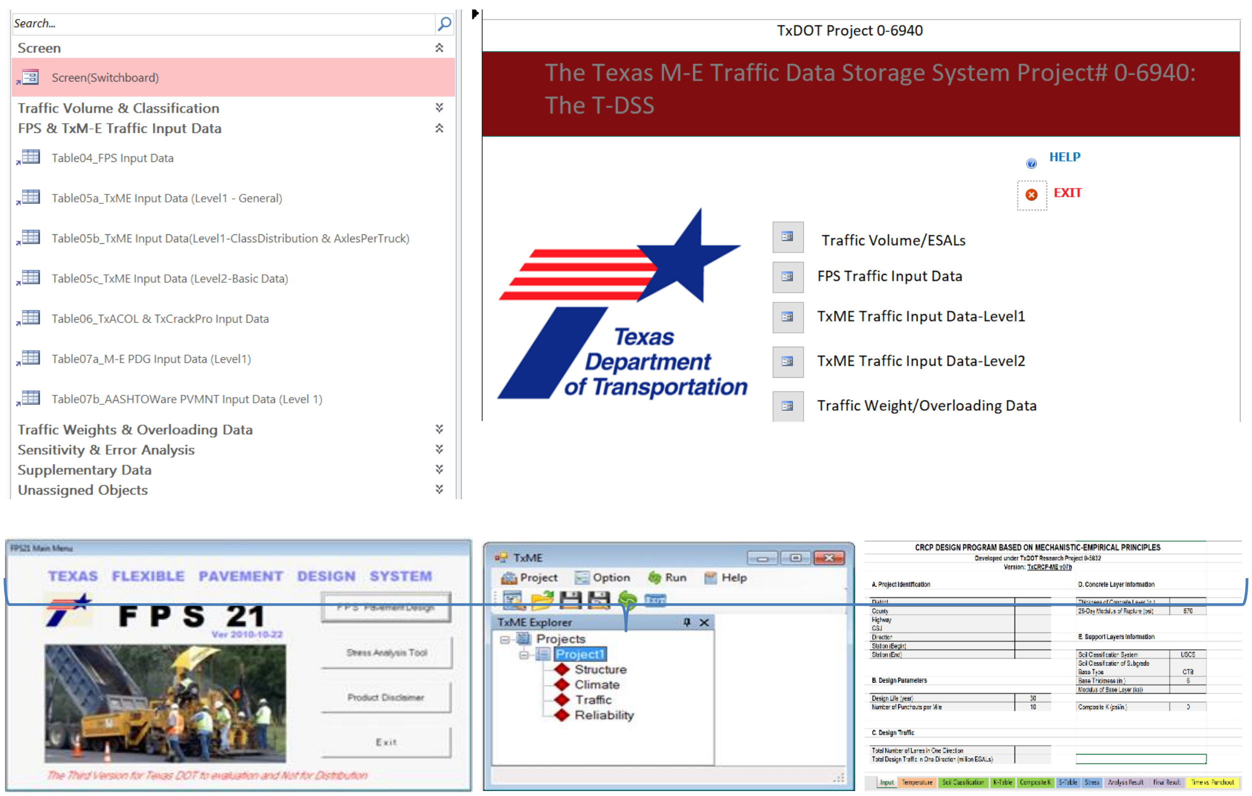
Project 0-6940: Develop System to Render Mechanistic-Empirical Traffic Data for Pavement Design

PRODUCT 0-6940-P3

Guidelines for M-E Traffic Database (The T-DSS) Use and Recommendations for Developing Interfacial Modules



by

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TTI – The Texas A&M University System, College Station

| Published: October 2020 |

GUIDELINES FOR M-E TRAFFIC DATABASE (THE T-DSS) USE AND RECOMMENDATIONS FOR DEVELOPING INTERFACIAL MODULES

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Product 0-6940-P3
Project 0-6940
Project Title: Develop System to Render Mechanistic-Empirical Traffic Data for Pavement Design

Performed in cooperation with the
Texas Department of Transportation
and the
Federal Highway Administration

Published: October 2020

TEXAS A&M TRANSPORTATION INSTITUTE
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DISCLAIMER

This research was performed in cooperation with the Texas Department of Transportation (TxDOT) and the Federal Highway Administration (FHWA). The contents of this report reflect the views of the authors, who are responsible for the facts and the accuracy of the data presented herein. The contents do not necessarily reflect the official view or policies of the FHWA or TxDOT. This report does not constitute a standard, specification, or regulation.

This report is not intended for construction, bidding, or permit purposes. The researcher in charge of the project was Lubinda F. Walubita.

The United States Government and the State of Texas do not endorse products or manufacturers. Trade or manufacturers' names appear herein solely because they are considered essential to the object of this report.

ACKNOWLEDGMENTS

This project was conducted in cooperation with TxDOT and FHWA. The authors thank Wade Odell, the project manager, and members of the project team for their participation, guidance, and feedback: Enad Mahmoud, Hua Chen, Gisel Carrasco, Daniel Garcia, Lacey Peters, Brett Haggerty, Miles Garrison, Sergio Cantu, and Chris Didear.

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LIST OF SYMBOLS AND NOTATIONS

AADTT	Average annual daily truck traffic
ADT	Average daily traffic
ALD	Axle load spectra data
CRCP	Continuously reinforced concrete pavement
ESAL	Equivalent single axle load
FPS	Flexible pavement system
HAF	Hourly adjustment factor
MAF	Monthly adjustment factor
M-E	Mechanistic empirical
MS	MicroSoft
OV	Overlay
T-DSS	Traffic data storage system
TTI	Texas A&M Transportation Institute
TxACOL	Texas asphalt concrete overlay design
TxDOT	Texas Department of Transportation
TxME	Texas Mechanistic-Empirical pavement design

SECTION I. INTRODUCTION

These draft guidelines, documented herein, primarily address the following two objectives: (a) provide guidelines on how to access and use the data from the M-E traffic database (T-DSS) in the FPS and M-E software (i.e., the TxME); and (b) make recommendations for the future development of interfacial modules for automated and direct import of the FPS and M-E traffic data inputs from the T-DSS.

In the subsequent sections, the T-DSS is discussed, followed by the FPS and the corresponding traffic data inputs. This is followed by the TxME, TxCRCP-ME, and the M-E PDG along with their corresponding M-E traffic data inputs. A summary of recommendations for the development of interfacial modules between the T-DSS and M-E software then wraps up the document.

SECTION II. THE M-E TRAFFIC DATABASE (THE T-DSS)

The M-E traffic database, The T-DSS, was developed and is being maintained and managed in the user-friendly MS Access platform to provide M-E traffic data support for the FPS and other M-E software such as the TxME. MS Access is compatible with most computer machines and almost all the engineering professionals are conversant with MS office/access; hence, this was selected as the platform for the T-DSS. As shown in Figure 1, the data are arranged and stored in tabular format along with zipped attachments such as PDF, monthly adjustment factor (MAF), and axle load spectra data (ALD) files. As shown in Figure 1, the main traffic data tables are:

- Tables 01-03: Traffic volume and classification data.
- Table 04: FPS input data.
- Table 05: TxME input data.
- Table 06: TxACOL and TxCrackPro data.
- Table 07: M-E PDG and AASHTOWare input data.

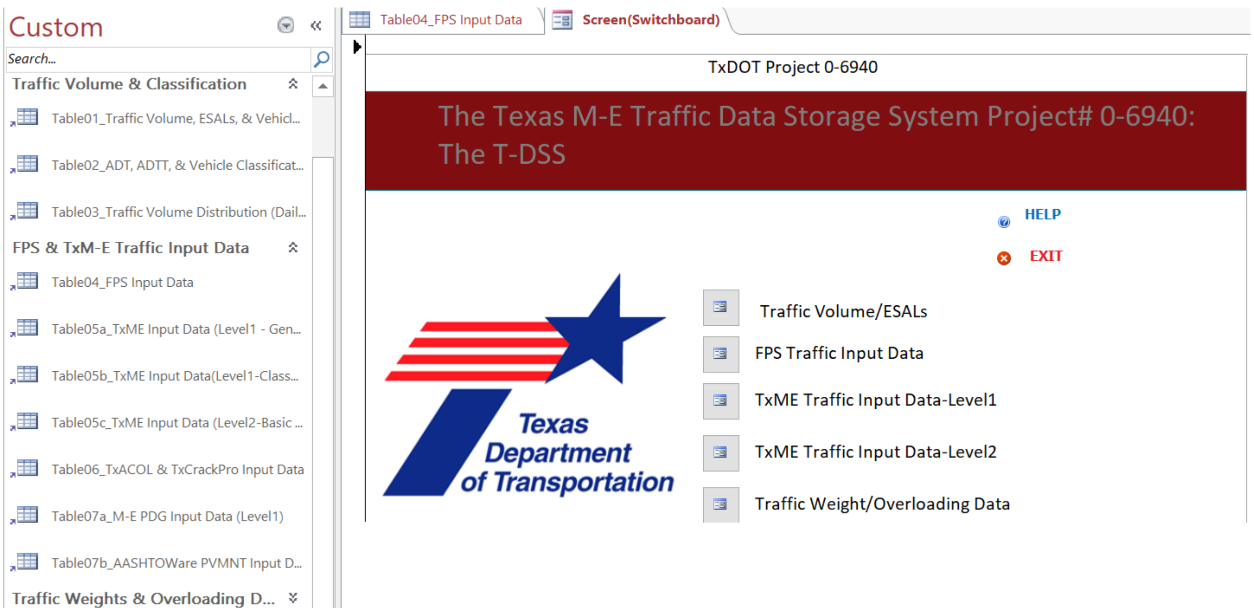


Figure 1. The T-DSS Main Screen.

Other traffic data contained in the T-DSS include traffic weights, overloading, and supplementary data such as the location of the WIM stations. Accessing of the T-DSS data is typically achieved through the MS Access function "External Data" that exports the data (selected table and/or data) into a tabular Excel format. This is exemplified in Figure 2 and Figure 3. The zipped attachments simply download by left-clicking on them just like any other standard download operation.

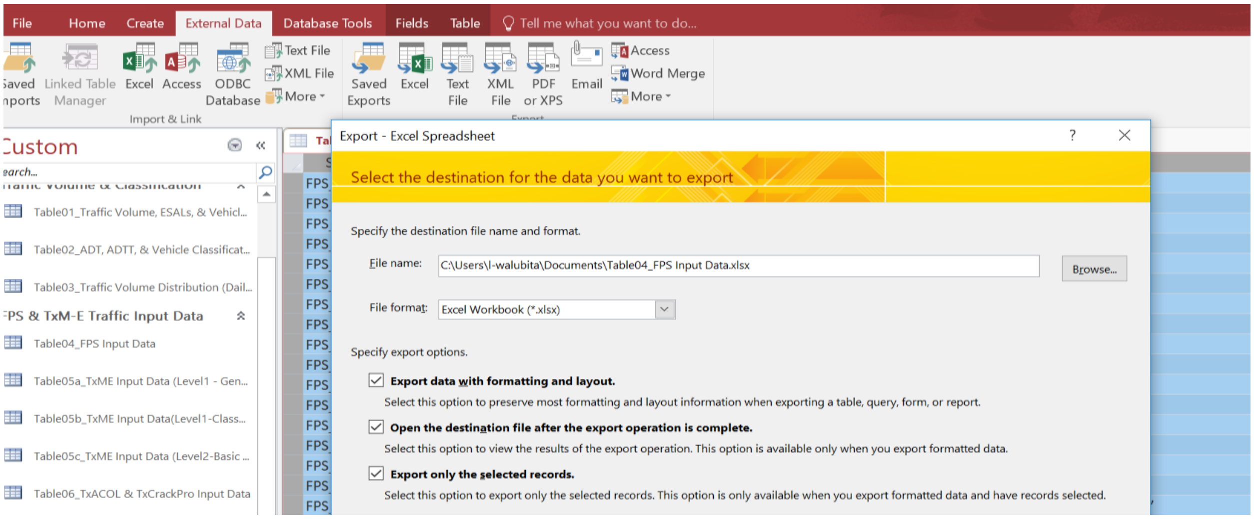


Figure 2. T-DSS Data Export (External Data ⇒ Excel).

District	County	HWY	LaneDirection	LaneDesignation	ADTbegin	ADTend-20Yr	8-kips ESALs (mi	Avg Vehicle Speed (mph)	%Trucks in ADT	ATHWLD (kips)	ge Tandem Axles
Laredo	La Salle	IH 35	NB	Outside (L1)	6113	23001	39.08	65.00	47.00%	14.34	55.50%
Laredo	La Salle	IH 35	NB	Inside (L2)	2699	10155	5.49	65.00	13.00%	11.78	51.06%
Laredo	La Salle	IH 35	SB	Outside (L1)	6213	23377	40.11	65.00	51.00%	12.25	57.91%
Laredo	La Salle	IH 35	SB	Inside (L2)	2656	9994	5.76	65.00	14.00%	12.74	54.87%
Pharr	Hidalgo	US 281	NB	Inside (L2)	2124	6473	1.79	65.00	14.00%	13.03	46.84%
Pharr	Hidalgo	US 281	SB	Inside (L2)	2150	6552	1.69	65.00	17.00%	12.86	46.73%
Atlanta	Cass	FM 3129	SB	Outside (L1)	504	910	0.44	65.00	33.00%	12.8	60.12%
Bryan	Leon	SH 7	WB	Outside(L1)	1902	3435	5.31	67.10	20.50%	15.5	49.12%
Laredo	Dimmit	FM 468	EB	Outside(L1)	1977	3571	12.74	64.80	54.00%	15.5	57.78%
Corpus Christi	Live Oak	US 281	NB	Outside(L1)	1354	2445	37.31	33.70	77.00%	20.51	56.42%
Corpus Christi	Live Oak	US 281	SB	Outside(L2)	3801	6865	18.90	35.20	32.00%	15.29	56.15%
Brownwood	Comanche	SH 6	NB	Outside(L1)	2118	3825	2.25	69.00	22.40%	12.68	45.61%
Laredo	La Salle	IH 35	NB	Outside (L1)	6113	23001	39.08	65.00	47.00%	14.34	55.50%
Laredo	La Salle	IH 35	NB	Inside (L2)	2699	10155	5.49	65.00	13.00%	11.78	51.06%
Laredo	La Salle	IH 35	SB	Outside (L1)	6213	23377	40.11	65.00	51.00%	12.25	57.91%
Laredo	La Salle	IH 35	SB	Inside (L2)	2656	9994	5.76	65.00	14.00%	12.74	54.87%
Odessa	Midland	FM 1787	SB	Outside(L1)	2675	4831	8.85	65.40	33.80%	16.29	49.20%
Odessa	Midland	FM 1787	SB	Outside(L1)	2623	4737	7.99	64.70	30.20%	11.53	48.96%
Fort Worth	Wise	SH 114	EB	Outside (L1)	4802	23571	39.38	65.00	33.00%	16.97	44.70%
Fort Worth	Wise	SH 114	EB	Inside (L2)	3236	15884	8.80	65.00	16.00%	17.48	28.40%
Fort Worth	Wise	SH 114	WB	Outside (L1)	4378	21490	37.31	65.00	39.00%	11.56	36.90%
Fort Worth	Wise	SH 114	WB	Inside (L2)	2844	13960	6.87	65.00	15.00%	8.37	28.10%
Fort Worth	Wise	SH 114	EB	Outside (L1)	5800	10476	38.69	67.01	47.10%	12.53	54.12%
Brownwood	Comanche	SH 6	NB	Outside(L1)	1862	3362	3.76	68.34	22.10%	9.28	46.00%
Laredo	Dimmit	FM 468	EB	Outside(L1)	1380	2493	13.50	59.43	47.30%	11.14	61.30%
Amarillo	Potter	IH 40	EB	Outside (L1)	4774	11759	49.67	70.00	58.00%	16.57	55.91%
Amarillo	Potter	IH 40	EB	Inside (L2)	1140	2808	5.47	70.00	28.00%	14.27	45.57%
Amarillo	Potter	IH 40	WB	Outside (L1)	4722	11754	43.44	70.00	58.00%	17.12	54.86%
Amarillo	Potter	IH 40	WB	Inside (L2)	1340	3301	7.07	70.00	21.00%	14.35	46.75%
Lubbock	Lubbock	US 84	EB	Outside (L1)	5686	14525	10.39	70.00	24.00%	10.39	38.23%
Lubbock	Lubbock	US 84	EB	Inside (L2)	3199	8170	11.10	70.00	11.00%	11.1	20.24%
Wichita Falls	Wilbarger	US 287	NB	Outside (L1)	3699	8383	22.23	75.00	51.74%	17.29	44.88%
Wichita Falls	Wilbarger	US 287	NB	Inside (L2)	1906	4319	1.80	75.00	12.27%	17.04	35.56%
Wichita Falls	Wilbarger	US 287	SB	Outside (L1)	3594	8145	16.95	75.00	46.93%	14.99	44.57%
Wichita Falls	Wilbarger	US 287	SB	Inside (L2)	1851	4195	1.25	75.00	11.12%	16.69	31.99%
Wichita Falls	Wichita	US 287	NB	Outside (L1)	6531	19357	27.73	70.00	36.00%	11.94	43.86%
Wichita Falls	Wichita	US 287	NB	Inside (L2)	3364	9971	3.66	70.00	12.54%	12.35	29.34%
Wichita Falls	Wichita	US 287	SB	Outside (L1)	6551	19417	29.93	70.00	34.65%	12.79	41.69%
Wichita Falls	Wichita	US 287	SB	Inside (L2)	3374	10000	2.33	70.00	10.05%	12.22	26.98%
San Antonio	Kerr	IH10	EB	Outside (L1)	3956	9266	14.83	75.00	45.00%	15.18	48.25%
San Antonio	Kerr	IH10	EB	Inside (L2)	2038	4773	0.79	75.00	7.00%	15.84	37.12%
San Antonio	Kerr	IH10	WB	Outside (L1)	3907	9151	19.08	75.00	45.00%	15.21	45.52%
San Antonio	Kerr	IH10	WB	Inside (L2)	2013	4715	0.78	75.00	8.00%	15.5	30.94%
Atlanta	Harrison	IH0020	EB	Outside (L1)	9622	17378	14.96	65.00	25.00%	12.94	42.90%
Atlanta	Harrison	IH0020	EB	Inside (L2)	4957	8953	1.92	65.00	19.00%	11.09	43.40%
Atlanta	Harrison	IH0020	WB	Outside (L1)	10791	19490	21.05	65.00	35.00%	13.64	46.70%
Atlanta	Harrison	IH0020	WB	Inside (L2)	5559	10040	4.64	65.00	21.00%	12.28	32.50%
Austin	Williamson	SH 130	NB	Outside (L1)	6733	87476	39.04	75.00	25.90%	11.87	39.91%

Figure 3. Example Data Export from The T-DSS (FPS Input Data).

SECTION III. THE FPS AND TRAFFIC INPUT DATA

FPS is the primary software that is routinely used by TxDOT for the design of flexible pavements. Figure 4 and Figure 5 show the main FPS and traffic-data input screens, respectively. Table 1 and Figure 6 lists the specific FPS traffic data inputs and the data source from the T-DSS.

Figure 4. Main FPS Screen.

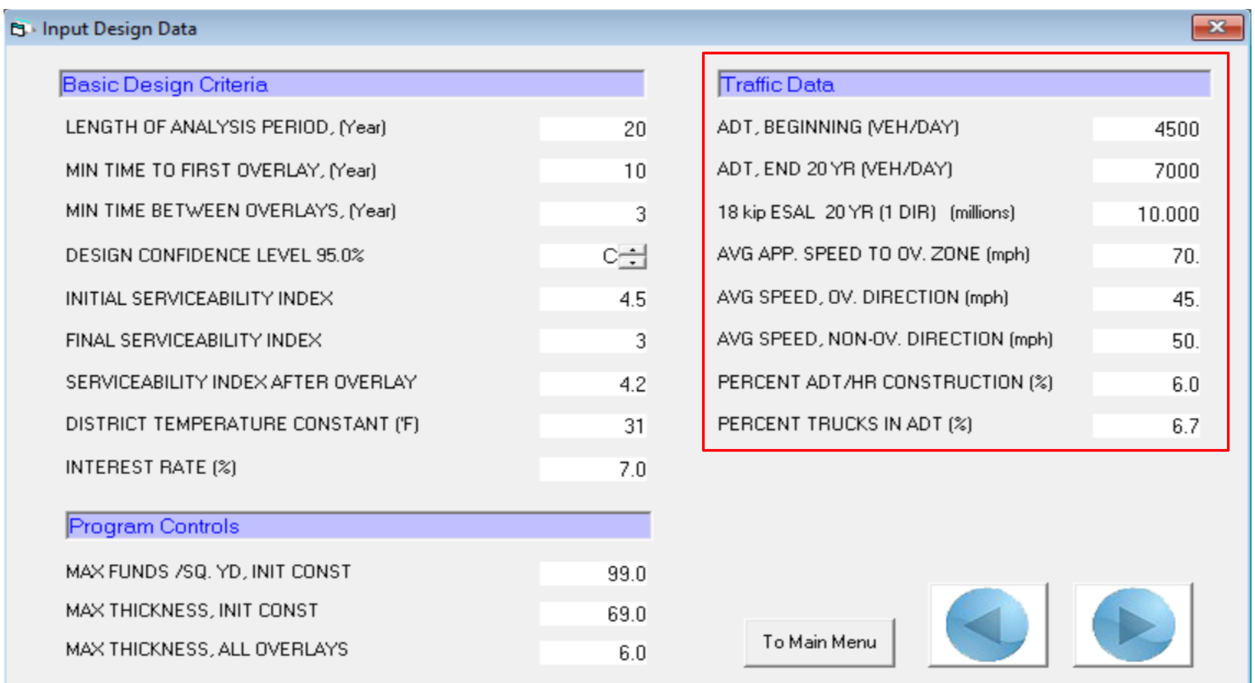
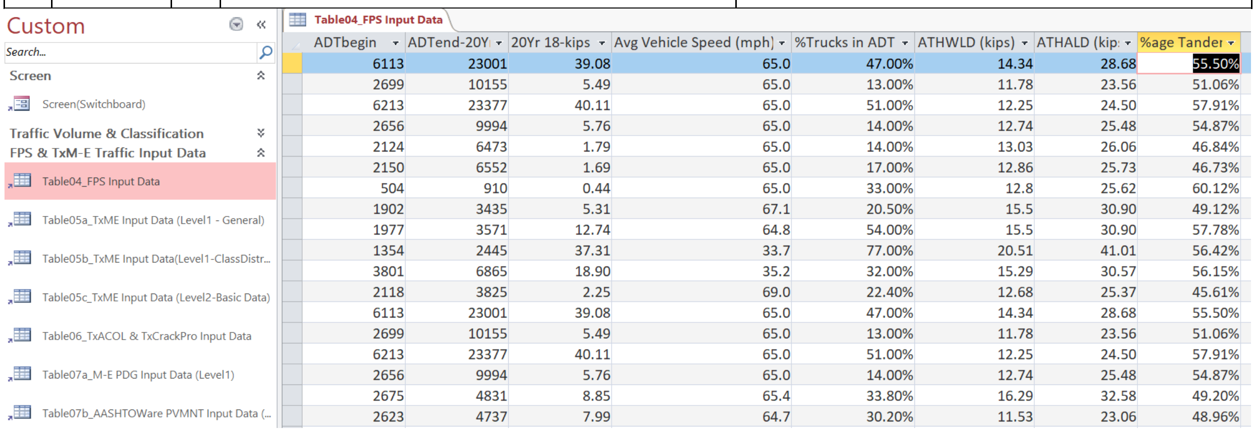


Figure 5. FPS Traffic-Data Input Screen.

Table 1. List of Main Traffic Data Inputs for the FPS Software.

#	Item	#	Description	Data Source/ Location in the T-DSS (Table04)
1	Traffic Data	a.	ADT begin (veh/day)	Table04_FPS Input Data
		b.	ADT end 20 Yr (veh/day)	
		c.	18 kip ESALs 20 Yr – 1 Direction (millions)	
		d.	Avg. App. Speed to OV Zone	
		e.	Avg. Speed OV & Non-OV Direction	
		g.	Percent ADT/HR Construction	
		h.	Percent trucks in ADT	



ADTbegin	ADTend-20Y	20Yr 18-kips	Avg Vehicle Speed (mph)	%Trucks in ADT	ATHWLD (kips)	ATHALD (kip:	%age Tander
6113	23001	39.08	65.0	47.00%	14.34	28.68	55.50%
2699	10155	5.49	65.0	13.00%	11.78	23.56	51.06%
6213	23377	40.11	65.0	51.00%	12.25	24.50	57.91%
2656	9994	5.76	65.0	14.00%	12.74	25.48	54.87%
2124	6473	1.79	65.0	14.00%	13.03	26.06	46.84%
2150	6552	1.69	65.0	17.00%	12.86	25.73	46.73%
504	910	0.44	65.0	33.00%	12.8	25.62	60.12%
1902	3435	5.31	67.1	20.50%	15.5	30.90	49.12%
1977	3571	12.74	64.8	54.00%	15.5	30.90	57.78%
1354	2445	37.31	33.7	77.00%	20.51	41.01	56.42%
3801	6865	18.90	35.2	32.00%	15.29	30.57	56.15%
2118	3825	2.25	69.0	22.40%	12.68	25.37	45.61%
6113	23001	39.08	65.0	47.00%	14.34	28.68	55.50%
2699	10155	5.49	65.0	13.00%	11.78	23.56	51.06%
6213	23377	40.11	65.0	51.00%	12.25	24.50	57.91%
2656	9994	5.76	65.0	14.00%	12.74	25.48	54.87%
2675	4831	8.85	65.4	33.80%	16.29	32.58	49.20%
2623	4737	7.99	64.7	30.20%	11.53	23.06	48.96%

Figure 6. Table04 in the T-DSS.

As clearly illustrated in Table 1 and Figure 6, traffic input data for the FPS software are contained in Table 4 of the T-DSS, namely "Table 04_FPS Input Data." These data are visually/manually accessed from the T-DSS and manually entered into the FPS software. For future automated data imports from the T-DSS to the FPS, a bridging interfacial software module linking the MS Access platform to the FPS platform and software code is imperative. This is not undoable and can be explored as part of the project implementation phase especially considering that the FPS software was developed at the Texas A&M Transportation Institute (TTI).

SECTION IV. TXCRCP-ME AND CONCRETE TRAFFIC INPUT DATA

TxCRCP-ME, an algorithm in MS Excel macro format, is one of the commonly used routine methods by TxDOT for designing concrete pavements. As shown in Figure 7, the key required traffic input parameters are the number of lanes and the 30-year 18-kip ESALs in one direction. As listed in Table 2, these two parameters are sourced from Table 1 in the T-DSS, namely "Table01_Traffic Volume, ESALs, and Vehicle Speed Data." As exemplified in Figure 8, the data are accessed visually/manually but with future plans for automated export into the TxCRCP-ME program as both the TxCRCP-ME program and the T-DSS are based on the MS Excel platform.

CRCP DESIGN PROGRAM BASED ON MECHANISTIC-EMPIRICAL PRINCIPLES

Developed under TxDOT Research Project 0-5832

Version: TxCRCP-ME v07b

A. Project Identification

District	
County	
Highway	
CSJ	
Direction	
Station (Begin)	
Station (End)	

B. Design Parameters

Design Life (year)	30
Number of Punchouts per Mile	10

C. Design Traffic

Total Number of Lanes in One Direction	
Total Design Traffic in One Direction (million ESALs)	

D. Concrete Layer Information

Thickness of Concrete Layer (in.)	
28-Day Modulus of Rupture (psi)	570

E. Support Layers Information

Soil Classification System	USCS
Soil Classification of Subgrade	
Base Type	CTB
Base Thickness (in.)	6
Modulus of Base Layer (ksi)	
Composite K (psi/in.)	0

Input | Temperature | Soil Classification | K-Table | Composite K | S-Table | Stress | Analysis Result | Final Result | Time vs. Punchout

Figure 7. Main MS Excel Worksheet for the TxCRCP Design Program.

Table 2. Main Traffic Data Inputs for the TxCRCP-ME Program.

#	Item	#	Description	Data Source/Location in the T-DSS (Table01)
1	Traffic Data	a.	Number of lanes in one direction	Table01_Traffic Volume, ESALs, and Vehicle Speed Data
		b.	30-year 18-kip ESALs in one direction	

Table01_Traffic Volume, ESALs, & Vehicle Speed Data

HWY	LaneDirection	LaneDesignation	NoOfLanesIn	Year	Estimated 20-Yr 18-kip ES	Estimated 30-Yr 18-kip ESALs (Millions)
IH 35	NB	Outside (L1)	2	2015	39.08	70.18
IH 35	NB	Inside (L2)	2	2015	5.49	9.15
IH 35	SB	Outside (L1)	2	2015	40.11	78.01
IH 35	SB	Inside (L2)	2	2015	5.76	9.24

District	County	HWY	LaneDirection	LaneDesignation	NoOfLanesInOneDirection	Year	Estimated 30-Yr 18-kip ESALs (Millions)
Laredo	La Salle	IH 35	NB	Outside (L1)	2.00	2015	70.18
Laredo	La Salle	IH 35	NB	Inside (L2)	2.00	2015	9.15
Laredo	La Salle	IH 35	SB	Outside (L1)	2.00	2015	78.01
Laredo	La Salle	IH 35	SB	Inside (L2)	2.00	2015	9.24

Figure 8. TxCRCP-ME Traffic Input Data (T-DSS and Excel-Export Tables).

SECTION V. TXACOL AND TXCRACKPRO TRAFFIC INPUT DATA

TxACOL and TxCrackPro software are overlay design and M-E analysis programs. Figure 9 shows the main software screens. The basic traffic input data requirements are listed in Table 3 along with data source location in the T-DSS, namely Table 6 (i.e., Table06_TxACOL and TxCrackPro Input Data; see Figure 10). Data export from the T-DSS to both these two M-E software is visual/manual based. Automated data import will require interfacial modules as the T-DSS and the software use different code platforms. Both the two M-E software were developed at TTI along with the T-DSS. Therefore, exploring for a bridging module to allow for automated data export/import is feasible.

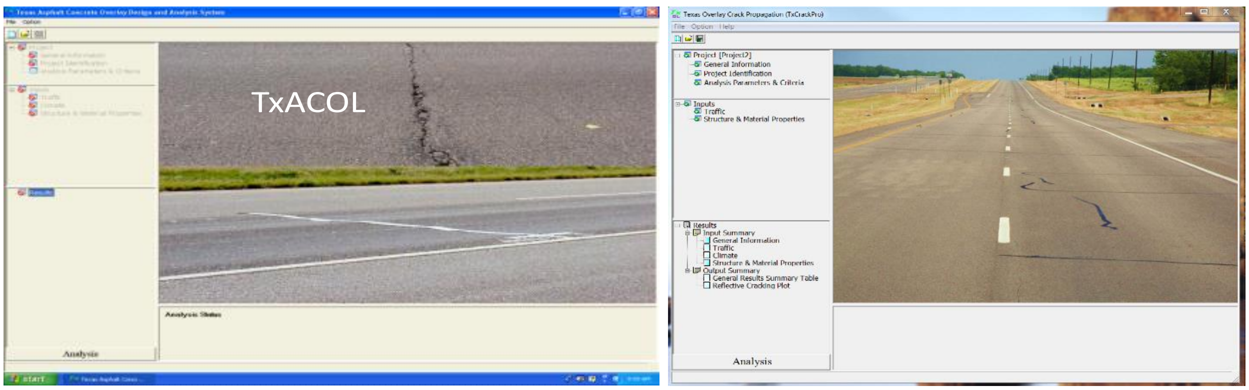
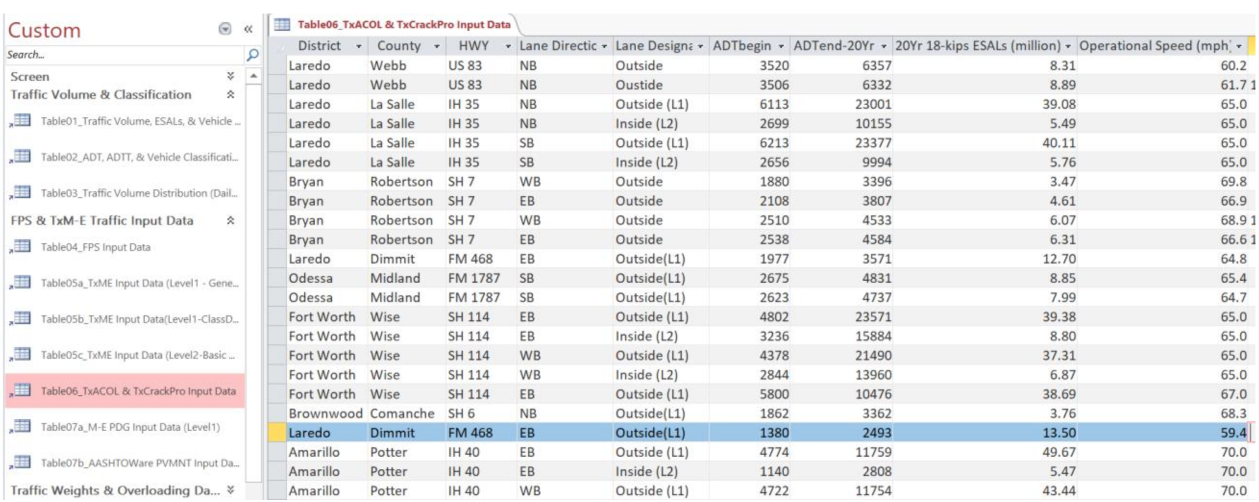


Figure 9. Main Screens for TxACOL and TxCrackPro Softwares.

Table 3. Main Traffic Data Inputs for the TxACOL and TxCrackPro Softwares.

Item	Description	Data Source/ Location in the T-DSS (Table06)
Traffic	ADT begin (veh/day) ADT end 20 Yr (veh/day) 18 kip ESALs 20 yr – 1 Direction (millions) Operation speed (mph)	Table06_TxACOL and TxCrackPro Input Data



District	County	HWY	Lane Directic	Lane Designa	ADTbegin	ADTend-20Yr	20Yr 18-kips ESALs (million)	Operational Speed (mph)
Laredo	Webb	US 83	NB	Outside	3520	6357	8.31	60.2
Laredo	Webb	US 83	NB	Oustide	3506	6332	8.89	61.7 1
Laredo	La Salle	IH 35	NB	Outside (L1)	6113	23001	39.08	65.0
Laredo	La Salle	IH 35	NB	Inside (L2)	2699	10155	5.49	65.0
Laredo	La Salle	IH 35	SB	Outside (L1)	6213	23377	40.11	65.0
Laredo	La Salle	IH 35	SB	Inside (L2)	2656	9994	5.76	65.0
Bryan	Robertson	SH 7	WB	Outside	1880	3396	3.47	69.8
Bryan	Robertson	SH 7	EB	Outside	2108	3807	4.61	66.9
Bryan	Robertson	SH 7	WB	Outside	2510	4533	6.07	68.9 1
Bryan	Robertson	SH 7	EB	Outside	2538	4584	6.31	66.6 1
Laredo	Dimmit	FM 468	EB	Outside(L1)	1977	3571	12.70	64.8
Odessa	Midland	FM 1787	SB	Outside(L1)	2675	4831	8.85	65.4
Odessa	Midland	FM 1787	SB	Outside(L1)	2623	4737	7.99	64.7
Fort Worth	Wise	SH 114	EB	Outside (L1)	4802	23571	39.38	65.0
Fort Worth	Wise	SH 114	EB	Inside (L2)	3236	15884	8.80	65.0
Fort Worth	Wise	SH 114	WB	Outside (L1)	4378	21490	37.31	65.0
Fort Worth	Wise	SH 114	WB	Inside (L2)	2844	13960	6.87	65.0
Fort Worth	Wise	SH 114	EB	Outside (L1)	5800	10476	38.69	67.0
Brownwood	Comanche	SH 6	NB	Outside(L1)	1862	3362	3.76	68.3
Laredo	Dimmit	FM 468	EB	Outside(L1)	1380	2493	13.50	59.4
Amarillo	Potter	IH 40	EB	Outside (L1)	4774	11759	49.67	70.0
Amarillo	Potter	IH 40	EB	Inside (L2)	1140	2808	5.47	70.0
Amarillo	Potter	IH 40	WB	Outside (L1)	4722	11754	43.44	70.0

Figure 10. TxACOL and TxCrackPro Traffic Input Data in The T-DSS (Table06).

SECTION VI. THE TXME SOFTWARE AND TRAFFIC INPUT DATA

TxME is an M-E based software used for the design, structural analysis, and performance predictions of flexible pavements. Figure 11 illustrates the TxME main screen. Table 4 lists the main traffic data inputs for the TxME along with the source location from the T-DSS. Data access is visual/manually based with the need for an interficial module to facilitate automated data export/import between the T-DSS and TxME. This aspect can be explored during the project implementation phase since both the T-DSS and TxME were developed at TTI.

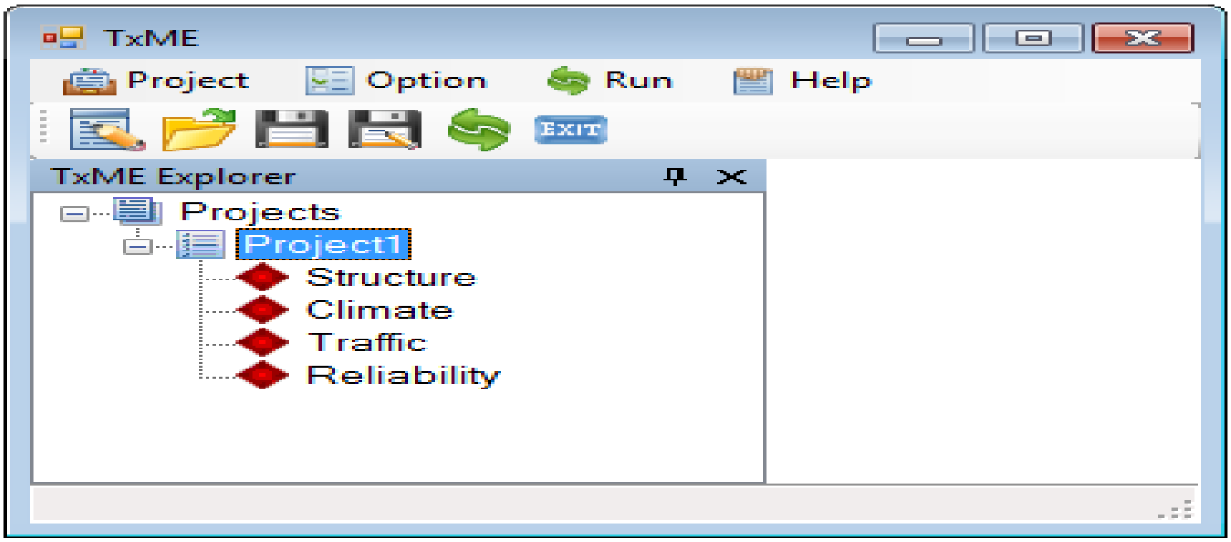


Figure 11. TxME Main Input Screen.

Table 4. Main Traffic Data Inputs for the TxME Software.

<table>
<tr><th colspan="2">Item</th><th colspan="2">Description</th><th>Location in the T-DSS (Table05)</th></tr>
<tr><td rowspan="15">Traffic</td><td rowspan="2">Level 2</td><td colspan="2">Tire Pressure</td><td rowspan="2">Table05c_TxME Input Data (Level2-Basic Data)</td></tr>
<tr><td colspan="2">ADT Beginning
ADT-End 20 YR
18kip ESALs 20 YR (1 DIR, millions)
Operation Speed</td></tr>
<tr><td rowspan="13">Level 1</td><td colspan="3">General Traffic Information</td></tr>
<tr><td rowspan="5"></td><td>Traffic Two-way AADTT</td><td rowspan="5">Table05a_TxME Input Data (Level1-General)</td></tr>
<tr><td>No. of Lanes in Design Direction</td></tr>
<tr><td>% of Trucks in Design Direction</td></tr>
<tr><td>% of Trucks in Design Lane</td></tr>
<tr><td>Operation Speed</td></tr>
<tr><td colspan="3">Axle Configuration</td></tr>
<tr><td rowspan="2"></td><td>Axle Tire
(Single & Dual Tire Pressure)</td><td>Table05a_TxME Input Data (Level1-General)</td></tr>
<tr><td>Axle Spacing
(Tandem, Tridem, & Quad)</td><td>Table05a_TxME Input Data (Level1-General)</td></tr>
<tr><td colspan="2">MAF and ALD files</td><td>Table05a_TxME Input Data (Level1-General) – under attachments</td></tr>
<tr><td colspan="2">Axle Load Distribution</td><td rowspan="3">Table05b_TxME Input Data (Level1-Class Distribution and Axles Per Truck)</td></tr>
<tr><td colspan="2">Vehicle Class Distribution and Growth</td></tr>
<tr><td colspan="2">Axle Per Truck</td></tr>
</table>

SECTION VII. THE M-E PDG AND AASHTOWARE SOFTWARE

Similar to the TxME, the M-E PDG and AASHTOWare are M-E based software used for the design, structural analysis, and performance predictions of flexible pavements. Figure 12 illustrates the M-E PDG main screen. Table 5 lists the main traffic data inputs for the M-E PDG and AASHTOWare along with the source location from the T-DSS (i.e., Table 7 [Table07_M-E PDG and AASHTOWare Input Data]). Data access is visual/manually with no possibilities of automated data export/import as these are federal developed/managed software.

Figure 12. M-E PDG Main Screen.

Table 5. Main Traffic Data Inputs for the M-E PDG Software.

Item	#	Description (Location in the T-DSS = Table07)	Comment
Traffic	a.	Design Life (yrs.)	User
	b.	Opening Date	Construction
	c.	Initial two-way AADTT	
	d.	Number of lanes in design direction	
	e.	Percent of trucks in design direction (%)	
	f.	Percent of trucks in design lane (%)	
	g.	Operational Speed (mph)	
Traffic Volume Adjustment Factors	a.	4.1.1. Monthly adjustment	
	b.	4.1.2. Vehicle Class Distribution	
	c.	4.1.3. Hourly Distribution	
	d.	4.1.4. Traffic growth factors	
Axle Load Distribution Factors	a.	Single axle	
	b.	Tandem axle	
	c.	Tridem axle	
	d.	Quad axle	
General Traffic Inputs	a.	Mean wheel location (inches from the lane marking)	
	b.	Traffic wander standard deviation (inches)	
	c.	Design lane width (ft) (Note: Not slab width)	
Number Axles/Truck		Single, Tandem, Tridem, & Quad (Class 4 to 13)	
Axle Configuration	a.	Average Axle width (edge to edge) outside dimensions, ft	Default
	b.	Dual tire spacing (inches)	Default
	c.	Tire Pressure (psi)	Default
	d.	Tandem Axle spacing (inches)	Default
	e.	Tridem Axle spacing (inches)	Default
	f.	Quad Axle spacing (inches)	Default
Wheelbase	a.	Average Axle spacing (ft)	Default
	b.	Percent of trucks (%)	

SECTION VIII. SUMMARY AND RECOMMENDATIONS

This document provided an overview of how to use the T-DSS and access traffic data for different M-E software including the FPS and TxCRCP-ME. Except for the MAF and ALD files that after T-DSS download are directly imported into the M-E software, all of the T-DSS data are visually/manually accessed, with the feasibility of automated data import/export between the T-DSS and the M-E software. Other than the MS Excel-based TxCRCP-ME, the key challenge in automating the data import/export is the difference in the software platforms; as such, interfacial modules are required for bridging and where applicable, data reformatting to match the M-E software format.

Other than the M-E PDG and AASHTOWare, all the other software exhibit potential to allow for interfacial module development for automated data export/import with the T-DSS; this is because majority of the M-E software discussed herein were largely developed at TTI. Thus, as part of the project implementation phase, interfacial module development is recommended for the following software: FPS, TxCRCP-ME, TxME, TxACOL, and TxCrackPro.