

Crash Magic Online

Training Notes



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2 Program Basics

This section covers the big picture for Crash Magic.

2.1 History

- Pd' Programming was founded in 1987 with the first release of the crash records analysis product "Intersection Magic".
- Our existing products include Crash Magic Online, Intersection Magic, Map Magic and the Magic Wands suite of programming tools.
- Crash Magic currently supports diagrams, charts, listings, cross-tabs, high crash location lists and data entry.
- Support for ArcGIS Server for generating pin maps in development.

2.2 Browser Based

- Crash Magic operates as a web server, providing reports to client browsers.
- The server that hosts Crash Magic maintains all generate reports, filters, settings, configuration information database connections, user information, etc.
- The client browser contains no unique data that needs to be backed up or configured.
- Any browser that can connect with the server can be used for analysis.
- SVG or Silverlight viewers provide interactive graphics
- Printing done through PDF download

2.3 Data flow through Crash Magic

Crash Magic connects directly to standard SQL databases including Oracle, MS SQL Server, DB2 and MySQL.

Most of our users have unique data. This means table layouts, relationships, list of fields, field meanings, and data structure. In order for the program to make use of your unique data, Crash Magic uses settings stored in several xml records. These records, when taken together are described as your "configuration". Preparation of this configuration is usually a part of the purchase of the program.

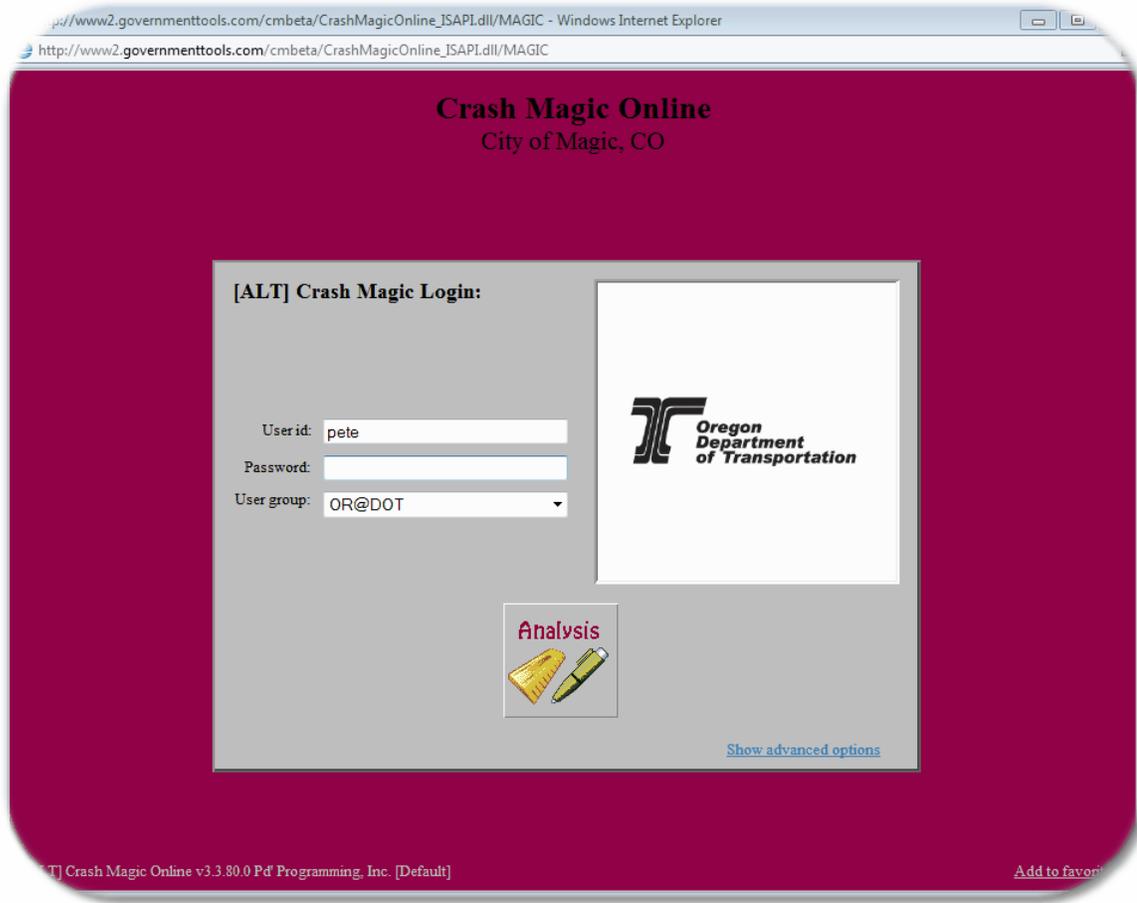
The access to crash data from the analysis side of the program is "read only". This means that there is no data conversion or even the possibility of changing your crash data from the analysis side of Crash Magic. While reading your crash data, the program uses "calculated fields" to "normalize" the data for use in the program.

In addition to the data to be analyzed, (crash data) Crash Magic requires a "system" database which holds configuration information as well as the projects, studies, reports, users and report settings. Users of the program do not typically address the system database directly.

2.4 Login

Crash Magic has been specifically designed to separate administrative tasks such as pre-defined report creation, standard template creation, user and group management, database queries and other "behind-the-scenes" program settings from the analysis portion of the program.

When logging in, the user may choose to enter the analysis side, (default) data entry, or "Show advanced options".



2.5 Projects and Home Page

Project Tree

Each Crash Magic user has a “tree” of information linked to their login. This tree contains studies, (the data) and reports attached to those studies.

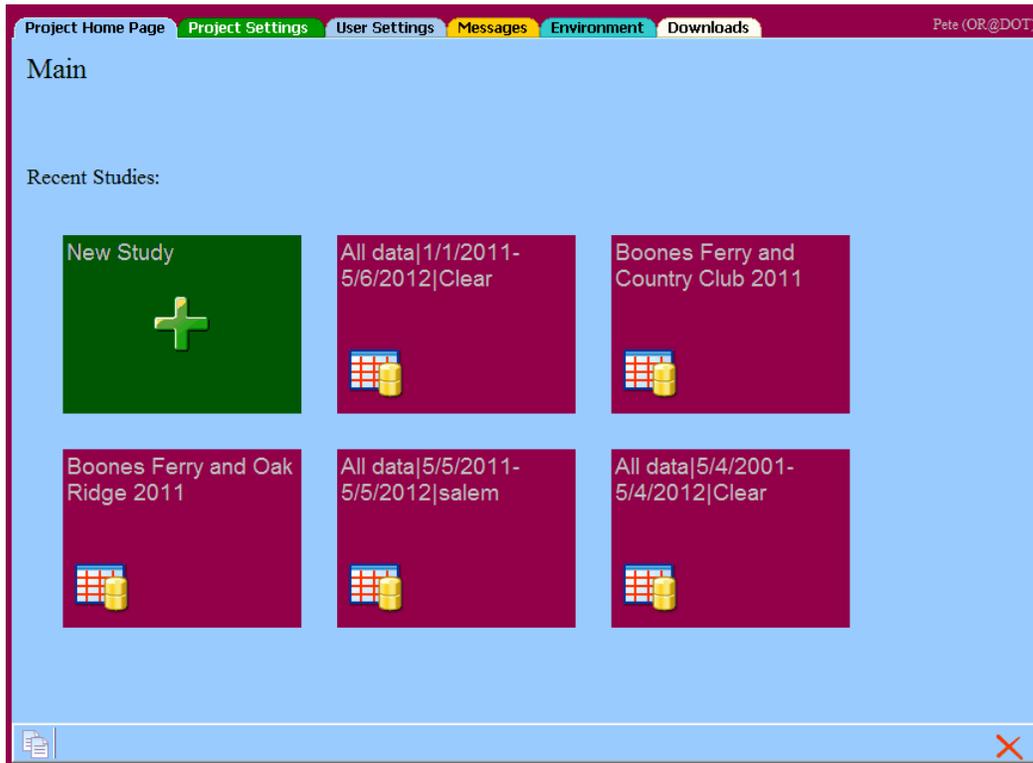


Your project tree is preserved between sessions and is available wherever you login from.

2.5.1 Home Page

The default page for Crash Magic is called the "Project page". This page contains references to recent studies, as well as project settings.

Projects are currently used to group studies. In the near future, all settings will be stored in projects as well. (last date range, filter, field lists, etc.)



2.6 Studies

Studies are references to a data set, or query. Each study contains the information required to query the database for crash data. Studies also manage filtering and links to related documents.

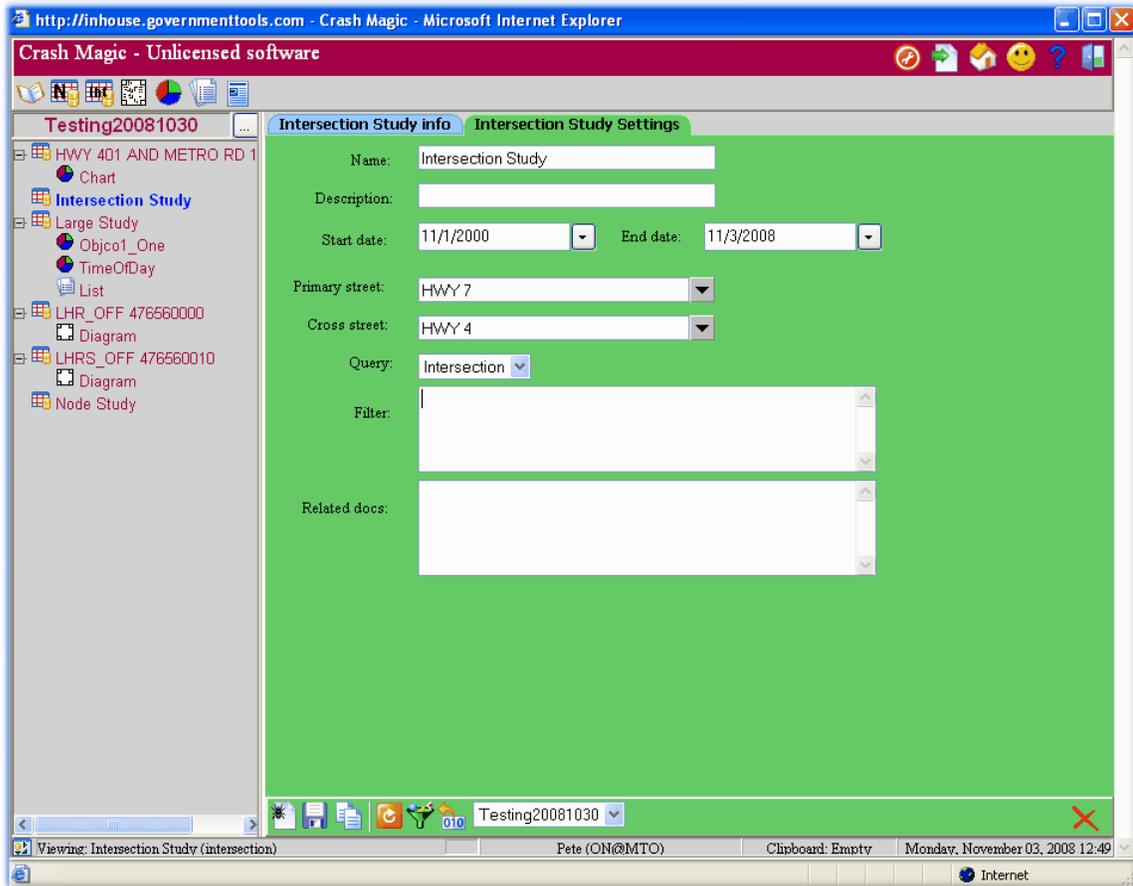
Depending on how your crashes are stored you could have one or more different types of studies. The following types of studies are available:

-  Intersection
-  X,Y Coordinate
-  Node
-  Route + Milepost
-  Case Id
-  MARRS
-  Address

In addition, a given study may accept different parameters depending on the selected query. For example, depending on the query selected, the node query can accept a date range, single node identifier, second node identifier, or all three items.

2.6.1 Intersection

The Intersection Study is for crashes that have been stored by primary street and cross street. The Intersection study provides the ability to query the database by date range plus primary and cross streets. This is the standard study for urban areas and rural areas where mileposts don't exist.



2.6.2 X,Y Coordinate

The X,Y Coordinate is for crashes that have been stored by X, Y coordinates. The X,Y coordinate study gathers crashes by prompting for a date range plus a rectangular area (X min/max and Y min/max values) that indicates a coordinate range from a GIS system.

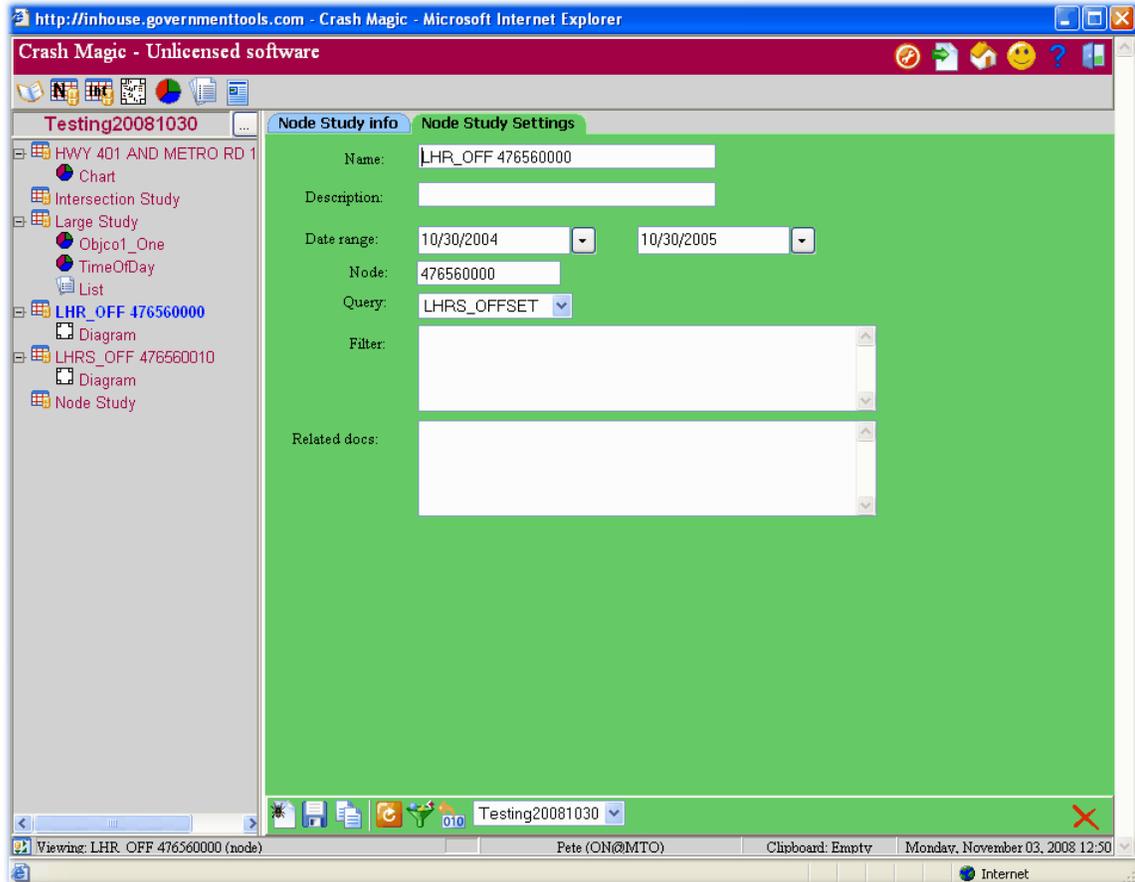
The screenshot displays the 'Crash Magic - Unlicensed software' window. The main area is titled 'XY Coords Study info' and 'XY Coord Study Settings'. The interface includes the following fields and controls:

- Name:** XY Coordinate Study
- Description:** (empty text box)
- First date:** 5/10/2005 (dropdown menu)
- Last date:** 5/10/2006 (dropdown menu)
- Y Max:** 0 (text box)
- X Min:** 0 (text box)
- X Max:** 0 (text box)
- Y Min:** 0 (text box)
- Query:** Default (dropdown menu)
- Filter:** (empty text box with scrollbars)
- Related docs:** (empty text box with scrollbars)

The status bar at the bottom shows 'Viewing: XY Coordinate Study (xyzrect)', 'Scott (SD@DOT)', 'Clipboard: Emstr', and 'Mar 10, 2006 @ 16:49'. The taskbar at the bottom of the window shows 'Highway 037'.

2.6.3 Node

The Node Study is for crashes that have been stored by a node to identify the crash location. The Node study uses a date range, a node identifier, and optionally one or two additional unique identifiers. These unique identifiers might specify a county, city, zip code, etc. The unique identifiers are only needed if multiple, non-unique instances of the node number occur in the database.

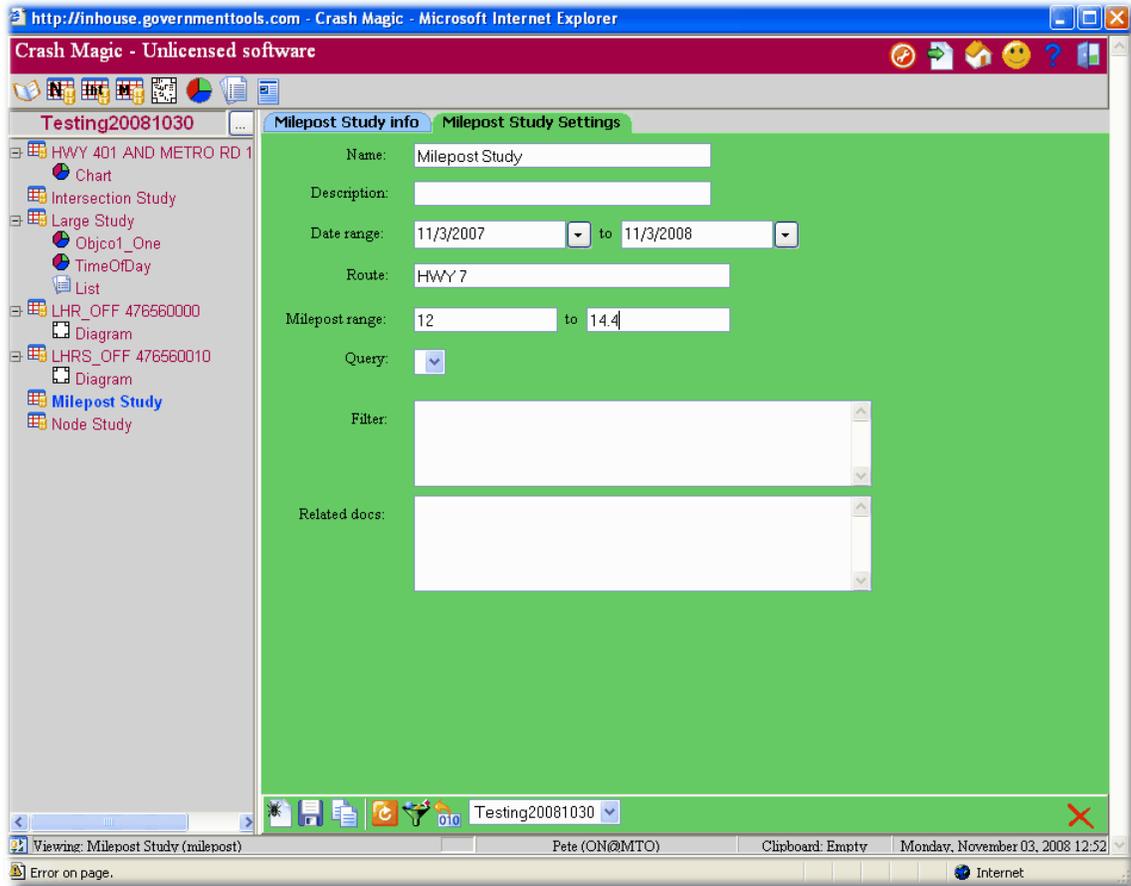


In version 2, the node study is also used for "all data", by specifying a query that only accepts dates.

It is also used to gather a single crash by case number.

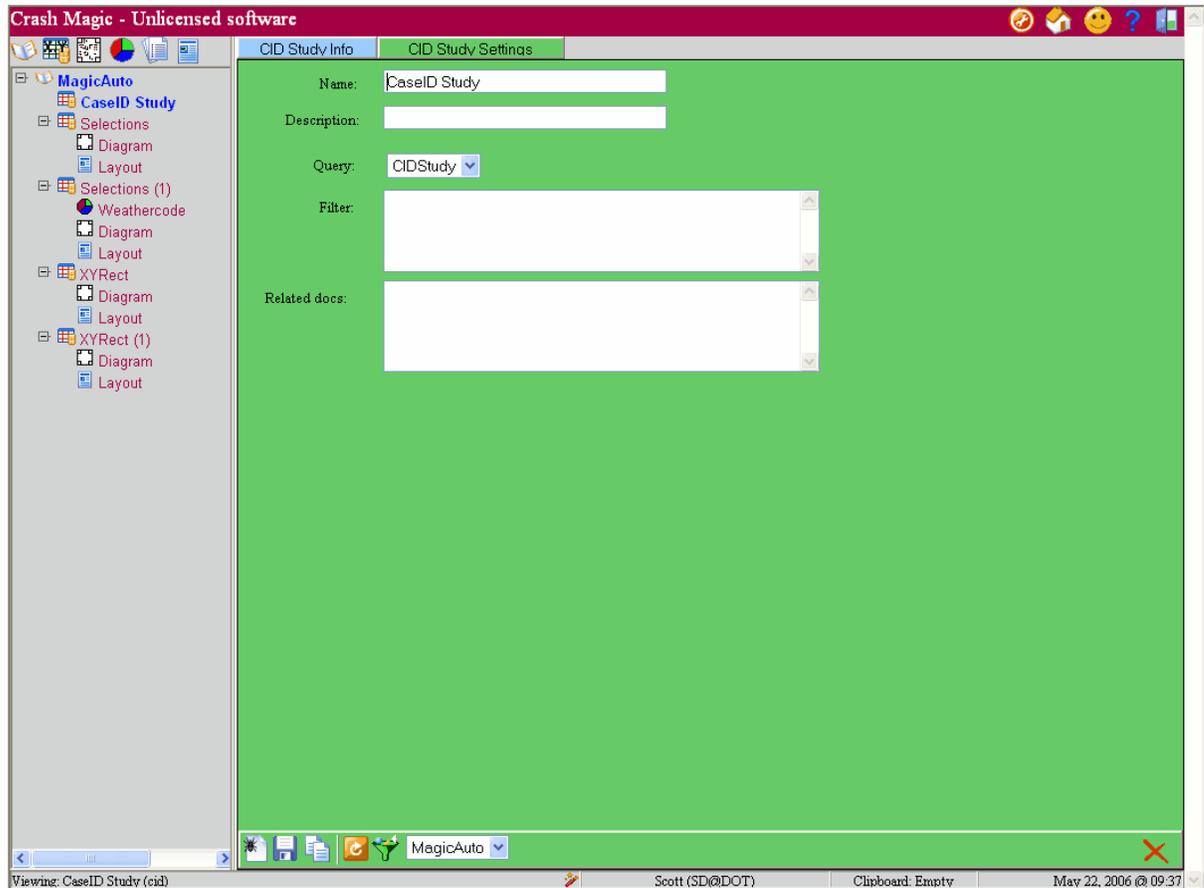
2.6.4 Route + Milepost

The Route + Milepost is for crashes that have been stored by a route and mile post. The Route + Milepost study uses a date range plus a route name/id and milepost range.



2.6.5 Case ID

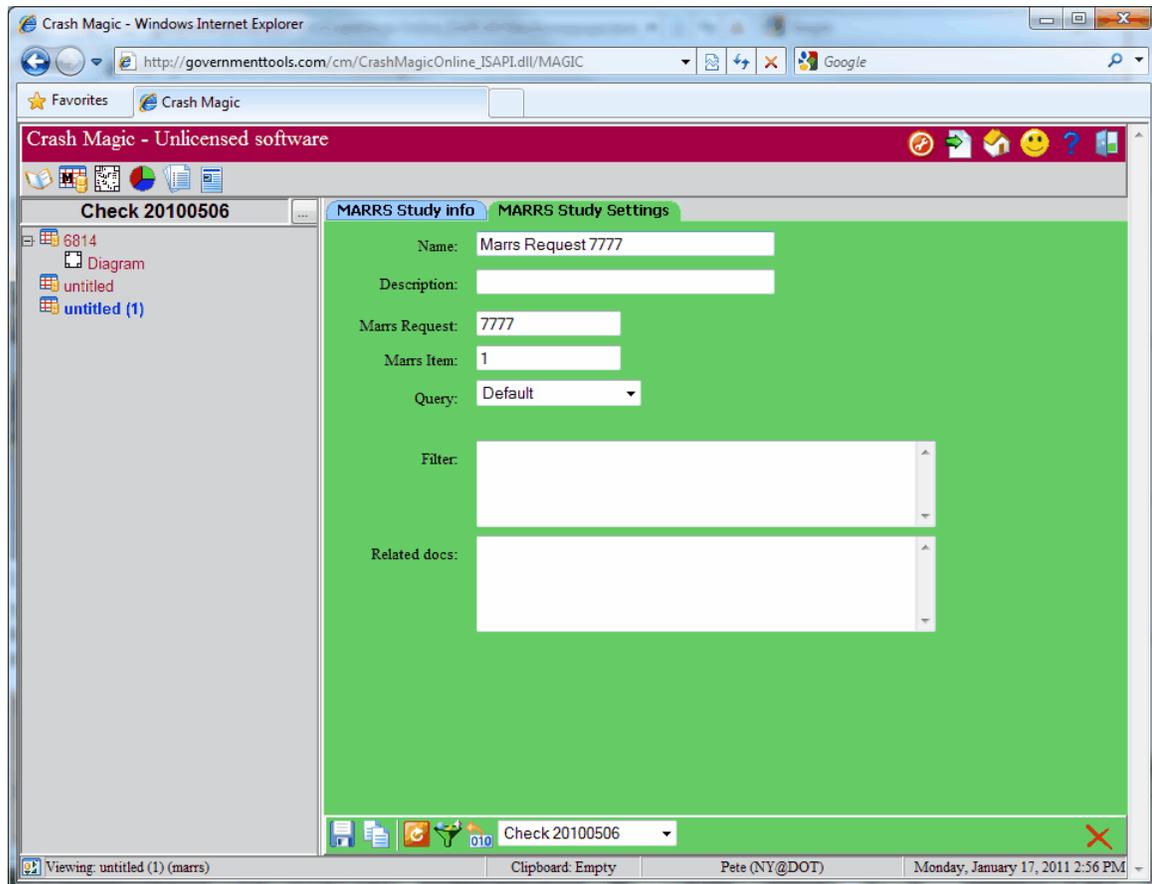
This study allows you to select crashes based on a stored list of crashes in the database. This study is auto generated only by the Map Magic selection tool and has no button to create it.



2.6.6 MARRS

The "MARRS" study type is specific to the New York State DOT.

MARRS requests originate in the Safety Information Management System. (SIMS) Each SIMS request is assigned a Request Id and Item number to reference the crashes. The MARRS study type provides a location to enter the request id and the item number. (typically "1")



Three queries have been created for the MARRS study panel.

- MagicAuto, which is used when calling Crash Magic from the SIMS system. This query accepts a request and an item number.
- MagicAuto_ORDR which can also be used when calling Crash Magic from the SIMS system directly. This query only accepts an order number.
- Default, which is the same as MagicAuto and is used for interactive queries.

2.6.7 Address

Address study is for collisions that have been stored by Street and block address. The Address study provides the ability to query the database by date range plus primary and block

address. This study is used for collisions that have a valid block address.

2.7 Reports

Reports are the output you view and print. These include:

- Collision diagrams
- Charting of any categorical database fields
- Cross-tab reports for any categorical database fields
- Crash field listings – raw data or “looked-up”
- High crash location lists

In addition, the following features enhance the power and capabilities of the program:

- A powerful filter mechanism provides access to ad-hoc query capabilities.
- Recall pre-defined studies and reports through the use of templates
- All reports, charts, diagrams, etc. produced by the program are available for printing, copy/paste, and many reports are exportable to other applications for custom formatting.
- PDF output format is template driven enabling a standard format for all reports.

Crash Magic has been written in such a manner as to enable the addition of custom or general reports within the built-in structure.

3 Common Themes

We've found that using similar or identical dialogs or forms for many purposes makes learning the system that much easier.

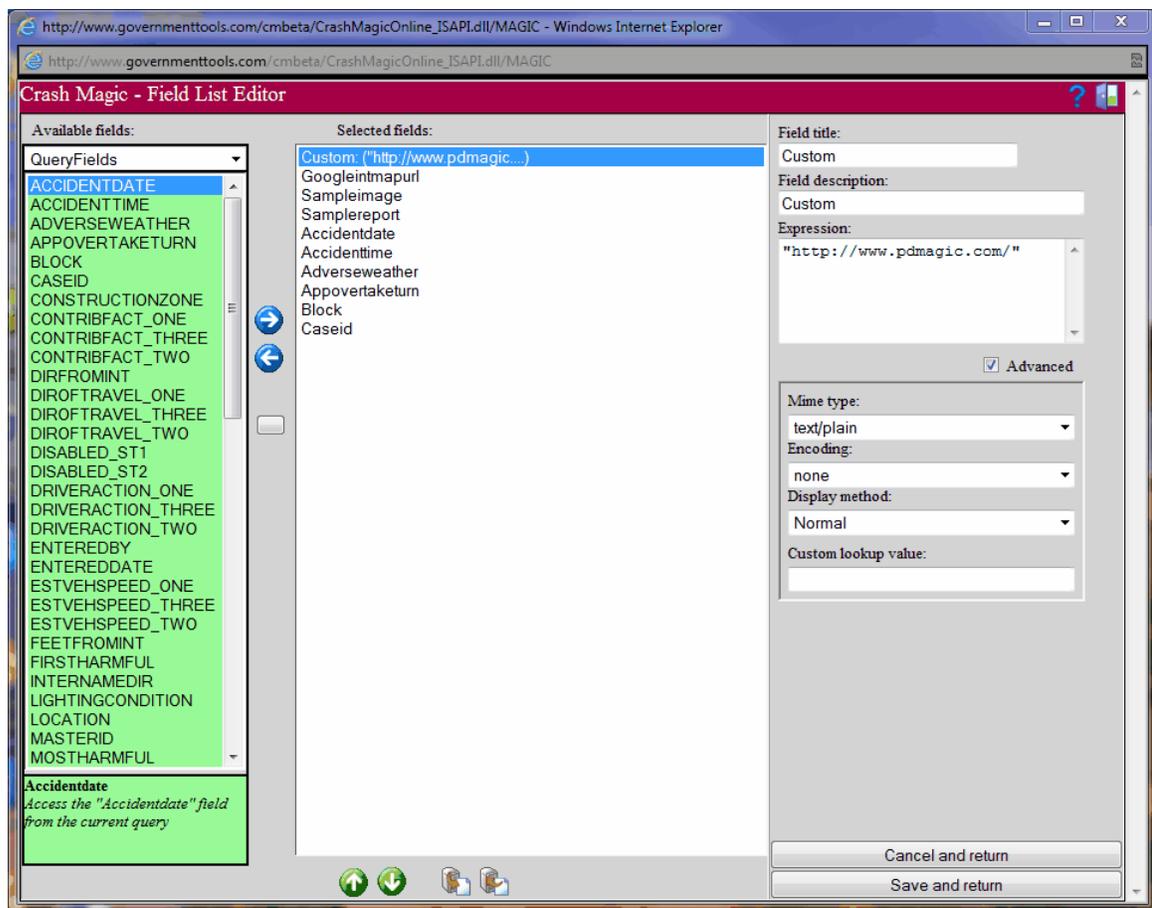
Here are some common screens that will help you use Crash Magic.

3.1 Field Lists

Field lists contain a list of fields, field titles and lookup information. They are edited in a form that provides ordering, field name selection, and several other variables.

Field lists are used for:

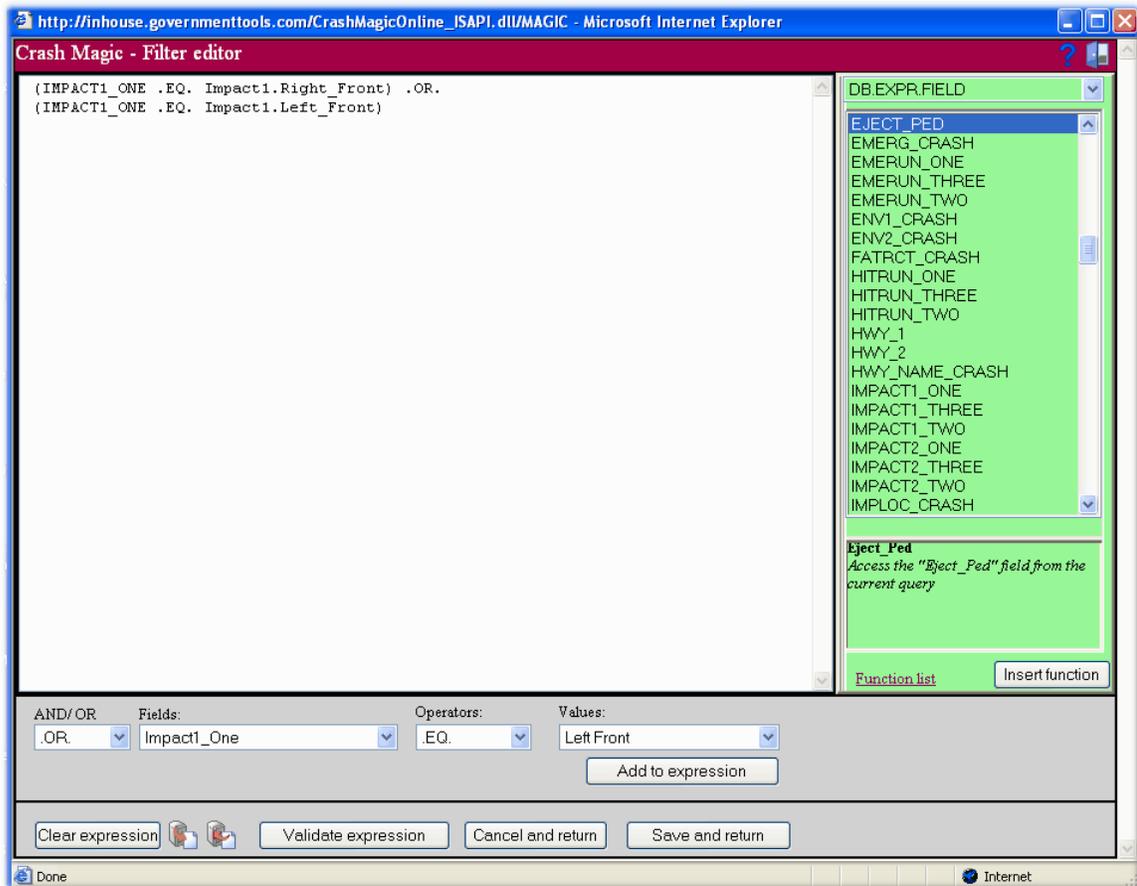
- Crash listings
- Click-on reports
- Labels



3.2 Filter editor

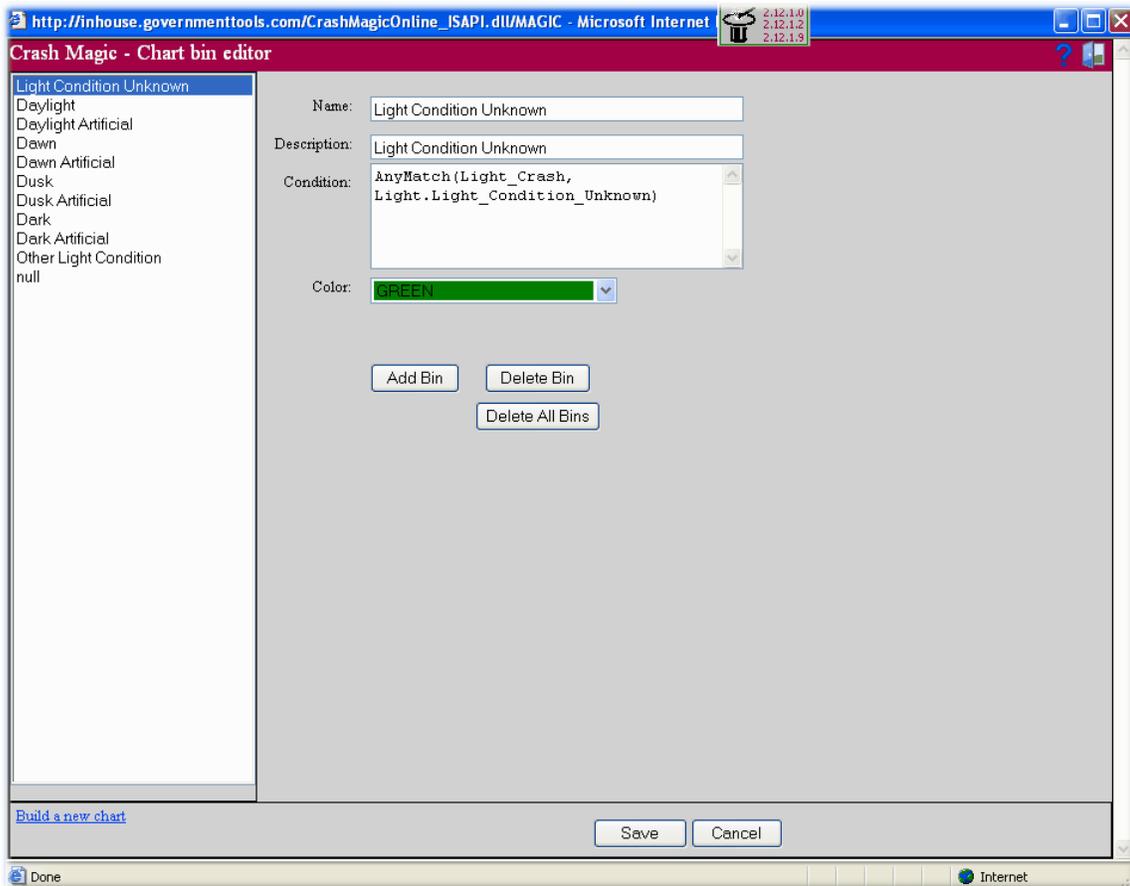
The filter editor, also used as the expression editor, is available for any study and a number of other locations in the program.

The large edit in the middle contains the expression. The bottom portion contains the list of database fields and values. The area on the right contains a list of fields, functions, constants, etc. as well as help for each of them.



3.3 Category editor

Currently in use only as a chart editor, this form will also be used for creating categorical field definitions in the future.



3.4 Template load and save

Templates are settings that are saved for future use. Pretty much anything can be saved to a template including:

- Studies
- Reports (diagrams, lists, high crash locations, cross-tabs, charts)
- Filters
- Layouts (for printing)
- Field lists (for printing, exporting, click-on)
- Category lists (used by charts and cross-tabs)

Templates allow the user to save settings used for a report, and then apply the same settings to other reports.



Template Save. Settings can be saved by clicking on the save template button

Please choose a name for this chart template

Existing templates:	Enter a new template name:
<ul style="list-style-type: none">Coll typeColl type - labeledDefaultWeather - bar chartWeather - pie chart	<input type="text" value="Coll type"/> <input type="button" value="Create a new template"/>
<input type="button" value="Replace existing template"/>	
<input type="button" value="Delete selected template"/>	
<input type="button" value="Cancel"/>	



Template load. Then the same user can apply the same template to another report by selecting the report to apply the template to and clicking on the load template button

3.5 Template Inheritance

When a template is requested by the user, the system looks for it in several places.

- First, the current user's account is checked.
- Second, the user group's "shared" account is checked.
- Finally, the built-in "master" "shared" account is checked.

When a user saves a template, that template is stored in the user's account. Group administrators may copy or move that template to the group "shared" account for others to use as well.

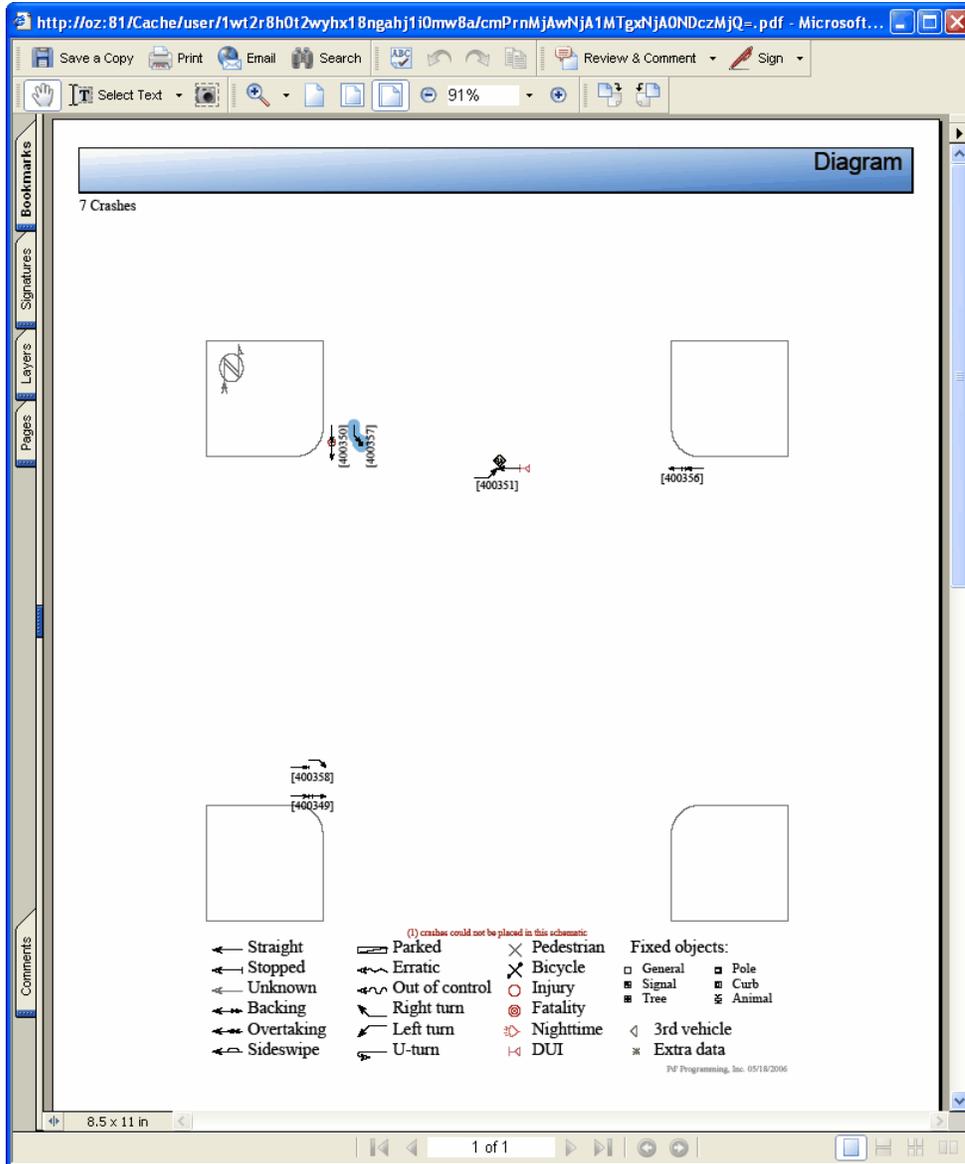
This "inheritance" mechanism provides the following benefits:

- One user's changes do not affect the other users on the system.
- Each user may name and organize their templates as desired.
- It is safe for a user to experiment with different settings and templates. Returning to the default configuration is simply a matter of deleting the undesired templates.
- For administrators, repairing a broken account is as simple as deleting a user's customized templates.

Note, for administrators and power users, the inheritance mechanism also applies to all the configuration attributes. This makes it possible, and even easy, to provide a specific user with their own connection, query or other configuration attribute that will then override the one provided to the rest of the group in the "shared" account.

3.6 Printing

Adobe Acrobat (pdf) output



4 Reports

The following reports are available in Crash Magic.

- Collision Diagrams
- Charts
- Listings
- High Crash Locations

4.1 Collision diagrams

Overview

A collision diagram is a schematic representation of a group of crashes. The template used to arrange the crashes on the display is referred to as a diagram schematic. A variety of schematics are available that describe location types such as intersections, T's, corridors, etc. There are about 100 different schematics packaged with the program. Custom schematics can be created (in administrator mode) by copying an existing schematic or starting from scratch. Annotations and graphics can also be added to the diagram.

The screenshot displays the Crash Magic software interface within a Microsoft Internet Explorer browser window. The browser address bar shows the URL: `http://inhouse.governmenttools.com - Crash Magic - Microsoft Internet Explorer`. The software title bar reads "Crash Magic - Unlicensed software".

The main window is titled "Testing20081030" and contains several tabs: "Diagram Report", "Diagram Settings", and "Print preview". The "Diagram Report" tab is active, showing a schematic diagram of a road intersection. The diagram includes various symbols representing crashes, with one central crash highlighted in blue. The diagram is annotated with numerous alphanumeric codes, such as [2004.41092448], [2005.50021728], [2004.41142285], [2005.51100479], [2004.41171445], [2005.51100498], [2005.51033995-50200347], [2005.50191837], [2005.50202364], [2005.50621372], [2005.50251686], [2004.41281329], [2005.50272115], [2005.50451477], [2005.51121679], and [2005.50470331].

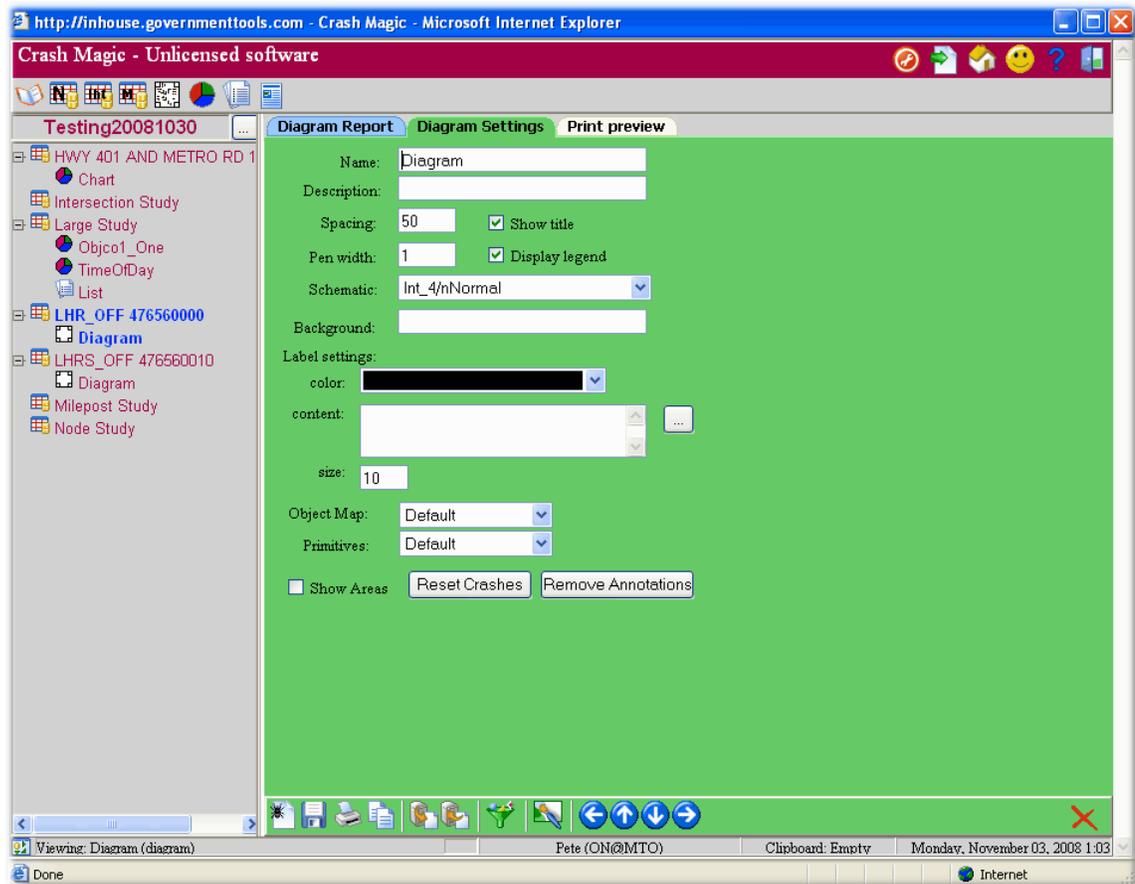
On the right side of the interface, a "ClickOn" dropdown menu is open, displaying a detailed report for a specific crash. The report includes the following information:

- Reference_No 47656
- Region 2
- Jur 0
- Mto_District_Crash 6
- Lhrs_Offset 476560000
- Offset 0
- Impact1_One Right Side Complete
- Light_Crash Dark Artificial
- Tvehty_One
- Tvehty_Two
- Vehtyp_One Automobile
- Vehtyp_Two Unknown Vehicle Type
- Vehtyp_Three

The bottom status bar of the browser shows "Viewing: Diagram (diagram)", "Pete (ON@MTO)", "Clipboard: Empty", and "Monday, November 03, 2008 1:03".

Diagram attributes

Most diagram settings are made using this panel.



Changing chart types and settings

Chart Report
Chart Settings
Print preview

Name:

Description:

Bottom title:

Chart type:

Sort Order:

Show Empty Bins:

Text attributes:
Title | Legend | Marks | Left axis | Bottom axis | Footer

Title

Visible

Font Size:

Font Color:











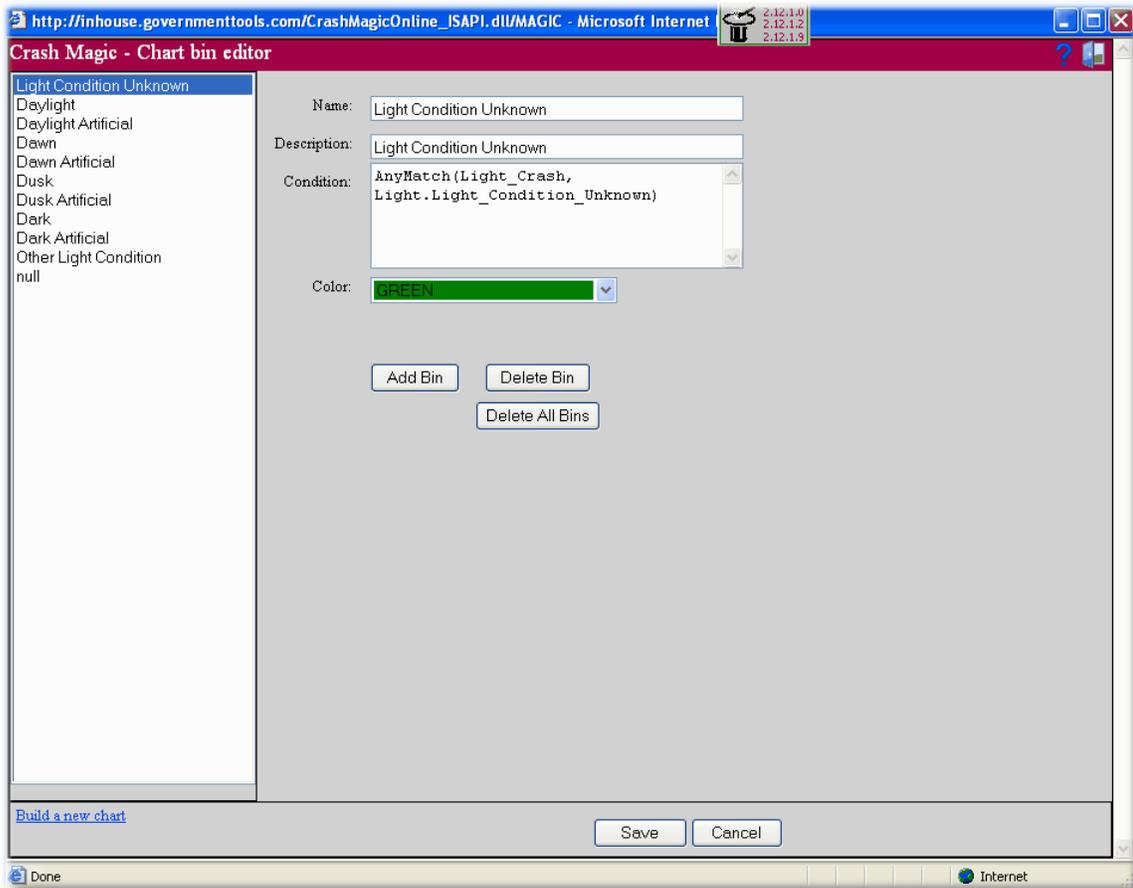



✕

Saving and recalling chart types and settings

Building / customizing charts

- Chart bins
- Automatic population of bins
- Expressions



4.3 Crash listings

This report presents you with a list of crashes from the current study. You can select the fields to display by editing the report format.

Crashdate	Primestreet	Crossstreet	County	Actionprior_One	Actionprior_Two	How	Vehdir_One	Vehdir_Two	Light	Weather
05/09/2000	State St	Midland Rd	Saginaw	Avoid Veh-Ft/bk		Other	W		Dark/lt	Rain
05/26/2000	Midland Rd	State/s I 675 Ramp	Saginaw	Start On Road	Go Straight	Other	N	S	Day	Cloudy
02/27/2000	Midland Rd	State/s I 675 Ramp	Saginaw	Go Straight	Slow/stop On Rd	Rr-End	N	N	Day	Cloudy
04/13/2000	Midland Rd	State/s I 675 Ramp	Saginaw	Stop On Road	Slow/stop On Rd	Rr-End	N	N	Day	Cloudy
06/25/2000	Midland Rd	State/s I 675 Ramp	Saginaw	Go Straight		Single	S		Dark/unltd	Fog/smke
11/02/2000	Midland Rd	State/s I 675 Ramp	Saginaw	Go Straight		Single	N		Dark/unltd	Unkn
04/11/2000	State St	Midland Rd	Saginaw	Go Straight	Right Turn	Rr-End	E	E	Day	Snow
07/28/2000	State St	Midland Rd	Saginaw	Go Straight	Slow/stop On Rd	Rr-End	E	E	Day	Cloudy
03/20/2000	Midland Rd	State/s I 675 Ramp	Saginaw	Go Straight	Slow/stop On Rd	Rr-End	N	N	Day	Clear
06/28/2000	Midland Rd	State/s I 675 Ramp	Saginaw	Go Straight	Start On Road	Ho-Lt	S	N	Day	Clear
04/21/2000	Midland Rd	State/s I 675 Ramp	Saginaw	Left Trun	Go Straight	Angle	E	S	Day	Rain
04/25/2000	Midland Rd	State/s I 675 Ramp	Saginaw	Stop On Road	Start On Road	Rr-End	N	N	Day	Clear
05/13/2000	Midland Rd	State/s I 675 Ramp	Saginaw	Left Trun	Go Straight	Angle	E	S	Dark/lt	Cloudy
07/29/2000	Midland Rd	State/s I 675 Ramp	Saginaw	Change Lanes		Single	S		Day	Rain
10/27/2000	Midland Rd	State/s I 675 Ramp	Saginaw	Go Straight	Left Trun	Angle	N	S	Dark/lt	Cloudy
10/13/2000	Midland Rd	State/s I 675 Ramp	Saginaw	Stop On Road	Slow/stop On Rd	Rr-End	S	S	Day	Cloudy
12/20/2000	State St	Midland Rd	Saginaw	Go Straight	Slow/stop On Rd	Rr-End	E	E	Day	Cloudy
03/31/2001	Midland Rd	State St/s I 675 Ramp	Saginaw	Go Straight		Single	S		Dark/lt	Cloudy
08/21/2001	State St	Midland Rd	Saginaw	Enter Road		Head On	S		Day	Clear
03/22/2001	State St	Midland Rd	Saginaw	Left Trun	Avoid Veh-Angle	Other	S	E	Day	Cloudy
04/17/2001	Midland Rd	State St/s I 675 Ramp	Saginaw	Go Straight	Unknown	Angle	N	E	Day	Clear
02/16/2001	Midland Rd	State St/s I 675 Ramp	Saginaw	Go Straight	Stop On Road	Unknown	N	N	Day	Cloudy
09/16/2001	Midland Rd	State St/s I 675 Ramp	Saginaw	Left Trun	Go Straight	Angle	E	N	Day	Clear
01/31/2001	Midland Rd	State St/s I 675 Ramp	Saginaw	Go Straight	Left Trun	Ss-Same	N	N	Day	Cloudy
07/13/2001	State St	Midland Rd	Saginaw	Go Straight	Stop On Road	Rr-End	E	E	Day	Clear
04/05/2001	Midland Rd	State St/s I 675 Ramp	Saginaw	Go Straight	Stop On Road	Rr-End	N	N	Day	Clear
10/09/2001	Midland Rd	State St/s I 675 Ramp	Saginaw		Stop On Road	Rr-End		E	Dark/lt	Cloudy
10/26/2001	State St	Midland Rd	Saginaw	Go Straight		Single	W		Dark/lt	Cloudy
05/11/2001	Midland Rd	State St/s I 675 Ramp	Saginaw	Start On Road	Stop On Road	Rr-End	S	S	Day	Cloudy
09/16/2001	Midland Rd	State St/s I 675 Ramp	Saginaw	Go Straight		Single	S		Dark/unltd	Clear

4.4 High crash locations

High crash locations lists are available for intersections and nodes. Development is underway to support sliding spot or "window" reports.

These lists support ranking by user-defined expressions, including access to other databases, such as roadside inventory. The default ranking is count, and a rate report is available as well.

The screenshot shows the Crash Magic software interface. The main window displays a 'High Crash Location List' report. The report title is 'High Crash Location List (Report Ran: 1/19/2011 12:00:33 PM (GMT-7))' and it indicates '1 of 1 pages'. The report is presented as a table with the following data:

Rank	Location	Count	Diagram
1	S Federal Blvd & W Alameda Ave	62	Diagram
2	S Santa Fe Dr & W Alameda Ave	61	Diagram
3	E 6th Ave & N Lincoln St	59	Diagram
4	E Leetsdale Dr & S Monaco St	59	Diagram
5	E Leetsdale Dr & S Quebec St	59	Diagram
6	E Evans Ave & S Monaco Street Pkwy	58	Diagram
7	E Martin Luther King Blvd & N Quebec St	55	Diagram
8	E Colfax Ave & N Colorado Blvd	55	Diagram
9	N Speer Blvd & W Colfax Ave	47	Diagram
10	E 39th Ave & N Peoria St	41	Diagram
11	E 8th Ave & N Colorado Blvd	41	Diagram
12	S Santa Fe Dr & W Mississippi Ave	40	Diagram
13	E Evans Ave & S University Blvd	40	Diagram
14	E Evans Ave & S Colorado Blvd	38	Diagram
15	E 45th Ave & N Peoria St	36	Diagram
16	E Leetsdale Dr & S Oneida St	35	Diagram
17	E Alameda Ave & S Colorado Blvd	35	Diagram

The interface also shows a sidebar with a tree view of the main menu, including options like 'List', 'Location list', 'Chart', and 'Layout'. The status bar at the bottom indicates 'Viewing: Location list (locationlist)', 'Clipboard: Empty', 'Pete (CO@Denver)', and the date 'Wednesday, January 19, 2011 12:00'.

4.5 Crosstab reports

Cross tab reports compare one category list to another. In this example we compare lighting to injury severity.

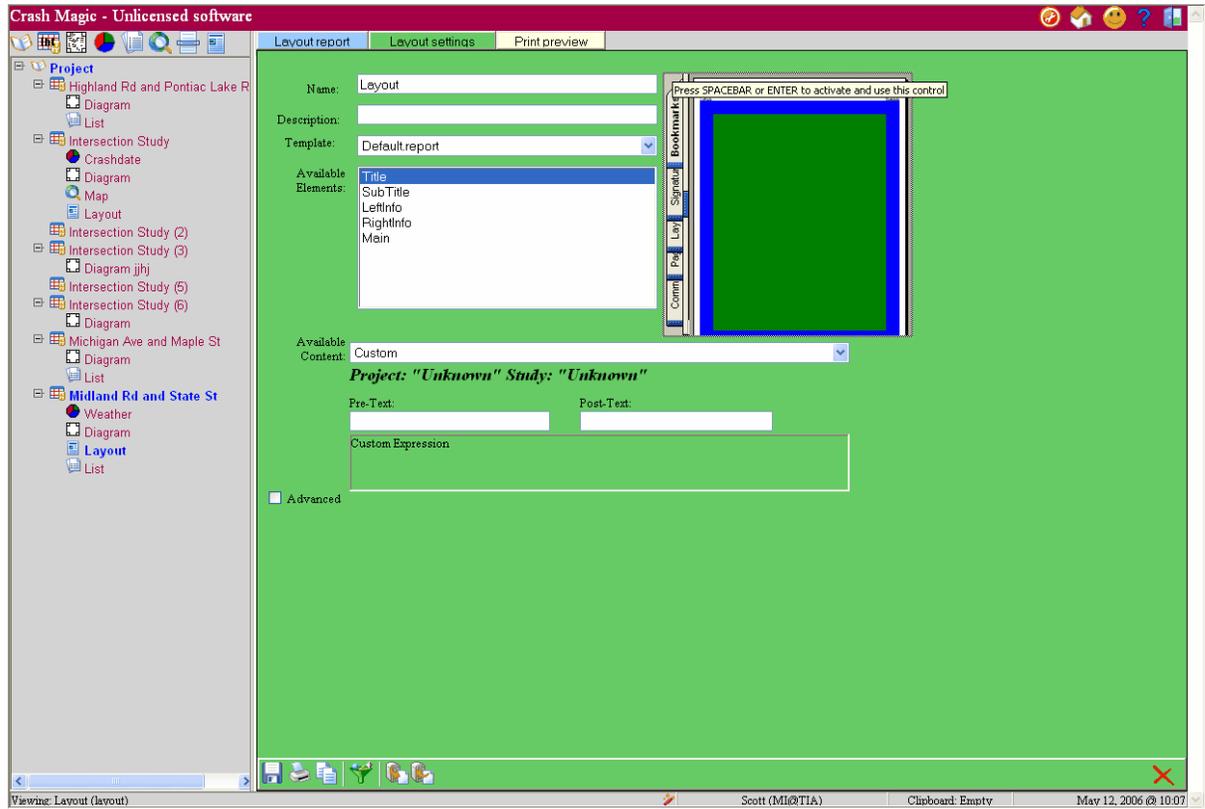
The screenshot shows the 'Crash Magic Analysis' application in a Windows Internet Explorer browser. The main window displays a 'Cross Tab Report' for 'All Crashes'. The report is a table with columns for 'Fatal', 'Injury', 'PDO', and 'Total', and rows for different lighting conditions: 'Daylight', 'Dawn Or Dusk', 'Dark - Lighted', 'Dark - Unlighted', and 'null'. A 'Total' row is also present at the bottom of the data section.

	Fatal	Injury	PDO	Total
Daylight	0	2	32	34
Dawn Or Dusk	0	0	3	3
Dark - Lighted	0	1	7	8
Dark - Unlighted	0	0	1	1
null	0	0	1	1
Total:	0	3	44	47

The interface also includes a left-hand navigation pane with a tree view of various report categories and filters, such as '1/1/2008 - 12/31/2008', 'Location list', 'Lightingcondition', and 'Time of day'. The status bar at the bottom indicates 'Viewing: Crash Magic Panel', 'Clipboard: Empty', 'Pete (CO@Denver)', and the date 'Wednesday, January 19, 2011 12:40'.

4.6 Layout

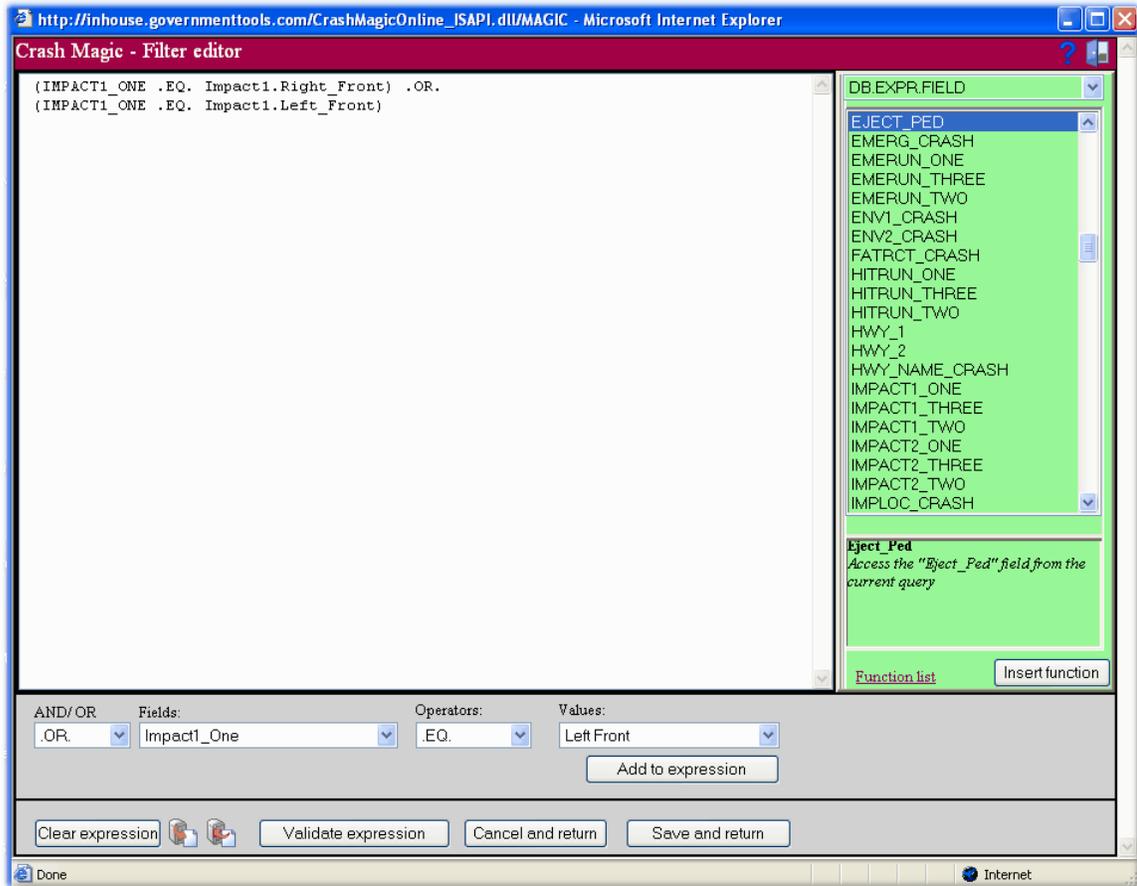
This allows the user to select various items to drop on to a report for printing.



5 Filters

5.1 Simple Filters

Field / value comparisons



Filter scope

Filters are applied at the study level and affect all reports in that study. Most reports contain a button for modifying the study filter.

- Diagrams
- Charts
- Listings
- High crash location lists

5.2 More on Simple Filters

Saving and loading filters

Naming filters

.AND. / .OR. (& / |)

Identifying useful fields

5.3 Complex Filters

Balancing parenthesis

In simple filters, with just a single expression, parentheses don't usually matter. However, once you start working with multiple expressions and mixing and matching AND's and OR's, parentheses become critical.

Mixing fields

Mixing AND's / OR's

Nulls

5.4 Filter Functions

Filter functions can greatly simplify otherwise complex filter expressions. There are about 30 or so functions currently in the library. They handle things like date manipulation, diagram settings, math, Boolean logic, string manipulation, etc.

5.5 Calculated Fields in Filters

Calculated fields work just like normal fields in filters

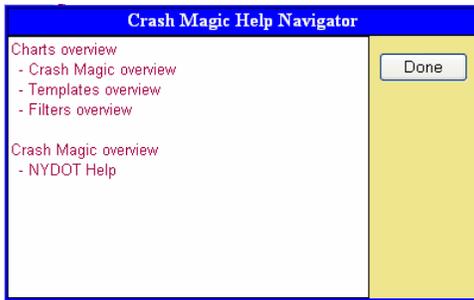
Calculated fields are most commonly used to aggregate multiple fields, but are also used to re-categorize existing fields.

6 Miscellaneous

This section will cover additional items that will increase your productivity in Crash Magic.

6.1 Help

The help button  will open Crash Magic's Help Navigator.



The Help Navigator will allow the user to select help based on the item he is on in Crash Magic. The user can also choose the following items.

- Tutorial Overview.
- The PDF manual for Crash Magic.
- The most current manual at www.pdmagic.com.
- The program can also link to user created web help.

6.2 Copy/Paste

The copy button  allows the user to copy an item in his tree to the clip board.

Then using the paste button  the user can paste the item from his clip board to another location in his tree.

6.3 Re-issue a Query

The refresh button  located in the Study Info panel can be used to re-issue a query against the database if items have changed.

7 Your configuration

Crash Magic is very configurable. Each installation can take advantage of different means of gathering data, different codes and lookups, different types of reports.

This section is included to describe the studies and reports specific to your installation.

7.1 Study definitions

Date with local street names (all data)

Name: All data|1/1/2011-5/6/2012|Clear

Description:

Type: Date With Local Street Nan

Filter: Clear

Date range:
1/1/2011 thru 12/31/2011

Date with street numbers (all data)

Name: All data|1/1/2011-5/6/2012|Clear

Description:

Type: Date With Street Numbers

Filter: Clear

Date range:
1/1/2011 thru 12/31/2011

Highway no and milepost (route milepost)

Name: All data|1/1/2011-5/6/2012|Clear

Description:

Type: Highway No and Milepost

Filter: Clear

Date range:
1/1/2011 thru 12/31/2011

Primary street:

0 0

Local street names (intersection)

Name: TANGLEWOOD DR (Clackamas,Lake Oswego) & CIRQUE
Description:
Type: Local Street Names test update
Filter: Clear
Date range:
1/1/2011 thru 12/31/2011
Intersection:
TANGLEWOOD DR (Clackamas,Lake Os CIRQUE (Clackamas,Lake Oswego)

Street number (intersection)

Name: 01940 & 05082|1/1/2011-12/31/2011|Clear
Description:
Type: Street Number test update
Filter: Clear
Date range:
1/1/2011 thru 12/31/2011
Intersection:
01940 05082

Street number with milepost (street milepost)

Name: 01940 12.50 to 14.50|1/1/2011-12/31/2011|Clear
Description:
Type: Street Number and Milepos test update
Filter: Clear
Date range:
1/1/2011 thru 12/31/2011
Primary street:
01940
12.5 14.5

7.2 Suggestions

- Because of large database, consider queries specific to counties/cities/regions/etc.
- Perhaps create additional user groups, or provide specific queries to specific users.
- Standardize on street names vs street numbers (reduce complexity of normalizers/study definitions)
-

8 Future Developement

This section contains items that are currently under development at Pd Programming. For the most up to date information see our web site at <http://www.pdmagic.com/prodmatrix.cfm>

8.1 Crash Magic Online

New in version 3, available January 2012:

- Cross tab reports
- Highlighting lists and diagrams
- Silverlight viewer
- Improved charting
- Interface: Projects to highest level, almost hidden
- Interface: Move Study, Filter and color highlighting front and center
- Interface: Rely on templates for report selection (provide dozens of default reports)

In development:

- Sliding spots
- ArcGIS Server support
- Online diagram schematic editing
- Query pruning for all reports
- Dynamic sharing of projects and studies
- Messaging between users

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