Maintenance Division: Preserving Quality

Texas Department of Transportation

September 15, 2025

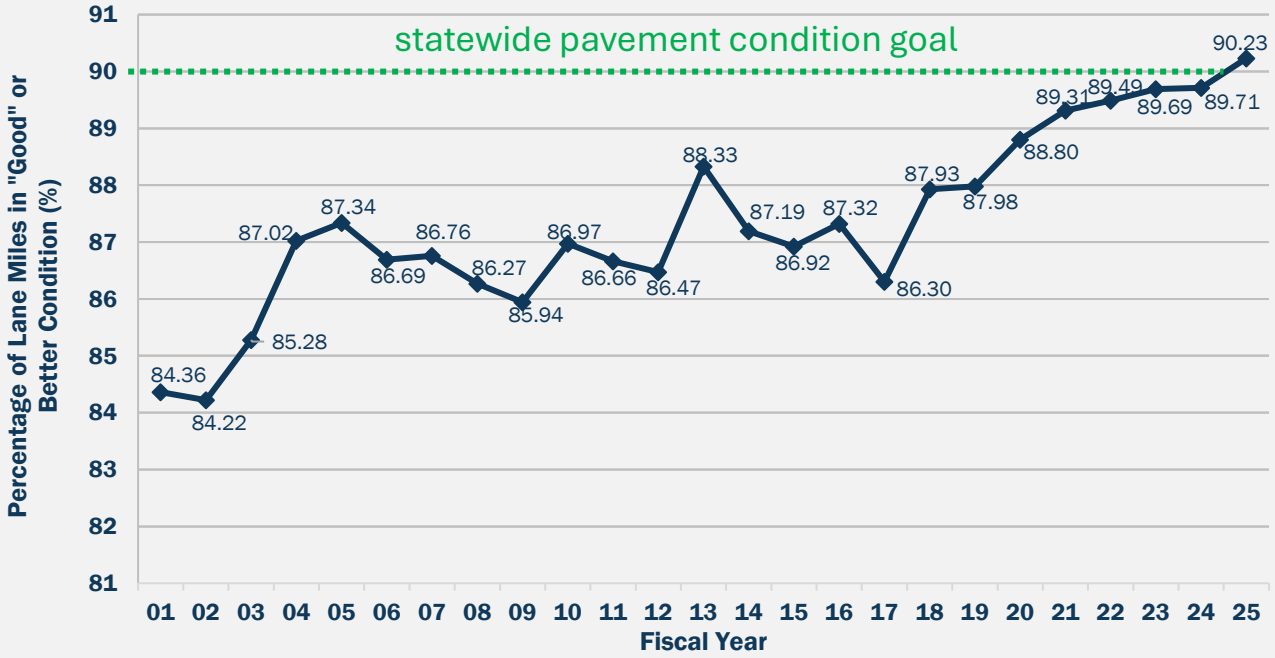
Table of Contents

Statewide Pavement Condition: FY 2001 -2025

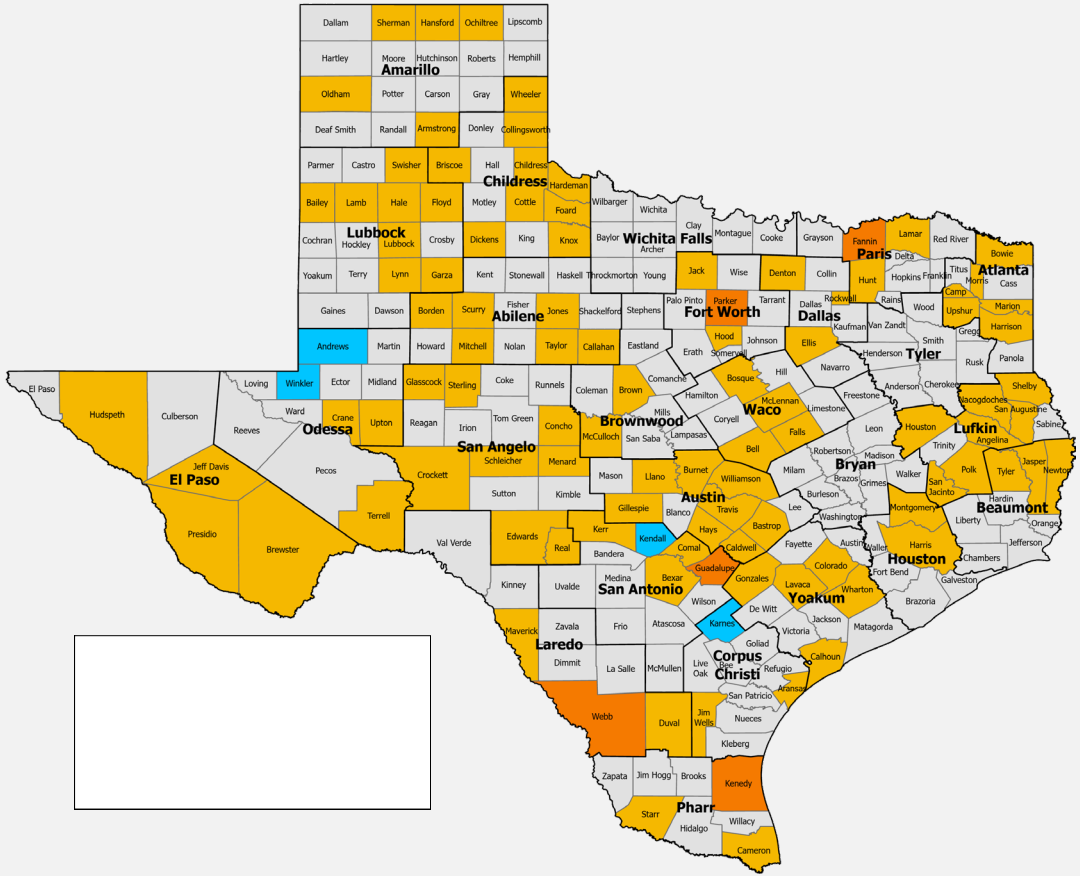
- TTC has established statewide pavement condition goal as 90% or more of the on-system network lane-miles in “Good" or “Very Good" condition

Achieved in FY 2025

- Data-driven and innovative solution to preserve the pavement infrastructure

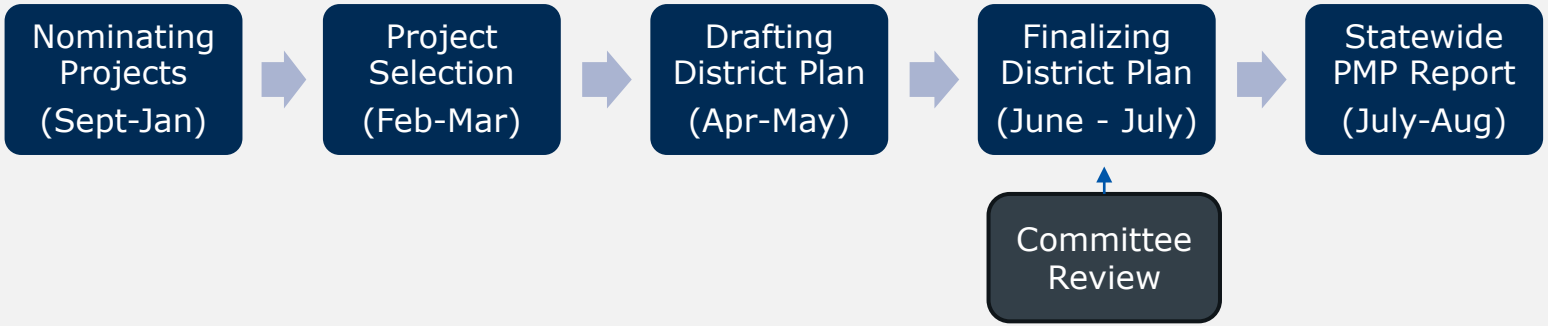


Texas County Percent "Good" or Better Change FY22 -25



4-Year Pavement Management Plan

- Goal: Develop a comprehensive pavement management plan which is roadway specific to the greatest extent possible and is fiscally constrained.



- Districts take the lead and prepare 4-yr PMP plans
- Four-Year Pavement Plan Committee & 4-yr plan committee review meetings

Continuing Improvements in Pavement Management Practices

- Continued to improve pavement management, maintenance, and rehabilitation techniques. These management efforts allowed TxDOT to treat additional lane miles, kept the pavement network in overall good condition, and reduced the long-term cost of maintaining pavements.
  - Starting in FY 2008, TxDOT required each district to produce a **Four-Year Pavement Management Plan** each year that includes all aspects of pavement-related work.
  - TxDOT also continued a series of **Peer Reviews** of each district's pavement maintenance program that began in FY 2009. The Peer Reviews have made it easier for districts to share "best practices" to use resources to improve the effectiveness of pavement maintenance.
- This accomplishment reflects **a collective effort across the agency and all major disciplines** including enhanced data collection, innovative research, design and construction practices, and the dedication of TxDOT employees past and present.

Seal Coat Project Lane -miles and Bid Quantities by FY19 - FY29

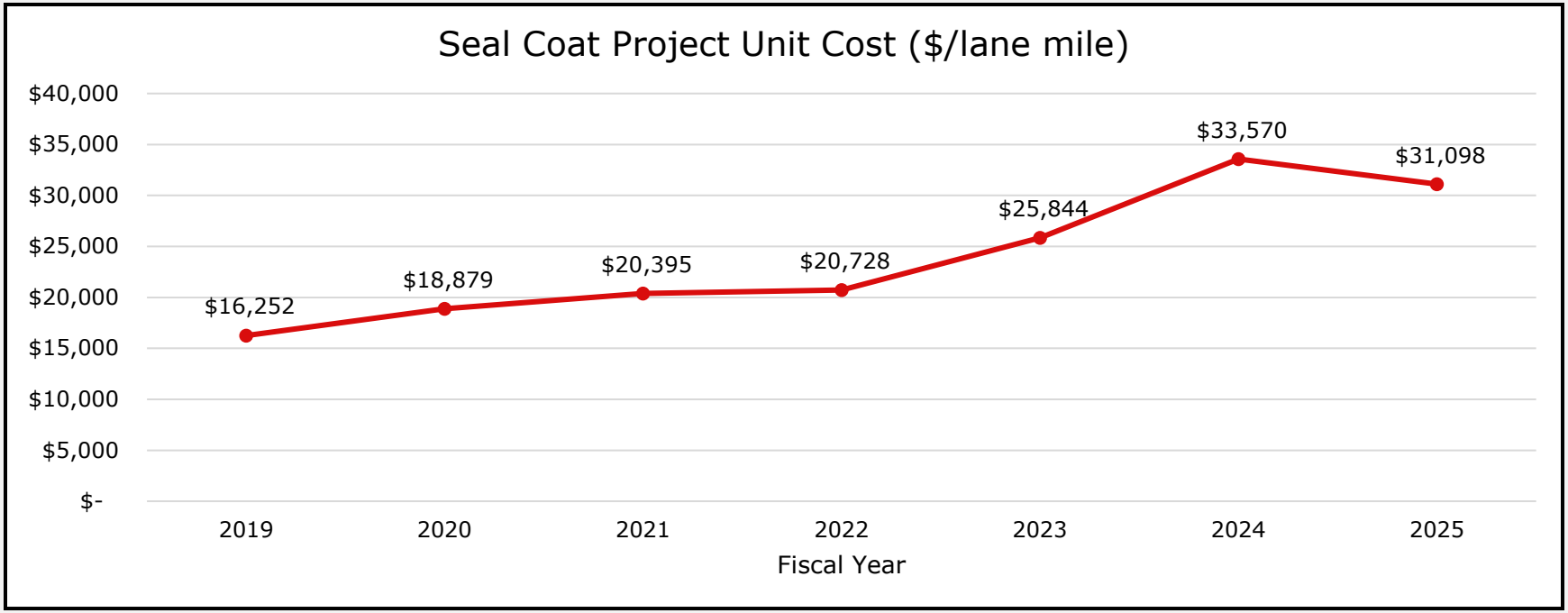
- **Projected Quantities based on "TOTAL" Sela Coat Project Lane Miles**

Fiscal Year	SC Project Lane Miles	AGGT QTY (CY)	ASPH QTY (GAL)
2019	15,092.66	1,567,416	69,384,028
2020	13,156.58	1,371,277	60,188,575
2021	14,075.23	1,356,662	61,721,450
2022	11,858.33	1,195,929	56,198,667
2023	13,232.66	1,266,535	60,746,879
2024	12,738.57	1,221,397	57,342,168
2025	12,294.11	1,076,839	52,457,810
2026	11,614.20	1,176,287	54,149,258
2027	12,249.85	1,223,206	56,374,938
2028	12,033.81	1,207,259	55,618,480
2029	9,621.25	1,029,178	47,170,969

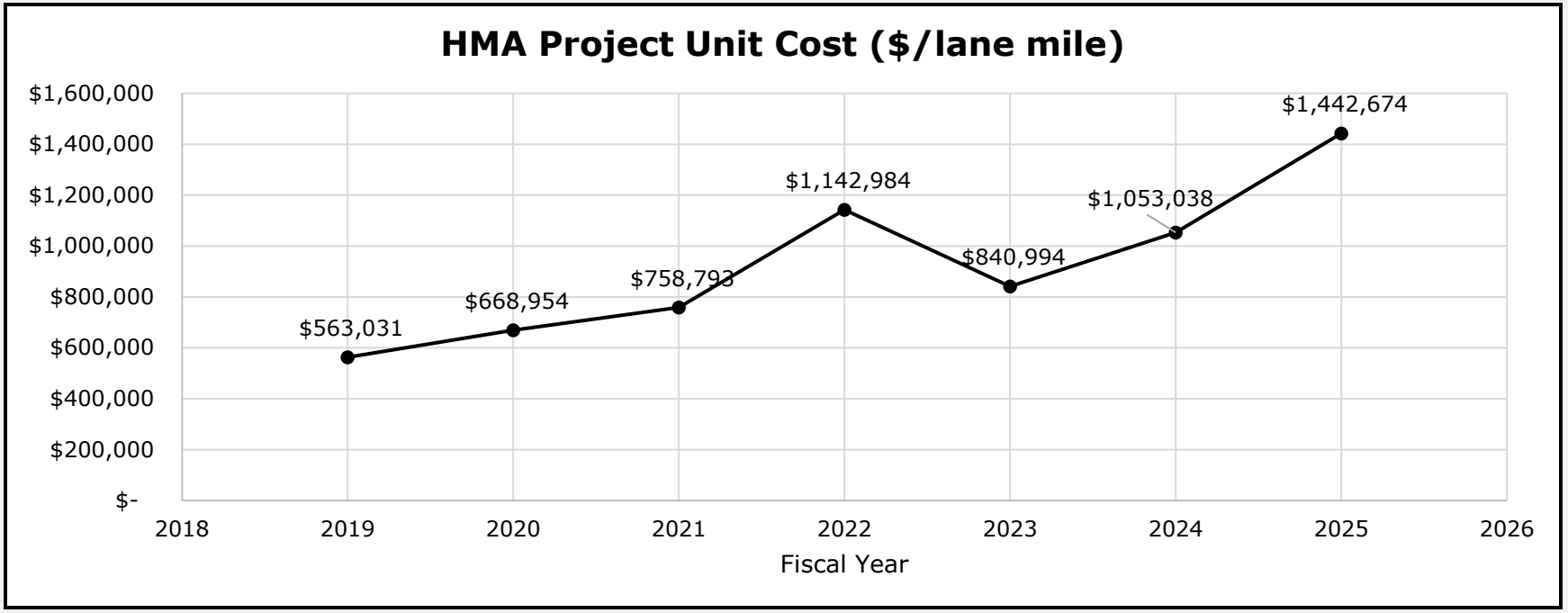
HMA Project Lane Miles and Bid Quantities by FY19 - FY29

Fiscal Year	HMA Project Lane Miles	HMA QTY (TON)
2019	9,098.57	15,441,048
2020	5,291.85	10,688,049
2021	6,512.29	10,587,272
2022	5,226.77	10,505,390
2023	7,643.69	12,210,983
2024	7,174.74	13,794,927
2025	4,961.25	9,544,772
2026	3,707.00	8,201,238
2027	3,727.21	8,226,922
2028	3,750.87	8,256,983
2029	3,482.57	7,916,049

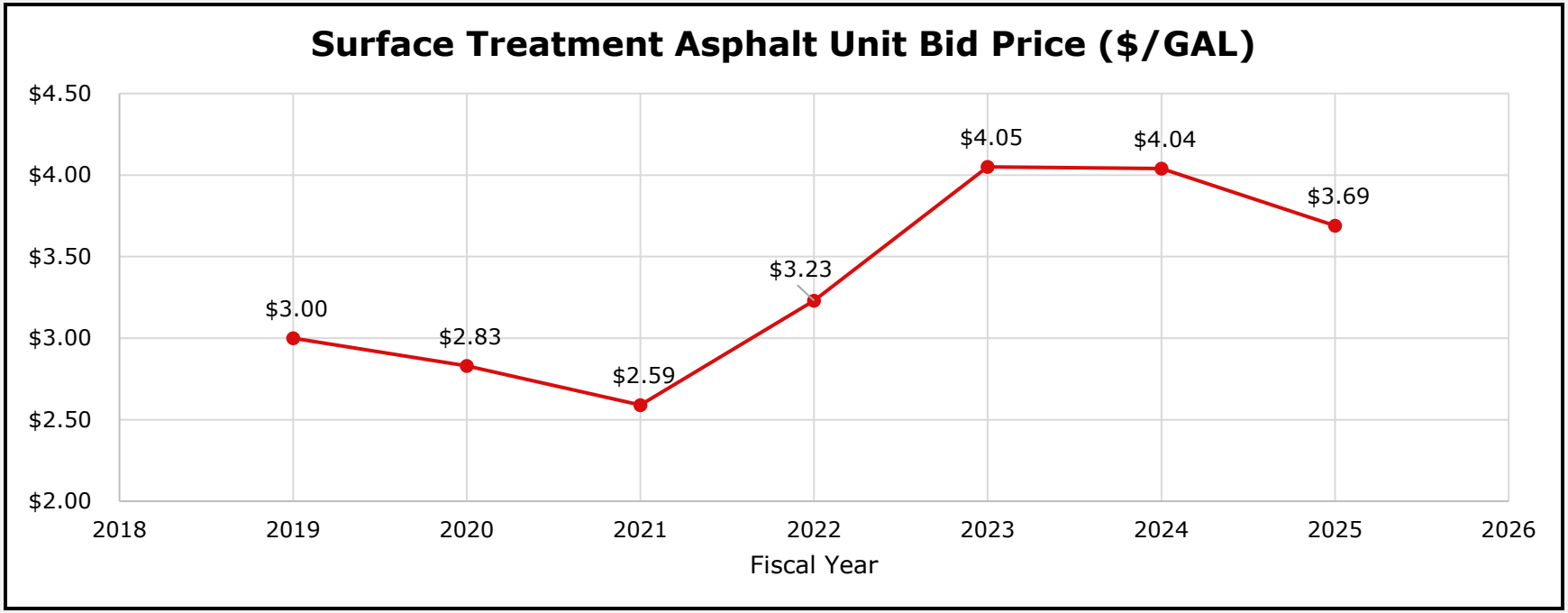
Seal Coat Project Unit Cost Trend



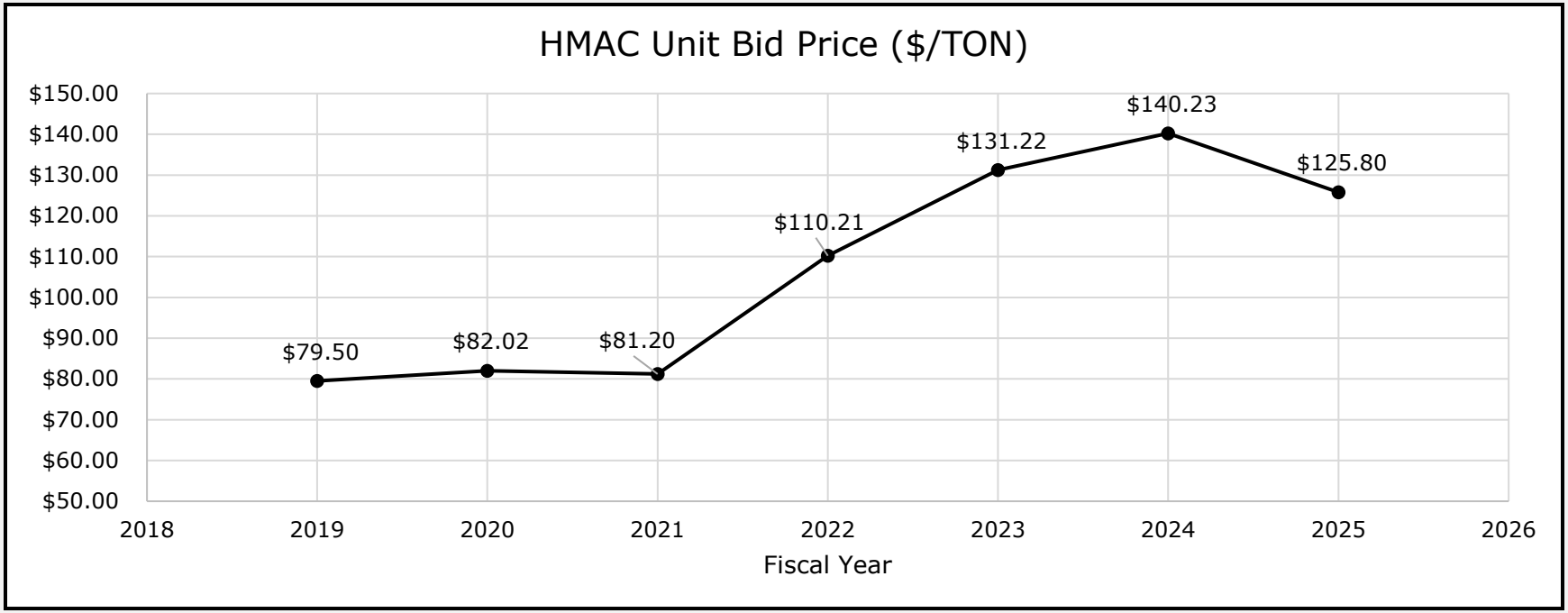
HMA Project Unit Cost Trend



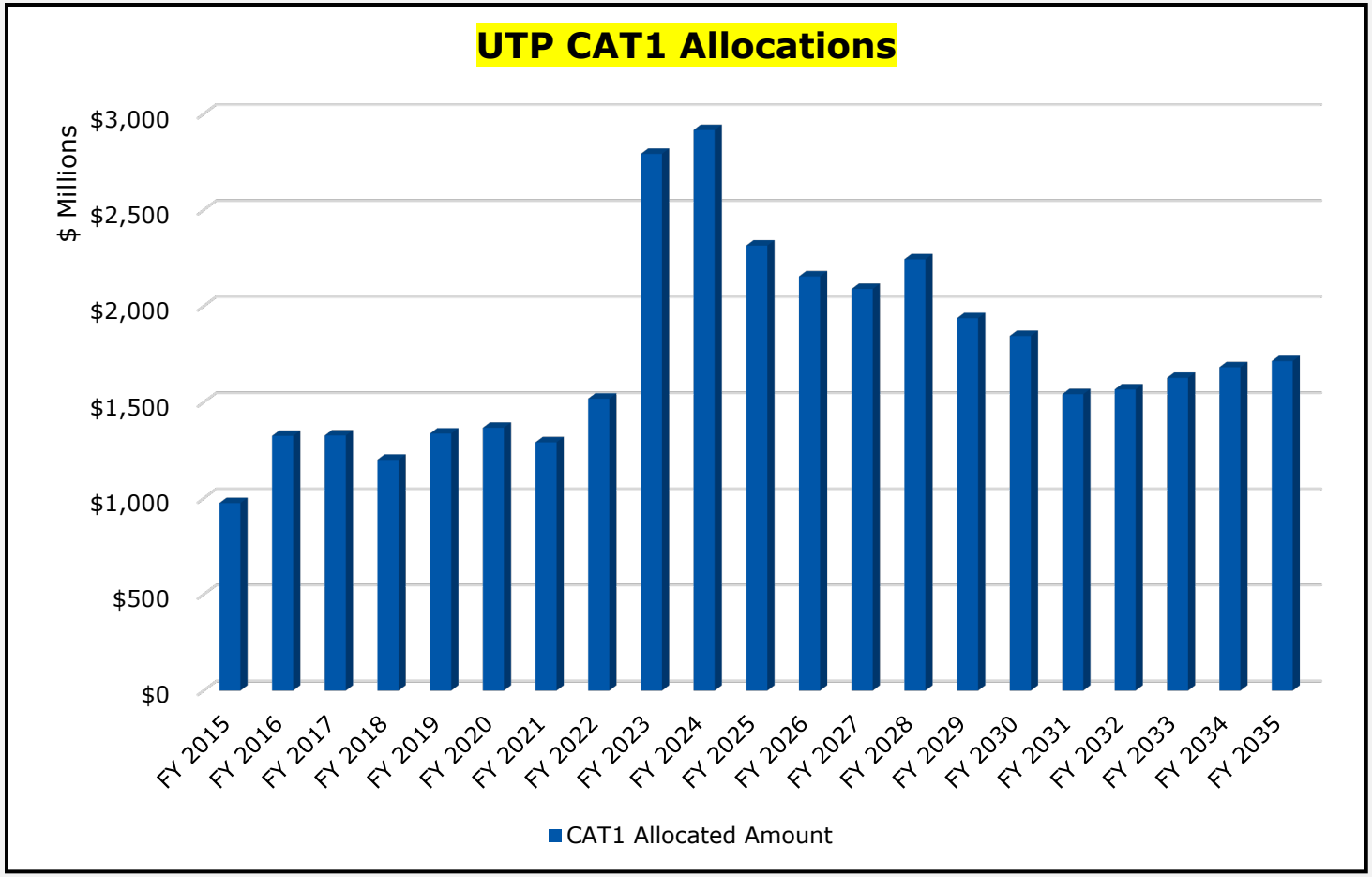
Surface Treatment Asphalt Unit Bid Price ($/GAL) Trend



HMAC Unit Bid Price ($/TON) Trend

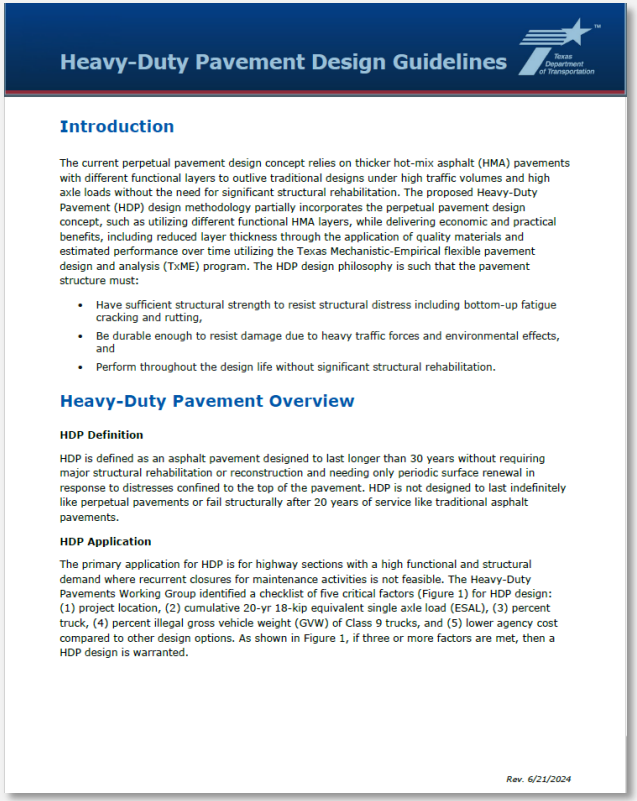


UTP	FY	Allocations
2015 UTP	2015	$975,970,000
2016 UTP	2016	$1,325,534,800
2017 UTP	2017	$1,327,490,000
2018 UTP	2018	$1,201,230,000
2019 UTP	2019	$1,337,610,000
2020 UTP	2020	$1,367,810,000
2021 UTP	2021	$1,292,112,491
2022 UTP	2022	$1,519,280,632
2023 UTP	2023	$2,792,630,000
2024 UTP	2024	$2,916,751,355
2025 UTP	2025	$2,315,691,334
2026 UTP	2026	$2,155,144,817
2026 UTP	2027	$2,089,821,761
2026 UTP	2028	$2,244,299,447
2026 UTP	2029	$1,937,952,229
2026 UTP	2030	$1,845,364,964
2026 UTP	2031	$1,542,647,810
2026 UTP	2032	$1,567,291,028
2026 UTP	2033	$1,627,409,988
2026 UTP	2034	$1,682,605,175
2026 UTP	2035	$1,714,275,642



Heavy Duty Pavement Design Guideline

- Specialized pavement designs for heavy-duty projects challenged by traditional design.
- Projects with very high functional and structural demands.
- Texas Mechanistic-Empirical (TxME) flexible pavement design program is required to develop the heavy-duty pavement design.
- Traffic data must be site-specific and collected with a portable weigh-in-motion (pWIM) system.



Heavy-Duty Pavement Design Guidelines

Introduction

The current perpetual pavement design concept relies on thicker hot-mix asphalt (HMA) pavements with different functional layers to outlive traditional designs under high traffic volumes and high axle loads without the need for significant structural rehabilitation. The proposed Heavy-Duty Pavement (HDP) design methodology partially incorporates the perpetual pavement design concept, such as utilizing different functional HMA layers, while delivering economic and practical benefits, including reduced layer thickness through the application of quality materials and estimated performance over time utilizing the Texas Mechanistic-Empirical flexible pavement design and analysis (TxME) program. The HDP design philosophy is such that the pavement structure must:

- Have sufficient structural strength to resist structural distress including bottom-up fatigue cracking and rutting,
- Be durable enough to resist damage due to heavy traffic forces and environmental effects, and
- Perform throughout the design life without significant structural rehabilitation.

Heavy-Duty Pavement Overview

HDP Definition

HDP is defined as an asphalt pavement designed to last longer than 30 years without requiring major structural rehabilitation or reconstruction and needing only periodic surface renewal in response to distresses confined to the top of the pavement. HDP is not designed to last indefinitely like perpetual pavements or fail structurally after 20 years of service like traditional asphalt pavements.

HDP Application

The primary application for HDP is for highway sections with a high functional and structural demand where recurrent closures for maintenance activities is not feasible. The Heavy-Duty Pavements Working Group identified a checklist of five critical factors (Figure 1) for HDP design: (1) project location, (2) cumulative 20-yr 18-kip equivalent single axle load (ESAL), (3) percent truck, (4) percent illegal gross vehicle weight (GVW) of Class 9 trucks, and (5) lower agency cost compared to other design options. As shown in Figure 1, if three or more factors are met, then a HDP design is warranted.

Rev. 6/21/2024

Heavy Duty Pavement Design Training

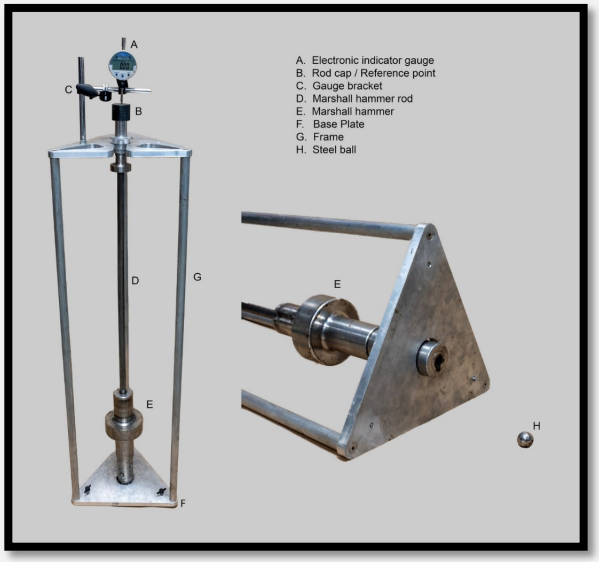
- Guidance Document was made available statewide in September 2024
- Presented in TxAPA's 2024 annual meeting (09/2024)
- Discussed in TxAPA's Everyday Asphalt Program (09/2024)
- Update presented in Transportation Short Course (10/2024)
- Update presented in Maintenance and Traffic Conference (10/2024)
- Incorporated HDP into TxDOT flexible pavement design training for the districts (on-going)
  - ELP (11/2024), FTW (12/2024), SJT (04/2025), BRY (05/2025), AMA (08/2025)
- HDP Section added to the revised version of the Pavement Manual (Winter 2025)

Quantify Maximum Accumulated Seal Coat Layer for Stability

- Project 0-7106 will investigate: “How many seal coats are too many?”
  - The objective of this research is to determine the maximum number of seal coats that can be applied to a pavement surface before the accumulated layers of seal coats become unstable.

Testing Pavement

- South African test method SANS 3001-BT10:2013, "Ball Penetration Test for the Design of Surfacing Seals" modified for Texas conditions following the draft Tex 10XX-S



Recommendations

Critical to get new seal coat rates correct

Condition	<=800 v/d/l or Underseal	800 v/d/l to 1500 v/d/l	>1500 v/d/l
No High Stress Areas	All approved Materials	Tier II	Tier I
Horizontal Curve Radius <= 1800 ft. (3°)	All approved Materials	Tier II	Tier I
Horizontal Curve Radius 1800 ft. to 820 ft. (3° to 7°)	Tier II	Tier II	Tier I
Horizontal Curve Radius >820 ft. (7°)	Tier I	Tier I	Tier I
Superelevation >6%	Tier I	Tier I	Tier I
Grade <=2%	All approved Materials	Tier II	Tier I
Grade 2% to 5%	Tier II	Tier II	Tier I
Steep Grades > 5%	Tier I	Tier I	Tier I
Posted Speed <= 35 mph	Tier I	Tier I	Tier I
Posted Speed 35 mph to 60 mph	Tier II	Tier I	Tier I
Posted Speed >60 mph	All approved Materials	Tier II	Tier I
Roundabouts	Tier II	Tier I	Tier I
Turning Lanes	Tier II	Tier I	Tier I
Intersections	Tier II	Tier I	Tier I

Planned Implementation Activities

- Update
  - MNT703 for project selection
  - Develop a field guide
- Testing Support
  - Work with MTD to approve test method for ball penetration (BP) test
  - BP device to all Districts & MNT Division
  - Train districts &MNT in test procedure
- Present research results at conferences

Pavement Structural Condition - TSD

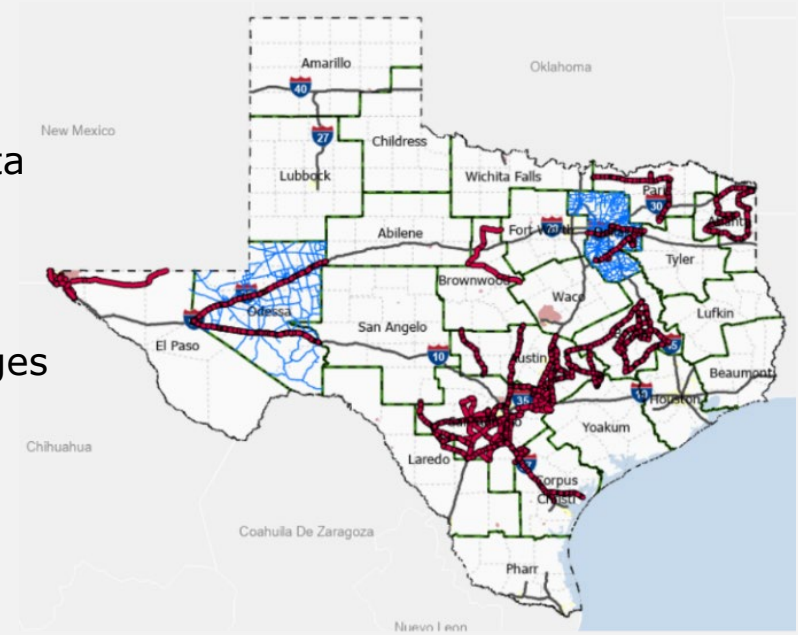
- Structural adequacy is an important indicator in making informed resource allocation for pavement treatment decisions
  - Explains the underlying reason for the distress observed at the surface
- Deflection testing
  - Falling Weight Deflectometer (FWD)
    - Mostly project level – Stop-and-go-operation, lane closures are required, safety hazard
  - Traffic Speed Deflectometer (TSD)
    - Network-level pavement management applications

TxDOT FWD Unit

ARRB TSD Unit

TSD Data Collection in Texas

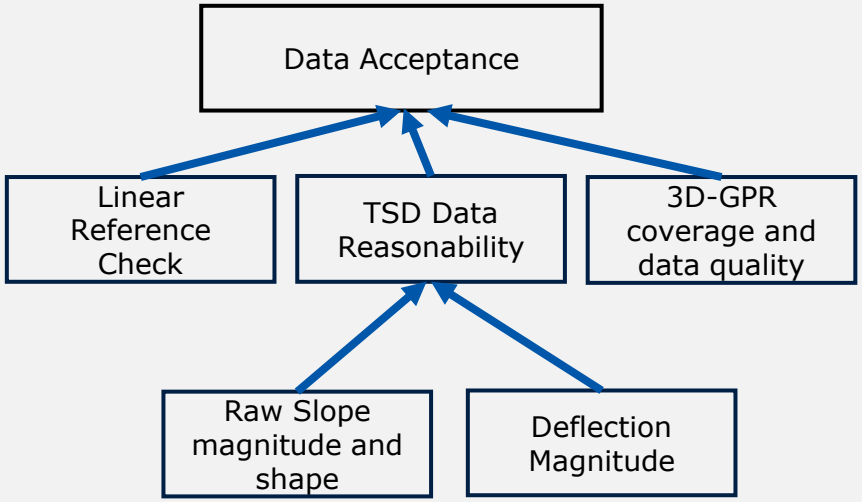
- Since 2019, about 5,000 miles of TSD data collected in 10 districts through TPF
- In 2025, contract with ARRB for four years of data collection
  - include structural data, 3D-GPR, surface distress rating, micro texture, IRI, ROW images and viewer tool
- In Summer 2025, entire districts of Dallas and Odessa are collected for total of 8,000 miles
- Data is stored in PMIS



TSD Data Collection

- Weekly verification and validation are prerequisite for data collection

- Data delivered was subjected to series of data quality effort before acceptance



District Support

- Developing methodologies to use TSD in treatment selection
  - Indices for surface, base and subgrade layers and structural condition index (SCI)
  - Completed TxDOT project 0-7107: Determine Feasibility and Methodologies of Using Structural Data From Traffic Speed Deflection Devices in Network-Level Treatment Decision Making

- PEPS contracts to support District on
  - TSD and 3D GPR data analysis
  - Three consultants were selected to work closely with districts in network-level and project –level pavement preservation and rehabilitation strategy determination

Thank you

Texas Department of Transportation

September 15, 2025