

# Impacts of Energy Developments on the Transportation Infrastructure and Right- of-Way

TxDOT Research Project 0-6498

Completed August 2012

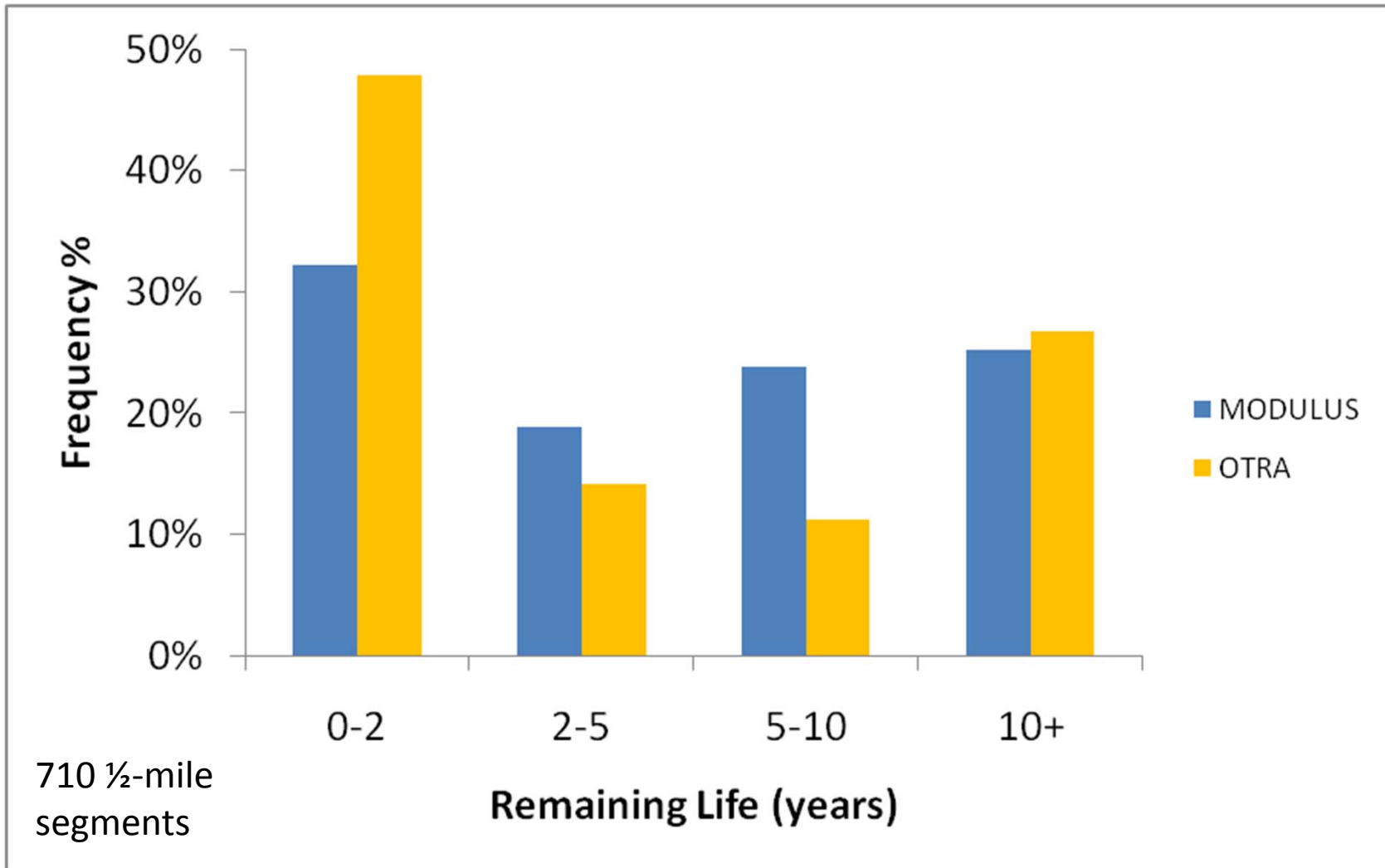
Texas Transportation Institute

The Texas A&M University System

# Summary of Research Activities

- Field visits and data collection
- Geodatabase of energy developments
- Pavement impacts
- Roadside impacts
- Operational and safety impacts
- Stakeholder meetings
- Strategy recommendations

# Remaining Life Analysis - Summary



# Saltwater Disposal Facility Impact

Saltwater Disposal Facility				Pavement Life (Years) for No. of Design ESALs		
Capacity barrels/day	No. truck loads per day	No. truck loads per year	No. ESALs used per year	750,000	2,500,000	7,000,000
1,000	10	3,494	8,581	87.4	291.3	815.8
3,000	29	10,483	25,743	29.1	97.1	271.9
10,000	97	34,944	85,810	8.7	29.1	81.6
20,000	194	69,888	171,621	4.4	14.6	40.8
25,000	243	87,360	214,526	3.5	11.7	32.6
30,000	291	104,832	257,431	2.9	9.7	27.2
37,000	359	129,293	317,499	2.4	7.9	22.0

Impact on roads near the saltwater disposal facility is lower if energy developers recycle saltwater at the gas well location or use a pipeline to carry saltwater.

2CST 6-in flex 6-in LSS (FM 2095)	2CST 8-11 in flex 8-in LSS (SH 11)	3-in HMA 10-in CSB 8-in LSS (US 79)
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2CST: Two-course surface treatment  
HMA: Hot-mix asphalt  
CSB: Cement-stabilized base  
LSS: Lime-stabilized subgrade

# Statewide Impact Estimate Caveats

- Impact to Farm to Market system, but not local roads
- Impact to bridges not included
- Impact of overweight vehicles not included
- Saltwater disposal facilities not included
- Truck hauling of petroleum products in areas not served by pipelines not included

# Strategy Recommendations

- Road maintenance and repair:
  - Strengthen the use of triaxial design checks in the current flexible pavement design method.
  - Extend the use of nondestructive testing tools.
  - **Strengthen guidelines for cross sectional elements on rural two-lane highways.**
  - **Examine the feasibility of converting paved roads to gravel surface roads.**

# Strategy Recommendations

- Roadside management:
  - **Strengthen driveway permitting requirements.**
  - Automate the driveway permitting process.

# Research Update - 2012

- Preventive treatments limited by funding
- Heavier loads have an exponential impact
- Additional hauling of petroleum products
- Updating of material prices
- Equal or greater impacts to local roads



# Estimated Annual Impacts

- Original Estimate for FM System: \$890 million
  - Additional 20% for heavier trucks
  - Additional 15% for higher road material prices
  - Very conservative: well over \$1 billion annually
- Extrapolating to local roads
  - Similar number of lane miles
  - Lower original design requirements
  - Estimated impacts well over \$1 billion annually