pavements for planning, design, construction, repair and maintenance phases of transportation projects
- Improve design and construction quality, increase safety, and reduce costs of transportation projects.

Additional Resources:

To learn more visit the NHI catalog Course Number 132040.

For More Information, contact:

Sam Mansukhani

Phone: (708) 283-3550

Email: sam.mansukhani@fhwa.dot.gov