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**THE URBAN TRANSPORTATION
PLANNING DATABASE**

Prepared for
Metropolitan Transit Authority of Harris County
and
State Department of Highways and Public Transportation

Prepared by
Texas Transportation Institute
The Texas A&M University System
College Station, Texas 77843

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ABSTRACT

This report summarizes the major aspects of the Urban Transportation Planning Database (UTPD) which is a transportation analysis tool developed to provide a common database for transportation information for use in the Houston area. General information is available from over 30 U.S. cities. This data provides for comparisons of approaches dealing with urban mobility and identifies trends which may be applicable to Houston. The database contains a wide variety of information collected and utilized by various transportation agencies in Houston. The database is designed and implemented using dBASE IV as the database software.

ACKNOWLEDGEMENT

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INTRODUCTION

Addressing urban mobility concerns has become a major interest of transportation professionals and officials in Texas. This is especially true in the Houston area. Responding to urban mobility needs has become a more significant and complex problem in recent years. The traditional roles and interrelationships of the different elements of the transportation system and the agencies responsible for each have been evolving to deal with these increased demands in a time of limited resources. Two recent examples of these changes in the Houston area are METRO's General Mobility Program and SDHPT's involvement in high occupancy vehicle (HOV) lane projects.

These changes have increased the long standing need for a good database that can be used by technical staff and others in project development. It is important that all groups are using a common set of information, and that the best available data are readily available to the decision making process.

Realizing these concerns and needs, METRO and SDHPT funded the development of an Urban Transportation Planning Database (UTPD) for use in the Houston area. It was not intended that this database would replace or supersede data already developed and used by different agencies. Rather, the intent was to make the available database more comprehensive and make all data more readily accessible to all agencies.

Scope of the Study

The purpose of the UTPD was to develop a common database for

-
- to provide a means for making comparisons between major cities;
 - to provide historical data and future estimates for use in illustrating trends in transportation; and,
 - to provide complete transportation statistics to aid in planning.

The database was designed and implemented using dBASE IV as the database software. dBASE IV was chosen because of its widespread use in the transportation industry.

Contents of Report

This report gives a brief summary of the purpose, contents, and capabilities of the UTPD. It is not intended to provide an indepth discussion of the database.

The report is divided into the following sections:

- Introduction
describes background information and purpose of the UTPD.
- The Database
describes scope of the data, discusses the data sources, describes the information in the database, and gives the procedure for updating the data.
- Database Management Program
lists features of dBASE IV, describes the structure of the UTPD, discusses the accompanying loose-leaf binder.
- Implementation of Database
discusses data manipulation, discusses methods of viewing data, and describes process for graphing data.

THE DATABASE

Scope

The Urban Transportation Planning Database (UTPD) contains information from more than 30 United States cities. The focus of the database is on the Houston area, whose data comprises over half of the database. The purpose of the database is to allow comparisons between transportation in Houston and other important metropolitan areas in the United States. It will also assist in identifying general trends in the peer cities which may be applicable to Houston.

Data Sources

With thirty-four sources utilized in the UTPD, keeping the information documented correctly is of vital importance. With this in mind, several safeguards have been added to the UTPD to insure that the correct source is associated with its data. The first safeguard is a numbering system within the filenames of the data and report files. These numbers reference the data files to specific sources listed in the accompanying loose-leaf binder. Furthermore, the source of the data is written within the data file along with a brief description as to the type of data in the file. This can be found in the first column when viewing the data on the computer screen. The final safeguard exists when multiple sources are incorporated within a single data file. When this occurs, an additional column containing the source is placed next to each column of data within the file. All of these safeguards together allow the database to function without the supporting binder. However, the user will encounter

Public Transportation

(U.S. cities)

Operating costs and revenues

Passenger-miles

Passenger trips

Revenue-miles and hours

DATABASE MANAGEMENT PROGRAM

dBASE IV Software

The dBASE IV program provides for data, report, and query files. The data files contain the actual data included in the database. The report files contain a template through which data is output to a printer. The query files allow the data to be searched and sorted in various ways. Another feature of the dBASE IV program is the catalog, which allows related data files to be grouped together. All of these features are important to the Urban Transportation Planning Database.

Each data file in the UTPD has an associated report file. This report file has been designed to output the information from the data file to the printer in much the same way as it appeared in its original form. The report files which accompany the data are made available upon access of the data file. There are no preconstructed queries within the UTPD because the number of possible queries is limitless. Thus, the particular query design and function is left to the discretion of the user.

Structure of Database

As mentioned earlier, the information in the UTPD is divided into four categories. Each of these categories is represented as a catalog within the database program. The catalogs which group related data files are:

1. Demographic and Socioeconomic
2. Roadway Travel and Mobility (many United States cities)
3. Roadway Travel and Mobility (Houston)

- Tabs

The tabs separate the catalogs into sections, each containing information on a certain subject.

- Descriptions of Contents

Once the desired tab is located, a description of all of the sources pertaining to that subject can be found. This description gives the title of the original data, its source, the UTPD source code number, the number of data files that the source occupies, and a brief description of the data itself.

- Data Matrices

Once the topic is chosen and the table number is located , a matrix shows the user what data are available on the subject. The matrix consists of either numeric or alphabetic symbols. The numbers represent the actual source number of the data file. The letters represent the use of more than one data file from the same source. The source and the computer data file name are listed at the bottom of the matrix.

IMPLEMENTATION OF THE DATABASE

Data Manipulation

The Urban Transportation Planning Database can retrieve the desired data by many different routines. These three basic methods are:

- Single data file
- Query within a single data file
- Query of two or more data files

The first method of data retrieval involves the withdrawal of the data directly from its data file. Once the data is found it can be viewed on the computer screen or sent to a printer using the preconstructed report file (Appendix B). While this method is sufficient for most events, there are instances when only certain pieces of a large data file are required or the data may not be in the desired order. When this occurs the first method is no longer sufficient.

The second method involves the use of a query to manipulate the data before extraction from the data file. For instance, the desired information may not have been in alphabetical order or only data from the year 1988 was needed. The query could correct these problems and the data could again be either viewed on the computer screen or output to a printer using the preconstructed report file (Appendix C). This method is adequate unless data from more than one file is needed. When this happens the third method is required.

The last method involves querying data from more than one data file. This is done by linking the data files together via a common attribute such as a city or

A new report will need to be generated when data is queried from more than one data file.

Graphing Data

Although graphing data from dBASE IV does require several steps, creating a graph from this information is fairly easy. First, the queried data must be written as a dBASE IV data file. Once this is complete, the data file must then be exported as a LOTUS spreadsheet. This is necessary because dBASE IV does not have the capabilities of producing graphics, and many of the graphics packages can function with LOTUS spreadsheets. In most of the graphics packages, LOTUS spreadsheets must be imported into the package in order to be utilized to construct a graph. Importing is required of all spreadsheets packages, other than LOTUS, in order to translate the LOTUS spreadsheet from dBASE IV into the format that the package utilizes.

PRODUCTS

In order to use the Urban Transportation Planning Database the user must have the dBASE IV software package. This software requires approximately 3.5 Megabytes of hard drive space. The UTPD contains approximately 8.5 Megabytes of data and pre-generated reports. This information is presented on nine high-density 5.25 inch floppy disks. Together the software and the data require nearly 12 Megabytes of hard drive space.

The UTPD contains over 700 files. This total includes both data and report files. Table 3 contains a list of the number of data and report files.

Table 3. UTPD Data and Report Files

Catalog	Data files	Report files
Demographic and Socioeconomic	89	193
Roadway Travel & Mobility (Houston)	70	185
Roadway Travel & Mobility (U.S.)	8	19
Public Transportation	20	121
Total	187	518

Accompanying the computer diskettes from the database is a loose-leaf binder. This binder contains a short overview of dBASE IV which describes the fundamental knowledge of dBASE IV and UTPD required to operate the database, a table of contents of the UTPD, a list of all data files included in the database, and many data matrices showing exactly what information is included in the database and where gaps exist in the data.

CONCLUSION

The Urban Transportation Planning Database is a transportation analysis tool developed to provide a common database for transportation information for use in the Houston area. Although analysis was possible before development of the database, the UTPD compiled this data into a central location making the search for data less difficult. Two levels of information exist within the database.

General information is available from over 30 U.S. cities. This information provides for comparisons of approaches dealing with urban mobility and identifies trends which may be applicable to Houston.

The database also contains a wide variety of information collected and utilized by various transportation agencies in Houston. The UTPD compiles this data into a comprehensive and readily available database for use by all agencies.

This database is an extremely valuable tool for persons involved in the transportation planning field. It is desirable that this tool be updated to keep the data as current and complete as possible. Keeping the data current, will allow better trends to be identified from the data. If this is done, this tool could continue to provide useful information for future transportation planning.

APPENDIX A

LIST OF SOURCES AND FILES

Source Number	Title and Source	Files	Description
02	METRO TRANSIT SYSTEMS COMPARISON STUDY, AUGUST 1989 [METRO STAFF]	AMPCPST2 ANNUCST2 CAPASST2 DEMOGRA2 FACTRID2 FAREREV2 LOCLCPI2 OPRCOST2 PRODCST2 PSRPROD2 RDRSHIP2 SERVLVL2	AMORTIZED CAPITAL COSTS ANNUAL COSTS CAPITAL ASSETS TRANSIT CITIES POP. & EMP. FACTORS AFFECTING RIDERSHIP FARE REVENUES LOCAL CONSUMER PRICE INDEX OPERATING COSTS PRODUCTIVITY FACTORS, OPERATING COSTS PRODUCTIVITY FACTORS, PASSENGER FACTORS TRANSIT RIDERSHIP TRANSIT SERVICE LEVELS
03	COUNTY AND CITY DATA BOOK ,A STATISTICAL ABSTRACT SUPPLEMENT, 1983 10TH EDITION [BUREAU OF THE CENSUS, US DEPT COMMERCE]	POP80_3	DEMOGRAPHIC INFORMATION
04	STATE AND METROPOLITAN AREA DATA BOOK, A STATISTICAL ABSTRACT SUPPLEMENT, 1986 [BUREAU OF THE CENSUS, US DEPT COMMERCE]	POP84_4	DEMOGRAPHIC INFORMATION
05	THE IMPACT OF DECLINING MOBILITY IN MAJOR TEXAS AND OTHER US CITIES RESEARCH REPORT 431-1F ('86-) , ('87+) MONITORING MOBILITY, PROJECT 11319 [TEXAS TRANSPORTATION INST]	CGSTVAR5 CONGCST5 DVMT5 IMPCONG5 INCDELY5 MOBILIT5 POP_MOB5 REGVEH5 RNKCONG5	CONGESTION COST VARIABLES CONGESTION COSTS CONGESTED DVMT ESTIMATED IMPACT OF CONGESTION RECURRING & INCIDENT DELAY RELATIONSHIP ROADWAY MOBILITY STATISTICS U.S. CITIES POPULATION U.S. CITIES REGISTERED VEHICLES RANK BY IMPACT OF CONGESTION
06	GLOBAL REPORT ON HUMAN SETTLEMENTS 1986 [UNITED NATIONS CENTRE FOR HUMAN SETTLEMENTS-(HABITAT)]	PROJPOP6	INT'L CITIES PROJECTED POPULATIONS
07	NATIONAL URBAN MASS TRANSPORTATION STATISTICS [URBAN MASS TRANSPORTATION ADMINISTRATION]	BUS7 RAIL7 TLTRAN7	U.S. CITIES BUS TRANSIT STATISTICS U.S. CITIES RAIL TRANSIT STATISTICS U.S. CITIES TRANSIT STATISTICS
08	MILES OF COMPLETED FREEWAYS AND EXPRESSWAYS, FREEWAY AND EXPRESSWAY LANE MILEAGE ACCUMULATED TOTALS, [HGRTS]	ACLNMI8 CMPHFEY8 FWYMILE8 LANMILE8	HGRTS AREA ACCUM. LANE MILEAGE HGRTS AREA COMPLETED MILES FREEWAY HGRTS AREA PROJECTED ROADWAY MILEAGE HGRTS AREA PROJECTED LANE MILEAGE

Source Number	Title and Source	Files	Description
17	CBD TODAY [HOUSTON CITY PLANNING DEPT, DEC 1964]	HOTSPC17 OFFSPC17 VLSALE17	HOUSTON HOTEL SPACE HOUSTON OFFICE SPACE HOUSTON VOLUME OF SALES
18	HOUSTON CBD REPORT, NOVEMBER 1970	TFUNCT18 TPARK18 TPERAC18 TVEHEN18 TVEHS18 TVHACC18	FUNCTIONAL USAGE IN THE CTD PARKING SPACE IN THE CTD PERSON ACCUMULATION IN CTD VEHICLES ENTERING THE CTD VEHICLES INBOUND & OUTBOUND IN CTD VEHICLES ACCUMULATION IN CTD
19	HOUSTON AND GALVESTON CORDON COUNT 1971 [HGRTS]	ACCPER19 ACCVEH19 PARK19 PKSP19 VEHOCC19 VEHYRS19	PERSON ACCUMULATION IN CBD & CTD VEHICLE ACCUMULATION IN CBD & CTD PARKING SPACE IN CBD & CTD PARK SPC & VEH ACCUM IN CBD & CTD VEHICLE OCCUPANCY IN CBD & CTD VEHICLES INBOUND & OUTBOUND IN CBD
20	1976 HOUSTON CBD CORDON COUNT [GCSPR]	BACVEH20 BMOVTF20 BMOVTL20 BPARK20 BUSOCC20 BUSTOT20 PERACC20 VEHS20	VEHICLE ACCUMULATION IN CBD TRAFFIC MOVEMENT BY TYPE IN CBD TRAFFIC MOVMENT IN CBD PARKING SPACE IN CBD BUS OCCUPANCY IN CBD BUS VOLUMES IN CBD PERSON ACCUMULATION IN CBD TOTAL VEH INBOUND & OUTBOUND, CTD & CBD
21	1986 HOUSTON CBD CORDON COUNT, OCTOBER 1986 [HOUSTON-GALVESTON AREA COUNCIL W/ CITY OF HOUSTON]	BCMPYR21 BMOVTF21 BMOVTL21 BOPKVH21 BPARK21 BPERAC21 BPKHOV21 BPKPVH21 BRDShP21 BVEHAC21 BVEHS21	COMPARISON OF CBD DATA BY YEAR TRAFFIC MOVEMENT BY TYPE IN CBD TOTAL TRAFFIC VOLUMES IN CBD OFF-PEAK VEHICLE VOLUMES IN CBD PARKING SPACE IN CBD PERSON ACCUMULATION IN CBD PEAK PERIOD HOV VEHICLE VOLUMES IN CBD PEAK PERIOD PSGR VEH VOLUMES IN CBD BUS OCCUPANCY IN CBD VEHICLE ACCUMULATION IN CBD VEHICLES INBOUND & OUTBOUND IN CBD
22	TRAVEL TIME AND SPEED SURVEY, JULY 1985 [HGRTS]	TSPD6922 TSPD7622 TSPD7922 TSPD8222 TSPD8522 TSPD8822	HOUSTON TRAVEL TIMES - 1969 HOUSTON TRAVEL TIMES - 1976 HOUSTON TRAVEL TIMES - 1979 HOUSTON TRAVEL TIMES - 1982 HOUSTON TRAVEL TIMES - 1985 HOUSTON TRAVEL TIMES - 1988
23	TRAFFIC VOLUME VARIATIONS, 1969-(1974-1975) [HGRTS]	HOUVOL23	HOUSTON ADT & K FACTOR VARIABLES

Source Number	Title and Source	Files	Description
30	AN ANALYSIS OF COMMUTING PATTERNS IN TEXAS URBAN AREAS [TEXAS TRANSPORTATION INST]	AVGHH30 COMFLO30 COMMOD30 DSTCOM30 FLOCIT30 FLOPAT30 MODALS30 MODWRK30 POP30 POPCHG30 POPEMP30 PRIVTT30 PUBWRK30 REGPOP30 SHRMRK30 SUBDST30 SUBPOP30 TEXPOP30 TRNSHR30 TXDIST30 TXPEMP30 VHAVL30 WRKAGE30 WRKPOP30	AVG. HOUSEHOLD SIZES, TEXAS & U.S. METRO BASIC COMMUTER FLOW, 1980 COMMUTING MODES, 1960-1980 DIST. OF COMMUTERS BY TRAVEL GROUP NO. COMM. FLOW FROM CITY & SUB BY METRO SIZE INTERNAL FLOW PATTERNS IN CENTRAL CITIES METRO MODAL SHARES, 1980 MODAL SHARE OF WORKER COMMUTING, 1960-80 TEXAS METRO POP. WITH COMPONENT COUNTIES POPULATION CHANGES DURING THE 1970'S POP. & EMPL. GROWTH TRENDS-TEXAS 1980-95 PRIVATE VEH. TRAVEL TIMES TO WORK, 1980 PUBLIC TRANSIT TO WORK REGIONAL POPULATION GROWTH RATES-U.S. SHARES OF INCREASE BY MARKET, 1960-80 COMM. TRIPS WITH SUBURBAN DEST., 1980 SHARE OF METRO POPULATION IN SUBURBS POP. GROWTH RATES IN TEXAS PUBLIC TRANSIT SHARES BY MARKET, 1980 TEXAS POPULATION DISTRIBUTION, 1960-80 POP. & EMPL.-TEXAS METRO AREAS 1980-95 VEH. AVAIL. BY HOUSEHOLD-TEXAS, 1980 SHARE OF WORKING-AGE POP. IN WORK FORCE GROWTH IN WORKERS VS. POPULATION
31	COMMUTING IN AMERICA : A NATIONAL REPORT ON COMMUTING PATTERNS AND TRENDS	AVGTRL31 CARPBL31 COMFLO31 COMMRK31 DISTNO31 METMO31 MODSHR31 PCTFLO31 SHFMO31 TTDIST31 VEHAVL31 VEHOC31 WKBOOM31 WORKTT31 WRKPOP31	AVG. TRAVEL DISTANCE BY MARKET FLOW, 1980 AUTO AVAILABILITY AND TRANSIT USE COMMUTING FLOWS BY METRO AREA SIZE TOP TEN COMMUTER MARKETS DIST. OF COMMUTERS BY TRAVEL GROUP NO. METRO MODAL SHARES, 1980 TRENDS IN MODAL SHARES, 1960-1980 COMM. GROWTH RATES BY METRO AREA SIZE SHIFTS IN MODAL CHOICE, 1980 TRAVEL TIME-DISTANCE-SPEED FACTORS VEH. AVAILABILITY BY HOUSEHOLDS AVG. VEHICLE OCCUPANCY RATES POP. & EMPL.- U.S. METRO WORK TRIP TRAVEL TIME DIST., 1980 WORKER VS. POPULATION GROWTH
32	HOUSTON TRANSITWAY OPENING DATES AND VEHICLE AUTHORIZATION	HOUTWY32	HOUSTON TRANSITWAY OPERATION DATA
33	24-HOUR COUNT LOCATIONS IN HOUSTON THROUGH 6/05/90 [TEXAS TRANSPORTATION INST]	COUNT33	HOUSTON 24-HOUR COUNT LOCATIONS
34	REGIONAL MOBILITY DATA FOR HOUSTON AREA [REGIONAL MOBILITY PLAN, 1980]	CGSTIX34 HOUFWY34 P_N_R34 TLEXP34 TRNEXP34	U.S. CITIES CONGESTION INDEXES-1984, 1987 HOUSTON VMT, LANE-MILES, TRAVEL SPEEDS HOUSTON PARK-N-RIDE LOTS, VEHICLES, TRIPS HOUSTON INDIVIDUAL CONSTRUCTION COSTS HOUSTON TOTAL TRANSPORTATION COSTS

APPENDIX B

SAMPLE ANALYSIS

A sample analysis is included in this section to illustrate data which could be found within a single file. This example shows the registered vehicles in 39 U.S. cities in 1987. This data was printed from the preconstructed report file without any manipulation of the data by a query.

Data Manipulation

After searching through the accompanying binder, it was discovered that registered vehicle information was located in the file "regveh5". The file contained the exact information desired so the pre-generated report was printed (Table B-1). No graph was required for the table.

APPENDIX C

SAMPLE ANALYSIS

A sample analysis is included in this section to illustrate how a single data file can be manipulated to withdraw the needed information. This example shows a comparison of vehicle-miles of travel and population growth in Houston from 1982 to 1988. A query was used to withdraw only the vehicle-miles of travel and population information for Houston from the data file "mobilit5".

Data Manipulation

After searching through the accompanying binder, it was found that the vehicle-miles of travel information was located in the data file "mobilit5". Upon reviewing the description of this data in the binder, it was discovered that population had been included in this same data file. Thus, all of the information desired was in this one file and no further searching was required.

Two problem existed with the data. First, the data file contained information on 39 U.S. cities when only Houston was needed. Second, there existed many other types of information in the file than vehicle-miles of travel and population. A query was designed to limit the scope of the data to Houston while also extracting only the desired types of data. A report was constructed to send the data to a printer (Table C-1). Once this was accomplished the queried data was written as a data file and was exported as a LOTUS spreadsheet for constructing a graph (Figure C-1).

APPENDIX D

SAMPLE ANALYSIS

A sample analysis is included in this section to illustrate data which was extracted from two data files by a query. This example shows a comparison in three light rail cities in the United States of vehicle-miles of travel and transit ridership. A query was constructed to limit the scope of the data to these three cities and the desired information in the files "mobilit5" and "rdrship2".

Data Manipulation

Vehicle-miles of travel was located using the loose-leaf binder in the file "mobilit5". Transit ridership was located in "rdrship2". A query was constructed to withdraw the desired information from the two files. The query combined the two files using the city and year fields. For example, the 1986 San Diego roadway travel data in "mobilit5" was matched with the 1986 San Diego transit ridership data in "rdrship2". All of this data was combined into one file by the query. Once the desired data was extracted, a report was constructed to print the information on a printer (Table D-1). A graph was generated from the data after the report was printed (Figures D-1 through D-3).

Figure D-2. Roadway vs. Transit Mileage
Sacramento

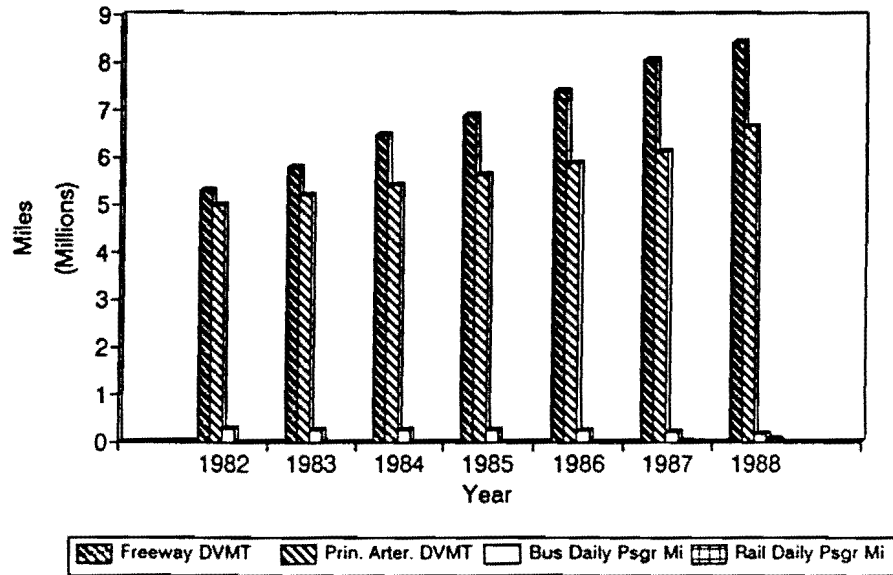


Figure D-3. Roadway vs. Transit Mileage
San Diego

