Final Report

Identification of Intersections' Crash Profiles/Patterns

Phase II, Client/Server Computer Application Deployment

BC355-10

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16. Abstract
This project extends the work performed under the project *Identification of Intersections' Crash Profile/Patterns* (BC355). It seeks to provide a web application that performs the same statistical analyses on signalized intersections within Florida thus providing a means for safety engineers to identify intersections with safety problems. The analyses may also assist the traffic operations engineers with the design and control of these intersections.

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Executive Summary

The goal of this project was to extend the previous work included in the project *Identification of Intersections' Crash Profile/Patterns* (BC355) by creating a web application that produces up-to-date statistical tables. In the previous project, intersections were grouped into 45 categories based on their configurations (e.g., number of intersection legs, number of through lanes on major- and minor-roads, roadway types for major- and minor-roads), traffic volume and traffic control factors (e.g., speed limit). For each category, a table was created to describe crash profiles/patterns, i.e., the mean number of crashes, the standard deviation, the 85th, 90th and 95th percentiles for collision type, severity, lighting condition, surface condition, month of the year, day of the week and hour of the day.

Over time the information provided in the tables may become less relevant as the data becomes stale and traffic patterns change. The web application includes a database and a collection of web pages that allow Florida Department of Transportation (FDOT) engineers to update intersection crash data and intersection configuration information on an annual basis. This web application allows the engineers to create the same type of statistical tables, using the methodology applied in the previous project, but with the advantage of using more contemporary data.

The web application uses Microsoft SQL Server 2000 to store the data and serves web pages using Microsoft ASP.NET within the Internet Information Services. The version of the .NET Framework is version 1.1. To seed the database, the data elements that were created for the previous project were migrated from Microsoft Excel. Security measures were put into place so that only database administrators have direct access to

the data while the users are only able to interact with the data. This security is achieved through using stored procedures and views.

The web pages within the web application were created to allow the engineers to update the database using both bulk loads and individual edits. The bulk loads allow for an easy way to minimize tedious data manipulation while the ability to perform individual edits provides a means to perform quality control of the data. The front-end also allows for quick access to the statistical analyses.

The benefit of this web application to the safety engineers at FDOT is to take known intersections that have a high collision count and give them further insight as to what may be the contributing factors.

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Definitions

Back-end – an abstraction of an application user interface. The components of a web application that feed the front-end but are transparent to the user.

Drop down list – a web page control which allows a user to choose one value from a list.

Front-end – an abstraction of an application user interface. It includes anything presented to the user that allows the user to interact with the application.

Hover – a computer mouse action that includes positioning the mouse pointer over an on screen object and holding it there without clicking any of the mouse buttons.

User – a general term referring to a person who is using the web site.

Introduction

Statistics show that signalized intersections are among the most dangerous locations of a roadway network. In the US, although only around 10% of all intersections are signalized, nearly 30% (2744) of intersection fatalities in 2005 occurred at signalized intersections (Rice, 2007). In Florida, more than 40% of fatal and serious injury crashes occurred at or were influenced by intersections (Florida Strategic Highway Safety Plan, 2006). In 2003, 96,710 crashes occurred at intersections, and these intersection crashes resulted in 929 fatalities and 107,429 injuries (extracted from the 2003 Florida crash database). Traffic crashes at signalized intersections are complicated events which involve the interaction between the driver, vehicle, roadway, traffic, and environment.

In order to improve the safety at signalized intersections, the Florida Department of Transportation (FDOT) supported a project, *Identification of Intersections' Crash Profile/Patterns* (BC355), and it was conducted by researchers at the University of Central Florida (UCF) to determine which crash patterns are abnormally high at intersections of different configurations and traffic levels. This would enable traffic engineers to identify the intersections that need more detailed study. Thus, the engineers can more effectively develop countermeasures. The UCF research team collected data from more than 1500 signalized intersections, accounting for more than 60,000 crashes reported in Orange, Seminole, Brevard, Hillsborough, and Dade counties, as well as the City of Orlando. Eventually all six jurisdictions were combined to represent the state, and intersections were classified into a total of 45 categories based on their geometry/configuration (e.g., the number of intersection legs, the number of through lanes on major-roads and minor-roads, roadway types for major- and minor-roads), and

then traffic volume and traffic characteristic (e.g., speed limit) factors. For every type of intersection, based on an adequate sample of intersections, a summary table was generated to depict the average number, the 85th, 90th and 95th percentiles of crashes over the study period by type, time, severity, road condition, etc. These tables show detailed patterns/profiles of every type of signalized intersections. These tables, as well as other information, have been provided to FDOT as the final report of Phase I of the project.

In order to encourage the implementation of these research results and to facilitate the signalized intersection safety analysis and also recognizing that as the number of intersections expands, there will be a need for a more organized way to manage and expand the data and to obtain the needed information in a simple and efficient manner. For example, the user should be able to determine the expected number of rear-end crashes for a 4×4 signalized intersection with low traffic volume by clicking several drop down menus. The user could also see the 95th percentile to determine if an intersection has an abnormally high value of a certain crash type, or he might choose to see the overall state average, etc. This database application is an extension of the previous project in a client/server model utilizing available network topologies to include all the results that were developed in the project. It also has the ability to dynamically expand the database by including more intersections and more counties, while using the most recent three years of crash data.

The crash data for the collected state road intersections in the previous project have been updated to the most recent three years (2003, 2004, and 2005) by retrieving the FDOT Crash Analysis Reporting System (CAR). The same intersection classification criteria are used for the web application. The state road intersections currently included in

the database are those within Brevard, Hillsborough, Miami-Dade, Orange and Seminole counties and will grow over time until it encompasses other areas of the state. This web application also has the capability for further expansion by allowing users to input data from other areas of the state. As other counties begin to enter data, the database has self-adaptive ability such that the necessary database tables and relationships will be created on-demand. Once the sample of a particular type of intersections in a new county is adequate to conduct the same type of analysis, the application is able to automatically switch from input to output mode. Users can view state road intersections for a specific county under *Inventory* from their Node Number, Mile Point, Intersection Name, Category, etc. (Mile Point, Intersection Name, and Category are blank for an unidentified intersection). Overall state and district statistics are always calculated and provided.

The web application will help a user to identity crash patterns for each type of intersection by crash type, severity, light condition, surface condition, month, week, and hourly distributions within a certain county, for a district, and for the overall state as shown in the *Analysis* web pages. These statistics can serve as a crash profile manual that can be used as reference values to assist FDOT engineers in identifying intersections with specific problems in a simple and straight forward manner. This will also help in proposing countermeasures, and determining what to expect for the safety of an intersection if changes are planned. Besides the Safety Office, it is expected that all district traffic engineering and roadway design offices will benefit from the results of this application.

Data Migration

As part of the data migration from the prior phase of this project, it was imperative to create an ingenious, unique ID for each intersection within the state. FDOT uses a five digit node number to identify intersections and a two digit code to identify the counties. The node numbers are unique within a county, but they are reused within the state and sometimes within a district. Therefore, a merging of the county ID and the node number was determined to be the best solution.

The creation of a unique ID to describe an intersection created a problem as the data that was collected as part of the prior phase did not include the node number. Approximately 22,000 intersections were cross referenced in the FDOT mainframe to acquire a complete list of node numbers.

In an effort to have more intersections categorized than the five counties under study previously, the seven district offices were contacted to inquire the availability of data. Both the Operations and Safety Offices of each district were contacted. Although some districts had partial information, none maintained a compiled list of all the fields required to categorize intersections.

Data Verification

In an effort to ensure that the existing intersections were correctly categorized, the geometry of the intersections were confirmed using online mapping web sites such as Google Maps, Google Earth, Yahoo Maps, Mapquest, and county property appraisers. The data items that were verified using this method were number of legs and number of approach lanes. Whenever possible, the online maps were used to confirm if the roads were one-way or two-way.

Database Design

A relational database was created to support the web site. The key components of the database are the intersection configurations and the summarized crash records. The intersection configuration data store is comprised of roadway names, number of approach lanes, number of legs, mile point, Annual Average Daily Traffic (AADT) per approach lane, speed limit, and category.

The summarized crash records stored within the database holds annual crash totals for each intersection. Along with the total number of crashes, the database also stores number of crashes based on collision type, collision severity, lighting condition, surface condition, month, day of week and time of day.

The following tables have been created within the database:

- Tbl_summary_stats: This table stores the summed annual crash record for each intersection. It is populated with crash data using the Upload Crashes page (upload.aspx). This table has the following definition:

Column Name	Data Type	Length
ID (PK)	Bigint	8
Intersection_id	Nchar	8
Year	Int	4
num_coll	Int	4
num_rearend	Int	4
num_headon	Int	4
num_angle	Int	4
num_leftturn	Int	4
num_rightturn	Int	4
num_sideswipe	Int	4
num_pedbike	Int	4
num_othertype	Int	4
num_pdocrash	Int	4
num_posssibleinjury	Int	4
num_nonincap	Int	4
num_incap	Int	4
num_fatal	Int	4
num_daylight	Int	4
num_dusk	Int	4
num_dawn	Int	4
num_darklit	Int	4
num_darkunlit	Int	4
num_dry	Int	4
num_wet	Int	4
num_slippery	Int	4
num_surface_others	Int	4

Column Name	Data Type	Length
num_january	Int	4
num_february	Int	4
num_march	Int	4
num_april	Int	4
num_may	Int	4
num_june	Int	4
num_july	Int	4
num_august	Int	4
num_september	Int	4
num_october	Int	4
num_november	Int	4
num_december	Int	4
num_Sunday	Int	4
num_Monday	Int	4
num_Tuesday	Int	4
num_Wednesday	Int	4
num_Thursday	Int	4
num_Friday	Int	4
num_Saturday	Int	4
num_am	Int	4
num_am_peak	Int	4
num_am_offpeak	Int	4
num_midday	Int	4
num_pm_offpeak	Int	4
num_pm_peak	Int	4
num_pm	Int	4

- Tbl_intersections: This table stores the characteristics of the signalized intersections. This table is populated by two pages Upload Intersections (intersupload.aspx) which is used to perform a bulk upload and New Intersection (newnode.aspx) which is used to insert a single intersection. Individual intersections can be maintained using the Update Intersection page (updatenode.aspx). This table has the following definition:

Column Name	Data Type	Length
Row_id	Bigint	8
Intersection_id	Nchar	8
DOT_County	Nchar	2
Road1	Nvarchar	70
Road2	Nvarchar	70
Node_number	Char	5
Mile_point_road1	Float	8
Mile_point_road2	Float	8
Category_id	Tinyint	1
Year	Int	4
Legs	Tinyint	1
Lanes_road1	Tinyint	1
Lanes_road2	Tinyint	1
Aadt_road1	Int	4
Aadt_road2	Int	4
Speedlimit_road1	Tinyint	1
Speedlimit_road2	Tinyint	1
Laneusage	Tinyint	1
Usage_road1	Tinyint	1
Usage_road2	Tinyint	1
Road1_major	Bit	1

- NodeList – this table is used for the sole purpose of identifying intersections in the Analysis by Milepoint page (getdatabymp.aspx). The data are used to populate the drop down lists. The contents of the table is seeded with data provided by the FDOT Safety Office and has the following definition:

Column Name	Data Type	Length
Intersection_id	Nchar	8
County	nvarchar	2
Node	Nchar	5
Rdwy_id	Nchar	8
Milepoint	Float	8
Route id	Nvarchar	12
Intersection name	nvarchar	40

- Counties – this table manage the FDOT and HSMV county codes for the counties as well as the districts that the counties belong. The table has the following definition:

Column Name	Data Type	Length
County_id	Tinyint	1
County	Nvarchar	50
Hsmv_code	Nchar	2
Dot_code	Nchar	2
Hsmv_num	Tinyint	1
Dot_num	Tinyint	1
Fdot_district	char	2

- Categories – this table stores the criteria for categorizing intersections. The table has the following definition:

Column Name	Data Type	Length
Category_id	Tinyint	1
Geometry	Nvarchar	25
Aadt_min	Int	4
Aadt_max	Int	4
Speed_limit_min	Tinyint	1
Speed_limit_max	Tinyint	1
Description	Nvarchar	100
Description_html	Nvarchar	100

Web Site Design

Components

The web site is broken down into five components:

- Data – the portion of the web site in which the user interacts with the database using upload/download file operations. The user can perform bulk uploads of crash and intersection information and download summarized crash data.

- Inventory – this portion allows the user to peruse the inventory of intersections that have been entered into the database.
- Analysis – this portion allows the user to perform statistical analysis based on the most recent 3 years of crash records in the database. Analysis compares the most recent year of data of a selected intersection against the three year average of the county, district and state.
- Manage – allows the user to maintain intersection information and district alignment.
- Help – online, context sensitive help page.

Site Navigation

Navigation of the web site is comprised of a toolbar that is present on each page (Figure 1). This toolbar has active links to the home page and the online help file. The other pages are reached by hovering the mouse over a label which brings up a navigation menu for that content area. Clicking on the title that appears directs the user to that page.

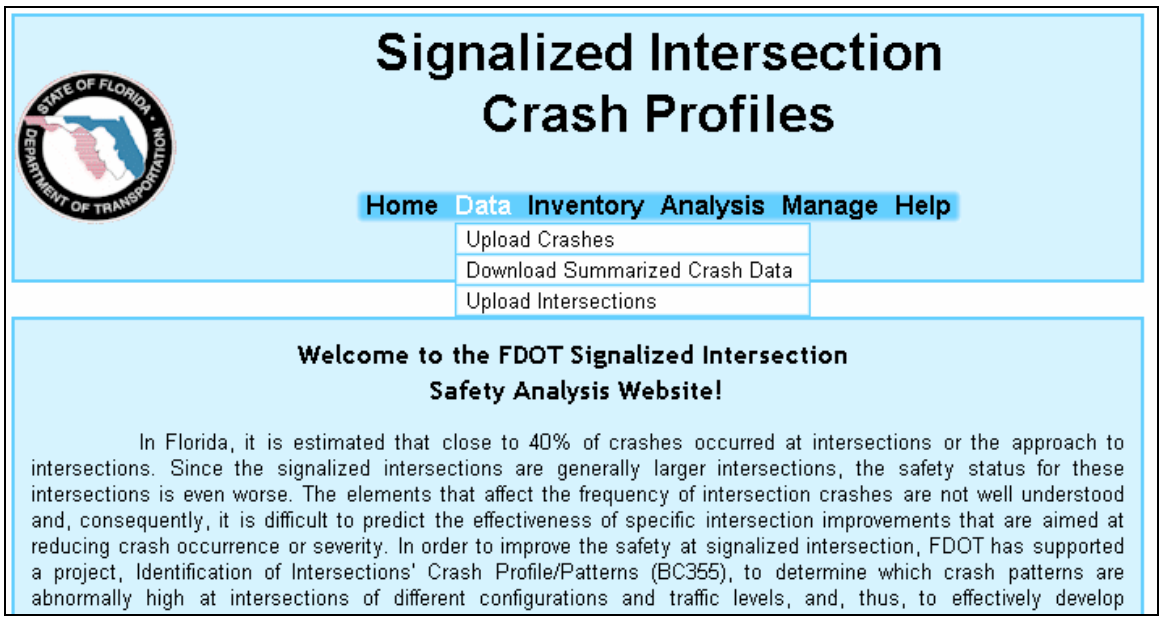

Figure 1. Site Navigation

Functionality

Data

Upload Crash Data – This page allows the user to upload crash data that was acquired from the CAR mainframe application. The data that is downloaded from the mainframe represents individual crash records and provides information such as crash type and severity, date and time, distance from intersection, node number and county. As the data file is being read into memory, crashes that occurred more than 250 feet from the intersection and crashes deemed not to occur at the intersection are filtered out. After the file is uploaded into server memory, the data is sorted by intersection and then summed by each of the elements listed above and then stored within the database.

Download Summarized Crash Data – Specific analysis is performed on this site using the aggregated data, but other uses for the data may exist. This page allows the user to download the aggregated data as plain text in Extensible Markup Language (XML) or Comma Separated Values (CSV). These files can then be imported into other applications such as Microsoft Access and Excel.

Upload Intersections – This page allows the user to bulk upload a data file that consists of intersections and their configuration information that are used to categorize intersections.

Inventory

Intersections – This page allows the user to view the intersections that have been entered into the database. The data presented on this page include the node number, mile point, roadway names and category. A hyperlink is also available for each intersection that, when clicked, will forward the user to an Update Intersection page. The database is seeded with intersections from the crash records obtained from the FDOT mainframe

application. The crash records do not include the posted speed limit or number of approach lanes, so not all intersections could be categorized using this data source. Also, the intersecting roadway is not available in the crash records, so these intersections will just list the state road.

Categories – This page displays the forty-five categories that were generated as part of the previous phase of this project and the criteria for each category.

Analysis

There are three pages in the Analysis section that perform the statistical analyses. The only difference between them is the method of selecting an intersection. A thorough description of the analyses is listed in the section Computational Methods on page 13.

Intersection – On this page, the user selects an intersection using roadway names presented in drop down lists. These drop down lists are dynamic in that when the user selects a roadway in the "Select Roadway" drop down list the page reloads and the "Select Intersecting Roadway" drop down list is populated with the names of roadways that intersect with the street selected from the "Select Roadway" drop down list.

Milepoint – On this page, the user selects the intersection using the roadway name/roadway ID and the milepoint using drop down lists. The user uses the "Select Roadway" drop down list that contains the state road number and its roadway ID. The roadway ID contains the section and subsection numbers. Based on this selection, the "Select Milepoint" drop down list is updated with the milepoints for the available categorized intersections.

Node Number – On this page, the user selects the intersection using the FDOT node number. The user first chooses the county from the "Select County" drop down list. This action causes the page to refresh and the "Select Node" drop down list to populate

with the node numbers from that county. The user then identifies the intersection from the "Select Node" drop down list.

Manage

New Intersection – This page is a web form that allows the user to insert a single intersection into the database. The fields on this page request all the information required to categorize an intersection.

Update Intersection – This page allows the user to update a single intersection. It can be used to correct erroneous existing information or update the data on an intersection when it changes.

Districts – Because parts of the analyses performed are based on districts, this page is provided to maintain the districts and the counties within them (should the districts undergo realignment).

Help

The online help file includes instructions for every page of the web site as well as how to prepare data for uploading into the database. For each web page there is a bookmark in the help file. The navigation menu bar contains a hyperlink to the help. This hyperlink is dynamic in that whenever a page is opened in the browser, the link is modified to link to the bookmark in the help file for that page. This makes the help system context sensitive while maintaining a single page that is able to be printed from a single file.

Computational Methods

There are three pages that perform statistical analyses on signalized intersections. All three pages perform the same analysis with the method of selecting the intersection

being the only difference between them. Intersections can be selected by using intersecting roadway names, roadway name with roadway id and mile point, and node number.

The following process is used to provide the output tables once the intersection is selected:

- A stored procedure that takes the intersection ID returns the current category of that intersection and the FDOT district it is in.
- A query is used to determine the most recent three years that the crash data is available.
- A query is made to see if this intersection has changed its category in the past three years. If it has, a message will be displayed on the page detailing that it had changed and it is not participating in the statistical analysis.
- A query is used to get the most recent year's crash data for the selected intersection.
- A stored procedure that takes the three most recent years and the category ID of the selected intersection, returns the three year average of each collision type with matching category ID. The results are returned into a .NET data structure called DataSet.
- The DataSet is queried three times to get the data belonging to the county, district and state. The results of the queries are then stored in three different DataRow data structures.
- The DataRow data structures are then passed to a helper function
    - The data within the DataRows are transferred to matrix arrays.
    - A sum of the three year averages is calculated

    - The three year average of the annual averages is calculated
    - The sum of the mean difference is calculated
    - The standard deviation is calculated
    - The percentile is calculated
- The results of the calculations are displayed on the page

Conclusions

The web application is a stable, database-driven web site that provides another valuable tool that can assist transportation engineers in making Florida's roads safer. The analysis tools provided provide a comprehensive breakdown of crash factors that previously were not directly available. By allowing the users to annually update the crash and intersection data, the web site will continue to provide analysis based on contemporary data.

The web site and database could be expanded further to include non-signalized intersections as well as other intersection data such as the number of left and right turning lanes, etc. To include non-signalized intersections within this web application would require further study such as the research performed in the previous phase of this project. Including other intersection characteristics would require database and web page updates.

References

1. Rice, E. Taking Action to Reduce Intersection Fatalities, *Safety Compass*, Vol. 1, Issue 2, 2007, pp. 1-3.
2. Florida Strategic Highway Safety Plan, 2006, Florida Department of Transportation.

APPENDIX A

Online User's Manual

Help Contents

I. Data Upload/Download
- A. Collecting Data
  1. Creating the Dataset
  2. Retrieving and downloading the dataset
- B. Uploading the Data
- C. Data Download
- D. Upload Intersections

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- B. View Categories

III. Analysis
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- B. Intersection
- C. Mile Point

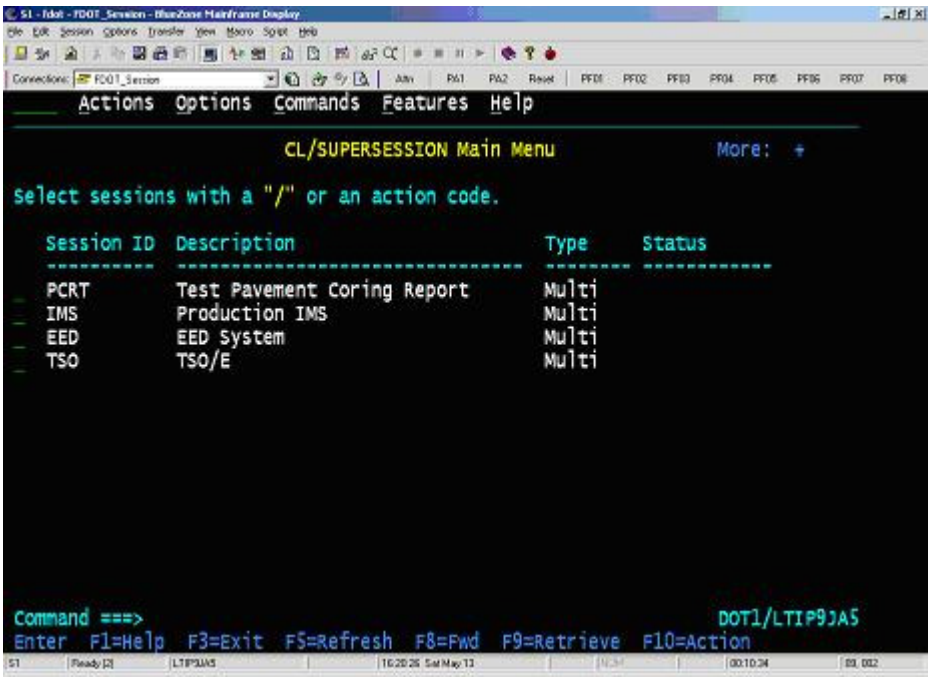
IV. Manage
- A. New Node
- B. Update Node
- C. Manage Districts

I. Data Upload/Download

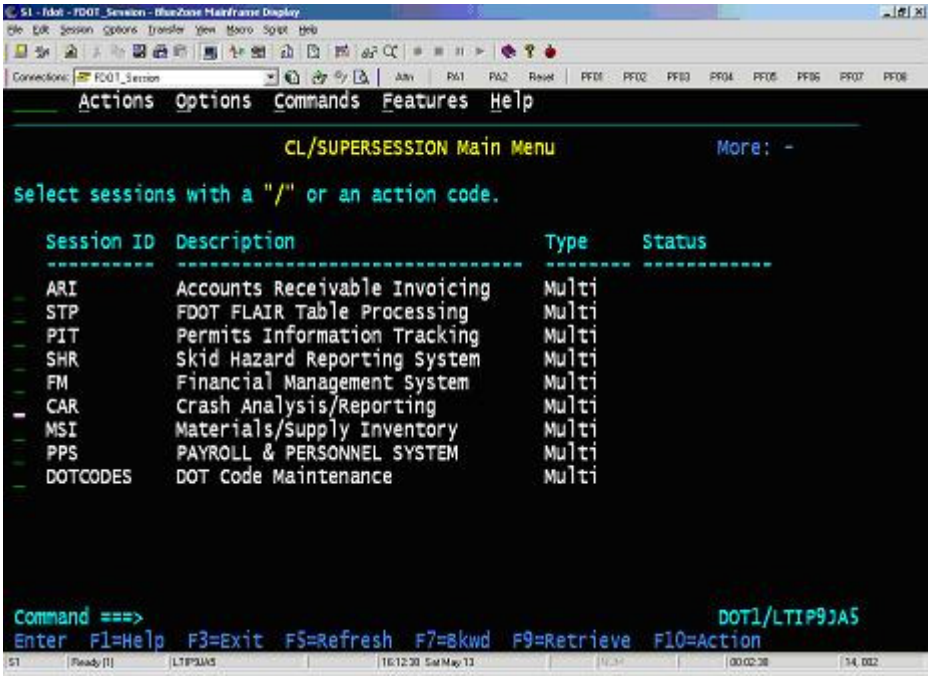
A. Collecting Data

1. Creating the Dataset

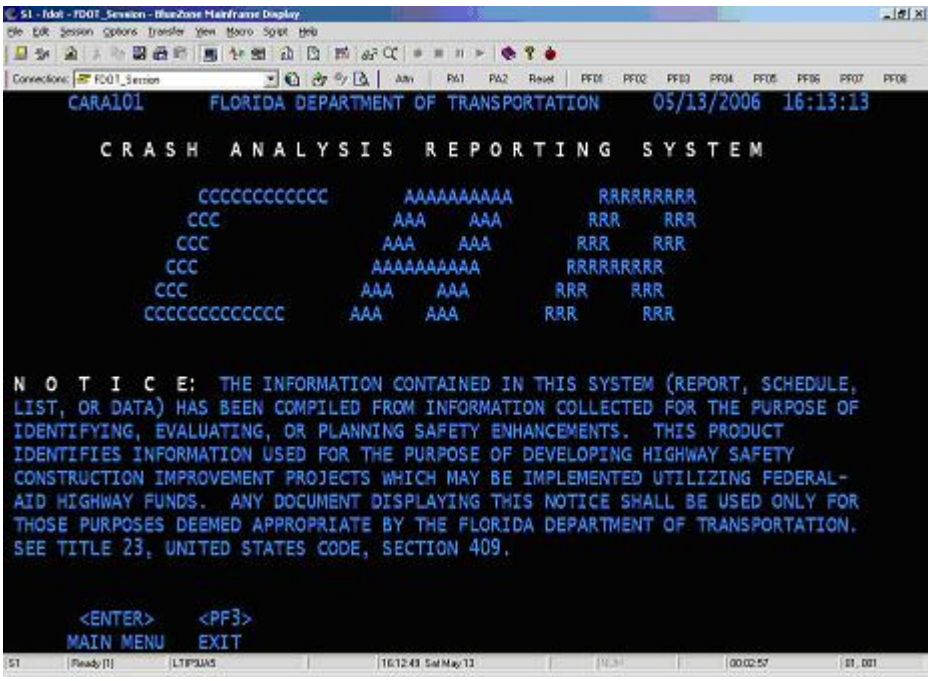
a. After logging into the mainframe, select TSO by either using the down arrow on your keyboard until the cursor is located on the corresponding prompt or by clicking the prompt with the mouse. After selecting TSO, press Enter on your keyboard to continue.



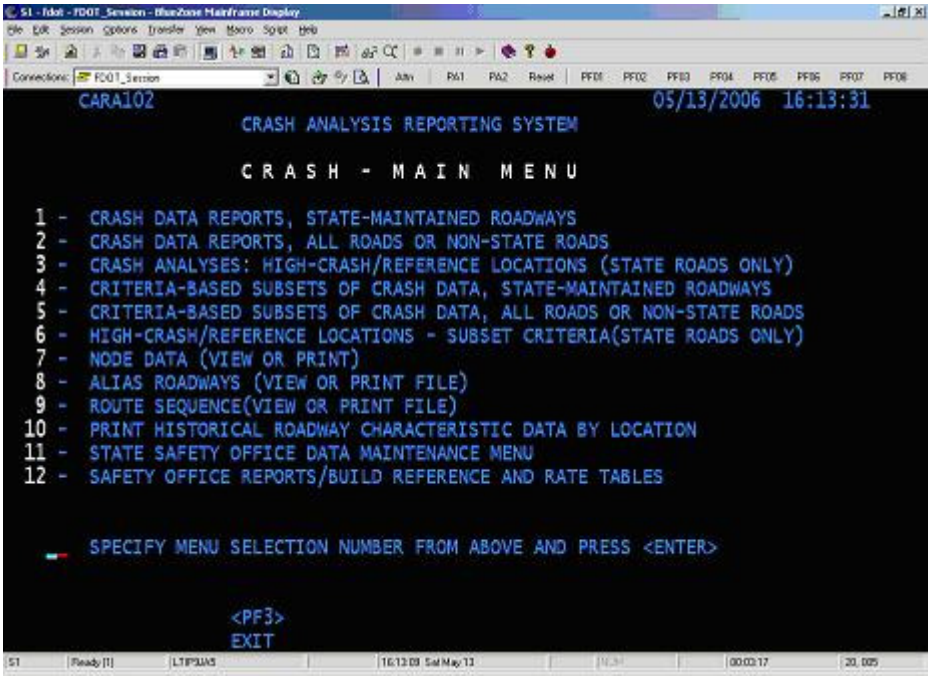
b. Select CAR from the next screen as shown below and press enter to continue.



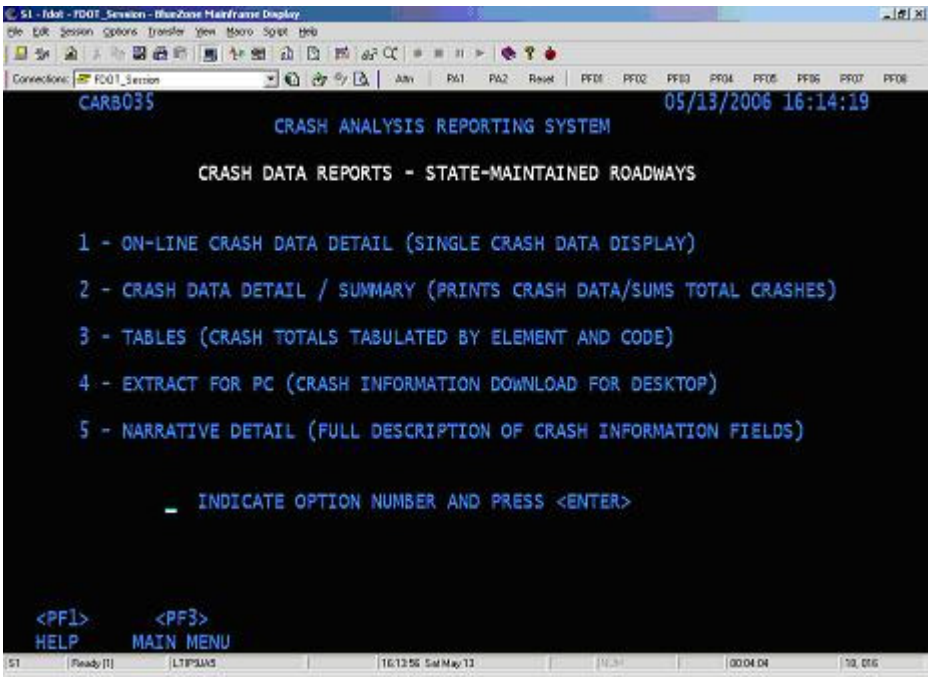
c. You will now see the Crash Analysis Reporting System CAR welcome screen as shown below. Press Enter to continue on to the CAR's Crash - Main Menu.



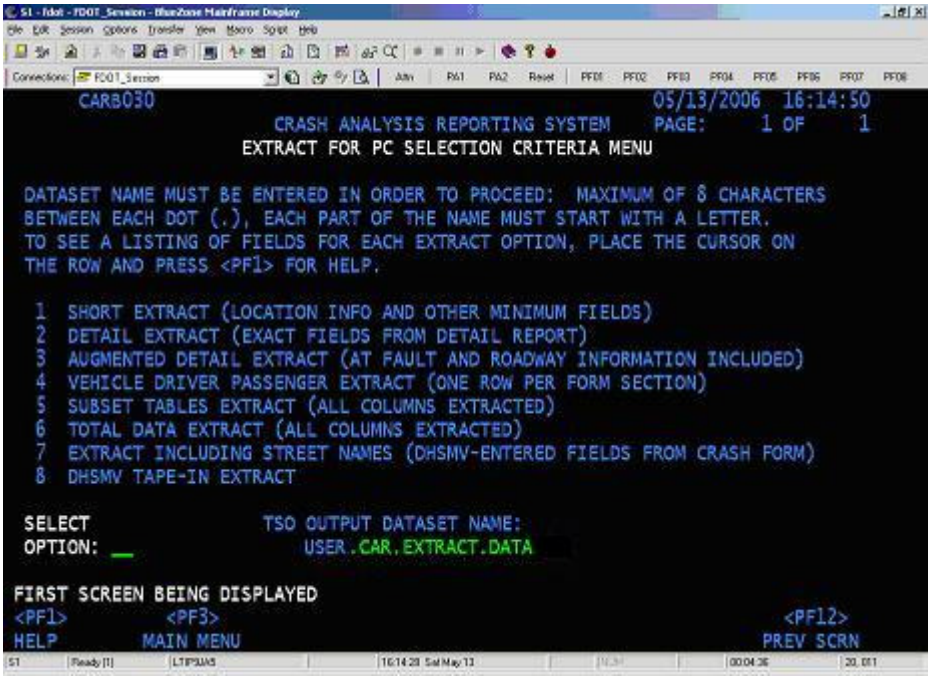
d. At the CAR's Crash - Main Menu press 1 to select Crash Data Reports, State Maintained Roadways



e. At the Crash Data Reports - State Maintained Roadways menu, press 4 to select the Extract for PC option.

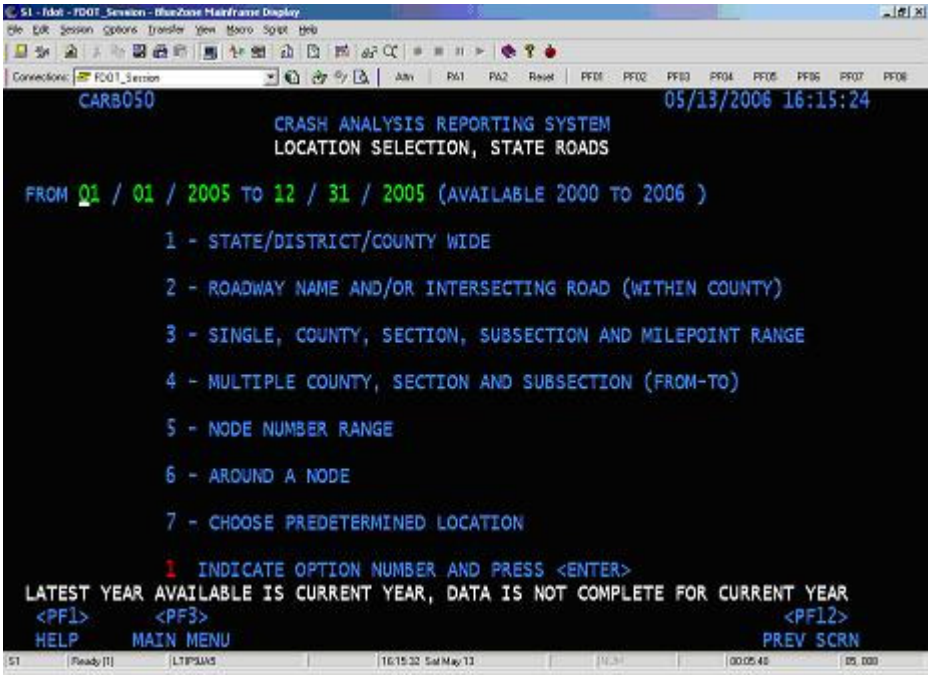


f. On the Extract for PC Selection Criteria Menu, press 3 to select Augmented Detail Extract.

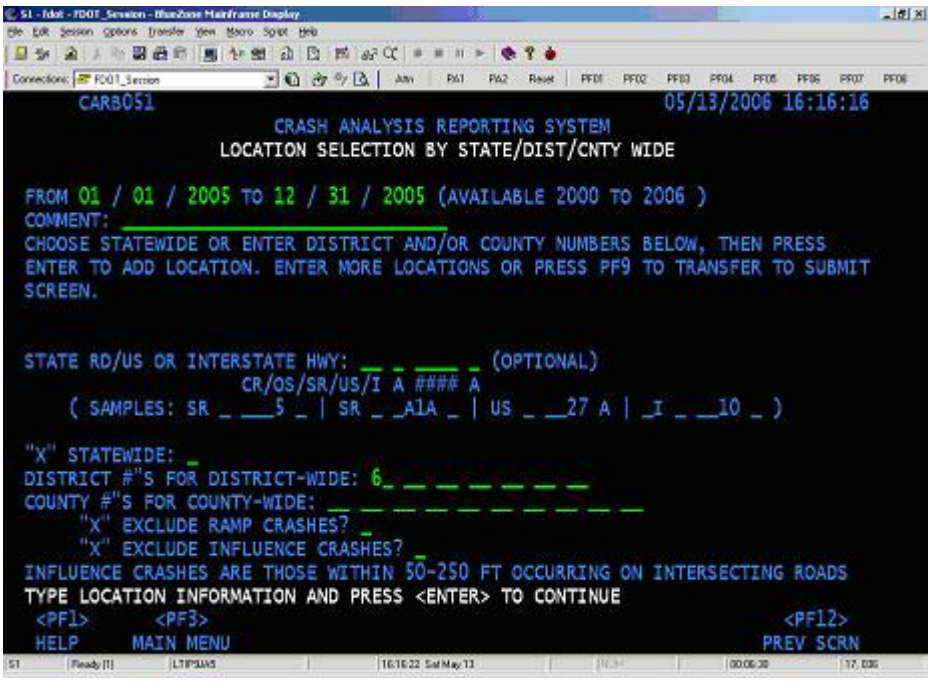


g. On the following screen, Location Selection, State Roads, change the dates to encompass the year of data that you want to retrieve. In the picture below, the year 2005 is being selected. After

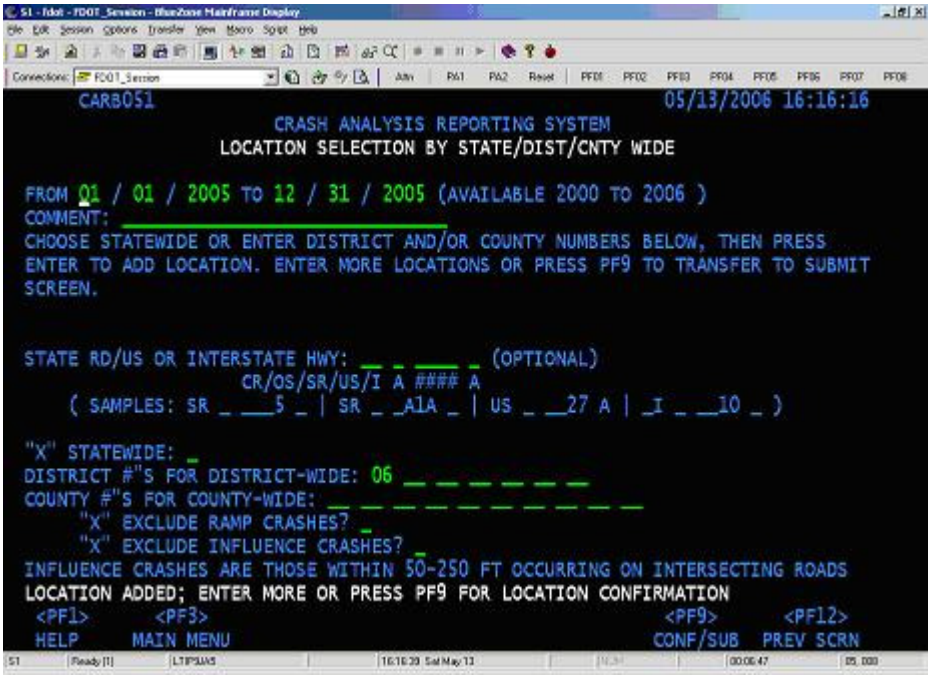
selecting the desired time frame, press 1 to select State/District/County Wide.



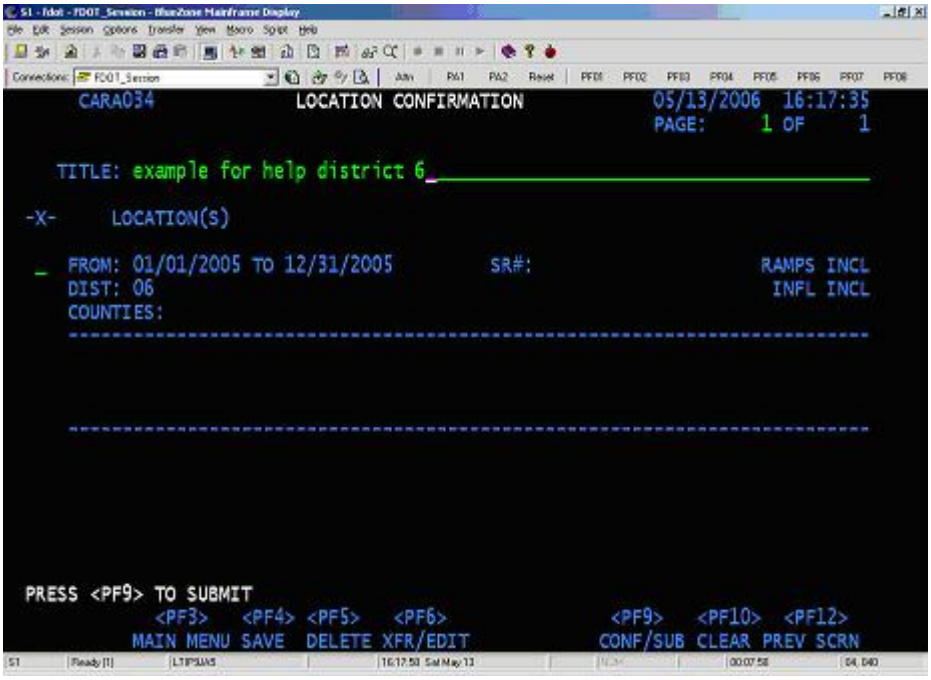
h. On the Location Selection by State/Dist/Cnty Wide screen enter the District that you want to retrieve. In the picture below, District 6 is being selected. After typing in the number of the district, press Enter to continue.



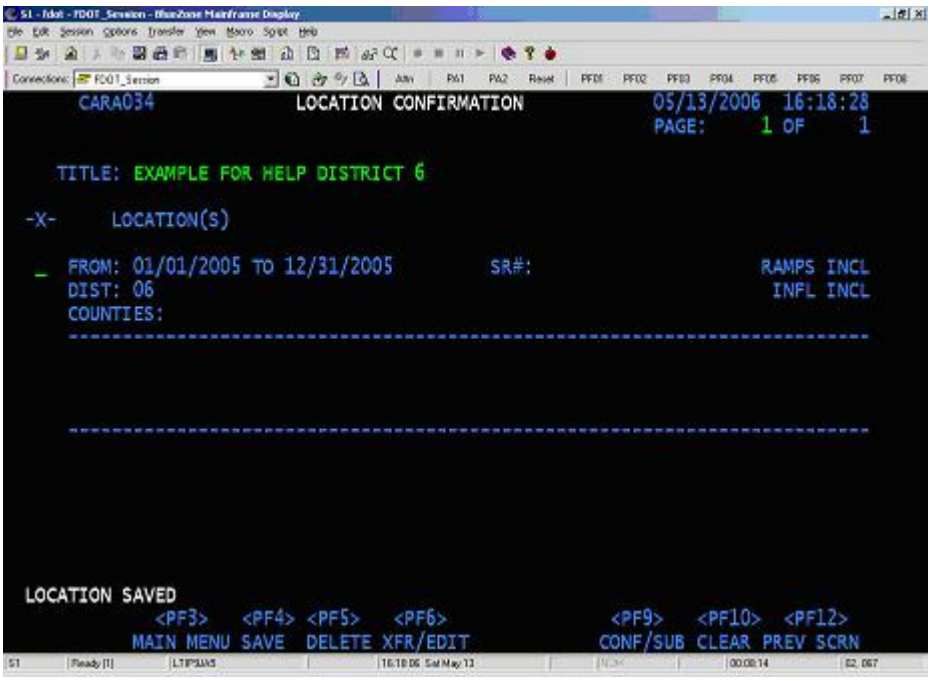
i. After pressing Enter, you will be prompted to press PF9 to continue.



j. On the Location Confirmation screen, confirm that the dates and choice of District are correct and enter a title for this dataset. Press PF4 to save then press PF9 to submit and continue to the next screen.



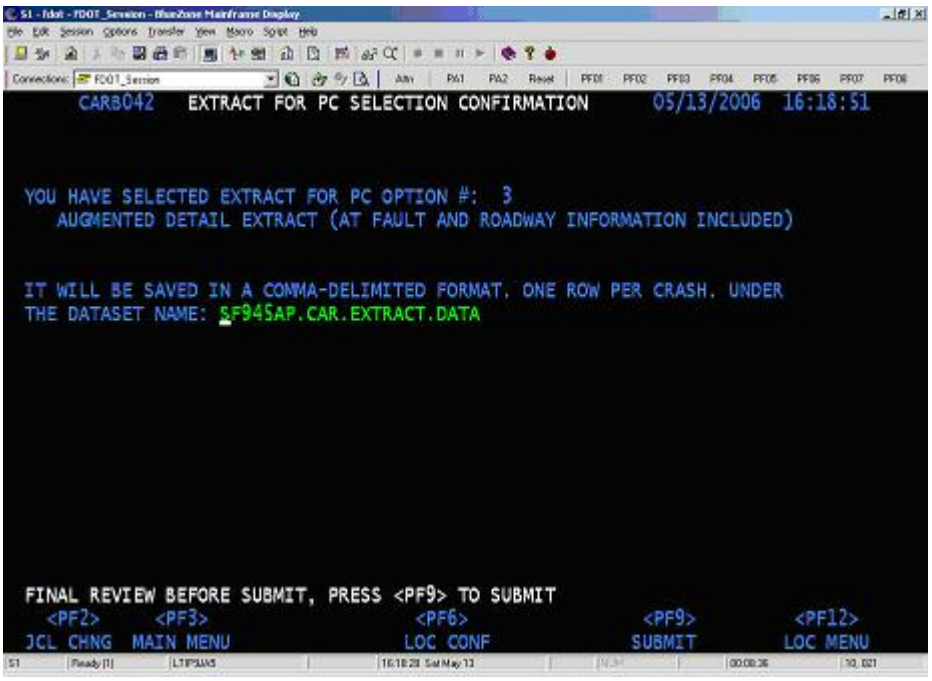
k. On the next screen you will be notified that the location has been saved. Press PF9 to continue.



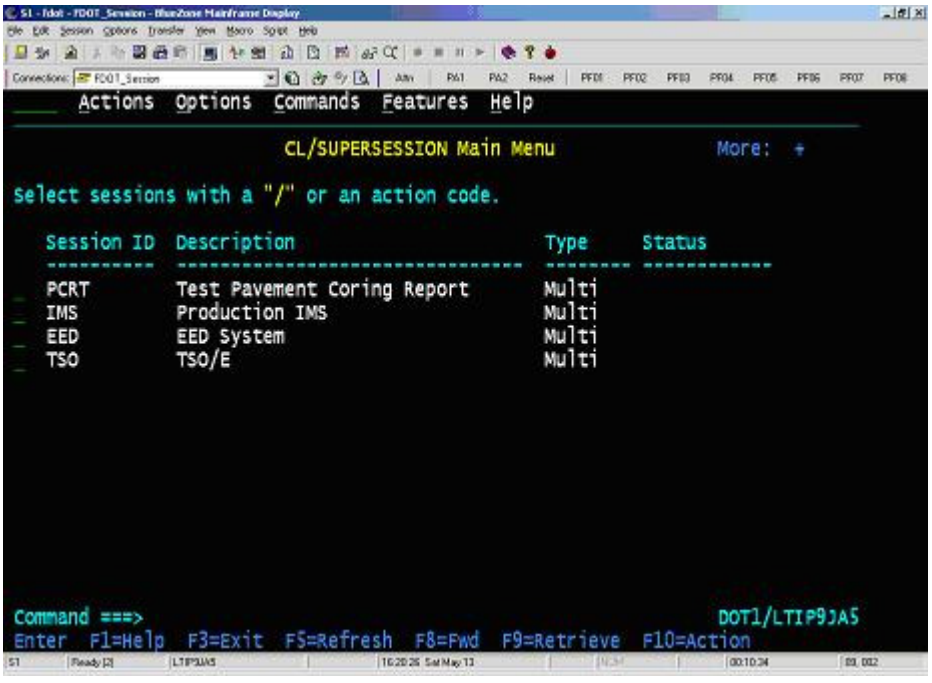
l. On the Extract for PC Selection Confirmation screen, change the dataset name. The following rules need to be followed when naming the dataset.

- The first term must be your mainframe User ID
- Each term is separated by a period
- Each term must begin with a letter
- Each term cannot exceed 8 characters
- No special characters are allowed

A simple format for naming the dataset so it may be found and retrieved more easily later might be *USERID.DISTRIC6.AUGMENT.Y2005*. This way you can easily identify the district, output and year directly from the dataset name. After entering the desired name for the dataset, press PF9 to submit.



m. You will be prompted that the job was successfully submitted for batch processing. After the confirmation press PF3 twice to return to the Supersession Main Menu.

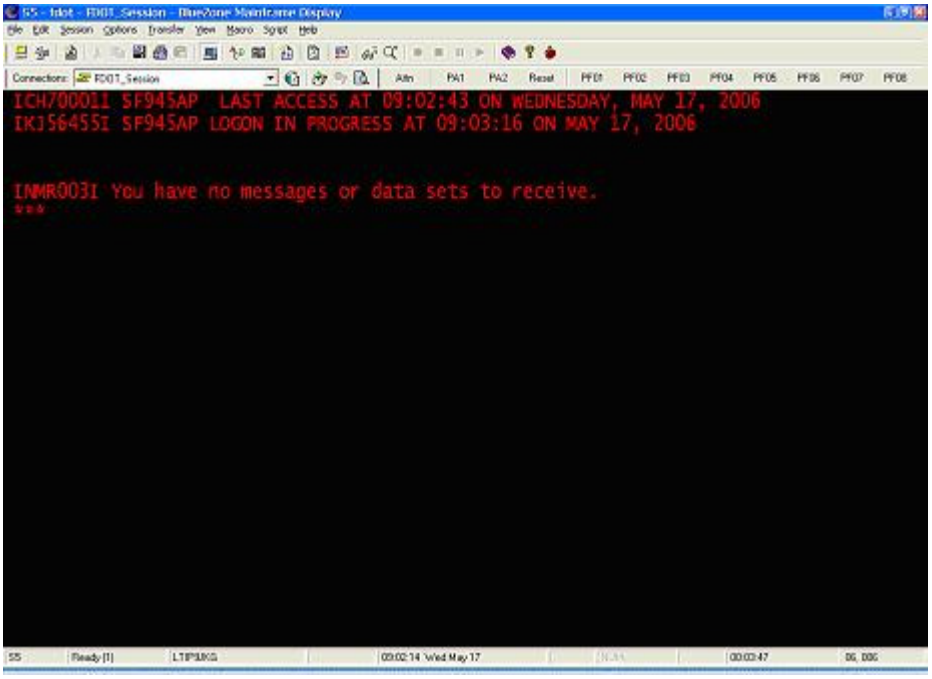


2. Retrieving and downloading the dataset

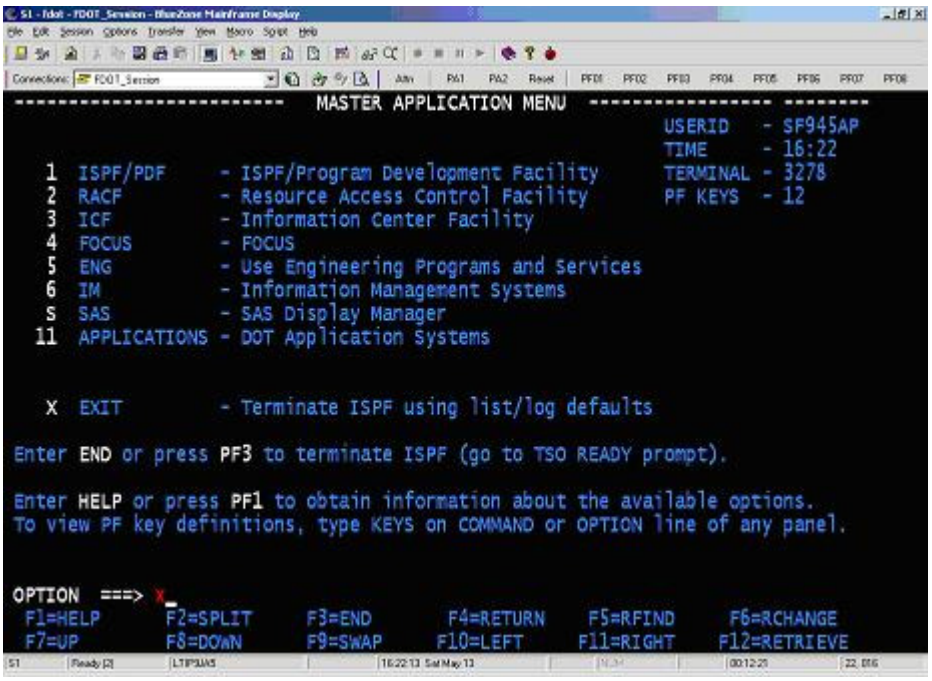
Note: These instructions assume you are using the

BlueZone Mainframe Emulator to access the mainframe.

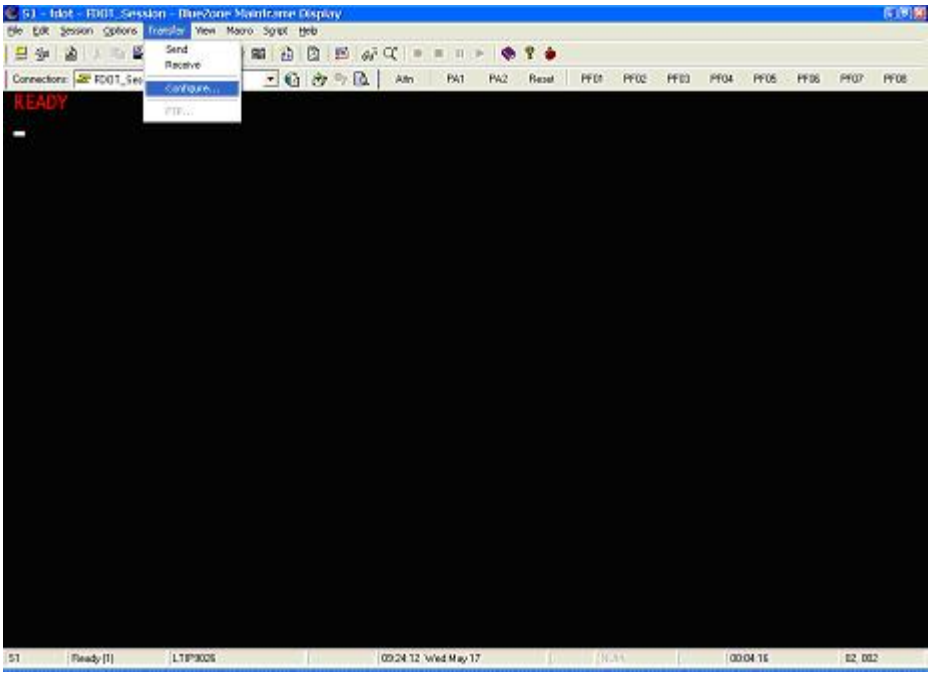
a. From Supersession Main Menu select TSO. You should see the below screen. Press Enter once to get to the TSO Master Application Menu.



b. At the Master Application Menu type "x" at the option prompt to exit this screen and access the Ready prompt.

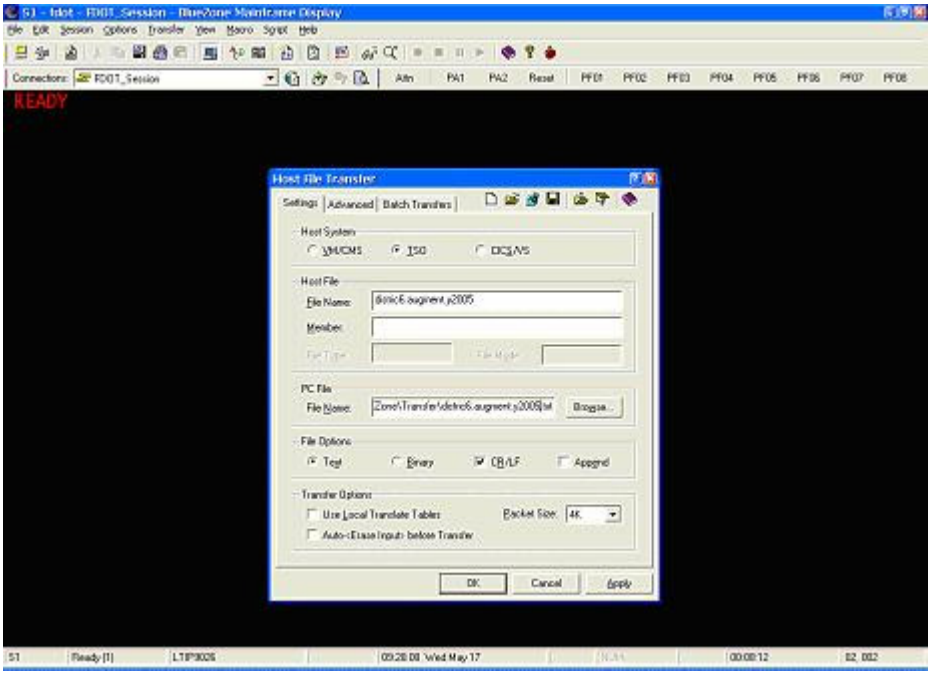


c. At the Ready prompt, select Transfer from the BlueZone toolbar and click Configure from the drop down menu.

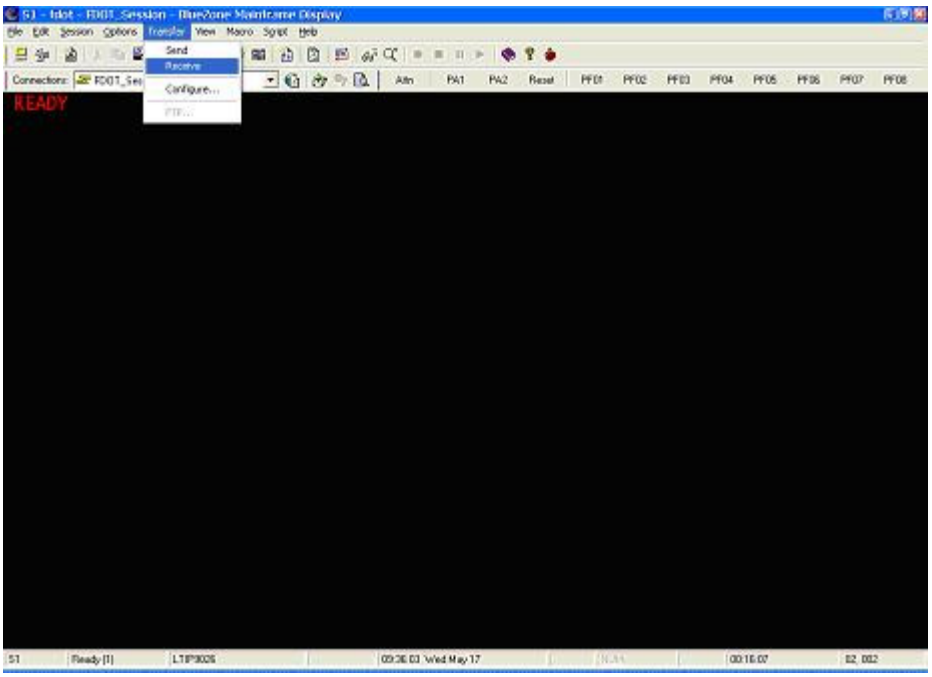


d. In the Host File Transfer dialog box enter the name of the dataset that you created in the text box File Name in the section that says Host File. It is imperative that you do not include the term

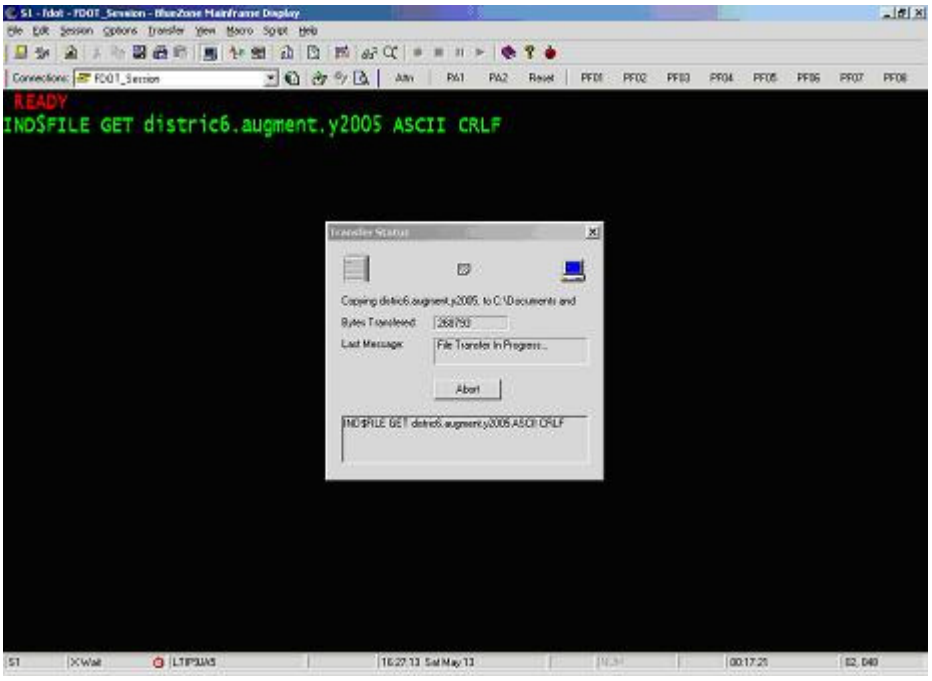
that includes your User ID. In the section that says PC File, enter the complete path and filename of the file. For example c:\mydatasets\distric6.augment.y2005.txt. Click OK to continue.



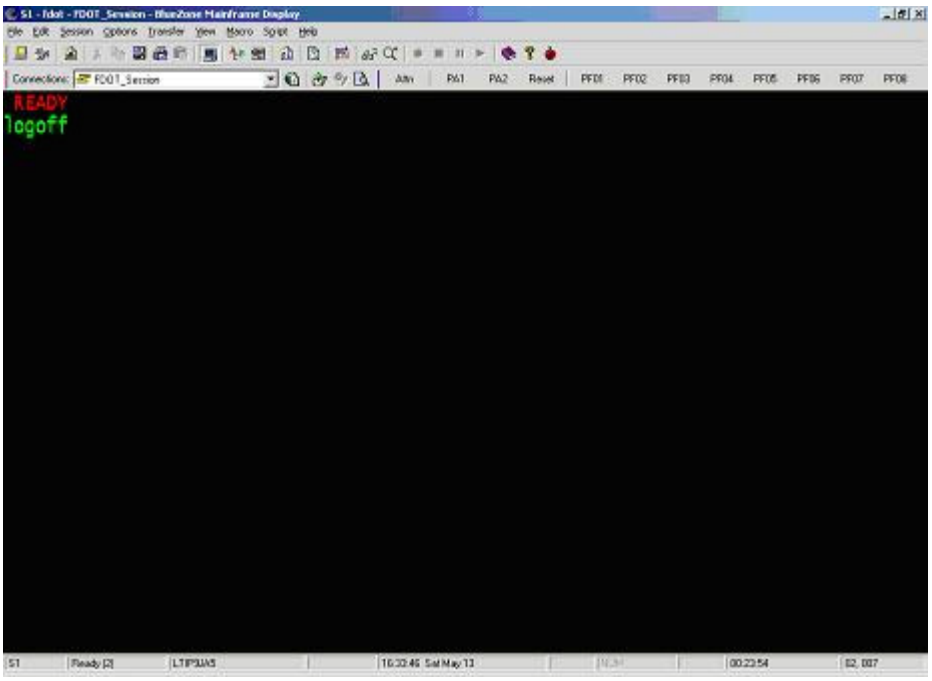
e. At the Ready Prompt, click Transfer from the BlueZone toolbar and click receive from the drop down menu.



f. Your file will now start to download.



g. After the file is completed its transfer, you will be back to the Ready prompt. Type in "logoff" and press Enter.

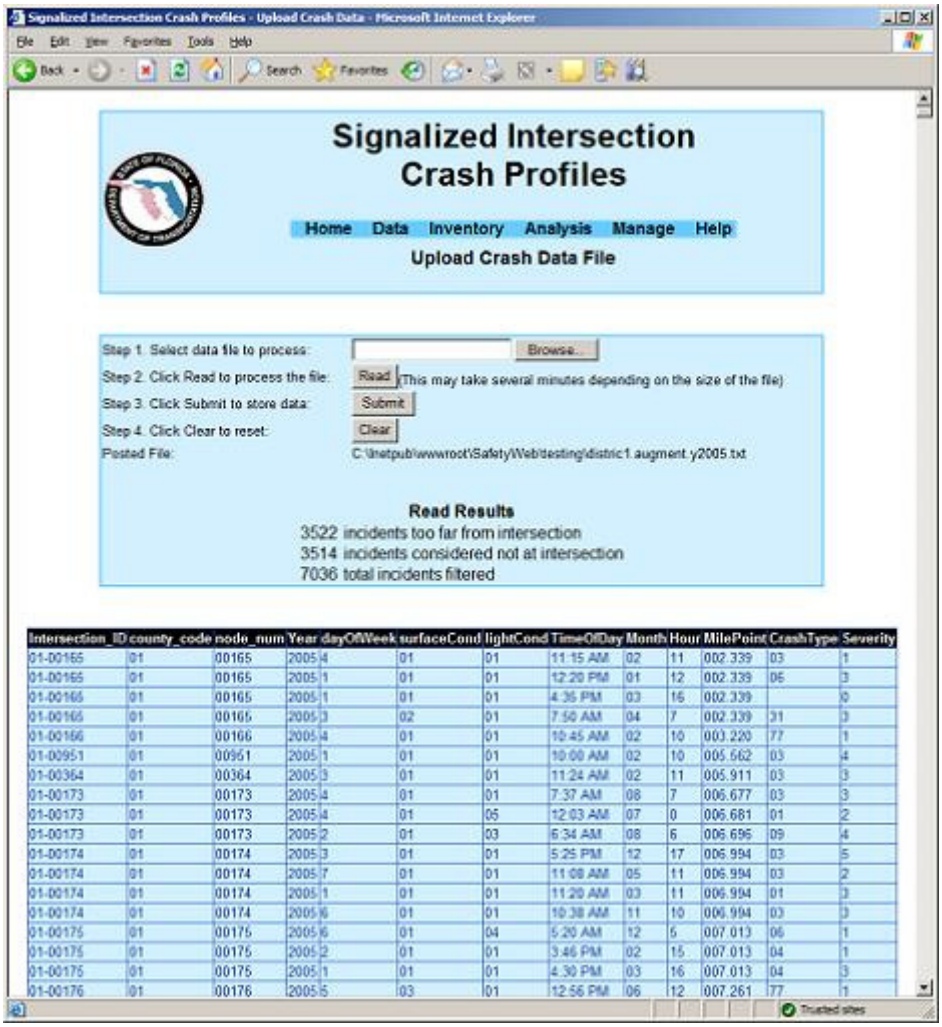


h. You may now log off from the mainframe.

B. Uploading the Data

a. Hover over 'Data' on the menu bar then select 'Upload Crashes' from the drop down menu that appears.

b. Click the Browse button to locate the text file you just downloaded. Once you have located the file in the Choose File dialog box, click Open to continue. You may now click Read. This will read all the crashes into memory and a table will now appear showing the data that were read.



Intersection_ID	county_code	node_num	Year	dayOfWeek	surfaceCond	lightCond	TimeOfDay	Month	Hour	MilePoint	CrashType	Severity
01-00165	01	00165	2005	4	01	01	11:15 AM	02	11	002.339	03	1
01-00165	01	00165	2005	1	01	01	12:20 PM	01	12	002.339	06	3
01-00165	01	00165	2005	1	01	01	4:35 PM	03	16	002.339		0
01-00165	01	00165	2005	3	02	01	7:50 AM	04	7	002.339	31	3
01-00166	01	00166	2005	4	01	01	10:45 AM	02	10	003.220	77	1
01-00951	01	00951	2005	1	01	01	10:00 AM	02	10	005.662	03	4
01-00364	01	00364	2005	3	01	01	11:24 AM	02	11	005.911	03	3
01-00173	01	00173	2005	4	01	01	7:37 AM	08	7	006.677	03	3
01-00173	01	00173	2005	4	01	05	12:03 AM	07	0	006.681	01	2
01-00173	01	00173	2005	2	01	03	6:34 AM	08	6	006.696	09	4
01-00174	01	00174	2005	3	01	01	5:25 PM	12	17	006.994	03	5
01-00174	01	00174	2005	7	01	01	11:08 AM	05	11	006.994	03	2
01-00174	01	00174	2005	1	01	01	11:20 AM	03	11	006.994	01	3
01-00174	01	00174	2005	6	01	01	10:38 AM	11	10	006.994	03	3
01-00175	01	00175	2005	6	01	04	5:20 AM	12	5	007.013	06	1
01-00175	01	00175	2005	2	01	01	3:46 PM	02	15	007.013	04	1
01-00175	01	00175	2005	1	01	01	4:30 PM	03	16	007.013	04	3
01-00176	01	00176	2005	6	03	01	12:56 PM	06	12	007.261	77	1

c. Once the file is read, you may upload the data into the database by clicking Submit. If you had entered the wrong file, you may click Clear to clear the data from memory.

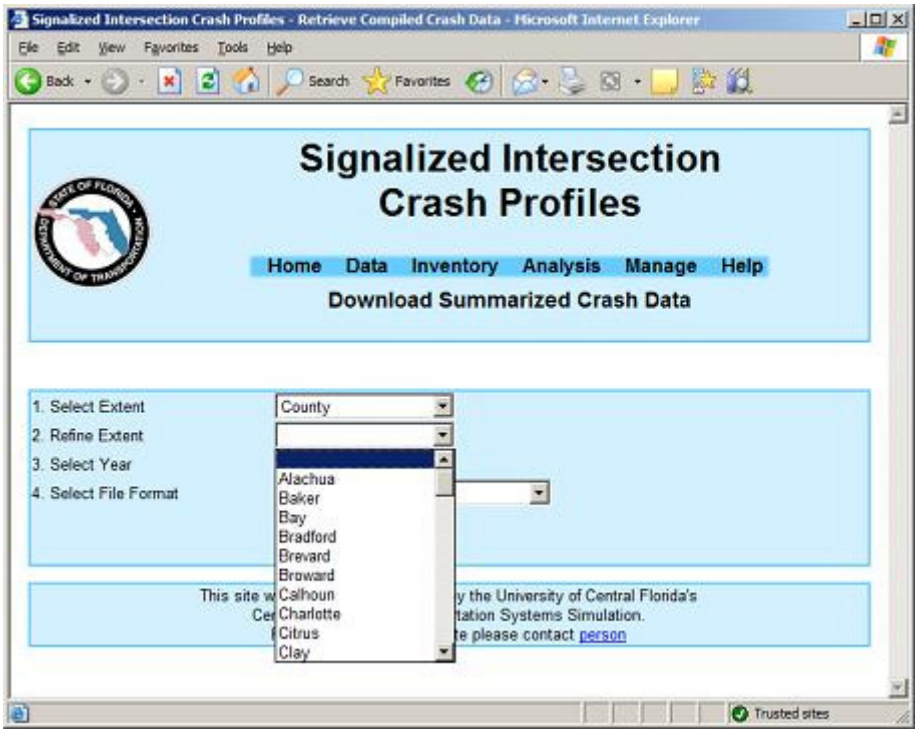
C. Data Download

a. The summarized data that is stored in the database may be downloaded for other analyses. Data may be downloaded in two plain-text formats. They are Comma Separated Values

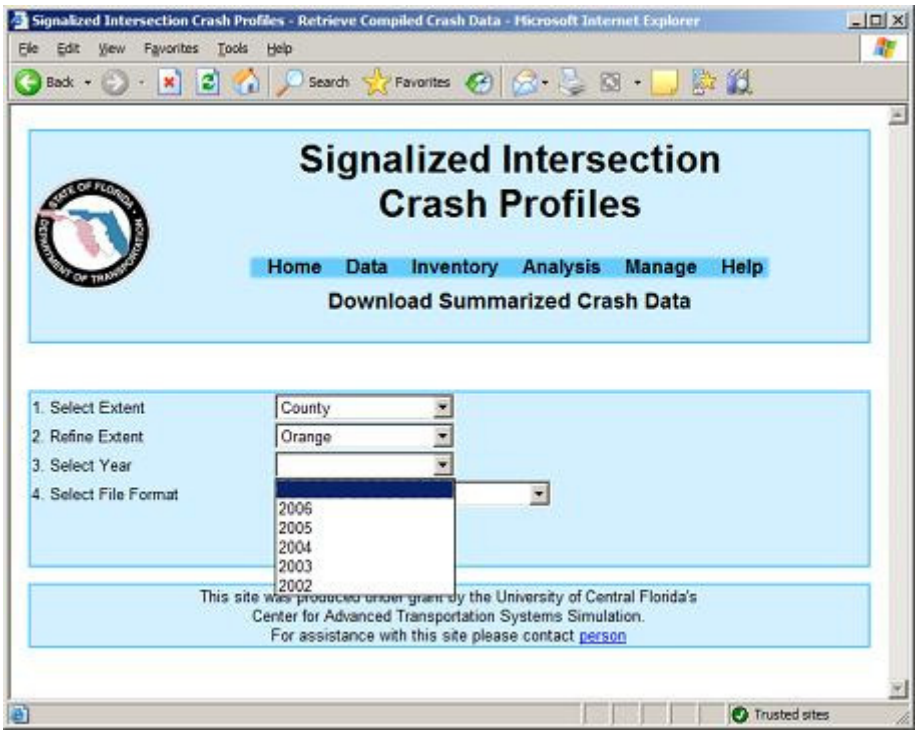
(CSV) and Extensible Markup Language (XML)

To begin the download process, hover over 'Data' in the menu bar then select 'Download Summarized Crash Data' from the drop down menu that appears. Select County, District or State from the first drop down list.

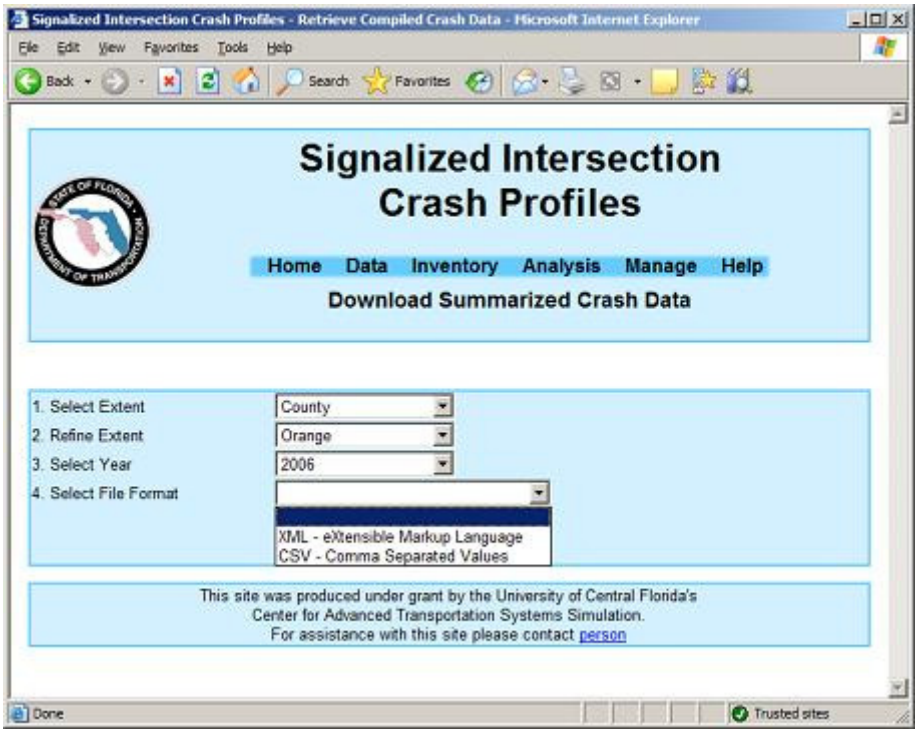
b. The second drop down list will be populated based on the selection you made with the first drop down list. Note that if you selected State with the first drop down list, there will be no choices other than 'State' available in the second.



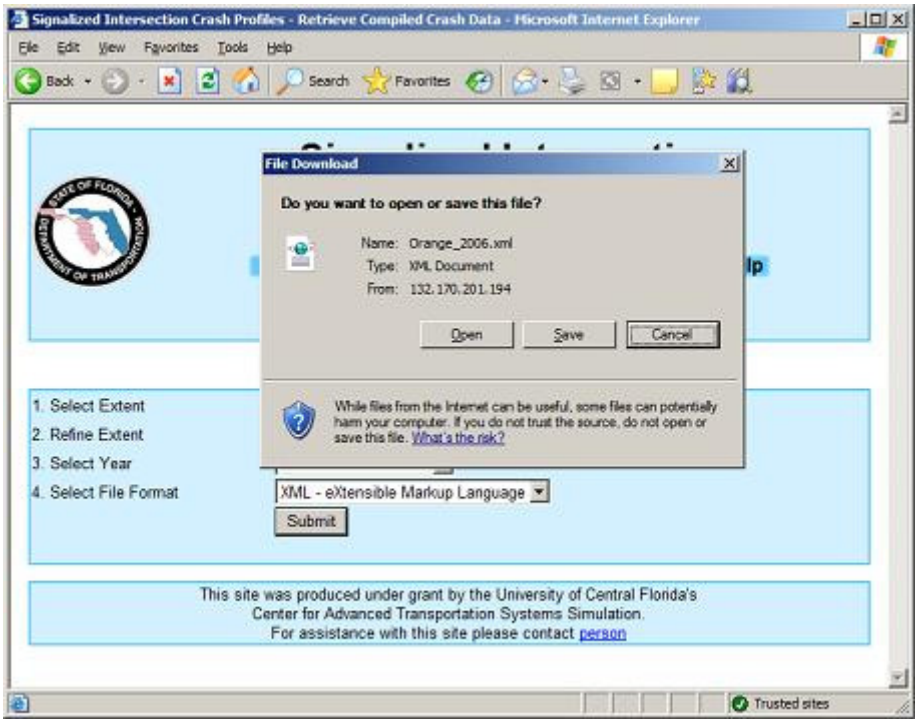
c. Use the third drop down list to select which year of data to download.



d. Use the fourth drop down list to select which file format you want the data saved.



e. Click "Submit" to start the download. The file will be automatically named based on the extent and year selected.



D. Upload Intersections

a. Hover over 'Data' on the menu bar then select 'Upload Intersections' from the drop down menu that appears.
b. Although an individual intersection may be added to the database using this site, it may be more productive to bulk upload several intersections at one time. A sample upload file may be downloaded so that you may see the required format for the input file.

   The file must be in CSV format. Although a header row is not necessary, the data columns **MUST** be in this order:
   i. County ID - FDOT 2 digit identifier for each county
   ii. Node Number - FDOT 5 digit identifier for each intersection
   iii. Legs - Either "3" or "4" depending on if it is a T intersection or not, respectively.
   iv. Road 1 Name - Must be the state road if only one of the roads included is a state road.
   v. Road 1 Milepoint - The milepoint along Road 1 where this intersection occurs.
   vi. Road 1 Thru Lanes - Number of thru lanes in both directions on Road 1.
   vii. Road 1 AADT - The AADT for all through lanes on Road 1.
   viii. Road 1 Speed Limit - The speed limit posted for Road 1.
   ix. Road 1 Usage - Indicate how the roadway is used. Valid values are:
      - 1 = One Way
      - 2 = Two Way
      - 3 = Ramp
   x. Road 2 Name
   xi. Road 2 Milepoint - If not available be sure to leave an empty space.
   xii. Road 2 Thru Lanes - Number of thru lanes in both directions on Road 2.

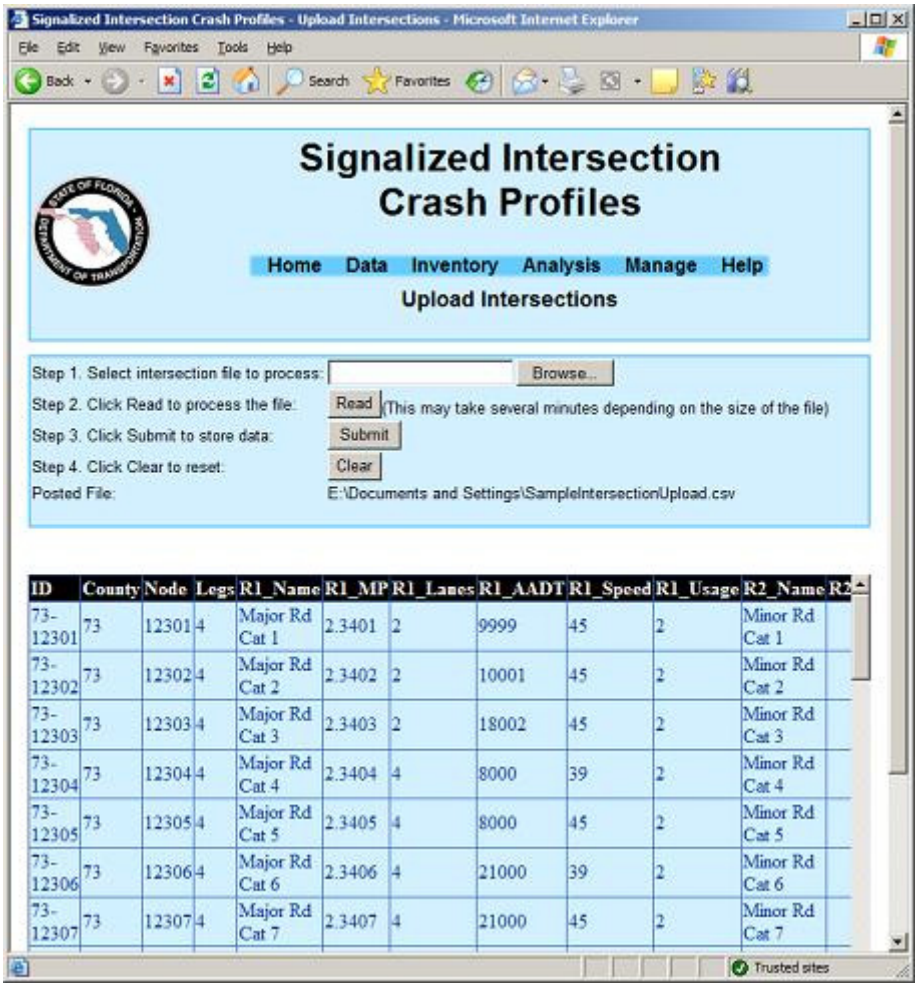
xiii. Road 2 AADT - If available, the AADT for all through lanes on Road 2.
xiv. Road 2 Speed Limit - The speed limit posted for Road 2.
xv. Road 2 Usage - See Road 1 Usage above.
xvi. Year - The first year that the configuration and traffic information provided for this intersection is valid.

c. Click the Browse button and select the file that you want to upload. Click the Read button to process the selected file. You will see a grid display on the web page with the data read from the file.

Two new columns are displayed. The first is the ID which is composed of the County ID and Node Number. The second new column (which appears last in the grid and can be viewed by using the scroll bars) is the Category.

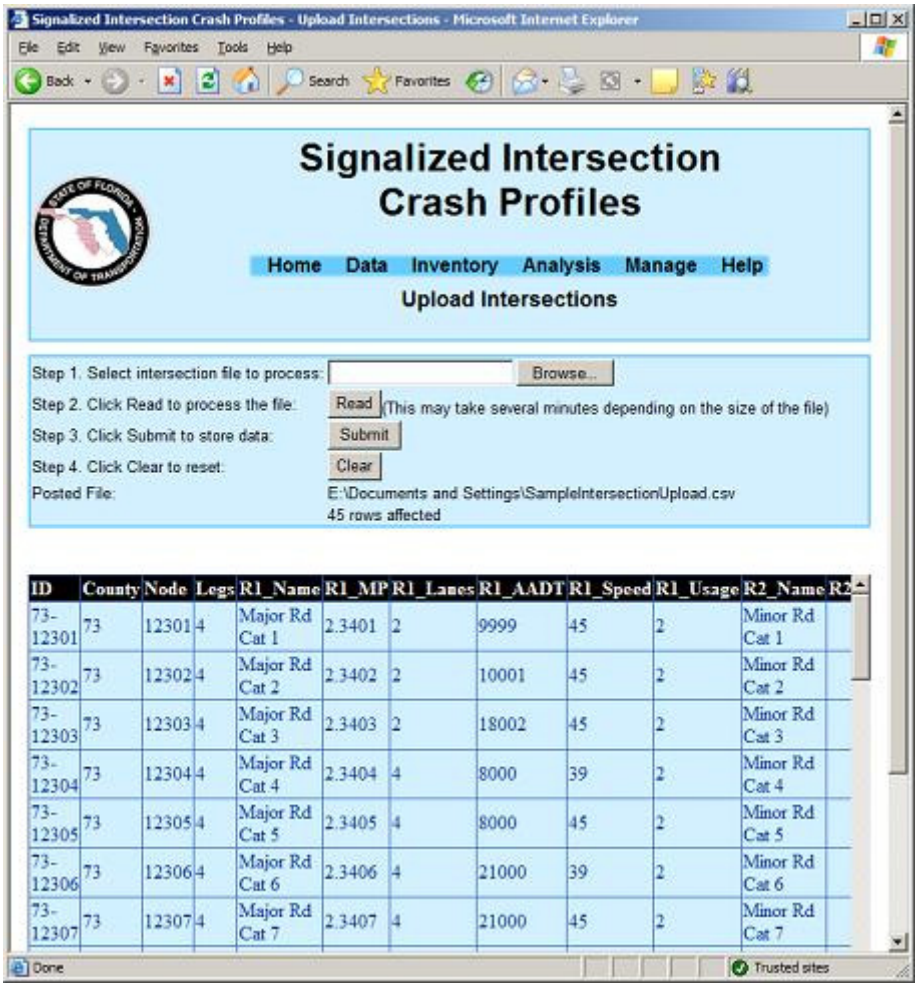
The path and name of the selected file is displayed below the Submit Button. If you

selected the wrong file, click the Clear button to remove the data and the file.



ID	County	Node	Legs	R1_Name	R1_MP	R1_Lanes	R1_AADT	R1_Speed	R1_Usage	R2_Name	R2
73-12301	73	12301	4	Major Rd Cat 1	2.3401	2	9999	45	2	Minor Rd Cat 1	
73-12302	73	12302	4	Major Rd Cat 2	2.3402	2	10001	45	2	Minor Rd Cat 2	
73-12303	73	12303	4	Major Rd Cat 3	2.3403	2	18002	45	2	Minor Rd Cat 3	
73-12304	73	12304	4	Major Rd Cat 4	2.3404	4	8000	39	2	Minor Rd Cat 4	
73-12305	73	12305	4	Major Rd Cat 5	2.3405	4	8000	45	2	Minor Rd Cat 5	
73-12306	73	12306	4	Major Rd Cat 6	2.3406	4	21000	39	2	Minor Rd Cat 6	
73-12307	73	12307	4	Major Rd Cat 7	2.3407	4	21000	45	2	Minor Rd Cat 7	

d. If all information is correct, click the Submit button to add these intersections to the database. A statement will appear under the filename stating how many intersections were uploaded into the database.



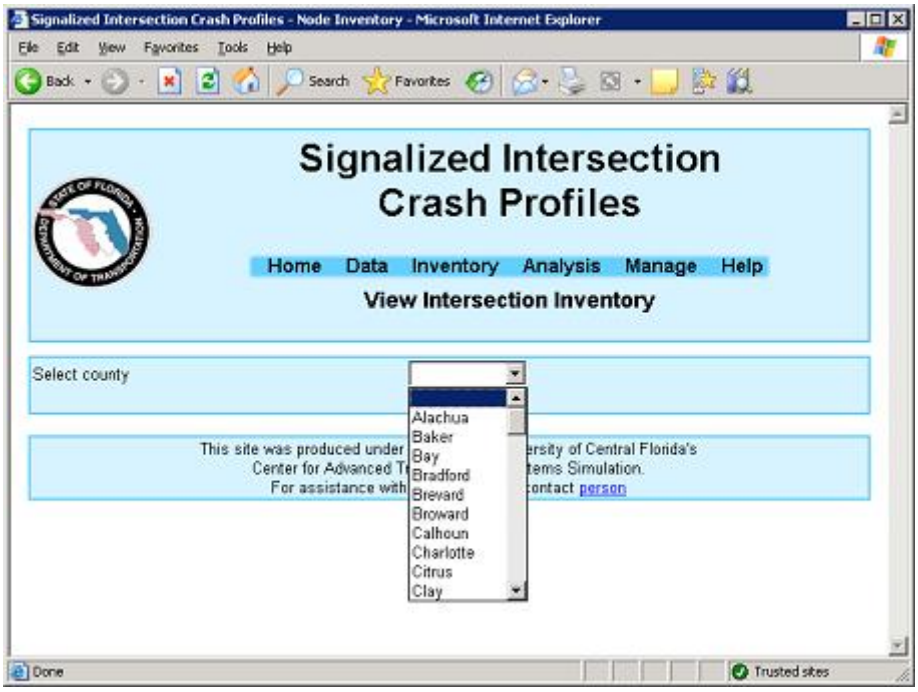
ID	County	Node	Legs	R1_Name	R1_MP	R1_Lanes	R1_AADT	R1_Speed	R1_Usage	R2_Name	R2
73-12301	73	12301	4	Major Rd Cat 1	2.3401	2	9999	45	2	Minor Rd Cat 1	
73-12302	73	12302	4	Major Rd Cat 2	2.3402	2	10001	45	2	Minor Rd Cat 2	
73-12303	73	12303	4	Major Rd Cat 3	2.3403	2	18002	45	2	Minor Rd Cat 3	
73-12304	73	12304	4	Major Rd Cat 4	2.3404	4	8000	39	2	Minor Rd Cat 4	
73-12305	73	12305	4	Major Rd Cat 5	2.3405	4	8000	45	2	Minor Rd Cat 5	
73-12306	73	12306	4	Major Rd Cat 6	2.3406	4	21000	39	2	Minor Rd Cat 6	
73-12307	73	12307	4	Major Rd Cat 7	2.3407	4	21000	45	2	Minor Rd Cat 7	

II. Inventory

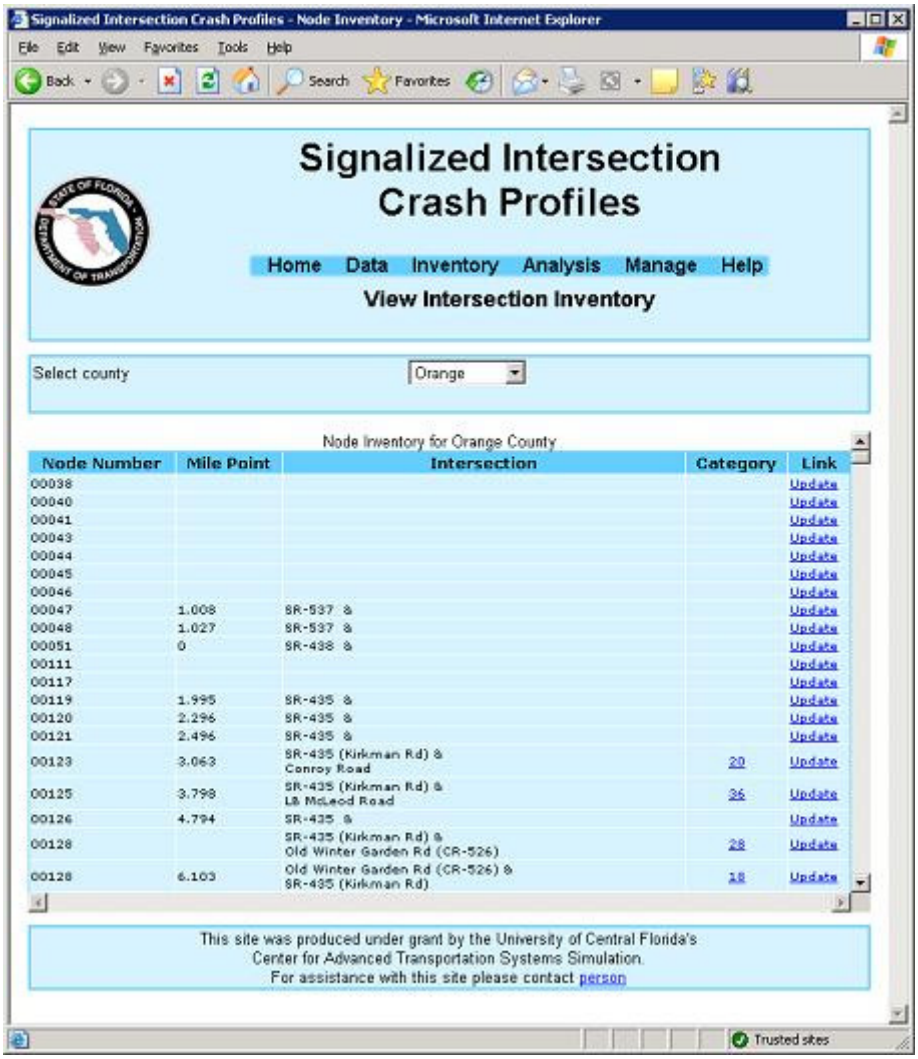
A. Node Inventory

a. Hover over 'Inventory' on the menu bar then select 'View Intersections' from the drop down menu that appears.

b. Use the drop down list provided to select a county.



c. After selecting a county, the page will refresh and list all the known state road signalized intersections.



The information provided in this table includes:

- Node Number
- Mile Point
- Intersection (Major Road & Minor Road)
- Category (hyperlinked to a description of the category)
- Update Link (will take you to a page in which you can update the information for that intersection)

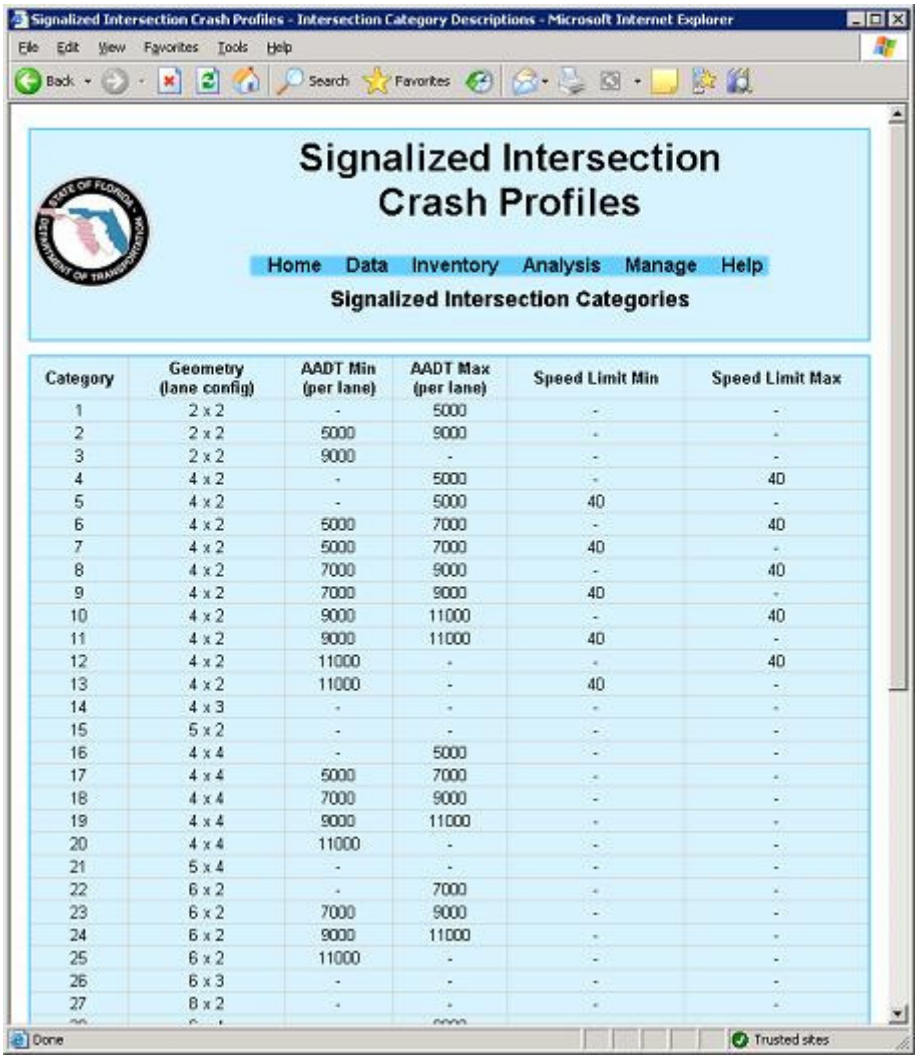
The information provided in this table comes from both crash record data and intersection data. If a row in the table has no Mile Point, Intersection or Category information, it is due to there being crash

records for intersections that have not yet been categorized. If you have the necessary information to classify any of these intersections, you can click the accompanying Update link.

B. View Categories

a. Hover over 'Inventory' on the menu bar then select 'View Categories' from the drop down menu that appears.

b. This page displays the categories and the criteria used to identify an intersection within that category.



Category	Geometry (lane config)	AADT Min (per lane)	AADT Max (per lane)	Speed Limit Min	Speed Limit Max
1	2 x 2	-	5000	-	-
2	2 x 2	5000	9000	-	-
3	2 x 2	9000	-	-	-
4	4 x 2	-	5000	-	40
5	4 x 2	-	5000	40	-
6	4 x 2	5000	7000	-	40
7	4 x 2	5000	7000	40	-
8	4 x 2	7000	9000	-	40
9	4 x 2	7000	9000	40	-
10	4 x 2	9000	11000	-	40
11	4 x 2	9000	11000	40	-
12	4 x 2	11000	-	-	40
13	4 x 2	11000	-	40	-
14	4 x 3	-	-	-	-
15	5 x 2	-	-	-	-
16	4 x 4	-	5000	-	-
17	4 x 4	5000	7000	-	-
18	4 x 4	7000	9000	-	-
19	4 x 4	9000	11000	-	-
20	4 x 4	11000	-	-	-
21	5 x 4	-	-	-	-
22	6 x 2	-	7000	-	-
23	6 x 2	7000	9000	-	-
24	6 x 2	9000	11000	-	-
25	6 x 2	11000	-	-	-
26	6 x 3	-	-	-	-
27	8 x 2	-	-	-	-

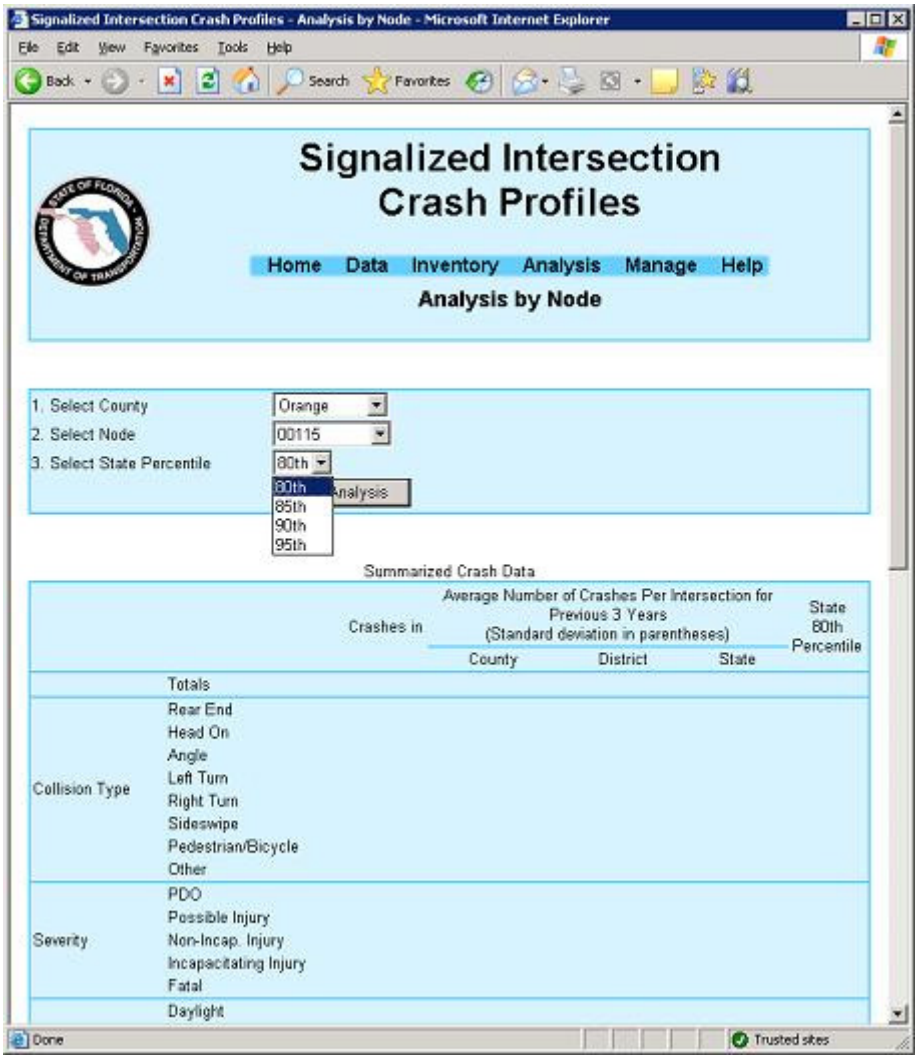
III. Analysis

A. Node

a. To perform an intersection analysis based on the node number, hover over 'Analysis' on the menu bar then select 'Node' from the drop down menu that appears. To select an intersection by node, first select the county from the first drop down list. Only counties that have categorized intersections will appear in this list.

b. Select the node number from the second drop down list. Only categorized intersections will appear in this list.

c. Select the State Percentile.



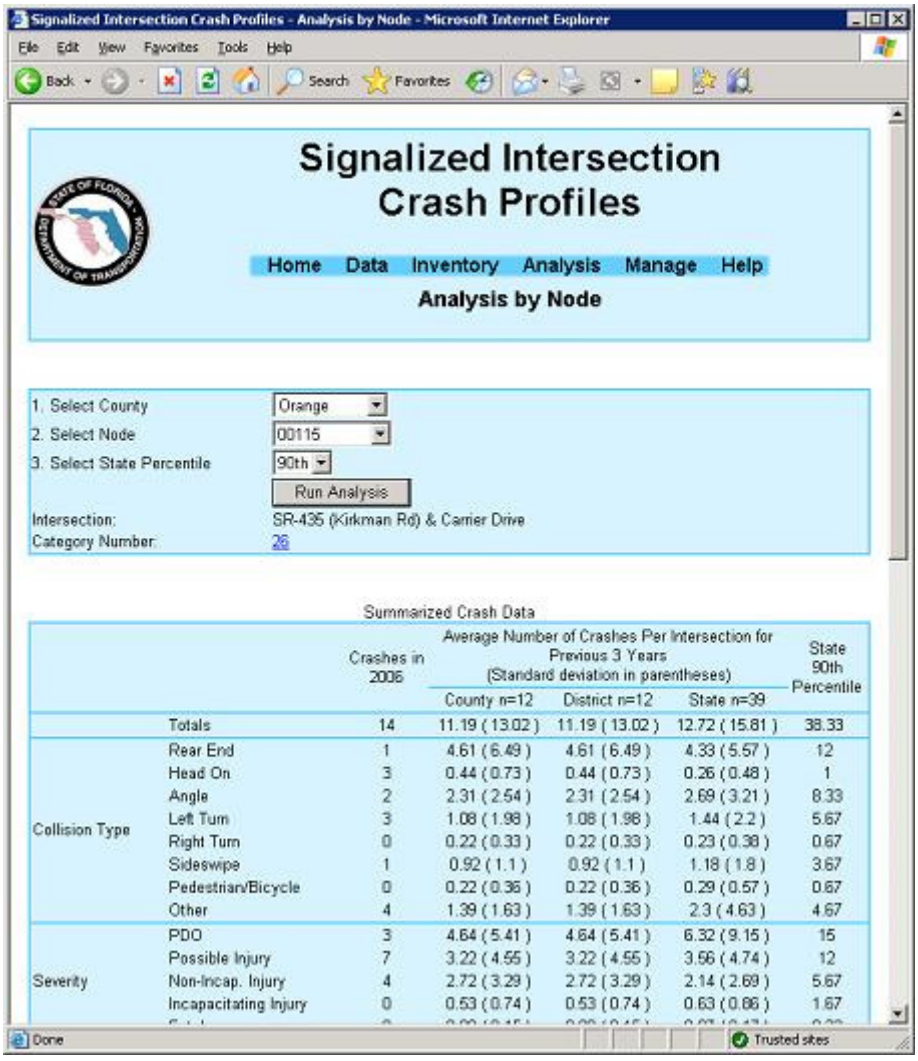
d. Click the Run Analysis button to populate the table. For verification, the roadway names corresponding to the node will be displayed.

The output columns include:

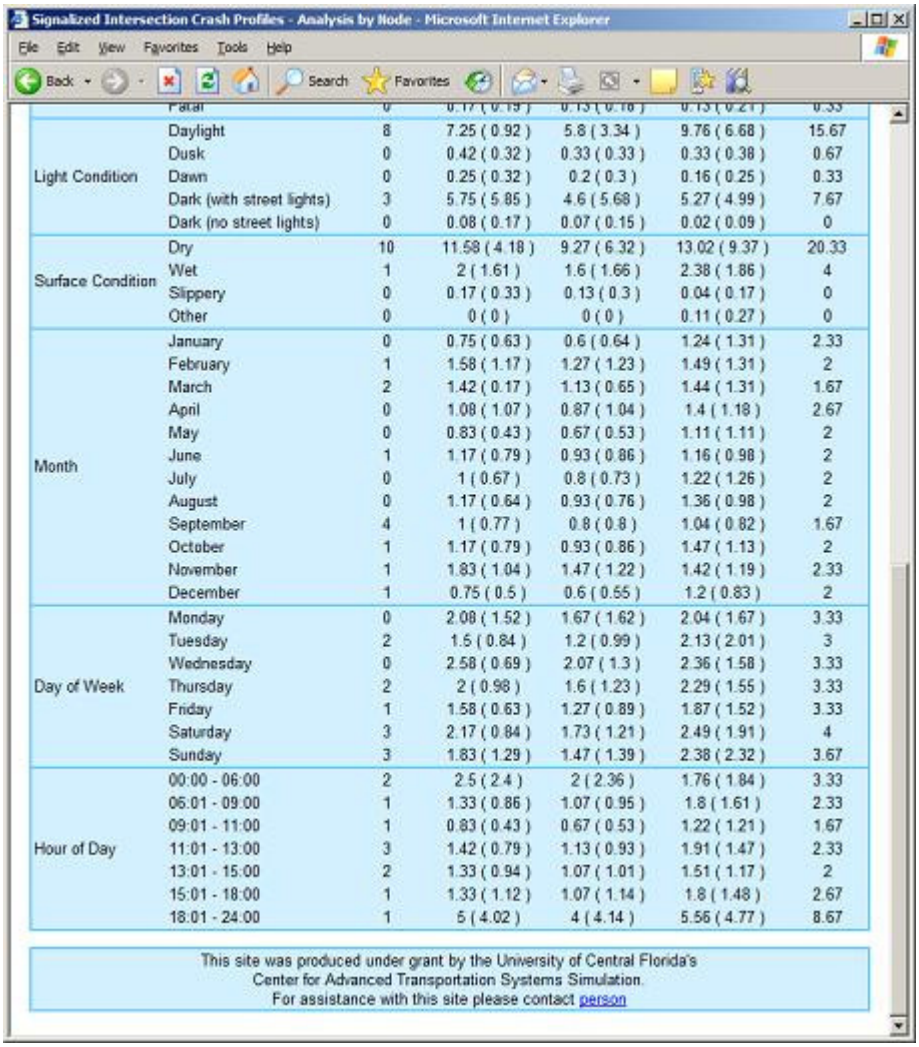
- Grouped totals based on data entered in the accident report forms
- Sum of the number of collisions for that intersection in the most recent year that data has been entered.
- Average number of collisions for the same county, same district and state over the previous three years for intersections that are

the same category as the selected intersection. The standard deviation is represented within the parentheses. n is the number of intersections in each region that are in the same category.

- The selected percentile.



e. Scroll down on the page to see all of the analysis results.



	Fatal	0	0.17 (0.15)	0.13 (0.16)	0.13 (0.21)	0.33
Light Condition	Daylight	8	7.25 (0.92)	5.8 (3.34)	9.76 (6.68)	15.67
	Dusk	0	0.42 (0.32)	0.33 (0.33)	0.33 (0.38)	0.67
	Dawn	0	0.25 (0.32)	0.2 (0.3)	0.16 (0.25)	0.33
	Dark (with street lights)	3	5.75 (5.85)	4.6 (5.68)	5.27 (4.99)	7.67
	Dark (no street lights)	0	0.08 (0.17)	0.07 (0.15)	0.02 (0.09)	0
Surface Condition	Dry	10	11.58 (4.18)	9.27 (6.32)	13.02 (9.37)	20.33
	Wet	1	2 (1.61)	1.6 (1.66)	2.38 (1.86)	4
	Slippery	0	0.17 (0.33)	0.13 (0.3)	0.04 (0.17)	0
	Other	0	0 (0)	0 (0)	0.11 (0.27)	0
Month	January	0	0.75 (0.63)	0.6 (0.64)	1.24 (1.31)	2.33
	February	1	1.58 (1.17)	1.27 (1.23)	1.49 (1.31)	2
	March	2	1.42 (0.17)	1.13 (0.65)	1.44 (1.31)	1.67
	April	0	1.08 (1.07)	0.87 (1.04)	1.4 (1.18)	2.67
	May	0	0.83 (0.43)	0.67 (0.53)	1.11 (1.11)	2
	June	1	1.17 (0.79)	0.93 (0.86)	1.16 (0.98)	2
	July	0	1 (0.67)	0.8 (0.73)	1.22 (1.26)	2
	August	0	1.17 (0.64)	0.93 (0.76)	1.36 (0.98)	2
	September	4	1 (0.77)	0.8 (0.8)	1.04 (0.82)	1.67
	October	1	1.17 (0.79)	0.93 (0.86)	1.47 (1.13)	2
	November	1	1.83 (1.04)	1.47 (1.22)	1.42 (1.19)	2.33
	December	1	0.75 (0.5)	0.6 (0.55)	1.2 (0.83)	2
Day of Week	Monday	0	2.08 (1.52)	1.67 (1.62)	2.04 (1.67)	3.33
	Tuesday	2	1.5 (0.84)	1.2 (0.99)	2.13 (2.01)	3
	Wednesday	0	2.58 (0.69)	2.07 (1.3)	2.36 (1.58)	3.33
	Thursday	2	2 (0.98)	1.6 (1.23)	2.29 (1.55)	3.33
	Friday	1	1.58 (0.63)	1.27 (0.89)	1.87 (1.52)	3.33
	Saturday	3	2.17 (0.84)	1.73 (1.21)	2.49 (1.91)	4
	Sunday	3	1.83 (1.29)	1.47 (1.39)	2.38 (2.32)	3.67
Hour of Day	00:00 - 06:00	2	2.5 (2.4)	2 (2.36)	1.76 (1.84)	3.33
	06:01 - 09:00	1	1.33 (0.86)	1.07 (0.95)	1.8 (1.61)	2.33
	09:01 - 11:00	1	0.83 (0.43)	0.67 (0.53)	1.22 (1.21)	1.67
	11:01 - 13:00	3	1.42 (0.79)	1.13 (0.93)	1.91 (1.47)	2.33
	13:01 - 15:00	2	1.33 (0.94)	1.07 (1.01)	1.51 (1.17)	2
	15:01 - 18:00	1	1.33 (1.12)	1.07 (1.14)	1.8 (1.48)	2.67
	18:01 - 24:00	1	5 (4.02)	4 (4.14)	5.56 (4.77)	8.67

B. Intersection

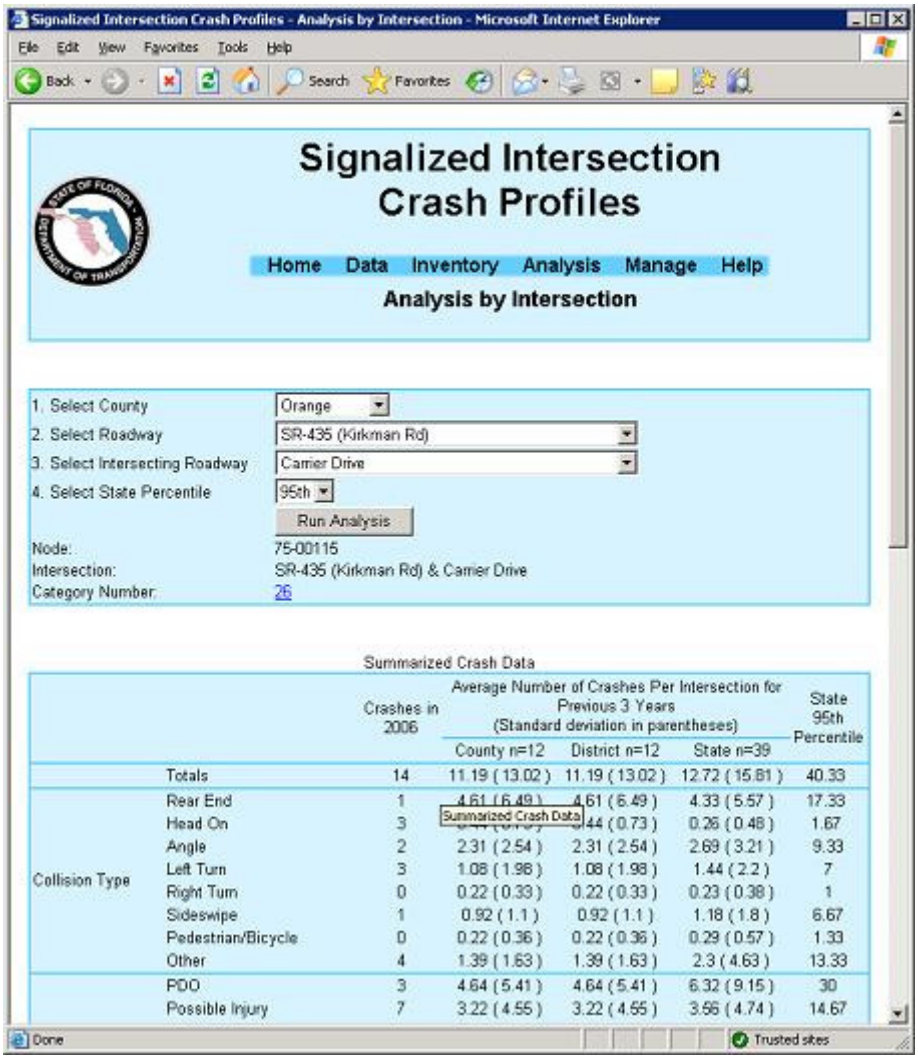
a. To perform an intersection analysis based on roadway names, hover over 'Analysis' on the menu bar then select 'Intersection' from the drop down menu that appears. To select an intersection by roadway names first select the county from the first drop down list. Only counties that have categorized intersections will appear in this list.

b. Next, select the first roadway name from the second drop down list.

c. Next, select the intersecting roadway from the third drop down list.

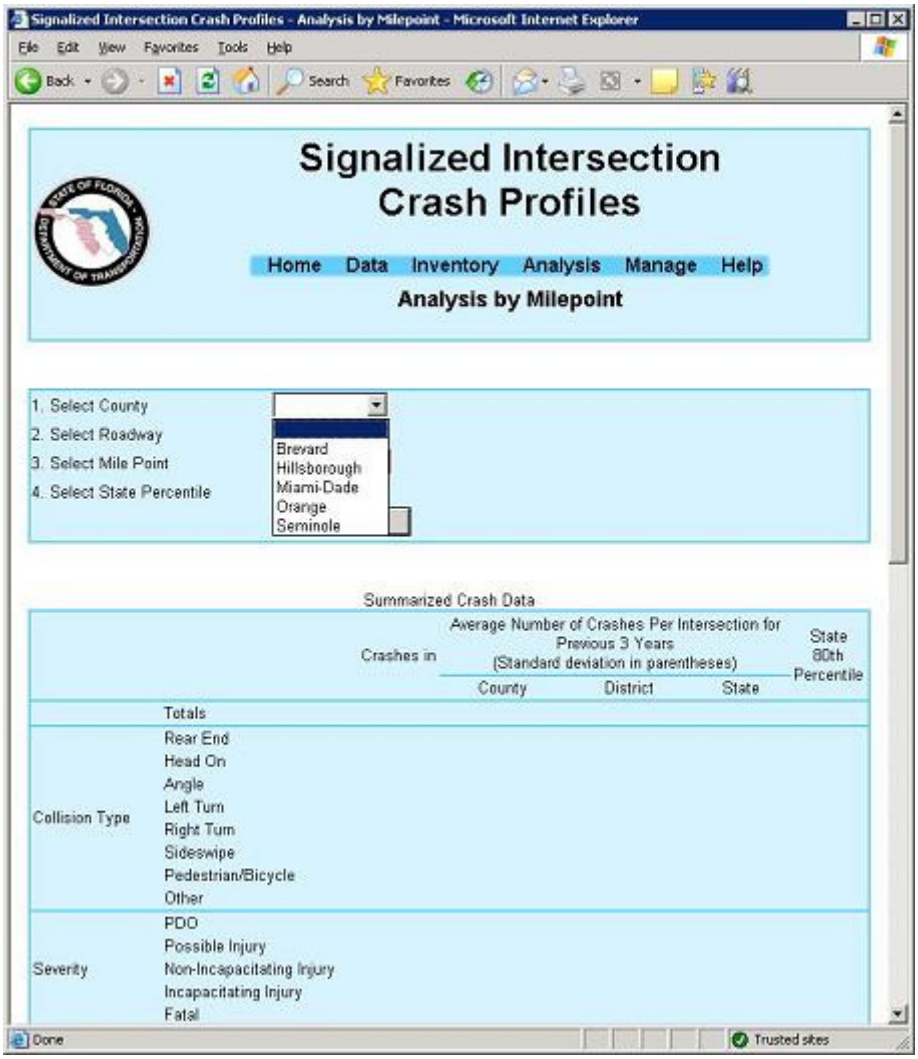
d. Select the State Percentile.

e. Click the Run Analysis button to populate the table. The node number, intersecting roads and category number are listed for confirmation. You may click on the category number to get a description. For description of the output, see analysis by node.

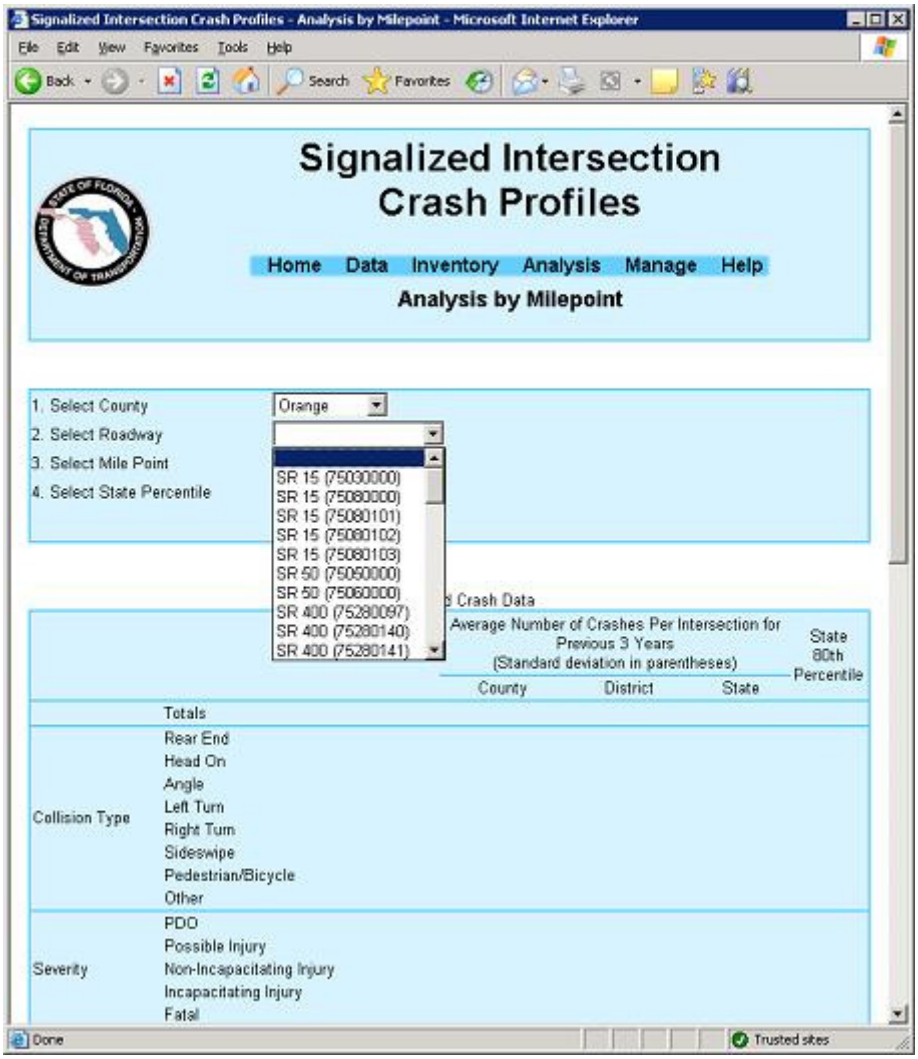


C. Mile Point

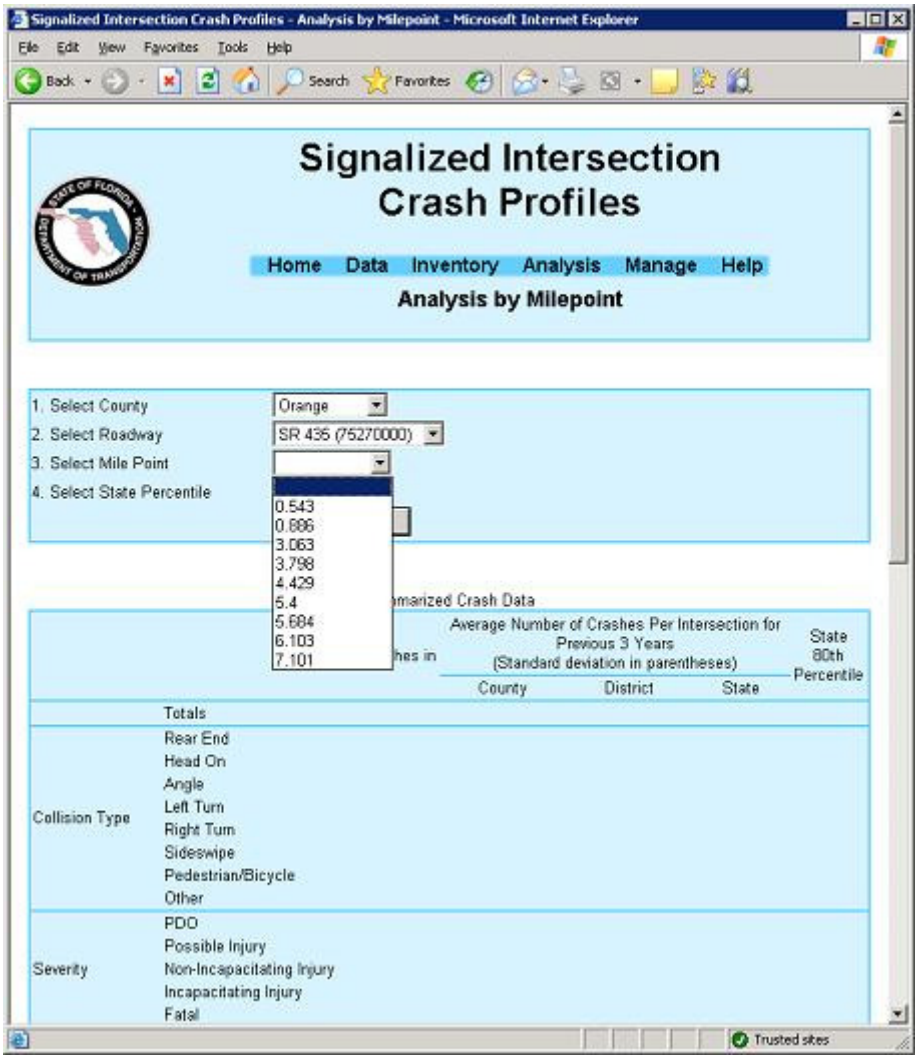
a. To perform an intersection analysis based on milepoint, hover over 'Analysis' on the menu bar then select 'Milepoint' from the drop down menu that appears. To select an intersection by mile point, first select the county from the first drop down list. Only counties that have categorized intersections will appear in this list.



b. Next, select the desired roadway from the second drop down list. The list includes the roadway name and roadway ID in parentheses.

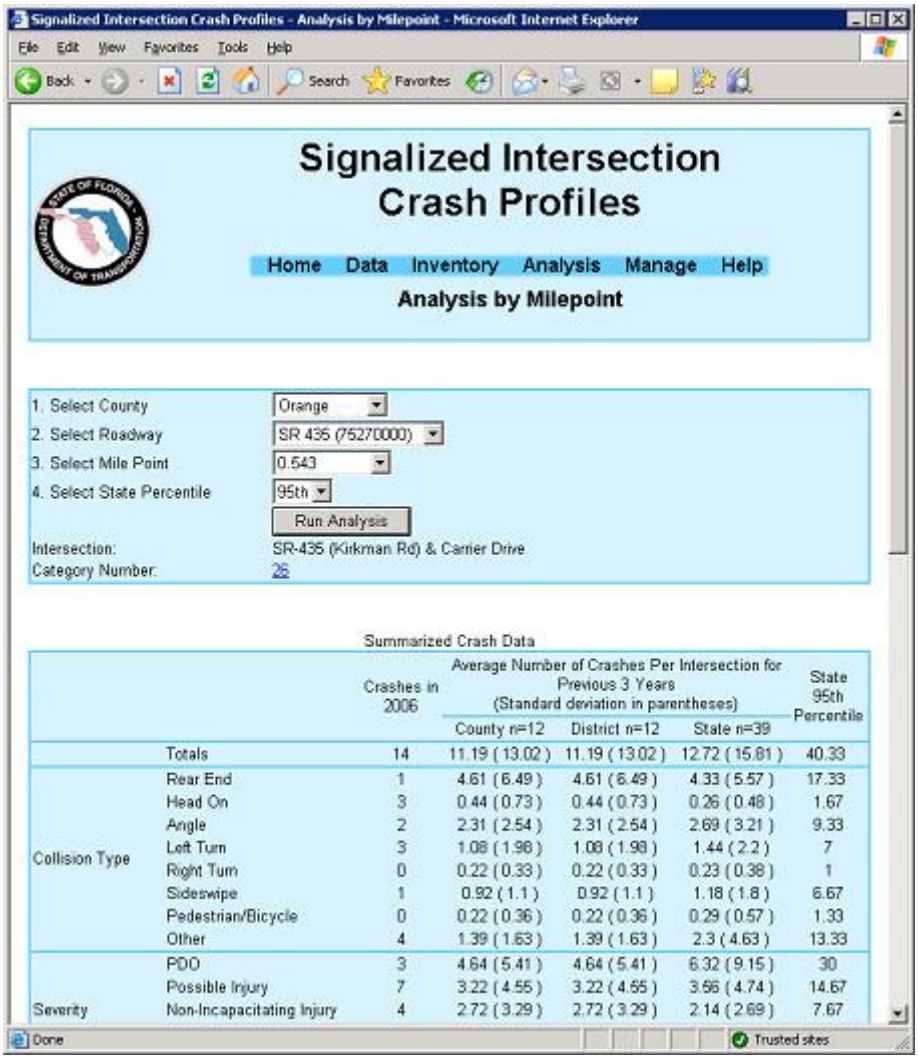


c. Select the mile point from the third drop down list.



d. Select the State Percentile.

e. Click the Run Analysis button to populate the table. The intersecting roads and category number are listed for confirmation. You may click on the category number to get a description. For description of the output, see analysis by node.



IV. Manage

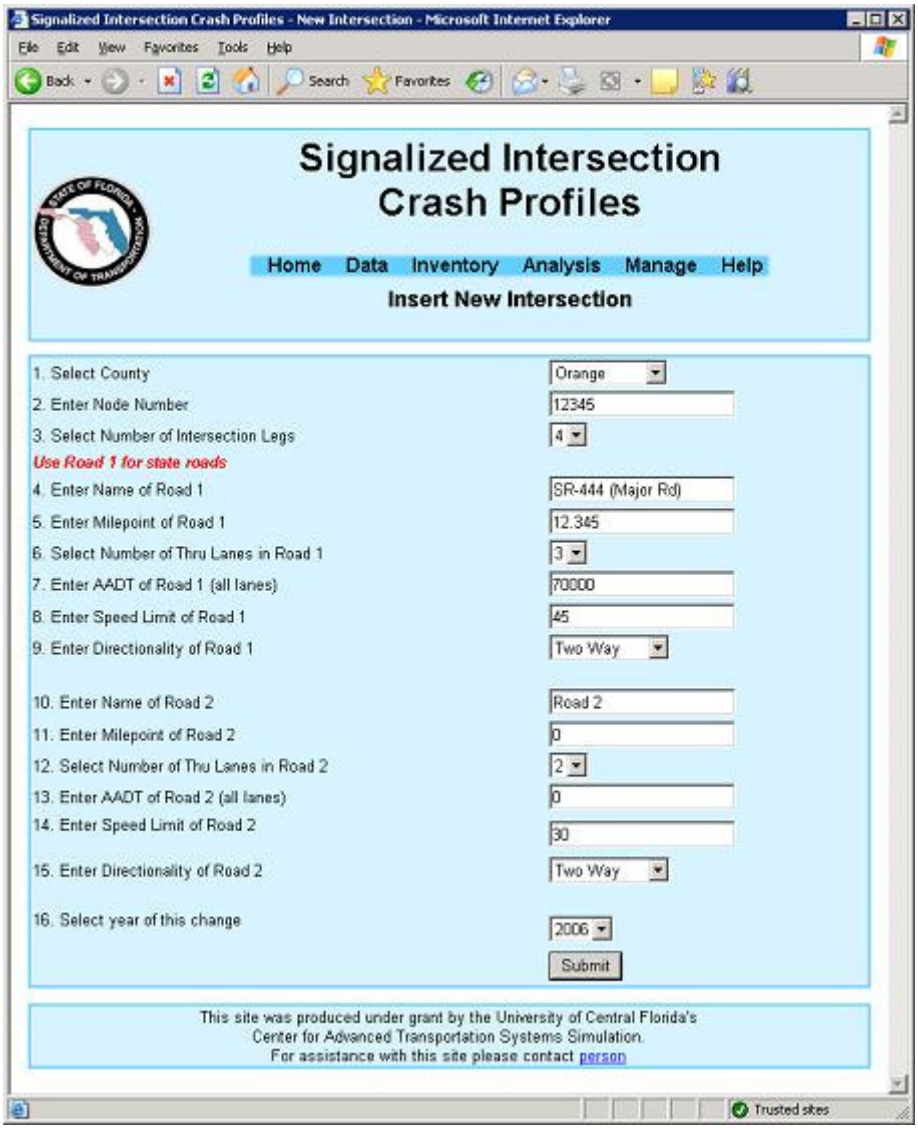
A. New Intersection

This interface is used to categorize an intersection for the first time or for when an intersection becomes signalized. A node is any signalized intersection involving a state road.

a. To enter a new intersection, hover over 'Manage' on the menu bar then click 'New Intersection' from the drop down menu that appears. Fill in the form with the information you have available. Some of the fields are required and you will not be able to enter any information without them.

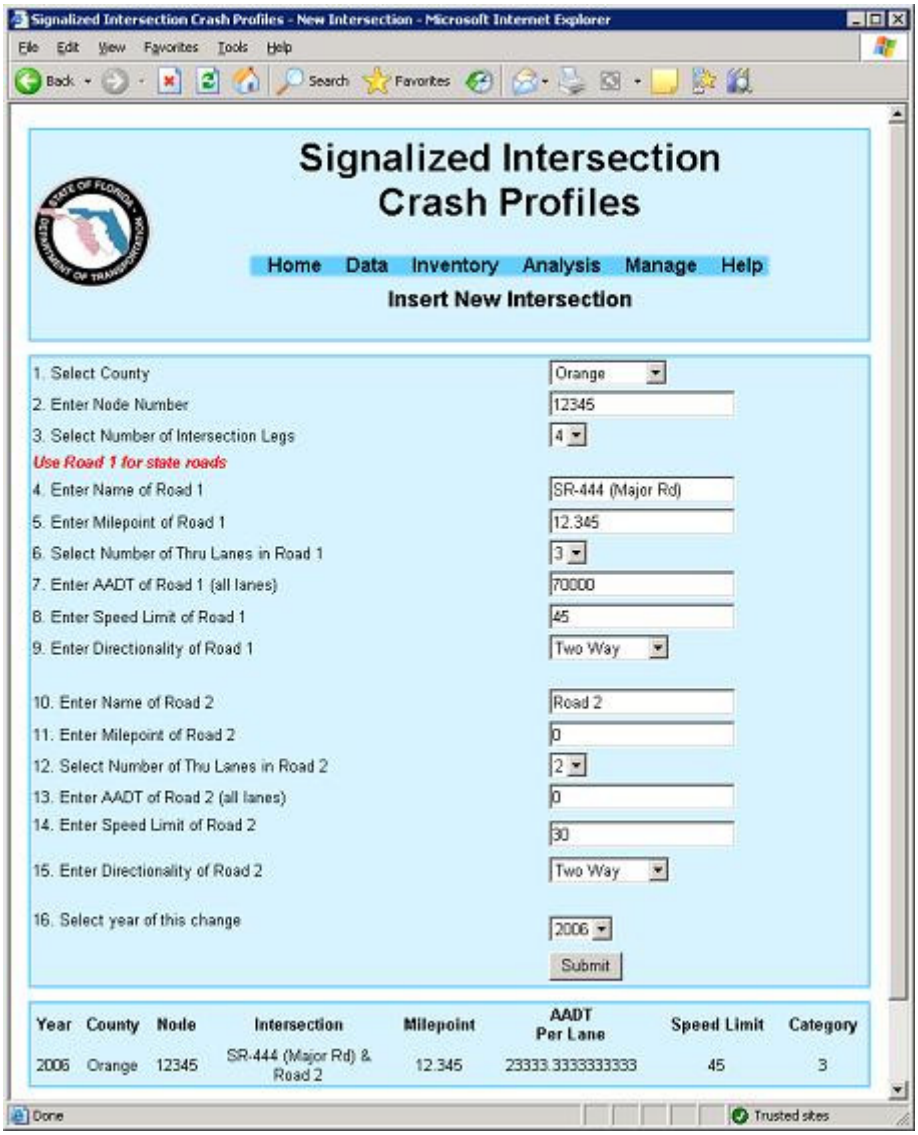
1. Select County
2. Enter Node Number: A 5 digit number used by FDOT to identify an intersection.
3. Select Number of Intersecting Legs: 3 legs represents a "T" intersection while 4 legs represents a full intersection.
4. Enter Name of Road 1: If only one of the roadways in the intersection is a State Road, Road 1 **MUST** be used for the State Road. Use the following formatting convention for the name: *SR-XXX (Name)*. Since State Roads change names along their length, enter the alternate name used for the state road at that intersection.
5. Enter Milepoint of Road 1: Use the FDOT designated milepoint for this intersection.
6. Select Number of Thru Lanes in Road 1: This is the total number of thru lanes in both directions in Road 1.
7. Enter AADT of Road 1: Enter the AADT for Road 1 for all thru lanes.
8. Enter Speed Limit of Road 1: Enter the posted speed limit for Road 1.
9. Enter Directionality of Road 1: Indicated if Road 1 is One Way, Two Way or an On/Off Ramp.
10. Enter Name of Road 2: Use the same formatting convention as Road 1 if Road 2 is a state road.
11. Enter Milepoint of Road 2: If Road 2 is a state road, enter the FDOT designated milepoint.
12. Select Number of Thru Lanes in Road 2: This is the total number of thru lanes in both directions in Road 2.
13. Enter AADT of Road 2: Enter the AADT for Road 2 for all thru lanes.
14. Enter Speed Limit of Road 2: Enter the posted speed limit for Road 2.

15. Enter Directionality of Road 2: Indicated if the Road 2 is One Way, Two Way or an On/Off Ramp.
16. Select year of this change: Select the first year that the entered information applied to this intersection.
17. Click the Submit button.



b. After submitting the information, a table will appear below that repeats some of the information entered but will also show the per lane AADT and how this intersection has been categorized. If any information was entered

incorrectly, you should use the Update Intersection page.

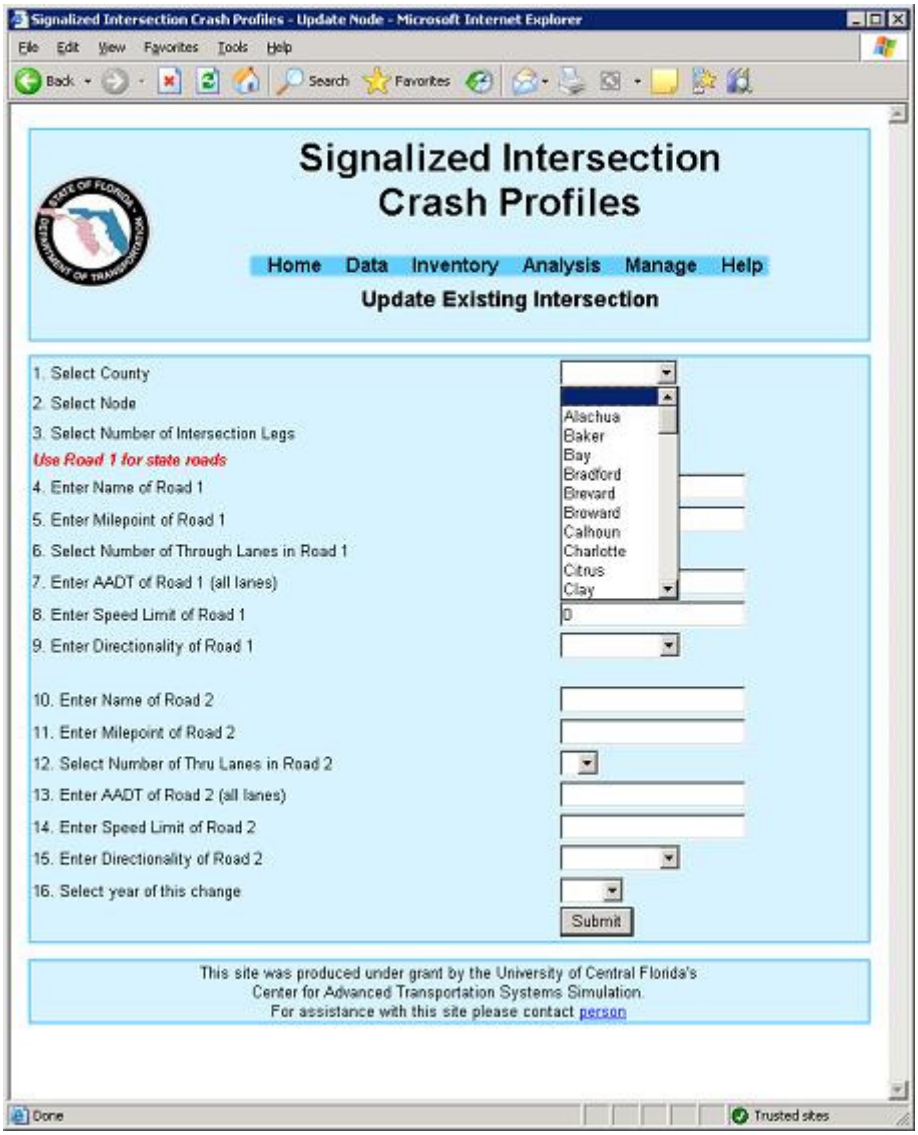


B. Update Intersection

a. To update the information for a specific intersection, hover over 'Manage' on the menu then select 'Update Intersection' from the drop down menu that appears. Select the county from the first drop down list. The second drop down list will automatically update the nodes based on the county selected.

If you do not know the node number for the

intersection that you want to modify, you can select the intersection from the inventory portion of the web site.

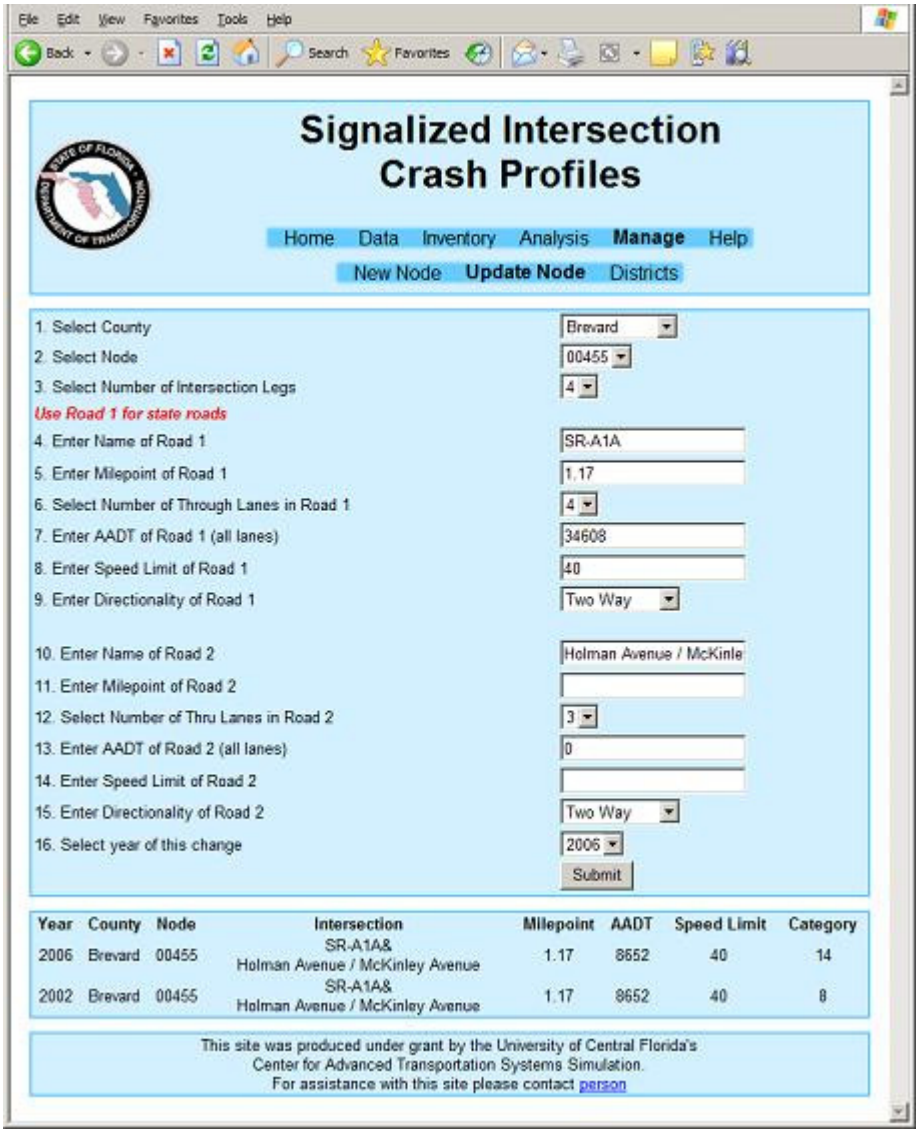


b. After selecting the node number, the fields will auto-populate with information already stored for that intersection. Some intersections have minimal information and have not been categorized yet.

Enter the information as described in the New Node section above.

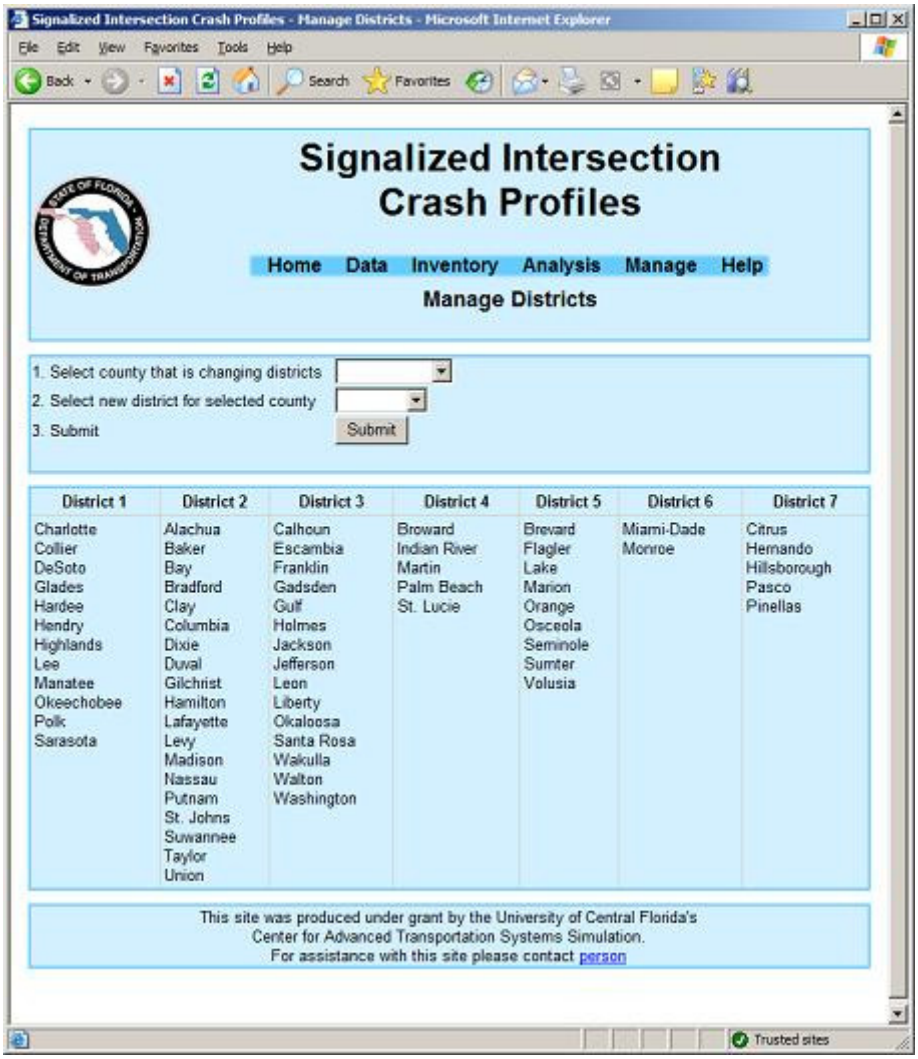
If you are correcting information already entered, be sure to have the appropriate year selected, otherwise a new row will be entered into the database.

c. After submitting, the output table below will update with the changes.

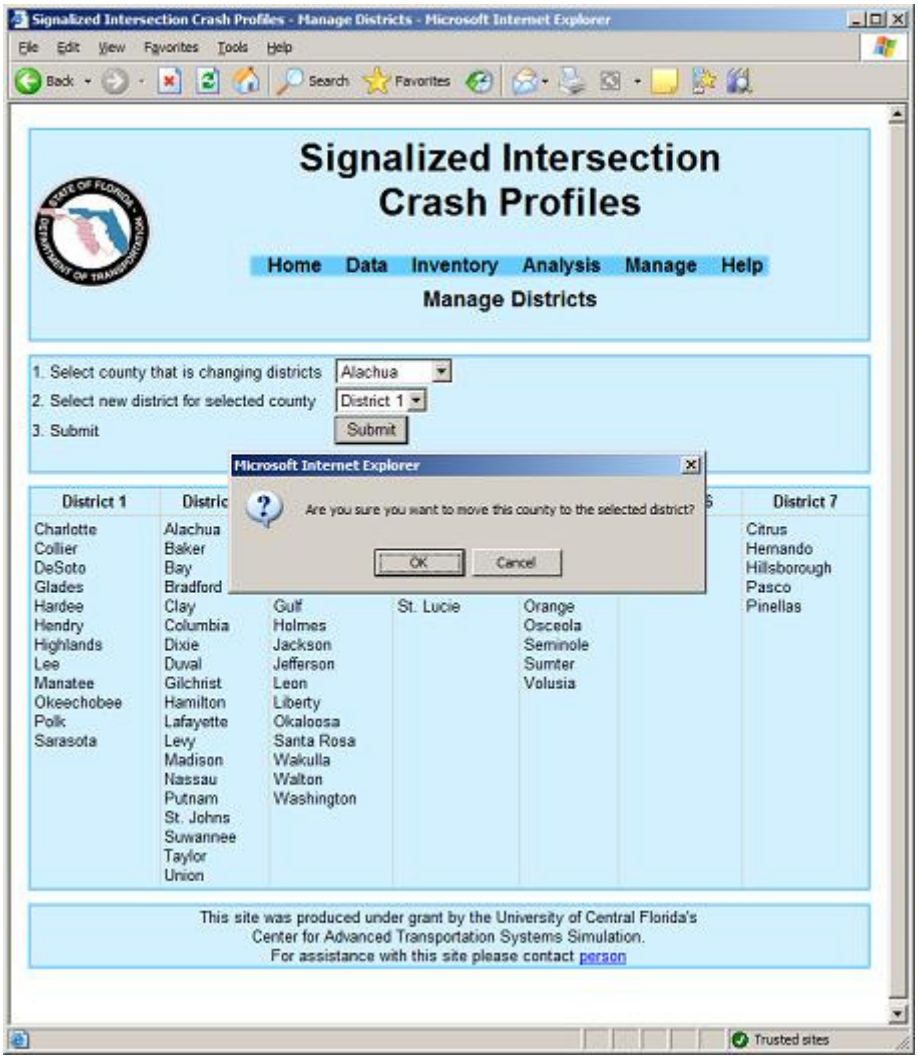


C. Manage Districts

a. Since the analysis pages perform calculations based on district groupings, it is necessary to maintain the districts within this site. Should a county ever move from one district to another, use this page to perform this task.



b. To migrate a county from one district to another, select the county to be moved from the first drop down list.
c. Next, select the new district for the selected county.
d. Click Submit to make the change.
e. After clicking the submit button, you will be presented with a confirmation dialog. Click OK to confirm the move or Cancel to disable the move.



End of Appendix A