Highway Accident System

User's Manual

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P:\HQ\Eng\safety\has\doc\user\HASuser.doc
   where p: ==> \\Olive\S3018
```

Document Revisions:

2000-07-04	Updates to HASUTIL section.
2000-10-23	Added references to the HASLKI2000 database, and removed references to mainframe datasets in the Network Definition section.
	References to obsolete mainframe datasets removed, references to SHNFIL improved.
2000-12-04	Obsolete cross-references removed or corrected. Minor formatting improvements.
	Traffic Volume section re-written.
	User Utilities Section added.
	Average Accident Rate file selection panels added for 210 and 220.
2000-12-09	Minor modifications in the Traffic Volume section.
2001-01-11	Enhancements to THAS225.
2001-04-19	Notes on non-mutually exclusive Accident Type Ratio reference groups added.
2001-05-18	Revisions for change to multiple personal Accident Type Ratio files.
2001-10-18	Minor revisions.
2001-11-14	THAS210 (APL): landmark and location type specification is now optional
2002-04-05	Revisions for Highway Classification expansion, addition of, CSV output options for THAS210 and THAS220, SAS program examples revised with sample reports added.
2002-05-27	Minor additions to EARF panel description, and to opposing segment km calculation.
2002-11-18	Changed "Location Types" to "Landmark Types" on panel EARF.
2002-12-13	Notes on the THAS225 IncOpp option added.
2003-03-13	"Fatality" changed to "Fatal Accident" in THAS260 section.
2003-04-22	Revised TSO logon instructions (LOGON instead of TSOP, check for SPFAUTO)
2003-05-07	replaced FS_Public@HQA@TH with P:\HQ
2003-10-20	LOCTEXT info available in 251 and 240.
2003-12-23	description of HASLKI files updated.
2004-03-16	added highway classification definitions.
2004-03-23	added HASutil section on adjusting reports in Word
2004-05-03	revised Detail Report section. (New report format)
2004-05-12	District --> Area changes. SAS section changes.
2004-05-30	Added traffic volume data in-filling information.
2004-08-16	Added section: List of SAS programs
2004-09-23	Updated HASutil section: extraction of fatal acc data for web site
2004-12-10	Added a note on unplottable accidents in the HASutil/collision diagram section.
2005-01-23	Added section Nodes and Interchanges. Updated THAS232 section.

Table of Contents

1   Introduction

The Highway Accident System (H.A.S.) was developed for the Highway Safety Branch of the Ministry of Transportation and Highways. The system runs on the B.C. Systems Corporation IBM Mainframe computer.

The H.A.S. data comes from MV-6020 accident forms, of accidents on Provincial Jurisdiction highways. (The old name for the form is MV104). The data is obtained from the Motor Vehicle Branch. Fatal accident data is cross-checked with other data sources, thus the fatal data is likely to be accurate and complete. The rest of the data is only as accurate and complete as the data coded and submitted by the police. In recent years (since 1996) the number of accidents attended and reported has dropped off significantly.

The H.A.S. requires a definition of the Provincial highway system as a Segment-Node network. This definition is provided by the Landmark Kilometre Inventory (LKI). For use by the Highway Accident System, the LKI was expanded from its original design to include data such as nodes, areas and classifications.

The Update Sub-System was completed in January 1988. The purpose of the Update Sub-System is to select accidents from the MVB data which have correct or correctable LKI location codes, and update the H.A.S. Master files.

The Data Retrieval Sub-System was first implemented in January 1989. This sub-system contains the accident reporting and analysis programs. These use accident data extracted from the PDS Master Files- a pair of Partitioned Data Sets with data stored in separate segment and node members. This allows direct access to the data of any segment or node in the highway network. Accident subset creation, Accident-Prone Location, Accident-Prone Section, Details Report, Summary Report, Histogram, Rate Table and SAS functions are the major features.

The Highway Accident System was originally designed and written by Matthew Nicoll, of Cypher Consulting, in consultation with Richard Dixon, who was then a Highway Safety Branch Engineer. Subsequent enhancements have been done by Matthew Nicoll and Mia Shinbrot, of Cypher Consulting.

The Highway Accident System was made Year-2000 compliant in early 1998.

Highway Accident System Chart

```
                              MVB
                              DATA
                               |
                               v
                        +---------------+
                        |    UPDATE     |            <--- LKI
                        |  SUB-SYSTEM   |
                        +---------------+

  Archive
  Current          (MUN)      (PROV       (PROV
                               VALID)      INVALID)
                                 |
                                 v
                           Segments  Nodes        PDS MASTER
                                 |
                                 v
  ACCIDENT          +---------------+            Traffic
  DATA        <-->  |     DATA      |  <---       Volumes
  SUBSETS           |  RETRIEVAL    |
    |               |  SUB-SYSTEM   |
    |               +---------------+
    v                      |
                           v
                       CSV Files

  Windows     <---      Reports
  Workstations          Histogram
                        Summary Report
                        Rate Table
                        A.P. Sections
                        A.P. Locations
                        Details Report
```
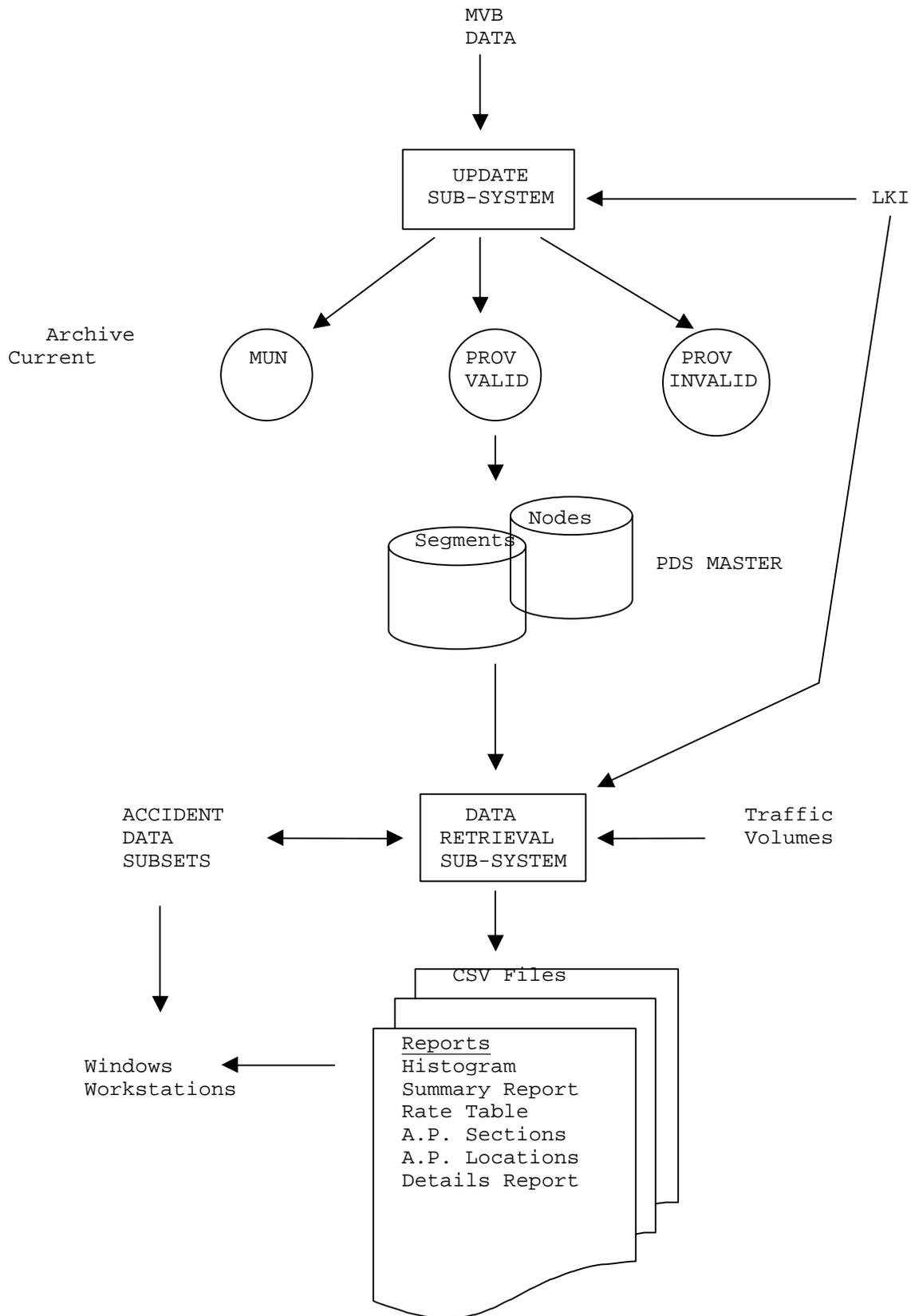
2   Highway Network Definition

2.1   Introduction

The network of provincial highways is divided into uniquely numbered highway segments. A segment may include both sides of the highway, or each side of the highway may be defined as separate segments - especially in the case of divided highways. Each segment has a designated origin for measuring purposes. One-way segments (e.g. one side of a divided highway) are always measured in the direction of travel. The distance along a segment from its designated origin is called a KMMARK.

Thus a highway location can be identified by its segment number and KMMARK. The location identification is unique except at segment connect points. (See the definition of Nodes below.)

An inventory of landmarks, such as bridges, intersections, railroad crossings, etc., is maintained for each segment in the Landmark Kilometre Inventory (LKI) Landmark File. When recording the location of an accident, the police officer refers to a listing of this inventory to get the KMMARK of the nearest landmark, then measures or estimates the distance to the accident location to get the KMMARK of the accident.

The concepts of Nodes and Continuity were developed for the Highway Accident System to describe how segments connect.

The following attributes are attached to highway segments and sub-segments within the network: highway classification, highway region, district, area, traffic volume, police detachment areas, segment pairing and 1-way/2-way information. This allows, for example, all sections of highway of a given highway classification, within a given district, to be identified.

2.2   Network Definition Files

The highway network information is available in various formats on the MoT LAN, in folder p:\HQ\Eng\safety\has\LKI, where p: is mapped to \\Olive\S3018

        HASLKI_DATA.MDB   MS-Access 97
        HASLKI.XLS   MS-Excel 97
        LKI_BC.PDF   PDF format

The PDF file is in a format suitable for printing. Finding data for particular highways or segments is also convenient with the PDF files, using the Adobe Acrobat Find function (Ctrl-F), and entering, for example "Highway 1" or "Segment 0330".

There may other PDF files put into the same folder from time to time, containing LKI data of subareas of BC.

Most of the database tables are also in plain text mainframe datasets named THASP.*tablename*.

The HASLKI database (as of 2003) contains the official MoT version of the Landmark Kilometre Inventory, until such time as it is incorporated into the RIMS database. The database is currently maintained in MS-Access format at the Cypher Consulting premises.

2.3   Network Terms and Concepts

2.3.1 Segment

A Segment is a section of provincial highway which is identified with a unique four digit number. In general, segments join at major intersections, and do not join other segments mid-segment.

See the **Introduction** section above, for more details.

2.3.2 1-Way/2-Way Segments

A Segment is a 2-way segment if it includes lanes for traffic travelling in opposite direction.

A 1-way segment has lanes for traffic travelling in only one direction, e.g. an entrance/exit ramp, or one side of a divided highway.

2.3.3 Opposite/Paired Segments

Paired segments are the segments on each side of a divided highway. Each of the pair is the opposite segment to the other. They are each measured in their own direction of travel.

2.3.4 KMMARK

A KMMARK is a distance from the start of a segment measured in kilometres. In the LKI the distances are measured to 2 decimal places (i.e. an accuracy of 10 metres). On the MV6020 accident report, however, KMMARKs are recorded to only 1 decimal place. In the H.A.S., therefore, all KMMARKs have just one decimal place.

Note that in the H.A.S. accident files, the KMMARK is stored without a decimal point. E.g. '1234' for 123.4 km.

2.3.5 Highway Number (Route)

A Highway is identified by a 1, 2 or 3 digit number, or by a 1 or 2 digit number followed by one letter. (In H.A.S. data entry fields, special justification of the Highway number within the field, or special placement of the letter, is not required.)

The Highway Accident System requires that a segment belongs entirely to one and only one Highway. The LKI allows a segment to be in more than one Highway. If the LKI has more than one Highway for a segment, the H.A.S. uses the first one listed.

2.3.6   Location Code

A Location Code consists of a Highway number, Segment number, and KMMARK. It is a field near the top of the MV6020 accident report form.

2.3.7   Landmark

A Landmark is a permanent road or road-side feature, recorded in the Landmark File with a Segment, Kmmark, and Landmark Type. A Landmark Type is a two digit code which defines the type of feature: e.g. intersection, railway crossing, etc.

2.3.8   Node

A Node is the end point of a segment, which may be the connecting point of zero or more other segments.

   - the Begin Node of a segment is the node at KMMARK 0.0 of the
     segment.
   - the End Node of a segment is the node at KMMARK = segment_length.
   - a Null Node is where a segment ends and does not connect to any
     other segment, e.g. at a ferry terminal.

Segments should be connected at the same level before they are considered to sharing a node. See the section on **Interchanges** below.

2.3.9   Node Names

Node names are 8 characters long, and are constructed as follows:

   - Null End Node   - the segment number followed by "NULL"
              - e.g. 1234NULL

   - Null Begin Node - "NULL" followed by the segment number
              - e.g. NULL1234

   - when two or more segments connect at a Node, the Node name should
     consist of any two of the connecting segment numbers. When
     possible, the first segment number should be that of a segment which
     ends at the node, and the second should be the number of a segment
     which begins at the node.

A Node has ONLY ONE NAME! If five segments connect at a Node, only two of those segment numbers are represented in the Node name. In fact, Nodes could be named without using any of the connecting segment numbers, but the convention described above was decided upon to make it easier to locate a Node, given the Node name.

2.3.10 Continuity

A Continuity attribute is associated with each end of each segment. A segment is Continuous at a Node if there is a segment connecting at that node measured in the same direction, i.e.:

   - a Segment is continuous at its End Node only if that Node is also a

Begin Node for another Segment, and it is possible to drive
(legally!) directly from one segment to the other in the direction
of measurement.

- a Segment is continuous at its Begin Node only if that Node is also
  an End Node for another Segment, and it is possible to drive
  directly from one segment to the other in the direction of
  measurement.

2.3.11 Mid-Segment Connection

There are currently a few instances in the Provincial highway network where a segment joins another in mid-segment. In this case the joining end of the joining segment is a Null Node.

2.3.12 Nodes and Interchanges

At interchanges, level separations and physical barriers result in separate nodes. I.e. two segments share a node only if a vehicle can have its front wheels on one segment and its rear wheels on the other. (Being connected by nearby ramps does not count.)

For example at a junction of a divided highway with an undivided highway, where the divided highway passes over (or under) the undivided highway, there may be three separate nodes: 1 for each side of the divided highway, and another on the undivided highway. If the undivided highway starts (or ends) at the interchange, it should have a null node at the interchange. (It is also possible that there will be **no** nodes at such an interchange - the segments of all three through routes could continue uninterrupted.)

Prior to the January 2005 LKI revision, this rule was not documented, nor applied consistently. Through the Fraser Valley it was done this way, but, for example, the top of Taylor way in North Vancouver was given the same node name as the connection between the two East-bound highway 1 segments which start/end there. Thus a HAS query of Highway 1 would have included the accidents coded at the top of Taylor Way (under the overpass) with the accidents coded on highway 1 on the bridge above. As of 22-Jan-2005 this is no longer the case.

There are some interchanges in the Vancouver area where every ramp is defined as a separate segment. The ends of these segments are null nodes, because the main-line segments either do not break at the interchange, or do not break at every entrance and exit. The node assignations in these interchanges were not changed in Jan 2005.

At most interchanges in the province, where the ramps are **not** defined as separate segments, the police are likely to code a ramp accident as being on the closest main segment, but will code an 11 (Entrance Ramp) or 08 (Exit Ramp) in field 2 of the MV6020 accident form. This is called "Accident Location" on the accident form, and called "Location Type" in the Highway Accident System.

The non-rigorous approach to interchange ramps creates artificial network discontinuities in HAS. This only has real consequences for the Accident Prone Section program: it cannot identify an accident-prone section spanning a discontinuity. The alternative extreme - calling each interchange one big node, would be great for continuity, but result in inflated accident counts when searching straight through interchanges, and make it difficult to separate accidents from different parts of the interchange. The rigorous segment-node solution would be to define as separate segments: each side of every road, every ramp, and all the small sections between exits and entrances through every interchange!   This is not considered practical at the moment.

2.3.13 Segment, Node, Continuity Examples

<u>Key</u>

```
*              node
 ──►           direction of measurement
D C            discontinuous or continuous
NULL0001       node name
0001           segment name
```

```
     D         0001        C C        0002           D
     * ──────────────────── * ────────────────────── *
   NULL0001      ──►         00010002      ──►          0001NULL
```

```
   D         0001        D D        0002         C C     0003
   * ──────────────────── * ──────────────────── * ──────────
 NULL0001     ──►        00010002     ◄──        00030002    ◄──
```

```
                         00010003
     D         0001        C C        0002           D
     * ──────────────────── * ────────────────────── *
   NULL0001      ──►          C │         ◄──           NULL0002
                               │
                         ▼     │  0003
                               │
                            D  │
                               *
                         0003NULL
```

```
                                      |
                                   ↑  |  0007
                                      |
                                   *  |  00060007
                                      | C
                                   ↑  |
                                      |  0006
                                      |
 0001    C C       0002          C| C        0003          C C     0004
 ─────────*─────────────────────────*───────────────────────────*─────────
    →       00010002      →       C| C      →                  00030004   →
                                   ↑  |
                                      |  0005

 Central Node could be             |
 called   00020003 or            D |
           00050006               * |
                                 NULL0005
```

```
   ←    C C    ←     0001        D
 ─────*─────────────────────────\ C        →   0003         C C   →
            divided highway        *────────────────────────────*─────────
 ─────*─────────────────────────/        two-way highway
   →   C C    →     0002         C
                             00020003
```
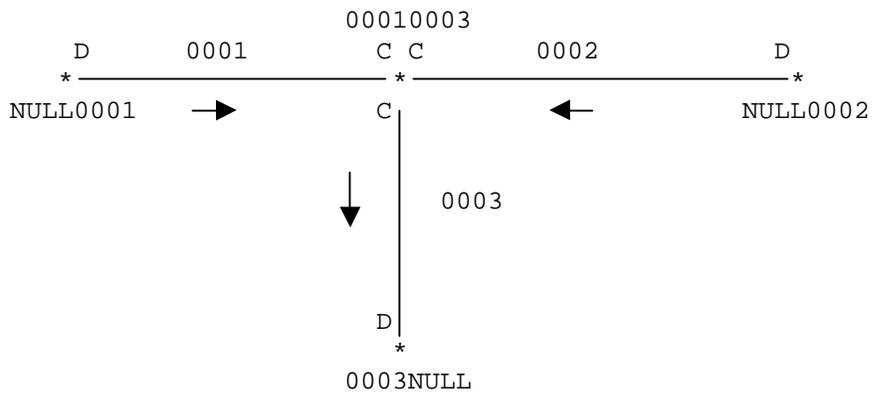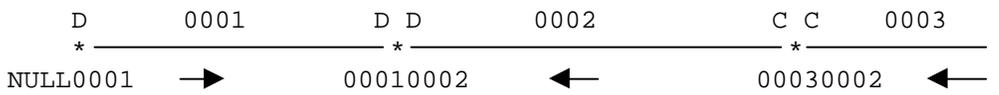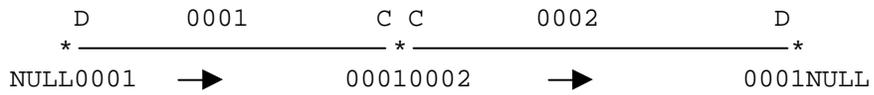
2.3.14 Search Sequence

The Search Sequence defines the order in which segments are to be searched when analysing the accident data. This is required because the segment numbers themselves do not necessarily increase in the same order searches should be done.

The Search Sequence is important, for example, to the Accident-Prone Sections program. Searching through the data in the correct order along the highway enables it to identify accident-prone sections which span Nodes.

A separate Search Sequence is specified for each Highway. I.e. the first segment of Highway 1 is given a search sequence number of 1, and so is the first segment of Highway 97, etc.

In the case of highways which have sections which are divided, with the sides defined as separate segments, the Search Sequences are currently defined going all the way along the highway in the direction of measurement, then coming back picking up all the one-way opposite direction segments.

2.3.15 Location ID

Location Codes uniquely identify mid-segment locations, but are not unique at non-null nodes. The Location ID concept was defined in order to have a location identifer which was unique in all locations.

In mid-segment, a Location ID consists of an S followed by the Segment Number, followed by the KMMARK with leading zeros and no decimal point.

At a node, a Location ID consists of an N followed by the Node Name.

```
E.g:  at Segment/Kmmark: 0355 12.4
         Location ID:     S03550124


      at Node:            0001NULL
         Location ID:     N0001NULL
```

The Location ID is not defined in the accident records until they are put into the PDS-Master by Utility job PDSM. The Location ID replaces the first 9 characters of the MVB_LOCN field.

2.4   Highway Classification

2.4.1   Introduction

The Highway Accident System allows sections of highways to be classified in up to 8 Categories. In each Category, one of 8 Characteristics may be assigned.

An example of a Category is TERRAIN. Possible TERRAIN Characteristics are MOUNTAINOUS, ROLLING, LEVEL, coded using Characteristic Codes M, R or L.

The Category and Characteristic names are not fixed anywhere in the system software, or in the accident data. They are defined in a Class Names file. The Highway Classifications are assigned to Segments or sub-segments in a Segment-Class file.

Multiple classification schemes may be defined. For each scheme there must be a Class Names file named THASP.CLASS.NAMES.xxxxxxxx, and a corresponding Segment Class file named THASP.SEGCLASS.xxxxxxxx.

The Highway Accident System user can select the desired classification scheme from the HAS main menu.

2.4.2   Characteristic Code

Each Characteristic is represented by a single letter, called a Characteristic Code. E.g. M for Mountainous, R for Rolling, etc.

The Characteristic Codes need to be unique only within each Category. E.g. U may stand for Urban in the LOCATION Category, and for Undivided in the TYPE Category.

2.4.3   THASP.CLASS.NAMES.* files

The format of the THASP.CLASS.NAMES.* files is defined in detail in the System Manual.

These files define Highway Classification schemes.

Until 2002, there was just one classification scheme, and thus just one THASP.CLASS.NAMES file.
It was called THASP.CLASS.NAMES, and is now called THASP.CLASS.NAMES.YR1897:

```
1 Location
  U Urban
  R Rural
  X U/R (for unnumbered routes)
2 Class
  C Conventional
  E Expressway
  F Freeway
  N unNumbered route (900 series)
```

This file defines two Categories (Location and Class). Following each Category name are the Characteristic Codes and names for that Category.

In 2002, the following scheme was introduced, in THASP.CLASS.NAMES.YR2002:

```
1 Primary/Secondary/Other
  P Primary
  S Secondary
  O Other
2 Urban/Rural
  U Urban
  R Rural
  X Unknown
3 Arterial/Expressway/Freeway
  A Arterial
  E Expressway
  F Freeway
  X Unknown
4 Divided/Undivided
  D Divided
  U Undivided
  X Unknown
5 Lane Class
  2 Up to 3 lanes
  4 4 or more lanes
  X Unknown
6 Terrain
  L Level
  R Rolling
  M Mountainous
  X Unknown
```

Definitions
For definitions of *Primary* and *Secondary,* see the Highway Planning Branch's **Functional Classification Manual.**
R = Rural – Lower access density and posted speed generally greater or equal to 70 km/hr U = Urban – increased access density and posted speed generally less than 60 km/hr except for urban freeways. Urban freeways generally are freeways within a major urban area.
A = Arterial – at grade intersections and mid block access E = Expressway – at grade intersections and no mid-block access F = Freeway - no access other than grade separated interchanges
U = Undivided D = Divided - by a median or a concrete barrier.
L = Level (average grade <1.5%) R = Rolling (average grade >=1.5% and < 3.5%) M = Mountainous (average grade >= 3.5%)

2.4.4 Category Order

The term 'Category Order' is used in the following sections of this document. It is the order in which the Categories are defined in the THASP.CLASS.NAMES file.

2.4.5 Highway Classification Code

A Highway Classification Code (often referred to as simply a Highway Classification) is a string containing up to eight characters - one Characteristic Code for each Category, in Category order. The first character is a Characteristic Code of the first Category, the second for the second, etc.

For example, in the YR2002 classification scheme shown above:

```
  PRED4R   - a "Primary,  Rural Expressway,  Divided,  4-Lane,  Rolling " highway.
  SUAU2L   - a "Secondary, Urban, Arterial, Undivided, 2-Lane, Level" highway.
```

There must not be any embedded blanks.

2.4.6 Composite and Predominant Highway Classification Codes

These terms apply to the classification of a section of highway of non-uniform classification.

The *predominant* classification of a section is the classification applied to a greater part of the section than any other classification.

The *composite* classification is like a Highway Classification, but has an asterisk for categories which are non-constant over the length of the section.

For example, given the following section of highway:

```
    Primary
    Urban
    Expressway            Freeway    Arterial
    Undivided             Divided    Undivided
    4 Lane                           2 Lane
    Level


    |-------------------------===========........|
    0                        10        15        20
```
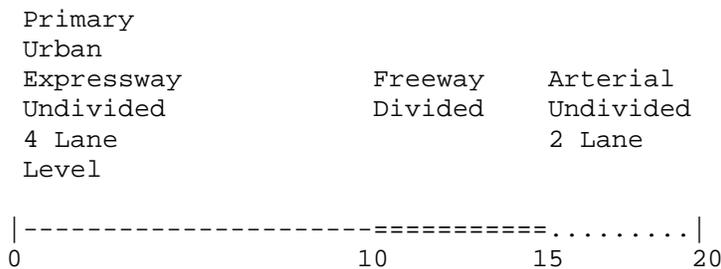
The Predominant Classification would be that of the 0-10 subsection: PUEU4L
The Composite Classification would be   PU***L

2.4.7 Highway Classification Set

A 'Highway Classification Set' is used to define a SET of highway classifications.

A Highway Classification Set is a string containing blank delimited substrings: one substring for each Category, in Category order. Each substring will be either an asterisk, or one or more Characteristic Codes.

For example:

```
        'U EF'      - means Urban, Expressway or Freeway
        'UR F'      - means Urban or Rural, Freeway
```

An asterisk can be used to indicate ALL of a certain Category.
The asterisk may be omitted if it is for the last Category being specified.

For example:

```
        'U *'       - means all Urban
        'U'         - also means all Urban
        '* F'       - means all Freeways   (same as 'UR F')
```

2.4.8 Summary of Terms

```
Name                      Example              Notes
--------------------      -------------        -----------------------------

Category                  Terrain              Something by which the highway
                                               is classified

Category Order                                 The order in which categories
                                               are defined in the file
                                               THASP.CLASS.NAMES

Characteristic            Mountainous          A classification within a
                                               Category

Characteristic Code       M                    A 1 character code for a
                                               characteristic - normally the
                                               first letter.

Highway Classification    URED4R               One character per category.
Code                                           No embedded blanks.

Highway Classification    'U * EF D 4'         A way of defining a SET of
Set                                            highway classifications.
                                               Embedded blanks separate the
                                               Ctegories.

Predominant Highway       URED4R               A Highway Classification Code which
Classification                                 describes a greater part of a
                                               highway section than any other
                                               classification.

Composite Highway         URED*R               A Highway Classification for a
Classification                                 section with asterisks indicating
                                               categories with non-constant
                                               characteristics over the section.
```

2.4.9 THASP.SEGCLASS.* - Segment Classification Files

It is in these files that Highway Classifications are assigned to Highway segments or sub-segments. The files are defined in detail in the System Manual.

For example the following segment/class combination:

```
Location:  Rural          Urban          Urban       Urban     Rural
   Class:  Expressway     Freeway        Convent.    Convent.  Freeway
           |---------------==============..........|........==============|
      Km:  0              10             20         30        15            40
                                                    0
 Segment: <............1111.....................><...........2222......>
```

... would be described with the following SEGCLASS file records:

```
   Segment Date1      Date1    StartKm EndKm Class
    1111 19870101 20501231    0.00    10.10 RE
    1111 19870101 20501231   10.10    20.46 UF
    1111 19870101 20501231   20.46    30.00 UC
    2222 19870101 20501231    0.00    15.30 UC
    2222 19870101 20501231   15.40   999.90 RF
```

Notes:
- when this data is read by HAS programs, the Kms are rounded to one decimal place, and end-start pairs are adjusted to be 0.1 km apart.
- if an end km is coded as 999.90 (or any number greater than the segment length), it is replaced with the segment length.
- different classifications may be coded for different date ranges.

Thus internally, the above example would become: (assuming segment 2222 is 40 km long):

```
    1111 19870101 20501231    0.00    10.10 RE
    1111 19870101 20501231   10.20    20.40 UF
    1111 19870101 20501231   20.50    30.00 UC
    2222 19870101 20501231    0.00    15.30 UC
    2222 19870101 20501231   15.40    40.00 RF
```

(This processing is done in PL/I routine THASLSC.)

2.5   *Highway Regions, Districts and Areas*

The province is divided into Highway Regions, Districts and Areas. Districts are wholly contained within Regions. Areas (contract management) are wholly contained within Districts. Regions are assigned 1-digit numbers, and Districts and Areas are assigned 2-digit numbers.

The definition of Highway Segments ignores Region, District and Area boundaries. I.e. Segments cross district boundaries.

Region, District and Area names, and the relationships between them and Segments are defined in the following files, and corresponding tables in the LKI database:

THASP.AREA
- one record per area, containing:
- area number, district number, area name

THASP.DISTRICT
- one record per district, containing:
- district number, region number, and district name

THASP.REGION
- one record per region, containing region number and region name.

THASP.SEGAREA
- one record per segment-area combination defining the portion of the segment in the area.

See the System Manual for detailed definitions of these files.

2.6   Traffic Volume

2.6.1   Data Sources

Traffic volume data comes into the Highway Accident System from the Traffic Information Management System (TIMS). TIMS supplies 1-directional data at single points (called TM Points in TIMS). 12 Monthly Average Daily Traffic (MADT) counts are provided for each point and year. Data is not always available for every month, or every year, for every point. The "TM point" names are called "Count IDs" in the HAS.

TIMS also supplies counter location information: descriptive and also some LKI (Segment & Km) locations.. TIMS is missing many of the LKI locations, and many are not consistent with the HAS version of the LKI. Consequently considerable effort has been put into a HAS version of the counter location data.

(Up until December 2000, traffic volumes came from the old Perm/Short count system. The latest year of volume data from that system was 1994.)

The traffic count data for TIMS comes from permanent and short count stations. Short counts are done for only a few weeks, usually in the summer. Data for the rest of the year for those locations is concocted by using data from the three Permanent Counts whose traffic count patterns best match the pattern of the Short count.

An idea of the numbers of each type of counter can be obtained from the following description of the situation in 1995:

> The Planning Services Branch, in 1995, had 80 Permanent Count Stations. Each station may count one or more lanes, ramps etc., so the 80 stations count 220 'traffic movements'. Permanent Counters count continuously, year-round.

> In 1995 the Branch did about 1100 Short counts, counting about 1600 traffic movements. 250 of these counts were done regularly - at the same place each year. The remainder were transient, from year to year.

2.6.2   User Expectations

It is important for HAS users to understand that the HAS is not guaranteed to provide accurate traffic volume data for any given location. Most of the data we have comes form short counts - counts taken for about two weeks in the summer, and extrapolated to the entire year using an elaborate statistical pattern matching technique   The HAS does, however, provide the tools to allow the available traffic counts to be intelligently applied to sub-segments, nodes and intersections.

It is currently up to the HAS user to verify that the traffic volumes which the HAS provides are suitably accurate for the research being done, in the area of study. There is a utility for extracting the HAS traffic volumes for any segment. (See section 10.1 for details)
If the user is not happy with the volumes, the source traffic count, counter location and counter map files are all available for viewing and checking. The user can:
- check that the locations (Segment & Km) assigned to Count ID's in the area are correct
- check to see if there are counter maps defined for the area,
- if counter map data needs to be corrected or added, contact the HAS support person.

More details, including locations and names of data files are given in following sections.

2.6.3   Counter Mapping

Counter Mapping is a HAS mechanism for applying point traffic counts to sub-segments, nodes, or intersections.

Sub-segment traffic volumes are defined by specifying up to 8 Count IDs, and a weighting factor for each. (A weight may be negative to use a counter to reduce a traffic volume.) This is called a Counter-Subsegment Map, because the volumes of individual Counters are mapped to sub-segments. The traffic volume for the sub-segment is calculated by summing the individual weighted traffic volumes.

Intersection traffic volumes are defined in exactly the same manner. Logically, an intersection is treated as a short sub-segment. An intersection location is usually defined with a segment number and a single KMMARK, but an optional second KMMARK is allowed for larger intersections (e.g. an interchange).

Node volumes are defined in the same manner, except that nodes are defined by node name, instead of segment and KMMARKs.

Each Counter Map has a year range attached, so that the mapping can be year-specific.

The counter mapping was originally (1995) done by regional Highways personnel. In 2002 it was updated using counter mapping done by Peter Lyall (APEX Engineering), with MoT Regional review and input. Subsequently it has been maintained by Cypher Consulting to keep up with LKI revisions.

2.6.4   Preparation of Traffic Volume Data in the H.A.S.

If traffic volumes at a count station are missing for one or more months or years, the HAS traffic volume preparation programs attempt to fill the data in as follows:
- the first year of data may be duplicated back one year,
- the last year of data may be duplicated forward one year,
- missing years are filled by interpolation. (Missing monthly counts are interpolated using that month's counts in previous and following years.)

First: a program attempts to calculate a single monthly traffic volume for each highway segment, by averaging data from count stations on, or adjacent to, each segment. This is done on a yearly basis: all the counters which have any data for a year are used to calculate the MADTs for that year. This process relies on having correct LKI locations for count stations. Since not all segments have count stations, this does not cover all segments. The file of data produced is referred to as SEGVOL1.

Second: the-Sub-segment Counter Map is implemented, producing traffic volumes for all the sub-segments and years defined therein. This data is merged with the data in SEGVOL1 to produce a more detailed traffic volume file called SEGVOL2.

Third: the Intersection Counter Map is implemented producing traffic volumes for all the intersections defined therein. This data is merged with the data in SEGVOL1 to produce a yet more detailed traffic volume file called SEGVOL3.

Fourth: the Node traffic volumes are determined, as follows:
- the Node Counter Map is implemented to obtain volumes for all the nodes defined therein.
- for all nodes not defined in the Node Counter Map, node volumes are determined by taking the average of the adjacent volumes in the two segments named in the Node name. (It is understood that this is less than rigourous - it was decided that the Node Counter Map was a better solution than coding a more elaborate automatic system.)

The user can select which of the SEGVOL files are to be used, each time a HAS program which uses traffic volumes is selected.

2.6.5 File Names and Locations

Counter Locations

MoTH LAN:
P:\HQ\Eng\safety\has\volume\Counter_Locations.xls   (where p: is mapped to \\Olive\S3018)
- Excel format
- worksheet *Counter_Locations* contains all Counter ID's from TIMS, including those not on numbered highways. Segment & Kms corrected and added for HAS.
- worksheet *Combined* contains all the combined Counter IDs, created for use in the HAS Counter Maps.

Mainframe:
THASP.COUNTER.LOCNS
- includes combined Counter IDs
- includes ONLY the Counter IDs on numbered highways, eg. those with Segment and Km location.
- in Counter ID order

Matthew Nicoll's Workstation
VOLUME.mdb (MS-Access) : tables *Counter_Locations* and *Combined_Counter_Locations*

Point Volumes

Mainframe:
THASP.VOLUMES.TIMS
THASP.VOLUMES.COMBINED
- volumes from THASP.VOLUMES.TIMS, combined for each N/S, E/W pair.
THASP.STATIONS.VOLUMES
- data from THASP.VOLUMES.TIMS and THASP.VOLUMES.COMBINED, for all Count IDs in the THASP.COUNTER.LOCNS file, plus any additional Count IDs in the Counter Map files.

Matthew Nicoll's Workstation
VOLUME.mdb (MS-Access) : tables *Volumes_TIMS* and *Volumes_Combined*

MoT LAN:
P:\HQ\Eng\safety\has\volume\VolumeDatabase.zip (where p: is mapped to \\Olive\S3018)

Counter Maps

Excel:
Reg*CounterMap.xls, one per region, where * is the region number
- e.g. Reg6CounterMap.xls
- each regional HAS representative has the file for his/her region.
- Matthew Nicoll keeps a copy on his workstation
- each Excel file has three worksheets: Subseg, Node, Intersection

Mainframe:
THASP.R*SEGMAP.CSV, THASP.R*INTMAP.CSV, THASP.R*NODMAP.CSV
- individual map files for each region

THASP.COUNTER.MAP.SUBSEG.CSV,
THASP.COUNTER.MAP.INTERSEC.CSV,
THASP.COUNTER.MAP.NODE.CSV

- combined counter maps of each type, for all regions

Volumes Applied to Sub-Segments and Nodes

    Mainframe:
       THASP.SEGVOL1   - one volume for entire segment
       THASP.SEGVOL2   - plus results of Subseg Counter Map
       THASP.SEGVOL3   - plus results of Intersection Counter Map

       THASP.NODEVOL   - volumes at nodes. (see the Preparation... section above for details.)

       THASP.PRETIMS.*   - same as above 4 files, but containing the data used prior to Dec 2000.

2.7 Range Features

A Range Feature is any attribute of a highway, or a feature adjacent to a highway which has length definable with a start and end KMMARK.

Highway Classification, and District information are range features which have their own special definition files. Other types of range features, such as Guard Rails, are stored together in the Range Features File (THASP.RANGE.FEATURES).

A Range Feature must be defined entirely within one segment. If a Range Feature in reality spans a node, it has to be defined in two pieces: one for each segment.

*** Range Feature data has never been compiled and implemented ***

2.8 Highway Network Data and the Accident Record

Some of the network information comes on the Accident Records from the MVB, some is added to the Accident Records later, and some is looked up as required, as follows:

-    On the original Accident Records, through the Update System, and onto the Tape Master Files:
      Highway, Segment, Kmmark

-    Added to the Accident Records when the PDS-Master is created:
      Region, District, Area, Node Name (in the Location ID),

-    Added to the Accident Records when the data is selected:
      Highway Classification

-    Looked up from information files as required by the Data Retrieval System:
      Continuity, Traffic Volume

3   The H.A.S Accident Record

There is one 258-byte H.A.S. accident record for each MV 104 form submitted to the Motor Vehicle Branch. One MV 104 is filled out by a police officer for each two vehicles of one accident. If there is more than one page filled out for one accident, each page becomes one record. The pages are numbered 1, 2, ... up to 9.

3.1   Numeric and Letter Code Fields

Certain fields are stored differently in the H.A.S. accident record than the way they were coded on the original MVB form. Some of the changes were made to save space; others separate the individual digits of two digit codes.

All fields on the MVB form may be coded as 'data not present.' There are three different 2-digit codes for this:

00	UNKNOWN
98	NOT APPLICABLE
99	OTHER

There are no 1-digit 'data not present' codes on the MVB form; however, some of the 1-character fields in the H.A.S. accident record require 'data not present' codes of X, Y, and Z (corresponding to 98, 99, and 00) as illustrated in the three sections below.

3.2   SPEEDTYP and SPEEDLIM

The fields SPEEDTYP and SPEEDLIM come from the 3-digit MVB Speed Zone field. The first digit of the MVB field gives the type of speed zone, and the 2nd and 3rd digits together give the speed limit. The decoding is done as follows:

Speed Zone	SPEEDTYP	SPEEDLIM	
'98 '	X	X	
'99 '	Y	Y	
'00 '	Z	Z	
'ab '	a	b	(where a is 1-3, b is 1-9)
'a10'	a	A	
'a11'	a	B	
'a99'	a	Y	

If there are ever speed limits beyond 110 km/hr, Speed Zone will be 'a12', 'a13', and so on, and SPEEDLIM can be coded C or D for 120 or 130 km/hr., etc.

3.3   Two-to-one Character Fields

Certain fields were coded as 2-digit fields on the MVB form, but are stored in only one character in the
Accident Record. These fields are:

```
ROADSURF
DAMSVRT1
DAMSVRT2
ROADTYPE
LANDUSE
WEATHER
LIGHTING
LOCN1ST
PEDLOCN
TRAFFLOW
```

And in the Victim Table: SAFQUIP,   EJECTIO,   VICTCON

These fields are coded in the H.A.S. Accident Record as follows:

```
MVB field    HAS field
   '98'         X
   '99'         Y
   '00'         Z
   '0a'         a                   (where a is 1-9)
```

3.4   Split Fields

The following 2-digit MVB fields have been split into pairs of 1-character fields in the H.A.S. Accident
Record:

```
Road Class          ->  NUMLANE   ROADCLAS  (stored in reverse order)
Roadway Character  ->  ROADCURV  ROADGRAD  (stored in same order)
```

These fields are coded in the Accident Record as follows:

```
MVB field   HAS field 1   HAS field 2
   '98'          X             X
   '99'          Y             Y
   '00'          Z             Z
   'ab'          a             b          (where a is 1-9, b is 1-9)
```

3.5   Record Description

Most fields come from the accident report (form MV 6020, which used to be called the MV104) via the ICBC TAS database. MV 6020 template field numbers are provided below where appropriate. For details on how the MV 6020 is completed, see the TRAFFIC INCIDENT REPORTING POLICE PROCEDURES MANUAL.

"PDS-Master only" means that the field is inserted by program THAS110 in utility job PDSM, and is thus present in the PDS-Master files but not in the tape master files.

"post-Data-Selection only" means that the field is inserted by program THAS200, when accidents are selected from the PDS-Master. Thus the field is available in Subsets, but not in the PDS or Tape master files.

```
BYTE   NAME          LENGTH        DESCRIPTION

 1     PAGE_NO        01    -  MV6020 page number
                             -  more than 1 page is required if there are more
                                than 2 vehicles involved in the accident

 2     JURCODE        01    -  jurisdiction code
                             -  numeric: 1-Provincial, 2-Municipal, 3-Rural

 3     LOCN_CODE      12    -  the Location Code consists of the following 4
                                fields:

 3     HIGHNUM        03    -  highway number (does not include the letter)
                             -  numeric, right justified, blank filled

 6     HIGHLET        01    -  highway letter

                                ( There are 3 spaces on the MV6020, and in the MVB
                                file, for the highway number and optional letter.
                                Program THAS010 extracts the letter into HIGHLET,
                                if there is one. )

 7     SEGNUM         04    -  highway segment number of the accident location
                             -  numeric, zero filled
                             -  second section of 'Location Code' on the MV6020
                             -  segment numbers are defined in the LANDMARK
                                KILOMETRE INVENTORY

11     KMMARK         04    -  kilometre mark of the accident location
                             -  numeric - km to 1 decimal place (no decimal point)
                             -  last section of the 'Location Code' on the MV6020

15     OBSOLETE_LOCN  01    -  X if the accident occurred on an obsolete section
                                of highway; blank otherwise
                             -  used to be FILLKM (the old HSI system had a 2nd
                                decimal place for the KMMARK)

16     ACCDATE        08    -  accident date, yyyymmdd
                             -  numeric: year, month day

24     ACCHOUR        04    -  accident time
                             -  numeric - 24 hour time

28     ACCASE         08    -  case number
                             -  sequential on multiple page accidents prior to
                                1984
```

```
                        -  now same case number on all pages of an accident
                           from 1984
                        -  alphanumeric

   36   POLICEFILE   16   -  police file number.  Length varies.  Most are 8.

   52   TOTALINJ     03   -  total number of people injured in the accident
                        -  numeric

   55   TOTALKLD     03   -  total number of people killed in the accident
                        -  numeric

   58   TOTALVEH     03   -  total number of vehicles involved in the accident
                        -  numeric

   61   SPEEDTYP     01   -  speed zone type (Posted, or Special)
                        -  numeric (1 or 3)
                        -  1st digit of #2A on the MV6020

   62   SPEEDLIM     01   -  speed limit code
                        -  1-9, A,B,C
                        -  from 2nd and 3rd digits of #2A on the MV6020

   63   SPEEDADV     01   -  advisory speed limit
                        -  1-9, A,B,C
                        -  from 2nd and 3rd digits of #2B on the MV6020

   64   LOCN_TYPE    02   -  accident location-type code
                        -  numeric
                        -  #2 on the MV6020

   66   TRAFCNTL     02   -  traffic control code
                        -  numeric
                        -  #5 on MV6020

   68   TRAFFLOW     01   -  traffic flow code (one way or two way)
                        -  numeric or letter code
                        -  #1A on the MV6020

   69   ROADCLAS     01   -  road class
                        -  numeric (1, 2, or 3) or letter code (X, Y, or Z)
                        -  2nd digit of #1 on the MV6020

   70   NUMLANE      01   -  number of lanes
                        -  numeric or letter code
                        -  1st digit of #1 on the MV6020

   71   ROADSURF     01   -  road surface code
                        -  numeric or letter code
                        -  #7 on the MV6020

   72   ROADTYPE     01   -  road type code (eg asphalt, gravel etc.)
                        -  numeric or letter code
                        -  #4 on the MV6020

   73   ROADCURV     01   -  road curve code (misspelled ROADCURC on report
                           R1-2)
                        -  numeric or letter code
                        -  1st digit of #6 on the MV6020 (Roadway Character)

   74   ROADGRAD     01   -  road gradiant code
                        -  numeric or letter code
```

```
                                 -  2nd digit of #6 on the MV6020 (Roadway Character)

 75   LANDUSE        01  -  land usage in accident area
                        -  numeric or letter code
                        -  #3 on MV6020

 76   WEATHER        01  -  weather condition code
                        -  numeric or letter code
                        -  #8 on the MV6020

 77   LIGHTING       01  -  lighting code
                        -  numeric or letter code
                        -  #9 on the MV6020

 78   DIAGRAM        02  -  number of the diagram describing the accident
                        -  numeric

 80   LOCN1ST        01  -  location of first contact
                        -  numeric or letter code
                        -  #24 on the MV6020

 81   ATTENDED       01  -  1 if police attended the accident, 2 otherwise

 82   POLICECD       04  -  police code
                        -  numeric
                        -  see appendix A of the TRAFFIC INCIDENT REPORTING
                           POLICE PROCEDURES MANUAL

 86   PEDLOCN        01  -  pedestrian location code
                        -  numeric or letter code
                        -  #29 on the MV6020
```

```
 87  PEDNACTN      02  -  pedestrian action code
                       -  numeric
                       -  #30 on the MV6020

 89  VEHTYPE1      02  -  type of vehicle 1
                       -  numeric
                       -  #27 on the MV6020

 91  VEHTYPE2      02  -  type of vehicle 2
                       -  numeric
                       -  #28 on the MV6020

 93  VEHUSAG1      02  -  usage of vehicle 1
                       -  numeric
                       -  #27A on the MV6020

 95  VEHUSAG2      02  -  usage of vehicle 2
                       -  numeric
                       -  #28A on the MV6020

 97  STOLEN1       01  -  Y or N
 98  STOLEN2       01  -  Y or N

 99  LIC_CLASS1    03  -  Licence Class of driver 1
102  LIC_CLASS1    03  -  Licence Class of driver 2

105  NOVLEARN1     01  -  N, L or blank (Novice, Learner) driver 1
106  NOVLEARN2     01  -  N, L or blank (Novice, Learner) driver 2

107  PREACTN1      02  -  pre-collision action of vehicle 1
                       -  numeric code
                       -  ##25 on MV6020

109  PREACTN2      02  -  pre-collision action of vehicle 2
                       -  numeric
                       -  #26 on the MV6020

111  TYPE2ND1      02  -  second event code for vehicle 1
                       -  numeric
                       -  #21 of the MV6020

113  TYPE3RD1      02  -  third event code for vehicle 1
                       -  numeric
                       -  #22 on the MV6020

115  TYPE3RD2      02  -  third event code for vehicle 2
                       -  numeric
                       -  #23 on the MV6020

117  CONTRB11      02     up to 4 contributing factors to the accident for
119  CONTRB12      02  /  vehicle 1.
121  CONTRB13      02  \  numeric.
123  CONTRB14      02     #31, 32, 33 & 33A on the MV6020


125  CONTRB21      02     up to 4 contributing factors to the accident for
127  CONTRB22      02  /  vehicle 2.
129  CONTRB23      02  \  numeric.
131  CONTRB24      02     #34, 35, 36 & 36A on the MV6020

133  VEHDIR1       01  -  the direction of travel for vehicle 1
```

```
                            -  N, E, W, S, P (parked) or U (unknown)
                            -  unnumbered MV6020 field
     134  VEHDIR2       01  -  the direction of travel for vehicle 2

     135  DAMSVRT1      01  -  damage severity code of the first vehicle
                            -  numeric or letter code
                            -  codes (1 to 5) explained on back of the MV6020
                               template

     136  DAMSVRT2      01  -  damage severity code of the second vehicle

     137  GROUP_ID      04  -  used to divide accidents in a subset into groups
                               (e.g., a group may be all accidents in one
                               accident-prone section)
                            -  set and used in the Data Retrieval sub-System

     141  HWYCLASS      08  -  Highway Classification
                            -  set in THAS200

     149  WEEKDAY       01  -  day of the week
                            -  numeric
                            -  Monday is 1, Sunday is 7
                            -  set in PDS-Master, by program THAS110
     150  MVB_LOCN      11  -  the location code as copied from the MVB file
                               (unmodified) -- only in tape file (pre-PDS Master)

     150  LOCN_ID       09  -  overlaid on MVB_LOCN in PDS Master files
                            -  defined in THASRACO
                            -  the Location ID consists of the following 2
                               fields:

     150  LOCN_ID_TYPE  01  -  letter code (N or S)
                            -  indicates whether accident occurred at a node (N)
                               or within a segment (S)

     151  LOCN_ID_CODE  08  -  nodename if accident occurred at a node
                            -  segment + kmmark otherwise (same as SEGNUM and
                               KMMARK fields above)
                            -  numeric

     161  LOCN_ERROR    01  -  8 bits, set by program THAS030, indicating the
                               following:
                                  1 - highway number/letter is bad
                                  2 - segment number is invalid
                                  3 - highway - segment mismatch
                                  4 - KMARK invalid for this segment
                                  5 - location type does not match LKI
                                  6 - police code does not match LKI
                                  7 - LOCN modified to make it valid
                                  8 - LOCN modified but still not valid
                            -  used in the Update sub-system only.
                            -  set blank by program THAS101 when PDSMASTER is
                               created.

     162  REGION        01  -  highway region
                            -  numeric
                            -  PDS-Master only

     163  DISTRICT      02  -  highway district
                            -  numeric
                            -  PDS-Master only
```

```
165  AREA            02  -  Contract Management Area
                         -  numeric
                         -  PDS-Master only
                         *  NOT IMPLEMENTED AS OF 2004-04-14 *

167  VEH_WT          02  -  vehicle causal factor
                         -  a percent, range 00 to 99
                         -  calculated by THAS140 in job U30

169  ROAD_WT         02  -  road causal factor
                         -  a percent, range 00 to 99
                         -  calculated by THAS140 in job U30

171  SEVERITY_TYPE 01  -  1 - Fatal, 2 - Injury, 3 - PDO
                         -  PDS-Master only.
                         -  calculated from TOTALKLD and TOTALINJ
                            by program THAS110 in job PDSM.
```

VICTIM TABLE (# 10-20 on MV6020) - repeats 8 times

```
185  OCCUPY        02  -  location of person, eg vehicle number, bicycle
                            etc.
                        -  numeric code
                        -  #10 on the MV6020

187  POSNVEH       02  -  position of person within or on a vehicle
                        -  numeric code
                        -  #11 on the MV6020

189  SAFQUIP       01  -  safety equipment used
                        -  numeric code
                        -  #12 on the MV6020

191  EJECTIO       01  -  code indicating whether or not the person was
                            ejected from the vehicle.
                        -  numeric code
                        -  #13 on the MV6020

192  VICTAGE       02  -  age of the person (victim)
                        -  numeric
                        -  #14 on the MV6020

194  VICTSEX       01  -  sex of the person
                        -  1 letter, M or F
                        -  #15 on the MV6020

195  LOCNINJ       02  -  location of the person's most severe injury
                        -  numeric code
                        -  #16 on the MV6020

197  TYPEINJ       02  -  type of injury
                        -  numeric code
                        -  #17 on the MV6020

199  INJCLASS      02  -  injury class
                        -  01 - minor, 02 - serious
                        -  #20A on the MV6020

201  VICTCON       01  -  victim's state of consciousness
                        -  numeric code
                        -  #18 on the MV6020
```

4   The IBM Mainframe

4.1   Introduction

The Highway Accident System runs on the BC Government IBM Mainframe BCSC01, which runs the MVS operating system. The MVS command language is called TSO. (TSO is analagous to DOS in Windows.) On top of TSO there runs a menu and screen-based system called ISPF. (ISPF stands for Interactive System Productivity Facility). An application written for ISPF is called an **ISPF Dialog.** When you first log on to the mainframe, an ISPF dialog called PDF is automatically started. (PDF stands for Program Development Facility). From PDF, you can edit or browse mainframe files (called datasets), issue TSO commands, submit batch jobs, and start other ISPF dialogs such as the Highway Accident System.

4.2   Logging On and Starting H.A.S.

IBM mainframes were traditionally accessed from IBM 3270 terminals. Ministry of Transportation Windows NT workstations are configured with a 3270 terminal emulation application called **Acadia.**

To log on:

- From the Windows NT Start menu, select: **Programs / Acadia / ITSD (BSCS) Login**
  (or, if you have a desktop icon for this function, double-click the icon.)

  A screen similar to the following should appear:

```
 99.172                              #                    System: HOSTA
 15:18                              ###                    Terminal: XTSAZ480
                                  #######                      Model: 2
                                 #########
                                 # # # # #
                          #      # # # # #     #
                 #    #     ###    #########    ###    #     #
                ###   ###    # #################### #    ###   ###
                # ##### #    ######################    # ##### #
                ######## Government of  British Columbia ########
                ### # ### # #### # ########### # #### # ### # ###
                # # # # # ## # #  ###    ###  # # ## # # # # # #
                ######### # ########  #   #  ######## # #########
                ### # ############### SPAN/BC ############## # ###
                ###      Shared Provincial Access Network    ###

 Pf Appl    Enter    Exit   Pf Appl     Enter   Exit   Pf Appl    Enter   Exit
 -------------------------|-------------------------|-------------------------
  1 NEWS    NEWS    ENTER  | 5 DB2PROD  DB2P    LOGOFF |
  2 IMS     IMS     /RCL   | 6 ICBC IMS IIMS    /RCL   | 10 IMS2    IMS2    /RCL
  3 TSO     LOGON   LOGOFF | 7 VM       VM      VMEXIT  | 11 FS VM   FS      VMEXIT
  4 IMSTEST IMSTEST /RCL   | 8 CICS     CICS    LOGOFF |
 ===>
```

- type: **LOGON** <userid>   (where <userid> is your TSO user ID, eg SC12345)
- press   **Enter.**

- the **TSO/E LOGON** screen should appear.
- enter your TSO password.
  If your password has expired you will be prompted to also enter a new password on this screen. After pressing Enter, you will be prompted to re-enter the new password.
- check that **SPFAUTO** appears in the Procedure field, like this:
  ```
  Procedure ===> SPFAUTO
  ```
  (use the Tab key to move from field to field.)
- press   **Enter.**

Various messages should appear. Whenever you see three stars on the screen, the system pauses until you press **Enter.**

- the **ISPF Primary Option Menu** should appear.

To Start the Highway Accident System:

type: **TSO %HAS**
then press   **Enter.**

Alternatively, you can go to the PDF option 6 screen, and just type **%HAS**. (PDF Option 6 is for issuing TSO commands, rather like a command window in Windows.)

Note that if your mainframe session is inactive for five minutes, you will automatically be logged off!

4.3   H.A.S. Start-up Alternatives

For users who know more about TSO and PDF, the following is the complete list of Highway Accident System startup commands:

Command	From	Function
%HAS	native TSO, or PDF option 6	starts the H.A.S. in native TSO
%HASPDF	native TSO	starts ISPF/PDF, set up so that the H.A.S. can be started from any COMMAND or OPTION line.
TSO %HAS	PDF Command> or Option> prompt	starts the H.A.S. in PDF
%HAS	PDF Option 6 command prompt	starts the H.A.S. in PDF

You can use PDF option 0.3 to assign the command 'TSO %HAS' to a function key, if you wish.

4.4   Logging Off the Mainframe

1. Select **Close Session** on the **File** menu of the **Acadia** window.
2. When the **Close Current Session** box appears, press **Enter** or click on **Terminate**.

Alternatively, you can do the following:

1. At the the **ISPF Primary Option Menu**, type **X** then press **Enter**
2. At the TSO READY prompt, type **LOGOFF** then press **Enter**
3. Close the Acadia terminal emulation application.

5   The H.A.S. Menu System (ISPF Dialog)

5.1   Introduction

Most of the system's functions are controlled through the menu system, but the user may require basic knowledge of the file manipulation and editing procedures of ISPF/PDF for a few functions.

The ISPF term for a screen of information and data input fields is **Panel**. The terms 'screen' and 'panel' are used interchangeably in this document. If the panel consists of a list of options to choose from, the panel may be called a 'menu'.

Most panels in the system have a field denoted by "=>", highlighted. This is called the Control Field. The contents of this field controls whether the user wants to return (exit) to the previous panel, continue on to the next panel, or make a choice about WHICH panel to bring up next.

There is often a *series* of panels for defining a single data-retrieval process. The information entered in the panels is not used by the system until the last panel of the series has been completed. Until then, the user may go back through the panels, using the X control field option (or PF3), checking and modifying entries in previous panels, then progress forward again.

A unique four character panel identifier is located at the top left of every H.A.S. panel. This identifier is included in the headings of related sections of this manual.

5.2   Controlling the Menu System

TAB/Back-TAB

- use these keys to move the cursor to the next/previous data entry field on a panel.

ENTER

- this key means: "Take the information I have entered, and use it", or: "Move forward"
- on simple panels (or menus), ENTER will cause the next panel to be displayed.
- on more complex panels, from which a number of functions may be performed, you may have to press ENTER once to register the last piece of information entered, then press ENTER again to move on to the next panel.

PF7/PF8

- Scroll UP/DOWN, on panels which allow scrolling to display more information than will fit on one screen.
- Most 3270 terminal emulation software will have PC keys PageUp and PageDown mapped to these functions.

PF3

- On an H.A.S. panel, PF3 is equivalent to entering X in the main option field, and pressing ENTER. Anything you have entered on the current panel is NOT saved, and you are returned to the previous panel.
- EXCEPTION: some H.A.S. panels invoke the ISPF Editor. When in the ISPF editor, PF3 means SAVE AND EXIT.

Other IBM 3270 Terminal Keys

The following keys are also useful. Where these keys are on your keyboard will be described in your terminal emulation software documentation:

NEW LINE

- this key moves the cursor to the next data entry field *on a following line*. (I.e fields to the right of the cursor will be skipped.)
- the NEW LINE key on your keyboard depends upon your terminal emulation software.

ERASE EOF

- clears a data entry field from the cursor to the right

RESET

- try this key if the 3270 terminal screen locks up

5.3 Main Menu

```
 MAIN              Highway Accident System  -  Main Menu
                   ----------------------    ---------

   Data Retrieval: 1.  Select Accident Data from the PDS Master.
                   2.  Use an Accident Data Subset.
                   3.  Select from Archive Accident Data. (Pre- 19870101 )

   User Utilities: 4.  Traffic Volumes, Average Accident Rates
                   5.  Select the Highway Classification Scheme   ( YR1987 )

     System Files: 6.  View Highway Network Definition Files
                   7.  View H.A.S. Parameter Files

 System Functions: U   Update
                   T   Utilities
                   H   Set High Level Indexes
                   P   Set Parameters
                   W   Set Weights for Severity-Weighted Accident Rates

                   X   Exit
          OPTION =>

   NOTE:  Throughout this system the  F3  key may be used to backup 1 screen.
```

Data Retrieval:
- options 1 and 2 are the two options most likely to be used by users of the H.A.S.
- see the **Data Retrieval** sections in this manual
- option 3 (archive data) has the same functionality as option 1, but accesses the "Archive" data - accidents which occurred before the shown date. This data is not available via option 1.

User Utilities:
- miscellaneous utilites available to H.A.S. users.
- The **Traffic Volume** and **Average Accident Rates** options are described in the **User Utilities** section of this manual.
- **Select the Highway Classification Scheme** - this allows you to select between the old 2-category scheme (YR1987) and the new, 6-category.scheme (YR2002), and any future schemes which may be developed.

System Files:
- users can view (browse) the mainframe copies of the HASLKI files, and the various HAS system parameter files.
- priviledged users (e.g. system maintenance people) can edit the files.
- See section **Highway Network and Parameter File Access Panels** below.

System Functions:
- options U, T, H and W are enabled only for system maintenance people.
- option P is available to all users, and is described in the following section.

To exit from the Highway Accident System ISPF Dialog, enter a Z or an X in the OPTION field, then press ENTER. Alternatively, press PF3.

5.4 Parameters

The first time the H.A.S. is run in a user's TSO account, two parameter panels will be displayed before the Main Menu appears. Subsequently, these panels can be reached using the P option on the Main Menu.

The Parameter panel is for setting parameters which control aspects of job submission, and characteristics of some batch jobs.

```
 PARM                 Highway Accident System - Parameters
                      ----------------------   ----------


   Update Parameters


           Police Code Checking:  NO          (YES or NO)
     Location/Landmark Checking:  NO          (YES or NO)

   Job Statement Information


              Job Name Prefix:  THAS        ('USERID' or 4 char. prefix)
                Charge Number:  151271
                      Address:  T&H.716COURTNEY
                  Destination:  R7
      Suppress JCL & Messages:  NO          (YES or NO - Data Retrieval only)

   High Level Indexes


            Enter a Y to modify:               (for development only)
```

POLICE CODE CHECKING

- ignore: affects the Update sub-system only.

LOCATION/LANDMARK CHECKING

- ignore: affects the Update sub-system only

JOB NAME PREFIX

- if 'USERID' is coded, the name of every job that is submitted will be your user ID followed by a single letter: U for an Update job, and R for an Data Retrieval job.
- if a four character prefix is coded, all your batch jobs will be named starting with those 4 characters.

CHARGE NUMBER

- this is the charge number which will go into the job statement of all batch jobs.

ADDRESS

- this goes on the job statement of batch jobs, and on the banner page of job listings.
- do NOT put in quotes - quotes are inserted in the job statement automatically.

DESTINATION

- batch job print destination:
    R7 - no printer, stays in the queue for viewing or printing with IOF

Check with your local system support personnel to find out what local printers are connected to the mainframe, and what their destination codes are.

SUPPRESS JCL & MESSAGES

- affects Data Retrieval jobs printed from the mainframe only
- if YES is coded, the Job Log, Messages, and JCL portions of the batch job listings are produced, but not printed when the rest of the job is printed. They can still be viewed with IOF.

5.5   *Highway Network and Parameter File Access Panels*

Following are the panels displayed by options 5 and 6 of the Main Menu. Users should not change these files, but these panels can be used to browse them.

```
EDFL                    Highway Accident System              ROW 1 TO 13 OF 13
                        ----------------------
                     Highway Network Definition Files


   B to Browse, ? for a description of the file.     PF3 to Exit
  -----------------------------------------------------------------------------
  >       CLASS.NAMES             Highway Classification Names and Codes
  >       COUNTER.LOCNS           Traffic Counter Locations
  >       HIGHWAY                 Highway numbers and names (LKI)
  >       LANDMARK                Landmark File (LKI)
  >       LMATCH                  Landmark Type / Location Type Match Table
  >       RCMP.DETACH             RCMP Detachment numbers and names (LKI)
  >       SEGCLASS                Highway Classification (S)
  >       SEGAREA                 Segment-Area information (S)
  >       SEGDTCH                 Segment-Police Detachment information (LKI)
  >       SEGMENT                 Segment numbers, descriptions & lengths (LKI)
  >       SHNFIL                  Re-organized Segment info, in search Seq order
  -----------------------------------------------------------------------------
```

```
  EDFL                    Highway Accident System              ROW 1 TO 6 OF 6
                          ----------------------
                       ------  Parameter Files  ------

    B to Browse, ? for a description of the file.     PF3 to Exit
  -----------------------------------------------------------------------------
  >       CRITICAL.RATES        .. for Accident-Prone Locations/Sections
  >       DEFAULTS(PRTYTIME)    Job Priority and Time
  >       DEFAULTS(DEF210)      Accident-Prone Locations Defaults
  >       DEFAULTS(DEF220)      Accident-Prone Sections Defaults
  >       DEFAULTS(COST)        Default Accident Type Costs
  >       DEFAULTS(TRAFFVOL)    Segment Traffic Volume Defaults
  -----------------------------------------------------------------------------
```

6   Data Retrieval - Concepts

6.1   Introduction

The Data Retrieval Sub-System allows the user to dynamically construct and run batch jobs to do analysis, produce reports and create subsets of accident data. Using a system of menus on the IBM mainframe, the user selects a portion of the highway network, specifies date, hour and other selection criteria, then selects one or more programs to be run on the data. Each program may take as its input the initially selected data, or accident subsets of any previous programs in the job or of previous jobs.

The output from the Highway Accident System is in the form of reports, and (increasingly) in the form of CSV text files. Both forms of output can be downloaded to the PC using the Windows-based HASutil program.

Note the following important features of this system:

- The PDS-Master is a set of accident data files organized to allow direct access to data down to the Segment and Node level. Only the requested segments of the highway network are read for each job.
- All accidents at a Node are collected together regardless of the segment number coded on the MV6020. This means that when searching along route A through a node which is a junction with route B, accidents which are at the node but coded as on route B will be included. It also allows for accidents at the intersection of two highways to be selected twice, if both highways are being analysed sequentially.
- Accidents may be selected from the highway network by Highway, Segment, Region, District, Area, Highway Classification, or using start and end points in a defined Search Sequence through the highway network. Further selection may be done by Landmark, Range Feature, or by data fields.
- Each subset created with this system has an associated description file, which provides a complete history of the subset: the names of the programs which created the file, when they were run, and what control parameters they used.

User-written SAS programs may be included in a Data Retrieval job, allowing custom reports and specialized subset creation.

Following are some of the Data Retrieval programs. The complete list, along with detailed descriptions is in section 9 of this document.

Data Selection	selects accident data from the PDS-Master files.
Accident-Prone Locations	searches for accident-prone intersections, railway crossings etc
Accident-Prone Sections	searches for accident-prone sections of highway.
Histogram	produces a histogram (with accident totals) showing fatal, injury and PDO accidents at each location.
Details Report	shows meanings of all data in each accident record (one accident per printed page).
Summary Report	shows meanings of key fields of accident records (one accident per printed line).
Rate Table	calculates average accident rates by traffic volume and highway classification
Specified Sections Analysis	analyses highway sections defined in a user-produced CSV file.
Accident Type Ratios	calculates average accident type ratios
Fatal/Injury/PDO counts	creates a comma-delimited, text (down-loadable) file containing the number of Fatal, Injury, PDO and total number of accidents at each location with accidents.

6.2   Definition of Terms

Refer to **Highway Network Definition** of this manual for the definition of terms such as SEGMENT, KMMARK, NODE, which are part of the Highway Network definition.

The following definitions are in alphabetical order. Capitalised terms refer to other definitions in this section.

ACCIDENT-PRONE LOCATION

- a highway location (identified by a segment number and a Kmmark) where the number of accidents, Accident Rate and/or Accident Severity Ratio meet specified criteria. For example, an Accident-Prone Location may defined as being a location with an accident rate greater than 1.0.
- a location may be expanded to include a specified radius either side of the location.
- see the description of the Accident-Prone Locations program for more details.
- "Accident-Prone" replaced "Hazardous" in the system terminology in May 1993.

ACCIDENT-PRONE SECTION

- a section of highway (e.g. of length 5 km) in which the number of accidents, Accident Rate and/or Accident Severity Ratio meet specified criteria. For example, an Accident-Prone Section may be defined as being a location with an accident rate greater than 1.0.
- see the description of the Accident-Prone Sections program for more details.

DATA PERIOD

- the date range from which the accident data was selected, as specified on the Data Selection panel (P200).
- this is included in the headings of most reports.

DATA SELECTION

- selection of a subset of the accidents on the PDS-MASTER.
- the first step of a Data Retrieval job, unless the INITIAL DATA SOURCE is a catalogued subset.
- the Data Selection Menu controls the Data Selection Program (THAS200).

DATA SOURCE

- the source of accident data for a PROCESS.
- may be the INITIAL DATA SOURCE, or an output subset of a previous process in the same Data Retrieval job.

DISCONTINUITY

- a point in a SEARCH PATH where the preceding segment is not physically connected to the following segment, or where the preceding and following segments are physically connected, but not measured in the same direction.

EXCLUDED

    - refers to accidents, or accident subsets, which were not included in a
      type of search.
    - e.g. accidents NOT in accident-prone locations, or NOT in accident-
      prone sections.

HAZARDOUS LOCATION

    - This is the original term for "Accident-Prone Location".

HAZARDOUS SECTION

    - This is the original term for "Accident-Prone Section".

INITIAL DATA SOURCE

    - A Data Retrieval job may start either by selecting a subset from the
      PDS-MASTER, or by using a previously catalogued SUBSET PAIR.
    - the term INITIAL DATA SOURCE is used to refer to this starting
      subset.

OBSOLETE LOCATION

    - An Obsolete Location is a location on a section of road which is no
      longer part of a Segment defined in file THASP.SEGMENT. For example,
      after a curve has been straightened, locations on the curved piece of
      road which is no longer in use, are OBSOLETE.
    - (Obsolete Locations are identified in the Location Code Conversion
      procedure.)

PDS-MASTER

    - a pair of Partitioned Data Sets, one containing a member for each
      SEGMENT, and the other containing a member for each NODE of the
      highway network.
    - each member contains all the accident records of that segment or node.

PROCESS

    - a function in the Data Retrieval sub-system which reads an accident
      SUBSET file and produces a report and/or accident subset(s).
    - the DATA SELECTION process (program THAS200) is a special case in that
      it reads the PDS-MASTER instead of a SUBSET. (Data Selection is not
      always included in lists of processes in this document.)

REFERENCE GROUP (of accidents)

    - a reference group of accidents is the set of accidents which occurred
      on highways of a particular Highway Classification Set, and, for
      locations, at a particular set of Landmark Types.

SEARCH PATH

    - a list of segment names, node names and DISCONTINUITY marks
      indicating the path taken through the highway network while searching
      for accident records for inclusion in the related accident data SUBSET.
    - elements on the SEARCH PATH will always appear in the same order as in
      file THASP.SHNFIL (which is a re-organized version of the HASLKI
      Segment table).

```
SELECTED
```

> - this term is used to refer to accidents selected from the PDS-MASTER
>   by the DATA SELECTION program, and also to accidents included in search
>   objects - e.g. IN Accident-Prone locations, or IN Accident-Prone
>   sections.

```
SUBSET (PAIR)
```

> - A Subset Pair consists of a sequential accident subset file and its
>   related description file.
> - since subsets created by the Data Retrieval sub-system are always
>   subset PAIRS, the word 'pair' is sometimes omitted.
> - see the following section in this manual for more details.

6.3   Subset Pairs

An important part of the heading of any kind of Accident Data report is the description of the subset of the Accident data base which is being listed, or upon which statistics are based. In the Data Retrieval sub-system, it is possible that an input subset is the result of a number of 'subsetting' or data selection processes.

If a program's output is to be properly labelled, the program must have access to a history of the accident file it is reading.

In order to solve this problem, every subset file created by the Data Retrieval sub-system, temporary or permanent, has associated with it a description file. The description file is a free form, 80 byte record file. Every process which reads the associated subset file prefaces its reports with the description file.

Every process which creates a subset file copies the input description file into the output description file, and appends information about the current process. The information appended includes program name, version, date and control parameters. Information from different programs is separated by a double line (a line of equal signs).

The Data Selection program (THAS200) also writes the "Search Path" to the description file. This is a list of all Segment and Nodes searched for accidents, how many accidents were selected from each, and how many of those accidents are at obsolete locations. Discontinuities are indicated by '----'.

If the user accumulates a number of subset files, the description files can be browsed in TSO/ISPF (option 1) to determine what the subsets are, and whether they are still needed.

A subset file and its associated description file is referred to as a Subset Pair.

Catalogued subset pairs are named as follows:

```
        THASP.SUBSET.name.DATA
        THASP.SUBSET.name.DESC
```

where 'name' is an up to 8 character name for the subset, e.g. TRUCKS85.

6.4   Segment Ordering

In the H.A.S. Data Retrieval sub-system, the segments of the highway network are ordered in Highway and Segment-Search-Sequence order. The Segment-Search-Sequence is a field in the HASLKI Segment table. It indicates the order, within the highway, in which the segments are to be searched.

Within a highway, segments are ordered in the direction of measurement along the highway, ignoring opposite segments. After the end of the highway is reached, any opposite segments (1-way segments driven and measured in the opposite direction) come next, in order back down the highway.

Note that lettered highways follow the unlettered highway of the same number (i.e. Highway 1A follows Highway 1).

To check the highway and segment order in effect, browse file THASP.SHNFIL on the mainframe, using option 6 of the H.A.S. Main menu, or TSO/ISPF option 1. The first three fields in this file are Highway, SearchSequence, Segment, and it is sorted in that order.

Following is an example. (The segment numbers are fictitious - they were chosen to illustrate that the order does NOT depend upon the segment numbers.)

```
   Highway        Segment      Segment-Search-Sequence

      1            0123            1
      1            0023            2     \          From 0023
      1            8048            3     |
      1            0001            4     |
     1A            0347            1      >    selected segments
     1A            0002            2     |
     1A            0842            3     |
      2            1111            1     /           To 1111
      2            0011            2
```

This example shows which segments would be selected if segments

        "FROM 0023 TO 1111"

were requested, on panel FRTO (section 7.3.3) or in a Section Definitions File (section 9.11.5)

6.5   Critical Accident Rates

6.5.1   Summary

Critical Accident Rates are used (along with simple accident counts and Accident Severity Ratios) as thresholds for identifying Accident-Prone Sections and Locations.

There are four methods of specifying Critical Accident rates to the Accident-Prone Locations and Sections programs:

a)   **Single Rate**: a single rate is determined by the user, and specified as the Accident-Prone threshold for all the data for one run of the program.

b)   **Lookup method**: the user determines critical rates for various Highway Classifications and traffic volume ranges, and codes these numbers in the Critical Rate Table. (File THASP.CRITICAL.RATES). The user may use the Rate Table program to get Average Accident Rates from which the Critical Accident Rates are manually calculated. (Critical Numbers of accidents, and Critical ASRs are also coded for lookup in the Critical Rate Table.)

The Accident-Prone Locations & Sections programs look up the critical accident rate depending upon the Highway Classification and the traffic volume of the location or section under consideration.

c)   **Calculated method - Traditional**: Average accident rates for various Reference Groups of accidents are calculated with the Rate Table Program, and are manually copied into Average Accident Rate Files (See section 10.2). These rates are NOT broken down by traffic volume. A Reference Group is defined with a Highway Classification Set, and, for locations, one or more Landmark Types.

The Accident-Prone Locations & Sections programs look up the average accident rate by Highway Classification and (for locations) Landmark Type. A formula is applied for each candidate Accident-Prone Section or Location to calculate a Critical Rate, using the traffic volume at that Section or Location.

d)   **Calculated method - Modified**: this works just like the Traditional Calculated method, except that in every situation where accidents are counted, instead of adding '1' for each accident, the value W_r is added, where W_r is the Road Causal Factor - the degree to which the accident was attributable to highway design. The critical rates calculated in this case are called **Road-Weighted** critical rates.

The Road Causal Factor (or Weight) is calculated for each accident by program THAS140, in the H.A.S. Update job U30. See the description of program THAS140 in the H.A.S. System Manual for details.

6.5.2 Determining Average Accident Rates

Average Accident Rate files must be populated with average accident rates, so that the Accident-Prone Locations and Sections programs can calculate Calculated Critical Accident Rates.

The Rate Table Program can be used to calculate the Average Accident Rates.
Traditional, Road-Weighted and Severity-Weighted rates can be calculated at once.
The rates must then be copied manually from the Rate Table report to the files.

1. Use the Accident-Prone Locations program (THAS210) to separate accidents at the Locations from those not at Locations: set the critical number of accidents to 1, and specify all the Landmark Types of the location reference groups. (Typically, this will be the three types of intersections: Signalized, Stop/Yield and Uncontrolled.)

2. Calculate all the Section rates with one run of the Rate Table program: define a column of the Rate Table for each Section Reference Group (= Highway Classification Set), and define just one row - one inclusive traffic volume range. Use the SECTION accident subset created in step 1, and run the program in Section mode.

3. Calculate the LOCATION rates with one run of the Rate Table for each of the Location Reference Groups: define the columns and rows as for the Sections, then specify the Landmark Type(s) for one reference group for each run of the program. Use the LOCATION accident subset created in step 1, and run the program in Location mode.

Average Accident Rate files may be created and edited wherever they are selected (on panel PARF), or via one of the User Utilities options on the main panel. See section 10.2 (Edit or Create Average Accident Rate Files) for details.

6.5.3 Critical Rate Formula

In the calculated methods, a **Critical Rate** (CR), for a location or section is calculated as follows:

$$CR = X_R + k\sqrt{\frac{X_R}{V}} + \frac{0.5}{V}$$

where: X_R is either the standard, road-weighted or severity-weighted Average Accident Rate for the reference group - depending upon which critical rate is being calculated.

                        V is the traffic exposure: million vehicles for locations, million vehicle-kilometres for sections.

                        k is a constant looked up on the following table from a user-specified 'Level of Significance':

Level of Significance	K
0.01%	3.719
0.05%	3.290
0.10%	3.090
0.50%	2.576
1.00%	2.326
5.00%	1.645

This calculation is done in PL/I routines THASCCR, and THASCR6.

6.6   The Countermeasure Method

6.6.1   Description

The Countermeasure Method is a method of identifying Accident-Prone Locations and Sections. It is so named because it may identify sections or locations where road-design measures can be taken to counter a type of accident which is occurring disproportionately.

The object of the Countermeasure Method is to identify sections and locations which have a proportion of one type of accident which is larger than the average for the highway class or location type. These sections and locations may not be identified by the other methods, but are likely to be candidates for cost-effective treatment.

(As elsewhere in the H.A.S. the general term *Location* is used, but the type of location studied is usually *intersections*.)

The following accident types are analysed:

```
1.   right angle                        8.   off road
2.   left turn opposing                 9.   fixed object
3.   straight ahead rear end           10.   parked
4.   left turn rear end                 11.   general rear end
5.   right turn                         12.   pedestrian
6.   sideswipe                          13.   animal
7.   head on
```

(These accident type descriptions are stored in file THASP.TABLE(ACCTYPES))

For any location or section, and for each accident type, a ratio can be calculated of the number of accidents of that type to the total number of accidents at the location or section:

$$p_i = \frac{x_i}{n}$$

where:
   p_i is the accident type ratio for accident type i

   x_i is the number of accidents of type i at the location or section

   n is the total number of accidents at the location or section

For each of the Accident Reference Groups, and for each of the accident types, average accident type ratios are calculated. Accident type ratios at individual locations or sections can then be compared to the averages for the province.

Program THAS270, selectable from the H.A.S. Data Retrieval Process Selection menu, calculates the average accident type ratios, and can be instructed to automatically create a pair of average accident type ratio files: *userid*.ACCTYPE.RATIOS.LOCATION.*name* and *userid*.ACCTYPE.RATIOS.SECTION.*name,* where *name* is a user-given name.

Thus the ratio files are personal: each user, using program THAS270, can create one or more pairs of ratio files to suit his/her requirements. When running the Accident-Prone Locations or Sections programs, the user then selects the desired ratio file.

6.6.2 Average Accident Type Ratio Calculation

$$\overline{p}_{ij} = \frac{\displaystyle\sum_{k=1}^{m} x_{ijk}}{\displaystyle\sum_{k=1}^{m} n_{ijk}}$$

where

p_{ij} is the average accident type ratio of type *i* for reference group *j*.

x_{ijk} is the number of accidents of type *i* at location *k* in reference group *j*.

n_{ijk} is the total number of accidents at location *k* in reference group *j*.

m   is the total number of locations in reference group *j*.

To assess whether a particular section or location has over-representation of a particular accident type we calculate the chi square statistic for one accident type as:

$$CHI^2 = \frac{(x - \overline{p}n)^2}{\overline{p}n} + \frac{((n - x) - n(1 - \overline{p}))^2}{n(1 - \overline{p})}$$

which simplifies to:

$$CHI^2 = \frac{(x - \overline{p}n)^2}{(\overline{p}n)(1 - \overline{p})}$$

The value of CHI^2 is compared to the value CHI^2_a obtained from the following table, using a user-specified level of confidence:

	Level of Significance	CHI^2_a
1	0.5%	7.879
2	1.0%	6.635
3	2.5%	5.024
4	5.0%	3.841
5	10.0%	2.706

If *p* is greater than p, and CHI^2 is greater than CHI^2_a, then the location or section is considered accident prone, for the accident type.

The CHI-squared comparison cuases an over-representation of an accident type to be taken more seriously for larger sample sizes.

6.6.3 Determining Accident Types

A number of accident record fields must be examined to determine to which accident classification(s) an accident belongs. The types are defined below in terms of the H.A.S. PL/I accident record variables.

Note that an accident may not fit into any of these classifications, and may fit into more than 1 classification.

PL/I logic symbols are used: & (and), | (or)

```
 1.   Right Angle
         DIAGRAM = 5

 2.   Left Turn Opposing
         DIAGRAM = 11 or 13

 3.   Straight Ahead Rear End
         DIAGRAM = 1  &  PREACTN1 = 1  &  PREACTN2 = 1

 4.   Left Turn Rear End
         (DIAGRAM = 1 | DIAGRAM = 12)  &  (PREACTN1 = 3 | PREACTN2 = 3)

            - this will include left turn side-swipes.

 5.   Right Turn
         DIAGRAM = 7 or 9

 6.   Sideswipe
         DIAGRAM = 3 or 16

 7.   Head On
         DIAGRAM = 2

 8.   Off Road
         DIAGRAM = 14 or 15

 9.   Fixed Object
         TYPE2ND1, TYPE3RD1 or TYPE3RD2 in (25,32,20,21,26,35,28,36,24,33)

10.   Parked
         PREACTN1 = 11 | PREACTN2 = 11

11.   General Rear End
         DIAGRAM = 1 & (not type 3 or 4)

12.   Pedestrian
         TYPE2ND1 = 3  &  PEDNACTN not in (0, 98, 99)

            - omitting the requirement that PEDNACTN (MV6020 field 30) be coded
              is a possibility, but it is assumed that this field would be
              coded if it was a pedestrian accident.

13.   Animal
         TYPE2ND1 = 5
```

This logic is coded in PL/I routine THASSAT.

7   Data Retrieval Job Creation

7.1   Overview

Using ISPF panels (menus and data entry screens), the user specifies the Initial Data Source, and the processes which are to be included in one batch job. The system automatically extracts JCL (Job Control Language) pre-written for each process, alters the input and output DD statements to suit the situation, and builds the JCL file for the job.

The initial data source may either be the PDS-Master, a Subset Pair created by a previous job, or archive (pre-1987) data. If the PDS-Master or Archive is selected, the user specifies the DATA SELECTION information: the portion of the highway network, the dates, months, hours, data codes etc.

Each process is selected from a menu showing all the Data Retrieval process options. When a process is selected, sub-panels prompt for the parameters required for that process. The user also specifies the data source for that process, which may be the Initial Data Source, or may be any of the subsets (temporary of permanent) created by previous processes specified in this job. For processes which can create subsets, the user indicates whether or not output subsets are required for input into subsequent processes.

7.2   Initial Data Source Selection (From the Main Menu)

The "initial data source" selection is done using the first three options of the HAS main menu.

```
MAIN                Highway Accident System  -  Main Menu
                    -----------------------     ---------


  Data Retrieval: 1.  Select Accident Data from the PDS Master.
                  2.  Use an Accident Data Subset.
                  3.  Select from Archive Accident Data. (Pre- 19870101 )
```

- Options 1 and 3 will bring up the Data Selection Panel (P200).
- Option 2 will bring up the Input Accident Subset Specification Panel (ASUB).

Archive data:

- Data quality has not been as carefully maintained with the Archive accident records, so support for the same level of system performance as with the Current data is not guaranteed!
- As with the Current data, all Location codes have been converted to the latest Landmark Kilometre Inventory.

7.3   P200: Data Selection (from the PDS-Master)

When **Select Data from the PDS Master** is selected as an initial data source, the following panel is displayed. This panel, and its sub-panels are used to specify the initial query on the H.A.S. accident database. Note that the query is not actually performed at this stage, it is merely *specified*. The actual query happens when the batch job is started.

```
 P200              Highway Accident System - Data Selection
                   ----------------------  --------------    Press PF1 for Help
 Data available:  19870101 - 20031231  plus incomplete data to  20040206


 Recall saved data selection specification  =>
 (? for a list, X for main menu)


 START DATE:  20030101   (yyyymmdd)     MONTH RANGE:    TO
  END  DATE:  20031231   (yyyymmdd)     HOUR  RANGE:    TO


 From-To Hwy/Segment/Km  >               19A
 Section Definitions file>
 Highway Classification  >
 Region, District, Area  >

 Select by Data Fields   >
 Select by Landmarks     >


 Select Fatal,Injury,PDO : FI           (enter letters F, I and/or P)
 Node Selection          : 1            (M - Multiple, 1 - once only, 0 - none)
 Obsolete Locations      : YES          (YES, NO or ONLY)

 Save this data selection specification with name:
```

There are three types of data entry fields on this panel:

```
        =>  (Control Field) enter:
              the name of a saved data selection specification,
              ?  - to get a selection list of saved specs,
              X  - to return to the previous panel.

        :   enter data

        >   enter:
              S - to specify data selection criteria on a sub-panel,
              D - to clear the selection criteria of a sub-panel.
```

If specifications have been made on any of the sub-panels, all or part of the specification is displayed on the right side of the P200 panel, on the same line as the prompt for that sub-panel.

The 'From-To', 'Highway Classification', and 'Region,District,Area' sub-panels each allow a specification of a subset of the highway network. If more than one of these are used, it is the *intersection* of the subsets which is ultimately selected. For example if Highway 1 is specified on the 'From-To' sub-panel, and District 6 is specified on the 'Region,District,Area' sub-panel, accidents will be selected from all sections of Highway 1 which are in District 6.

Likwise when selecting by Landmarks and Data Fields, it is the *intersection* of the specified subsets which is produced. (I.e. "AND" logic is used between the various accident selection methods.)

7.3.1 Saved Data Selection Specifications

The contents of the Data Selection panel and its sub-panels are called a Data Selection Specification. A Data Selection Specification can be named and saved so that it can be recalled in another session. A Data Selection Specification name may be up to 8 characters in length, must start with a letter of the alphabet, and may not be 'X'. (X is used as a command meaning 'return to the previous panel.')

If the name of a saved Data Selection Specification is entered in the Control Field (top right of the menu), the current contents of the panel will be replaced with the named Specification.

To save a Specification, enter a name in the last field (bottom right) of the panel, and press ENTER. If a saved Data Selection Specification with the name already exists, it will be replaced.

The Data Selection Specifications are stored in PDS THASP.DATASEL - one per member.

In addition to user-saved Specifications, the following Specifications are always available:

        BLANK   - (type out 'BLANK') clears the specification.
        CURRENT   - the last specification which was used.
        PREV   - the 2nd to last specification used.

CURRENT and PREV are stored separately for each user, in files called <userid>.DATASEL.CURRENT and <userid>.DATASEL.PREV. They do not appear in the list of Specifications obtained with '?'.

To select from a list of all saved Data Selection Specifications, enter **?** in the Control Field, and press ENTER. The following panel will appear:

```
MSEL - MEMBER LIST -- THASP.DATASEL----------------------- ROW 00001 OF 00007
COMMAND ===>                                               SCROLL ===> PAGE
    S-Select, B-Browse, D-Delete, E-Edit, R-Rename, PF3-Cancel, PF1-Help
------------------------------------------------------------------------
   NAME              VV.MM  CREATED     CHANGED     SIZE  INIT   MOD    ID
  BRIDGE
  SHORTSEG
  TESTP
  TEST1
  **END**
```

Select a name by entering an S at the left. Similarly, a D will delete the Data Selection Specification, and an R will rename it. For a Rename, press TAB after entering the R, then enter the new name to the right of the old one.
Browsing and Editing the specifications are possible, but not recommended. The specification files are not designed to be easy on the human eye!.

7.3.2 Start and End Dates

Either of these fields may be left blank. The default dates are the oldest and newest accident dates on the PDS-Master.

A date should be entered in 8-digit, year, month, day form:
yyyymmdd, e.g. 19930125 for 1993 January 25.

Only accidents in the specified date range will be selected.

7.3.2.1 Month and Hour Ranges

Accident selection may be limited to specific months and hours. Otherwise, these fields may be left blank.

Months should be entered in the range 01 to 12.

Hours should be entered in the range 00 to 23.

The first Month or Hour may be a larger number than the second. This allows the selection of winter months, and night hours. For example, to select accidents of December and January, two hours either side of midnight, code months 12 to 01, and hours 22 to 01.

To get accidents in daytime hours in August and September, code months 08 to 09, and hours 06 to 21. To get accidents at all hours in July, August and September, code months 07 to 09, and leave the Hour Range fields blank.

When specified, the months and hours must be two digit numbers (i.e. include the leading zero).

7.3.3 FRTO: From-To Specifications

7.3.3.1 Introduction

Enter an S after the 'From-To Hwy/Segment/Km >' prompt (on panel P200) to bring up a sub-panel for specifying sections of the Highway network by Highway and Segment:

```
FRTO                                                           Row 1 of 100
          Highway Accident System - Highway/Segment/KmMark Specification
          -----------------------   -----------------------------------

  =>           Press PF1 for help, X or PF3 to cancel, blank to continue.

          FROM                      TO                 Include Lettered?  Include
HIGHWAY SEGMENT KMMARK   HIGHWAY SEGMENT KMMARK   (YES, NO or ONLY)  Opposing?
---------------------   ---------------------   -----------------  ---------
   97    1115   125.4                   127.1
   17                                                    YES
          0355
          0330    1.5                    12.0
          2353              2347                                        YES


```

Detailed or general extractions from the network may be specified. Selections specified in terms of entire highways may be made using the HIGHWAY fields, individual segments may be specified using the SEGMENT fields, and portions of segments may be specified using the KMMARK fields.

Each FROM-TO specification allows the definition of a start and an end point in the ordered list of all the highway segments in the province. (Segment ordering is described in section 6.2.3.)

Up to 100 FROM-TO specifications may be entered. Use the scroll up and down keys (PF7 & PF8) if more than one screen-full is needed.

The FROM-TO specification rules are designed so that no more information than is necessary need be entered to define what the user wants. As a result, there are rules defining the assumptions made when fields are left blank. The intent was to make these rules quite intuitive. The coding rules are defined below; however, it may be advisable to skip straight to the examples to get an initial idea of how things work.

Errors:
>   Coding errors, inconsistencies or overlaps unfortunately are not caught at the data entry stage.
>   These errors will cause warnings or aborts in the Data Selection program (THAS200) when the
>   Data Retrieval job executes.

7.3.3.2 Coding and Interpretation Rules

General Rules:

- if ALL is coded in the first FROM Highway field, and all other fields are left blank, then all segments of the highway network will be selected. (The first INCLUDE LETTERED field may be used to exclude lettered or unlettered highways.)
- if the Segment is entered, the Highway need not be entered, since the highway is implied by the Segment.
- if both the Segment and Highway are entered, the Data Selection program (THAS200) will check that the segment is in fact in the specified highway.
- if more than one FROM-TO specification is entered, they must not cause duplicate selection of a segment. (See comment on Errors, at the end of this section.)
- if the KMMARK field is entered, the Segment field must also be entered.
- if more than one FROM-TO specification is entered they do not need to be in any particular order.
- blank FROM-TO specifications may occur before non-blank ones.

FROM Rules:

- if the KMMARK is omitted, the beginning of the Highway or Segment specified is assumed.
- if the Segment is entered but the KMMARK is omitted, the FROM KMMARK will be 0. This will cause the inclusion of the Begin Node of the segment (if the Node Selection field on the main data selection panel is not 0).
- to exclude the Begin Node of a segment, code 0.1 as the FROM KMMARK.
- entering the Highway and leaving the Segment and KMMARK blank is equivalent to entering the Highway and the first Segment of the highway.

TO Rules:

- if the TO specification is left blank, the end point is assumed to be the end of whatever is specified in the FROM specification, e.g. the end of the Highway (if only the FROM Highway is entered), or the end of the Segment (if the FROM Segment is entered).
- if the TO Segment is entered but the KMMARK is omitted, the TO KMMARK is assumed to be the Segment length. This will cause the inclusion of the End Node of the segment (if the Node Selection field on the main data selection panel is not 0).

INCLUDE LETTERED Rules:

- if this field is left blank, YES is assumed.
- YES   implies the inclusion of lettered highways in the FROM-TO range of highways (e.g. FROM Highway 1 TO Highway 3 will include highways 1, 1A, 1B,..., 2, 2A, 2B,..., 3, 3A, 3B,...)
    WARNING: this means that if you want just one unlettered highway, or a range of unlettered highways, NO must be coded (because blank means YES).
- NO   no segments of lettered highways will be included.
- ONLY   lettered highways will be included, but unlettered highways will not be included.

- If no highways are specified, but a segment range is specified, then the INCLUDE LETTERED specification will be applied to each segment in the sequence. (This is why the default value is YES - so that by default it will not interfere with segment-specific specifications.)

INCLUDE OPPOSING Rules
- see the next section.

7.3.3.3 INCLUDE OPPOSING Feature

The INCLUDE OPPOSING field on the FRTO panel allows single-direction segments opposite any of the segments specified in the From-To fields to be automatically included for accident selection.

- code YES to select this option.
- otherwise code NO or leave the field blank.
- (Y and N are equivalent to YES and NO)

Divided or 4-lane highways are likely to have a separate segment defined for each side of the highway, measured in the direction of travel. Within a highway, segments are ordered in the same order that you would drive on them if you drove along the highway in the primary direction of measurement. Any opposite-direction segments occur after that, in the order you would encounter them if you drove back down the highway.

Consider the following highway X:

```
                        <-- F          <-- E
|--------------|===========|==========|---------------|
     A -->           B -->        C -->         D -->
```
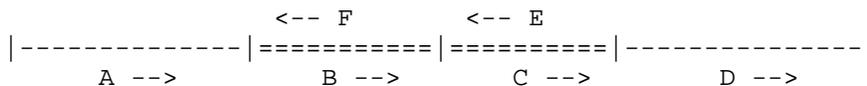
Segments A and D are 2-direction segments.
The others are 1-direction segments.
F and B are "Opposing Segments", as are C and E.

The six segments A to F would be ordered in the HAS as: A B C D E F.
If you asked for the whole highway, you would get data from those segments, in that order.

You could specify the entire highway X in one of the following three ways:
- From Highway = X, INCLUDE LETTERED = NO
- From Segment = A, To Segment = F
- From Segment = A, To Segment = D, INCLUDE OPPOSING = YES.

Now suppose you wanted just segments A, B and F. Without the 'Include Opposing" feature, you would have to code two From-To specifications: 1: Segment A to Segment B, and 2: Segment F. Using the "Include Opposing" field you can do it on one line, as follows:
- From Segment = A, To Segment = B, INCLUDE OPPOSING = YES

Kms may also be used with this feature.   A km of 0.0 is translated to the length of the opposing segment. A km >= the primary segment length is translated to km 0.0 of the opposing segment. A mid-segment km is translated by subtracting it from the primary segment length. This means that if the opposing segment is a different length than the primary segment, the point on the opposing segment may not be exactly opposite the point on the primary segment.

If you wanted Segment A, and just up to Km 9 on Segment B, and from that point back to the beginning of Segment F, you would code:
- From Segment = A, To Segment = B, to KMmark = 9.0, INCLUDE OPPOSING = YES

The starting point on Segment F would be calculated as the length of Segment B minus 9.

If you wanted the data of segments B and F, you could code either one, as the From Segment, and set INCLUDE OPPOSING = YES. In the output accident subset produced, the data of the explicitly specified segment will come first, followed by data of the opposing segment.

Coding INCLUDE OPPOSING = YES in any of the following situations is illegal:

- if Highway number(s) and no segments are coded - because specifying a highway number already includes segments in both directions on that highway.
- if a segment range is specified which already includes one or more opposing segments, e.g. if you coded From Segment = A, To Segment = E, INCLUDE OPPOSING = YES.

7.3.3.4 FROM-TO Examples
(See the previous page for examples using the INCLUDE OPPOSING field.)

```
            FROM                            TO              Include Lettered?
    HIGHWAY SEGMENT KMMARK       HIGHWAY SEGMENT KMMARK      (YES, NO or ONLY)
 1.  ...   0920    5.0            ...   0920    10.0             ....
 2.  1     0925    ....           ...   0950    ....             ....
 3.  ...   0925    ....           ...   0950    ....             ....
 4.  3     ....    ....           6     ....    ....             NO
 5.  97A   ....    ....           ...   ....    ....             ....
 6.  3     ....    ....           ...   ....    ....             ....
 7.  3     ....    ....           ...   ....    ....             NO
 8.  3     ....    ....           3     ....    ....             NO
 9.  1     ....    ....           2     ....    ....             YES
10.  1     ....    ....           2     ....    ....             NO
11.  97    1110    ....           97    ....    ....             YES
12.  97    1110    ....           97    1125    ....             YES
13.  97    ....    ....           97A   1122    ....             YES
14.  97    ....    ....           97A   1122    ....             NO
```

Explanations:

```
 1.  - kilometre 5.0 through to kilometre 10.0 (inclusive) on segment 0920.

 2.  - all of segments 0925, 0935 and 0950.  (These are 3 physically
       consecutive segments of Highway 1.)

 3.  - same as 2., except that it will not be verified that segment 0925 is
       in highway 1.

 4.  - all segments in highways 3, 4, 5 and 6.

 5.  - all segments in highway 97A

 6.  - all segments in highway 3, 3A, 3B, ...

 7.  - all segments in highway 3.

 8.  - same as example 7.

 9.  - all segments in highways 1, 1A, 1B,..., 2, 2A, 2B,...

10.  - all segments in highways 1 and 2.

11.  - segments in highway 97 starting at segment 1110, plus all segments
       in all lettered highways 97.  (97A, 97B, ...)

12.  - segments 1110 up to 1125 in highway 97.  No lettered 97 highway
       segments will be included because the specific TO segment prevents
       generalization to lettered highways beyond that segment in the
       ordered list of segments.

13.  - all of highway 97 plus segment 1122 in 97A.  (1122 is the first
       segment in 97A.)

14.  - all segments of highway 97.  No 97A segments are included because
       the INCLUDE LETTERED field is NO.
```

7.3.4   SDEF: Section Definitions File

Enter an S after the 'Section Definitions file >' prompt to bring up a sub-panel for specifying the name of a Section Definitions CSV file. This option was designed primarily to make it convenient to select the data for input into the **Specified Section Analysis** program (THAS225). The same Section Definitions CSV file may be specified here and in the panel for that program. This option may be used instead of using the **From-To Hwy/Segment/Km** panel, if you find it more convenient. Note, however, that you cannot select data by Highway using a Section Definitions file.

```
  SDEF       Highway Accident System - Section Definitions File
             ----------------------   -----------------------

   Section Definitions File > SDF4       (.CSV extension assumed)

      - the file must be a CSV (Comma Separated Values) file.
      - it may be the same file used for the Specified Section Analysis program.
      - the first record must contain column headings of Seg1 and Km1,
        and, optionally, Seg2 and Km2.
      - other columns (eg Dates) will be ignored by the data selection program.
      - your userid is the assumed file name prefix (as is the case when
        you upload a CSV file using the HASutil program).

   The sections may overlap > Y        (Y or N)

     Y: - the sections may overlap.  The Union of all the sections defined
          in the file will be used.
        - accidents will be extracted in the H.A.S. search sequence order.
     N: - if any sections overlap, the data selection program will ABORT.
        - accidents will be extracted in the order of the specified sections.


                   Press Enter to continue, PF3 to Cancel
```

Dates:
   If the Section Definitions file contains Date fields, they are **ignored** by the Data Selection program. You must make sure that the date range you specify on the Data Selection panel (P200) covers the entire date range of all the defined sections. (The Specified Sections Analysis program will ignore any accidents outside the physical and date range of the defined sections.)

Intersection of Accident Sets:
   It is important to note that if any From-To, Area or Highway Class data selection specifications are also made, it is the *intersection* of the specifications which will be used. E.g. if you specify a Section Definitions file, specify District 6 on the district panel, and specify Highway 1 on the From-To panel, the accidents selected will be those which are in the defined sections, in district 6 AND on Highway 1. If none of the defined sections are on highway 1, or none are in district 6, *no accidents will be selected.*

Section Overlaps:
   If overlaps are disallowed (with an **N** in the overlap option field), the Data Selection program treats the section definitions just as if they were specified on the From-To panel: accidents are extracted in the specified order, and the sections specified must not overlap. If overlaps *are* allowed (with a **Y** in the overlap option field), the **union** of all all the sections is determined, and the accidents are extracted in Highway and Segment-Search-Sequence order.

   Note that a node may be included in multiple sections without it being considered an overlap.

See the **Specified Section Analysis** section for information on preparing a Section Definitions File.

7.3.5 CLAS: Highway Classification

Enter an S after the 'Highway Classification >' prompt to bring up a sub-panel for specifying sections of the Highway network by Highway Classification:

```
                                                              ROW 1 TO 2 OF  2
   CLAS
             Highway Accident System - Highway Classification Selection
             ----------------------   -------------------------------

   =>          Enter HELP for instructions (PF1), X to to cancel (PF3),
               or    C    for a full list of characteristic codes.

      Enter the one-letter code of each desired characteristic:

   CATEGORY                 CHARACTERISTICS

   Location     > U         U-Urban, R-Rural, X-U/R (for unnumbered routes
   Class        > EF        C-Conventional, E-Expressway, F-Freeway, N-unNumber ...
   -----------
```

On the sample panel above, Urban Expressways and Freeways have been specified.

When the Data Retrieval job runs, the data selection program uses file THASP.SEGCLASS to determine which sections of highway are of the specified classification.

The Categories, Characteristic Codes and Characteristic Names shown on this panel come from file THASP.CLASS.NAMES, and will change dynamically if the THASP.CLASS.NAMES file is changed.

See section 2.4 for a full description of Highway Classification.

7.3.6 DIST: Highway Region, District & Area

Enter an S after the 'Region, District, Area >' prompt to bring up a sub-panel for specifying sections of the Highway network by administratative areas:

```
 DIST     Highway Accident System   Region, District and Area Selection
          ----------------------    ----------------------------------

    =>                              Options: ALL, An, Dn, Rn, CLEAR (F1 for help)

 R1 SOUTH COAST           R2 SOUTHERN INTERIOR        R3 NORTHERN

 D1 Lower Mainland        D3 Rocky Mountain           D8 Peace
  >    4 Howe Sound        >   11 East Kootenay        >    21 South Peace
  >    5 Sunshine Coast    >   12 Selkirk              >    22 North Peace
  >    6 Lower Mainland    D4 West Kootenay
  >    7 Fraser Valley     >    9 Kootenay Boundary    D9 Fort George
                           >   10 Central Kootenay     >    19 Fort George
 D2 Vancouver Island      D5 Okanagan-Shuswap         >    20 Robson
  >    1 South VI          >    8 South Okanagan
  >    2 Central VI        >   13 Okanagan-Shuswap    D10 Bulkley-Stikine
  >    3 North VI          D6 Thompson-Nicola          >    24 Lakes
                           >   14 Nicola               >    25 Bulkley-Nass
                           >   15 Thompson             >    28 Stikine
    S to Select           D7 Cariboo
                           >   16 South Cariboo       D11 Skeena
                           >   17 Central Cariboo      >    26 Skeena
                           >   18 North Cariboo        >    27 Queen Charlotte
```

To select individual Contract Management Areas, tab to the desired area, and enter an S for Select.

Alternately, the following commands may be entered at the command field prompt

```
   => ALL   - select all Areas      (this fills with S's)
      CLEAR - unselect all          (erases all S's)
      n     - select one Area
      An    - select one Area
      Dn    - select one District   (e.g. D7 to get all areas in district 7)
      Rn    - select on Region      (puts S's on all Areas of that Region)
```

Multiple commands may be entered, separated by spaces. For example:

```
   => R1 D11 16 A17
```

... will select all of Region 1, plus District 11, plus areas 16 and 17.

To proceed, saving the selections, leave the command field blank and press Enter.

To cancel all changes and return to the Data Selection panel, put an X in the command field and press Enter, or just press PF3.

7.3.7 FSEL: Data Field Selection

Enter an S after the 'Select by Data Field >' prompt on panel P200 to bring up this panel. This panel is also reached from panel P203, for the "Select by Data Fields" process.

Note that when selecting from the PDS-Master (i.e. from panel P200) there is some duplicated functionality between panel P200 and this panel: e.g. you can specify a date range on panel P200, and on FSEL via field ACCDATE. In these cases, it is more efficent, in terms of computer time and your time, to do the selection on or from panel P200.

```
 FSEL                                                     ROW 1 TO 14 OF 117
                 Highway Accident System - Data Field Selection    PF1 for Help
                 ----------------------   --------------------     Scroll: PF7/PF8

   =>                   L to Locate,  D to De-select all fields, X (PF3) to cancel.
    > ALL     ANY or ALL of the field groups must qualify to select an Accident.
    > A       A to check all pages, 1 to check page 1's only.

 Cmd Grp Act Name          MV104  H.A.S. Field Description
  -   -   -  ------------- -----  ----------------------------------------------
    >           ACCASE          0  Accident case number
    >           ATTENDED        U  Police attended the accident?
    >           CONTRB11       31  =  First contributing factor for vehicle 1
    >           CONTRB12       32  =  Second contributing factor for vehicle 1
    >           CONTRB13       33  =  Third contributing factor for vehicle 1
    >           CONTRB21       34  =  First contributing factor for vehicle 2
    >           CONTRB22       35  =  Second contributing factor for vehicle 2
    >           CONTRB23       36  =  Third contributing factor for vehicle 2
    >           DAMSVRT1        U  Damage severity code of first vehicle
    >           DAMSVRT2        U  Damage severity code of second vehicle
    >           DIAGRAM         U  Number of the diagram describing the accident
    >           EJECTIO(1)     13  =  Ejection code (victim ejected from vehicle?)
    >           EJECTIO(2)     13  =  Ejection code (victim ejected from vehicle?)
    >           EJECTIO(3)     13  =  Ejection code (victim ejected from vehicle?)
```

All the selectable data fields are listed, one per line, in alphabetical order. To specify codes for a data field, enter an S in the Cmd column next to the field name. To proceed, saving the selections, leave the primary and line command fields blank and press Enter.

Primary Commands (entered at the => prompt):

```
   D       - De-select all fields.  Erases all field code selections.

   X       - CANCEL: Exit from the panel without saving selections made during
             this session on this panel.  (Pressing PF3 has the same effect.)

   L abc   - locate the field name starting with 'abc', e.g.:
               L POLICECD - move to the POLICECD field
               L V        - move to the first field name starting with V
               L VEH      - move to the first field starting with VEH

   Scroll commands, e.g.:
         UP or DN - moves one screen-full (same as PF7/PF8)
         UP MAX   - move to the top of the list
         DN MAX   - move to the end of the list
         UP 10    - move up 10 lines
```

ALL/ANY (logic specification):

A field 'qualifies' if the code in that field of an accident record matches one of the codes specified for that field.

ALL: For an accident to be selected, **every** field (or field group) with codes specified must qualify. In other words, the AND logical operator is used between fields.

ANY: An accident will be selected if **any** of the fields (or field groups) qualify. In other words, the OR logical operator is used between fields.

Field groups are defined below.

Check Accident Page 1's only, or all pages:

1:   Check fields on page 1's only
A: Check fields on all pages.
     A Match on any page is considered a match for the accident.

Cmd: Line commands:

S - Selects the sub-panel for specifying codes for the field.
   - In most cases the sub-panel will be panel SMVB, which is described in the following section.
   - For fields which contain simply numbers (e.g. TOTALKLD, or VICTAGE), panel RANG appears, on which the user specifies a minimum and maximum number.
   - The ACCASE field is a special case. The user specifies up to 20 accident case numbers, on panel CASE.
   - The AREA field also has its own special panel (DIST - the same one as when selecting by Region,District,Area directly from panel P200).

D - De-selects (clears) all code specifications for the field.

C - Copies code specifications from the previous field in the list. (useful for same-code multiple fields e.g. CONTRB11, CONTRB12 ...)
   - More than one C may be entered to copy codes to a number of following fields all at once.
   - Codes may only be copied to a field which has identical code meanings.

Grp: Field Groups:

If ALL is coded in the ALL/ANY field at the top of the panel, you may want a group of fields to be treated as a single field, so that a match in any one of the fields in that group will cause the group to 'qualify'. To group fields, enter the same character in the **Grp** column of all member fields.

Example: To select all fatal accidents involving trucks:

- Code ALL in the ALL/ANY field at the top of the panel,
- Select TOTALKLD with an S, then enter 001 and 999 for the TOTALKLD minimum and maximum values,
- Select VEHTYPE1 with an S, and select trucks in the VEHTYPE1 sub-panel,
- Select VEHTYPE2 with a C to copy the VEHTYPE1 specification,
- Code A (or any other character) in the Grp column of the VEHTYPE1 & VEHTYPE2 lines. (If the VEHTYPE fields were not grouped, BOTH would have

   to be trucks in order for the accident to qualify.)

Act: Active Flag

  If there are code selections active for a field, an asterisk (*) will be
  displayed in this column.

Name: Field Name

  These are the abbreviated field names (as defined in the PL/I programs.)

MV104

  This column defines the relationship between the field on the Highway
  Accident System data record and the MV104 accident form (now called the
  MV6020 form).

  The first two digits (if present) are the MV104 reference number for the
  field.

  The last character in the column may contain one of the following
  characters:
      1 - the H.A.S. field contains the first digit of the MV field.
      2 - the H.A.S. field contains the second digit of the MV field.
      = - the H.A.S. field is identical to the MV field.
      U - the H.A.S. data comes from an un-numbered MV field.
      0 - (zero): not an MV field

(The field names and descriptions displayed on the panel come from file
THASP.TABLE(FLDNAMES))

7.3.8   SMVB: Select MVB Codes

This panel allows the user to specify codes from a list of all the codes of one field. This panel appears when a field is selected from the Data Field Selection panel (FSEL) described in the previous section.

The short name of the field appears in the title.

```
SMVB                                                    ROW 1 TO 17 OF 55
                Highway Accident System - Select CONTRB11      Scroll: PF7/PF8
                ----------------------   -------------------  PF1 for Help.

     =>               ALL, D, nn, n*, X (PF3) to cancel.
       S to select:   FIRST CONTRIBUTING FACTOR FOR VEHICLE 1
        -     -----    -------------------------------------------------------
      >     10        ALCOHOL INVOLVEMENT
      >     11        BACKING UNSAFELY
      >     12        CUTTING IN
      >     13        DRIVING WITHOUT DUE CARE
      >     14        DRIVER INEXPERIENCE
      >     15        DRUGS (ILLEGAL)
      >     16        EXTREME FATIGUE
      >     17        FAILING TO SIGNAL
      >     18        FAILING TO YIELD RIGHT OF WAY
      >     19        FELL ASLEEP
      >     20        FOLLOWING TOO CLOSELY
      >     21        IMPROPER PASSING
      >     22        ILLNESS**
      >     23        SUDDEN LOSS OF CONSCIOUSNESS
      >     24        DRIVING ON WRONG SIDE OF ROAD
      >     25        PEDESTRIAN ERROR/CONFUSION
      >     26        PREEXISTING PHYS. DISABILITY
```

Enter an S beside one or more codes to select, or use the following commands at the command prompt:

```
   => ALL    - select all codes      (this fills with S's)
      D      - unselect all codes    (this erases all S's)
      nn     - select one code       (e.g. 32)
      n*     - select one SET of codes, e.g. 3* for all the thirties.
```

Multiple commands may be specified, separated by spaces, e.g.:

```
   => 4* 62
```

... will select codes 40 to 49, and code 62.

To proceed, saving the selections, leave the command field blank and press Enter.

To cancel all changes and return to the Data Selection panel, put an X in the command field and press Enter, or just press PF3.

(The vehicle type descriptions displayed on the panel come from file THASP.TABLE(MV104))

7.3.9 Select by Landmark

This panel allows landmark types to be specified. An accident will be selected only if there is a landmark with a matching type in the Landmark file which has the same location code as the accident.

```
 SMVB                                                           Row 1 of 25
                 Highway Accident System - Select LANDMARK_TYPE  Scroll: PF7/PF8
                 ----------------------   --------------------  PF1 for Help.

     =>                 ALL, D, nn, n*, X (PF3) to cancel.
          S to select:
          -     -----   ------------------------------------------------------
          >     A1      Intersection with stop sign or flashing red lights, no tur
          >     A2      Intersection with stop sign or flashing red lights, and tu
          >     A3      Intersection with traffic control lights, no turning slots
          >     A4      Business/Commercial Access
          >     A5      Intersection with traffic control lights, and turning slot
          >     A6      Lane Merge
          >     B3      Interchange Off Ramp
          >     B4      Interchange On Ramp
          >     C1      Controlled Railway Grade Crossing
          >     C2      Uncontrolled Railway Grade Crossing
          >     D1      Major Structure  (visible in winter, e.g. bridge structure
          >     D2      Minor Structure  (invisible in winter, e.g. culverts, catt
          >     E1      Weigh Scale
          >     E2      Ferry Ramp
          >     F1      Permanent Traffic Count Station
          >     F2      Temporary (Short) Traffic Count Station
          >     XD      District Boundary
```

Landmark types may be selected individually with an S, or the following commands may be used at the main command field:

```
ALL - selects all landmarks - inserts an S on every line.
    - this is equivalent to not selecting any
    - if you want to select all EXCEPT intersections, select all with the ALL
      command, then remove the S's from A1, A2, A3 and A4.

D   - (Delete) - removes all selections

nn  - selects on landmark type
    - e.g. Y3 would insert an S next to landmark type Y3, saving you from
      having to move the cursor there.

n*  - selects all landmark types with the same first character.
    - e.g. A* would select A1, A2, A3 and A4
```

7.3.10 Select Fatal, Injury, PDO

Enter one or more of the letters F, I and P to select Fatal, Injury and/or PDO (Property-Damage-Only) accidents. For example if you only want Fatal and Injury accidents, enter **FI**. The order of the letters is not important. To get all accidents, enter **FIP**.

Note that this same selection can be done (less conveniently) using **Select by Data Fields**, and selecting by field SEVERITY_TYPE, or using the TOTALKLD or TOTALINJ fields. If accident severity restrictions are specified both on the P200 panel on the **Select Fatal,Injury,PDO** line *and* via **Select by Data Fields**, they will both be applied, with the **Select Fatal,Injury,PDO** restriction being done first. (So if you ask for Fatals in one place, and Injury in the other, NO accidents will be selected!)

7.3.11 Range Feature Selection

*** *This feature has been removed from panel P200, due to lack of supporting data.* ***

> Using this feature requires that you know ahead-of-time the name of a SAS program in the THASP.SASUTIL library which reads the THASP.RANGE.FEATURES file and produces a subset of the file containing just the records of the range feature you want.

> If you enter the name of a THASP.SASUTIL SAS program in the 'Range Feature Selection' field on the P200 panel, that SAS program will be run prior to data selection, to create a temporary subset of the Range Features file: the "Selected Range Features" file.

> Only accidents located within the range of one of the features on the Selected Range Features file will be selected.

> The SAS program THASP.SASUTIL(RGFSEL) is a sample SAS program which selects Guard Rail features only. To create a SAS program to select other types
> of range features, start with a copy of RGFSEL, and modify it to check for the desired codes. Refer to the definition of the THASP.RANGE.FEATURES file in the H.A.S. System Manual.

> Note that at present there is little Range data in the Range Features file to support this feature.

7.3.12 Node Selection

This field may not be left blank. One of the following codes must be entered. (If the field is left blank, or is otherwise invalid, coding instructions will appear on the screen, then the menu will be re-displayed.)

```
  M - Multiple
    - if intersecting highways have been specified in the FROM-TO
      Specification, the accidents at Intersection Nodes will be selected
      once for each highway.
    - this is suitable for Accident-Prone Location or Section analysis, so
      that the accidents at an Intersection Node will be considered in the
      analysis of both highways.
    - WARNING: total accident counts for the subset produced will include
      Intersection Node accidents twice.  (Conceivably more than twice, if
      several highways meet at a particular Node.)

  1 - Once only
    - if intersecting highways have been specified in the FROM-TO
      specification, the accidents at an Intersection Node will be
      selected only the first time the Node is encountered in the search.
    - this is suitable if accurate total record counts are needed.

  0 - (zero) - no accidents at Nodes are included.
```

7.3.13 Obsolete Locations

If this field is left blank, YES is assumed.

```
    YES  -    implies the inclusion of accidents occurring at obsolete
              locations.
    NO   -    no accidents occurring at obsolete locations will be included
              in the selected data.
    ONLY -    only accidents occurring at obsolete locations will be
              included.
```

Note: A given location may have both obsolete-location and non-obsolete-location accidents.

Obsolete locations are locations which are no longer on the LKI (e.g. on a section of a road which has now been eliminated).

7.4   ASUB: Input Accident Subset Specification

Selecting an *Accident Subset* as the initial data source (option 2 on panel DRET) brings up the following panel. This allows you to use a previously created accident data subset as the input to the Data Retrieval job, instead of selecting data from the PDS-Master.

```
ASUB
         Highway Accident System - Input Accident Subset Specification
         ----------------------   ----------------------------------



   Enter:
           xxxxxxxx  - a subset name (max 8 characters)
           ?         - to select from a list of existing subsets

           X         - to exit to previous menu

        =>
```

If you want to see what subsets are available, enter **?** then press Enter, to bring up the following panel:

```
SSEL - SUBSET LIST --  Select for INPUT                        Row 1 of 9
COMMAND ===>                                             SCROLL ===> PAGE
   S - Select, D - Delete, R - Rename, B - Browse, PF3 - Cancel, PF1 - Help
--------------------------------------------------------------------------------


         SUBSET     (newname)    CREATION DATE      STATUS
         --------    ---------    -------------      -----------
>        BS                       1997/11/18         Migrated
>        CONTRIB2                 1998/02/04         Migrated
>        FREQ4                    1997/12/09         Migrated
>        HORSE7                   1999/05/26         Rolled in
>        LSMITH                   1998/01/21         Migrated
>        RT1OTH                   1998/05/26         Migrated
>        RT1TRU                   1998/05/26         Migrated
>        S1                       1997/11/18         Migrated
>        TCP2                     1998/01/15         Migrated
**END**
```

The Browse option allows you to look at the Description file of the subset, which will define what data the subset contains.

The dates on this panel are in year/month/day format.

A STATUS of **Migrated** means that the subset has not been used for a while, and has been migrated to tape. The subset is still available, but if you enter a B next to one of these subsets, you will have to wait for a minute or so for the datsets to be brought back to disk.

7.5   SUB2: Output Accident Subset Specification Menu

This panel will be displayed after specifying a data selection from the PDS-Master, and after selecting any other subsequent process which can create output accident subsets.

```
 SUB2
        Highway Accident System - Output Accident Subset Specification
        -----------------------   ----------------------------------

  Enter: a subset name - to produce or replace a cataloged subset
                            (for later use in this or other jobs)

         T               - to produce a temporary subset
                             (for later use in this job)

         ?               - to see a list of currently cataloged subsets

     or: leave blank   - to produce no output subset

        ------------
       |            |      SELECTED Accidents
       | TESTEX     |      EXCLUDED Accidents
        ------------


                Press PF3 to Exit to previous screen
```

Notes:

     - this panel will appear for any process which can produce subset output.
     - the example above is for a process which can produce both SELECTED
       and EXCLUDED output subsets. If only SELECTED output can be produced
       the "EXCLUDED Accidents" line will not appear on the panel.
     - there is an 8 character field for each possible output subset, in the
       boxed area of the panel. Instructions for this field are included in
       the panel.
     - in the above example, no SELECTED output subset will be created, and
       the EXCLUDED output subset will be cataloged with name TESTEX.
     - see section 6.3 (**Subset Pairs**) for details on subsets.

     - if **?** is entered instead of a subset name, a list of existing subsets
       will be produced. This is in case the user wants to make sure that a
       subset name has not already been used.

Data Selection

       When panel appears after the Data Selection panel (P200) only the
       SELECTED subset field is shown, and leaving the field blank
       is not an option. Otherwise the panel functions just the same.

7.6 PSEL: Process Selection Menu

After specifying the initial data source for a data retrieval batch job, the following panel is displayed. After selecting a *Process* (reporting, analysis of subsetting program), this panel will be re-displayed (with the step letter incremented) to allow subsequent processes to be specified, until you enter an **E** to end the job creation process.

```
PSEL           Highway Accident System - Process Selection Menu
               ----------------------   ----------------------


                    SELECT PROCESS FOR STEP  B                PF1 for Help


             1    ACCIDENT-PRONE LOCATIONS    (THAS210)
             2    ACCIDENT-PRONE SECTIONS     (THAS220)
             3    HISTOGRAM                   (THAS230)
             4    DETAILS REPORT              (THAS240)
             5    SUMMARY REPORT              (THAS25x)
             6    RATE TABLE                  (THAS260)
             7    ACCIDENT TYPE RATIOS        (THAS270)
             8    FATAL/INJURY/PDO COUNTS     (THAS232)
             9    SELECT BY CM ACC TYPE       (THAS205)
            10    SPECIFIED SECTION ANALYSIS  (THAS225)
             S    Execute a SAS program
             V    Execute a SAS program on Victim Records


             E    END OF JOB - NO MORE PROCESSES
             C    CANCEL creation of this job


        Option >
   DATA SOURCE > AS   2 CHARACTERS: STEP LETTER FOLLOWED BY S OR X
                      (? or blank to get a selection list)
```

Each process selected is assigned a step letter. The first process selected (after DATA SELECTION) is called 'B', to allow 'A' to be used to refer to the Initial Data Source.

A process may produce zero, one or two output subsets. If it produces subsets, it may produce a subset of SELECTED accidents (referred to with the letter S), and/or it may produce a subset of EXCLUDED accidents (referred to with the letter X).

A subset created by a previous process in the job can be uniquely identified using two letters: the step letter, and the subset letter: S or X. For example, BX - the excluded accident subset from step B. The menu system maintains a list of available data sources in case the user loses track.

If the DATA SOURCE field is left blank, or if a **?** is coded, a list of available subsets is displayed. **This is a list of subsets created by this job only** - it does not include subsets saved by previous jobs.

The following is what would be displayed if you are at the stage of selecting set C, and step B was
Accident-Prone Locations:

```
DSEL                                                              ROW 1 OF 5
               Highway Accident System - Data Source Selection
               ----------------------   --------------------

             =>      blank - continue, X - previous menu (Cancel)

  Enter an S at the left of the Data Source you want to select.


>        AS  -  Initial Data Source - Data selected from the PDS Master
> S      BS  -  Accidents in Accident-Prone Locations
>        BX  -  Accidents not in Accident-Prone Locations
**END**
```

When the Data Source has been selected on this screen, and ENTER is pressed, the Process Selection
Menu will be re-displayed with the selected Data Source code inserted. Press ENTER again to proceed
with the displayed Option and Data Source.

7.7   Submitting the Job

When you have finished specifying processess for the data retrieval job, enter an **E** (for End) on the
Process Selection panel. The following panel will then be displayed:

7.7.1 PRTY: Job Priority and Submission Panel

```
 PRTY
             Highway Accident System – Job Priority and Submission
             ----------------------   --------------------------


                            HAS Job  DRET


  Job Name:  THASDRET  (Change if you wish.)


  Job Time:  5          cpu minutes.  (Changes not normally required.)


  Copies  :  1          Applies only to reports printed on the mainframe.


  Priority:  7          5 Weekend, 6 Overnight, 7 Normal, 8 High, 9 Highest


   Options:  blank   - SUBMIT the job
             X or C  - CANCEL: do NOT submit the job  (PF3 has same effect)
             J       - Display Job Control statements, for final confirmation.

         =>
```

Job Name:
- Change the job name if you wish.
- Job names must start with a letter.
- It is recommended that the first four characters of the name be left to identify the system (or the person), and the last four be used to identify a particular job.
- See the description of the the P option on the main menu if you wish to change the default for the first four characters of the name.

Job Time:
- This should not normally be changed.

Copies:
- This number is used only for reports printed from the mainframe.

Priority:
- If you do not intend to look at the output of a job until the next day, change the priority to 6. The job will be run some time during the night when the computer is not busy.

Job names must start with a letter.

Option:
- Leave blank and press Enter to submit the job.
- Enter X and press Enter (or just press PF3) to NOT submit the job.
- Enter J if you want to see (and edit) the Job Control Language file before submitting the job. (This is mostly for the benefit of programmers.) You will be given another chance to either submit or cancel the job. See the following section.

7.7.2 CONF: Job Submission Confirmation

This panel appears only if a **J** was entered on the Job Priority and Submission panel (described in the previous section.)

This panel gives you one last chance to cancel the submission of the job. For those who understand IBM Job Control Language, it displays the "job card", and allows the entire JCL file which is about to be submitted to be browsed or edited. (These latter options are primarily for the benefit of programmers.)

```
 CONF
            Highway Accident System - Job Submission Confirmation
            ----------------------   --------------------------

        //HAS0DRET JOB (81171,461413),'HWYS.940.BLAN',
        //  TIME=5,PRTY=7,
        //  MSGCLASS=A,USER=*,PASSWORD=*,GROUP=*,NOTIFY=*
        //*
        //ALLOUT OUTPUT DEFAULT=YES,JESDS=ALL,FORMS=STD,CLASS=A,
        //        DEST=R7,COPIES=1


           THE JCL IS READY FOR SUBMISSION IN FILE   JOBJCL


           Options: blank   - SUBMIT the job
                    X       - do NOT submit the job
                    B       - BROWSE the JCL file
                    E       - EDIT the JCL file

                =>
```

8   Handling Batch Job Output

8.1   Introduction

A batch job on the IBM Mainframe produces "listing" output, and may also produce output datasets. ("Dataset" is the mainframe term for a "file".) "Listing" output includes operating system messages which log the progress of the job, reports, and other messages which programs may produce for diagnostic purposes. Traditionally, "listing" output was automatically printed.

The "listing" output from Highway Accident System batch jobs is stored on-line. It is stored in what is essentially a print queue which never gets printed. After about 5 days, job listings are automatically deleted from the queue. H.A.S. reports are written to the "listing" output.

CSV (Comma-Separated-Values) files and accident subsets are written as mainframe files. CSV files are private to each user. Thus every user can have his/her own file named MYFILE.CSV. This is because the full name of the file has the users's userid as a "High-Level Index" (prefix). Thus in TSO (on the mainframe), MYFILE.CSV can also be referred to as 'SC12345.MYFILE.CSV'. In TSO, the *absence* of single quotes indicates that the userid prefix is assumed.

Accident subsets are shared among all users. This means that you must compete with all other HAS users for unique subset names. (See the **Subset Pairs** section in the **Data Retrieval Concepts** section for subset file name details.)

8.2   IOF - Viewing and Extracting Reports

To view the "listing" output of a batch job, (or to send all or part of it to a mainframe printer) a mainframe application called IOF (Interactive Output Facility) is used. IOF is a large application with many features. Only the basic procedures for extracting H.A.S. reports is included here.

- To invoke IOF, type **IOF** and press **Enter**, in any PDF command or option field.
- You will see the **IOF User Option Menu.**
- To get a list of your jobs, leave all fields on this panel blank, and press **Enter**.
- (If a field on this panel always appears non-blank, e.g. a job name in the job name field, you can clear it permanently by blanking out all fields, then typing **SAVEPROF** in the command field at the top, then pressing **Enter**.)
- You will see the **IOF Job List Menu** - a list of all your jobs.
- Enter the number of the job you want to view in the command field, or type an **s** to the left of the job you want to view, and press **Enter**.
- You will see the **IOF Job Summary**.
  In the third section of this panel (headed --- DDNAME ---STEP ---), there is a numbered list of output datasets. To view an output dataset, enter its number in the command field, or put an **s** to the left of the dataset number, and press **Enter**.
- The first three (LOG, JCL, MESSAGES) are system-generated messages which are only interesting for debugging purposes. The subsequent datasets (numbered 4 and up) are the reports and other listing output produced by the programs you selected for the H.A.S. job. The step name (e.g. STEPA) corresponds to the step letter which was displayed at the top of the Data Selection Panel from which you selected H.A.S. processes.
- If you selected data from the PDS Master (as opposed to using a subset as your initial accident data source), dataset 4 (SYSPRINT   STEP A) will contain information about the data selection. If you do not get the data you expected in your reports, or if you got NO data, look at this listing dataset and search it for error or other messages.
- If the only process you selected was a Summary report, Detail report or Histogram, the output report will be dataset 5.
- To send a report to a mainframe printer, overtype the **R7** at the right (under the heading DEST) with the name of your local mainframe printer, and press **Enter**. (To find out the printer name, you will have to talk to your local system support personnel, or call the MoTH help desk at 250-387-0142)

- To extract (snap) a report dataset into a plain mainframe dataset (file) for downloading to your PC, enter the following commands in the command field:

SD DA(myreport.REP)	opens a mainframe file called myreport.rep. (DS is synonymous with DA)
5 SNAP	copies listing dataset 5 to the file.
SNAPCLOS	closes the file (exiting from IOF with PF4 has the same effect)

The HASUtil Windows (NT) application can be used to download the report to your PC. (See the following section.)

Report files should be deleted from the mainframe, when you are finished with them.   PDF option 3.4 can be used to view and delete files, or you can enter **DELETE MYREPORT.REP** on the TSO command line in PDF option 6.

8.3   HASUtil

The Highway Accident System Utilities program (HASutil) is a 32-bit Windows (Windows NT, 95 or 98) application for downloading and processing output from the Highway Accident System (HAS). The program has separate functions for downloading reports, CSV (Comma-Separated-Values) files, and accident subsets. Data fields can be selected (and optionally translated to English) from downloaded subsets, for custom CSV file and spreadsheet creation.

The program includes options to automatically load the downloaded files into MS-Word or MS-Excel. These functions require that MS-Word and MS-Excel (97 or higher) be installed on the workstation.

Other features include the creation of collision diagrams in MS-Word, and creation of the Excel, Word and HTML files for the MoT fatal accident intranet web pages.

8.3.1 Installation

To install the HASutil application on your workstation, double click on the following file in Windows Explorer:

```
P:\HQ\Eng\safety\HAS\HASutil\setup\SETUP.EXE
```
(where p: is mapped to \\Olive\S3018)

If you want to put a HASutil shortcut on your desktop, right-click "c:\Program Files\HASutil\HASutil.exe", in Explorer, and select "Create Shortcut", then drag the shortcut to the desktop.

The HASutil files are normally installed in the "C:\Program Files\HASutil" folder on your workstation.

8.3.2 Using HASUtil

In order for the download functions to work, your workstation must have an active internet connection. If you can open a TSO terminal session on the IBM mainframe (which is what you do to run the Highway Accident System), then the download utilities should also work. Note that download functions are independent of your TSO connection - i.e. downloads will work whether or not you currently have a TSO terminal session open. (The FTP protocol is used for downloads.)

To start the application, select HASUtil from the Start/Programs menu, or double click its icon, if you have one your desktop. The HASutil main window appears as follows:
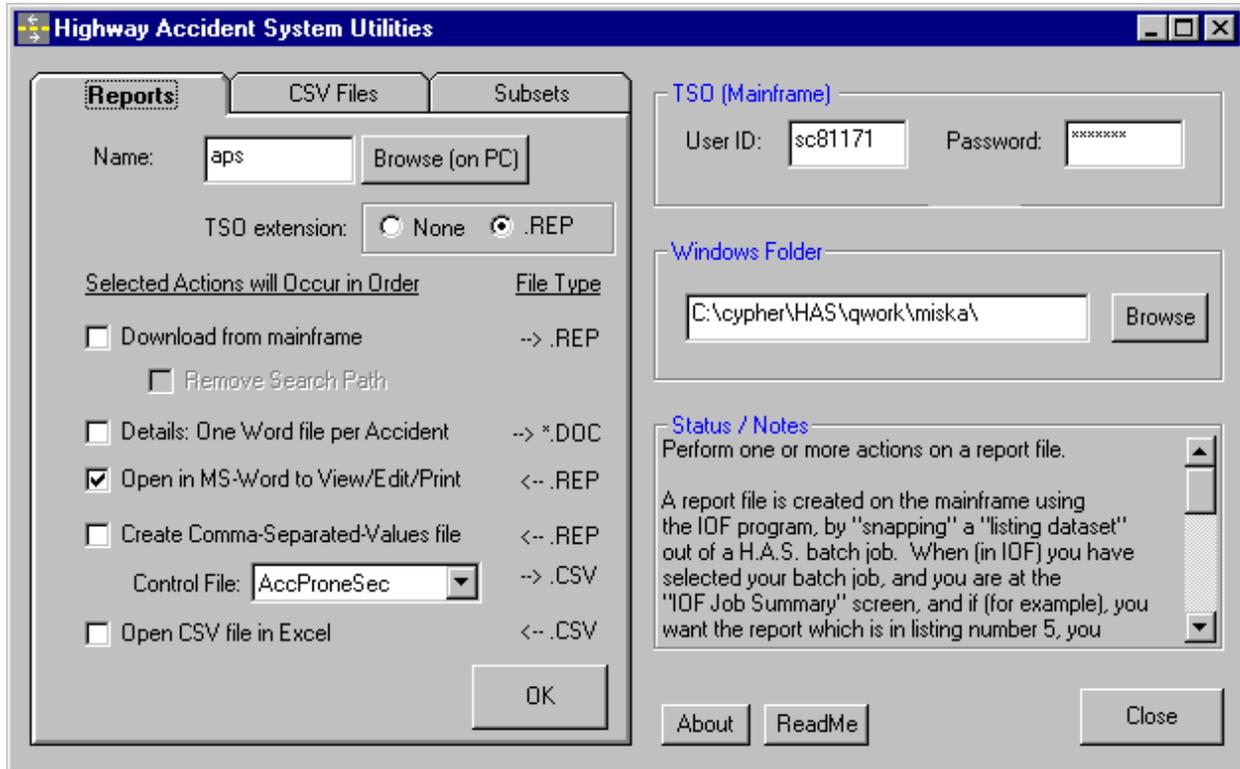
Make sure your TSO userid is entered correctly, enter your TSO password, and make sure that the **Windows Folder** field indicates where you want downloaded files to go.

Select the tab depending upon whether you are downloading Reports, CSV files or Accident Subsets. Enter the name of the file you want to download (or have already downloaded), select the options you want, then click OK. All the checked operations on the current tab will be performed, in sequence. Thus you have the choice of doing multi-step jobs one step at a time, or all at once.

8.3.3 Reports in MS-Word

In order to ensure that the 133 column, 64 line-per-page HAS reports print properly in Word, on letter size paper, a Courier New size 8 font is used, in Landscape mode, with Paragraph / Line Spacing set to "Exactly" At: 9

The **Details: One Word File per Accident** option applies to the HAS Details Report only. If processing a Details report, it will create a separate MS-Word file for each accident in the report. A font size of 9 is used. It will also create two HTML files called "FatalReportsByArea.html" and "FatalReportsByDate.html". These go with the Word files when fatal accident reports are put onto the MoT web site.

8.3.4 Using the Field Selection Definition Editor

HASutil can be used to create custom accident data reports, in spreadsheet form. The accident record selection is done by creating an accident subset with the Highway Accident System on the mainframe. HASutil is used to download the subset, select, order and translate the required data fields, create a CSV file, and load it into Excel.

Custom report definitions (the selection of fields to extract) can be stored and named. Each such definition is called a Field Selection Definition. A Field Selection Definition can be created or modified via the **Edit** button which is to the right of the **Field Selection** field on the **Subsets** tab.

The Field Selection Definition Editor form displays, on the left, a complete list of the fields in an accident record. For each field there is a short name (in capital letters), followed by a description. On the right is a list of fields which are in the current Field Selection Definition. This list is labelled *CSV File Fields*, because these are the fields which will end up in a CSV file. Using the various buttons on the form, you can add fields to the CSV list from the complete list, move fields in the list, delete fields etc.

Each field in the *CSV File Fields* list is preceded by a check box. If the box is checked, the data code for this field will be translated into its English equivalent, if possible. Checking a field which has no translation will have no effect. Note that it is possible to have the same field in the list more than once. This allows you to have both the code and the translation in the output, if you wish.

Each accident record (in the downloaded subset) corresponds to one MV6020 form page. If an accident involved more than 2 vehicles, there will be more than one page. For multiple-page accidents, the second and subsequent pages contain unique vehicle and victim data, but duplicated general accident data. The CSV file created will likewise have one record (or row) for each page. For this reason, you are given the choice of selecting data from all pages, or only Page 1 pages. If selecting from all pages, it is recommended that you put the page number field (PAGENO) at the beginning of each record.

Field Selection Definitions are stored in files with the .FSD extension, in the HASutil installation folder

8.3.5 Creating a Collision Diagram

Note: pre-1989 accident data can not be diagrammed (because it has no vehicle direction data).

The HASutil collision diagram has a collision symbol for each of the collision diagrams on the MV6020 accident form, in each of the four orientations, at fixed locations on the intersection diagram. There are 5 additional symbols for accidents involving one vehicle and an animal. (1 for each possible vehicle direction, and one when no direction is indicated.)

Accident data records from a H.A.S. accident subset are read, and each accident is associated with one of the collision symbols, using the following fields in the accident record:

DIAGRAM	Collision diagram number
VEHDIR1	travel direction of the first vehicle
VEHDIR2	travel direction of the second vehicle
PREACTN1	pre-collision action of vehicle 1
PREACTN2	pre-collision action of vehicle 2

If the DIAGRAM information is missing for an accident, or if the other fields are missing or inconsistent with the DIAGRAM code, then the accident is abandoned as "unplottable".

The location of each collision symbol on the diagram is symbolic. There is no information in the accident record indicating where in an intersection the collision actually took place.

To create a collision diagram, first you must create an accident subset using the Highway Accident System on the mainframe. The subset must contain the accidents you want, at one or more locations for which you want to create collision diagrams.

Start HASutil on your PC, select the **Subsets** tab, select the **Download** and **Create Collision Diagram** options, and click the **OK** button. (If you have already downloaded the subset you want, do not check the Download option).

The following form will appear:

From Accident Subset...
    Select the subset from which you want to select locations. The drop-down list will show all the
    subsets which are currently in the "Windows Folder" specified on the HASutil main form. Initially, the
    subset named on the HASutil Subsets tab will be selected.

Display Data of...
    The list at the right shows all the locations with accidents in the selected subset. Node names will be
    shown at segments ends. Other locations will be displayed as a segment and km.

    You can choose to display the accidents from ALL locations on one diagram, or you can choose to
    display the accidents of just selected locations on one diagram. If you want just selected location(s),
    select the first location by clicking on it. To select multiple locations, hold down the Shift or Ctrl
    buttons while you click.

Location Type
    Select (by clicking) the type of intersection (or non-intersection) you want drawn on the diagram.
    This selection does not limit the accidents shown, or where they are shown. It simply determines
    which road-edge lines are drawn.

Accident Data Tables
    If this option is checked, selected data of the accidents plotted are put into a table, on the page
    following the collision diagram in the MS-Word document. If there are any accidents which were not
    plotted due to missing data, a second table will contain the data from those accidents.

    You can specify the data fields for the tables in the same manner as when creating CSV files for
    import into Excel - by selecting and editing a Field Selection Definition. A provided collision diagram
    FSD file called CollDiag is selected by default.

    (Note: if more than 10 or so accidents are involved, this function may be quite slow.)

Accident Count Labels
 Accidents are counted for each orientation of each collision type. The accident counts are reported to the right of each collision symbol on the diagram. You can have the accident counts broken down by Fatal, Injury and PDO accidents, if you wish.

Subset Description File
 The subset description file describes what accidents are in the subset. Click the **View Now!** button to preview the description file of the selected subset. If this option is checked, the description file is inserted into the Collision Diagram MS-Word document.

Close Button
 Click this button to close the Collision Diagram form.

Create Diagram Button
 Click this button to create the Collision Diagram for the selected location(s).

8.3.6 Producing Fatal Accident Monthly Reports for the Ministry Intranet

Fatal accident data from HAS is made available on the MoT intranet, at:
   http://gww.th.gov.bc.ca/gwweng/Content/fatalaccidentinfo/default.asp

The process of extracting the data from HAS and updating the web site is performed by system maintenance people, but the process is documented here so that HAS users can do something similar for other purposes if desired.

In HAS on the mainframe, create a subset containing just the fatal accidents of the desired time period:
* start HAS on the mainframe
* select option 1 - select data from the PDS-Master
* enter the start date, e.g. 20040101
* enter the end date, typically the last date of data shown at the top of the panel. (This will cause a warning to appear the next time you press Enter. Just press Enter again and it will go away.)
* **From-To** panel: clear it, then enter ALL under Highway
* make sure other selection options (e.g. Select by Data Fields) are clear
* enter just F in the **Select Fatal, Injury, PDO** field.
* press Enter till the subset naming panel (SUB1) appears.
* enter a descriptive subset name (max 8 characters, must start with a letter) e.g. "FATALS04"
* press enter to get the process selection panel
* enter a 4 to select a Details Report
* press Enter till the process selection panel appears again
* enter E to end the job creation process, and process Enter to continue to submit the job.
* exit from HAS
* go to IOF (see section 8.2 IOF - Viewing and Extracting Reports)
* when the job has completed, look at the STEP A SYSPRINT output to make sure a reasonable number of accidents were selected
* have a quick look at the STEP B RPT01 output to make sure the detail report was produced.
* copy the detail report out to a mainframe dataset: SD DA(FAT2004.rep), 6 SNAP, SNAPCLOS

Prepare an empty folder on your workstation to contain the data and report files.

Open HASutil on your workstation. Make sure it is version 1.4 or higher.
* enter your TSO password in the password field
* enter the full name of the empty target folder in the Windows Folder field
* in the Reports tab, enter the name of the report file you just created on the mainframe (fat2004 in the example above)
* check the Download from Mainframe, Remove Search Path, and Details: One Word file per Accident check boxes, then click OK.

- watch the status window: the download should not take long, but converting to Word files takes a while. It should complete with: "HTML indeces complete"
- in the Subsets tab, enter the name of the HAS subset you created. (Fatals04 in the example above.) Note that this name will become the first part of each XLS file created.
- select the following options: Download from mainframe, Convert data to comma-separated-value file, Field Selection, 1 File for each month, Save as Excel.
- in the Field Selection box, enter or select: Monthly
- click OK.

In your workstation folder, the following files should now exist:
   HTML fragments which become indexes to the XLS and DOC files on the web site:
      FatalDataByMonth.html
      FatalReportsByArea.html
      FatalReportsByDate.html

   Monthly Excel files named <repname>_yyyy_mm.xls, where <repname> is the Detail Report name (fatdet04 in the examples above), and yyyy_mm identifies the month.

   Word files, one per accident, named <case>_yyyymmdd.doc, where <case> is the accident case number, and yyyymmdd is the accident date.

   Other intermediate files, with extensions: txt (one per doc file), csv (one per xls file), data, desc and rep.

Copy files to the Engineering public drive.
- On the Ministry of Transportation LAN, find folder:
      `P:\HQ\ENG\safety\HAS\WebData`
      `where P is mapped to \\Olive\S3018`
- Clear out that folder (delete all files).
- Copy *.html, *.xls and *.doc from your workstation folder to the LAN WebData folder.

The following step is currently (October 2004) done by Steve Burtch:

Copy files to the intranet server, folder:
`gww.th.gov.bc.ca/gwweng/Content/fatalaccidentinfo/hasdata`
- delete *.xls and *.doc from that folder
- copy *.* (all files) from   `P:\HQ\ENG\safety\HAS\WebData` to the server folder.

No changes are required in other web site files. The three html fragment files (listed above) are automatically included into the web pages to create up-to-date indexes to the new set of XLS and DOC files. (For more details on the web site management, contact Steve Burtch: 250 383-4334, Steve.Burtch@gems1.gov.bc.ca)

8.3.7 Getting Help

When an item (text box, command button etc.) in the HAS Utilities Window gets the "focus", (i.e. when you click on it, or tab to it), information about that item is displayed in the Status/Notes area at the lower right of the window.

To get a summary of each type of HAS output (Reports, CSV Files and Subsets), click on the tab for the output type.

For details on an option or text field, click on (or tab to) that item. To get information on a command button without activating the command, you must use the Tab key to move the focus to the command button.

On the Field Selection Definition Editor form, hold the mouse pointer over a field or button to get information on that item.

For more information, click the **Readme** button.
For support information, click the **About** button.

9   Data Retrieval Process Descriptions

9.1 Accident-Prone Locations (THAS210)

9.1.1 Accident-Prone Location Identification

Accident-Prone locations are identified as follows:

```
1)  There must be one or more accidents at a location.

2)  The location must be a "Potential Accident-Prone Location".  This is
    determined as follows:

    a) the location must be listed as a landmark in the LKI Landmark file,
       and one of the landmark types listed for that location in the
       Landmark file must match one of the landmark types entered on the
       Accident-Prone Locations Parameter Menu,

    OR

    b) the Location Type field on at least one of the accidents at the
       location must match one of the location types entered on the
       Accident-Prone Locations Parameter Menu.

3)  The number of accidents "attributed" to the location is counted.  The
    number of accidents "attributed" to a location is the number of
    accidents within the Location Radius of the location.  For example, at
    a Potential Accident-Prone Location at KMMARK 3.3:

    KMMARK:                 3.1  3.2  3.3  3.4  3.5
    # accidents:             4   10    3    7    2
    Location Radius 0.                  3
                                    _____/
    Location Radius 0.1                20
                                _____/
    Location Radius 0.2                26

4)  Traffic Volume for the data period at the location is looked up.  If
    volume data is not available for the entire period, whatever data is
    there is averaged and used.

5)  The Accident Rates and Accident Severity Ratio (ASR) are calculated.
    (See the Report section below for more details.)

6)  Any required lookups and/or calculations are done for determining
    critical numbers, ASRs or accident rates.  (See the description of
    Critical Rates in section 6.2)

7)  For the specified accident types (if any), the accident type ratio is
    calculated.  (See the description of the Counter-Measure Method in
    section 6.2)

8)  Average Accident Type Ratios are looked up, and for any specified
    accident type which has a ratio greater than the average for that type,
    the Chi-square statistic is calculated.
```

Finally, the criteria which the user specified on panel P210 are evaluated, to determine if the location is

Accident-Prone.

NOTE: There must be at least one accident at a location before the location becomes a Potential Accident-Prone Location. Even if there were 200 accidents 0.1 km before and after the location, and the Location Radius was 0.1 or more, the location will not be considered a Accident-Prone Location if there are no accidents coded exactly at the location.

9.1.2 Discontinuities

The specification of a non-zero Location Radius will not cause accidents to be counted from beyond a discontinuity.

9.1.3 Nodes

All accidents at a node will be considered if the node is a Potential Accident-Prone Location, however in the case of a non-zero Location Radius, only accidents along the Search Path are attributed to the location. I.e. the radius is not extended along other segments which may share the node.

```
                                    |
                            Seg  |  C
                                    |
                                    |
              *---------------*---------------*
                   Seg A        Node      Seg B
                                 AB
```
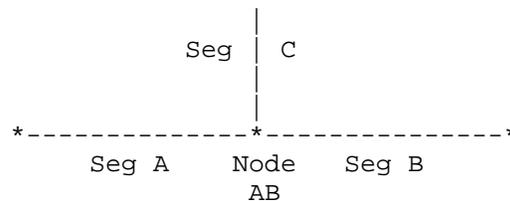
In the diagram, if segments A and B are on the Search Path, the Location Radius will be extended from node AB back along segment A, and forward along segment B, but will NOT be extended up segment C.

(A separate Node Analysis program, with direct access to the PDS-Master, could be written to alleviate this restriction.)

9.1.4 Overlaps

If a non-zero Location Radius is specified, it is quite possible that KMMARKS within two Location Radii of each other will be Accident-Prone Locations, with some of the same accidents contributing to the accident counts in each Accident-Prone Location. This situation is termed an Overlap.

Accidents which are counted twice in this manner are only written once to the Selected output accident subset.

An Accident-Prone Location which overlaps a previously identified Accident-Prone Location is flagged on the Accident-Prone Location Report with an asterisk immediately before the "LMK" or "LOC" characters in the TYPE field. Thus strings of overlapping Accident-Prone Locations can be identified on the report (if it is sorted by Search Sequence) by vertical strings of asterisks.

The first Accident-Prone Location in a string of overlapping Accident-Prone Locations is not flagged.

9.1.5 P210: Accident-Prone Locations Parameter Panel

```
 P210      Highway Accident System - Accident-Prone Locations Parameters
           ----------------------   ----------------------------------
  Report Title > Sample


  Define criteria for Accident-Prone Locations:        (Press PF1 for help)


        ( ( N >= 10    ) AND ( R >  C      ) )     (              )     OR
            - -- -----    ---    - -- -----     ---    - -- -----        ---
        Counter-Measure Accident Types   > 1  2  3   4   5   6   7   8   9   10 11 12 13
                                            -- -- -- -- -- -- -- -- -- -- -- -- --
             Min number of any type    > 6         Ratio File > TEST1
        Level of Significance
             for Crit. Rate Calculation   > .1  %    (.01, .05, .1, .5, 1 or 5)
             for Counter-Measure Method   > 2.5 %    (.5, 1, 2.5, 5 or 10)


  Location Radius           > 0.0
  Landmark Types (LKI)      > A1 A2 A3 A4 A5                \ Enter 2-digit codes,
  Location Types (MV104)    > 01                            / or ? in first field.


  Traffic Volumes:       Include Intersection:   > Y   Use pre-TIMS: >
  Analyse Locations with SAS program > BYGROUPL  >       (Y to select)
  Produce Output CSV file           > OUT210    > Y
  Produce Printable Reports:                    > Y
```

DEFINE CRITERIA:

This is where "Accident-Prone" is defined. Up to 3 conditions may be specified. Start at the left, and inside at least one pair of parentheses, code:

1:An Attribute of a candidate Location:
        N – to indicate Number of Accidents,
        R – to indicate Accident Rate,
        W – to indicate Road-Weighted Accident Rate,
        F – to indicate Severity-Weighted Accident Rate,
        S – to indicate Accident Severity ratio (ASR)

2: a comparison operator, one of: <   <=   =   >   >=

3: a critical number, an L, or a C:
        L – to use a critical value Looked up (in file
            THASP.CRITICAL.RATES) by traffic volume and highway class,
          – available for attributes N, R and S **only.**
        C – to use a critical value Calculated from the traffic volume
            and the average accident rate for the type of location.
          – available only for accident rate attributes, i.e. if field
            1 is R, W or F
          – will cause a panel to be displayed so that you can specify
            the Average Accident Rate file from which critical rates
            are to be calculated.

If more than one condition is coded, code AND or OR between conditions to indicate how they are to be combined.

For example, coding the following:

```
   ( ( N >    10  ) AND ( R >  C    ) ) OR (   S >=  1.3 )
       - -- -----   ---    - -- -----     ---      - -- -----
```

... would find Locations where there are more than 10 accidents and the accident rate is greater than the calculated critical rate, OR, the accident severity ratio is greater than or equal to 1.3.

For more information on Critical Rates, see section 6.5

COUNTER-MEASURE ACCIDENT TYPES:

Enter up to 13 2-digit accident types.

A Location with an over-representation of any of the specified accident types will be considered Accident-Prone.

1 digit Accident Type numbers may be entered left or right justifed, blank or zero filled, i.e. '01' = ' 1' = '1 '

The following commands may be entered in the first accident type field:
      ? or S - select accidents from a labelled list on a sub-panel
      *   - set all accident types
      D or C - Delete (or Clear) all accident types

Before an over-representation calculation is attempted for an accident type, there must be at least the **Min number of any type** accidents of that type.

If you are coding both Relational Criteria and Counter-Measure accident types, enter AND or OR at the end of the relational criteria line to indicate whether both or one of the methods are sufficient to determine a location or section as Accident-Prone.

The average accident type ratios used for the comparisons are read from file *userid*.ACCTYPE.RATIOS.LOCATION.*name*, where *userid* is your TSO userid, and *name* is a name which you enter in the **Ratio File** field. Enter **?** in the Ratio File field to select from a list of existing files. Accident Type Ratio files are created using the Accident Type Ratio program (THAS270), which is selectable from the HAS Data Retrieval Process Selection menu.

If the Accident Type Ratios file you specify contains non-mutually-exclusive reference groups, the ratios of the first group into which each accident location falls will be used for that accident.

LEVEL OF SIGNIFICANCE:

For Critical Rate Calculation

      If a Calculated Critical Rate has been specified (with a C on the right side of a relational criterion), the Level of Significance adjusts the critical rate. A HIGHER level of significance results in a lower K-value, which decreases the critical rate, which means you will end up with MORE Accident-Prone locations.

For the Counter-Measure Method

      The Level of Significance in this case adjusts the CHI-squared(a) value. A HIGHER level of significance results in a lower CHI-squared(a), which means an accident-type proportion is more likely to be considered an over-representation, which means you will end up with MORE Accident-Prone locations.

LOCATION RADIUS:

A Location is defined by a Segment and KMMARK.
The number of accidents attributed to a location includes the
accidents back to and including KMMARK - R, and forward to and
including KMMARK + R, where R is the specified Location Radius.

LANDMARK and LOCATION TYPES:

Coding Landmark and Location types is optional. If none are coded,
every location with one or more accidents is considered as a potential
Accident-Prone Location.

If Landmark and/or Location types are specified, a location is
considered as a potential Accident-Prone Location only if:
- at least one accident is found at the location proper, and the
  location is at one of the specified Landmark Types (according to
  the LKI Landmark File), OR
- at least one accident is found (at the location) which has a
  Location Type (field 2 on the MV6020) equal to one of the
  specified Location Types.

Up to 9 of each type of code may be entered. Include leading zeros.

Enter a question mark (?) in the first code position on either line to
get a selection list of the codes and their meanings. (If more than 9
codes are selected on the list, on the first 9 will be used.)

TRAFFIC VOLUMES:
   INCLUDE INTERSECTION >

   Y   - use traffic volume file which has intersection traffic volumes.
        - THASP.SEGVOL3
        - use this option if intersection traffic volumes are available
          (i.e. coded in the Intersection Counter Map) throughout the study
          area.
   N   - (or blank) - use the traffic volume file which does NOT have
          intersection traffic volumes.
        - THASP.SEGVOL2
        - use this option if part of the study area has intersection
          volumes, and part does not; in order to get comparable results.
   1   - use the traffic volume file which has just one automatically
          calculated traffic volume per segment.
        - THASP.SEGVOL1
        - use this option if you want to compare the results to old reports
          created when this was the only option.

   USE PRE-TIMS >

   Y   - use the old traffic volume files: those which were in use prior
          to December 2000, before data from the Traffic Information
          Management System was implemented in the HAS.
        - this option is provided so that accident rates consistenct with
          previous HAS output can be obtained, and so that comparisons can
          be made.
   N   - (or blank) - use the current traffic volume files.

ANALYSE LOCATIONS WITH SAS PROGRAM:

Specifying a SAS program here, and a Y to activate it, is equivalent to
saving the Selected accidents in a temporary subset, then specifying

the SAS program as a separate process step.

Enter ? to get a member list of SASLIB programs.

PRODUCE OUTPUT CSV FILE:
To produce an output CSV (comma-seperated-values) file with one record
for each accident-prone-location, code the name of the output file in
the first field, and a Y in the second field. If the second field is N
or blank, no such file will be created.

The file name must start with a letter.

An extension of ".CSV" will be added automatically.
The CSV file can be downloaded directly from the mainframe when the
batch job has finished. (I.e. there is no need to extract from the
batch queue as is required for reports.)

If this option is selected, you will be given the opportunity to select
and order the fields you want in the CSV file, in a following panel
(SSOF).

PRODUCE PRINTABLE REPORTS:
Code a **Y** in this field to produce Accident-Prone Location reports.
(Until April 2002, reports were always produced.)

(In a sense, there is only one report produced, but multiple copies
with different sort orders may be produced.)

If this option is selected, Report options are specified in a following
panel (REPS).

The following option still exists in the PL/I program but has been removed from the user interface,
because it was developed for a project done by people no longer working with the system.

OUTPUT FOR DIAGNOSIS PHASE ON PC:

Selecting this option (with a Y) will cause the following two
output datasets to be created:

        THASP.DIAGNOS.LOCATION.DATA   - diagnosis data file
        THASP.DIAGNOS.LOCATION.DESC   - description file.

These files contain detailed counter-measure data which may be wanted for detailed
research on a PC.

9.1.6 PARF: Average Accident Rate File selection panel

This panel appears only if a **C** (for Calculated Critical Rate) was used on the right-hand side of an expression in the criteria section of panel P210. This is the same panel used for the **Edit or Create Average Accident Rate files** utility (see section 10.2).

In this situation, when simply selecting an existing file, you need only be concerned with the fields on the **Select/Edit** line.

Note that the file you select here must be consistent with the Highway Classification scheme (which is specified on the main panel.)

```
 PARF                       Highway Accident System     Accident-Prone Locations
                            -----------------------
                                                                PF1 for Help
                 Specify an Average Accident Rate File
                 to use for calculating the Critical Accident Rates

                     S or blank - Select
  Command ==>        E          - Edit a file which already exists.
                     C          - Create and edit a new file.
                     X (PF3)    - Exit

                  P - Public       L - Location   Name
                  M - My personal  S - Section    ? for a list
 Select/Edit: > P               > L              > MASTER

 Copy from:   >                  >               >


 If Editing or Creating a file, and if all 3 "Copy from" fields are
 coded, the "Copy from" file will be copied to the "Select/Edit" file
 prior to editing.
```

See section 6.5 for details on Average Accident Rates and their use.

9.1.7 REPS: Report Selection Panel

This panel is used to specify report sort options for both Accident-Prone Locations and Sections programs. This panel is displayed only if the Reports option was selected on the 210 (or 220) panel.

Each A or D entered in the bottom section of the panel will cause a copy of the report to be produced.

```
 REPS                Highway Accident System - Reports                Row 1 of 15
                     ----------------------   -------


   Type of Weighted Acc Rates to put in Reports   > R     (R-Road, S-Severity)
   Include Landmark Descriptions in Reports       >

   Region/District Sort         >           (blank, R, D or RD)
   Region/District Page Break   >           (blank, R or D)

   Enter A or D to select a report in Ascending or Descending order:
        > A       SEARCH SEQUENCE
        >         Hwy-Segment-Km
        >         Highway Class
        >         Average Daily Traffic (ADT)
        >         Accident Rate
        >         Road-Weighted Acc. Rate
        >         Rate/Critical Rate Ratio
        >         Road-Weighted Rate Ratio
        >         Number of Accidents
        >         Number of Vehicles
        >         Number of Fatal Accidents
        >         Number of Fatalities
        >         No. of Injury Accidents
        >         Number of PDO Accidents
```

TYPE OF WEIGHTED ACC RATES TO PUT IN REPORTS

        The Accident-Prone Locations report does not have room for both Road-
        and Severity-Weighted accident and critical rates.

        Code an **R** to get Road-weighted data, **S** to get Severity-weighted data.

INCLUDE LANDMARK DESCRIPTIONS IN REPORTS:

        If this option is selected (with a Y), landmark descriptions (from file
        THASP.LANDMARK) will be added to the report.

REGION/DISTRICT SORT:

    - allows a specification of a primary sort - done ahead of sorts
      specified on the lower part of the panel.
    - Enter: R to sort by Region number,
             D to sort by District number.
             RD to sort by first Region, then District.
    - the specified Region & District Sort applies to ALL of the reports
      requested with A's & D's in the lower section of the panel.

REGION/DISTRICT PAGE BREAK:

    - Enter: R to cause a page break when the Region changes,

          D to cause a page break when the District changes.
     - applies to ALL reports.

ENTER A OR D...:

     - each A or D entered causes a separate copy of the report to be
       produced. In the example above, two copies of the report will be
       produced.
     - if no A's or D's are entered, no reports are produced.
     - the field name selected becomes the primary sort field (after
       Region/District, if specified). The secondary sort field is always the
       Search Sequence.
     - the Search Sequence differs from Highway-Segment-KMMARK sequence only
       if the physical order of the segments along a highway is not the
       numerical order of the segment numbers.

9.1.8 SSOF: Panel

If the CSV Output file option was selected, panel SSOF will appear. This panel is used to select the fields you want in the output CSV file, and the order in which they are to appear.

This panel is also displayed for CSV file output for the Accident-Prone Locations program, and for the Specified Sections Analysis program.

```
 SSOF      Highway Accident System - Output CSV File Field Selection Row 1 of 43
           -----------------------   ------------------------------
  =>              S to select all,  D to deselect all.           PF1 for Help
 Select/Order Output Fields with sequence numbers < 900
 Sequence  Field Name     Field Description
 --------  -------------  --------------------------------------------------
  >  10     GroupID        ID of Accident-Prone Location
  >  20     Seg            Segment number of start of section
  >  30     Km             Km on Seg1 of start of section
  >  40     Node           Node name, if APL is at a node
  >  50     LocType        Location type. Only available if searching by locn ty
  >  60     LmkType        Landmark Type (as defined in the HASLKI)
  >  70     ASR            Accident Severity Ratio
  >  80     Class          Highway Classification
  >  90     ADT            Average Daily Traffic count for the section and time
  > 100     Volume         Number of Vehicle-Days = ADT * #days in date range.
  > 110     #Acc           Number of accidents
  > 120     #Veh           Total number of vehicles
  > 130     Fat#Acc        Number of fatal accidents
  > 140     Fat#Fat        Number of fatalalities
  > 150     Fat#Inj        Number of injured people in fatal accidents
  > 160     Inj#Acc        Number of injury accidents
  > 170     Inj#Inj        Number of injured people in injury accidents
  > 180     PDO#Acc        Number of Property Damage Only accidents
```

 All the available output fields for the program are listed. The first column contains sequence numbers. The second column contains the field names which will appear in the heading row of the output CSV file. The third column describes the fields.

Use the PF7/PF8 (or PageUp/PageDown) keys to scroll up and down through the list.

To select a field, give it a sequence number less than 900.
To deselect a field, give it a number greater than or equal to 900.
To change the position of a field, change its sequence number.

After changing one or more sequence numbers, press **Enter** to have the fields re-displayed in sequence number order. (Scrolling also causes a re-sort.)

The following commands may be entered at the **=>** prompt:

        S -   Select all fields. This will cause the sequence numbers to be re-numbered by 10's from start to end in the current order.
        D -   Deselect all fields. This will cause the sequence numbers be re-numbered all > 900.
        X -   Cancel: back-up one screen without saving changes. (Same as PF3.)

To save and continue, press **Enter** with a blank command field, after no new sequence number changes. If you have changed any sequence numbers since the last re-display, pressing Enter once will cause a sort and re-display, and pressing Enter again will save the results and move on the next panel.

9.1.9 Report

The Accident-Prone Locations Report starts with a copy of the Description file of the input accident data Subset Pair. This contains the Data Selection information, Search Path, and details of any other processes which have helped to select the input data.

The Accident-Prone Location control parameters are printed on a new page following the Description file listing.

```
REGION and DISTRICT
    - come from the accident records

HWY SEGNUM-KM
    - the Highway (Route) number, Segment number and KMMARK of the
      Accident-Prone Location
    - if the KMMARK is immediately followed by a lower case 'x', this
      indicates that the location is 'obsolete', i.e. is on a section of road
      which no longer in the LKI.

TYPE
    - this field indicates the type of location, how it was identified,
      and whether it overlaps with a previous accident-prone location.
    - there are three sub-fields in the TYPE field:

      Overlap Indicator:
         - an asterisk indicates an overlap - see section 9.1.4

      LOC or LMK:
         - indicates whether the location was identified as a Potential
           Accident-Prone Location by a Location Type match or a Landmark
           Type match.
         - if in fact there was both a Location Type AND a Landmark Type
           match, Landmarks take precedence, and "LMK" will be displayed.

      Type Code
         - the Location Type on an accident record, or the Landmark Type
           on the LKI Landmark file which matched one of the Location or
           Landmark Types specified on the Accident-Prone Locations
Parameters
           Menu.  If in fact more than one code matched, the first match
           is displayed.

NODE
   - if the Accident-Prone Location is at a Node, the Node Name will appear
     in this column.

CLASS
    - the Highway Classification.
    - if blank, it means this location is not defined on the THASP.SEGCLASS
      file.
    - if the Class string is followed by an exclamation mark, it means that
      the classification changed during the time period from which data was
      selected.  The Classification shown is that of the majority of the time
      period.

ADT
   - the Average Daily Traffic for the Data Period at this location.
     (The average of whatever volume data is available is used.)
   - if blank, it means that there were no traffic counts for this segment
     during the data period.
```

CM-ACC / TYP %
    - COUNTER-MEASURE ACCIDENT TYPE and PERCENT
    - if any counter-measure accident types were specified, and if any of
      those accident types were over-represented, then these fields are
      filled.
    - if more than one accident type was over-represented, the most over-
      represented accident type put in the TYP column.
    - the accident type ratio, expressed as a percent, is put into the %
      column. E.g. if a quarter of the accidents at this location were of
      the offending type, then the percent column would contain 25.

ACC RATE / TRAD
    - Traditional Accident Rate
    - the Accident Rate, units = accidents/(million vehicles)

$$AccidentRate = \frac{\#\,Accidents\ x\ 1,000,000}{\#Vehicles}$$

      where #Vehicles is the ADT times the number of days in the data period.

ACC RATE / xWTD
    - Road or Severity-Weighted Accident Rate (depending upon which was
      requested.)
    - calculated in the same manner as the Traditional Accident Rate, but
      instead of accumulating the number 1 for each accident:
      Road-Weighted: the road-weight (W_r) causal factor for each accident is
      accumulated.
      Severity-Weighted: the Fatal, Injury or PDO weight is accumulated for
      each accident. (Typically these weights are 100, 10 and 1.)

RATE/CRATE   TRAD
    - Traditional Accident Rate Ratio
    - the accident rate divided by the critical accident rate

RATE/CRATE   xWTD
    - Road-Weighted or Severity-Weighted Accident Rate Ratio
    - the road- or severity-weighted accident rate divided by the critical
      road-weighted accident rate.

TOTAL-NUM / ACC
    - Total Number of Accidents attributed to the location.

TOTAL-NUM / #VEH
    - Total Number of Vehicles involved in all the accidents at the location.

FATALS
        ACC - the number of accidents in which there were one or more
              fatalities
        KLD - the total number of fatalities (people killed)
        INJ - the number of people who were injured in accidents involving one
              or more fatalities.

INJURY
        ACC - the number of accidents in which there were no fatalities, but
              there were one or more injuries.
        INJ - the total number of people injured in accidents in which there
              were no fatalities.

```
PDO ACC
    - the number of accidents in which there were no injuries or
      fatalities.  (Property Damage Only)
```

```
ASR - Accident Severity Ratio:

      FATALS_ACC * 100 + INJURY_ACC * 10 + PDO_ACC
                      TOTAL_#ACC


GRP / ID
      - GROUP_ID
      - the n'th accident-prone location which the program identifies is given
        a GROUP_ID (or sequence number) of n.
      - all accident records of one accident-prone location written to the
        Selected output subset have the same number in the GROUP_ID field.
      - the GROUP_ID allows subsequent analysis (eg SAS programs) to be done by
        location.
```

There is an option to have relevant landmark descriptions included in the report. The landmark descriptions come from the THASP.LANDMARK file. The following logic is used to determine which landmarks are printed. The algorithm depends upon the sort order of the report:

Report in Search Sequence Order:

```
      Find the NEAREST landmark.  If it is:

      AT the location:
         - print the landmark description
         - print the accident-prone location report record

      BEFORE the location:
         - print a blank line
         - if the landmark is not the same as the last one printed,
           print the landmark description.
         - print the accident-prone location report record.

      ARTER the location:
         - print the accident-prone location report record.
         - if the landmark is not the same as the last one printed,
           print the landmark description.
```

Report NOT in Search Sequenc Order:

```
      If there is a landmark AT the accident-prone location:
         - print a blank line
         - print the landmark description.
         - print the accident-prone location report record.
```

                                  TEST
DATA PERIOD: 1999/01/01 - 2001/03/31   SORTED BY: Search Sequence
LOCATION RADIUS: 0.0 Km   (Swtd >= Calc)

DESCRIPTION (HISTORY) OF THE INPUT ACCIDENT FILE ... Page   1
===

        ===
        PROGRAM: THAS200 VERSION: 2.9 RUN DATE & TIME: 2002/02/25 12:11

               ACCIDENT SELECTION CRITERIA

               FROM   TO   LETTERED
            Hwy Seg   Km   Hwy Seg   Km
         1. 11 2742   0.0   11 2744 10.0   NO

        Segment-Classification file: THASD.SEGCLASS.YR2002.SORTED

        SECTION DEFINITIONS FILE: (NONE)
        DISTRICTS:
        HIGHWAY CLASS SET:
        DATES: 19990101 TO 20010331
        MONTHS: TO
        HOURS: TO
        NODE SELECTION: 1 (once only)
        OBSOLETE LOCATIONS: NO

        ----
        *SEARCH PATH   (FROM   TO)   # REC # ACC X_REC X_ACC
        NODE NULL2742   0   0   0   0
        SEG 2742   0.0   3.4   6   5   0   0
        NODE 27422743   0   0   0   0
        SEG 2743   0.0   3.7   18   13   0   0
        NODE 27432744   4   4   0   0
        SEG 2744   0.0 10.0   96   81   0   0
        NODE 27442750   1   1   0   0
        ----
        *END OF SEARCH PATH. TOTALS: 125   104   0   0
           125 RECORDS,   104 ACCIDENTS SELECTED
             0 RECORDS,   0 ACCIDENTS AT OBSOLETE LOCATIONS SELECTED
        THAS200 COMPLETED SUCCESSFULLY

DATA PERIOD: 1999/01/01 - 2001/03/31   SORTED BY: Search Sequence
LOCATION RADIUS: 0.0 Km   (Swtd >= Calc)

===

           Accident-Prone Location Control Parameters

        Criteria: (Swtd >= Calc)

        Level of Significance for Critical Rate Calculation: 0.10%
                                                         K: 3.090

        Location Radius: 0.0 km

        Landmarks Searched For:
           A1 - Intersection with stop sign or flashing red lights, no turning slots
           A2 - Intersection with stop sign or flashing red lights, and turning slots
           A3 - Intersection with traffic control lights, no turning slots
           A4 - Business/Commercial Access
           A5 - Intersection with traffic control lights, and turning slots

        Location Types Searched For:
           01 - At intersection

     Average Accident Rate Table, from file: THASD.AVERATES.LOC.MASTER
     Class Set   Landmarks   Rate   RW-Rate SW-Rate
     -------------------- ---------------- ------- ------- -------
     PS U EF D 4 RM   A1 A2 A3 A4 A5   1.09   0.22   1.22
     P U EF U 4 RM   A1 A2 A3 A4 A5   0.80   0.16   1.16
     S U F D 4 RM   A1 A2 A3 A4 A5   0.14   0.03   1.03
     P R EF D 4 RM   A1 A2 A3 A4 A5   1.31   0.24   1.24
     S R EF D 4 R   A1 A2 A3 A4 A5   0.64   0.12   1.12
     P * * * * RM   A1 A2 A3 A4 A5   1.49   0.20   1.20
     S * * * * RM   A1 A2 A3 A4 A5   0.24   0.05   1.05
     P R A U * *   A1 A2 A3 A4 A5   0.88   0.77   1.66

                                        TEST
DATA PERIOD: 1999/01/01 - 2001/03/31   SORTED BY: Search Sequence
LOCATION RADIUS: 0.0 Km   (Swtd >= Calc)

Reg Dis	Hwy	Segnum	-Km	Type	Node	Class	ADT	CM-Acc Typ %	Acc-Rate Trad	Acc-Rate SWtd	Rate/CRate Trad	Rate/CRate SWtd	Total-Num Acc	Total-Num Veh	Fatals Ac/Kl/In	Injury Acc/Inj	PDO Acc	ASR	Group ID
		2742	1.0	ACCESS TO LUMBERYARD															
1 7	11	2742	1.1	LOC 01		PRAU2L	15982		0.08	0.08	.07	.07	1	1	0/ 0/ 0	0/ 0	1	1.0	0001
		2742	3.1	EXIT TO RTE 1 E/B															
1 7	11	2742	3.1	LOC 01		PRAU2L	15982		0.08	7.62	.07	7.69	1	2	1/ 1/ 1	0/ 0	0	100.0	0002
		2743	2.5	EXIT TO OLD CLAYBURN RD N/B															
1 7	11	2743	2.6	LOC 01		PRAU4R	25351		0.05	0.48	.04	.47	1	2	0/ 0/ 0	1/ 1	0	10.0	0003
		2743	2.9	ON RAMP FROM OLD CLAYBURN RD															
1 7	11	2743	2.9	LOC 01		PRAU4R	25351		0.10	0.53	.09	.53	2	3	0/ 0/ 0	1/ 3	1	5.5	0004
1 7	11	2744	2.5	LOC 01		PRAU2R	33069		0.07	0.74	.06	.74	2	4	0/ 0/ 0	2/ 4	0	10.0	0005
		2744	2.6	JCTN CLAYBURN RD															
1 7	11	2744	8.3	LOC 01		PRAU4R	33069		0.22	0.88	.21	.88	6	10	0/ 0/ 0	2/ 3	4	4.0	0006
		2744	8.4	EXIT TO HORNE ST															

--- END OF REPORT ---   6 ACCIDENT-PRONE LOCATIONS REPORTED,   0 OVERLAPS ---

9.1.10 CSV Output File

If the CSV Ouput File option is selected on the first Accident-Prone Locations panel (P210), a comma-separated values file will be created (when the batch job has completed), named: <name>.CSV, where <name> is the name you also specified on panel P210.   (The full TSO name has your TSO userid prepended.)

The file will contain:
- 5 lines of heading infrormation
- a blank line
- comma-separated column headings
- a line of comma-separated data for each accident-prone location
- information describing the history of the input accident subset.

The data records will contain just the fields you selected on panel SSOF, in the order specified.

Following is a list of all the available fields:

GroupID	ID of Accident-Prone Location
Reg	Highway Region number of the location
Dist	Highway District number of the location
Area	Contract Management Area of the location
Highway	Highway number and letter
Seg	Segment number
Km	Km of location
Node	Node name, if APL is at a node
LocType	Location type. Only available if searching by locn type.
LmkType	Landmark Type (as defined in the HASLKI)
Date1	Earliest date of accident selection, format yyyy-mm-dd
Date2	Latest date of accident selection, format yyyy-mm-dd
Class	Highway Classification
ClassTimeChange	'Yes' if class changed over the time period.
CM AccType	Over-represented Counter Measure accident type
CM Ratio	Counter Measure ratio of the CM AccType
ADT	Average Daily Traffic count for the location and time period
Volume	Number of Vehicle-Days = ADT * #days in date range.
Rate	Accident rate. Accidents per million vehicles
RW Rate	Road-Weighted Accident Rate
SW Rate	Severity-Weighted Accident Rate
ASR	Accident Severity Ratio
CritRate Lkup	Critical Accident Rate, looked up. (in file THASP.CRITICAL.RATES.scheme)
CritNum Lkup	Critical Number of accidents, looked up.
CritASR Lkup	Critical Accident Severity Ratio, looked up.
CritRate Calc	Critical Accident Rate Calculated (using Average Acc Rate)
RW CritRate	Calculated Critical Road-Weighted Accident Rate
SW CritRate	Calculated Critical Severity-Weighted Accident Rate
AveRate	Average Accident Rate (looked up from the file specified on panel PARF)
RW AveRate	Road-Weighted Average Accident Rate
SW AveRate	Severity-Weighted Average Accident Rate
Rate Ratio	Accident Rate / Critical Rate
RW Rate Ratio	RW Accident Rate / RW Critical Rate
SW Rate Ratio	SW Accident Rate / SW Critical Rate
#Acc	Number of accidents
#Veh	Total number of vehicles
Fat#Acc	Number of fatal accidents

Fat#Fat	Number of fatalalities
Fat#Inj	Number of injured people in fatal accidents
Inj#Acc	Number of injury accidents
Inj#Inj	Number of injured people in injury accidents
PDO#Acc	Number of Property Damage Only accidents
CM Acctype	most-over-represented counter-measure accident type
CM Ratio	ratio of CM Acctype accidents to all accidents.

9.2   Accident-Prone Sections (THAS220)

9.2.1 Description

The Accident-Prone Section program searches along highways identifying accident-prone sections. The user specifies the section length. The user specifies the criteria for classifying a section as accident-prone by specifying 1 to 3 conditions involving the number of accidents, the accident rate, and the accident severity ratio (ASR), and/or by specifying accident types for the counter-measure method.

Critical values may be specified, may be looked up by Highway Classification and Traffic Volume. Accident rates can also be calculated from looked up average accident rates. For more details, see the description of panel P220, and information on Critical Rates and the Counter-Measure Method in section 6.

In the case of overlapping accident-prone sections, this program identifies the total extent of overlapping accident-prone sections, and the single most accident-prone section within it.

Details are included in the definition of the following terms:

```
Fixed Section Length
    -  the user specified section length

Fixed Length Accident-Prone Section
    - a section of highway starting at an accident location, and extending
      the Fixed Section Length from that starting point, in which there
      are at least the Critical Number of Accidents.
    - NOTE that a Fixed Length Accident-Prone Section of length L starting at
      KMMARK A includes KMMARKS A through to A + L - 0.1.  KMMARK A + L is
      NOT included.  This is because KMMARKs are coded to 0.1 km accuracy,
      so the section of highway from A - 0.05 through to A + 0.05 is
      represented by KMMARK A.  Consequently, the section from KMMARK A to
      A + L - 0.1 includes accidents from A-0.05 to A + (L - 0.1) + 0.05,
      which is a section of length L !

Short Accident-Prone Section
    - a section of highway which meets the Accident-Prone criteria, but which
      ends in a discontinuity before the Fixed Section Length is reached.

Extended Accident-Prone Section
    - an Extended Accident-Prone Section is defined as the total extent of a
      set of overlapping Fixed Length Accident-Prone Sections.  Thus it will
      start at the beginning of the first Fixed Length Accident-Prone
      Section, and end at the end of the last one.
    - it is quite possible that an Extended Accident-Prone Section will
      contain a section of the Fixed Section Length which is not accident-
      prone.  This is because of the possibilities of uneven accident spacing
      in overlapping Fixed Length Accident-Prone Sections.  Consider the
      following  example, in which the Fixed Section Length is 0.5 km, and
      the Critical Number of Accidents is 11:
    - note that it is also possible to have an extended section with counter-
      measure fields blank, even though one or more of its fixed length
      sections are accident-prone by the CM method.
```

```
     KMMARK:            4.0   4.1   4.2   4.3   4.4   4.5   4.6   4.7   4.8   4.9
     # Accidents:        10    0     0     0     1     0     0     0     10
                        _____/
                                  A            _____/
                                                          B
```

A and B are both Fixed Length Accident-Prone Sections.
The Extended Accident-Prone Section extends from 4.0 to 4.8, but a
section of the Fixed Section Length starting at 4.2 is not
accident-prone.

Worst Fixed Section
     - the Fixed Length Accident-Prone Section within an Extended Accident-
       Prone Section with the highest number of accidents.
     - when there are > 1 Fixed Length Accident-Prone Sections in an Extended
       Accident-Prone Section with the highest number of accidents, the FIRST
       one will be identified as the Worst fixed Section.
     - printed on a separate line in the report, following the Extended
       Section which contains it.

Node Spanning.
     - both Fixed Length and Extended Accident-Prone Sections may span nodes,
       as long as both connecting segments are Continuous at the Node. (See
       section 2.3.10 for a definition of Continuity.)

9.2.2 P220: Accident-Prone Sections Parameter Panel

```
P220    Highway Accident System - Accident-Prone Sections Parameters
        ----------------------  --------------------------------


 Report Title > Sample Title

 Define criteria for Accident-Prone Sections:         (Press PF1 for help)

      ( ( N >= 20    ) OR  ( F >= C     ) )    (             )
           - -- -----   ---   - -- -----    ---   - -- -----     ---
      Counter-Measure Accident Types   >
                                       -- -- -- -- -- -- -- -- -- -- -- -- --
            Min number of any type   > 6        Ratio File > TEST1
      Level of Significance
          for Crit. Rate Calculation  > .1  %    (.01, .05, .1, .5, 1 or 5)
          for Counter-Measure Method  > 2.5 %    (.5, 1, 2.5, 5 or 10)


 Section Length (km)          > 1.0

 Traffic Volumes:        Include Intersection:   >     Use pre-TIMS: >
 Analyse Sections with SAS program   > BYGROUPS  >       (Y to select)
 Produce Output CSV file             > OUT220    > Y
 Produce Printable Reports:                      > Y
 Report Worst Section in Extended Sections       >
```

DEFINE CRITERIA:

    This is where "Accident-Prone" is defined. Up to 3 conditions may be
    specified. Start at the left, and inside at least one pair of
    parentheses, code:

    1:An Attribute of a candidate Location:
          N - to indicate Number of Accidents,
          R - to indicate Accident Rate,
          W - to indicate Road-Weighted Accident Rate,
          F - to indicate Severity-Weighted Accident Rate,
          S - to indicate Accident Severity ratio (ASR)

    2: a comparison operator, one of: <   <=   =   >   >=

    3: a critical number, an L, or a C:
          L - to use a critical value Looked up (in file
              THASP.CRITICAL.RATES) by traffic volume and highway class,
            - available for attributes N, R and S only.
          C - to use a critical value Calculated from the traffic volume
              and the average accident rate for the type of location.
            - available only for accident rate attributes, i.e. if field
              1 is R, W or F
            - will cause a panel to be displayed so that you can specify
              the Average Accident Rate file from which critical rates
              are to be calculated.

    If more than one condition is coded, code AND or OR between conditions
    to indicate how they are to be combined.

    For more information on Critical Rates, see section 6.5

COUNTER-MEASURE ACCIDENT TYPES:

    Enter up to 13 2-digit accident types.

    A section with an over-representation of any of the specified accident
    types will be considered Accident-Prone.

    1 digit Accident Type numbers may be entered left or right justifed,
    blank or zero filled, i.e. '01' = ' 1' = '1 '

    The following commands may be entered in the first accident type field:
         ? or S - select accidents from a labelled list on a sub-panel
         *   - set all accident types
         D or C - Delete (or Clear) all accident types

    Before an over-representation calculation is attempted for an accident
    type, there must be at least the **Min number of any type** accidents of
    that type.

    If you are coding both Relational Criteria and Counter-Measure accident
    types, enter AND or OR at the end of the relational criteria line to
    indicate whether both or one of the methods are sufficient to determine
    a location or section as Accident-Prone.

    The average accident type ratios used for the comparisons are read from
    file *userid*.ACCTYPE.RATIOS.SECTION.*name*, where *userid* is your TSO
    userid, and *name* is a name which you enter in the **Ratio File** field.
    Enter **?** in the Ratio File field to select from a list of existing
    files. Accident Type Ratio files are created using the Accident Type
    Ratio program (THAS270), which is selectable from the HAS Data
    Retrieval Process Selection menu.

    If the Accident Type Ratios file you specify contains non-mutually-
    exclusive reference groups, the ratios of the first group into which
    each accident location falls will be used for that accident.

LEVEL OF SIGNIFICANCE:

    For Critical Rate Calculation

         If a Calculated Critical Rate has been specified (with a C on the
         right side of a relational criterion), the Level of Significance
         adjusts the critical rate. A HIGHER level of significance
         results in a lower K-value, which decreases the critical rate,
         which means you will end up with MORE Accident-Prone sections.

    For the Counter-Measure Method

         The Level of Significance in this case adjusts the CHI-squared(a)
         value. A HIGHER level of significance results in a lower CHI-
         squared(a), which means an accident-type proportion is more
         likely to be considered an over-representation, which means you
         will end up with MORE Accident-Prone sections.

SECTION LENGTH:

    Accidents in each stretch of highway of this length summed to determine
    if the section is accident-prone. See the description of the Accident-
    Prone Sections program for details.

TRAFFIC VOLUMES:
   INCLUDE INTERSECTION >

      Y   - use traffic volume file which has intersection traffic volumes.
           - THASP.SEGVOL3
           - you may want to use this option if intersection accidents are
             included in the input accident subset, and if traffic volumes are
             available throughout the study area.
      N   - (or blank) - use the traffic volume file which does NOT have
             intersection traffic volumes.
           - THASP.SEGVOL2
      1   - use the traffic volume file which has just one automatically
             calculated traffic volume per segment.
           - THASP.SEGVOL1
           - use this option if you want to compare the results to old reports
             created when this was the only option.

   USE PRE-TIMS >

      Y   - use the old traffic volume files: those which were in use prior
             to December 2000, before data from the Traffic Information
             Management System was implemented in the HAS.
           - this option is provided so that accident rates consistenct with
             previous HAS output can be obtained, and so that comparisons can
             be made.
      N   - (or blank) - use the current traffic volume files.

SAS PROGRAM:

      Specifying a SAS program here, and a Y to activate it, is equivalent to
      saving the Selected accidents in a temporary subset, then specifying
      the SAS program as a separate process step.

      Enter ? to get a member list of SASLIB programs.

TYPE OF WEIGHTED ACC RATES TO PUT IN REPORTS

      The Accident-Prone Locations report does not have room for both Road-
      and Severity-Weighted accident and critical rates.

      Code an **R** to get Road-weighted data, **S** to get Severity-weighted data.

PRODUCE OUTPUT CSV FILE:
      To produce an output CSV (comma-seperated-values) file with one record
      for each accident-prone-location, code the name of the output file in
      the first field, and a Y in the second field. If the second field is N
      or blank, no such file will be created.

      The file name must start with a letter.

      An extension of ".CSV" will be added automatically.
      The CSV file can be downloaded directly from the mainframe when the
      batch job has finished. (I.e. there is no need to extract from the
      batch queue as is required for reports.)

      If this option is selected, you will be given the opportunity to select
      and order the fields you want in the CSV file, in a following panel
      (SSOF).

PRODUCE PRINTABLE REPORTS:

> Code a **Y** in this field to produce Accident-Prone Location reports.
> (Until April 2002, reports were always produced.)
>
> (In a sense, there is only one report produced, but multiple copies
> with different sort orders may be produced.)
>
> If this option is selected, Report options are specified in a following
> panel (REPS).

```
REPORT WORST SECTION:
```

> If this option is selected (with a Y), each extended Accident-Prone
> Section report line will be followed by a line reporting the worst
> fixed-length section within the extended section.
> This applies to both the report and the CSV file output.

The following option still exists in the PL/I program but has been removed from the user interface, because it was developed for a project done by people no longer working with the system.

```
OUTPUT FOR DIAGNOSIS PHASE ON PC:

    Selecting this option (with a Y) will cause the following two
    output datasets to be created:

        THASP.DIAGNOS.LOCATION.DATA     - diagnosis data file
        THASP.DIAGNOS.LOCATION.DESC     - description file.
```

These files contain detailed counter-measure data which may be wanted for detailed research on a PC.

9.2.3 Panels PARF, REPS and SSOF

When defining an Accident Prone Section process, panel P220 will be followed by panel PARF, and, depending upon options selected, panels REPS and SSOF. These panels serve the same purpose here as with the Accident Prone Locations program. Please see sections 9.1.6 , 9.1.7 and 9.1.8 for details.

9.2.4 Report

The Accident-Prone Sections Report starts with a copy of the Description file of the input accident data Subset Pair. This contains the Data Selection information, Search Path, and details of any other processes which have helped to select the input data. (See section 6.2.2 for a description of Subset Pairs and Description files.)

The Accident-Prone Section control parameters are printed on a new page following the Description file listing.

Next comes the body of the report. In the case of Extended Accident-Prone Sections, there are two lines on the report, followed by a blank line. The first line describes the Extended Section, and the second line describes the Worst Section. Suppressing the Worst Section lines is an option of the program. Note that sorting and ranking is done using the Extended Section information.

The fields of the report are the same as in the Accident-Prone Locations report, except that fields TYPE and NODE are replaced with 'STOP SEGNUM-KM' and 'LENGTH', and the Accident Rate is calculated differently:

```
STOP
    - the Segment number and KMMARK defining the end point of the
      Accident-Prone Section.

LENGTH
    - the length of the Accident-Prone Section.
    - if the Length is greater than the SECTION LENGTH specified in the
      report heading (which is the user specified Fixed Section Length),
      then the Accident-Prone Section is an Extended Accident-Prone Section.
    - the length may be shorter than the specified Fixed Section Length, in
      cases where the section ends at a discontinuity (such as a null node).
    - note that the length is 0.1 km greater than the Stop Km minus the Start
      Km.  The H.A.S. works with 100m accuracy, so 50 metres before the Start
      km, and 50 metres after the End km are included in the length.

CLASS
    - the Predominant Highway Classification for the section.
    - if blank, it means this location is not defined on the THASP.SEGCLASS
      file.
    - the Class string may be followed by one of the following 1-character
      flags:
          !  -  the classification changed during the time period from which
                data was selected.  The Classification shown is that of the
                majority of the time period.
          *  -  the classification changed over the length of the section.
                The class shown is the predominant one.
          %  -  both ! and * apply.


ACC RATE
    - the Accident Rate, units = accidents/(million vehicle-kms)
```

$$AccidentRate = \frac{\#\,Accidents \; x \; 1,000,000}{SectionLength \; x \; \#\,Vehicles}$$

```
        where #Vehicles is the ADT times the number of days in the data period.
```

There is an option to have relevant landmark descriptions included in the report. The landmark descriptions come from the THASP.LANDMARK file. The following logic is used to determine which landmarks are printed. This algorithm is independent of report sort order.

```
        Find the landmark nearest to the START location (LM1).
        Find the landmark nearest to the END location   (LM2).

        If LM1 is AT or BEFORE the START, and is NOT the same as the last
        landmark printed:
            Print LM1.

        Print the accident-prone section line(s).

        If LM1 occurs AFTER the START and before the END of the section:
            Print LM1.

        If LM2 is not the same as LM1:
            Print LM2.
```

                                TEST
DATA PERIOD: 1999/01/01 - 2001/03/31   SORTED BY: Search Sequence
SECTION LENGTH: 1.0 Km   (Swtd >= Calc)

DESCRIPTION (HISTORY) OF THE INPUT ACCIDENT FILE ... Page   1
==

        ==
        PROGRAM: THAS200 VERSION: 2.9 RUN DATE & TIME: 2002/02/25 12:11

            ACCIDENT SELECTION CRITERIA

             FROM   TO   LETTERED
          Hwy Seg   Km   Hwy Seg   Km
       1. 11 2742   0.0   11 2744 10.0   NO

        Segment-Classification file: THASD.SEGCLASS.YR2002.SORTED

        SECTION DEFINITIONS FILE: (NONE)
        DISTRICTS:
        HIGHWAY CLASS SET:
        DATES: 19990101 TO 20010331
        MONTHS: TO
        HOURS: TO
        NODE SELECTION: 1 (once only)
        OBSOLETE LOCATIONS: NO

        ----
        *SEARCH PATH   (FROM   TO)   # REC # ACC X_REC X_ACC
        NODE NULL2742   0   0   0   0
        SEG 2742   0.0   3.4   6   5   0   0
        NODE 27422743   0   0   0   0
        SEG 2743   0.0   3.7   18   13   0   0
        NODE 27432744   4   4   0   0
        SEG 2744   0.0 10.0   96   81   0   0
        NODE 27442750   1   1   0   0
        ----
        *END OF SEARCH PATH. TOTALS: 125   104   0   0
           125 RECORDS,   104 ACCIDENTS SELECTED
             0 RECORDS,   0 ACCIDENTS AT OBSOLETE LOCATIONS SELECTED
        THAS200 COMPLETED SUCCESSFULLY

DATA PERIOD: 1999/01/01 - 2001/03/31   SORTED BY: Search Sequence
SECTION LENGTH: 1.0 Km   (Swtd >= Calc)

===

        Accident-Prone Section Control Parameters

     Criteria: (Swtd >= Calc)

     Level of Significance for Critical Rate Calculation: 0.10%
                                                      K: 3.090

     Fixed Section Length: 1.0 km

   Average Accident Rate Table, from file: THASD.AVERATES.SEC.MASTER
   Class Set   Landmarks   Rate   RW-Rate SW-Rate
   -------------------- ---------------- ------- ------- -------
   PS U EF D 4 RM   1.09   0.22   1.22
   P U EF D 4 RM   0.80   0.16   1.16
   O U EF D 4 RM   0.14   0.03   1.03
   P R EF D 4 RM   1.31   0.24   1.24
   S R EF D 4 RM   0.64   0.12   1.12
   * * * * * L   0.11   0.21   1.21
   * * * * * R   0.42   0.22   1.22
   * * * * * M   0.43   0.23   1.23

DATA PERIOD: 1999/01/01 - 2001/03/31   SORTED BY: Search Sequence
SECTION LENGTH: 1.0 Km   (Swtd >= Calc)

Reg   Start   Stop   CM-Acc   Acc-Rate   Rate/CRate Total-Num   Fatals   Injury   PDO   GRP
 Dis Hwy Segnum-Km   Segnum-Km Length Class   ADT Typ %   Trad RWtd Trad RWtd Acc Veh   Ac/Kl/In Acc/Inj Acc   ASR   ID
===

           2742   3.0 S PARALLEL RD
 1 7 11 2742   3.0 2743   0.6   1.1 PRAU4R* 21518   0.51 0.09   .57 .16   10   28   1/ 1/ 1   4/ 10   5 14.5 0001
           2743   0.6 MARSHALL RD INT

 1 7 11 2744   2.5 2744   3.4   1.0 PRAU2R 33069   0.33 0.06   .40 .12   9   17   0/ 0/ 0   8/ 15   1   9.0 0002
           2744   2.6 JCTN CLAYBURN RD
           2744   3.4 JCTN TOWNSHIPLINE RD

           2744   7.2 MISSION BRIDGE S END   2317
 1 7 11 2744   7.2 2744   8.9   1.8 PRAU4R 33069   1.00 0.15 1.39 .34   49   98   1/ 1/ 1   20/ 30   28   6.7 0003
           2744   8.9 MISSION BRIDGE N END   2317

--- END OF REPORT ---   3 ACCIDENT-PRONE SECTIONS REPORTED ---

9.2.5 CSV Output File

If the CSV Ouput File option is selected on the first Accident-Prone Sections panel (P220), a comma-separated values file will be created (when the batch job has completed), named: <name>.CSV, where <name> is the name you also specified on panel P210.   (The full TSO name has your TSO userid prepended.)

The file will contain:
- 5 lines of heading infrormation
- a blank line
- comma-separated column headings
- a line of comma-separated data for each accident-prone section
- Extended AP sections may be followed by a line describing the Worst fixed-length section within the Extended section, if that option was selected.
- information describing the history of the input accident subset.

The data records will contain just the fields you selected on panel SSOF, in the order specified.

Following is a list of all the available fields:

GroupID	ID of Accident-Prone Section
SecType	'E' - extended, 'W' - Worst, 'S' - Short, ' ' - normal
Reg	Highway Region number of start of section
Dist	Highway District number of start of section
Area	Contract Management Area of start of section
Highway	Highway number and letter of start of section.
Seg1	Segment number of start of section
Km1	Km on Seg1 of start of section
Seg2	Segment number of end of section
Km2	Km on Seg2 of end of section
ObsLocn	'x' if accidents at obsolete locations included in counts
Length	Length of section = end - start + 0.1 km = PrimLength + OppLength
Date1	Earliest date of accident selection, format yyyy-mm-dd
Date2	Latest date of accident selection, format yyyy-mm-dd
Class	Predominant Highway Classification
CompClass	Composite Highway Classification (asterisks for changes in section)
ClassTimeChange	'Yes' if class changed over the time period.
ADT	Average Daily Traffic count for the section and time period
Volume	Number of Vehicle-Days = ADT * #days in date range.
Rate	Accident rate. Accidents per million vehicle-km
RW Rate	Road-Weighted Accident Rate
SW Rate	Severity-Weighted Accident Rate
ASR	Accident Severity Ratio
CritRate Lkup	Critical Accident Rate Looked up.
CritNum Lkup	Critical Number of accidents, looked up.
CritASR Lkup	Critical Accident Severity Ratio, looked up.
CritRate Calc	Critical Accident Rate Calculated (using Average Acc Rate)
RW CritRate	Calculated Critical Road-Weighted Accident Rate
SW CritRate	Calculated Critical Severity-Weighted Accident Rate
AveRate	Average Accident Rate
RW AveRate	Road-Weighted Average Accident Rate
SW AveRate	Severity-Weighted Average Accident Rate
Rate Ratio	Accident Rate / Critical Rate
RW Rate Ratio	RW Accident Rate / RW Critical Rate
SW Rate Ratio	SW Accident Rate / SW Critical Rate

#Acc	Number of accidents
#Veh	Total number of vehicles
Fat#Acc	Number of fatal accidents
Fat#Fat	Number of fatalalities
Fat#Inj	Number of injured people in fatal accidents
Inj#Acc	Number of injury accidents
Inj#Inj	Number of injured people in injury accidents
PDO#Acc	Number of Property Damage Only accidents
CM Acctype	most-over-represented counter-measure accident type
CM Ratio	ratio of CM Acctype accidents to all accidents.

9.3   Histogram Report (THAS230)

9.3.1 Description

The Histogram Report shows a graphical representation of the number of accidents at each location of the specified data Subset.

The report starts with a copy of the Description File of the input data Subset Pair. This contains the Data Selection information (from the main Data Selection menu), the Search Path, and details of any other processes which have helped to create the Subset (such as the Accident-Prone Locations or Accident-Prone Sections programs).

In addition to the report, the program may produce a Comma-Separated-Values file, suitable for downloading to a PC and loading into a spreadsheet or database.

9.3.2 P230: Histogram Panel

```
P230        Highway Accident System - Histogram Specification
            ----------------------  ----------------------


Title:


Km per line            > 0.1        Kilometres to be represented by each line
                                    of the Histogram (to one decimal place).


Accidents per Character > 1         Number of accidents to be represented by
                                    each character on the histogram line.


Produce a CSV  file    > Y          Y for a Comma-Separated-Values file.


CSV File Name          >            (.CSV will be appended)


CSV File Options (Enter Y to select):

    > Y   - Include the Histogram string of F, I and P characters.
    > Y   - Include Discontinuity indicator records.
    > Y   - Include the cumulative totals (between discontinuities).

           Press Enter to continue, PF3 to cancel.
```

TITLE:
    - the Histogram Title entered here will appear on every page of the
      Histogram Report.
    - a blank title can be entered if desired.

KILOMETRES PER LINE:
    - 0.1 means that every KMMARK will be represented by one line on the
      histogram.
    - any number larger than 0.1 will condense the histogram, e.g. 2.0 will
      cause all the accidents of each 2 km to be represented on one line of
      the histogram.

ACCIDENTS PER CHARACTER:
     - if set to 1, then each accident will be represented by one character on
       each histogram line: an F for a Fatal, an I for an Injury, and a P for
       a PDO accident.
     - if Kilometres per line is set larger than 0.1, you may want to increase
       the number of accidents per character, to prevent long, wrapped lines
       of characters.
     - if set to N greater than 1, one character prints for N accidents. If
       the number of accidents of one type (F, I or P) is not divisible by N,
       then an extra character is printed for the remaining accidents.

PRODUCE A CSV FILE:

     - Enter a Y to have a Comma-Separated-Values file produced. This file
       will contain the same data as the report, but in a form suitable for
       importing into a spreadsheet or database.

CSV FILE NAME:

     - enter a file name: up to 8 characters. An extension of **.CSV** will be
        added automatically.

CSV FILE OPTIONS:

     - these options allow you to eliminate unwanted data from the CSV file.

9.3.3 Report

Headings

Data Selection Dates: YearMonthDay - YearMonthDay
     This is the range of dates within which the accidents all occurred. It
     is the date range that the user specified on the initial Data Selection
     menu.

Report Date: Year/Month/Day   Hour:Minute
     This is the date and time that the Histogram program started. It may
     be somewhat later than the time that the Histogram's data was chosen
     from the Data Selection menu (particularly if the Initial Data Source
     was an already created Subset Pair).

Multiplier Factor:
     This line describes how many fatal, injury, and PDO accidents are
     represented by each F, I, or P in the histogram.

User-Defined Title
     Any title the user has entered in the menu option when choosing to
     generate a Histogram. It should be something useful to help identify
     the Histogram Report, such as:
          TRUCKS -- 1987-89
     or
          THE MALAHAT, DAYLIGHT HOURS, WINTER, 1989.

Fields of the Histogram Report

LANDMARK DESCRIPTION
- This is the first 24 characters of the description from the
THASP.LANDMARK file, which is a part of the Landmark Kilometre
Inventory. Many locations have no landmark in the LKI, and their
landmark description is therefore blank.

- A node is further identified by **NODE node#** on the line before its
landmark description (if any).

- The beginning of a segment is similarly signalled by
SEGMENT segment# on the line before the landmark description (if
any) of the first KMMARK in the segment.

KMMARK
- The location of each point within a segment, measured in tenths
of a kilometre from the beginning of a segment. Nodes have no
KMMARK.

Obsolete Location marker
- Locations containing accidents that occurred at obsolete
locations are marked with an **x** immediately after the KMMARK.

- Locations marked with an **x** may also display accidents that did
not occur at obsolete locations, since a given segment-KMMARK or
node that once was located on an obsolete piece of road may now
be located on a road that is currently part of the highway
system.

HISTOGRAM OF ACCIDENT FREQUENCY
- For each location (a segment-KMMARK <u>or</u> a node), this string
contains:
     one **F** for each N **fatal** accidents;
     one **I** for each N non-fatal accidents involving **injury** to
          at least one person;
     one **P** for each N **property-damage-only** accidents;

... where N is the specified number of accidents per character.

- If N is > 1, then the number of accidents is rounded **up** for the
purpose of calculating how many characters to print. For
example, if N=5, and there 11 PDO accidents, 3 P's will print.
(The exact numbers can still be read on the right side of the
report.)

- The histogram counts the number of <u>accidents</u> of each type, NOT
the number of fatalities or injuries.

- If there are too many accidents at a location to fit on one
histogram line (which can show up to 60 accidents), the display
of accidents will be continued on up to 9 subsequent lines. If
there are too many accidents to fit even on 10 display lines, the
last line displayed will be followed by:
     .....more than 600 accidents at this location.

FAT
     – Number of fatal accidents at each location.

INJ
     – Number of non-fatal injury accidents at each location.

PDO
     – Number of property-damage-only accidents at each location.

TOT
     – Total number of accidents of all three types at each location.

 C U M U L A T I V E
FAT   INJ   PDO   TOT
     – Running totals of each of the above types of accidents.

     – The cumulative totals are accumulated until the Histogram reaches
       a discontinuity in the search path, when the totals are reset to
       zero.

Other information shown

     Discontinuity marker:
            --------------- **DISCONTINUITY IN SEARCH PATH** ---------------
     – This marker is placed wherever a discontinuity occurs. (See the
       Search Path in the Description File, which is dumped at the
       beginning of every Histogram. A discontinuity is marked by **----**
       in the Search Path.)

     – A discontinuity occurs at discontinuous or null nodes, and also
       whenever sections of different highways or different sections of
       the same highway are requested.

     – In general, whenever it is not possible, or not <u>legally</u> possible,
       to drive directly from one part of the Search Path to the next
       part, there will be a discontinuity in the Search Path.

     Page Totals
     – Totals of each type of accident displayed on a single page of a
       Histogram. The page totals for each page are printed at the
       bottom of that page.

     Segment Totals
     – Totals of all accidents of each type occurring within a segment.

     – Accidents occurring at the nodes at the beginning and end of a
       segment are not included in the segment totals.

     End-of-histogram marker:
            *************** **HISTOGRAM COMPLETE** ***************
     – Signals the end of a Histogram Report.

```
                        *** H.A.S.  A C C I D E N T   H I S T O G R A M ***                        Page    1
                                         Version  2.2
Report date: 1999/03/21   09:05                                        FAT: # FATAL ACCIDENTS
Data Period: 1995/01/01 - 1998/03/31                                   INJ: # NON-FATAL INJURY ACCIDENTS
                                                                       PDO: # PROPERTY-DAMAGE-ONLY ACCIDENTS
                                     Campbell River                    TOT: TOTAL ACCIDENTS (FAT, INJ & PDO)
No multiplier factor.  Each F, I, or P represents one fatal, injury, or PDO accident.


==================================================================================================================
Description (history) of the input accident file
------------------------------------------------------------------------------


===============================================================================
PROGRAM: THAS200 VERSION:  2.4  RUN DATE & TIME: 1999/03/21 09:05
----------------------------------------------------------------
          ACCIDENT SELECTION CRITERIA

        FROM                TO          LETTERED
     Hwy  Seg   Km       Hwy  Seg   Km
  1.   19  2340 100.0      19  2370  10.0     NO


DISTRICTS:
HIGHWAY CLASS SET:
DATES:              19950101 TO 19980331
MONTHS:             TO
HOURS:              TO
NODE SELECTION:    1  (once only)
OBSOLETE LOCATIONS: YES


          ------------------------------------------------------------
*SEARCH PATH   (FROM    TO )    # REC  # ACC  X_REC  X_ACC
SEG  2340     100.0  120.6      184    168      0      0
NODE 23402370                     6      6      0      0
SEG  2370       0.0   10.0       39     38      0      0
----
*END OF SEARCH PATH.  TOTALS:   229    212      0      0
     229 RECORDS,     212 ACCIDENTS SELECTED
       0 RECORDS,       0 ACCIDENTS AT OBSOLETE LOCATIONS SELECTED
THAS200 COMPLETED SUCCESSFULLY
```

```
Report date: 1999/03/21   09:05                                          FAT: # FATAL ACCIDENTS
Data Period:  1995/01/01 - 1998/03/31                                    INJ: # NON-FATAL INJURY ACCIDENTS
                                                                         PDO: # PROPERTY-DAMAGE-ONLY ACCIDENTS
                                    Campbell River                       TOT: TOTAL ACCIDENTS (FAT, INJ & PDO)
No multiplier factor.  Each F, I, or P represents one fatal, injury, or PDO accident.


========================================================================================================================
                                                                                  |    C U M U L A T I V E
                                                                                  |
  LANDMARK DESCRIPTION  KMMARK|       HISTOGRAM OF ACCIDENT FREQUENCY        FAT INJ PDO TOT |   FAT    INJ    PDO    TOT
------------------------------------------------------------------------------------------------------------------------

                              |                                                             |
SEGMENT 2340                  |                                                             |
                       100.0  |                                               0   0   0   0 |   0      0      0      0
                       100.1  |                                               0   0   0   0 |   0      0      0      0
                       100.2  | III                                           0   3   0   3 |   0      3      0      3
                       100.3  |                                               0   0   0   0 |   0      3      0      3
S ENTR REST AREA       100.4  |                                               0   0   0   0 |   0      3      0      3
                       100.5  | P                                             0   0   1   1 |   0      3      1      4
N ENTR REST AREA       100.6  |                                               0   0   0   0 |   0      3      1      4
                       100.7  |                                               0   0   0   0 |   0      3      1      4
                       100.8  |                                               0   0   0   0 |   0      3      1      4
                       100.9  |                                               0   0   0   0 |   0      3      1      4
                       101.0  | IIP                                           0   2   1   3 |   0      5      2      7
                       101.1  |                                               0   0   0   0 |   0      5      2      7
                       101.2  |                                               0   0   0   0 |   0      5      2      7
                       101.3  |                                               0   0   0   0 |   0      5      2      7
                       101.4  | P                                             0   0   1   1 |   0      5      3      8
                       101.5  |                                               0   0   0   0 |   0      5      3      8
                       101.6  | P                                             0   0   1   1 |   0      5      4      9
                       101.7  |                                               0   0   0   0 |   0      5      4      9
                       101.8  | P                                             0   0   1   1 |   0      5      5     10
                       101.9  |                                               0   0   0   0 |   0      5      5     10
                       102.0  |                                               0   0   0   0 |   0      5      5     10
                       102.1  |                                               0   0   0   0 |   0      5      5     10
                       102.2  |                                               0   0   0   0 |   0      5      5     10
                       102.3  | I                                             0   1   0   1 |   0      6      5     11
SAILOR RD              102.4  |                                               0   0   0   0 |   0      6      5     11
                       102.5  |                                               0   0   0   0 |   0      6      5     11
                       102.6  | I                                             0   1   0   1 |   0      7      5     12
                       102.7  | PP                                            0   0   2   2 |   0      7      7     14
                       102.8  |                                               0   0   0   0 |   0      7      7     14
                       102.9  |                                               0   0   0   0 |   0      7      7     14
                       103.0  | P                                             0   0   1   1 |   0      7      8     15
                       103.1  |                                               0   0   0   0 |   0      7      8     15
                       103.2  | I                                             0   1   0   1 |   0      8      8     16
                       103.3  | P                                             0   0   1   1 |   0      8      9     17
                       103.4  |                                               0   0   0   0 |   0      8      9     17
YORK RD                103.5  | P                                             0   0   1   1 |   0      8     10     18
                       103.6  |                                               0   0   0   0 |   0      8     10     18
                       103.7  |                                               0   0   0   0 |   0      8     10     18
                       103.8  |                                               0   0   0   0 |   0      8     10     18
                       103.9  |                                               0   0   0   0 |   0      8     10     18
                             -+----+----+----+----+----+----+----+----+----+----+
                              0    10   20   30   40   50   60
                                                                FAT INJ PDO TOT
                                                                ----------------
                                          Accident totals this page:    0   8  10  18


Histogram for:  HWY  19  (ISLAND)
         SEGMENT 2340 (PARKSVILLE - CAMPBELL RIVER)   FROM KM 100.0 TO KM 103.9
```

```
                          *** H.A.S.  ACCIDENT  HISTOGRAM ***                                   Page    3
                                      Version  2.2
Report date: 1999/03/21   09:05                                         FAT: # FATAL ACCIDENTS
Data Period: 1995/01/01 - 1998/03/31                                    INJ: # NON-FATAL INJURY ACCIDENTS
                                                                        PDO: # PROPERTY-DAMAGE-ONLY ACCIDENTS
                              Campbell River                            TOT: TOTAL ACCIDENTS (FAT, INJ & PDO)
No multiplier factor.  Each F, I, or P represents one fatal, injury, or PDO accident.


======================================================================================================================
                                                                                 |   C U M U L A T I V E
   LANDMARK DESCRIPTION  KMMARK|          HISTOGRAM OF ACCIDENT FREQUENCY        FAT INJ PDO TOT |  FAT   INJ   PDO   TOT
----------------------------------------------------------------------------------------------------------------------
                         104.0 | P                                               0   0   1   1 |   0    8    11    19
                         104.1 |                                                 0   0   0   0 |   0    8    11    19
APPIAN WAY               104.2 | II                                              0   2   0   2 |   0   10    11    21
HENRY RD                 104.3 |                                                 0   0   0   0 |   0   10    11    21
ANTON RD                 104.4 | IP                                              0   1   1   2 |   0   11    12    23
                         104.5 | I                                               0   1   0   1 |   0   12    12    24
ASH RD                   104.6 | II                                              0   2   0   2 |   0   14    12    26
                         104.7 | I                                               0   1   0   1 |   0   15    12    27
                         104.8 | P                                               0   0   1   1 |   0   15    13    28
                         104.9 |                                                 0   0   0   0 |   0   15    13    28
LYNWOOD RD               105.0 | II                                              0   2   0   2 |   0   17    13    30
SEAWAVE RD               105.1 | IIIP                                            0   3   1   4 |   0   20    14    34
                         105.2 | IP                                              0   1   1   2 |   0   21    15    36
                         105.3 | II                                              0   2   0   2 |   0   23    15    38
                         105.4 |                                                 0   0   0   0 |   0   23    15    38
                         105.5 |                                                 0   0   0   0 |   0   23    15    38
                         105.6 | I                                               0   1   0   1 |   0   24    15    39
ACCESS TO FRONTAGE RD (S105.7 | P                                                0   0   1   1 |   0   24    16    40
                         105.8 |                                                 0   0   0   0 |   0   24    16    40
MCGIMPSEY RD             105.9 | II                                              0   2   0   2 |   0   26    16    42
                         106.0 |                                                 0   0   0   0 |   0   26    16    42
                         106.1 | I                                               0   1   0   1 |   0   27    16    43
                         106.2 | P                                               0   0   1   1 |   0   27    17    44
ACCESS TO FRONTAGE RD (B106.3 |                                                  0   0   0   0 |   0   27    17    44
ACCESS TO FRONTAGE RD (R106.4 |                                                  0   0   0   0 |   0   27    17    44
ENGLES RD                106.5 | PP                                              0   0   2   2 |   0   27    19    46
                         106.6 |                                                 0   0   0   0 |   0   27    19    46
                         106.7 |                                                 0   0   0   0 |   0   27    19    46
                         106.8 |                                                 0   0   0   0 |   0   27    19    46
                         106.9 |                                                 0   0   0   0 |   0   27    19    46
                         107.0 |                                                 0   0   0   0 |   0   27    19    46
HEARD RD                 107.1 |                                                 0   0   0   0 |   0   27    19    46
                         107.2 | IP                                              0   1   1   2 |   0   28    20    48
                         107.3 |                                                 0   0   0   0 |   0   28    20    48
                         107.4 |                                                 0   0   0   0 |   0   28    20    48
                         107.5 |                                                 0   0   0   0 |   0   28    20    48
                         107.6 |                                                 0   0   0   0 |   0   28    20    48
                         107.7 |                                                 0   0   0   0 |   0   28    20    48
CRAWFORD RD              107.8 | III                                             0   3   0   3 |   0   31    20    51
BEACH ACCESS (SHORELINE 107.9 | P                                               0   0   1   1 |   0   31    21    52
                         108.0 | IPP                                             0   1   2   3 |   0   32    23    55
SHELL RD                 108.1 |                                                 0   0   0   0 |   0   32    23    55
                               -+----+----+----+----+----+----+----+----+----+----+
                                0    10   20   30   40   50   60
                                                               FAT INJ PDO TOT
                                                               ----------------
                                    Accident totals this page:   0  24  13  37

 Histogram for:  HWY  19  (ISLAND)
             SEGMENT 2340 (PARKSVILLE - CAMPBELL RIVER)   FROM KM 104.0 TO KM 108.1
```

```
Report date: 1999/03/21   09:05                                                  FAT: # FATAL ACCIDENTS
Data Period: 1995/01/01 - 1998/03/31                                             INJ: # NON-FATAL INJURY ACCIDENTS
                                                                                 PDO: # PROPERTY-DAMAGE-ONLY ACCIDENTS
                                      Campbell River                             TOT: TOTAL ACCIDENTS (FAT, INJ & PDO)
No multiplier factor.  Each F, I, or P represents one fatal, injury, or PDO accident.


===================================================================================================================================
                                                                                           |   C U M U L A T I V E
   LANDMARK DESCRIPTION  KMMARK|           HISTOGRAM OF ACCIDENT FREQUENCY               FAT INJ PDO TOT |  FAT    INJ    PDO    TOT
-----------------------------------------------------------------------------------------------------------------------------------
                        108.2 |                                                          0   0   0   0 |   0     32     23     55
SEAGULL RD              108.3 |                                                          0   0   0   0 |   0     32     23     55
ACCESS TO FRONTAGE RD   108.4 | PP                                                       0   0   2   2 |   0     32     25     57
                        108.5 |                                                          0   0   0   0 |   0     32     25     57
OCEAN GROVE RD          108.6 | IPP                                                      0   1   2   3 |   0     33     27     60
                        108.7 | I                                                        0   1   0   1 |   0     34     27     61
ACCESS TO FRONTAGE RD   108.8 | PP                                                       0   0   2   2 |   0     34     29     63
                        108.9 |                                                          0   0   0   0 |   0     34     29     63
                        109.0 | P                                                        0   0   1   1 |   0     34     30     64
                        109.1 |                                                          0   0   0   0 |   0     34     30     64
MARYLAND RD             109.2 | P                                                        0   0   1   1 |   0     34     31     65
TWILLINGATE RD          109.3 | P                                                        0   0   1   1 |   0     34     32     66
                        109.4 | I                                                        0   1   0   1 |   0     35     32     67
                        109.5 |                                                          0   0   0   0 |   0     35     32     67
DAHL RD                 109.6 |                                                          0   0   0   0 |   0     35     32     67
                        109.7 |                                                          0   0   0   0 |   0     35     32     67
                        109.8 |                                                          0   0   0   0 |   0     35     32     67
                        109.9 |                                                          0   0   0   0 |   0     35     32     67
BARLOW RD               110.0 | PP                                                       0   0   2   2 |   0     35     34     69
                        110.1 |                                                          0   0   0   0 |   0     35     34     69
                        110.2 |                                                          0   0   0   0 |   0     35     34     69
                        110.3 | P                                                        0   0   1   1 |   0     35     35     70
                        110.4 |                                                          0   0   0   0 |   0     35     35     70
                        110.5 | I                                                        0   1   0   1 |   0     36     35     71
ERICKSON RD TO AIRPORT  110.6 | IPPP                                                     0   1   3   4 |   0     37     38     75
                        110.7 | I                                                        0   1   0   1 |   0     38     38     76
                        110.8 |                                                          0   0   0   0 |   0     38     38     76
                        110.9 | IIPP                                                     0   2   2   4 |   0     40     40     80
LARWOOD RD              111.0 | IP                                                       0   1   1   2 |   0     41     41     82
                        111.1 | I                                                        0   1   0   1 |   0     42     41     83
                        111.2 | I                                                        0   1   0   1 |   0     43     41     84
ADAMS RD                111.3 | II                                                       0   2   0   2 |   0     45     41     86
WESTGATE RD WITH CROSSWA111.4 | IIIIP                                                    0   4   1   5 |   0     49     42     91
                        111.5 | I                                                        0   1   0   1 |   0     50     42     92
HILCHEY RD              111.6 | IIIIP                                                    0   4   1   5 |   0     54     43     97
                        111.7 |                                                          0   0   0   0 |   0     54     43     97
                        111.8 |                                                          0   0   0   0 |   0     54     43     97
SIMMS RD                111.9 | II                                                       0   2   0   2 |   0     56     43     99
                        112.0 |                                                          0   0   0   0 |   0     56     43     99
                        112.1 |                                                          0   0   0   0 |   0     56     43     99
                        112.2 | I                                                        0   1   0   1 |   0     57     43    100
                        112.3 |                                                          0   0   0   0 |   0     57     43    100
                              -+----+----+----+----+----+----+----+----+----+----+----+
                              0        10        20        30        40        50        60
                                                                                 FAT INJ PDO TOT
                                                                                 ----------------
                                                        Accident totals this page:   0  25  20  45


 Histogram for:  HWY  19  (ISLAND)
                 SEGMENT 2340 (PARKSVILLE - CAMPBELL RIVER)   FROM KM 108.2 TO KM 112.3
```

9.4 Details Report (THAS240)

9.4.1 Description

The Details Report program takes all the selected accident records and prints a full description of all the accident details in tabular form. Each accident is divided into three sections for ease of viewing -- accident, vehicle, and victim information. (The victim information section is omitted in reports produced for the general public.)

The descriptions of the accident record codes are looked up on a table: THASP.TABLE(MV104).

9.4.2 P240: Details Report Parameter Panel

```
P240
          Highway Accident System - Details Report Options
          ----------------------   ---------------------



Please indicate whether this report will be viewed by the public under the
provisions of the Freedom Of Information Act.  Confidential information (i.e.
Victim information) will be elided from such reports.


Is this report to be printed for public viewing?  N  (Y/N)



              Press Enter to continue, PF3 to cancel.

```

Entering Y on this panel will cause a version of the details report to be produced with no victim information.

9.4.3 Report

The Details Report starts with a copy of the Description file of the input accident data Subset Pair. This contains the Data Selection information, Search Path, and details of any other processes which have handled the input data. (See section 6.2.2 for a description of Subset Pairs and Description files.)

Every field of the accident record is shown in the Details Report. All codes are converted in to their English meanings, as given on the original MV106/MV6020 form. (Unknown codes come out as **?code?** on the report, where '**code**' is the unknown code.)

Where the meaning of a code has changed over time, the Accident Date is used to determine the correct meaning of the code at the time the accident occurred.

Dates
- Report Date at the top left is the date the information was extracted from the Highway Accident System.
- The Accident Date is the date on which the accident occurred.

Page

- There are two page numbers:
- the HAS Detail report page number is at the top right of each page,
- the page number within each accident is in the Accident Case No field (underneath the Segment).

Location:
- The Highway, Segment and Km information is according to the current LKI.
- it may not be as originally coded:
- it may have been corrected when entered into HAS,
- it may have been transformed to be consistent with the latest LKI
- if the location is no longer exists, due to road changes, i.e. is obsolete, "(obs)" will follow the km.
- If the location is at the beginning or end of a segment, an LKI Node identifier will be included.
- the Place, On and At information is presented as originally coded.

Severity:
- Fatal, Injury or PDO (Property Damage Only)
- determinied from the Total Killed and Total Injured fields.

Vehicle Information
- maximum of 2 vehicles per page.
- labelled Vehicle 1 and Vehicle 2 on each page, thus multiply by the page number (located after the Case Number) to get the absolute vehicle numbers.

The victim information section is omitted on reports produced for the public.

```
Report Date:  2004/05/03 12:45              MINISTRY OF TRANSPORTATION                        Page        1
                                              HIGHWAY ACCIDENT SYSTEM
                                             Accident Details Report

Location: Highway:  19A Segment: 2340 Km:   0.0  Node: 23162340  Place: PARKSVILLE  On: ALBERNI     At: 19A

Accident Case No.: R3247440 page 1          Police File No.   : 03 2499           Severity        : Injury

Accident Date   : Tuesday, 18 Mar 2003  Speed Limit (km/h): 50  - Posted     Weather Condition  : Cloudy
Accident Time   : 09:43                 Advisory Speed Lim: Not Applicable**  Road Surface       : Wet
Police Presence : Attended              Traffic Flow    : Two-way traffic     Lighting Condition : Daylight
Total Killed    :  0                    Traffic Control : Red traffic signal  Pedestrian Location : Not Applicable**
Total Injured   :  1                    Number of Lane(s) : Three             Pedestrian Action  : Not Applicable**
Total Vehicles  :  2                    Road Class      : Undivided           Land Usage         : Business/shopping
Primary Occurence: Rear end             Road Curve      : Straight            Police Detachment  : PARKSVILLE MUNICIPAL
Accident Location: At intersection      Road Gradient   : Flat                Region             : 1-South Coast
1st Contact Locn : On roadway           Road Type       : Asphalt             District           : 2-Vancouver Island
                                                                              Contract Mgmnt. Area: 2-Central Island

                              VEHICLE 1                        VEHICLE 2
------------------------------------|------------------------------------|-----------------------------------------
Direction                           | East                               | East
Vehicle Type                        | Passenger car                      | Passenger car
Vehicle Usage (Stolen)              | Personal                           | Personal
Driver License Class (N/L)          |                                    |
Pre-collision Action (1st event)   -|- Stopped in traffic               -|- Slowing or stopping
Second Event                        | Other motor vehicle                |
Third Event                         | Not Applicable**                   | Not Applicable**
Damage Severity                     | None                               | None
First  Contributing Factor         -|- Other**                          -|- Driving without due care
Second Contributing Factor          | Not Applicable**                   | Other**
Third  Contributing Factor          | Not Applicable**                   | Not Applicable**
Fourth Contributing Factor          | Unspecified**                      | Unspecified**
-----------------------------------------------------------------------------------------------------------------


-----------------------------------------------------------------------------------------------------------------
Per|Location| Position in | Victim  |  Safety Equipment    |Age |Sex|Injury | Location of Most  | Type of | State of Victim
son|        |   Vehicle   | Ejection| (ABD=Air Bag Deployed)|    |   |Class  | Severe Injury     | Injury  | Consciousness
-----------------------------------------------------------------------------------------------------------------
 1 | Veh 1  |Driver       |Not eject|Lap & Harness         | 44 | F |Unspeci|Neck               |Whiplash |Apparently normal
 2 | Veh 2  |Driver       |Not eject|Lap & Harness         | 33 | F |Unspeci|No injury          |None     |Apparently normal
-----------------------------------------------------------------------------------------------------------------
```

9.5   Summary Report (THAS250 & THAS251)

9.5.1 Description

The Summary Report starts with a copy of the Description File of the input data Subset Pair. This contains the Data Selection information (from the main Data Selection menu), the Search Path, and details of any other processes which have helped to select the data (such as the Accident-Prone Locations or Sections programs).

Some accidents have more than one record in the master data files. These were accidents that were continued on page 2, page 3, etc., in the original MV104/MV6020 police reports. In general, they are accidents where more than two vehicles were involved, or where there were more than eight victims of the accident. Only page-1 records are used in generating the Summary Report, so the accident counts and totals are true records of the number of **accidents** of each type, not the number of data records.

There are two versions of the program. The current one is version 2. In version 2, the **Lighting** column was replaced with **First Contributing Factor.** version 2 has the CSV output file option, and version 1 does not.

Version 2 also has an option to create CSV output in addition to (or instead of) a report. The CSV file can include data for which there is no room on the report - e.g. Place, On and At location text fields.

9.5.2 P250: Summary Report Parameters Panel

```
P250              Highway Accident System - Summary Report
                  ----------------------   --------------


The Summary Report contains one line per accident, displaying the most
commonly referenced data fields, translated into English where possible.


A printable report and/or a comma-separated (CSV) file can be produced.
The report must be accessed from the batch job output using IOF.
The CSV file is created as a separate file, which can be downloaded
as soon as the job finishes, then loaded directly into a spreadsheet
or database program.

   Version  > s          1 - Lighting, 2 - First Contributing Factor


   Report   > s          Y to produce a printable report


   CSV File > N          Y to produce a CSV file
        Name > SUMTEST    eg: if you enter MYFILE, file MYFILE.CSV
                              will be created on the mainframe.
    LocText > Y          Y to add Place, On and At location text fields.


   NOTE: The CSV option is currently available for Version 2 only!

              Press Enter to continue, PF3 to cancel.
```

9.5.3 Version 2 Report

Fields of the Summary Report

        Accident Case #
            - A unique 7- or 8-character code identifying a particular accident
              report.

        Accident Date
            - The date each accident occurred.

        Time
            - The time each accident occurred, in the format HH:MM (24-hour
              clock). For example: 17:47

        Location
        Hwy   Sgmt   Km
            - The full location code (highway, segment, and KMMARK) at which an
              accident occurred.

            - Node locations are distinguished from locations within a segment
              by an **n** after the highway number for accidents occurring at a
              node.

            - Accidents occurring at obsolete locations are marked by an **x**
              between the segment number and the KMMARK.

            - All accidents at a particular node are preceded by the line:
                        NODE node#:
              All accidents in a particular segment are preceded by the line:
                        SEGMENT segment#:

        Place: On: At:
            - These text descriptions of the location are available for
              accidents starting about October 1999.

        Acc Typ
            - Accident type (**FAT**al, **INJ**ury, or **P**roperty-**D**amage-**O**nly).

        Tot Kld
            - Total number of people killed in each accident.

        Tot Inj
            - Total number of people injured in each accident.

        Tot Veh
            - Total number of vehicles involved in each accident.

        Primary Occurrence
            - An approximate description of the kind of accident and its cause
              or first incident, such as **SIDE SWIPE**, or **LEFT TURN HEAD ON**
              (head-on collision when a vehicle turned left), or **OFF ROAD RIGHT**
              (when a vehicle went off the right-hand side of the road).

            - Primary Occurrence is taken from the Diagram on the Police Report
              form.

  - This field may appear as **UNSPECIFIED****, **UNKNOWN****,
    NOT APPLICABLE**, or **OTHER****. In these cases, Diagram was coded
    as blank, 00, 98, or 99 (respectively) on the original Police
    Report, and the police may have included written comments that do
    not appear in the data files.

  - These four entries (ending with ******) may appear in other fields as
    well. If the corresponding field of the Accident Record was 2
    characters long, it will have been coded as blank, Z, X, or Y,
    respectively. (The code Z appears on the Report as **UNKNWN** rather
    than as **UNKNOWN****.)

Acc. Loc.
  - The type of location at which an accident occurred, such as
    AT INTERSECTION or **BTWN INTERSECTION/EXCHS** (between intersections
    or highway exchanges).

  - Appears as a two-digit code on the Version 2 report. Meanings of
    all the Accident Location codes are given at the end of the
    Report.

First Contributing Factor for First Vehicle
  - Primary contributing factor to the accident, such as
    UNSAFE SPEED, **DRIVER INEXPERIENCE**, or **FOLLOWING TOO CLOSELY.**

  - This is the single most important piece of information about the
    cause of an accident, after the Primary Occurrence.

Road Surf. Cond.
  - Road surface conditions at the time of each accident.

  - **NOT APPLICABLE** (code 8 or X) has been abbreviated to **N/A.**

Weather Conditions
  - Weather conditions at the time of each accident.

  - To save space, **SNOWING/SLEET** (code 4) has been abbreviated to
    SNOW/SLEET.

Drctn Travl
   V1 V2
  - Direction of travel of Vehicle 1 and Vehicle 2 (if any).

  - This field was never coded until the beginning of 1989, so it
    frequently appears as blank. In addition, if only one vehicle
    was involved in an accident, Vehicle 2's direction of travel will
    naturally be blank.

  - Due to space restrictions, this field has been left as a 1-
    character code. It may be **N**, **S**, **E**, or **W** (the four directions),
    P (Parked), or **U** (Unknown).

Corresponding Accident Record Fields

Summary Report field	Accident Record field
Accident Case #	ACCASE
Accident Date	ACCDATE
Time	ACCHOUR
Location	LOCN_CODE
Hwy	.HIGHNUM and .HIGHLET
Sgmt	.SEGNUM
Km	.KMMARK
Acc Typ	(Determined from
	TOTALKLD and TOTALINJ)
Tot Kld	TOTALKLD
Tot Inj	TOTALINJ
Tot Veh	TOTALVEH
Primary Occurrence	DIAGRAM
Acc. Loc.	LOCN_TYPE
First Contributing Factor	
for First Vehicle	CONTRB11
Road Surf. Cond.	ROADSURF
Weather Conditions	WEATHER
Drctn Travl	
V1	VEHDIR1
V2	VEHDIR2

```
                  *****  H.A.S.  A C C I D E N T   S U M M A R Y   R E P O R T  *****


Report Date: 1999/02/25   14:51                         Version 2.2                                      PAGE   1
Description (history) of the input accident file
---------------------------------------------------------------------------------


===============================================================================
PROGRAM: THAS200 VERSION:  2.4  RUN DATE & TIME: 1999/02/25 14:51
----------------------------------------------------------------
          ACCIDENT SELECTION CRITERIA

        FROM                TO          LETTERED
      Hwy  Seg   Km       Hwy  Seg   Km
   1.  16  1501  0.0       16  1570  8.6     YES


DISTRICTS:          25
HIGHWAY CLASS SET:
DATES:              19980101 TO 19980331
MONTHS:                 TO
HOURS:                  TO
NODE SELECTION:     1  (once only)
OBSOLETE LOCATIONS: YES


      ----------------------------------------------------------
*SEARCH PATH   (FROM     TO )    # REC  # ACC  X_REC  X_ACC
SEG  1510       47.9  90.7        2      2      0      0
NODE 15101515                     0      0      0      0
SEG  1515        0.0  43.0       12     12      0      0
NODE 15151520                     0      0      0      0
----
NODE 15101520                     0      0      0      0
SEG  1520        0.0 131.7       24     24      0      0
NODE 15201540                     0      0      0      0
SEG  1540        0.0  81.3       10      9      0      0
NODE 15401550                     1      1      0      0
SEG  1550        0.0  32.3        1      1      0      0
----
*END OF SEARCH PATH.  TOTALS:    50     49      0      0
     50 RECORDS,       49 ACCIDENTS SELECTED
      0 RECORDS,        0 ACCIDENTS AT OBSOLETE LOCATIONS SELECTED
THAS200 COMPLETED SUCCESSFULLY
```

Accident Case #	Accident Date	Time	Hwy	Sgmt	Location Km	Acc Typ	Tot Kld	Tot Inj	Tot Veh	Primary Occurrence	Loc. Type	First Contributing Factor for First Vehicle	Road Surf. Cond.	Weather Conditions	Drctn Travl V1 V2
R1155292	31 JAN 1998	05:20	16	1510	77.2	INJ	0	1	1	OFF ROAD RIGHT	02	WINDSHIELD DEFECTIVE	WET	FOG	W
R1147901	12 JAN 1998	13:50	16	1510	82.5	PDO	0	0	1	OFF ROAD LEFT	04	WEATHER	ICE	CLEAR	E
	SEGMENT 1515:														
R1155058	15 MAR 1998	02:10	16	1515	3.7	INJ	0	2	1	OFF ROAD LEFT	02	UNSAFE SPEED	ICE	CLOUDY	E
R1147888	25 FEB 1998	09:00	16	1515	4.0	INJ	0	2	1	OTHER**	02	WEATHER	ICE	CLOUDY	W
R1155042	15 MAR 1998	06:10	16	1515	14.0	PDO	0	0	2	OFF ROAD RIGHT	02	WEATHER	SNOW	CLOUDY	E E
R1147626	11 MAR 1998	08:00	16	1515	15.6	PDO	0	0	1	OFF ROAD RIGHT	02	WEATHER	SNOW	SNOW/SLEET	E
R1147902	30 JAN 1998	07:00	16	1515	16.7	PDO	0	0	1	OFF ROAD LEFT	02	WEATHER	ICE	FOG	W
R1147903	30 JAN 1998	07:00	16	1515	16.7	PDO	0	0	1	OFF ROAD RIGHT	02	WEATHER	ICE	FOG	W
R1147892	14 MAR 1998	07:10	16	1515	16.7	PDO	0	0	1	OFF ROAD RIGHT	02	WEATHER	ICE	CLEAR	E
R1147601	28 JAN 1998	18:50	16	1515	30.9	PDO	0	0	1	OFF ROAD RIGHT	13	WEATHER	ICE	CLOUDY	W
R1155135	28 JAN 1998	18:31	16	1515	32.2	INJ	0	1	2	REAR END	02	ROAD MAINTENANCE/CONSTRUCTIO	ICE	CLOUDY	P E
R1726387	13 FEB 1998	06:00	16	1515	35.3	INJ	0	2	1	OFF ROAD LEFT	02	WEATHER	ICE	CLEAR	W
R1155056	20 JAN 1998	27:00	16	1515	40.2	PDO	0	0	1	OFF ROAD LEFT	02	DRIVING WITHOUT DUE CARE	ICE	CLOUDY	U
R1155325	27 JAN 1998	13:20	16	1515	40.6	PDO	0	0	1	OFF ROAD RIGHT	02	WEATHER	ICE	CLEAR	E
	SEGMENT 1520:														
R1155104	17 JAN 1998	12:50	16	1520	0.2	INJ	0	1	2	INTERSECTION 90	03	OTHER**	SLUSH	CLEAR	E U
R1147883	15 FEB 1998	13:40	16	1520	0.5	PDO	0	0	2	INTERSECTION 90	02	OTHER**	DRY	CLEAR	W S
R1147821	10 JAN 1998	02:05	16	1520	1.3	PDO	0	0	1	OFF ROAD LEFT	13	ALCOHOL INVOLVEMENT	SNOW	CLEAR	E
R1147853	23 JAN 1998	23:00	16	1520	3.0	PDO	0	0	1	OFF ROAD RIGHT	02	WEATHER	SNOW	SNOW/SLEET	W
R1147825	01 FEB 1998	17:30	16	1520	3.1	PDO	0	0	1	UNKNOWN**	02	WILD ANIMAL	WET	CLEAR	E
R1155080	23 JAN 1998	06:10	16	1520	3.8	INJ	0	1	1	OTHER**	02	WILD ANIMAL	SNOW	CLEAR	W
R1147887	23 FEB 1998	00:32	16	1520	9.3	PDO	0	0	1	OFF ROAD LEFT	02	ALCOHOL INVOLVEMENT	DRY	CLOUDY	E
R1147819	01 JAN 1998	10:30	16	1520	30.5	PDO	0	0	1	OFF ROAD RIGHT	13	WEATHER	ICE	CLOUDY	W
R1147886	21 FEB 1998	09:49	16	1520	36.4	PDO	0	0	1	OFF ROAD LEFT	13	ROAD MAINTENANCE/CONSTRUCTIO	ICE	CLEAR	E
R1147882	09 FEB 1998	09:00	16	1520	39.2	PDO	0	0	1	OFF ROAD RIGHT	02	UNSAFE SPEED	UNKNO	CLEAR	W
R2883080	06 JAN 1998	19:40	16	1520	39.9	PDO	0	0	1	OFF ROAD LEFT	02	WEATHER	ICE	CLEAR	E
R2883164	06 JAN 1998	13:20	16	1520	55.0	PDO	0	0	1	OFF ROAD RIGHT	02	PAVEMENT SURFACE DEFECTIVE	ICE	SNOW/SLEET	W
R2883079	04 JAN 1998	15:15	16	1520	57.5	INJ	0	2	1	OFF ROAD LEFT	02	WEATHER	ICE	CLOUDY	W
R1679057	25 FEB 1998	06:00	16	1520	58.7	INJ	0	1	1	OFF ROAD RIGHT	02	WEATHER	ICE	CLOUDY	E
R2883056	20 JAN 1998	19:36	16	1520	68.2	INJ	0	4	2	INTERSECTION 90	01	ALCOHOL INVOLVEMENT	SNOW	SNOW/SLEET	E N
R1377658	17 FEB 1998	09:30	16	1520	89.9	PDO	0	0	2	OVERTAKING	02	NOT APPLICABLE**	DRY	CLEAR	W W
R2883179	15 JAN 1998	12:55	16	1520	94.4	INJ	0	1	2	OVERTAKING	01	IMPROPER PASSING	ICE	CLOUDY	E E
R2734413	15 MAR 1998	07:30	16	1520	94.4	PDO	0	0	1	OFF ROAD LEFT	02	WEATHER	UNKNO	UNKNOWN**	E
R2883112	02 MAR 1998	10:51	16	1520	98.6	INJ	0	3	2	INTERSECTION 90	01	NOT APPLICABLE**	WET	SNOW/SLEET	W W
R2725956	18 FEB 1998	21:57	16	1520	121.4	INJ	0	1	2	SIDE SWIPE	02	ALCOHOL INVOLVEMENT	DRY	CLOUDY	E W
R2864828	10 MAR 1998	15:30	16	1520	125.7	PDO	0	0	1	OFF ROAD RIGHT	02	WEATHER	ICE	SNOW/SLEET	W
R2864706	01 MAR 1998	03:35	16	1520	126.4	INJ	0	2	1	OFF ROAD LEFT	02	ALCOHOL INVOLVEMENT	ICE	CLOUDY	E
R2864827	10 MAR 1998	15:00	16	1520	127.2	PDO	0	0	1	OTHER**	04	WEATHER	ICE	SNOW/SLEET	W
R2864705	27 FEB 1998	10:35	16	1520	127.8	PDO	0	0	2	REAR END	01	FOLLOWING TOO CLOSELY	DRY	CLEAR	W W
	SEGMENT 1540:														
R2864704	30 JAN 1998	11:15	16	1540	3.5	INJ	0	6	1	OFF ROAD LEFT	02	OTHER**	ICE	CLOUDY	W
R0665119	05 JAN 1998	11:05	16	1540	5.9	PDO	0	0	1	UNKNOWN**	12	OTHER**	ICE	CLOUDY	E
R2725953	28 JAN 1998	23:04	16	1540	11.3	INJ	0	1	3	OTHER**	02	ALCOHOL INVOLVEMENT	SNOW	SNOW/SLEET	W E
R2725976	13 JAN 1998	12:30	16	1540	20.2	PDO	0	0	2	REAR END	01	NOT APPLICABLE**	SNOW	CLEAR	E E
R1692069	08 JAN 1998	18:15	16	1540	34.2	PDO	0	0	1	OTHER**	02	WILD ANIMAL	ICE	CLOUDY	E
R2725954	21 JAN 1998	16:00	16	1540	35.5	PDO	0	0	1	OFF ROAD LEFT	02	ROAD MAINTENANCE/CONSTRUCTIO	ICE	CLOUDY	E
R0665804	10 MAR 1998	20:18	16	1540	61.6	PDO	0	0	1	LEFT TURN REAR	02	WILD ANIMAL	ICE	CLOUDY	W
R1214616	10 MAR 1998	14:55	16	1540	71.7	PDO	0	0	1	OTHER**	02	ALCOHOL INVOLVEMENT	SNOW	SNOW/SLEET	E
R0665803	06 FEB 1998	16:52	16	1540	80.2	INJ	0	1	1	OTHER**	01	FAILING TO YIELD RIGHT OF WA	SLUSH	CLOUDY	S
	NODE 15401550:														
R2731290	21 MAR 1998	12:00	16	n1550	0.0	INJ	0	3	2	LEFT TURN 90'	01	NOT APPLICABLE**	DRY	CLEAR	E W
	SEGMENT 1550:														
R0665723	28 FEB 1998	21:30	16	1550	15.6	INJ	0	3	1	OFF ROAD RIGHT	02	WEATHER	ICE	SNOW/SLEET	W

```
          MEANING OF CODES:

Markers within Location Codes:
   n -- Accident occurred at a node.
   x -- Accident occurred at an obsolete location.


Accident Location Type codes:
   01 -- AT INTERSECTION
   02 -- BTWN INTERSECTION/EXCHS
   03 -- INT ROAD&DRIVEWAY/ALLEY
   04 -- BRIDGE
   05 -- FERRY OR DOCK
   06 -- TUNNEL
   07 -- EXIT DECELERATION LANE
   08 -- EXIT RAMP
   09 -- EXIT INTERSECTION
   10 -- ENTR/ACCELERATION LANE
   11 -- ENTRANCE RAMP
   12 -- ENTRANCE INTERSECTION
   13 -- OFF HIGHWAY
   14 -- SNGL/MLTILEVEL PKNG LOT
   15 -- RR CROSSING
   16 -- INDUSTRIAL ROAD
   17 -- TRANSIT EXPRESS LANE
   98 -- NOT APPLICABLE**
   99 -- OTHER**
   00 -- UNKNOWN**
```

9.6   Accident Rate Table (THAS260)

9.6.1   Description

9.6.1.1 Introduction

The Accident Rate Table is a table with columns for various Highway Classification Sets, and rows for various traffic volume ranges. The entry in each cell of the table (in its simplest form) is an accident rate. The rate is calculated using accident data from sections of highway which have a Highway Classification covered by the column definition, and with a traffic volume in the range defined for that row.

It is important to note that the input Accident Subset determines the results:

the results reflect only sections of highway included in the Search Path of the Subset,
only accidents which are in the Subset are counted,
the date range of the Subset is used to determine traffic volumes.

There are three different calculation methods. One is by highway SECTIONs, and there are two different LOCATION methods. (The LOCATION methods can be used to get accident rates at intersections.)

The basic accident rate provided in the table is called a Weighted Average Accident Rate, because (in the SECTION case), the accident rate of each section is weighted by its length and traffic volume. Accident rates in the two other types of tables are weighted by traffic volume only.

Below is a conceptual example, showing the general layout:

```
                          -- Highway Classification Sets --
          Traffic Volume  |   1   |   2   |   3   |    4    |
           Ranges (ADT)   | U EF  | R EF  |  * C  |    *    |
        ------------------------+-------+-------+---------
        |     0 -  5000   ||  1.23 |  1.56 |  0.67 |  2.34   |
        ----------------++-------+-------+-------+--------|
        |  5001 - 10000   ||  2.34 |  2.34 |  1.56 |  0.56   |
        ----------------++-------+-------+-------+--------|
        |  7000 - 50000   ||  1.23 |  2.34 |  2.56 |  1.67   |
        --------------------------------------------------
```

This is a simple example. The following sections in this document explain the following additional features:
- various other rates and statistics which may be included in each cell of the table,
- details of the three different types of rate calculations,
- the optional Class-Rate report.

See section 2.4.7 for a summary of Highway Classification terminology.

9.6.1.2 Optional Cell Information

The basic item in each cell of the Rate Table is called the Weighted Average Accident Rate. Additional information may be requested on the second Rate Table panel (RTSS for Section calculations, and RTSL for Location calculations). The complete contents of the cells, if all options are selected, are shown below.

Label On Panel	Data labels in each cell	Symbol in Formulae
(not on panel)	Wtd. Avg. Acc. Rate	WAAR
Fatal Accident Rate	Wtd. Avg. Fatal Acc. Rate	WAFAR
Road-Weighted Rate	Road-Weighted Acc. Rate	RWAR
Rd-Wtd Fat. Rate	Road-Wtd. Fatal Acc. Rate	RWFAR
Severity-Weighted Rate	Sev-Weighted Acc Rate	SWAR
Critical Rate	Critical Accident Rate	
Rd-Wtd Critical Rate	Rd-Wtd Critical Acc. Rate	
Sev-Wtd Critical Rate	Sev-Wtd Critical Acc. Rate	
Statistics	Mean Acc. Rate	MAR
	Standard Deviation (Sigma)	SIGMA
	N (# Sections)	N \ (depending
	N (# Locations)	T >- on table
	N (# Landmarks)	T / type)
Acc Type Numbers	# Fatal Accidents	
	# Injury Accidents	
	# PDO Accidents	
Acc Type Percents	% Fatal Accidents	
	% Injury Accidents	
	% PDO Accidents	
Total Accidents	Total Accidents	
Total Length	Total Length (km)	L

Note that the Critical Rate options are available for Section-type calculations only.

For Location and Landmark accident rate calculations, the Total Length is the length of highway which was scanned for locations with accidents (i.e., the length of the search path falling within each cell).

9.6.1.3 Calculation Types

There are two basic calculation types: SECTION and LOCATION.

There are two types of LOCATION calculations: LOCATIONS WITH ACCIDENTS and LOCATIONS AT LANDMARKS. These types are sometimes called simply LOCATION and LANDMARK, respectively, when a shorter name is needed.

The SECTION calculation involves accident rates calculated over sections of highway, in units of accidents per vehicle-kilometers.

The LOCATION calculation deals with accident rates at individual locations, in units of accidents per vehicle. The difference between the two LOCATION methods is a matter of what is considered a 'Location' for the purposes of the Rate Table.

In the LOCATIONS-WITH-ACCIDENTS method, every location (segment-kmmark) which is represented by one or more accidents in the input accident file is considered. Therefore, to create a Rate Table with accident rates at intersections, a subset would have to be created containing only accidents at intersections, before running the Rate Table program. The subset creation can be done using the initial Data Selection program, the Accident-Prone Locations program (setting the critical number of accidents to 1), or a custom SAS program. Of course, types of locations other than intersections can also be included in the input accident data.

A problem with the LOCATIONS-WITH-ACCIDENTS method is that locations (e.g. intersections) which have no accidents will not be represented in the input accident subset, so the resulting average accident rates will not have been influenced by those accident-free intersections. Thus, the accident rates will be higher than the true intersection accident rates.

In the LOCATIONS-AT-LANDMARKS method, landmark types are specified, and the landmark file (THASP.LANDMARK) is used to determine which locations are included in the calculation. For each section of highway defined in the Search Path of the input accident subset, the corresponding section of the Landmark file is scanned for locations of the specified type. The important features of this method are:
- Only accidents at those qualifying locations are counted. (All other accidents are ignored.)
- **If there are no accidents at a qualifying location, the zero accident count is included in the calculation of the average accident rate** (thus reducing it).

When considering which LOCATION method to use, and when interpreting the results, keep in mind:
- the accuracy of Location Code (segment-kmmark) coding by the police,
- the accuracy of the Location Type coding by the police,
- the completeness and accuracy of the Landmark file (e.g. not all intersections are currently on the Landmark file),
- the processes which have created the input accident subset.

9.6.1.4 Section Lengths

By default, the length of each 'section' in the SECTION calculation type is the extent of one Highway Classification, as defined in the THASP.SEGCLASS file. Sections cannot span Segments.

Nodes are now considered to be short sections, 0.1 km. long. Therefore, the nodes at the beginning and end of segments are not included in the sections that contain the remainder of the segments.

It is possible to specify a maximum section length, so that long sections are broken artificially into a series of smaller sections. This increases the sample size (N), and therefore makes Mean Accident Rates and Standard Deviations more meaningful. When a section spans multiple traffic volume zones, the volume for the section is obtained by averaging the volumes, weighted by zone lengths. So breaking long sections into short sections will reduce the amount of volume averaging, which may be desirable if the rate table is being divided into volume ranges.

Different maximum section lengths may be specified for each of the Characteristics of the first Highway Classification Category (e.g. for Primary, Secondary, Other).

9.6.1.5 Accident Rate Formulae

9.6.1.5.1 Definitions


```
Section    - a section of highway all with the same Segment number, Highway
             Class and Traffic Volume.

Location   - a location on a highway denoted with a Segment number and a
             KMMARK.
           - whether or not the Rate Table program includes a location in its
             calculation depends upon the calculation type:
             1 -   LOCATION - only those locations with one or more accidents
                   in the input file are counted.
             2 -   LANDMARK - all, and only, locations at specified landmark
                   types are counted, whether they are represented with
                   accidents or not.
```


For a set of Sections or Locations within a defined set of Highway Classifications and in a defined Traffic Volume range (i.e., within a particular cell of the Rate Table):

```
        MAR    - Mean Accident Rate (defined below)

        WAAR   - Weighted Average Accident Rate (defined below)

        WAFAR  - Weighted Average Fatal Accident Rate
                 - calculated as WAAR but counting only fatal accidents
                   (fatal ACCIDENTS, not FATALITIES)

        RWAR   - Road-Weighted Accident Rate (depends on the road weights in
                 each accident record)

        RWFAR  - Road-Weighted Fatal Accident Rate
                 - calculated as WAFAR, with road weights included, as in RWAR.

        RS     - Section Accident Rate

        RL     - Location Accident Rate
```

```
i       is the index of a section.
j       is the index of a location within a section.
k       is the index of a location throughout all sections.
l       is the index of an accident within a section, among all accidents
        at a location, or among all accidents at all locations.
```

A_i is the number of Accidents in section i.
   - for Location-Landmark calculations, this includes only those
     accidents which are at specified Landmarks.
   - for Fatal accident rates, this includes only fatal accidents.

B_{ij} is the number of accidents at location j in section i.

B_k is the number of accidents at location k.

L_i is the length of section i.

V_i is the traffic Volume of section i.

V_k is the traffic Volume of location k.

W_{il} is the road Weight of accident l in section i.
W_{kl} is the road Weight of accident l at location k.
W_l is the road Weight of accident l.

W_{fat} is the Fatal accident weight (e.g. 100)
W_{inj} is the Injury accident weight (e.g. 10)
W_{pdo} is the Property Damage Only accident weight (e.g. 1)

M_i is the number of locations in section i.

N   is the Number of sections.

T   is the number of locations in all sections.

P_i is the number of accidents in section i.
P_k is the number of accidents at location k.

Q   is the total number of accidents, at all locations in all
        sections.

Q_{fat} is the total number of fatal accidents.
Q_{inj} is the total number of injury accidents.
Q_{pdo} is the total number of PDO accidents.

F   is a factor: 1 million for Accident Rates,
                     100 million for Fatal Accident Rates.

9.6.1.5.2 Weighted Average Accident Rate

A weighted average is an average where each sample is weighted according to some attribute of the sample.

A weighted average of samples x_i where i goes from 1 to N can be expressed as:

$$\frac{\sum_{i=1}^{N} x_i w_i}{N} \quad where: \quad \sum_{i=1}^{N} w_i = N$$

or as:

$$\sum_{i=1}^{N} x_i f_i \quad where: \quad \sum_{i=1}^{N} f_i = 1$$

If each sample x_i is to be weighted by an associated value v_i, the weighting factor f_i can be calculated as follows:

$$f_i = \frac{v_i}{\sum_{i=1}^{N} v_i}$$

(It is simple to verify that the sum of the f_i equals 1.)

In the Rate Table case where accident rates are calculated by SECTION, the accident rates of individual sections of highway are weighted by the length of the section, and by the traffic volume on the section. In other words, accident rates are weighted by the vehicle-kilometres of the section.

If L is the length of a section, and V is the traffic volume, then for section i, the accident rate RS_i is weighted by L_iV_i. Substituting this into the formula above, we get the following expression for the weighting factor:

$$f_i = \frac{L_i V_i}{\sum_{i=1}^{N} (L_i V_i)}$$

The Accident Rate for section i (where F is a factor of 1 million) is:

$$RS_i = \frac{A_i}{L_i V_i} \times F$$

So the Weighted Average Accident Rate, over N sections, is:

$$WAAR = \sum_{i=1}^{N} (RS_i f_i) = \sum_{i=1}^{N} \left(\frac{A_i}{L_i V_i} \frac{L_i V_i}{\sum_{i=1}^{N} (L_i V_i)} \right) \times F = \frac{\sum_{i=1}^{N} A_i}{\sum_{i=1}^{N} (L_i V_i)} \times F$$

All accident rates produced by the Rate Table program are weighted in this manner. Road-Weighted and Severity Weighted accident rates have *additional* weighting applied.

9.6.1.5.3 Section Calculations

$$RS_i = \frac{A_i}{L_i V_i} \times F$$

$$MAR_s = \frac{\sum_{i=1}^{N} RS_i}{N} \times F = \frac{\sum_{i=1}^{N} \frac{A_i}{L_i V_i}}{N} \times F$$

$$WAAR_s = \frac{\sum_{i=1}^{N} A_i}{\sum_{i=1}^{N}(L_i V_i)} \times F$$

$$RWAR_S = \frac{\sum_{i=1}^{N} \sum_{l=1}^{P_i} W_{il}}{\sum_{i=1}^{N}(L_i V_i)} \times F = \frac{\sum_{l=1}^{Q} W_l}{\sum_{i=1}^{N}(L_i V_i)} \times F$$

$$SWAR_s = \frac{\left(Q_{fat} W_{fat} + Q_{inj} W_{inj} + Q_{pdo} W_{pdo} \right)}{\sum_{i=1}^{N}(L_i V_i)} \times F$$

9.6.1.5.4 Location Calculations

In the following equations, derivations are included where appropriate to show how calculations can be done section by section. (Mathematically, sections are irrelevant to LOCATION and LANDMARK rate table accident rates.)

$$RL_k = \frac{B_k}{V_k} \times F = RL_{ij} = \frac{B_{ij}}{V_i} \times F$$

$$MAR_L = \frac{\sum_{k=1}^{T} RL_k}{T} = \frac{\sum_{k=1}^{T} \frac{B_k}{V_k}}{T} \times F = \frac{\sum_{i=1}^{N} \sum_{j=1}^{Mi} \frac{B_{ij}}{V_i}}{\sum_{i=1}^{N} M_i} \times F = \frac{\sum_{i=1}^{N} \frac{A_i}{V_i}}{\sum_{i=1}^{N} M_i} \times F$$

$$WAAR_L = \frac{\sum_{k=1}^{T} B_k}{\sum_{k=1}^{T} V_k} \times F = \frac{\sum_{i=1}^{N} \sum_{j=1}^{Mi} B_{ij}}{\sum_{i=1}^{N} \sum_{j=1}^{Mi} V_i} \times F = \frac{\sum_{i=1}^{N} \sum_{j=1}^{Mi} B_{ij}}{\sum_{i=1}^{N} (M_i V_i)} \times F = \frac{\sum_{i=1}^{N} A_i}{\sum_{i=1}^{N} (M_i V_i)} \times F$$

$$RWAR_L = \frac{\sum_{k=1}^{T} \sum_{l=1}^{P_k} W_{kl}}{\sum_{k=1}^{T} V_k} \times F = \frac{\sum_{i=1}^{N} \sum_{l=1}^{P_i} W_{il}}{\sum_{i=1}^{N} (M_i V_i)} \times F = \frac{\sum_{l=1}^{Q} W_l}{\sum_{i=1}^{N} (M_i V_i)} \times F$$

$$SWARL = \frac{(Q_{fat} W_{fat} + Q_{inj} W_{inj} + Q_{pdo} W_{pdo})}{\sum_{k=1}^{T} V_k} \times F$$

9.6.1.6 Sigma - Standard Deviation

If statistical output is requested, the Mean Accident Rate (defined above), the Standard Deviation, and N (the number of sections or locations) are included in each element of the rate table.

The Standard Deviation is calculated as follows:

$$ s = \sqrt{\frac{N \sum_{i=1}^{N} (x_i^2) - (\sum_{i=1}^{N} x_i)^2}{N^2}} $$

This method:

- is mathematically the same as the classical formula for standard deviation, but it does not require saving all the samples until after the mean can be calculated.
- introduces more round off errors than the classical formula, but the calculations are done in double precision to compensate.

9.6.1.7 Road Weights

Each accident has a road weight, which indicates what portion of the responsibility for the accident is due to road design or conditions, as opposed to the driver, or the vehicle. (These road weights are always less than 1.) In the road-weighted accident rates, the sum of the road-weights of all accidents in a Section (or Location) is used in place of the total number of accidents. Thus, a regular accident rate is always greater than its corresponding **road-weighted** accident rate, and similarly a fatal accident rate is greater than its corresponding **road-weighted** fatal accident rate.

9.6.1.8 Severity Weights

The Severity Weights used - for each of Fatal, Injury and PDO accidents - are read from the THASP.SWARWTS file. The values in this file can be set by privileged users from the HAS main menu.

9.6.1.9 Critical Accident Rates

Critical accident rates are defined in section 6.5.

Critical Accident Rate calculation is only an option for Section-Type calculations.

Critical accident rates in the Rate Table program are calculated in the same manner as in other HAS programs.

The Average Accident Rates used to calculate the Critical Rates are the ones looked up on the specified Average Accident Rate file - **not** the Average Rates calculated in the current run of the Rate Table program! Thus you might (1) run the Rate Table program with a large sample of data to calculate average accident rates, (2) put those rates into an Average Accident Rate file, then (3) run the Rate Table program on a smaller sample, using the Average Accident Rate file just populated to calculate critical rates for the smaller sample.

9.6.2 Parameter Panels

9.6.2.1 P260: Rate Table Parameters

```
P260          Highway Accident System  -  Rate Table Parameters
              ----------------------     ---------------------


   Title:


   Calculation Type: (Select one only, with an S)


        Sections         :         - Section lengths as they occur
                         :         - maximum Section length to be specified


        Locations        :         - all With Accidents in input subset
                         :         - only At Landmarks specified below:


          Landmark Types :


          ----------------------------------------------------


   Class-Rate Report    :         C, S or P to sort by Class, Segment or
                                   search Path.  Blank to suppress the report.


   Intersection Volumes :         Y to include intersection traffic volumes
```

TITLE:
    Enter a title to appear on each page of the reports. (The title may be
    blank.)

CALCULATION TYPE:
    See section 6.5.6.2 for a description of the different rate calculation
    types.

    If the second SECTION calculation type is selected, maximum section
    lengths are specified on a following panel (RTML).

LANDMARK TYPES:
    Up to ten 2-digit landmark type codes may be specified, if the
    LOCATIONS AT LANDMARKS calculation type is selected. (There is no
    landmark lookup option from this panel - this is a possible future
    enhancement.)

CLASS-RATE REPORT:
    This is an optional additional report that may be produced. It
    contains specific accident rate information for each entity (each
    section, location, or landmark) that was used to produce the main Rate
    Table. It always contains fatal accident rates and road-weighted
    accident and fatal accident rates, even if they were not specified as
    part of the main Rate Table.

INTERSECTION VOLUMES:
    Y   - use traffic volume file which has intersection traffic volumes.
        - THASP.SEGVOL3
    N   - (or blank) - use the traffic volume file which does NOT have
          intersection traffic volumes.
        - THASP.SEGVOL2
    1   - use the traffic volume file which has just one automatically
          calculated traffic volume per segment.
        - THASP.SEGVOL1

                     - use this option if you want to compare the results to old reports
                       created when this was the only option.

9.6.2.2 RTSS / RTSL: Rate Table Cell Contents

In the Rate Table, there is one cell for each Highway Class - Volume Range combination. Each cell always contains a Weighted Average Accident Rate. Additional types of information may be selected for adding to each cell, on one of the following two panels.

Section Calculations:

```
 RTSS          Highway Accident System  -  Rate Table Cell Contents  (Sections)
               ----------------------     -----------------------


    Select from the following to add information to each Rate Table Cell:


                     Use  S  to select

 Statistics           :         - Std Dev, Mean and N with each rate
 Fatal Accident Rate  :         - Accidents with >= 1 fatality counted as 1
 Road-Weighted Rate   :         - Rate using Road Causal Factor instead of 1
 Rd-Wtd Fat. Rate     :         - Fatal Acc. Rate using Road Causal Factor
 Severity-Weighted Rate :       - Rate using Fatal, Injury and PDO weights
 Critical Rate        :         - Calculated Critical Accident Rate
 Rd-Wtd Critical Rate :         - Calc. Road-Weighted Critical Accident Rate
 Sev-Wtd Critical Rate :        - Calc. Severity-Weighted Crit Accident Rate
 Accident Type Counts :         - Number  of Fatal, Injury, PDO accidents
 Accident Type Percents :       - Percent of Fatal, Injury, PDO accidents
 Total Accidents      :         - Total number of accidents
 Total Length         :         - Length of Sections searched


 Level of Significance for Crit. Rate Calculations> .01 (.01 .05 .1 .5 1 or 5)


    Press ENTER to continue, PF3 to return to the previous panel.
```

Location Calculations:

```
 RTSL          Highway Accident System  -  Rate Table Cell Contents  (Locations)
               ----------------------     -----------------------


    Select from the following to add information to each Rate Table Cell:


                     Use  S  to select

 Statistics           : s    - Std Dev, Mean and N with each rate
 Fatal Accident Rate  :         - Accidents with >= 1 fatality counted as 1
 Road-Weighted Rate   :         - Rate using Road Causal Factor instead of 1
 Rd-Wtd Fat. Rate     :         - Fatal Acc. Rate using Road Causal Factor
 Severity-Weighted Rate :       - Rate using Fatal, Injury and PDO weights

 Accident Type Counts :         - Number  of Fatal, Injury, PDO accidents
 Accident Type Percents :       - Percent of Fatal, Injury, PDO accidents
 Total Accidents      :         - Total number of accidents
 Total Length         :         - Length of Sections searched



    Press ENTER to continue, PF3 to return to the previous panel.
```

9.6.2.3 RTCL: Rate Table Highway Classes

```
RTCL    Highway Accident System - Rate Table Highway Classes   ROW 1 TO 5 OF 5
        ----------------------   -------------------------

=>         Enter HELP for instructions (PF1), X to back-up one screen (PF3),
           or   C    for a list of Characteristic Codes.

Specify Highway Classifications for each column of the table by entering
up to 5 Characteristic Codes in each cell below.  Use * to indicate ALL.

                --------------------- Columns ---------------------
      Category  | 1  | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9  |
      ----------|-----|-----|-----|-----|-----|-----|-----|-----|
      Location    U    R    UR   U    *
      Class       EF   EF   C    *
      ----------------------------------------------------------------
```

Each column of the table on the panel is used to define the Highway Classification for one column of the Rate Table you want to produce. As shown in the example above, Highway Classifications may overlap.

An asterisk may be used to include ALL Characteristics of the Category. If there are any other entries in the column, leaving a panel cell blank has the same effect as *. (In the example above, the asterisk in column 4 could be left out without changing anything, but the asterisk in column 5 could not.)

Columns in the panel may be left blank: if only columns 7 and 9 on the panel are coded, they will define columns 1 and 2 of the Rate Table.

The actual category names (Location and Class in the panel shown above) come from the THASP.CLASS.NAMES.*scheme* file. The Highway Classification scheme can be selected from the HAS main panel. The example above used the YR1987 scheme. If the YR2002 scheme was in effect, there would be six categories listed instead of just two.

9.6.2.4 RTVR: Rate Table Volume Ranges

```
RTVR                                                  ROW 1 TO 13 OF 100
             Highway Accident System - Rate Table Volume Ranges
             ----------------------   -----------------------

Specify Traffic Volume Ranges (ADT) for each row of the Rate Table.

Leave Min blank to get prev Max + 1.    Leave Max blank to get all above Min.
Scroll up/down with PF7/PF8.            Press PF3 to back-up one screen.

                         |   Min    |    Max   |
                         |----------|----------|
                         |  0       |  1000    |
                         |  1001    |  2000    |
                         |          |  3000    |
                         |  4000    |  9999999 |
                         |  0       |          |
                         |          |          |
                         |          |          |
                         |          |          |
                         |          |          |
                         |          |          |
                         |          |          |
                         |          |          |
                         |          |          |
 ----------------------------------------------------------------------------
```

Each Traffic Volume range specified defines a row of the Rate Table.

In the example above:
- the 1001 in row two could be omitted,
- row three Min will be set to 2001 automatically,
- row 5 defines a range including **all** Traffic Volumes

As exemplified, volume ranges may overlap.

Up to 100 rows may be specified.

9.6.2.5 RTML: Rate Table Section Lengths

```
RTML   Highway Accident System  -  Rate Table Section Lengths  ROW 1 TO 3 OF 3
       ----------------------     --------------------------

  Sections of Highway with the same Segment Number and Highway Classification
  may be broken into sub-sections.  This will not affect the Accident Rate
  in each cell of the Rate Table, but by increasing the sample size, it will
  make the statistics in each cell (N, Sigma, Mean) more meaningful.

  Remnants less than half of the defined length will be appended to the last
  sub-section.  Code a length of 999.9 to turn off section division.

  A different section length may be defined for each of the Characteristics
  of the first Highway Classification Category:

         Location                     Length (km)
    ----------------------------      ------
    U - Urban                         999.9
    R - Rural                         999.9
    X - U/R (for unnumbered routes    999.9
    ---------------------------------------
```

9.6.3 Rate Table Report

There is one column in the report for each specified Highway Classification Set. If there is room, the Highway Classification Set is put into the column heading. If there is not room, the Highway Classification Sets are defined at the end of the report, by column number.

```
                              *****  A C C I D E N T   R A T E   T A B L E  *****
                                     Version  4.1
Report Date: 1999/04/13    9:23                                                                          Page   1
Data Period:  1989/01/01 - 1998/03/31
```

```
Calculation Type:  SECTIONS                              Accident Rate Units:  Accidents per     million vehicle-km.
'UNDIVIDED'                                        Fatal Accident Rate Units:  Accidents per 100-million vehicle-km.


Description (history) of the input accident file
--------------------------------------------------------------------------------


================================================================================
PROGRAM: THAS200 VERSION:  2.4  RUN DATE & TIME: 1999/04/13 09:22
----------------------------------------------------------------
         ACCIDENT SELECTION CRITERIA

         FROM              TO         LETTERED
    Hwy  Seg  Km      Hwy  Seg  Km
  1.    1  0305   0.0    964  2398   5.0    NO


DISTRICTS:            1  2  3  4  5  6  7  8  9 10
                     11 12 13 14 15 16 17 18 19 20
                     21 22 23 24 25 26 27 28
HIGHWAY CLASS SET:  R CE
DATES:               19890101 TO 19980331
MONTHS:                   TO
HOURS:                    TO
NODE SELECTION:     1  (once only)
OBSOLETE LOCATIONS: YES


----------------------------------------------------------
--- Search Path Removed by sub RepFix ---
  83641 RECORDS,   80094 ACCIDENTS SELECTED
    218 RECORDS,     212 ACCIDENTS AT OBSOLETE LOCATIONS SELECTED
THAS200 COMPLETED SUCCESSFULLY
```

Report Date: 1999/04/13   9:23   Page 10
Data Period: 1989/01/01 - 1998/03/31

Calculation Type: SECTIONS   Accident Rate Units: Accidents per   million vehicle-km.
'UNDIVIDED'   Fatal Accident Rate Units: Accidents per 100-million vehicle-km.

----- Highway Classification Sets -----

Traffic Volume Ranges (ADT)	1 R C	2 R E	3 R F	4 U C	5 U E	6 U F
ADT: 0 - 1000						
Wtd. Avg. Acc. Rate	1.079	0.000	0.000	0.000	0.000	0.000
Wtd. Avg. Fatal Acc. Rate	2.072	0.000	0.000	0.000	0.000	0.000
Road-Wtd. Fatal Acc. Rate	0.285	0.000	0.000	0.000	0.000	0.000
ADT: 1001 - 2000						
Wtd. Avg. Acc. Rate	1.027	0.000	0.000	0.000	14.998	0.000
Wtd. Avg. Fatal Acc. Rate	2.100	0.000	0.000	0.000	0.000	0.000
Road-Wtd. Fatal Acc. Rate	0.297	0.000	0.000	0.000	0.000	0.000
ADT: 2001 - 3000						
Wtd. Avg. Acc. Rate	0.989	1.190	0.000	39.712	0.000	0.000
Wtd. Avg. Fatal Acc. Rate	1.764	2.396	0.000	0.000	0.000	0.000
Road-Wtd. Fatal Acc. Rate	0.245	0.314	0.000	0.000	0.000	0.000
ADT: 3001 - 4000						
Wtd. Avg. Acc. Rate	0.771	0.000	0.000	11.558	0.000	0.000
Wtd. Avg. Fatal Acc. Rate	1.556	0.000	0.000	0.000	0.000	0.000
Road-Wtd. Fatal Acc. Rate	0.211	0.000	0.000	0.000	0.000	0.000
ADT: 5001 - 10000						
Wtd. Avg. Acc. Rate	0.577	1.914	10.485	8.753	13.108	4.427
Wtd. Avg. Fatal Acc. Rate	1.100	3.050	0.000	0.000	0.000	0.000
Road-Wtd. Fatal Acc. Rate	0.160	0.496	0.000	0.000	0.000	0.000
ADT: 10001 - 15000						
Wtd. Avg. Acc. Rate	0.784	3.337	0.000	9.561	6.161	0.000
Wtd. Avg. Fatal Acc. Rate	1.636	1.946	0.000	0.000	10.100	0.000
Road-Wtd. Fatal Acc. Rate	0.249	0.304	0.000	0.000	1.212	0.000

Calculation Type: SECTIONS   Accident Rate Units: Accidents per   million vehicle-km.
'UNDIVIDED'   Fatal Accident Rate Units: Accidents per 100-million vehicle-km.

```
                         ----- Highway Classification Sets -----
        Traffic Volume    |
         Ranges (ADT)     |   1    |   2    |   3    |   4    |   5    |   6    |
                          | R C    | R E    | R F    | U C    | U E    | U F    |
--------------------------+--------+--------+--------+--------+--------+--------+
|    ADT:  15001 - 20000 ||        |        |        |        |        |        |
|     Wtd. Avg. Acc. Rate || 0.444  | 0.788  | 0.000  | 0.000  | 0.000  | 0.000  |
|                         ||        |        |        |        |        |        |
| Wtd. Avg. Fatal Acc. Rate|| 1.021 | 1.062  | 0.000  | 0.000  | 0.000  | 0.000  |
|                         ||        |        |        |        |        |        |
| Road-Wtd. Fatal Acc. Rate|| 0.135 | 0.153  | 0.000  | 0.000  | 0.000  | 0.000  |
|                         ||        |        |        |        |        |        |
--------------------------++--------+--------+--------+--------+--------+--------+
|    ADT:    0 -9999999   ||        |        |        |        |        |        |
|     Wtd. Avg. Acc. Rate || 0.791  | 1.269  | 10.485 | 17.038 | 8.732  | 4.427  |
|                         ||        |        |        |        |        |        |
| Wtd. Avg. Fatal Acc. Rate|| 1.485 | 1.470  | 0.000  | 0.000  | 6.468  | 0.000  |
|                         ||        |        |        |        |        |        |
| Road-Wtd. Fatal Acc. Rate|| 0.210 | 0.218  | 0.000  | 0.000  | 0.776  | 0.000  |
|                         ||        |        |        |        |        |        |
--------------------------++--------+--------+--------+--------+--------+--------+
```

SET 1: Rural Conventional

SET 2: Rural Expressway

SET 3: Rural Freeway

SET 4: Urban Conventional

SET 5: Urban Expressway

SET 6: Urban Freeway

Calculation Type: SECTIONS   Accident Rate Units: Accidents per   million vehicle-km.
'UNDIVIDED'   Fatal Accident Rate Units: Accidents per 100-million vehicle-km.

==================== THAS260 SUMMARY ====================

     80094 Accidents were read to construct the Rate Table.
     15135 Accidents fell in ONE cell of the Rate Table.
     64350 Accidents fell in MORE THAN ONE cell of the Rate Table.
       609 Accidents fell in NO cell of the Rate Table.

        10 Section(s) or segment(s) fell in no cell of the Rate Table.

9.6.4 Class Rate Report

The Class-Rate report is an optional report which may be produced in addition to the Rate Table. The Class-Rate report contains one line for each section in a SECTION calculation, or for each location in a LOCATION or LANDMARK calculation. Each report line contains accident count, traffic volume, classification and accident rate details of that section or location.

If analysing a large portion of the highway network, this report can become quite large. In particular, for LOCATION or LANDMARK calculations, the Class-Rate report may be hundreds of pages long.

The report starts with a copy of the Description File of the input data Subset Pair. This contains the Data Selection information (from the main Data Selection menu), the Search Path, and details of any other processes which have helped to create the Subset (such as the Accident-Prone Locations or Accident-Prone Sections programs). This information is important for the interpretation of the data in the body of the report.

Headings

Each page of the Class-Rate Report begins with some identifying headings. These include:

DATA SELECTION DATES   Year/Month/Day – Year/Month/Day
        This is the range of dates specified on the original Data Selection panel, before any secondary processes (requested before the Rate Table) may have modified the data.

REPORT DATE   Year/Month/Day   Hour:Minute
        This is the date and time that the Rate Table program started. It may be somewhat later than the time that the Rate Table's data was chosen from the Data Selection panels (particularly if the Initial Data Source was an already created Subset Pair).

CALCULATION TYPE
        This is the type of Rate Table that was specified on the Rate Table options panel. It may be 'SECTIONS,' 'LOCATIONS WITH ACCIDENTS,' or 'LOCATIONS AT LANDMARKS.'

LANDMARK TYPES
        This is the list of all landmark types specified on the Rate Table options panel. It is present in the Report headings only if the calculation type is 'LOCATIONS AT LANDMARKS.'

ACCIDENT RATE UNITS
        This shows the units that are used for displaying accident rates, always either 'Accidents per million vehicle-kilometres' for Section-type Rate Tables, or 'Accidents per million vehicles' for the two Location types of Rate Tables. It applies to the Weighted Average Accident Rate and the Road-Weighted Accident Rate in the main Rate Table, and to the Accident Rate and the Road-Weighted Accident Rate in the Class-Rate Report.

FATAL ACCIDENT RATE UNITS
>This shows the units that are used for displaying **fatal** accident rates, always either 'Accidents per 100-million vehicle-kilometres' for Section-type Rate Tables, or 'Accidents per 100-million vehicles' for the two Location types of Rate Tables. It applies to the Weighted Average Fatal Accident Rate and the Road-Weighted Fatal Accident Rate in the main Rate Table, and to the Fatal Accident Rate and the Road-Weighted Fatal Accident Rate in the Class-Rate Report.

User-Defined Title
>Any title the user has entered on the Rate Table options panel. It should be something useful to help identify the Rate Table and Class-Rate Report, such as:
>>WINTER ACCIDENTS, DISTRICT 15

Fields of the Class-Rate Report

Each line of the Class-Rate Report lists details of one section (for Section-type Rate Tables) or details of one location (for Location- and Landmark-type Rate Tables).

REG/DIST
-        This gives the region and district numbers of the section or location.

HWY
-        The highway number and letter of the section or location.

SEG.
-        The segment number of the section or location.

The following three fields are present for Section-type tables only:

START KMMARK
-        The KMMARK that begins the section.

Node or END KMMARK
-        The KMMARK that ends the section. If the 'section' is actually a node, this field contains the 8-character node number instead.

LENGTH
-        The length of the section (in kilometres). Note that the section length is equal to the end-KM minus the start-KM, **plus** 0.1. The 0.1 km. is added to the length so that the sum of the lengths of several consecutive sections (such as 0.0-10.0, 10.1-20.1, 20.2-30.2) equals the total length of all sections (10.1 + 10.1 + 10.1 = 30.3, in this case).

The following two fields are present for Locations-with-Accidents-type tables only:

KMMARK
-        The KMMARK of the location.

NODENAME
-        For locations that fall on a node, this is the unique 8-character number that identifies the node.

The following three fields are present for Locations-at-Landmarks-type tables only:

KMMARK
– The KMMARK of the landmark.

NODENAME
– For landmarks that fall on a node, this is the unique 8-character number that identifies the node.

LMK TYPE
– The Landmark Type (from THASP.LANDMARK) of the landmark. If a location has several lines in the Landmark file, with different Landmark Types, this is the Landmark Type of the first line in the file that matches one of the Landmark Types specified on the Rate Table options panel.

The following fields are present in the Class-Rate Report regardless of the Calculation Type of the Rate Table.

HWY CLASS
– This is the Highway Classification of the section or location, from the THASP.SEGCLASS.*scheme* file.

AVERAGE ADT
– This is the Average Daily Traffic Volume of the section or location. ADT's for the entire date-range (and month-range) of the input data are averaged to give an average ADT for the entire period.

#ACCIDENTS / FAT INJ PDO TOT
– The FAT, INJ and PDO columns are the number of Fatal, Injury and PDO (Property Damage Only) accidents in the section or location. The TOT column is the sum of those three columns.

ACCIDENT RATE / Trad, Road Wtd, Sev Wtd
– These are the Traditional (RS_i), Road-weighted and Severity-weighted accident rates.

FATAL ACCIDENT RATES / Trad, Rd-Wtd
– These are the fatal accident rates of the section or location. It is calculated in the same way as the accident rate, but only fatal accidents enter into the calculations, and the units are accidents per 100-million vehicles instead of 1 million vehicles

The following three fields are present for Section-type tables only:

CRITICAL ACCIDENT RATES
– These are the Traditional, Road-weighted and Severity-weighted Critical accident rates. They are calculated as defined in section 6.5, using average accident rates looked up on the specified Average Accident Rate file (e.g. THASP.AVERATES.SEC.MASTER).

```
                                      Class-Rate Report
                                      Version 5.0
Report Date:  2002/03/10   14:07                                                         Page   1
Data Period:  1999/01/01 - 2001/03/31


Calculation Type:  LOCATIONS AT LANDMARKS              Accident Rate Units:  Accidents per     million vehicles
  Landmark Types:  A1 A2 A3                      Fatal Accident Rate Units:  Accidents per 100-million vehicles

                                              Sample
                                                          Accident Rates         Fatal
Reg                          Lmk             Average    #Accidents        Road  Sev   Accident Rates
Dist Hwy  Seg   KMMARK NodeName Type Class     ADT    FAT INJ PDO TOT  Trad  Wtd   Wtd    Trad  Rd-Wtd
----------------------------------------------------------------------------------------------------------
1  7  11  2742   0.1           A1  PUAU2L    15982    0   0   0   0  0.000 0.000 0.000  0.000 0.000
1  7  11  2742   0.1           A1  PUAU2L    15982    0   0   0   0  0.000 0.000 0.000  0.000 0.000
1  7  11  2742   0.2           A1  PUAU2L    15982    0   0   0   0  0.000 0.000 0.000  0.000 0.000
1  7  11  2742   0.2           A1  PUAU2L    15982    0   0   0   0  0.000 0.000 0.000  0.000 0.000
1  7  11  2742   0.3           A1  PUAU2L    15982    0   0   0   0  0.000 0.000 0.000  0.000 0.000
1  7  11  2742   0.3           A1  PUAU2L    15982    0   0   0   0  0.000 0.000 0.000  0.000 0.000
1  7  11  2742   0.4           A1  PUAU2L    15982    0   0   0   0  0.000 0.000 0.000  0.000 0.000
1  7  11  2742   0.4           A1  PUAU2L    15982    0   0   0   0  0.000 0.000 0.000  0.000 0.000
1  7  11  2742   0.5           A1  PUAU2L    15982    0   0   0   0  0.000 0.000 0.000  0.000 0.000
1  7  11  2742   0.6           A1  PUAU2L    15982    0   0   0   0  0.000 0.000 0.000  0.000 0.000
1  7  11  2742   0.7           A1  PUAU2L    15982    0   0   0   0  0.000 0.000 0.000  0.000 0.000
1  7  11  2742   1.6           A1  PRAU2L    15982    0   0   0   0  0.000 0.000 0.000  0.000 0.000
1  7  11  2742   2.9           A1  PRAU2L    15982    0   0   0   0  0.000 0.000 0.000  0.000 0.000
1  7  11  2742   3.0           A1  PRAU2L    15982    0   2   1   3  0.228 0.028 1.600  0.000 0.000
1  7  11  2743   0.2           A1  PRAU4R    25351    0   2   1   3  0.144 0.027 1.008  0.000 0.000
1  7  11  2743   0.6           A1  PRAU4R    25351    0   0   2   2  0.096 0.017 0.096  0.000 0.000
1  7  11  2743   0.9           A1  PRAU4R    25351    0   0   0   0  0.000 0.000 0.000  0.000 0.000
1  7  11  2743   1.0           A2  PRAU4R    25351    0   0   0   0  0.000 0.000 0.000  0.000 0.000
1  7  11  2744   0.0 27432744  A1  PRAU2R    29210    0   1   3   4  0.166 0.022 0.542  0.000 0.000
1  7  11  2744   0.2           A1  PRAU2R    33069    0   0   0   0  0.000 0.000 0.000  0.000 0.000
1  7  11  2744   0.3           A2  PRAU2R    33069    0   0   1   1  0.036 0.008 0.036  0.000 0.000
1  7  11  2744   0.4           A1  PRAU2R    33069    0   0   1   1  0.036 0.005 0.036  0.000 0.000
1  7  11  2744   0.6           A1  PRAU2R    33069    0   1   0   1  0.036 0.006 0.368  0.000 0.000
1  7  11  2744   0.7           A2  PRAU2R    33069    0   2   0   2  0.073 0.013 0.736  0.000 0.000
1  7  11  2744   1.2           A1  PRAU2R    33069    0   0   0   0  0.000 0.000 0.000  0.000 0.000
1  7  11  2744   1.8           A1  PRAU2R    33069    0   0   0   0  0.000 0.000 0.000  0.000 0.000
1  7  11  2744   2.6           A1  PRAU2R    33069    0   0   0   0  0.000 0.000 0.000  0.000 0.000
1  7  11  2744   3.4           A1  PRAU2R    33069    0   5   0   5  0.184 0.037 1.841  0.000 0.000
1  7  11  2744   4.2           A1  PRAU2R    33069    0   0   1   1  0.036 0.004 0.036  0.000 0.000
1  7  11  2744   5.0           A3  PRAU2R    33069    0   4   1   5  0.184 0.032 1.510  0.000 0.000
1  7  11  2744   5.9           A1  PRAD4R    33069    0   0   0   0  0.000 0.000 0.000  0.000 0.000
1  7  11  2744  10.0 27442750  A1            19988    0   1   0   1  0.060 0.013 0.609  0.000 0.000
```

```
                                         Class-Rate Report
                                           Version 5.0
Report Date:  2002/03/10   10:29                                                          Page   1
Data Period:  1999/01/01 - 2001/03/31


Calculation Type:  SECTIONS                           Accident Rate Units:  Accidents per     million vehicle-km.

                                                    Sample
                         Node or                              Accident Rates       Fatal            Critical
Reg              Start  End                   Average    #Accidents        Road  Sev  Accident Rates   Accident Rates
Dist Hwy  Seg   KMMARK KMMARK  Length Class     ADT   FAT INJ PDO TOT Trad  Wtd  Wtd   Trad  Rd-Wtd   Trad  Rd-Wtd SevWtd
-------------------------------------------------------------------------------------------------------------------
1  7  11  2744   10.0 27442750  0.1          19988   0   1   0    1 0.609 0.134 6.093 0.000 0.000   1.000 1.000 1.000
1  7  11  2744    8.8  9.9      1.2          33069   1  12  22   35 1.074 0.184 7.427 3.069 0.583   1.000 1.000 1.000
1  7  11  2744    5.1  7.0      2.0 PRAD4R   33069   0   0   0    0 0.000 0.000 0.000 0.000 0.000   0.000 0.000 0.000
1  7  11  2742    1.0  3.3      2.4 PRAU2L   15982   1   2   2    5 0.158 0.026 3.873 3.175 0.793   0.345 0.529 1.954
1  7  11  2744    0.0 27432744  0.1 PRAU2R   29210   0   1   3    4 1.667 0.225 5.420 0.000 0.000   2.184 1.554 4.081
1  7  11  2744    0.1  5.0      5.0 PRAU2R   33069   0  15   6   21 0.154 0.026 1.149 0.000 0.000   0.630 0.373 1.576
1  7  11  2743    0.0 27422743  0.1 PRAU4R   20666   0   0   0    0 0.000 0.000 0.000 0.000 0.000   0.000 0.000 0.000
1  7  11  2743    0.1  3.6      3.6 PRAU4R   25351   0   6   7   13 0.173 0.028 0.894 0.000 0.000   0.705 0.428 1.701
1  7  11  2744    7.1  8.7      1.7 PRAU4R   33069   0  12  13   25 0.541 0.078 2.881 0.000 0.000   0.785 0.487 1.835
```

9.7   Average Accident Type Ratios (THAS270)

9.7.1   Description

This program calculates Counter-Measure method Average Accident Type Ratios, broken down by Location/Section, reference group, and accident type. The results are written to a report, and optionally to files, which are used for the Counter-Measure Method of determining accident-prone locations and sections. See the **Data Retrieval Concepts / Counter-Measure Method** section (6.6) of this manual for details.

The program can also produce output accident subsets, of (S) accidents which are in any Location reference group, and (X) accidents which are not in any Location reference group but are in any Section reference group.

9.7.2   P270: Parameters Panel

```
 P270 Highway Accident System – Average Accident Type Ratios       Row 1 of 30
    ----------------------   --------------------------     Scroll:PF7/PF8
  Command ==>                              (Press PF1 for Help)
  Create Ratio Files  >                    (blank for none, ? for list)
  Location Group Name > Intersection       (e.g. Location or Intersection)


   TYPE    Name                    Hwy Class Set       Landmark Types
    L       Urban Signalized        U                   A1
    L       Urban Stop/Yield        U                   A2
    L       Urban Uncontrolled      U                   A3
    L       Rural Signalized        U                   A4
    L       Rural Stop/Yield        U                   A5
    L       Rural Uncontrolled      R                   A1
    L                               R                   A2
    L                               R                   A3
    L                               R                   A4
    L                               R                   A5
    S       Urban Conventional      U C
    S       Urban Expressway        U E
    S       Urban Freeway           U F
    S       Rural Conventional      R C
    S       Rural Expressway        R E
    S       Rural Freeway           R F
```

   Command ===>
    - enter an X and press Enter to return to previous panel (same as PF3).
    - enter scroll commands such as UP 3 or DOWN 5 .
    - enter LOAD, and enter a name in the Create Ratio Files field, then press Enter, to replace the
      reference groups in the scrollable portion of the screen with the reference groups defined in the
      named Ratio Files.

   Create Ratio Files
    - leave this field blank to get a report only.
    - enter **?** to get a list of existing Accident Type Ratio file pairs.
      This will also allow you to delete, browse, edit or rename existing files.
    - enter a name, (starting with a letter, no longer than 8 characters) to create a pair of Accident Type

Ratio files, named as follows:
```
    userid.ACCTYPE.RATIOS.LOCATION.name
    userid.ACCTYPE.RATIOS.SECTION.name
```
where *userid* is your TSO user ID, and *name* is the name you enter.
These are your personal files. You may create as many as you need.
These files are used for the Counter-Measure Method of determining accident-prone locations and sections.

Location Group Name
 - If the Location Reference Groups you are defining are all intersections, code Intersection in this field. Otherwise, the more general term Location is suggested. This name is used in report headings only.

Reference Groups

The lower part of the panel contains a scrollable list of Reference Group definitions. A Reference Group is a group of accidents which occurred on a defined set of Highway Classifications, and (for Location groups) at a defined set of Landmark types. The Accident Type Ratios are calculated separately for each Reference Group. An accident is a candidate for a Section group only if it is not in any Location group.

```
Type                - enter L for Location, or S for Section, or:
                       I - insert a blank row following
                       C - clear this row
                       D - delete this row
Name                - enter a descriptive name for the reference group.
Highway Class Set - defined in detail in the H.A.S. User Manual
                    - e.g. R EF - rural express and free-ways.
Landmark Types    - (Location ref. groups only) enter up to 6
                      2-digit landmark type codes, separated by blanks.
```

Blank lines may be left in the table.

The reference groups need not be mutually exclusive. An accident which location falls into more than one reference group, it will be counted in all those reference groups. **However**, if you are re-creating the Ratio files, it may be advisable to define mutually exclusive reference groups, because the Accident-Prone Location and Sections programs, when looking up ratios for a particular location, use the ratios of the *first* reference group in the ratio file into which that location falls.

Output Subsets

After you have specified the Reference Groups, the Output Subsets panel will be displayed. The Average Accident Type Ratios program (THAS270) can produce the following output accident subsets:

```
Selected Accidents  - those in one or more Location Reference Groups.

Excluded Accidents  - those NOT in any Location Reference Group,
                       but in one or more Section Reference Groups.
```

 Note that accidents which are not in any reference group are not written out at all.

9.7.3 Report

```
Program THAS270 Version  2.1 - Control Parameters:

Replace ratio files with new ratios:                NO

REFERENCE GROUP DEFINITIONS:

  Intersection   :
    Urban Signalized          U       A1
    Urban Stop/Yield          U       A2
    Urban Uncontrolled        U       A3
    Rural Signalized          U       A4
    Rural Stop/Yield          U       A5
    Rural Uncontrolled        R       A1
                              R       A2
                              R       A3
                              R       A4
                              R       A5


  SECTIONS:
    Urban Conventional        U C
    Urban Expressway          U E
    Urban Freeway             U F
    Rural Conventional        R C
    Rural Expressway          R E
    Rural Freeway             R F

====== Description file of Input Subset =========

    ===============================================================================
    PROGRAM: THAS200 VERSION:  2.4  RUN DATE & TIME: 1999/06/11 11:50
    ----------------------------------------------------------------
              ACCIDENT SELECTION CRITERIA

            FROM                 TO          LETTERED
        Hwy  Seg   Km      Hwy  Seg   Km
      1.    1A 0303   0.0      1A 0303   5.6    YES


    DISTRICTS:
    HIGHWAY CLASS SET:
    DATES:              19870101 TO 19980331
    MONTHS:                 TO
    HOURS:                  TO
    NODE SELECTION:     1  (once only)
    OBSOLETE LOCATIONS: YES


    ----------------------------------------------------------

    ---- Search Path Omitted ---

    *END OF SEARCH PATH.  TOTALS:   1180    1097     135     125
        1180 RECORDS,    1097 ACCIDENTS SELECTED
         135 RECORDS,     125 ACCIDENTS AT OBSOLETE LOCATIONS SELECTED
    THAS200 COMPLETED SUCCESSFULLY

====== End of Description File ======
```

==

```
------------------------------------------------------- Intersection  -------------------------------------------------------------
Reference-Group-Name /    # Loc-  # Acc   # Acc   --------------- Number/Ratio of Accidents by Accident Type -----------------
Clas-set Landmark-Types   ations          Typed     1     2     3     4     5     6     7     8     9    10    11    12    13
-----------------------------------------------------------------------------------------------------------------------------------

Urban Signalized            28     370     276      43    39    16    22     3    23     3    35    33     0    77     9     0
U       A1                                0.746   0.116 0.105 0.043 0.059 0.008 0.062 0.008 0.095 0.089 0.000 0.208 0.024 0.000

Urban Stop/Yield             0       0       0       0     0     0     0     0     0     0     0     0     0     0     0     0
U       A2                                0.000   0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000

Urban Uncontrolled           0       0       0       0     0     0     0     0     0     0     0     0     0     0     0     0
U       A3                                0.000   0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000

Rural Signalized             0       0       0       0     0     0     0     0     0     0     0     0     0     0     0     0
U       A4                                0.000   0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000

Rural Stop/Yield             5     319     258      33    44    20    10     8     8     5    26    29     1    92    13     0
U       A5                                0.809   0.103 0.138 0.063 0.031 0.025 0.025 0.016 0.082 0.091 0.003 0.288 0.041 0.000

Rural Uncontrolled           0       0       0       0     0     0     0     0     0     0     0     0     0     0     0     0
R       A1                                0.000   0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000

                             0       0       0       0     0     0     0     0     0     0     0     0     0     0     0     0
R       A2                                0.000   0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000

                             0       0       0       0     0     0     0     0     0     0     0     0     0     0     0     0
R       A3                                0.000   0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000

                             0       0       0       0     0     0     0     0     0     0     0     0     0     0     0     0
R       A4                                0.000   0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000

                             0       0       0       0     0     0     0     0     0     0     0     0     0     0     0     0
R       A5                                0.000   0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000
-----------------------------------------------------------------------------------------------------------------------------------
Intersection    Totals:     32     677     523      73    80    35    32    11    31     8    60    62     1   166    22     0
                                          0.773   0.108 0.118 0.052 0.047 0.016 0.046 0.012 0.089 0.092 0.001 0.245 0.032 0.000

------------------------------------------------------- SECTIONS -------------------------------------------------------------------
Reference-Group-Name /    # Loc-  # Acc   # Acc   --------------- Number/Ratio of Accidents by Accident Type -----------------
Highway-Class-Set         ations          Typed     1     2     3     4     5     6     7     8     9    10    11    12    13
-----------------------------------------------------------------------------------------------------------------------------------
```

Data Period: 1987/01/01 - 1998/03/31
==


```
Urban Conventional          20     322     270      34      45      13      10       2      13       2      29      29       0     111      11       0
U C                                         0.839   0.106 0.140 0.040 0.031 0.006 0.040 0.006 0.090 0.090 0.000 0.345 0.034 0.000

Urban Expressway             1      98      78      11       6      12       1       0       6       0      11       7       1      28       0       2
U E                                         0.796   0.112 0.061 0.122 0.010 0.000 0.061 0.000 0.112 0.071 0.010 0.286 0.000 0.020

Urban Freeway                0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0
U F                                         0.000   0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000

Rural Conventional           0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0
R C                                         0.000   0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000

Rural Expressway             0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0
R E                                         0.000   0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000

Rural Freeway                0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0
R F                                         0.000   0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000

----------------------------------------------------------------------------------------------------------------------------
SECTIONS  Totals:           21     420     348      45      51      25      11       2      19       2      40      36       1     139      11       2
                                            0.829   0.107 0.121 0.060 0.026 0.005 0.045 0.005 0.095 0.086 0.002 0.331 0.026 0.005
```

==

There were   0 accidents which were in NO reference group.

Of the   1097 accidents which were in at least one reference group:

           226 accidents were of   0 accident type(s).
           778 accidents were of   1 accident type(s).
            92 accidents were of   2 accident type(s).
             1 accidents were of   3 accident type(s).

There were   1097 accidents in total.
             1180 accident records.

Notes:
    An accident may be of zero or more accident types.
    # Locations - the number of distinct locations with accidents.
    # Acc Typed - the number of accidents which were of one or more accident types.
    Totals   - the number of accidents in at least one group.

    --- Key to Accident Types ---
     1 - Right Angle
     2 - Left Turn Opposing
     3 - Straight Ahead Rear End
     4 - Left Turn Rear End
     5 - Right Turn
     6 - Sideswipe
     7 - Head On
     8 - Off Road
     9 - Fixed Object
    10 - Parked
    11 - General Rear End
    12 - Pedestrian

    13 - Animal

Accident types are determined in PL/I procedure THASP.SRCELIB(THASSAT).

                  === PROGRAM THAS270 SUMMARY ===

INDATA -   1180 ACCIDENT RECORDS READ FROM THE INPUT FILE
        -   1097 ACCIDENTS

9.8   Fatal / Injury / PDO Counts (THAS232)

This program reads an accident subset data file, and creates a comma-separated values (CSV) file containing the number of Fatal, Injury, PDO and total number of accidents at each location with accidents. The CSV file can then be downloaded from the mainframe (using the HASutil program), and loaded into PC-based applications (e.g. Excel).

```
P232                    Highway Accident System
                        ----------------------

                Create a Comma-Delimited Text File
   of Fatal, Injury, PDO and Total Accident Counts by Location and/or Year


 File Name  > COUNTS       - .CSV extension will be added
                           - will be deleted from the mainframe after 1 week.
                           - blank for no CSV output

 By Location>             - Y to get one line per location with accidents.
 By Year    > Y           - Y to get totals by year

 Title      > Counts for Highway 19

 Subset Desc> Y           - Y to include the input subset description.

 Totals, and totals by year will always be printed to the SYSPRINT output.

 Use the HASutil program to download the Counts CSV file to your PC.



                Press Enter to continue, PF3 to Cancel
```

File Name:
- Enter the output (CSV) file name. Maximum of 8 characters. Must start with a letter. An extension of .CSV is added automatically. When the HAS job has finished, this file can be downloaded using HASutil. The file will be deleted automatically from the mainframe after one week.
- The file is created directly on the mainframe - it does not need to be extracted using the mainframe IOF program, as with reports.

By Location:
- Enter a Y to get separate counts for each location which has one or more accidents.
- In the CSV file, nodes are NOT identified as such. The accident counts for a node are labelled with the first seg-km of the node encountered in the accident data.

By Year:
- Enter a Y to get totals by year written to the CSV file.

Subset Desc:
- Enter a Y to get the input subset description at the top of the CSV file.

See sample output on the following pages.

Sample "By Location" CSV output:

This file produced by Highway Accident System program THAS232 version 2.2
Run at: 2005/01/23 11:04
Data Selection Period: 1995/01/01 - 2004/12/15

Parksville

		Crash Counts				Victim Counts	
Segment	Km	Total	Fatal	Injury	PDO	Killed	Injured
2340	0	39	0	21	18	0	30
2340	0.1	3	0	1	2	0	1
2340	0.2	2	0	1	1	0	1
2340	0.3	11	0	4	7	0	7
2340	0.4	1	0	0	1	0	0
2340	0.5	4	0	1	3	0	1
2340	0.6	1	0	0	1	0	0
2340	0.7	6	0	5	1	0	7
2340	0.8	7	0	5	2	0	8
2340	0.9	14	0	4	10	0	10
2340	1	2	0	2	0	0	2
2340	1.1	3	0	3	0	0	3

... many rows deleted...

2340	48.8	3	2	1	0	2	2
2340	49.1	1	0	1	0	0	2
2340	49.2	3	0	0	3	0	0
2340	49.3	1	0	1	0	0	1
2340	49.5	3	0	1	2	0	1
2340	50.3	1	0	0	1	0	0
2346	0	5	0	4	1	0	10

===== TOTALS of   267 Locations =====

		742	16	357	369	16	544

Sample "By Year" CSV output:

This file produced by Highway Accident System program THAS232 version 2.2
Run at: 2005/01/03 15:26
Data Selection Period: 1995/01/01 - 2004/11/17

Provincial Crash Counts

| Year | Crash Counts | | | | Victim Counts | | Segment |
	Total	Fatal	Injury	PDO	Killed	Injured	Km-Years
1995	20539	257	8243	12039	319	12921	14374.3
1996	14716	186	6219	8311	218	9882	14527.1
1997	10409	172	5043	5194	214	8062	14527.1
1998	9971	186	4952	4833	228	7924	14592.7
1999	9738	199	4959	4580	227	8086	14625.5
2000	10161	187	4986	4988	222	8068	14744.6
2001	11755	197	5283	6275	227	8266	14745.6
2002	11971	235	5143	6593	278	8118	14844.6
2003	12600	205	5315	7080	238	8315	14960.4
2004*	9164	157	3814	5193	177	5823	15095.0
Totals:	121024	1981	53957	65086	2348	85465	147036.9

Notes:
1 * The data for the last year is incomplete. By late Feb, Mar, Apr each year,
  the previous year's counts will be approximately 84%, 92%, 99% complete.
2 'Injured' counts include injury victims in fatal crashes.
3 PDO - Property Damage Only.
4 Non-fatal crash counts (especially PDO) are greatly affected
  by variations in police reporting policies.
5 Date range of crashes counted: 1995/01/01 - 2004/11/17
6 Only crashes located on the CURRENT LKI are counted.

The length calculation for a year does not include segments which were not in the LKI in that year. If a segment was added part-way through a year, only the appropriate fraction of the length is added for that year. Hence the Length column is titled "Segment Km-Years". Note that if a segment is removed from the LKI, it is not included in any year's length (or accident counts) - it is as if it never existed.

9.9   Select by Counter-Measure Accident Type (THAS205)

9.9.1 Description

The Counter-Measure Method is a method of identifying Accident Prone Locations or Sections. (See **Data Retrieval Concepts / Counter Measure Method** for details.)

Counter-Measure Method accident types are defined using a combination of data fields of the accident record.

This program will write accidents of any of the selected types to the Selected output subset, and all others to the Excluded output subset.

The program uses the same accident type definition logic as in the Accident Prone Locations and Sections programs.

Browse PL/I program 'THASP.SRCELIB(THASSAT)' on the mainframe to see the logic currently in use.

9.9.2 P205: Panel

```
 P205                      Highway Accident System
                           ----------------------


          Accident Selection by  Counter-Measure Accident Type
          ---------------------------------------------------

  Mark with an S the Accident Types to select.                    PF1 for Help

     >        1.  - Right Angle
     >        2.  - Left Turn Opposing
     >        3.  - Straight Ahead Rear End
     >        4.  - Left Turn Rear End
     >        5.  - Right Turn
     >        6.  - Sideswipe
     >        7.  - Head On
     >        8.  - Off Road
     >        9.  - Fixed Object
     >       10.  - Parked
     >       11.  - General Rear End                Press ENTER to proceed
     >       12.  - Pedestrian                      PF3   to cancel
     >       13.  - Animal


```

9.10 Select By Data Fields (THAS203)

9.10.1 Description

The Select By Data Fields program (THAS203) duplicates the "Select By Data Fields" functionality of the "Data Selection from the PDS-Master" program (THAS200). This program (THAS203), however, takes an accident subset as its input. It can produce output subsets for the *selected* and/or the *excluded* accidents.

If, for example, you wanted to create an accident subset containing all the truck accidents on highway 1, you could do it in one step, by specifying Highway 1 and Trucks via panel P200 (Select from the PDS-Master), or you could do it in two steps:
- A)   specify Highway 1 via panel P200,
- B)   on the Process Selection panel (PSEL) for step B select "Select By Data Fields", then specify that you want Trucks on fields VEHTYPE1 and VEHTYPE2.

You would then have three subsets available for subsequent processing:
1. All the accidents on Highway 1 (Step A, output)
2. All the Truck accidents on Highway 1 (Step B, *selected* output)
3. All the non-truck accidents on Highway 1 (Step B, *excluded* output)

9.10.2 P203: Panel

```
P203              Highway Accident System - Select by Data Fields
                  ----------------------   --------------------


This process allows the selection of accidents from an accident subset, based
upon values of selected data fields.  The query panels are the same as those
invoked from the "Select by Data Fields" line of the main Data Selection panel.

Since a query can become complex, queries can be saved and recalled.
The names are public, which means they can be be shared among H.A.S. users,
but also means care must be taken in choosing names.
By default, your last-used query is loaded.


            E      - Edit the current query.  (Name ignored)
            N      - edit a New, blank query. (Name ignored)
            L      - Load and edit a named query.
                     (If Name is blank, the Last query you used is loaded.)
            S      - Save the current query with the provided name.

        => L      Name:              (? for a list)

            blank - proceed, using the current query.
            X     - Cancel this process.  (PF3)
```

When the panel first appears, an **L** will be in the option field. So if you just press Enter, you will be working on the same query as when you last proceeded from from this panel.

Queries are edited from panel FSEL, which is described in the the **Data Retrieval Job Creation / P200 / FSEL** section of this document. When invoked from panel P203, the field list displayed on panel FSEL includes the HWYCLASS field name. Thus this program can be used to select accidents by Highway Class Set.

If you want to work on a named query, press Tab to move to the Name field, and enter the query name. If you want to select from a list of queries, enter **?** in the Name field, and press Enter. You will be presented with a list of all queries saved by all HAS users.

When you return to this panel after editing a query, you can continue editing the same query, by entering an **E** then pressing Enter.

If you want to save a query so that you can re-use it in the future, enter an **S**, then enter a name for saving the query. The name must start with a letter, and be no longer than 8 characters. There is just one library of queries for all HAS users, so starting the name with your initials might be a good idea. If you have created a query which you think might be generally useful, you could give it a general name (i.e. without your initials). You will be warned if you enter the name of a query which already exists. Enter a **?** in the Name field to see a list of currently saved queries.

When you are finished defining (and optionally saving) your query, leave the option field blank, and press Enter. You will next see panel SUB2, where you specify what output subsets you want.

9.11 Specified Section Analysis (THAS225)

9.11.1 Description

The Specified Section Analysis program (THAS225) produces accident statistics for specified sections of highway. A "section" may be as large as an entire highway (or all the highways in the Province), and may be as small as a single location.

The statistics produced are similar to those produced by the Accident-Prone Sections program: counts, accident rates, accident severity ratio etc. Optionally, the accident rates for a section may be calculated as in the Accident-Prone Locations program: in units of Accidents per Million Vehicles, instead of Accidents per Million Vehicle-Kilometres.

The sections must be defined in a comma-separated-values (CSV) file, and the output is written to a CSV file. CSV files can be exported from, and imported into PC applications such as Excel, and can be transferred to/from the mainframe using the HASutil program.

In the Section Definitions File (SDF), which is described in detail below, sections may be given identifiers, and may have individually specified date ranges. Traffic volumes, average accident rates and landmark types may be specified in the SDF, if you wish to over-ride the data looked-up in the H.A.S.

The user can select which output fields are wanted, and can specify the order in which they are written.

Selected and *Excluded* accident subsets can be created with this program. Selected accidents are those which fall into one or more of the specified sections. There is an option to have selected accidents duplicated in the output subset if they occur in more than one specified section. In this case, the output GroupID field identifies the section.

9.11.2 P225: Panel

```
   P225      Highway Accident System - Specified Section Analysis
             ----------------------   -------------------------   F1 for Help

   Section Definitions File   >             (.CSV extension assumed)

   Level of Significance for
    Crit. Rate Calculation    > .05        (.01, .05, .1, .5, 1 or 5)

   Output CSV File           > SEC5       (.CSV extension assumed)
                                           (will persist for 1 week on mainframe)

   Add Subset Description     >            (Y to put the input subset description
                                            file in the output CSV file.)

   Analyse Sections with SAS program   > BYGROUP   >           (Y to select)

   Duplicate accidents which fall in more than
    one section, in the Selected output subset     >
   (Recommended if doing SAS analysis by section.)

   Include Intersection Traffic Volumes            >


                 Press Enter to continue, PF3 to Cancel
```

Section Definitions File name
    Enter the file name without an extension. An extension of .CSV is automatically added. The name must be a maximum of 8 letters and numbers, and must start with a letter.

(Input and output CSV files will have your TSO userid as a High-Level Index, but this is handled automatically and is not something the user need normally be aware of).

Level of Significance
This number is only used if the **CritRate Calc** (Calculated Critical Rate) output field is selected. See section 6.5.3 for details.

Output CSV File name
Same rules as the SDF file name. The two names must differ!

Analyse Sections with SAS program
Specifying a SAS program here, and a Y to activate it, is equivalent to saving the Selected accidents in a temporary subset, then specifying the SAS program as a separate process step.

Enter ? in place of a SAS program name to get a list of currently availabe programs (in the THASP.SASLIB program library).

The BYGROUP SAS program produces tables of DIAGRAM (collision type) and CONTRIB11 (1st contributing factor for vehicle 1) vs Fatal, Injury and PDO accidents, separately by GROUP_ID. In the "Selected" accident subset produced by the Specified Section Analysis program, the GROUP_ID is the ID of each section (either supplied in the section definitions file, or generated numerically), so this SAS program provides additional analysis for each specified section.

Duplicate Accidents...
This option is relevant only if there are any overlaps among the specified sections, and if a "Selected" output accident subset is being produced for subsequent processing.

If this option is selected (with a Y), each accident will be written to the "Selected" output subset once for each section in which it occurs. If the option is NOT selected (i.e. an N is entered), each accident is written out just once, even if it is in more than one section.

The choice depends upon the type of processing planned for the output subset. If you are doing analysis by section, e.g. with SAS program BYGROUP, you will want the accidents duplicated for each section.

9.11.3 Field Selection Panel (SSOF)

This panel is used to select the fields you want in the output CSV file, and the order in which they are to appear. For details, see the description of this panel (section 9.1.8) in the Accident Prone Locations section.

9.11.4 Average Accident Rate File Panels (PARF)

If any of the Critical or Average Accident Rate output fields were selected, panel PARF will be displayed twice, so that you can specify which Average Accident Rate files are to be used to look up Section and Location average accident rates. The procedure is the same as selecting average accident rates for the Accident-Prone Locations and Sections programs. See section 9.1.6 for details.

(Panel PARF will be displayed for both the Sections and Locations even if you are only doing one kind of calculation, because at this point the system does not know what you have specified is in your SDF file.)

9.11.5 Section Definitions File

The Section Definitions File (SDF) is a Comma-Separated-Values (CSV) file which defines the highway sections to be analysed. The idea is that the section definitions be compiled in a spreadsheet program (e.g. Excel) on a PC, exported to a CSV file, then uploaded to the mainframe using the HASutil program.

The *columns* in the spreadsheet become *fields* in the CSV file. The word *field* is used in the following description.

The fields in the SDF must be identified in a heading record, which must be the first non-blank record in the CSV file. The fields may be in any order, and additional fields may exist in the file without causing any problems. The Specified Section Analysis program will simply ignore any fields whose names it does not recognize. Many of the fields which the program *does* recognize are optional.

Following is the smallest possible Section Definitions file, for the analysis of a single location:

```
seg,km
0304,1
```

This specifies that the location at km 1.0 on segment 0304 is to be analysed.

The following example would have exactly the same effect:

```
Priority,Km,Shoesize,Segment,Engineer,Highway
7, 1.0, 13,0304,Smith,17
```

The following defines the same location, and also a section from km 1 to km 2.5

```
seg,km,km2
0304,1,
0304,1,2.5
```

Following are descriptions of all the fields which are recognized by the Specified Section Analysis program. Some field names have aliases which are also recognized. The field names are not case sensitive. Only **seg1** and **km1** (or one of their aliases) are mandatory. An optional field is "omitted" for *all* sections by omitting the field heading (i.e. omitting the entire column). A field can be omitted for a single section by simply having a null or blank field.

Seg1 = Seg, Segment, Segment1
- the LKI segment number of the start of the section.
- leading zeros are optional.

Km1 = Km, KmMark, KmMark1
- the Km offset (on Seg1) of the start of the section
- decimal point is optional
- will be rounded to 1 decimal place, if > 1 specified.

Seg2 = Segment2
- the LKI segment number of the end of the section.
- leading zeros are optional.
- if omitted Seg2 to is set to Seg1
- Beware: If Seg2 does not follow Seg1 in the Segment Search Sequence, all intervening segments in the sequence will also be selected! (See section 2.3.13).

Km2 = KmMark2
- the Km offset (on Seg2) of the end of the section
- decimal point is optional
- will be rounded to 1 decimal place, if > 1 specified.
- if omitted, Km2 is set to Km1
- if coded as 999.9, the length of segment Seg2 will be automatically substituted.

IncOpp = Include Opposing = IncOpposing
- this is a Yes/No field. "Yes" is indicated by any string which starts with Y or y. Anything else means No.
- If Yes is indicated, any segments which are opposite the primary section defined by Seg1, Km1, Seg2, Km2 will be included as part of the "section".
- e.g. if you define a section which is one side of a divided highway, then coding Yes will cause the corresponding section on the other side of the highway to be included.
- coding Yes when there is no opposing segment will have no effect.
- Seg2 must not already be opposite any of the segments in the Seg1 to Seg2 range.
- See section 6.4 to understand Segment Ordering.
- If the primary section includes one or more nodes, the length (0.1 km) and traffic volume of those nodes will be accumulated again if the opposing segments also include those nodes.
- the included opposite sections are added as extensions to the primary 1-way sections: the lengths are added, the traffic volumes are averaged in.
- the PrimLength and OppLength output fields may be of interest if this option is used.

ID = Project, ProjectID, GroupID
- may contain any characters
- if longer than 4 characters, only the first 4 are used
- if omitted, a numeric ID is generated.

Date1
- earliest date for selecting accidents for this section.
- may be in any of the following formats:
  ```
  yyyymmdd
  yyyy/mm/dd
  yyyy-mm-dd
  yyyy.mm.dd
  dd-Mon-yy        (20yy assumed if yy < 50)
  dd-Mon-yyyy
  ```
- if omitted, the start of the date range of the input accident subset is used.

Date2
- latest date for selecting accidents for this section.
- same formats as Date1.
- if omitted, the end of the date range of the input accident subset is used.

ADT = AADT
- Average Daily Traffic count to use in calculating accident rates.
- if omitted, or if = 0, the Highway Accident System traffic volume for the section and date range is used.

Loc/Sec
- any string starting with an **L** indicates that *Location-type* accident rate calculations are to be done. I.e. the accident rates will be in units of Accidents per Milliion Vehicles. For *Calculated Critical Accident Rates*, the *Location* average accident rate (if not specified) will be looked up according to the highway class at the start of the section, and using the looked up or specified Landmark Type.
- any string starting with an **S** indicates that *Section-type* accident rate calculations are to be done. I.e. the accident rates will be in units of Accidents per Million Vehicle-Kilometres. For *Calculated Critical Accident Rates*, the *Section* average accident rate (if not specified) will be looked up according to the highway class at the start of the section. (Note that the section length used is the end km minus the start km plus 0.1 km.)
- If omitted or blank, **Section** is assumed.

LmkType = Landmark Type
- Landmark Type, used for looking up Location average accident rates.

- If omitted, the landmark type at the *start* of the section will be looked up.
- Ignored for Section calculations.

AveRate = Average Rate
- Average Accident Rate, used for calculating Calculated Critical Accident Rates.
- If omitted, the Average Accident Rate is looked up by Highway Class and (for Location calculations) Landmark Type, on the Location and Section Average Accident Rate files, as specified on the PARF panels.

RWAveRate = RW Average Rate
- Road-Weighted Average Accident Rate, used for calculating Calculated Road-Weighted Critical Accident Rates.
- If omitted, the RW Average Accident Rate is looked up by Highway Class and (for Location calculations) Landmark Type, on the Location and Section Average Accident Rate files, as specified on the PARF panels.

SWAveRate = SW Average Rate
- Severity-Weighted Average Accident Rate, used for calculating Calculated Severity-Weighted Critical Accident Rates.
- If omitted, the SW Average Accident Rate is looked up by Highway Class and (for Location calculations) Landmark Type, on the Location and Section Average Accident Rate files, as specified on the PARF panels.

Note = Notes, Description
- The contents of this field are copied through to the output CSV file. (If necessary the information is truncated to 98 characters on output.)

9.11.6 Output CSV File

The output CSV file consists of:
- up to 7 lines of heading information
- a blank line
- a field heading line (comma-separated column headings)
- a comma-separated data line for each section.

The fields included, and their order, depends upon what was specified on panel SSOF (described above).

Following is a list of all possible fields.
("SDF" = Section Definition File, "APS" = Accident-Prone Sections)

ID	- ID from SDF file, or generated section number
Reg	- Highway Region number of start of section
Dist	- Highway District number of start of section
Area	- Contract Management Area of start of section
Seg1	- Segment number of start of section.
	- Note that segment numbers are written with leading zeros, and in quotes, but Excel, when loading a CSV file, thinks it knows best, and strips the leading zeros.
Km1	- Km on Seg1 of start of section
Seg2	- Segment number of end of section
Km2	- Km on Seg2 of end of section
IncOpposite	- Include Opposite: **Yes** if opposite (other side) segments or sub-segments are included as part of the "section".
PrimLength	- Primary Length: If IncOpposite = No, this is the same as Length. - If IncOpposite = Yes, this length does NOT include the length of the opposing sections.
OppLength	- If IncOpposite = Yes, this is the length of the included opposing sections. - If IncOpposite = No, this will be zero.
Length	- Length of section = end - start + 0.1 (Since accidents are located to the nearest 0.1 km, the section is assumed to include an extra 0.05 km at the beginning and end. Thus the length of a single location is 0.1 km.) = PrimLength + OppLength
Date1	- earliest date of accident selection, format yyyy/mm/dd
Date2	- latest date of accident selection, format yyyy/mm/dd
Class	- Predominant Highway Classification.
CompClass	- Composite Highway Classification (asterisk for non-constant categories)
ClassTimeChange	"Yes" if the Highway Classification changed during the time period from which the accidents were selected.
ADT	- Average Daily Traffic count for the section and time period. - 0 if no traffic volume data available.
ADT Src	- Source of the ADT:
	HAS - from the Highway Accident System
	User - provided in the SDF
	none - none available
Volume	- This is the ADT multiplied by the number of days from Date1 to Date2 inclusive. - 0 if no traffic volume available.
Rate	- Accident rate: number of accidents per million vehicle-km.
	- these are the same units used for the accident rate in the APS or APL report.
	- for a single-point treated as a Section, the rate will be ten times the rate which would result from treating it as a Location, because for a Section it is treated as a section of length 0.1 km
RW Rate	- Road-Weighted Accident Rate, as defined in the description of the APS report.
SW Rate	- Severity Weighted Accident Rate, as defined in the description of the APS report.
ASR	- Accident Severity Ratio, as defined in the description of the APS report.

#Acc	- number of accidents
#Veh	- total number of vehicles
Fat#Acc	- number of fatal accidents
Fat#Fat	- number of fatalalities
Fat#Inj	- number of injured people in fatal accidents
Inj#Acc	- number of injury accidents
Inj#Inj	- number of injured people in injury accidents
PDO#Acc	- number of Property Damage Only accidents
CritRate Lkup	- Looked-up Critical Accident Rate
CritRate Calc	- Calculated Critical Accident Rate
RW CritRate	- Road-Weighted Calculated Critical Accident Rate
SW CritRate	- Severity-Weighted Calculated Critical Accident Rate
AveRate	- Average Accident Rate
AveRate Src	- Source of **AveRate**: either HAS (if looked-up) or User (if specified in the input file).
RW AveRate	**-** Road-Weighted Average Accident Rate
RW AveRate Src	- Source of **RW AveRate**: either HAS (if looked-up) or User (if specified in the input file).
SW AveRate	- Severity-Weighted Average Accident Rate
SW AveRate Src	- Source of **SW AveRate**: either HAS (if looked-up) or User (if specified in the input file).
LmkType	**-** Landmark Type
LmkType Src	- Source of **LmkType**: either HAS (if looked up) or User (if specified in the input file).
Loc/Sec	- Loc or Sec, to indicate whether Location or Section rate calculations were done.
Note	- note (description) field copied from input SDF.

If no traffic volume data is available for any of the nodes or sub-segments which comprise a "section", then the ADT and Volume fields for that section will be zero, and all accident rate fields will be blank.

9.12 SAS Programs

9.12.1 Introduction

User-written SAS programs may be included as part of a Data Retrieval job. A SAS program can be written to generate reports, and it may produce zero, one or two output files (subsets) of accident data. The program can read the data file of one Accident Subset. It may also read some of the supporting Highway Network Definition files (e.g. the LANDMARK file.)

The S option of the Process Selection Menu (panel PSEL) brings up panel PSAS, where the SAS program name is specified. If the SAS program creates subsets, the subset names must be specified on the following panel (SUB2). The H.A.S. system has no other way of knowing whether or not a particular SAS program creates subsets.

The V option of the Process Selection Menu brings up panel PVIC, where the name of a SAS program written specially for analysing Victim information is entered.

There are some file I/O and DD name guidelines which must be followed in order for the SAS program to work as part of a Data Retrieval job. These requirements are discussed in following sections.

The SAS programs must be stored as members of one of the following Partitioned Datasets:

   `THASP.SASLIB`   - option S (non-victim programs)

Other user-modifiable Highway Accident System SAS programs, written for other tasks such as analysing data from the Archive Master File, are stored in PDS THASP.SASUTIL. SAS programs from THASP.SASUTIL can not be included in a Data Retrieval job.

9.12.2 List of SAS programs

SAS programs in THASP.SASLIB as of August 2004:

Note that many of the programs which work with Highway Class currently use only the 1st 2 characters of the highway class field, because the old classification scheme only used two characters. This is easy to fix if and when required.

BYCLASS	COUNTS THE NUMBER OF ACCIDENTS OF EACH HIGHWAY CLASS
BYCLTYP	Counts accidents by Highway Class, and accident severity type
BYGROUPL	PRODUCES FREQUENCY TABLES FOR EACH ACC-PRONE LOCATION: Diagram and 1st contributing factor by accident severity type.
BYGROUPS	Same as BYGROUPL, for Acc. Prone Sections. (Only difference is in the title.)

CLASSYR	Create a table of the following statistics, with a row for each Highway Class and Year:
	    FATACC - number of fatal accidents
	    TOTKLD - number of fatalities
	    INJACC - number of injury accidents
	    TOTINJ - number of injured people.
	    PDOACC - number of PDO accidents.

COLLDIA	Lists accident subset fields ACCASE PAGE_NO ACCDATE ACCTIME KMMARK TOTINJ TOTKLD TOTVEH DIAGRAM LOC_TYPE TRAFCNTL ROADSURF WEATHER PREACTN1 VEHDIR1 PREACTN2 VEHDIR2; with collision diagram field translated to text.
CONTRIB	Selects construction zone accidents from a subset and writes them to another accident subset.
DIAGRAM	Selects accidents with DIAGRAM = 01 from a subset and writes them to another accident subset.
FREQ1	? appears to simply select accidents with DIAGRAM = 99

HWYYEAR	Create a table of the following statistics, with a row for each
	 Highway and Year:
	    FATACC - number of fatal accidents
	    TOTKLD - number of fatalities
	    INJACC - number of injury accidents
	    TOTINJ - number of injured people.
	    PDOACC - number of PDO accidents.

NOVEH	SEPARATE SINGLE AND MULTIPLE VEH ACCIDENTS
SELSEG	Select accidents and copy them to SDATA (Selected accident subset.) and (optionally) to copy excluded accidents to the XDATA subset, according to criteria coded in the SAS program.
SUMMARY	List accident fields: ACCASE ACCDATE ACCTIME HIGHWAY SEGNUM KMMARk ACCTYP TOTKLD TOTINJ TOTVEH DIAGRAM LOC_TYPE CONTRB11 ROADSURF WEATHER VEHDIR1 VEHDIR2
SUMMARY2	List accident fields: ACCDATE ACCTIME ACCTYP DIAGRAM LOC_TYPE CONTRB11 TRAFCNTL ROADSURF WEATHER LIGHTING VEHTYPE1 PREACTN1 VEHDIR1 VEHTYPE2 PREACTN2 VEHDIR2
VICTIM	for inclusion into other SAS programs: sets variable VICTIM to FATAL, INJURED or PDO depending upon the value of victim fields VICTCON and LOCNINJ.

Frequency tables:
    Notes:
- ACCTYP   - Fatal, Injury or PDO
- VICTIM   - Fatal, Injury or PDO for victims
- other field names can be looked up in section 3.5 (Record Description)
- names ending in Y are broken down by Year,
- names ending in V work with victim counts.
- names ending in D are broken down by District

FREQ	DIAGRAM*ACCTYP
FREQ10	(CONTRB11 CONTRB21)*ACCTYP
FREQ11	DIAGRAM*ROADSURF
FREQ11Y	DIAGRAM*ROADSURF
FREQ12	TOTVEH*ACCTYP
FREQ12Y	TOTVEH*ACCTYP
FREQ13	ACCTIME*ACCTYP
FREQ14	ACCTYP*TYPE2ND1*TYPE3RD2
FREQ15	ROADSURF*ACCTYP
FREQ15D	ROADSURF*ACCTYP
FREQ15P	ROADSURF*YEAR / NOCUM NOROW NOPERCENT NOCOL
	ROADSURF / NOCUM NOPERCENT SPARSE
FREQ15Y	ROADSURF*ACCTYP
FREQ16	YEAR * ACCTYP
FREQ16P	YEAR * ACCTYP /NOPERCENT NOROW NOCOL
FREQ16V	YEAR * VICTIM
FREQ17	CONTRB11*YEAR
	CONTRB21*YEAR
FREQ18	CONTRB11*DIAGRAM
FREQ18Y	CONTRB11*DIAGRAM
FREQ19	TRAFCNTL*ACCTYP
FREQ2	VICTAGE * VICTIM (for pedestrians)
FREQ20	CONTRB11*ACCTYP
FREQ20D	CONTRB11*ACCTYP /NOROW NOCOL NOPERCENT
	YEAR*CONTRB11*ACCTYP / NOROW NOCOL NOPERCENT
FREQ20Y	CONTRB11*ACCTYP
FREQ21	TYPE2ND1*ACCTYP
FREQ21D	TYPE2ND1*ACCTYP
FREQ21Y	TYPE2ND1*ACCTYP
FREQ22	ACCDATE*ACCTYP
FREQ23	ACCHOUR*ACCTYP
FREQ23P	ACCHOUR / NOCUM NOPERCENT NOCOL NOROW
FREQ23Y	ACCHOUR*ACCTYP
FREQ24	MONTH*ACCTYP
FREQ25	WEATHER*ACCTYP
FREQ26	ACCTYP*TYPE3RD1*TYPE3RD2
FREQ27	ATTENDED*ACCTYP
FREQ28V	YEAR * VICTIM
FREQ29	LOCNCODE TRAFCNTL
FREQ2V	VICTAGE * VICTIM
FREQ2VY	VICTAGE * VICTIM
FREQ3	POLICECD * DISTRICT
FREQ30	YEAR*MONTH*ACCTYP
FREQ30P	MONTH*ACCTYP / NOROW NOCOL NOPERCENT
FREQ30YM	YEARMON*ACCTYP / NOROW NOCOL NOPERCENT
FREQ31	ACCTYP*DIAGRAM*ROADSURF
FREQ33	LANDUSE*ACCTYP
FREQ33Y	SPEEDLIM*ACCTYP
FREQ34	LIGHTING*ACCTYP
FREQ34Y	LIGHTING*ACCTYP
FREQ35	LOC_TYPE*ACCTYPE
FREQ35D	YEAR*ACCTYP /NOROW NOCOL NOPERCENT
	LOC_TYPE*ACCTYP /NOROW NOCOL NOPERCENT
	ACCHOUR /NOCUM SPARSE
	SPEEDLIM /NOCUM SPARSE
FREQ35P	LOC_TYPE /NOROW NOCOL NOPERCENT SPARSE NOCUM

	LOC_TYPE / SPARSE NOPERCENT NOCUM
FREQ35Y	LOC_TYPE*ACCTYP
FREQ36	(VEHTYPE1 VEHTYPE2)*ACCTYP
FREQ36Y	(VEHTYPE1 VEHTYPE2)*ACCTYP
FREQ37	DISTRICT*ACCTYP
FREQ38	ROADCURV*ACCTYP
FREQ38Y	ROADCURV*ACCTYP
FREQ39	PEDNACTN*ACCTYP
FREQ39D	YEAR*ACCTYP /NOROW NOCOL NOPERCENT
	PEDNACTN*ACCTYP
	LOC_TYP*ACCTYP
FREQ39T	PEDNACTN*ACCTYP /NOROW NOPERCENT NOCOL
FREQ39Y	PEDNACTN*ACCTYP
FREQ4	MONTH*YEAR
FREQ40	CONTRB11*ROADSURF
FREQ41	ACCTYP*VEHUSAG1*VEHUSAG2
FREQ45	SPEEDLIM*ACCTYP
FREQ45Y	SPEEDLIM*ACCTYP
FREQ46	VEHTYPE1*ACCTYP
FREQ46Y	VEHTYPE1*ACCTYP
FREQ49	ACCTYP*NUMLANE*ROADCLAS
FREQ50	TOTVEH * YEAR
FREQ51	MONTH*VEHDIR1*ACCTYP
FREQ52	DIAGRAM*ACCHOUR
FREQ53	VEHDIR1*ACCTYP
FREQ54	ACCTYP*(VEHTYPE1 VEHTYPE2)*CONTRB11
FREQ56	CONTRB11*ROADGRAD
FREQ57	VEHTYPE1*VEHTYPE2 / NOPERCENT
FREQ57P	VEHTYPE1 / NOCUM NOPERCENT SPARSE
	VEHTYPE2 / NOCUM NOPERCENT SPARSE
	VEHTYPE1 / NOCUM NOPERCENT SPARSE
	VEHTYPE2 / NOCUM NOPERCENT SPARSE
FREQ57Y	VEHTYPE1*VEHTYPE2
FREQ58	HIGHWAY*ACCTYP
FREQ59	DISTRICT*REGION
FREQ5V	VICTAGE * VICTSEX
FREQ61	(VEHICLE 1 VEHICLE 2) DIAGRAM
FREQ62	WEEKDAY*ACCTYP
FREQ64	(VEHDIR1 VEHDIR2)*ACCTYP
FREQ65	DIAGRAM*LOC_TYPE
FREQ65Y	DIAGRAM*LOC_TYPE
FREQ69Y	ROADSURF*HWYCLASS
FREQ70	HWYCLASS*ACCTYP
FREQ70D	VICTAGE*ACCTYP
FREQ70P	HWYCLASS /SPARSE NOCUM NOPERCENT
	HWYCLASS / SPARSE NOCUM NOPERCENT
FREQ70Y	HWYCLASS*ACCTYP
FREQ71	LOCNCODE*ACCTYPE
FREQ72	SEGNUM*ACCTYP
FREQ74P	ROADGRAD*ACCTYP
FREQ8	ACCTYP*TYPE2ND1*TYPE3RD1
FREQ9	(CONTRB11 CONTRB21)*DIAGRAM
FREQV	DIAGRAM*VICTIM
FREQY	DIAGRAM*ACCTYP
YEARTYPE	YEAR*ACCTYP

9.12.3 PSAS: SAS Program Specification Panel

```
 PSAS

              Highway Accident System - SAS Program Specification
              ----------------------   ------------------------




      Enter:

              xxxxxxxx  - a SAS program name
              ?         - to select from a list of available programs

              X         - to exit to the previous menu

         =>


         => Y  Edit the SAS program for Title entry (Y/N)?

```

Notes:

-       The SAS programs must be stored in Partitioned Dataset THASP.SASLIB.

-       Entering **?** will bring up the SAS program member selection list:

```
MSEL - MEMBER LIST -- THASP.SASLIB------------------------ ROW 00001 OF 00059
COMMAND ===>                                                SCROLL ===> PAGE
   S-Select, B-Browse, D-Delete, E-Edit, R-Rename, PF3-Cancel, PF1-Help
-----------------------------------------------------------------------------
   NAME                 VV.MM  CREATED    CHANGED    SIZE INIT   MOD   ID
  DIAGRAM
  DIAGRAM2
  DIAGRAM3
  DIAGRAM4
  DIAGRAM5
s DIAGRAM6
  DIAGRAM7
  DIAGRAM8
  DIAGRAM9
  DIAGRM10
  DIAGRM11
  DTEMP
  DTEMP2
  FATALS
  FREQ
  FREQ1
```

The Browse option can be used to check that a program does what you want it to do. The Edit option can be used to change the report title, or make other modifications to a program. You can also delete or rename a program using the D and R options.

9.12.4 Victim Data Analysis

A Victim data analysis SAS program must be designed to read a file of accident data which has the non-victim section of the accident record duplicated for each victim. For each duplication, the victim information is moved into the Victim 1 part of the record.

Victim analysis SAS programs may not create subsets.

Select option V on the Process Selection Menu to specify the name of a Victim data analysis SAS program. Selecting option V (instead of S) causes a step to be inserted prior to the SAS step which converts the input accident file into a Victim file.

See the notes on panel PVIC, in section 6.4.17.

9.12.5 PVIC: Victim-SAS Program Specification Panel

```
+------------------------------------------------------------------------------+
¦ PVIC      Highway Accident System - Victim-SAS Program Specification          ¦
¦           ----------------------   -------------------------------            ¦
¦                                                                               ¦
¦                                IMPORTANT                                      ¦
¦                                                                               ¦
¦    Before the SAS program you specify is run, the input accident data         ¦
¦    is converted to a file where:                                              ¦
¦       - each input record is DUPLICATED for each victim of that record,       ¦
¦         so that there is only one victim per record;                          ¦
¦       - victim information is in columns 137 to 150 only;                      ¦
¦       - record length is 151.                                                 ¦
¦                                                                               ¦
¦    The SAS program must be designed for analysing VICTIM information.          ¦
¦    Counts of non-victim information will not be correct.                       ¦
¦    No subset creation is allowed.                                             ¦
¦                                                                               ¦
¦    Enter:                                                                     ¦
¦            xxxxxxxx  - a SAS program name                                      ¦
¦            ?         - to select from a list of available programs            ¦
¦            X         - to exit to the previous menu                           ¦
¦                                                                               ¦
¦         =>                                                                    ¦
¦                                                                               ¦
+------------------------------------------------------------------------------+
```

Notes:

- The SAS programs must be in stored in the PDS (library) THASP.SASLIB.
- As for the normal SAS program specification panel, entering **?** will bring up a SAS program member selection list.

9.12.6 Program Requirements and Available Files

A SAS program that is used as part of the Highway Accident System has access to the following DDNAMEs of files. Accident records must be read from INDATA only, and written to SDATA and XDATA only.

```
INDATA
     - the file containing input accident records.
     - may have been created by another SAS program.
     - Be aware that some accidents extend over 2 or more records, and most
       SAS report-generators should be interested only in the page-1 accident
       records.

INDESC
     - the input description file.  (INDATA and INDESC form a Subset Pair.)
     - Report-generator programs should print out a copy of INDESC at the
       beginning of their reports.  See the first step of the example SAS
       program CONTRIB for an easy way to do this.

SDATA
     - the output file into which a SAS program may place Selected accident
       records.
     - Be certain that accident records placed in SDATA (and XDATA) are
       unchanged from the form they appeared in within INDATA.  See the
       example SAS program FATALS for an example of how this may be done.  The
       relevant SAS statements (within a DATA step) are:
```

INFILE INDATA;	(Declares the input file to be INDATA.)
FILE SDATA DCB=INDATA;	(Sets up the file SDATA to have a file format identical to the file format of INDATA.)
PUT _INFILE_;	(Copies records exactly as they appeared in INDATA.)

```
XDATA
     - the output file into which a SAS program may place Excluded accident
       records.
     - See the notes under SDATA for more information.

REPORTS
     - a file that may be used to print a report that will appear after all
       messages produced by SAS itself.  (Messages from SAS might otherwise
       appear within or after the report, if file REPORTS were not used.)
     - currently can be used only in DATA steps.  However, a future version of
       SAS is expected to allow arbitrary print files (such as REPORTS) to be
       used in PROC PRINT steps as well.  For now, use FT18F001 (see below) if
       a separate report file is needed in a PROC PRINT step.
     - In a DATA step, use the statement
           FILE REPORTS PRINT;
       before the PUT statements that print to the report file.
```

FT18F001
    - a file that may be used by a **PROC PRINT** step to print a report that
      will appear after all messages produced by SAS itself.
    - To use it, put the statement
          PROC PRINTTO UNIT=18 NEW;
      before the **PROC PRINT** step(s) that print to the report file FT18F001.
    - If you put the **PROC PRINTTO** step more than once in a program, leave off
      the **NEW** option after the first time.
    - It is also possible to use this same report file in a DATA step by
      placing the statement
          FILE FT18F001 PRINT;
      before the **PUT** statements that print to the report file. See the
      example SAS program CONTRIB for an example of using this same report
      file in <u>both</u> a **DATA** step and a **PROC PRINT** step within the same program.

SHNFIL
    - the Segment-Highway-Node File **THASP.SHNFIL**. It has one record for each
      highway segment.
    - To be used **for input only**.
    - The various fields can be read with:
          INPUT @1 HWY $4.   (highway)
                  @1 HWY_NUM $3.   (highway number only)
                  @4 HWY_LETT $1.   (highway letter only)
                  @10 SEG_NUM $4.   (segment number)
                  @15 SEG_LEN 6.2   (segment length in kilometres with
                                            two decimal places)
                  @29 BGN_NODE $8.   (beginning node of segment)
                  @38 BGN_CONT $1.   (begin node's continuity -- C for
                                            Continuous or D for Discontinuous)
                  @40 END_NODE $8.   (end node of segment)
                  @49 END_CONT $1.   (end node's continuity -- C or D)
                  @51 SEG_NAME $50.;   (segment name)
    Use only the fields your program needs. Variable names can, of course,
    be changed if desired.

LMKFIL
    - the Landmark File **THASP.LANDMARK**. It has one record for each landmark.
    - to be used **for input only**.
    - The various fields can be read with:
          INPUT @1 SEG_NUM $4.   (segment number)
                  @6 KM   7.2   (location of landmark in kilometres
                                            from start of the segment -- given
                                          with 2 decimal places)
                  @14 LMK_NUM 1.   (landmark number)
                  @16 LMK_TYPE 2.   (landmark type)
                  @20 LMK_DESC $80.   (landmark description)
    Use only the fields your program needs. Variable names can, of course,
    be changed if desired.

TLKIHWY
    - the Highway Names File **THASP.HIGHWAY**. It has one record for each
      highway.
    - to be used **for input only**.
    - The fields can be read with:
          INPUT @1 HWY $4.   (highway number and letter)
                  @6 HWY_NAME $60.   (highway name)

```
TLKISEG
    - the Segment File THASP.SEGMENT.  It has one record for each highway
      segment.
    - to be used for input only.
    - The fields can be read with:
              INPUT @1  SEG_NUM  $4.         (segment number)
                    @6  SEG_NAME $50.        (segment name)
                    @56 SEG_LEN  7.2;        (segment length in kilometres)
    - If you are using both SHNFIL and TLKISEG, be sure to change the names
      of the fields of one file or the other so that each field name is
      unique.  Otherwise you will not be able to distinguish between, e.g.,
      SEG_NUM in the SHNFIL and SEG_NUM in the TLKISEG file.
```

9.12.7 Adding a DD Statement

If you ever need to write a SAS program that uses a file other than the files listed in the previous section, call the Highway Accident System maintenance programmer.

Ask that person to add a DD statement **to the EXEC SAS step** of the file THASP.ISPF.ISPSLIB(THASPSAS). The new DD statement should be similar to the DD statement for SHNFIL.

Give him or her the name of the file you want to be able to use (the name you would use if you were editing or browsing it in TSO) and the DDNAME (the name you wish to use within your SAS program).

```
6.7.5  Description Files
```

Input Description File:

> The Description File corresponding to your input data is available to you as the file INDESC. It is a good idea to copy it at the beginning of any reports you produce, since it identifies the source of the data and any processes used to create it. See the first DATA step in the example SAS program CONTRIB for an example of how to do this.

Output Description Files:

> The Description Files corresponding to SDATA and XDATA are created for you by a PL/I program that is run automatically just after your SAS program terminates. They consist of a copy of the input Description File INDESC followed by a copy of your SAS program (the one that created SDATA and XDATA).

9.12.8 Notes on Useful Accident Record Fields

9.12.8.1   GROUP_ID

The Accident-Prone Locations and Sections programs generate a sequence number for each accident-prone location or section identified. This sequence number is inserted into the GROUP ID field of the output subset of Selected Accidents. Thus all the accidents of one accident-prone location or section will have the same GROUP_ID.   The Specified Sections Analysis program also sets the GROUP ID field - to either a sequence number or a user-defined section identifier.

The SAS command **BY** can be used with the GROUP ID to produce a separate report for each set of accidents with the same GROUP ID. E.g. a separate report could be produced for each Accident-Prone section, if the SAS program is run on a accident-prone section Selected Accident subset.

9.12.8.2   LOCN_ID

Use this field, rather than the LOCN_CODE field to identify accidents all at one place. The LOCN_ID is:

> `Sssssskkkk` – for locations not at nodes, where ssss is the segment number, and kkkk is the
>   KMMARK (with no decimal place)
> `Nnodename` – for nodes, where "nodename" is an 8-digit node name.

This field can also be used in the SAS **BY** command (instead of the GROUP ID) to report separately on the accidents of each location.

9.12.8.3   ACCTYPE = SEVERITY_TYPE

ACCTYPE used to be a SAS calculated field: 1 - Fatal, 2 - Injury, 3 - PDO. As of May 2004, this calculated fields is included in the HAS accident record, named SEVERITY_TYPE. Both names are included in DESCRIPC so that SAS programs which use ACCTYPE will continue to work.

9.12.9 INCLUDE Statements

Sections of SAS code which are used in many SAS programs can be stored in separate members in THASP.SASLIB, then brought into the programs at execution time with INCLUDE statements. See example programs FREQ and BYFREQ for examples.

The include files which are currently in use are:

```
DESCRIPC  - defines the accident record fields,
          - most fields are defined as character strings rather than
            numbers, so that SAS does not get upset (and print lots of
            error messages) when non-numeric characters are found in
            the fields.

FORMATC   - defines 'formats' to replace most MV104 codes with their
            descriptions on reports.
```

9.12.9.1   DESCRIPC

```
  /* Accident record definition.  Most fields are defined as
     character fields, because defining them as numeric causes
     error messages when invalid codes are encountered.
     2004-04-08 MN: revised for revised accident record.
  */
  INPUT @1   PAGE_NO $1.
        @2   JURCODE $1.
        @3   LOCNCODE $CHAR12.
        @3   HIGHNUM $CHAR3.
        @3   HIGHWAY $CHAR4.
        @6   HIGHLET $1.
        @7   SEGNUM $4.
        @11 KMMARK 4.1
        @16 DATESTR $8.
        @16 ACCDATE YYMMDD8.
        @16 NDATE 8.
        @16 YEAR 4.
        @20 MONTH 2.
        @24 ACCTIME $4.
        @24 ACCHOUR $2.
        @28 ACCASE $8.
        @36 POLICEFILE  $16.
        @52 TOTINJ  3.
        @55 TOTKLD  3.
        @58 TOTVEH  3.
        @61 SPEEDTYP  $1.
        @62 SPEEDLIM  $1.
        @63 SPEEDADV  $1.
        @64 LOC_TYPE  $2.
        @66 TRAFCNTL  $2.
        @68 TRAFFLOW  $1.
        @69 RCL_NL $2.       /* WARNING: reverse of MV6020 ROAD CLASS */
        @69 ROADCLAS  $1.   /* Second digit of    MV6020 ROAD CLASS */
        @70 NUMLANE  $1.    /* First  digit of    MV6020 ROAD CLASS */
        @71 ROADSURF  $1.
        @72 ROADTYPE  $1.
        @73 ROADCURV  $1.
        @74 ROADGRAD  $1.
        @75 LANDUSE  $1.
        @76 WEATHER  $1.
        @77 LIGHTING  $1.
        @78 DIAGRAM  $2.
        @80 LOCNIST  $1.
        @81 ATTENDED  $1.
        @82 POLICECD  $4.
        @86 PEDLOCN  $1.
        @87 PEDNACTN  $2.
        @89 VEHTYPE1  $2.
        @91 VEHTYPE2  $2.
        @93 VEHUSAG1  $2.
        @95 VEHUSAG2  $2.
        @97 STOLEN1  $1.
        @98 STOLEN2  $1.
        @99 LIC_CLASS1  $3.
        @102 LIC_CLASS2  $3.
        @105 NOVLEARN1  $1.
        @106 NOVLEARN2  $1.
        @107 PREACTN1  $2.
        @109 PREACTN2  $2.
        @111 TYPE2ND1  $2.
        @113 TYPE3RD1  $2.
        @115 TYPE3RD2  $2.
```

```
           @117 CONTRB11  $2.
           @119 CONTRB12  $2.
           @121 CONTRB13  $2.
           @123 CONTRB14  $2.
           @125 CONTRB21  $2.
           @127 CONTRB22  $2.
           @129 CONTRB23  $2.
           @131 CONTRB24  $2.
           @133 VEHDIR1   $1.
           @134 VEHDIR2   $1.
           @135 DAMSVRT1  $1.
           @136 DAMSVRT2  $1.
           @137 GROUP_ID  $4.
           @141 HWYCLASS  $8.
           @149 WEEKDAY   $1.
           @150 LOCN_ID   $9.
           @150 LOCN_ID_TYPE  $1.
           @151 LOCN_ID_CODE  $8.
           @162 REGION   $1.
           @163 DISTRICT  $CHAR2.
           @165 AREA   $2.
           @167 VEH_WT  $2.
           @169 ROAD_WT  $2.
           @171 ACCTYP  1.
           @171 SEVERITY_TYPE $1.
           @185 OCCUPY  $2.
           @187 POSNVEH  $2.
           @189 SAFQUIP  $2.
           @191 EJECTIO  $1.
           @192 VICTAGE  $2.
           @194 VICTSEX  $1.
           @195 LOCNINJ  $2.
           @197 TYPEINJ  $2.
           @199 INJCLASS  $2.
           @201 VICTCON  $1.;
       FORMAT ACCDATE DATE9.;
```

9.12.9.2   FORMATC

(Only the first three format definitions are included here, because FORMATC
is a long file.)

```
  /*  Format definitions for Accident Record codes.
      For codes defined as character strings (see DESCRIPC)  */

    VALUE $ROADCL
       '1'='UNDIVIDED'
       '2'='DIVIDED'
       '3'='RAMP';
    VALUE $NUML
       '1'='ONE LANE'
       '2'='TWO LANE'
       '3'='THREE LANE'
       '4'='FOUR LANE'
       '5'='FIVE LANE'
       '6'='SIX LANE'
       '7'='SEVEN LANE';
    VALUE $LOCNT
```

```
'01'='INTERSECTION'
'02'='BTWN INTERSECTION/'
'03'='INT ROAD/DRIVEWAY/ALLEY'
'04'='BRIDGE'
'05'='FERRY/DOCK'
'06'='TUNNEL'
'07'='EXIT DECEL. LANE'
'08'='EXIT RAMP'
'09'='EXIT INTERSECTION'
'10'='ENT ACCEL LANE'
'11'='ENT RAMP'
'12'='ENT INTERSECTION'
'13'='OFF HIGHWAY'
'14'='PARKING LOT'
'15'='RR CROSSING'
'16'='INDUSTRIAL RD'
'17'='TRANSIT EXPRESS LANE';

... etc.
```

9.12.10   Example SAS Programs

Example SAS programs and reports are provided on the following pages:

9.12.10.1   Example: HWYYEAR

```
/*---------------------------------------------------------------------
 Create a table of the following statistics, with a row for each
 Highway and Year:
    FATACC  - number of fatal accidents
    TOTKLD  - number of fatalities
    INJACC  - number of injury accidents
    TOTINJ  - number of injured people.
---------------------------------------------------------------------
 2002-03-14 Matthew Nicoll, Cypher Consulting
-------------------------------------------------------------------*/


DATA _NULL_;
    TITLE1 'Fatal Accidents, Fatalities, Injury Accidents and Injuries';
    TITLE2 'by Highway and Year';
    FOOTNOTE '(Note that TOTINJ includes injuries in fatal accidents.)';
    INFILE INDESC;
    INPUT;
    FILE FT18F001 PRINT;
    PUT _INFILE_;
DATA DESCRIP;
    INFILE INDATA;
    %INCLUDE 'THASP.SASLIB(DESCRIPC)';
    FATACC = 0;
    INJACC = 0;
    IF TOTKLD > 0 THEN FATACC = 1;
    IF TOTINJ > 0 THEN INJACC = 1;
    IF PAGE_NO = '1';

PROC TABULATE FORMAT=6.;
    CLASS HIGHWAY YEAR;
    VAR TOTKLD TOTINJ FATACC INJACC;
    TABLE HIGHWAY*YEAR,
          FATACC TOTKLD INJACC TOTINJ;
```

HWYYEAR REPORT:

```
          Fatal Accidents, Fatalities, Injury Accidents and Injuries
                          by Highway and Year
```

HIGHWAY	YEAR	FATACC SUM	TOTKLD SUM	INJACC SUM	TOTINJ SUM
4	1999	0	0	90	155
	2000	4	5	107	181
	2001	1	1	33	47
4A	1999	1	1	7	12
	2000	0	0	4	5
	2001	0	0	0	0
19	1999	3	4	114	162
	2000	5	6	90	143
	2001	0	0	22	30
19A	1999	7	9	111	178
	2000	3	3	102	175
	2001	1	2	18	24

(Note that TOTINJ includes injuries in fatal accidents.)

9.12.10.2   Example: BYCLASS

```
/* BYCLASS -  COUNTS THE NUMBER OF ACCIDENTS OF EACH HIGHWAY CLASS

    - Does NOT print the input description file.

   -------------------------------------------------------------------------
   16-Dec-1993 MN - Matthew Nicoll, Cypher Consulting
   -------------------------------------------------------------------------*/

OPTIONS PAGESIZE=64;

/*-------------------------------------------------------------------------
  Create a SAS dataset called PAGE1S containing only the highway class
  field of page 1 records.
-------------------------------------------------------------------------*/

DATA PAGE1S (KEEP=HWYCLASS);
    INFILE INDATA;
    %INCLUDE 'THASD.SASLIB(DESCRIPC)';
    IF PAGE_NO = '1';

PROC TABULATE data=page1s format=comma10.;
    TITLE1 'NUMBER OF ACCIDENTS BY HIGHWAY CLASS';
    CLASS  HWYCLASS;
    TABLE  HWYCLASS;
```

                      NUMBER OF ACCIDENTS BY HIGHWAY CLASS

```
-----------------------------------------------------------------------
|                              HWYCLASS                               |
|---------------------------------------------------------------------|
|  PRAU2L  |  PRAU2M  |  PRAU2R  |  PRFD4R  |  PUAU2L  |  PUAU2M  |
|----------+----------+----------+----------+----------+----------+
|    N     |    N     |    N     |    N     |    N     |    N     |
|----------+----------+----------+----------+----------+----------+
|       121|       173|       727|        30|        30|         9|
-----------------------------------------------------------------------
```

9.12.10.3   Example: FATALS

```
 /* ****************************************************************
    This SAS program selects the fatal accidents from the input file
    INDATA and saves them in the file SDATA.
    It also saves the non-fatal accidents in the file XDATA.

    No special provision is made for page-2 (and subsequent) accident
    records.  If TOTKLD has not been copied from the page-1 record,
    page-2 records will appear in the XDATA file regardless of whether
    they were actually non-fatal accidents.  This is a potential area
    of enhancement if it is ever necessary.
    ************************************************************** */

DATA _NULL_;
    INFILE INDATA;
    INPUT @50 TOTKLD 3.;
    FILE SDATA DCB=INDATA;
    IF TOTKLD > 0
        THEN PUT _INFILE_;

    FILE XDATA DCB=INDATA;
    IF TOTKLD = 0
        THEN PUT _INFILE_;
```

9.12.10.4   Example: FREQ

```
/*****************************************************************
THIS PROGRAM DOES A FREQUENCY ANALYSIS OF DIAGRAM VS THE
CALCULATED FIELD ACCTYP.
*****************************************************************/
TITLE1 'FREQ: ACCIDENT TYPE BY SEVERITY';
TITLE2 '';
DATA _NULL_;
    INFILE INDESC;
    INPUT;
    FILE FT18F001 PRINT;
    PUT _INFILE_;
DATA DESCRIP;
    INFILE INDATA;
    %INCLUDE 'THASP.SASLIB(DESCRIPC)';
    %INCLUDE 'THASP.SASLIB(ACCTYPE)';
    IF PAGE_NO ='1';
PROC FORMAT;
    %INCLUDE 'THASP.SASLIB(FORMATC)';

PROC FREQ;
    TABLES DIAGRAM*ACCTYP;
      FORMAT ACCTYP ACCTP.
            DIAGRAM $DIAFMT.;
```

First Page of FREQ Report:

```
FREQ: ACCIDENT TYPE BY SEVERITY       13:52 Friday, April 5, 2002   1

               TABLE OF DIAGRAM BY ACCTYP

DIAGRAM          ACCTYP

Frequency      |
Percent        |
Row Pct        |
Col Pct        |FATAL   |INJURY  |PDO     |  Total
---------------+--------+--------+--------+
UNKNOWN        |      1 |     63 |    106 |    170
               |   0.03 |   1.67 |   2.81 |   4.51
               |   0.59 |  37.06 |  62.35 |
               |   1.33 |   3.81 |   5.20 |
---------------+--------+--------+--------+
REAR END       |      3 |    355 |    339 |    697
               |   0.08 |   9.42 |   8.99 |  18.49
               |   0.43 |  50.93 |  48.64 |
               |   4.00 |  21.46 |  16.62 |
---------------+--------+--------+--------+
HEAD ON        |     23 |     59 |     29 |    111
               |   0.61 |   1.57 |   0.77 |   2.95
               |  20.72 |  53.15 |  26.13 |
               |  30.67 |   3.57 |   1.42 |
---------------+--------+--------+--------+
SIDE SWIPE     |      4 |     59 |     95 |    158
               |   0.11 |   1.57 |   2.52 |   4.19
               |   2.53 |  37.34 |  60.13 |
               |   5.33 |   3.57 |   4.66 |
---------------+--------+--------+--------+
BACKING        |      0 |      2 |     15 |     17
               |   0.00 |   0.05 |   0.40 |   0.45
               |   0.00 |  11.76 |  88.24 |
               |   0.00 |   0.12 |   0.74 |
---------------+--------+--------+--------+
INTERSECTION 90|      3 |    100 |     85 |    188
               |   0.08 |   2.65 |   2.26 |   4.99
               |   1.60 |  53.19 |  45.21 |
               |   4.00 |   6.05 |   4.17 |
---------------+--------+--------+--------+
Total                75     1654     2040     3769
                   1.99    43.88    54.13   100.00
(Continued)
```

9.12.10.5   Example: BYFREQ

```
/* PRODUCES A FREQUENCY TABLE FOR EACH SET OF ACCIDENTS WITH THE
   SAME GROUP_ID, USING "BY" GROUPING. */

OPTIONS PAGESIZE=64;

DATA _NULL_;
    TITLE1 '';
    INFILE INDESC;
    INPUT;
    FILE FT18F001 PRINT;
    PUT _INFILE_;

DATA DESCRIP;
    INFILE INDATA;
    %INCLUDE 'THASP.SASLIB(DESCRIPC)';
PROC FORMAT;
    %INCLUDE 'THASP.SASLIB(FORMATC)';

PROC SORT;
    BY REGION DISTRICT GROUP_ID;

PROC FREQ PAGE;
    TITLE1 'ACCIDENT FREQUENCY TABLES';
    TITLE2 ' ';
    BY REGION DISTRICT GROUP_ID;
    TABLES DIAGRAM*ACCTYP  CONTRB11*ACCTYP;
    FORMAT ACCTYP ACCTP.
           DIAGRAM $DIAFMT.
           CONTRB11 $CONTRIB.;
```

10 User Utilities

Selecting option 4 on the Main Menu will bring up the following panel:

```
 UUTL              Highway Accident System  -  User Utilities
                   -----------------------   --------------


              1.  Create Traffic Volume CSV file for download.

              2.  Edit or Create Average Accident Rate files.

              X   Previous menu.
              Z   Exit from H.A.S.


        OPTION =>
```

10.1 Create Traffic Volume CSV file for download

This utility creates a Comma Separated Values (CSV) file of Highway Accident System traffic volumes, which can be downloaded and loaded into a spreadsheet or database application.   One record is produced for each node, and for each sub-segment with an unchanging traffic volume. Put another way: the traffic volumes for the specified segments are scanned, and a record is produced each time a node is encountered or the traffic volume changes.

Each output record contains the following fields, separated by commas:
- Segment
- Start Km
- End Km
- ADT
- Node name (if at a node)

The ADT is the Average Daily Traffic (number vehicles) over the time period and months specified. Thus in order to get an AADT (Annual Average Daily Traffic), specify the date range to be the start and end of the year of interest, and leave the month range at 01 to 12.

```
VDNL                      Highway Accident System
                          -----------------------

                    Traffic Volume CSV File Creation

    Date Range:  From:  19870101  To:  19990630     (yyyymmdd)

    Month Range: From:  01     To:  12          (restrict to months in range)

    Input Volume File:  3   1 - same volume throughout each segment.
                            2 - sub-segment volumes added to SEGVOL1.
                            3 - intersection volumes added to SEGVOL2.

       Use old data:      Y to get pre-TIMS traffic volumes.

    Output File Name:   VOLUME     (.CSV will be appended)

    Segments: 2315  2316
              ----  ----  ----  ----  ----  ----  ----  ----  ----  ----
       (Enter up to 10 segment numbers, or ALL to get entire province.)

          Press Enter to create the volume file, PF3 to Cancel.
```

Date Range:
>   Specify the start and end date of the period from which traffic counts are to be extracted.
>   The dates are expressed in yyyymmdd format.

Month Range:
>   Specify the start and end month numbers. Only traffic counts in those months (and which are also inside the Date Range will be used.
>   To get a month range which spans a year end, code the From month number greater than the To month. E.g. From 12 To 01 to get December and January of each year in the date range.

Input Volume File:
> 1   Use SEGVOL1 - the one-volume-per segment volume file. This is the file which does not have any of the Counter Maps applied.
> 2   Use SEGVOL2 - this includes all the volumes determined using the Subsegment Counter Map. In areas not covered by the Subsegment Counter Map, the results will be the same as with SEGVOL1.

3   Use SEGVOL3 - this includes all the volumes determined using the Intersection Counter Map. At locations not included in the Intersection Counter Map, the results will be the same as with SEGVOL2.

At nodes, (in all three cases) the volumes using the Node Counter Map will be used if specified, and otherwise, the average of the adjacent volumes in the segments named in the node name will be used.

Use Old Data

Enter a Y in this field if you want data from the Pre-TIMS traffic volume files which were used in the HAS prior to December 2000.

Output File Name

Enter a name, maximum 8 characters, starting with a letter. The default is VOLUME. Thus with the default, a file named VOLUME.CSV will be created on the mainframe. After the HAS batch job has finished, you can download this file to your workstation using the CSV Files tab in the HASutil application.

Segments

If you want data for the entire province, code ALL in the first field.

Otherwise enter up to 10 segment numbers. Include leading zeros. Separate output records will be produced for the node at each end of each segment, except that if two adjacent segments (in the list) share the same node, only one record for that node will be produced.

10.2 Edit or Create Average Accident Rate files

This utility allows Average Accident Rate files to be viewed, created and edited.

See section 6.5 (Critical Accident Rates) for a full discussion of Average Accident Rates and how they are used.

```
 PARF                      Highway Accident System     Utility – Edit
                           ----------------------
                                                               PF1 for Help
                  Specify an Average Accident Rate File to Edit



  Command ==>      E or blank - Edit a file which already exists.
                   C          - Create and edit a new file.
                   X (PF3)    - Exit

                  P - Public        L - Location   Name
                  M - My personal   S - Section    ? for a list
 Select/Edit: > P                > S              > MASTER

 Copy from:   >                  >                >


 If Editing or Creating a file, and if all 3 "Copy from" fields are
 coded, the "Copy from" file will be copied to the "Select/Edit" file
 prior to editing.
```

Average Accident Rate files can be created as personal or public. You can view and edit your own personal files, and public files. Separate files are maintained for Location and Section average accident rates.

Command ==>

> **E**   - the default action:
> - Edit the file specified on the **Select/Edit** line

> **C**   - Create a new file and open it for editing.
> - if an existing file is specified on the **Copy from** line, that file will be copied to the
>   new file before it is opened for editing.
> - if the file specified on the **Select/Edit** line already exists, you will get an error message.

Select/Edit
   The three fields in this line identify the average accident rate file to be edited or viewed. Specify:
   - P or M for Public or (My) personal.
   - L or S for Location or Section
   - a name, maximum 8 characters, starting with a letter. The public files intended for general
     use are named **MASTER**. If you enter a question mark (?) in the name field, a selection list
     of existing files will be displayed.

Copy from
   - A file specified here will be copied to the **Select/Edit** file before it is displayed for editing.
     This simplifies the creation of a new file which you want to be similar to an existing file.
   - If the file specified on the **Select/Edit** line already exists, it will be over-written.
   - If the file specified on the **Select/Edit** line does NOT exist, you must code a C at the
     Command prompt to indicate that you want to Create a new file.

When you have selected an Average Accident Rate file for editing, the file will be displayed as in the following two examples. The first is an example **Location** file, and the second is a **Section** file.

RW AAR is a Road-Weighted Average Accident Rate.
SW AAR is a Severity-Weighted Average Accident Rate.

(The AAR's in these examples are not intended to be realistic!)

```
 EARF - Edit File:  'THASD.AVERATES.LOC.MASTER'                  Row 1 of 100
 COMMAND ===>                         ENTER: Save. PF3: Cancel   SCROLL ===>
                                                                PF1 - Help
   Hwy Class Set            Landmark Types       AAR    RW AAR  SW AAR
   -------------------      -----------------    --.--  ---.--  ---.--
 > PS U FE D 4 RM           A1 A2 A3 A4 A5       1.09    0.22    1.22
 > P  U FE U 4 RM           A1 A2 A3 A4 A5       0.80    0.16    1.16
 > S  U F  D 4 RM           A1 A2 A3 A4 A5       0.14    0.03    1.03
 > P  R FE D 4 RM           A1 A2 A3 A4 A5       1.31    0.24    1.24
 > S  R FE D 4 R            A1 A2 A3 A4 A5       0.64    0.12    1.12
 > P  * *  * * RM           A1 A2 A3 A4 A5       1.49    0.20    1.20
 > S  * *  * * RM           A1 A2 A3 A4 A5       0.24    0.05    1.05
 > P R A U * *              A1 A2 A3 A4 A5       0.88    0.77    1.66
 > P *                                           0.99    0.88    1.88
 >
```

Enter a ? in a landmark type field to select landmark types from a list.
A record in a "Locations" average accident rate file with no landmark types coded will match any landmark type. The lookup is done in order, so put such catch-all records at the end.

```
 EARF - Edit File:   'THASD.AVERATES.SEC.MASTER'                 Row 1 of 100
 COMMAND ===>                         ENTER: Save. PF3: Cancel   SCROLL ===>
                                                                PF1 - Help
   Hwy Class Set            Landmark Types       AAR    RW AAR  SW AAR
   -------------------      -----------------    --.--  ---.--  ---.--
 > PS U FE D 4 RM                                1.09    0.22    1.22
 > P  U FE D 4 RM                                0.80    0.16    1.16
 > O  U FE D 4 RM                                0.14    0.03    1.03
 > P  R FE D 4 RM                                1.31    0.24    1.24
 > S  R FE D 4 RM                                0.64    0.12    1.12
 > *  * *  * * L                                 0.11    0.21    1.21
 > *  * *  * * R                                 0.42    0.22    1.22
 > *  * *  * * M                                 0.43    0.23    1.23
 >
```

(Note that there is a a a heading for "Landmark Types" in the Section file, but no landmark types should be coded.)

Use the arrow keys and the tab key to move around the panel. Use the PageUp and PageDown keys if you have more lines than will fit on one screen.

See section 2.4.7 for a definition of Highway Class Sets.