0-6297-P3

USER MANUAL FOR THE RELATIONAL MULTIMODAL FREIGHT DATABASE

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INTRODUCTION

This document was developed as part of TxDOT project 0-6297 entitled: *Freight Planning Factors Impacting Texas Commodity Flows*. The project focused on understanding the critical factors that influence freight planning. All states are required in by the Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991 and by the subsequent Transportation Equity Act for the 21st century (TEA-21) to conduct statewide freight transportation planning. However, understanding how freight impacts the transportation system of a state and conducting statewide freight planning requires robust data.

The research team found that most states that are conducting statewide freight modeling planning seem to have relied on the commercial TRANSEARCH database, partly because this is currently the only database that captures most of the variables needed for freight modeling (Prozzi, Mani, and Harrison, 2006). Although the TRANSEARCH database has most of the necessary variables, concerns have been expressed because there is not a clear understanding of how the data is gathered and the methodology used for compiling the database. It is also true that this database can be costly, making it difficult for some planning agencies and policy makers to purchase it. Consequently, as part of TxDOT project 0-629, the CTR research team developed a Relational Multimodal Freight Database that can capture relevant publicly-available freight variables required for updating TxDOT freight models and studies.

From the Multimodal Freight Database, TxDOT is able to identify any missing data that the public databases do not capture. The missing data can be obtained through purchasing a commercial database or by collecting the relevant data.

This manual provides step-by-step guidance on how to use the TxDOT Relational Multimodal Freight Database Software (Freight Database), as well as information on how the database was developed, and the public databases from which the data was extracted.

SELECTION OF VARIABLES AND PUBLIC DATABASES

The variables that were included in the Multimodal Freight Database were selected in consultation with prospective TxDOT users of the database. Specifically, the research team met with the SAM Project Director and transportation planners from TxDOT's multimodal office. These meetings provided the potential users of the database with the opportunity to provide invaluable input in terms of their data needs, the database structure, and the software platform to be used. In terms of the latter, Microsoft Access 2007 was selected to be the software platform.

Freight Variables

In consultation with TxDOT, it was decided to include the following variables in the Multimodal Freight Database:

- Year
- Modes of Transportation
  - Air
  - Mail
  - Multimodal
  - Piggyback
  - Pipeline
  - Rail
  - Truck
  - Rail/Truck
  - Unknown
  - Vessel
  - Water
- Origin
  - By State
  - By Country
- Destination
  - By State
  - By Country
- Port
  - Port Location by State
- Type of Movement
  - Export
  - Import
- Number of Loads
  - Carloads
  - Container
- Value ($U.S.)

- Weight (1,000 lbs)
- Commodity Type
  - STCC (Standard Transportation Commodity Code at 2-Digit Level)

Freight Public Databases

The research team identified and reviewed 25 publicly available databases from which freight data could be extracted at no cost. After evaluating these public databases, it was found that 11 of these databases contained all or some of the variable information of interest to TxDOT at the appropriate level of disaggregation. Freight data included in the Multimodal Freight Database were thus ultimately extracted from the following databases:

- Carload Waybill Public Use File (WAY)
- Commodity Flow Survey (CFS)
- Freight Analysis Framework (FAF)
- Transborder Surface Freight Data (TBR)
- Annual Coal Report (ACR)
- Border Crossing Data (BCD)
- Fresh, Fruit and Vegetables Shipments by Commodities, States and Months (FFV)
- Maritime Administration Data (MAR)
- National Transportation Statistics (NTS)
- USA Trade Data (USA)
- Waterborne Commerce Statistics (WBN)

Appendix A provides detailed information on each of the public databases consulted, including the methodology used to obtain the data, limitations, assumptions, and contact information for obtaining the database.

Tables 1 to 4 illustrate which public databases captured the relevant freight data that were included in the Multimodal Freight Database. Table 1 illustrates which public databases captured data on weight, value, and number of loads.

Table 1: Weight, Value, and Number of Loads

Data Source	Weight	Value	Number of Loads
CFS	X	X	
TBR	X (Exports)	X	
NTS		X	
ACR	X		
FAF	X	X	
MAR		X	
WBN	X		
USA		X	
BCD			X (Containerized)

WAY	X		X
FFV	X		

Table 2 illustrates which public databases captured origin and destination data and the geographic unit used in capturing the information.

Table 2: Origin and Destination Information

Data Source	Origin -Destination				
	Country		State	Province	NTAR / BEA
	Imports	Exports			
CFS		X	X		X
TBR	X	X	X	X	
MAR	X	X	X	X	
NTS	X	X	X		
FAF	X	X	X	X	
USA	X	X	X	X	
FFV	X				
WAY					X
ACR			X		
BCD			X		
WBN	X	X	X	X	

Table 3 illustrates the modal information captured in each of the public databases.

Table 3: Mode of Transportation

Data Source	Air	Mail	Multi-modal	Piggy-back	Pipeline	Rail	Truck	Unknown	Vessel	Water
ACR						X				
CFS	X		X		X	X	X	X		X
TBR	X	X			X	X	X	X	X	
FAF	X		X		X	X	X	X		X
BCD						X	X			
WBN										X
MAR										X
WAY			X			X		X		
FFV	X			X		X	X			X

Table 4 illustrates which public databases captured commodity information and the classification system used.

Table 4: Commodity and Classification System Used

Data Source	Commodity Classification			Industry Classification
	HS	SCTG	STCC	NAICS
CFS		X		X
FAF		X		
USA	X			X
WBN	X*			
WAY			X	
TBR	X			

* Categories are slightly different from the standard classification used by the Harmonized System

From Tables 2 and 4 it is evident that different public databases used different codes and geographic units when capturing freight data. Development of the Multimodal Freight Database thus required the development of a standardized list of codes for each of the freight variables included in the database. All the public data extracted was thus coded to a uniform set of codes that are included in Appendix B. Appendix B also contains the mapping of the commodity codes developed and how they relate to the HS, NAICS, SCTG, and STCC classification systems. Finally, the use of standardized codes also simplified the coding of the user-friendly interfaces that were developed for the Multimodal Freight Database.

USING THE SOFTWARE

Step 1: Installing the software

Insert the Multimodal Freight Database CD in the CD-ROM drive of the computer.

System Requirements

Microsoft .Net Framework 4.0 Client Profile is required to run the **Multimodal Freight Database**. The Framework is packaged with Windows Vista and Windows 7. If the computer does not have Microsoft .Net Framework 4.0 Client Profile installed, the user will need to first install the Framework (see Figure 1).

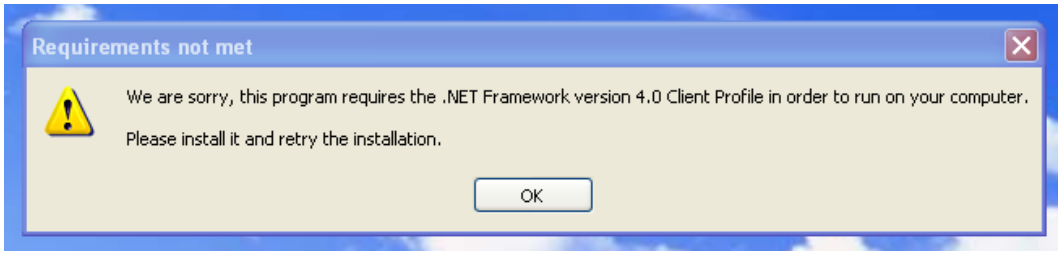


Figure 1: Require Microsoft .Net Framework 4.0 Client Profile

Microsoft .Net Framework 4.0 Client Profile can be installed from the **Multimodal Freight Database CD** or downloaded from the Microsoft website.

Please note Administration Privileges is required to install Microsoft .Net Framework 4.0 Client Profile

Multimodal Freight Database Installation

1. Double click **MFD Setup.exe** on the **Multimodal Freight Database CD.**
2. The following message box will appear (see Figure 2).
3. Click ***Next*** and follow the instructions to install **Multimodal Freight Database.**

Please note Administration Privileges is required to install the access driver.

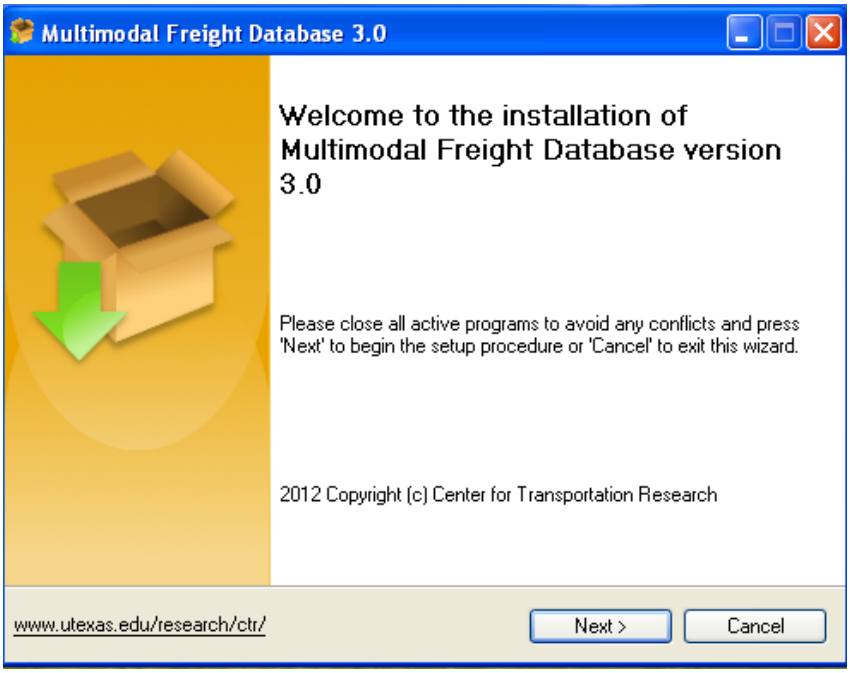


Figure 2: Installation Message Box

Step 2: Start Screen

To begin using the software

1. Go to **Start > All Programs >> Multimodal Freight Database.**
2. Click on **Multimodal Freight Database** (see Figure 3).
3. **The *Multimodal Freight Database Start*** screen will appear (see Figure 4).

Figure 3: Multimodal Freight Database Link and Icon

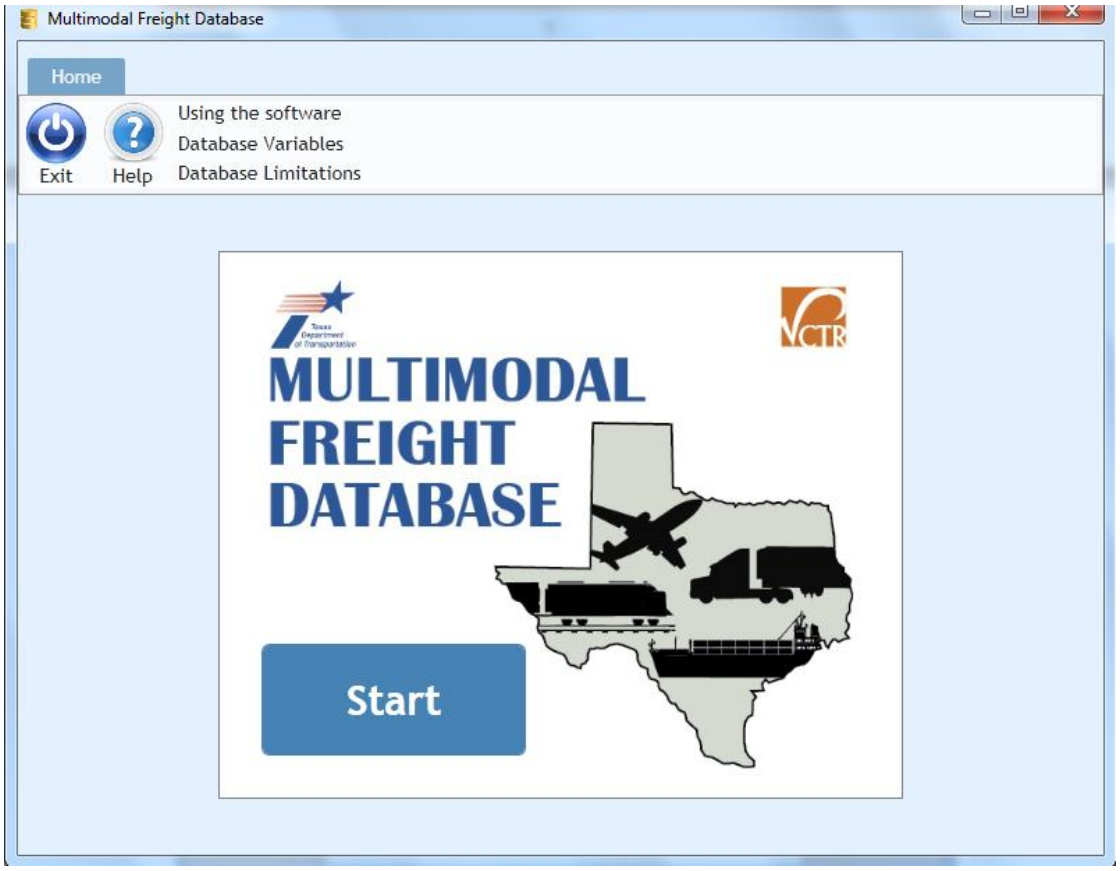


Figure 4: Start Screen

Step 3: Selecting Public Databases

After clicking ***Start,*** the user will see the Database screen (see Figure 5).

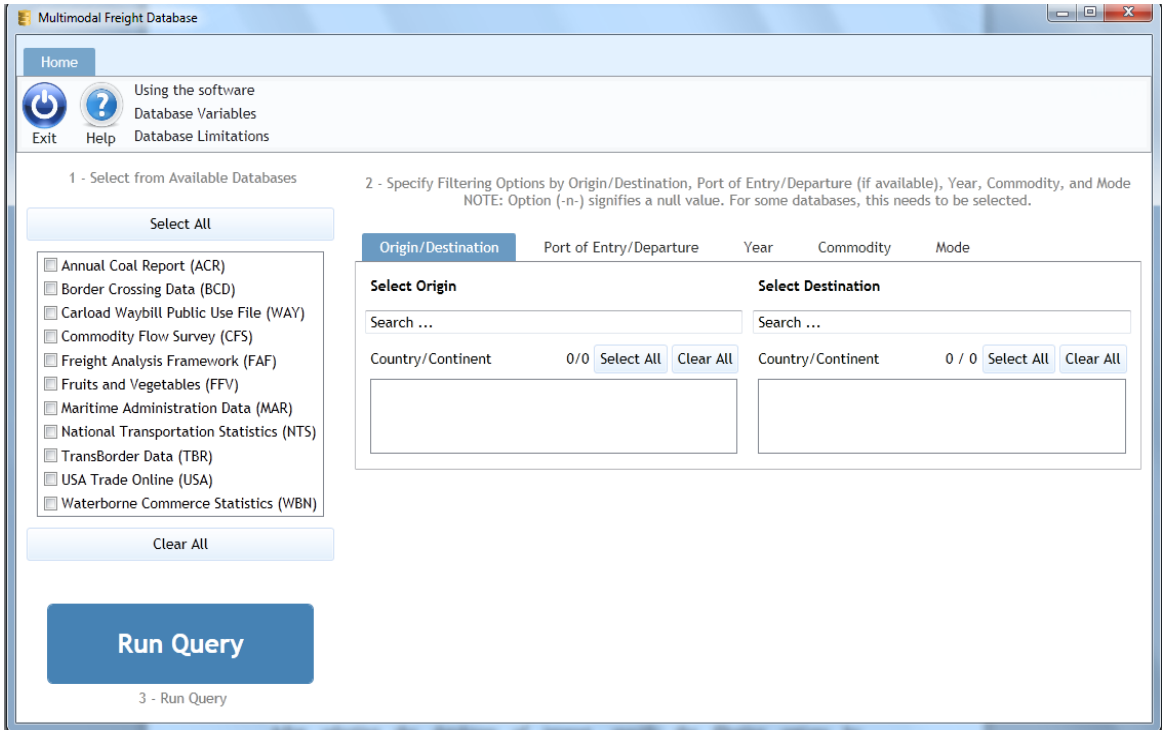


Figure 5: Database Screen

The screen shows all the databases that freight data can be extracted from. The user can select multiple databases by clicking the checkbox next to the database name.

Click ***Select All*** to select all the databases.

Click ***Clear All*** to erase all selections.

Click ***Help*** to access the Quick User Guide, explore the Database Features, and obtain detailed information on each of the public databases consulted including the methodology used to obtain the data, limitations, assumptions, and contact information for obtaining the database.

Please note – In subsequent screens/ forms, all information displayed will relate to the databases selected in Step 3.

Step 4: Filtering Options

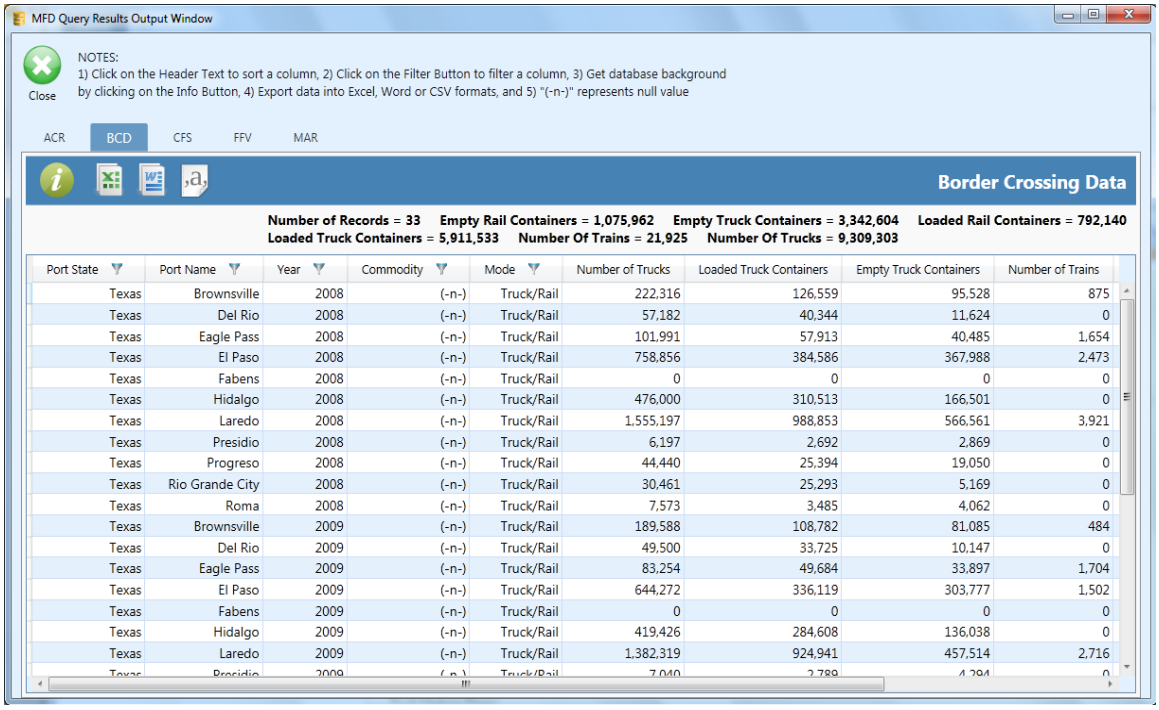
After selecting the databases of interest, specify the filtering options by ***Origin/Destination, Port of Entry/Departure***, ***Year***, ***Commodity***, and ***Mode*** by clicking the tabs and checking the appropriate boxes.

After the appropriate filtering options have been selected, click ***Run Query***.

Please note – Not all freight variables are captured in all the public databases. The Multimodal Freight Database will thus only report the freight variable data if at least one of the databases selected in Step 3 contains the data.

Step 5: Preparing the Report

Upon completing Step 4, a final report containing the freight data will be compiled (see Figure 6 for an example of a final report). The final report presents the specified freight data by data source.



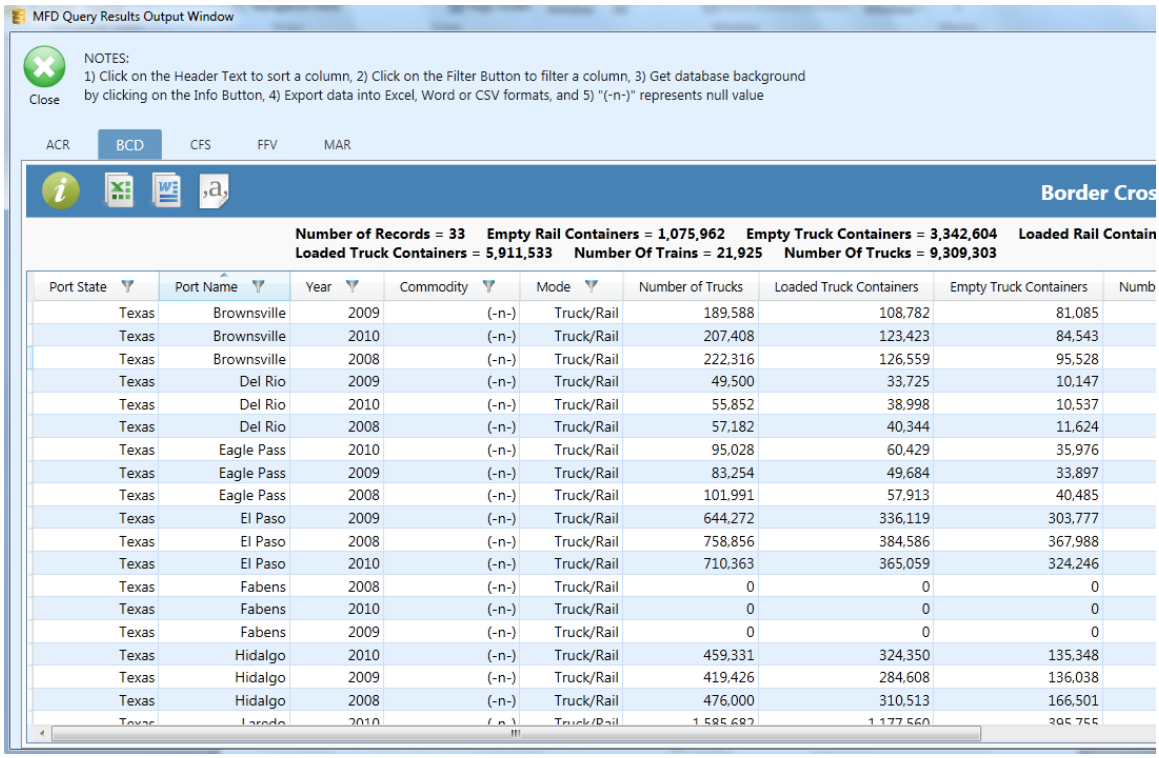
Port State	Port Name	Year	Commodity	Mode	Number of Trucks	Loaded Truck Containers	Empty Truck Containers	Number of Trains
Texas	Brownsville	2008	(-n-)	Truck/Rail	222,316	126,559	95,528	875
Texas	Del Rio	2008	(-n-)	Truck/Rail	57,182	40,344	11,624	0
Texas	Eagle Pass	2008	(-n-)	Truck/Rail	101,991	57,913	40,485	1,654
Texas	El Paso	2008	(-n-)	Truck/Rail	758,856	384,586	367,988	2,473
Texas	Fabens	2008	(-n-)	Truck/Rail	0	0	0	0
Texas	Hidalgo	2008	(-n-)	Truck/Rail	476,000	310,513	166,501	0
Texas	Laredo	2008	(-n-)	Truck/Rail	1,555,197	988,853	566,561	3,921
Texas	Presidio	2008	(-n-)	Truck/Rail	6,197	2,692	2,869	0
Texas	Progreso	2008	(-n-)	Truck/Rail	44,440	25,394	19,050	0
Texas	Rio Grande City	2008	(-n-)	Truck/Rail	30,461	25,293	5,169	0
Texas	Roma	2008	(-n-)	Truck/Rail	7,573	3,485	4,062	0
Texas	Brownsville	2009	(-n-)	Truck/Rail	189,588	108,782	81,085	484
Texas	Del Rio	2009	(-n-)	Truck/Rail	49,500	33,725	10,147	0
Texas	Eagle Pass	2009	(-n-)	Truck/Rail	83,254	49,684	33,897	1,704
Texas	El Paso	2009	(-n-)	Truck/Rail	644,272	336,119	303,777	1,502
Texas	Fabens	2009	(-n-)	Truck/Rail	0	0	0	0
Texas	Hidalgo	2009	(-n-)	Truck/Rail	419,426	284,608	136,038	0
Texas	Laredo	2009	(-n-)	Truck/Rail	1,382,319	924,941	457,514	2,716
Texas	Presidio	2009	(-n-)	Truck/Rail	7,040	2,789	4,294	0

Figure 6: Final Report Excerpt

The *upper tabs* provide the navigation tools to see the query results by data source. If multiple databases are selected on the Database screen, each will have its own tab in the

final report. For example, by selecting the **BCD** tab in Figure 6, the program will automatically show the data corresponding to the Border Crossing Data.

To **sort** the data according to a specific characteristic click the column header corresponding to the desired characteristic. For example, in Figure 7 the Border Crossing Data is sorted alphabetically by Port Name.



Port State	Port Name	Year	Commodity	Mode	Number of Trucks	Loaded Truck Containers	Empty Truck Containers	Numb
Texas	Brownsville	2009	(-n-)	Truck/Rail	189,588	108,782	81,085	
Texas	Brownsville	2010	(-n-)	Truck/Rail	207,408	123,423	84,543	
Texas	Brownsville	2008	(-n-)	Truck/Rail	222,316	126,559	95,528	
Texas	Del Rio	2009	(-n-)	Truck/Rail	49,500	33,725	10,147	
Texas	Del Rio	2010	(-n-)	Truck/Rail	55,852	38,998	10,537	
Texas	Del Rio	2008	(-n-)	Truck/Rail	57,182	40,344	11,624	
Texas	Eagle Pass	2010	(-n-)	Truck/Rail	95,028	60,429	35,976	
Texas	Eagle Pass	2009	(-n-)	Truck/Rail	83,254	49,684	33,897	
Texas	Eagle Pass	2008	(-n-)	Truck/Rail	101,991	57,913	40,485	
Texas	El Paso	2009	(-n-)	Truck/Rail	644,272	336,119	303,777	
Texas	El Paso	2008	(-n-)	Truck/Rail	758,856	384,586	367,988	
Texas	El Paso	2010	(-n-)	Truck/Rail	710,363	365,059	324,246	
Texas	Fabens	2008	(-n-)	Truck/Rail	0	0	0	
Texas	Fabens	2010	(-n-)	Truck/Rail	0	0	0	
Texas	Fabens	2009	(-n-)	Truck/Rail	0	0	0	
Texas	Hidalgo	2010	(-n-)	Truck/Rail	459,331	324,350	135,348	
Texas	Hidalgo	2009	(-n-)	Truck/Rail	419,426	284,608	136,038	
Texas	Hidalgo	2008	(-n-)	Truck/Rail	476,000	310,513	166,501	
Texas	Laredo	2010	(-n-)	Truck/Rail	1,585,682	1,177,560	395,755	

Figure 7: Example of Sorted Data

To **filter the** data, click on the Filter icon (see Figure 8).

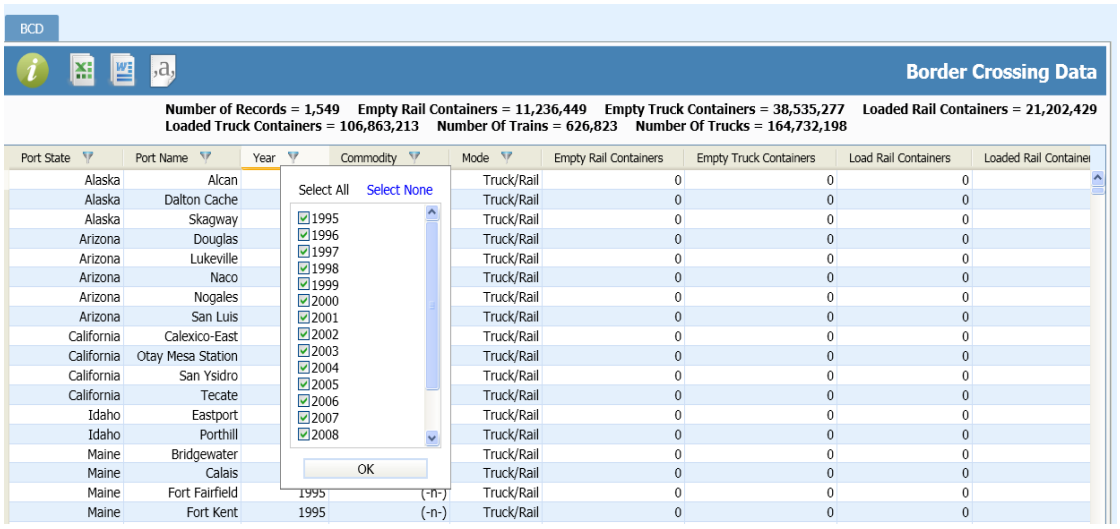
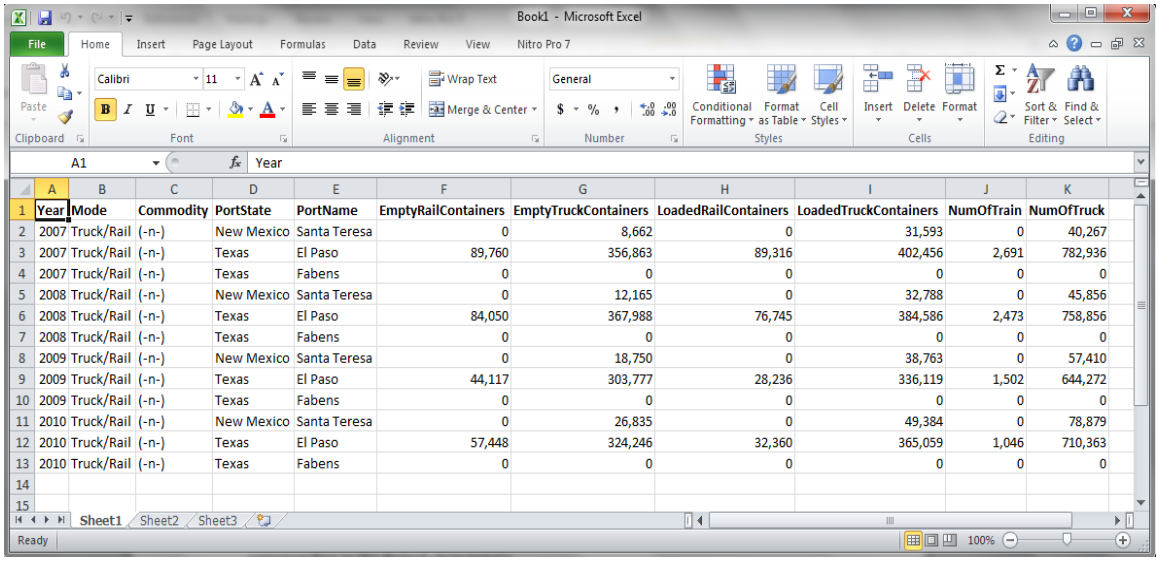


Figure 8: Example of Filtered Data

Additionally, the **Relational Multimodal Freight Database** provides the option to export the query results to several programs.

By clicking the Excel icon in the upper left part of the window, an Excel spreadsheet will automatically be created (see Figure 9).



Year	Mode	Commodity	PortState	PortName	EmptyRailContainers	EmptyTruckContainers	LoadedRailContainers	LoadedTruckContainers	NumOfTrain	NumOfTruck
2007	Truck/Rail	(-n-)	New Mexico	Santa Teresa	0	8,662	0	31,593	0	40,267
2007	Truck/Rail	(-n-)	Texas	El Paso	89,760	356,863	89,316	402,456	2,691	782,936
2007	Truck/Rail	(-n-)	Texas	Fabens	0	0	0	0	0	0
2008	Truck/Rail	(-n-)	New Mexico	Santa Teresa	0	12,165	0	32,788	0	45,856
2008	Truck/Rail	(-n-)	Texas	El Paso	84,050	367,988	76,745	384,586	2,473	758,856
2008	Truck/Rail	(-n-)	Texas	Fabens	0	0	0	0	0	0
2009	Truck/Rail	(-n-)	New Mexico	Santa Teresa	0	18,750	0	38,763	0	57,410
2009	Truck/Rail	(-n-)	Texas	El Paso	44,117	303,777	28,236	336,119	1,502	644,272
2009	Truck/Rail	(-n-)	Texas	Fabens	0	0	0	0	0	0
2010	Truck/Rail	(-n-)	New Mexico	Santa Teresa	0	26,835	0	49,384	0	78,879
2010	Truck/Rail	(-n-)	Texas	El Paso	57,448	324,246	32,360	365,059	1,046	710,363
2010	Truck/Rail	(-n-)	Texas	Fabens	0	0	0	0	0	0

Figure 9: Exported Excel Spreadsheet

Similarly, a Word file can be created by clicking the corresponding icon. After clicking, a window will ask you to name the file and select a folder to be created (see Figure 10).

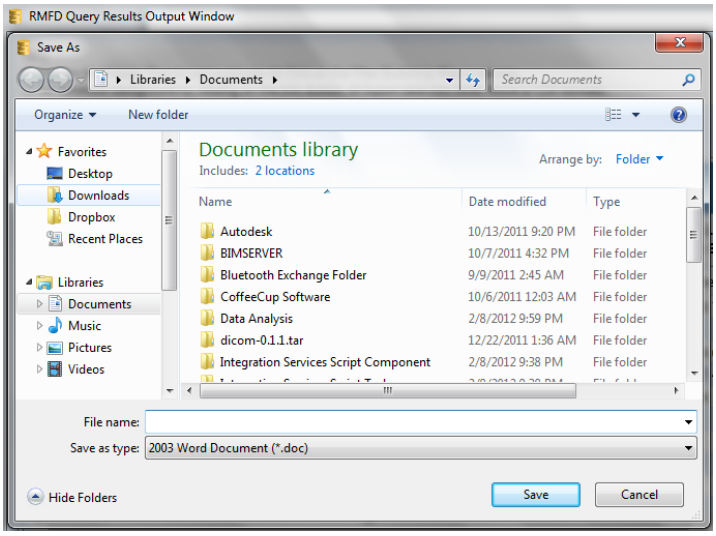
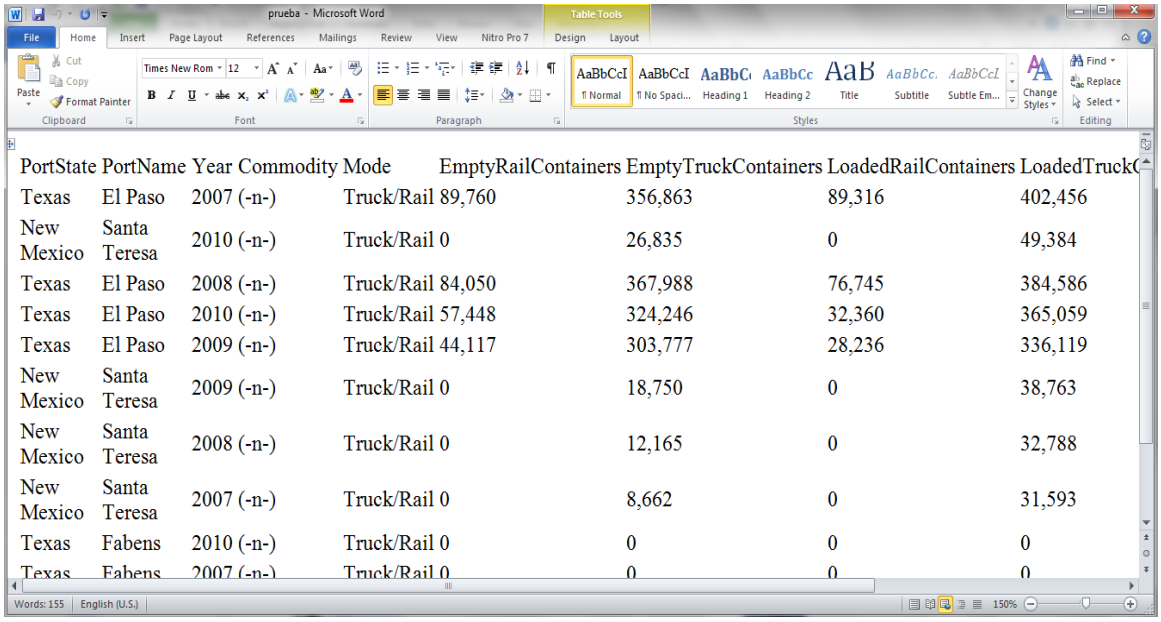


Figure 10: Creating the Word File

Once the file has been created, open it, and the file should contain a Word table similar to Figure 11.

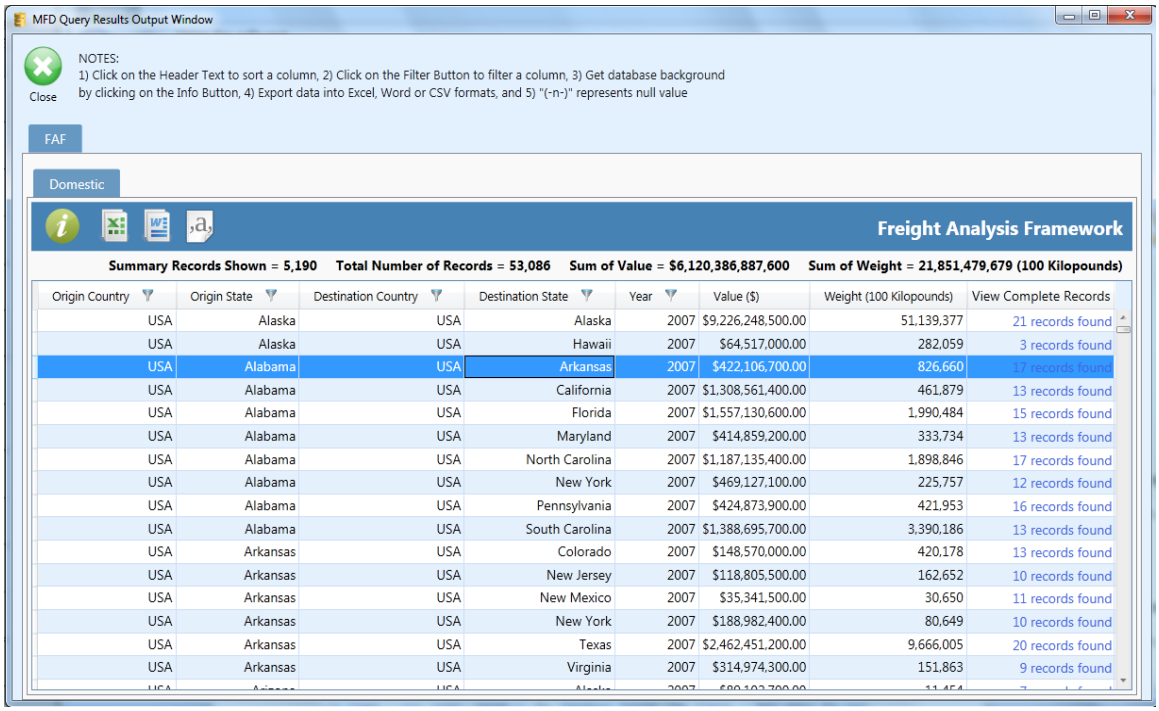


PortState	PortName	Year	Commodity	Mode	EmptyRailContainers	EmptyTruckContainers	LoadedRailContainers	LoadedTruckC
Texas	El Paso	2007	(-n-)	Truck/Rail	89,760	356,863	89,316	402,456
New Mexico	Santa Teresa	2010	(-n-)	Truck/Rail	0	26,835	0	49,384
Texas	El Paso	2008	(-n-)	Truck/Rail	84,050	367,988	76,745	384,586
Texas	El Paso	2010	(-n-)	Truck/Rail	57,448	324,246	32,360	365,059
Texas	El Paso	2009	(-n-)	Truck/Rail	44,117	303,777	28,236	336,119
New Mexico	Santa Teresa	2009	(-n-)	Truck/Rail	0	18,750	0	38,763
New Mexico	Santa Teresa	2008	(-n-)	Truck/Rail	0	12,165	0	32,788
New Mexico	Santa Teresa	2007	(-n-)	Truck/Rail	0	8,662	0	31,593
Texas	Fabens	2010	(-n-)	Truck/Rail	0	0	0	0
Texas	Fabens	2007	(-n-)	Truck/Rail	0	0	0	0

Figure 11: Exported Word Table

The Freight Analysis Framework (FAF), Carload Waybill Use File (WAY), and Transborder Data (TBR) databases are so large that they present a summary report containing links to complete records.

When the user clicks on the hyperlink, a full report of the selected row is displayed. For example, by clicking ***17 records found*** in the summary report shown in Figure 12, the user can view all the records for freight transported from Alabama to Arkansas.



Origin Country	Origin State	Destination Country	Destination State	Year	Value ($)	Weight (100 Kilopounds)	View Complete Records
USA	Alaska	USA	Alaska	2007	$9,226,248,500.00	51,139,377	21 records found
USA	Alaska	USA	Hawaii	2007	$64,517,000.00	282,059	3 records found
USA	Alabama	USA	Arkansas	2007	$422,106,700.00	826,660	17 records found
USA	Alabama	USA	California	2007	$1,308,561,400.00	461,879	13 records found
USA	Alabama	USA	Florida	2007	$1,557,130,600.00	1,990,484	15 records found
USA	Alabama	USA	Maryland	2007	$414,859,200.00	333,734	13 records found
USA	Alabama	USA	North Carolina	2007	$1,187,135,400.00	1,898,846	17 records found
USA	Alabama	USA	New York	2007	$469,127,100.00	225,757	12 records found
USA	Alabama	USA	Pennsylvania	2007	$424,873,900.00	421,953	16 records found
USA	Alabama	USA	South Carolina	2007	$1,388,695,700.00	3,390,186	13 records found
USA	Arkansas	USA	Colorado	2007	$148,570,000.00	420,178	13 records found
USA	Arkansas	USA	New Jersey	2007	$118,805,500.00	162,652	10 records found
USA	Arkansas	USA	New Mexico	2007	$35,341,500.00	30,650	11 records found
USA	Arkansas	USA	New York	2007	$188,982,400.00	80,649	10 records found
USA	Arkansas	USA	Texas	2007	$2,462,451,200.00	9,666,005	20 records found
USA	Arkansas	USA	Virginia	2007	$314,974,300.00	151,863	9 records found

Figure 12: Summary Report for Large Databases

To begin a new query, return to the Database Screen (see Figure 5) and select the new database(s) and filtering options of interest. Each new query will open in a separate window.

For Further Questions and Comments, please contact the research team at:

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