RESEARCH HIGHLIGHT - TEXAS TECH UNIVERSITY

APRIL 23, 2014

Texas Transportation Commission
Partnership – TxDOT & Texas Tech Research Centers

Center for Multidisciplinary Research in Transportation (TechMRT)
- Pavement Engineering and Construction
- Geotechnical Engineering
- Structural Engineering
- Traffic Engineering
- Environmental Engineering

National Wind Institute
- Wind Science and Engineering (WiSE) Research Center
- Texas Wind Energy Institute (TWEI)
Reese Technology Center

Former US Air Force Base
Regional Technology Center

Texas Tech is an anchor customer for RTC

– Texas Tech Wind Science & Engineering Research Center
– The Institute of Environmental and Human Health/Non-woven Cotton Research
Partnership – TxDOT & Texas Tech

TechMRT

- $4.8M in research funding since 2008
- Five research projects have been selected for the TxDOT Top Innovations Award
- Texas Tech researchers have trained over two thousand TxDOT employees
- Seven research projects completed in FY 2013
- Five research projects currently active
- Upgraded research infrastructure
LEAN CLAY (CL): brown, with stone fragments

SANDY CLAY (CL): brown & tan

CLAYEY SAND (SC): tan, with calcareous gravel
- Seal Coat Constructability Review
  • $17.5m operational costs saved

- STV Lighting Design Method
  • $11m operational costs saved

- Pavement Edge Repair and Maintenance
  • $4.5m operational costs saved

- Micro-Deval Aggregate Test
  • $1.5m operational costs saved
Research in all Major Areas of Transportation

- Pavements
- Geotechnical
- Structural & Wind
- Hydrology
- Traffic
- TTU is a member of the consortium of eight universities
- The Region 10 UTC for Center funded by USDOT
- Covers the five-state region of TX, OK, NM, AR, LA
- Theme: State of Good Repair of Transportation Infrastructure
- Emphasis on climate adaptive transportation systems
- $5M for four years
Research Clusters Related to Transportation

- Advanced Vehicle Technologies
- Climate Adaptive Infrastructure
- Advanced Material Systems for Infrastructure
- Wind-Induced Damage to Transportation Infrastructure
National Wind Institute

- Partnering with four other universities on a $2.2M Texas Emerging Technology Fund project awarded recently by Governor Perry
- Several research facilities as well as a 67-acre research field site
  - Wind hazard mitigation
  - Wind engineering and science
  - Wind energy
- One active research project
  - $500K in research funding

Partnership – TxDOT & Texas Tech
Aligning to strategic goals: Connecting Texas Communities

- Minimize premature distresses in continuously reinforced concrete pavement
- Pilot implementation of whitetopping
- Reliability-based deep foundation design using Texas cone penetrometer (TCP) test
Aligning to Strategic Goals: Maintaining a Safe System

- Snow and ice chemicals for Texas roads
- Implementation of best practices for TxDOT on handling wildland fires
- Testing of alternative support materials for portable signs for maintenance work zones
- Repair systems for deteriorated bridge piles
- Development of design guidelines and mitigation strategies for wind-induced traffic signal structure vibrations
Safety and Efficiency: Snow and Ice Chemicals for Texas Roads
Winter Weather Management and Operations Curriculum Development and Instruction

- Delivered *management* training to 700 TxDOT personnel
- Delivered *operations* training through train-the-trainer courses
Aligning to Strategic Goals: Best in Class Agency

- Project level performance database for rigid pavement in Texas
- Preparing for EPA effluent limitation guidelines
- Load rating TxDOT culvert design standards
- Empirical flow parameter distributions — a tool for hydraulic model validity assessment
- Seal coat quality: does low cost mean low quality?
Recent Successes: Pilot Implementation of White-Topping

What is White-topping?

- White-topping is an innovative overlay/leveling maintenance technique that uses concrete instead of asphalt as an overlay for an existing hot mix asphalt concrete (HMAC) pavement. It is used to address distresses in asphalt pavement such as rutting and shoving and may minimize development of potholes.

- TechMRT developed the design procedures used by TxDOT for white-topping.
Moore County Fire of 2011
Implementation of Best Practices for TxDOT in Handling Wildland Fires

Eastland County Fire of 2011 - Possum Kingdom Lake
Bastrop County Complex Fire of 2011
June 6, 2011, TxDOT contracted with TechMRT through Research Project 0-6735 to capture “Best Practices for TxDOT on Handling Wildfires.”
Along with capturing best practices, TechMRT also developed a training course for TxDOT personnel who have to deal with wildfire situations.

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