Summary

PP-16-14

Maintenance Division
Inter Agency Contract

Summer 2016

Information Available

- TxDOT Maintenance Division (MNT)

- Share Point Site
- https://txdot.sharepoint.com/sites/division-mnt/site pages/home.aspx

Expected Outcomes

- **Select Repair Strategies** that will
  - Improve opportunities for correct decisions
  - Reduce risk of incorrect decisions
- **Reduce repair cost**
  - First cost
  - Life cycle cost
- **Reduce traffic disruption**
- **Improve safety**

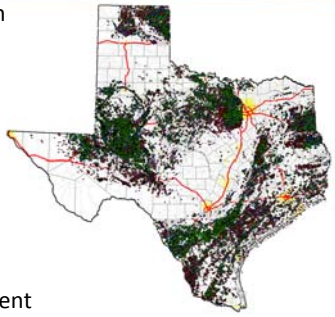
Workshop Documents

- Agenda
- PowerPoint Presentations
- Energy Sector Briefs
- List of Documents
- Thichkess Design

Documents

- Energy Sector Briefs (ESB)
- Implementation Reports (IR)
- Technical Memorandum (TM)
- Research Reports (RR)

- **Oil/Gas permits issued/year-10,000 to 24,000**
- **Well development**
  - Site preparation
  - Drilling
  - Completion
  - Operating Infrastructure
- **Well operation**
  - Crude haul
  - Salt water haul
  - Re-stimulation
  - Service equipment



BACKGROUND

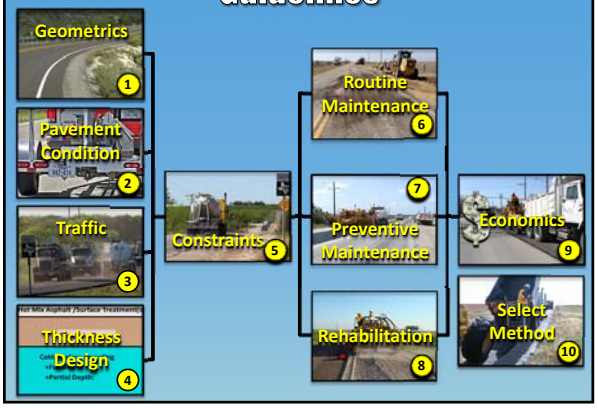
- **Well development**
  - 1,000 to 4,000 loaded trucks
- **Well operation**
  - Crude oil haul
  - Salt water haul
  - Re-stimulation (2,000 plus or minus)
  - Service equipment

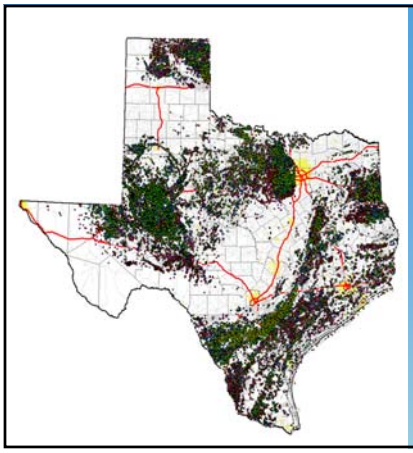
BACKGROUND

Economic Impact

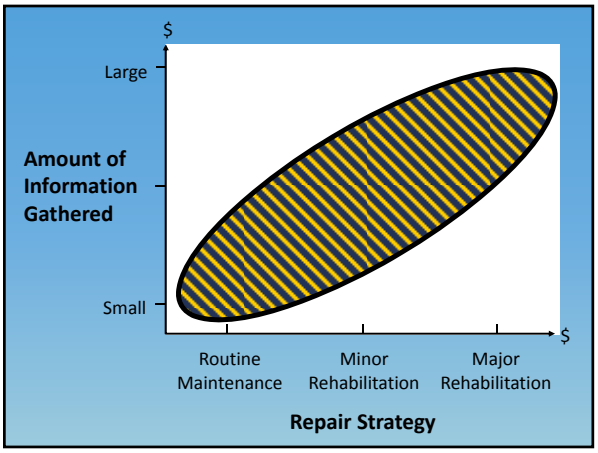
- **West Texas**
  - –$14.5 billion in 2012
  - –21,450 jobs
  - –$1 billion in wages
  - –$475 million in state revenue

Guidelines





Future



STEP 2
PAVEMENT CONDITION

Anticipated Maintenance/ Rehabilitation	Pavement Condition Investigation	
	Level	Activities
Routine Maintenance	1	Historic records/visual condition & perhaps GPR
Preventive Maintenance	1 & 2	GPR/FWD & perhaps DCP
Rehabilitation	1, 2 &3	Field sampling and laboratory testing

Energy Sector Pavement Design Catalog for 4-Layer (Surface, Flex Base, FDR, Subgrade) Pavement (Flex Base Thickness in Inches)

Traffic, ESAL	<0.5 Million			0.5-1.5 Million			1.5-3.0 Million			3.0-4.0 Million			4.0-5.0 Million			>5.0 Million
EF #Wells	<10			10-90			90-200			200-270			270-340			
PB #Wells	<20			20-110			110-250			250-340			340-440			
BS #Wells	<40			40-210			210-470			470-640			640-810			
	Eagle Ford (Subgrade Modulus < 7ksi)															
Surface	2 CST	4" HMA	6" HMA	2 CST	4" HMA	6" HMA	2 CST	4" HMA	6" HMA	2 CST	4" HMA	6" HMA	2 CST	4" HMA	6" HMA	
CM 6"	11	7	6	12	8	6	12	9	7	-	-	7	-	-	7	Use Formalized Design
CM 8"	9	6	6	10	6	6	10	7	6	-	-	6	-	-	6	
AE/NS 6"	12	8	6	12	9	7	12	10	7	-	-	8	-	-	8	
AE/NS 8"	12	6	6	12	7	6	12	10	7	-	-	8	-	-	8	
	Medium Subgrade (Subgrade Modulus < 7 – 15 ksi)															
CM 6"	7	6	6	10	6	6	12	6	6	-	-	6	-	-	6	
CM 8"	6	6	6	7	6	6	10	6	6	-	-	6	-	-	6	
AE/NS 6"	12	6	6	12	6	6	12	6	6	-	-	6	-	-	6	
AE/NS 8"	12	6	6	12	6	6	12	6	6	-	-	6	-	-	6	
	Permian Basin (Subgrade Modulus > 15 ksi)															
CM 6"	6	6	6	6	6	6	10	6	6	12	-	6	-	-	6	
CM 8"	6	6	6	6	6	6	10	6	6	12	-	6	-	-	6	
AE/NS 6"	6	6	6	9	6	6	12	6	6	12	-	6	-	-	6	
AE/NS 8"	6	6	6	8	6	6	12	6	6	12	-	6	-	-	6	

BS # Wells: Number of wells serviced by road in Barnett Shale; PB = Permian Basin; EF = Eagle Ford Shale
CM 6" = Cement Modified FDR, 6 in. thick
CM 8" = Cement Modified FDR, 8 in. thick
AE/NS 6" = Asphalt Emulsion FDR or Non-Stabilized FDR, 6 in. thick
AE/NS 8" = Asphalt Emulsion FDR or Non-Stabilized FDR, 8 in. thick
Not Recommended – Premature Failure Expected

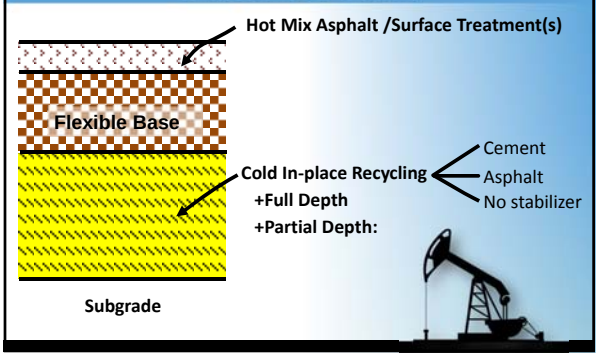
Traffic/No. of Wells

Traffic, ESAL	<0.5 Million	0.5-1.5 Million	1.5-3.0 Million	3.0-4.0 Million	4.0-5.0 Million	>5.0 Million
EF #Wells	<10	10-90	90-200	200-270	270-340	Use Formalized Design
PB #Wells	<20	20-110	110-250	250-340	340-440	
BS #Wells	<40	40-210	210-470	470-640	640-810	

STEP 5
CONSTRAINTS

- Financial
- Work force availability
- Equipment availability
- Materials availability
- Weather conditions
- Traffic control

STEP 4
THICKNESS DESIGN



Structural Design Considerations

Subgrade	Shoulder Widths, Ft	
	Recommended	Minimum
Soft	6	4
Stiff	4	2

Repair Strategies

Routine Maintenance	Preventive Maintenance	Rehabilitation/ Strengthening
•Shallow Patch •Deep Patch •Level-up •Shoulder/Edge Repair	•Fog Seal •Seal Coat (Chip Seal) •Slurry/Micro Seal •Hot Mix Asphalt	•Subgrade Stabilization •FDR •Flex Base •Surface Treatment •Hot Mix Asphalt

QUESTIONS ???

Premature Distress

- Traffic
- Design
- Materials
- Mixture designs
- Workmanship
- Environment

Usually more than one cause

Relatively small percent of projects

STEP 9 – ECONOMICS
Life Cycle Assessment Format