CONDUCTING CRASH ANALYSES USING THE PENNSYLVANIA CRASH INFORMATION TOOL

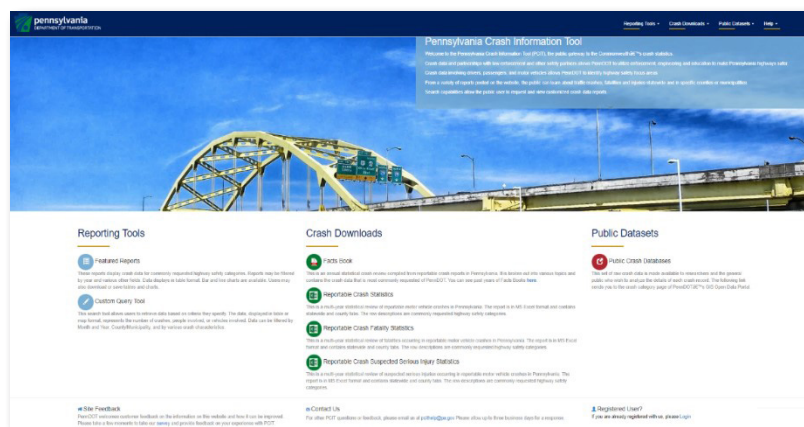by Jyothi Rani and Wendy Kelley, P.E., Pennoni, Inc.

Crash analyses are essential for assessing the safety of local roads in Pennsylvania. These analyses can help to determine safety problems at curves, intersections, and other parts of the road system. Crash analyses should also be conducted as part of the traffic studies required to determine whether traffic signs, pavement markings, stop signs, speed limits, and other features are necessary.

Title 67, Chapter 212, defines crash analysis as "the orderly review and evaluation of the root causes of crashes involving vehicles or pedestrians at a given location or within a given area along a highway." The term "crash" only includes reportable crashes as defined in Chapter 212, except when the term "nonreportable crash" is explicitly used.

A crash analysis, which may include the development of a collision diagram, must consider the following items:
- Total number of crashes during the last five years.
- Number of crashes by type or cause.
- Vehicle type involved.
- Pedestrian involvement.
- Type of traffic control present.
- Roadway or intersection geometrics.
- Cause of crash.
- Time of crash.
- Environmental conditions, such as rain, snow, fog, ice, clear, sun, and dry or wet pavement.

The Pennsylvania Crash Information Tool (PCIT) offers an easy-to-access online method for reviewing crash data for the last 20 years. This searchable geographic database can be used to examine safety issues at the municipal level or to check safety at specific spots or by types of crashes. The tool can be accessed at https://crashinfo.penndot.gov/PCIT/welcome.html.

The home screen of the Pennsylvania Crash Information Tool

The PCIT has two main reporting tools: Featured Reports and Custom Query Tool.

Featured Reports provides crash data for commonly requested highway safety categories. It may be filtered by year of crash and other fields, such as crashes due to deer or distracted driving or severity of motorcyclist

injury by helmet usage. This data is available in tabular format with both bar charts and line charts and may be downloaded if necessary.
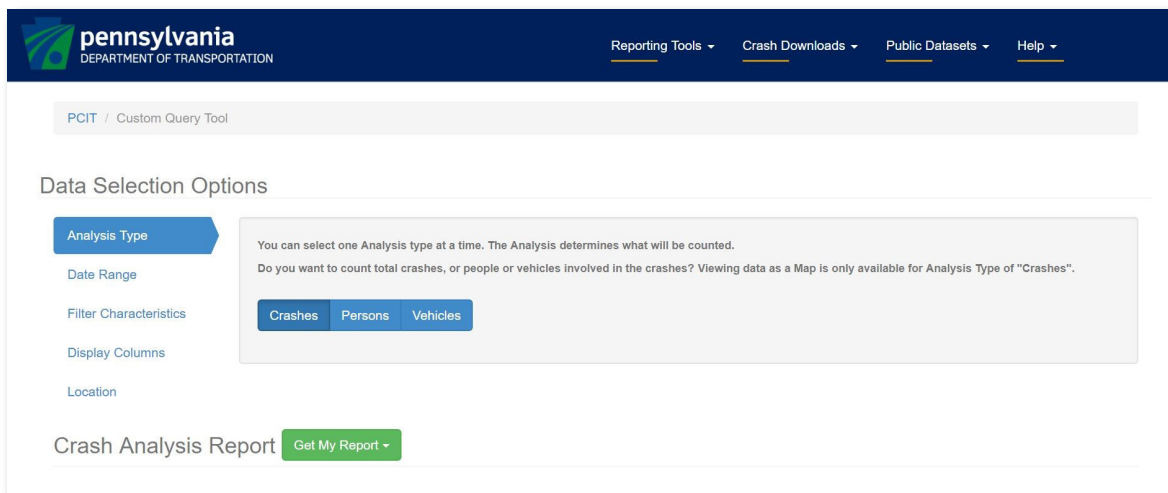
The Custom Query Tool allows users to search, request, and view customized crash data reports and filter the data by county. As the main tool for examining municipal-wide or location-specific crash data, the Custom Query Tool allows users to retrieve data based on criteria they specify. The data can be displayed as a table, map, or crash history report and can be filtered by type or time of analysis as well as other characteristics, including fields from the categories of crash events, roads, drivers, vehicles, severity, and location.

Using the Custom Query Tool

Example: A municipality (East Earl Township, Lancaster County) is considering posting a speed limit on a specific road (West Quarry Road). As part of the traffic study for the speed limit, the municipality must review crash data. The following steps will show you how this is done.
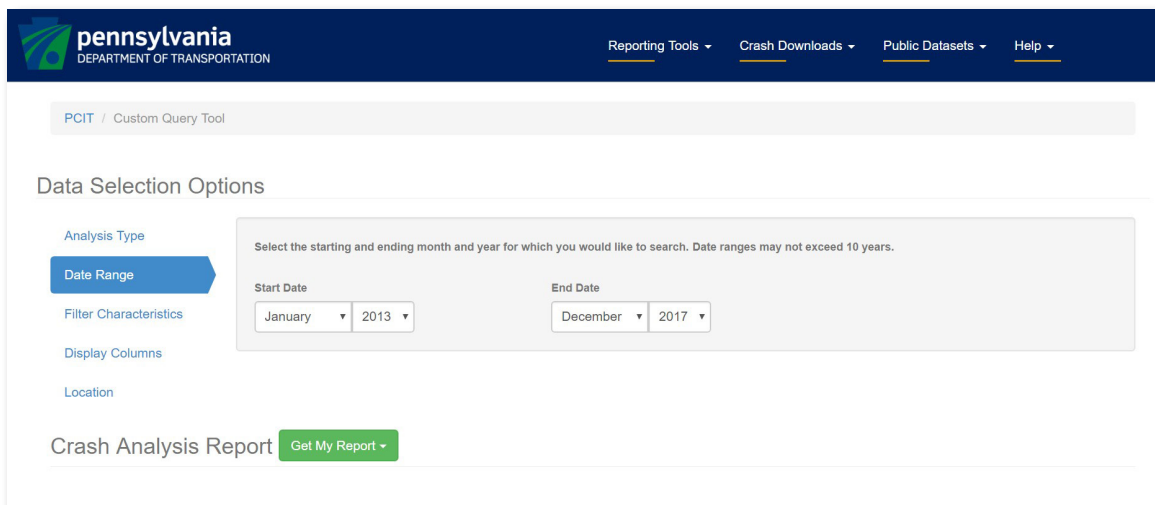
Step 1: Select the Analysis Type

Select the Custom Query Tool, which will bring up the PCIT Data Selection Options screen. Depending on the analysis to be conducted, you can choose to count either the total number of crashes or the total number of people or vehicles involved in crashes. For safety studies, select crashes.

Step 2: Select the Date Range

This step allows users to select the starting and ending dates (month and year) of the study period for which you want to analyze the crash data. When doing a traffic safety assessment or a traffic study, you should examine the last five years of data. For example, you could select January 2013 as the start date and December 2017 as the end date of a period to study. (Please note that 2017 was selected for the end date since crash data for 2018 is not yet available.)
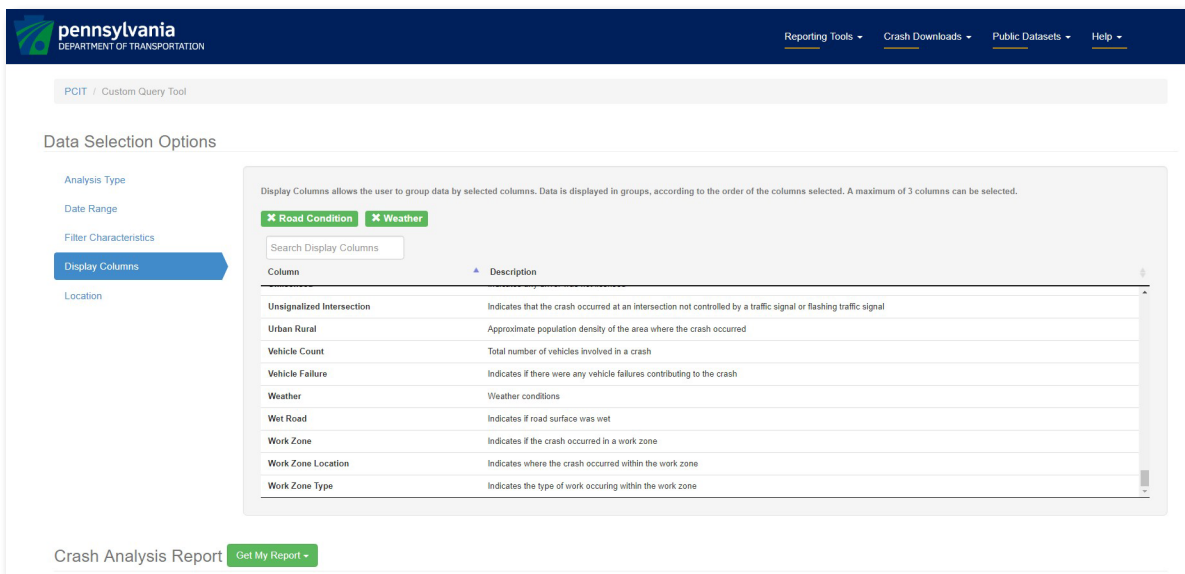
Step 3: Select the Filter Characteristics

In this step, users may filter several crash characteristics that suit their purpose and can narrow down their search for analysis. The tool allows a maximum of five crash characteristics to be selected at a time to display the results. (Note: These characteristics act as an "and" statement so, for example, if you select "angle" and "rear end," you will get zero crashes.) For crash analysis and traffic studies, all crashes should be reviewed, and no filter characteristics should be selected.
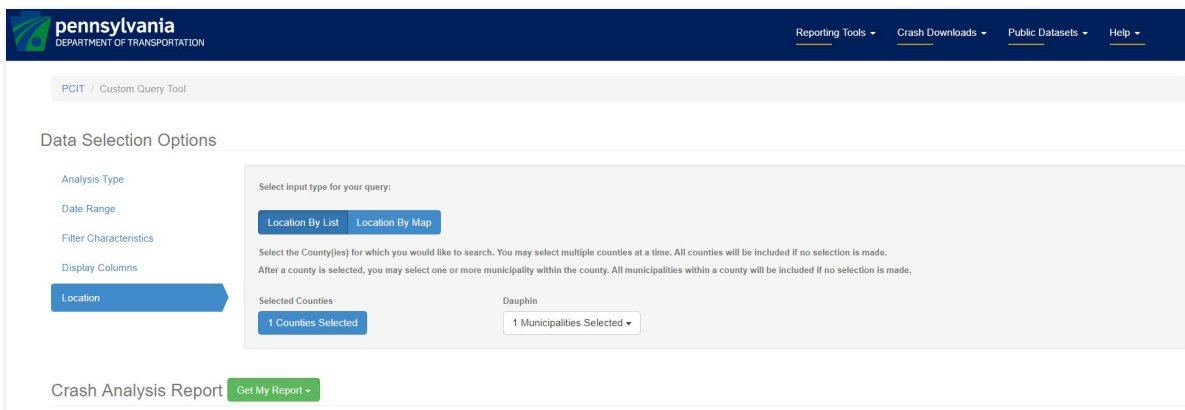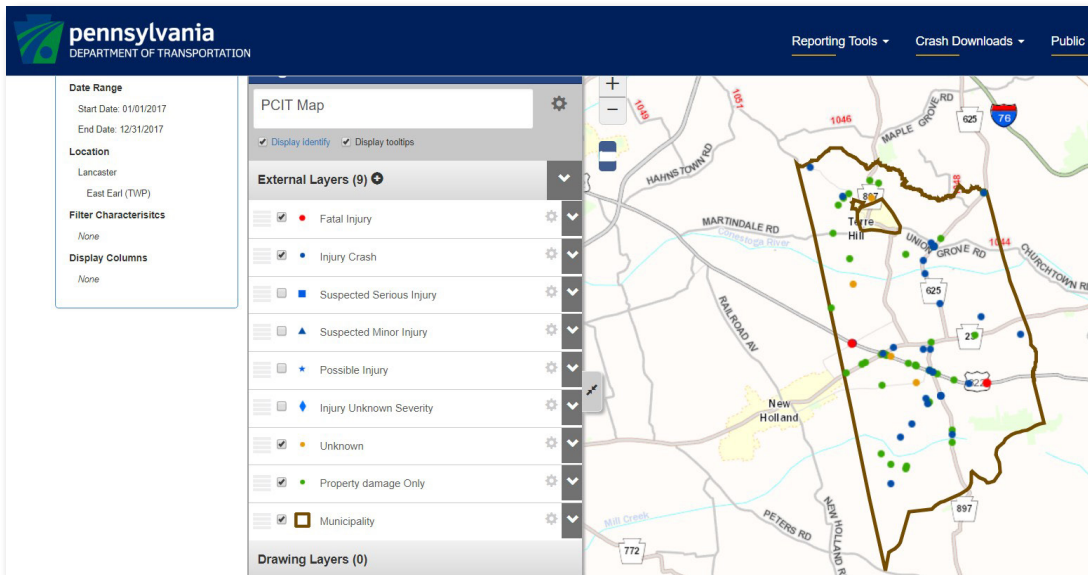
Step 4: Select the Display Columns

This step allows users to group data by selected columns and order of selection. For example, you could group the data by Road Condition and Weather. (Note: This feature is only functional if you select "Table" from the drop-down menu under Get My Report as your output. If you select "Map" or "Crash History Report," it will be ignored.) Since all crashes and conditions should be evaluated, no display columns need to be selected.
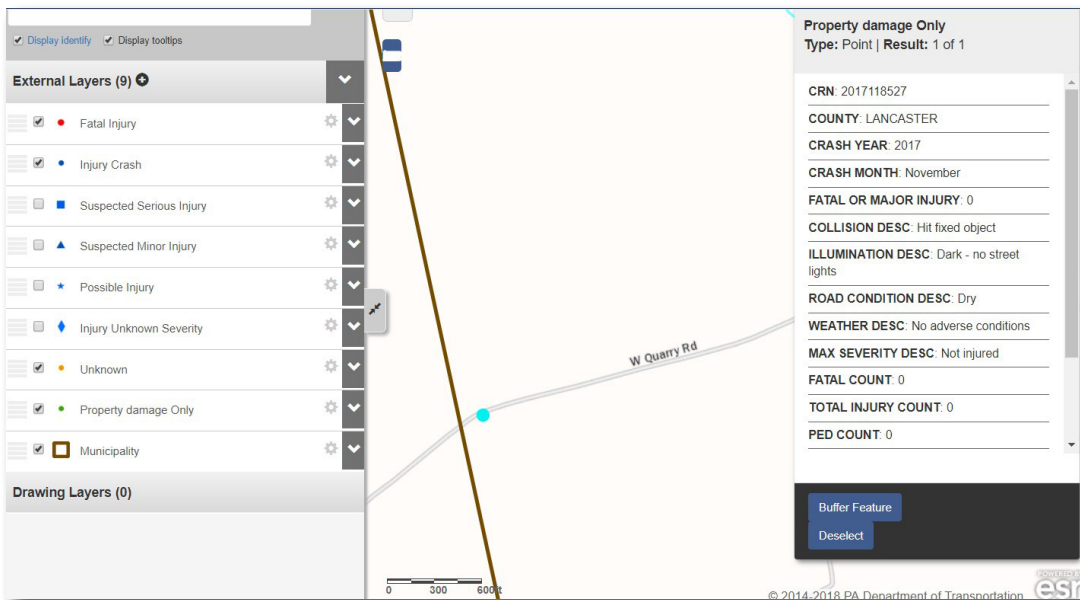

Step 5: Select the Location

The study location may be selected from a map or a list of counties and municipalities. The map may be more convenient when users are looking for data linked to a specific location. For example, drawing on the map with a point or an intersection circle allows users to select a specific location or intersection, while drawing with a circle, polygon, or rectangle allows users to select a specific geographic area around their neighborhood, school, or other location.

The crash data for our example in East Earl Township, Lancaster County, is shown on a municipal-wide map. The user may zoom in and select locations to review crash data. Each dot on the map represents one or more crashes.

The same map is zoomed in to West Quarry Road. The dot represents one crash on the road. Clicking on the dot provides a summary of the crash data. If you use the Geographic Selection of Line/Route, you will be able to select start and end points along the road and display a table of data or crash history for that section of road.

The Applications of Crash Data

Crash data is crucial in analyzing the safety of a road segment or an intersection. It is typically used to identify hazardous locations, determine the causes of crashes, and select appropriate countermeasures for a safety problem. Many times, crash data is used as a basis to justify and prioritize projects. Crashes should also be reviewed as part of traffic studies for signs, pavement markings, and other traffic-control devices.

Crash data assessments are discussed at various LTAP safety classes. To find a safety class near you, go to www.ltap.state.pa.us. The Federal Highway Administration also has safety analysis tools for local roads. They are available at https://safety.fhwa.dot.gov/local_rural/training/fhwasaxx1210/s3.cfm.