

Heavy Vehicle Travel Information System

Field Manual

May 2001

HEAVY VEHICLE TRAVEL INFORMATION SYSTEM

CHAPTER 1 INTRODUCTION

BACKGROUND

The data from the Heavy Vehicle Travel Information System (HVTIS) will be used to analyze the amount and nature of truck travel at the national and regional level. The information would be used by FHWA and other DOT administrations to evaluate changes in truck travel in order to assess impacts on the highway safety; the role of travel in economic productivity; impacts of changes in truck travel on infrastructure condition, and maintaining our mobility while protecting the human and natural environment. The increasing dependence on truck transport requires that data be available to better assess its overall contribution to the Nation's well-being. The data will allow transportation professionals at the Federal, state and metropolitan levels to make informed decisions about policies and plans.

The majority of States collect vehicle weight data periodically throughout the year using weigh-in-motion devices and also collect vehicle classification and/or total vehicle volume data continuously. To support the HVTIS data needs, the FHWA is requesting that the various State Highway Agencies provide monthly reporting of vehicle classification and/or total vehicle volume as well as annual reporting of weight data they collect as part of their existing traffic data collection programs.

Through its three stages of development, the HVTIS will provide increasingly detailed heavy vehicle data:

1. National estimates of heavy vehicle highway travel on a monthly basis.
2. National estimates of axle loadings and highway ton-miles of freight moved each month, and
3. Highway specific estimates of truck volumes and loadings

TRAFFIC DATA RECORDS

This section contains instructions for coding data in the formats requested by the FHWA. The record formats and coding instructions have been developed to provide input to the Heavy Vehicle Travel Information System. The HVTIS is supported by the Traffic Volume Trends (TVT) system and the Vehicle Travel Information System (VTRIS).

The TVT system is used to process the continuous traffic volume and vehicle classification data and produce a monthly Traffic Volume Trends report. The VTRIS is used to

process the vehicle classification and truck weight data. Both are microcomputer database management systems that validate, summarize, and maintain traffic data. TVT and VTRIS may be used by anyone with data in the formats described in this section. They are available for downloading on the FHWA website from the Traffic Volume and Truck Weight page at <<http://www.fhwa.dot.gov/ohim/tvtw/tvtwpage.htm>>.

The data records are divided into four types: station description data, traffic volume data, vehicle classification data, and truck weight data. Each type of data has its own individualized record format. Specific coding instructions and record layouts are discussed separately for each type of data in the next chapters.

Note that some fields are labeled “critical.” This means that a record cannot be processed by TVT or VTRIS without them. All data files described here are ASCII flat files. For character fields with missing or inapplicable data, enter blanks. Numbers such as counts should be right-justified and filled with leading blanks or zeros unless noted otherwise. For numeric fields with missing or inapplicable data, enter blanks or "-1" right-justified.

Certain data items are common to all four types of records. For example, all records contain a six-character station identification. This allows States to use a common identification system for all traffic monitoring stations.

Several fields in the station description record were replaced with fields that are needed to tie traffic data to geographic information systems (GIS). This will allow traffic data to be overlaid on the National Highway Planning Network (NHPN) and similar systems.

DATA SUBMITTALS TO THE FHWA

Copies of vehicle classification data collected by continuous automatic vehicle classifiers should be submitted monthly. In those States that also collect traffic volume data by permanent automatic traffic recorders, this data should also be submitted monthly. Both types of data should be submitted to FHWA within 20 days after the close of the month for which the data were collected. The station description record need only be sent annually or when there is a change. The preferred method of transmission is as an attachment to an e-mail message sent to "atrdata@fhwa.dot.gov". Alternatively, diskettes may be mailed to:

**Federal Highway Administration
Travel Monitoring and Surveys Division, HPPI-30
400 Seventh Street, SW
Washington, D.C. 20590
Attention: Traffic Volume Trends**

Annually, each State should submit to the FHWA the vehicle classification and truck weight data collected at weigh-in-motion (WIM) sites. Data for the preceding calendar year should be submitted by June 15th. More frequent submissions are also acceptable.

If continuous weigh-in-motion data are available, send up to one week of data per quarter (select any week without a holiday). The data should be addressed as follows:

**Federal Highway Administration
Travel Monitoring and Surveys Division, HPPI-30
400 Seventh Street, SW
Washington, D.C. 20590
Attention: Vehicle Travel Information System**

All data should be in the record formats described in this section and edited for reasonableness. If the files are large, it is preferable that a compression program such as PKZIP be used to condense them. Please provide the name of a contact person and the telephone number in case further clarification is necessary. For further information, contact the Travel Monitoring and Surveys Division at (202) 366-0175.

CHAPTER 2

STATION DESCRIPTION DATA FORMATS

The Station Description record format is used for all traffic volume, vehicle classification, and truck weight monitoring stations. A Station Description file contains one record for each traffic monitoring station per year. All fields are considered to be character fields. The optional file naming convention is "ssyy.STA", where ss is state postal abbreviation and yy is the last two digits of the year. Table 1 summarizes the Station Description record.

Fields designated as *Critical* are required for entry into the HVTIS database.

1. **Record Type (Column 1) - Critical**

S = Station description record

2. **FIPS State Codes (Columns 2-3) - Critical**

<u>State</u>	<u>Code</u>	<u>State</u>	<u>Code</u>	<u>State</u>	<u>Code</u>
Alabama	01	Louisiana	22	Ohio	39
Alaska	02	Maine	23	Oklahoma	40
Arizona	04	Maryland	24	Oregon	41
Arkansas	05	Massachusetts	25	Pennsylvania	42
California	06	Michigan	26	Rhode Island	44
Colorado	08	Minnesota	27	South Carolina	45
Connecticut	09	Mississippi	28	South Dakota	46
Delaware	10	Missouri	29	Tennessee	47
D.C.	11	Montana	30	Texas	48
Florida	12	Nebraska	31	Utah	49
Georgia	13	Nevada	32	Vermont	50
Hawaii	15	New Hampshire	33	Virginia	51
Idaho	16	New Jersey	34	Washington	53
Illinois	17	New Mexico	35	West Virginia	54
Indiana	18	New York	36	Wisconsin	55
Iowa	19	North Carolina	37	Wyoming	56
Kansas	20	North Dakota	38	Puerto Rico	72
Kentucky	21				

Table 1: Station Description Record**(OMB No. 2125-0587 Expiration 4/30/2004)**

Field	Columns	Width	Description
1	1	1	Record Type
2	2-3	2	FIPS State Code
3	4-9	6	Station ID
4	10	1	Direction of Travel Code
5	11	1	Lane of Travel
6	12-13	2	Year of Data
7	14-15	2	Functional Classification Code
8	16	1	Number of Lanes in Direction Indicated
9	17	1	Sample Type for Traffic Volume
10	18	1	Number of Lanes Monitored for Traffic Volume
11	19	1	Method of Traffic Volume Counting
12	20	1	Sample Type for Vehicle Classification
13	21	1	Number of Lanes Monitored for Vehicle Class.
14	22	1	Method of Vehicle Classification
15	23	1	Algorithm for Vehicle Classification
16	24-25	2	Classification System for Vehicle Classification
17	26	1	Sample Type for Truck Weight
18	27	1	Number of Lanes Monitored for Truck Weight
19	28	1	Method of Truck Weighing
20	29	1	Calibration of Weighing System
21	30	1	Method of Data Retrieval
22	31	1	Type of Sensor
23	32	1	Second Type of Sensor
24	33	1	Primary Purpose - <i>NEW</i>
25	34-45	12	LRS Identification - <i>NEW</i>
26	46-51	6	LRS Location Point - <i>NEW</i>
27	52-59	8	Latitude - <i>NEW</i>
28	60-68	9	Longitude - <i>NEW</i>
29	69-72	4	SHRP Site Identification - <i>NEW</i>
30	73-78	6	Previous Station ID
31	79-80	2	Year Station Established
32	81-82	2	Year Station Discontinued
33	83-85	3	FIPS County Code
34	86	1	HPMS Sample Type
35	87-98	12	HPMS Sample Identifier
36	99	1	National Highway System - <i>NEW</i>
37	100	1	Posted Route Signing
38	101-108	8	Posted Signed Route Number
39	109	1	Concurrent Route Signing
40	110-117	8	Concurrent Signed Route Number
41	118-167	50	Station Location

3. **Station Identification** (Columns 4-9) - *Critical*

This field should contain an alphanumeric designation for the station where the survey data are collected. Station identification field entries must be identical in all records for a given station. Differences in characters, including spaces, blanks, hyphens, etc., prevent proper match. Right justify the Station ID if it is less than 6 characters. There should be no embedded blanks.

4. **Direction of Travel Code** (Column 10) - *Critical*

Do not combine directions. There should be a separate record for each direction. Whether or not lanes are combined in each direction depends on the next field.

<u>Code</u>	<u>Direction</u>
1	North
2	Northeast
3	East
4	Southeast
5	South
6	Southwest
7	West
8	Northwest
9	North-South or Northeast-Southwest combined (ATR stations only)
0	East-West or Southeast-Northwest combined (ATR stations only)

5. **Lane of Travel** (Column 11) - *Critical*

Either each lane is considered a separate station or all lanes in each direction are combined.

<u>Code</u>	<u>Lane</u>
0	Data with lanes combined
1	Outside (rightmost) lane
2-9	Other lanes

Note: The Station ID, Direction of Travel, and Lane of Travel make up the Station Code. There should be one Station Description record per Station Code. Stations can be either by lane or with lanes combined by direction, but not both.

6. **Year of Data** (Columns 12-13) - *Critical*

Code the last two digits of the year in which the data were collected.

7. **Functional Classification Code** (Columns 14-15) - *Critical*

	<u>Code</u>	<u>Functional Classification</u>
RURAL	01	Principal Arterial - Interstate
	02	Principal Arterial - Other
	06	Minor Arterial
	07	Major Collector
	08	Minor Collector
	09	Local System
URBAN	11	Principal Arterial - Interstate
	12	Principal Arterial - Other Freeways or Expressways
	14	Principal Arterial - Other
	16	Minor Arterial
	17	Collector
	19	Local System

8. **Number of Lanes in Direction Indicated** (Column 16)

Code the number of lanes in one direction at the site. Use "9" if there are more than eight lanes.

9. **Sample Type for Traffic Volume** (Column 17)

T = Station used for Traffic Volume Trends

N = Station not used for Traffic Volume Trends

10. **Number of Lanes Monitored for Traffic Volume** (Column 18)

Code the number of lanes in one direction that are monitored at this site. Use "9" if there are more than eight lanes.

11. **Method of Traffic Volume Counting** (Column 19)

1 = Human observation (manual)

2 = Portable traffic recording device

3 = Permanent automatic traffic recorder (ATR)

12. **Sample Type for Vehicle Classification** (Column 20)

H = Station used for Heavy Vehicle Travel Information System

N = Station not used for Heavy Vehicle Travel Information System

13. **Number of Lanes Monitored for Vehicle Classification** (Column 21)

Code the number of lanes in one direction that are monitored for vehicle classification at this site. Use "9" if there are more than eight lanes.

14. **Method of Vehicle Classification** (Column 22)

- 1 = Human observation (manual) vehicle classification
- 2 = Portable vehicle classification device
- 3 = Permanent vehicle classification device

15. **Algorithm for Vehicle Classification** (Column 23)

Code the type of input and processing used to classify vehicles:

- A = Human observation on site (manual)
- B = Human observation of vehicle image (e.g., video)
- C = Automated interpretation of vehicle image or signature (e.g., video, microwave, sonic)
- D = Vehicle length classification
- E = Axle spacing with ASTM Standard E1572
- F = Axle spacing with Scheme F
- G = Axle spacing with Scheme F modified
- H = Other axle spacing algorithm
- K = Axle spacing and weight algorithm
- L = Axle spacing and vehicle length algorithm
- M = Axle spacing, weight, and vehicle length algorithm
- N = Axle spacing and other input(s) not specified above
- Z = Other means not specified above

16. **Classification System for Vehicle Classification** (Columns 24-25)

This indicates the total number of classes in the vehicle classification system. The default value is 13 which indicates the standard FHWA 13 class system (see Appendix 4-C). The other vehicle classification systems are based on the HPMS and the Traffic Monitoring System (TMS) documentation. The value that is used will determine the number of count fields needed on the Vehicle Classification Record. In the following list the numbers in parentheses are from the FHWA 13 class system:

- 1 = One class: total volume
- 2 = Two classes: non-commercial (classes 1-3) and commercial (classes 4-13) vehicles
- 3 = Three classes: non-commercial (classes 1-3), single-unit commercial (classes 4-7), combination commercial (classes 8-13) vehicles
- 4 = Four classes: non-commercial (classes 1-3), single-unit commercial (classes 4-7), single-trailer commercial (classes 8-10), multi-trailer commercial (classes 11-13) vehicles
- 5 = Five classes as follows:
 - 1 of 5 = two-axle, two or four-tire vehicles (classes 1-3)
 - 2 of 5 = buses (class 4)
 - 3 of 5 = single-unit trucks (classes 5-7)
 - 4 of 5 = single-trailer combination trucks (classes 8-10)
 - 5 of 5 = multiple-trailer combination trucks (classes 11-13)
- 13 = FHWA's standard 13 class system (see Appendix 4-C)
- 14 = FHWA's 13 class system plus a class 14 (State or vendor defined)
- 15 = FHWA's 13 class system plus classes 14 and 15 (State or vendor defined)
- Other numbers = number of classes (unsupported)

17. Sample Type for Truck Weight (Column 26)

B = Station used for TMG sample and Strategic Highway Research Program (SHRP) Long Term Pavement Performance (LTPP) sample

L = Station used for SHRP/LTPP sample (but not TMG sample)

T = Station used for TMG sample (but not SHRP/LTPP sample)

N = Station not used for any of the above

18. Number of Lanes Monitored for Truck Weight (Column 27)

Code the number of lanes in one direction that are monitored for truck weight at this site. Use "9" if there are more than eight lanes.

19. Method of Truck Weighing (Column 28)

1 = Portable static scale

2 = Chassis-mounted, towed static scale

3 = Platform or pit static scale

4 = Portable weigh-in-motion system

5 = Permanent weigh-in-motion system

20. Calibration of Weighing System (Column 29)

Code the method used to calibrate the weighing system, e.g., comparing weight-in-motion and weights from static scales.

A = ASTM Standard E1318

B = Subset of ASTM Standard E1318

C = Combination of test trucks and trucks from the traffic stream (but not ASTM E1318)

D = Other sample of trucks from the traffic stream

M = Moving average of the steering axle of 3S2s

S = Static calibration

T = Test trucks only

U = Uncalibrated

Z = Other method

21. Method of Data Retrieval (Column 30)

1 = Not automated (manual)

2 = Automated (telemetry)

22. Type of Sensor (Column 31)

Code the type of sensor used for traffic detection.

A = Automatic vehicle identification (AVI)
B = Bending plate
C = Capacitance strip
D = Capacitance mat/pad
E = Hydraulic load cells
F = Fiber optic - *NEW*
G = Strain gauge on bridge beam
H = Human observation (manual)
I = Infrared
K = Laser/lidar
L = Inductance loop
M = Magnetometer
P = Piezoelectric
Q = Quartz piezoelectric - *NEW*
R = Road tube
S = Sonic/acoustic
T = Tape switch
U = Ultrasonic
V = Video image
W = Microwave
X = Radio wave
Z = Other

23. Second Type of Sensor (Column 32)

If there are two types of sensors at the station, code the second using the same codes as Type of Sensor. Otherwise, code "N" for none.

24. Primary Purpose (Column 33) – *NEW*

This field indicates the *primary purpose* for installing the station and hence which organization is responsible for it and supplies the data.

E = Enforcement purposes (e.g., speed or weight enforcement)
I = Operations purposes in support of ITS initiatives
L = Load data for pavement design or pavement management purposes
O = Operations purposes *but not ITS*
P = Planning or traffic statistics purposes
R = Research purposes (e.g., LTPP)

25. LRS Identification (Columns 34-45) - *NEW*

The LRS Identification reported in this item for the station must be the same as the LRS identification reported in the HPMS for the section of roadway where the station is located. The LRS identification is a 12-character, right justified value. The LRS ID can be alphanumeric, but must not contain blanks; leading zeros must be coded. More information concerning the LRS may be found in Chapter V of the *HPMS Field Manual*, Linear Referencing System

Requirements.

26. **LRS Location Point** (Columns 46-51) - *NEW*

This is the LRS location point for the station. It is similar information to the LRS Beginning Point and LRS Ending Point in the HPMS. The KMPT for the station must be within the range of the LRS beginning point and LRS ending point for the roadway section upon which the station is located. It is coded in kilometers with an implied decimal in the middle: XXX.XXX.

27. **Latitude** (Columns 52-59) - *NEW*

This is the latitude of the station location with the north hemisphere assumed and decimal place understood as XX.XXX XXX.

28. **Longitude** (Columns 60-68) - *NEW*

This is the longitude of the station location with the west hemisphere assumed and decimal place understood as XXX.XXX XXX.

29. **SHRP Site Identification** (Columns 69-72) - *NEW*

If the site is used in the SHRP/LTPP sample, give the SHRP site ID.

30. **Previous Station ID** (Columns 73-78)

If the station replaces another station, give the station ID that was used previously.

31. **Year Station Established** (Columns 79-80)

Code the last two digits of the appropriate year if known.

32. **Year Station Discontinued** (Columns 81-82)

Code the last two digits of the appropriate year if known.

33. **FIPS County Code** (Columns 83-85)

Use the three-digit FIPS county code (see Federal Information Processing Standards Publication 6, "Counties of the States of the United States").

34. **HPMS Sample Type** (Column 86)

N = No, not on an HPMS standard sample section

Y = Yes, on an HPMS standard sample section

35. **HPMS Sample Identifier** (Columns 87-98)

If the station is on an HPMS standard sample section, code the HPMS Sample Identifier per the *HPMS Field Manual* (Item 47).

36. **National Highway System** (Column 66) - *NEW*

N = No, not on National Highway System

Y = Yes, on National Highway System

37. **Posted Route Signing** (Column 100)

This is the same as Route Signing in *HPMS Field Manual* (Item 22).

<u>Code</u>	<u>Description</u>	<u>Code</u>	<u>Description</u>
0	Not signed	5	County
1	Interstate	6	Township
2	U.S.	7	Municipal
3	State	8	Parkway or Forest Route Marker
4	Off-Interstate Business Marker	9	None of the above

38. **Posted Signed Route Number** (Columns 101-108)

Code the route number of the principal route on which the station is located. If the station is located on a city street, zero-fill this field. This is the same as Signed Route Number in *HPMS Field Manual* (Item 24).

39. **Concurrent Route Signing** (Column 109)

Code same as Posted Route Signing for concurrent route if there is one.

40. **Concurrent Signed Route Number** (Columns 110-117)

Code same as Posted Signed Route Number for concurrent route if there is one.

41. **Station Location** (Columns 118-167)

For stations located on a numbered route, enter the distance and direction of the station from the nearest major intersecting route or state border or landmark on state road maps. If the station is located on a city street, enter the city and street name. Abbreviate if necessary. Left justify.

CHAPTER 3

TRAFFIC VOLUME DATA FORMATS

The Traffic Volume file contains one record for each day of traffic monitoring. All numeric fields should be right-justified and zero-filled. Table 2 summarizes the Hourly Traffic Volume record.

Fields designated as *Critical* are required for entry into the HVTIS database.

1. **Record Type** (Column 1) - *Critical*

3 = Traffic volume record

2. **FIPS State Code** (Columns 2-3) - See chapter 2. - *Critical*

3. **Functional Classification Code** (Columns 4-5) - See chapter 2. - *Critical*

4. **Station Identification** (Columns 6-11) - See chapter 2. - *Critical*

This should be right-justified and zero-filled. - *Critical*

5. **Direction of Travel Code** (Column 12) - See chapter 2. - *Critical*

6. **Lane of Travel** (Column 13) - See chapter 2. - *Critical*

The code for combined lanes (0) is preferred.

7. **Year of Data** (Columns 14-15) - See chapter 2. - *Critical*

8. **Month of Data** (Columns 16-17) - *Critical*

01 = January

02 = February

03 = March

04 = April

05 = May

06 = June

07 = July

08 = August

09 = September

10 = October

11 = November

12 = December

9. **Day of Data** (Columns 18-19) - *Critical*

Code the day of the month of data, 01-31. Must correspond to the month of data.

10. **Day of Week** (Column 20) - *Optional*

- 1 = Sunday
- 2 = Monday
- 3 = Tuesday
- 4 = Wednesday
- 5 = Thursday
- 6 = Friday
- 7 = Saturday

11-34. **Traffic Volume Counted Fields** (Columns 21-25, ..., 136-140)

Enter the traffic volume counted during the hour covered. If the data are missing, code a -1 or blanks.

<u>Field</u>	<u>Hour Covered</u>
11	00:01 am to 01:00 am
12	01:01 am to 02:00 am
.	.
.	.
.	.
34	11:01 pm to 12:00 midnight

35. **Restrictions** (Column 141)

- 0 = no restrictions
- 1 = construction or other activity affected traffic flow
- 2 = traffic counting device problem (e.g., malfunction or overflow) - *NEW*

Table 2: Hourly Traffic Volume Record
(OMB No. 2125-0587 Expiration 4/30/2004)

Field	Columns	Length	Description
1	1	1	Record Type
2	2-3	2	FIPS State Code
3	4-5	2	Functional Classification
4	6-11	6	Station Identification
5	12	1	Direction of Travel
6	13	1	Lane of Travel
7	14-15	2	Year of Data
8	16-17	2	Month of Data
9	18-19	2	Day of Data
10	20	1	Day of Week
11	21-25	5	Traffic Volume Counted, 00:01 - 01:00
12	26-30	5	Traffic Volume Counted, 01:01 - 02:00
13	31-35	5	Traffic Volume Counted, 02:01 - 03:00
14	36-40	5	Traffic Volume Counted, 03:01 - 04:00
15	41-45	5	Traffic Volume Counted, 04:01 - 05:00
16	46-50	5	Traffic Volume Counted, 05:01 - 06:00
17	51-55	5	Traffic Volume Counted, 06:01 - 07:00
18	56-60	5	Traffic Volume Counted, 07:01 - 08:00
19	61-65	5	Traffic Volume Counted, 08:01 - 09:00
20	66-70	5	Traffic Volume Counted, 09:01 - 10:00
21	71-75	5	Traffic Volume Counted, 10:01 - 11:00
22	76-80	5	Traffic Volume Counted, 11:01 - 12:00
23	81-85	5	Traffic Volume Counted, 12:01 - 13:00
24	86-90	5	Traffic Volume Counted, 13:01 - 14:00
25	91-95	5	Traffic Volume Counted, 14:01 - 15:00
26	96-100	5	Traffic Volume Counted, 15:01 - 16:00
27	101-105	5	Traffic Volume Counted, 16:01 - 17:00
28	106-110	5	Traffic Volume Counted, 17:01 - 18:00
29	111-115	5	Traffic Volume Counted, 18:01 - 19:00
30	116-120	5	Traffic Volume Counted, 19:01 - 20:00
31	121-125	5	Traffic Volume Counted, 20:01 - 21:00
32	126-130	5	Traffic Volume Counted, 21:01 - 22:00
33	131-135	5	Traffic Volume Counted, 22:01 - 23:00
34	136-140	5	Traffic Volume Counted, 23:01 - 24:00
35	141	1	Restrictions

CHAPTER 4

VEHICLE CLASSIFICATION DATA FORMATS

The Vehicle Classification file contains one record for each hour with the traffic volume by vehicle class. The optional file naming convention is "ssyy.CLA", where ss is state postal abbreviation and yy is the last two digits of the year. Table 3 summarizes the Vehicle Classification record.

Fields designated as *Critical* are required for entry into the HVTIS database.

1. **Record Type** (Column 1) - *Critical*

C = Vehicle classification record

2. **FIPS State Code** (Columns 2-3) - *Critical* - See chapter 2.

3. **Station Identification** (Columns 4-9) - *Critical* - See chapter 2.

4. **Direction of Travel Code** (Column 10) - *Critical* - See chapter 2.

5. **Lane of Travel** (Column 11) - *Critical* - See chapter 2.

Note: The Station ID, Direction of Travel, and Lane of Travel make up the Station Code. There should be one Station Description record per Station Code.

6. **Year of Data** (Columns 12-13) - *Critical* - See chapter 2.

7. **Month of Data** (Columns 14-15) - *Critical* - See chapter 3.

8. **Day of Data** (Columns 16-17) - *Critical* - See chapter 3.

9. **Hour of Data** (Columns 18-19) - *Critical*

Code the beginning of the hour in which the count was taken:

00 = 0:01 a.m. to 1:00 a.m.

01 = 1:01 a.m. to 2:00 a.m.

.

.

.

22 = 10:01 p.m. to 11:00 p.m.

23 = 11:01 p.m. to Midnight

10. **Total Hourly Volume** (Columns 20-24)

This numeric field is the total traffic volume for the hour. The total volume is needed because some vehicles might not be classified, in which case the sum of the class counts would not equal the total volume. If the total volume is not collected, leave this field blank or put "-1" (for missing data).

The following class count fields are numeric fields with the traffic volume by vehicle class for each hour of data. Field number 16 in the Station Description Record, "Classification System for Vehicle Classification," determines the number of classes expected from the station. The default classification system is the FHWA 13 class system (see Appendix 4-C).

These counts should be checked for reasonableness. For example, Class 13 should not be larger than 99. VTRIS allows users to set a limit for each class count

11. **Class 1 Count** (Columns 25-29) - Optional

Class 1 is for Motorcycles, which is an optional class. If motorcycles are not counted, enter "-1" or blanks in the Class 1 field.

12. **Class 2 Count** (Columns 30-34) - *Critical*

Class 2 is for Passenger Cars.

13. **Class 3 Count** (Columns 35-39) - *Optional*

Class 3 is for Other Two-Axle, Four-Tire, Single-Unit Vehicles. However, classes 2 and 3 may be combined, in which case the total for both classes should be entered in the class 2 field and "-1" or blanks in the Class 3 field.

14. **Class 4 Count** (Columns 40-44) - *Critical*

Class 4 is for Buses.

15. **Class 5 Count** (Columns 45-49) - *Critical*

Class 5 is for Two-Axle, Six-Tire, Single-Unit Trucks.

16. **Class 6 Count** (Columns 50-54) - *Critical*

Class 6 is for Three-Axle, Single-Unit Trucks.

17. **Class 7 Count** (Columns 55-59) - *Critical*

Class 7 is for Four-or-More Axle, Single-Unit Trucks.

18. **Class 8 Count** (Columns 60-64) - *Critical*

Class 8 is for Four-or-Less Axle, Single-Trailer Trucks.

19. **Class 9 Count** (Columns 65-69) - *Critical*

Class 9 is for Five-Axle, Single-Trailer Trucks.

20. **Class 10 Count** (Columns 70-74) - *Critical*

Class 10 is for Six-or-More Axle, Single-Trailer Trucks.

21. **Class 11 Count** (Columns 75-79) - *Critical*

Class 11 is for Five-or-Less Axle, Multi-Trailer Trucks.

22. **Class 12 Count** (Columns 80-84) - *Critical*

Class 12 is for Six-Axle, Multi-Trailer Trucks.

23. **Class 13 Count** (Columns 85-89) - *Critical*

Class 13 is for Seven-or-More Axle, Multi-Trailer Trucks.

The Vehicle Classification record may be ended here if exactly 13 classes are used. However, some automatic vehicle classification systems have one or two more classes usually designating "Unclassified" or "Unclassifiable" vehicles. If Class 14 and/or Class 15 are included such that the total of all the classes equals the total volume, then the Total Volume field may be left blank.

24. **Class 14 Count** (Columns 90-94) - *Optional*

If a Class 14 is used, enter the count for the hour here.

25. **Class 15 Count** (Columns 95-99) - *Optional*

If a Class 15 is used, enter the count for the hour here.

Table 3: Vehicle Classification Record

(OMB No. 2125-0587 Expiration 4/30/2004)

Field	Columns	Length	Description
1	1	1	Record Type
2	2-3	2	FIPS State Code
3	4-9	6	Station ID
4	10	1	Direction of Travel Code
5	11	1	Lane of Travel
6	12-13	2	Year of Data
7	14-15	2	Month of Data
8	16-17	2	Day of Data
9	18-19	2	Hour of Data
10	20-24	5	Total Volume
11	25-29	5	Class 1 Count
12	30-34	5	Class 2 Count
13	35-39	5	Class 3 Count
14	40-44	5	Class 4 Count
15	45-49	5	Class 5 Count
16	50-54	5	Class 6 Count
17	55-59	5	Class 7 Count
18	60-64	5	Class 8 Count
19	65-69	5	Class 9 Count
20	70-74	5	Class 10 Count
21	75-79	5	Class 11 Count
22	80-84	5	Class 12 Count
23	85-89	5	Class 13 Count

End the record here if the FHWA 13 class system is being used.

24	90-94	5	Class 14 Count (optional)
25	95-99	5	Class 15 Count (optional)

CHAPTER 5 TRUCK WEIGHT DATA FORMATS

The Truck Weight file contains one record for each truck with its axle weights and spacings. The optional file naming convention is "ssyy.WGT", where ss is the state postal abbreviation and yy is the last two digits of the year. Table 4 summarizes the Truck Weight record.

Fields designated as *Critical* are required for entry into the HVTIS database.

1. **Record Type** (Column 1) - *Critical*

W = Truck weight record

2. **FIPS State Code** (Columns 2-3) - *Critical* - See chapter 2.

3. **Station Identification** (Columns 4-9) - *Critical* - See chapter 2.

4. **Direction of Travel Code** (Column 10) - *Critical* - See chapter 2.

5. **Lane of Travel** (Column 11) - *Critical* - See chapter 2.

Note: The Station ID, Direction of Travel, and Lane of Travel make up the Station Code. There should be one Station Description record per Station Code.

6. **Year of Data** (Columns 12-13) - *Critical* - See chapter 2.

7. **Month of Data** (Columns 14-15) - *Critical* - See chapter 3.

8. **Day of Data** (Columns 16-17) - *Critical* - See chapter 3.

9. **Hour of Data** (Columns 18-19) - *Critical*

Code the beginning of the hour in which the count was taken:

00 = 0:01 a.m. to 1:00 a.m.

01 = 1:01 a.m. to 2:00 a.m.

.

.

.

22 = 10:01 p.m. to 11:00 p.m.

23 = 11:01 p.m. to Midnight

10. **Vehicle Class** (Columns 20-21) - *Critical*

Enter the class of the vehicle from FHWA Vehicle Classes 1 to 13. Classes 1 - 3 are ordinarily omitted.

A dummy vehicle class of -1 indicates that weight data for this hour are missing. A dummy vehicle class of 0 indicates that weight data for this hour are not missing, and thus if there are no Truck Weight records for the hour, then there were no trucks during that hour. Without these indications, no Truck Weight records for an hour might be interpreted to mean that the WIM system was not working.

11. **Open** (Columns 22-24) - *Optional*

This field is for special studies or State use such as for vehicle speed (kilometers per hour) or pavement temperature (degrees Celsius in the range -99 to +99).

12. **Total Weight of Vehicle** (Columns 25-28)

Enter the gross vehicle weight to the nearest tenth of a metric ton (100 kilograms) without a decimal point. This should equal the sum of all the axle weights except for rounding.

13. **Number of Axles** (Columns 29-30)

Enter the total number of axles in use by the vehicle (including any trailers).

The Number of Axles determines how many Axle Weight and Spacing fields will be expected. Axle Weight and Spacing fields that are not needed may be omitted. If a fixed-length record is desired, pad the record with blanks to the desired length.

The rest of the record alternates between axle weights and axle spacings, starting from the front of the vehicle. Axle weights are to the nearest tenth of a metric ton (100 kilograms) without a decimal point. Axle spacings are to the nearest tenth of a meter (100 millimeters) without a decimal point.

Reasonableness checks should be performed on the axle weights and spacings. The default limits in VTRIS are 200 to 20,000 kilograms for axle weights and 0.5 to 15 meters for axle spacings. The user may adjust these values.

14. **A-axle Weight** (Columns 31-33)

15. **A-B Axle Spacing** (Columns 34-36)

16. **B-axle Weight** (Columns 37-39)

17. **B-C Axle Spacing** (Columns 40-42)

18. **C-axle Weight** (Columns 43-45)

19. **C-D Axle Spacing** (Columns 46-48)

20. **D-axle Weight** (Columns 49-51)

21. **D-E Axle Spacing** (Columns 52-54)
22. **E-axle Weight** (Columns 55-57)
23. **E-F Axle Spacing** (Columns 58-60)
24. **F-axle Weight** (Columns 61-63)
25. **F-G Axle Spacing** (Columns 64-66)
26. **G-axle Weight** (Columns 67-69)
27. **G-H Axle Spacing** (Columns 70-72)
28. **H-axle Weight** (Columns 73-75)
29. **H-I Axle Spacing** (Columns 76-78)
30. **I-axle Spacing** (Columns 79-81)
31. **I-J Axle Spacing** (Columns 82-84)
32. **J-axle Weight** (Columns 85-87)
33. **J-K Axle Spacing** (Columns 88-90)
34. **K-axle Weight** (Columns 91-93)
35. **K-L Axle Spacing** (Columns 94-96)
36. **L-axle Weight** (Columns 97-99)
37. **L-M Axle Spacing** (Columns 100-102)
38. **M-axle Weight** (Columns 103-105)

Additional axle spacing and axle weight fields may be added in the same manner if needed.

Table 4: Truck Weight Record**(OMB No. 2125-0587 Expiration 4/30/2004)**

Field	Columns	Length	Description
1	1	1	Record Type
2	2-3	2	FIPS State Code
3	4-9	6	Station ID
4	10	1	Direction of Travel Code
5	11	1	Lane of Travel
6	12-13	2	Year of Data
7	14-15	2	Month of Data
8	16-17	2	Day of Data
9	18-19	2	Hour of Data
10	20-21	2	Vehicle Class
11	22-24	3	Open
12	25-28	4	Total Weight of Vehicle
13	29-30	2	Number of Axles
14	31-33	3	A-axle Weight
15	34-36	3	A-B Axle Spacing
16	37-39	3	B-axle Weight
17	40-42	3	B-C Axle Spacing
18	43-45	3	C-axle Weight
19	46-48	3	C-D Axle Spacing
20	49-51	3	D-axle Weight
21	52-54	3	D-E Axle Spacing
22	55-57	3	E-axle Weight
23	58-60	3	E-F Axle Spacing
24	61-63	3	F-axle Weight
25	64-66	3	F-G Axle Spacing
26	67-69	3	G-axle Weight
27	70-72	3	G-H Axle Spacing
28	73-75	3	H-axle Weight
29	76-78	3	H-I Axle Spacing
30	79-81	3	I-axle Weight
31	82-84	3	I-J Axle Spacing
32	85-87	3	J-axle Weight
33	88-90	3	J-K Axle Spacing
34	91-93	3	K-axle Weight
35	94-96	3	K-L Axle Spacing
36	97-99	3	L-axle Weight
37	100-102	3	L-M Axle Spacing
38	103-105	3	M-axle Weight

Note: The number of axles determines the number of axle weight and spacing fields.

APPENDIX A

FHWA VEHICLE TYPES

The classification scheme is separated into categories depending on whether the vehicle carries passengers or commodities. Non-passenger vehicles are further subdivided by number of axles and number of units, including both power and trailer units. Note that the addition of a light trailer to a vehicle does not change the classification of the vehicle.

Automatic vehicle classifiers need an algorithm to interpret axle spacing information to correctly classify vehicles into these categories. The algorithm most commonly used is based on the “Scheme F” developed by Maine DOT in the mid-1980s. **The FHWA does not endorse “Scheme F” or any other classification algorithm.** Axle spacing characteristics for specific vehicle types are known to change from State to State. As a result, no single algorithm is best for all cases. It is up to each agency to develop, test, and refine an algorithm that meets its own needs.

FHWA VEHICLE CLASSES WITH DEFINITIONS

1. **Motorcycles** (Optional) -- All two or three-wheeled motorized vehicles. Typical vehicles in this category have saddle type seats and are steered by handlebars rather than steering wheels. This category includes motorcycles, motor scooters, mopeds, motor-powered bicycles, and three-wheel motorcycles. This vehicle type may be reported at the option of the State.
2. **Passenger Cars** -- All sedans, coupes, and station wagons manufactured primarily for the purpose of carrying passengers and including those passenger cars pulling recreational or other light trailers.
3. **Other Two-Axle, Four-Tire Single Unit Vehicles** -- All two-axle, four-tire, vehicles, other than passenger cars. Included in this classification are pickups, panels, vans, and other vehicles such as campers, motor homes, ambulances, hearses, carryalls, and minibuses. Other two-axle, four-tire single-unit vehicles pulling recreational or other light trailers are included in this classification. *Because automatic vehicle classifiers have difficulty distinguishing class 3 from class 2, these two classes may be combined into class 2.*
4. **Buses** -- All vehicles manufactured as traditional passenger-carrying buses with two axles and six tires or three or more axles. This category includes only traditional buses (including school buses) functioning as passenger-carrying vehicles. Modified buses should be considered to be a truck and should be appropriately classified.

NOTE: In reporting information on trucks the following criteria should be used:

- a. Truck tractor units traveling without a trailer will be considered single-unit trucks.
 - b. A truck tractor unit pulling other such units in a "saddle mount" configuration will be considered one single-unit truck and will be defined only by the axles on the pulling unit.
 - c. Vehicles are defined by the number of axles in contact with the road. Therefore, "floating" axles are counted only when in the down position.
 - d. The term "trailer" includes both semi- and full trailers.
- 5. ***Two-Axle, Six-Tire, Single-Unit Trucks*** -- All vehicles on a single frame including trucks, camping and recreational vehicles, motor homes, etc., with two axles and dual rear wheels.
 - 6. ***Three-Axle Single-Unit Trucks*** -- All vehicles on a single frame including trucks, camping and recreational vehicles, motor homes, etc., with three axles.
 - 7. ***Four or More Axle Single-Unit Trucks*** -- All trucks on a single frame with four or more axles.
 - 8. ***Four or Fewer Axle Single-Trailer Trucks*** -- All vehicles with four or fewer axles consisting of two units, one of which is a tractor or straight truck power unit.
 - 9. ***Five-Axle Single-Trailer Trucks*** -- All five-axle vehicles consisting of two units, one of which is a tractor or straight truck power unit.
 - 10. ***Six or More Axle Single-Trailer Trucks*** -- All vehicles with six or more axles consisting of two units, one of which is a tractor or straight truck power unit.
 - 11. ***Five or fewer Axle Multi-Trailer Trucks*** -- All vehicles with five or fewer axles consisting of three or more units, one of which is a tractor or straight truck power unit.
 - 12. ***Six-Axle Multi-Trailer Trucks*** -- All six-axle vehicles consisting of three or more units, one of which is a tractor or straight truck power unit.
 - 13. ***Seven or More Axle Multi-Trailer Trucks*** -- All vehicles with seven or more axles consisting of three or more units, one of which is a tractor or straight truck power unit.