ACIS – Arizona Crash Information System
Training Video 3
Crash Analysis using ACIS

ADOT Traffic Safety Group
Created on February 4, 2021
- ACIS can be used to download crash data for Crash Analysis / Warrant Study / Agency Summaries

- The Standard Detail Report are the most commonly used report for this type of analysis.

- This training will show how to download data and best practices on saving the data / links and using the data for analyzing the data.
The Standard Detailed Report can be used for crash data with the following parameters:

- **CRASH PERIOD**
- **INCIDENT FLAGS**
- **LOCATION**
  - **Spatial region**
    - City
    - County
    - COG/MPO
    - Tribal Area
    - ADOT district
  - **By specific route**
    - Advanced map search (draw a box or rectangle around a location)
    - Milepost segment for a route (both directions can be selected if the route is divided)
    - Local road segment
    - Intersection (150 feet buffer is the default but any buffer can be used based on what is entered by the user)

For a specific route query, certain parameters such as incident flags or spatial region do not need to be selected, the route segment or intersection and the crash period are the most common parameters used.
The first step when running the query is to **enter the crash period**, it is recommended that the user does not leave this blank.

The most common crash period used is the **last 5 years of complete data** available (example: if crash data is complete through June 2020 then the most current 5 year period will be 7/1/2015 to 6/30/2020).

The ACIS site will show the crash completion date, this is updated every 3 months.

Options are available to select the prior 5 years or 3 years, please note that is for calendar years only and may not reflect the most current 5 year period of complete data.
The incident flags can be entered next. This is optional when using the standard detailed report.

The user should not enter any flags if they want all the data for a given location.
The location should be entered next. The user can enter the route and crossing feature manually or use the advanced map search.

Please do **NOT** use the advanced map search and the manual route search in the same query as this will create a potential conflict and no data will be found.

The advanced map search is recommended for intersections or traffic interchanges only and not segments.

Click on the **Open Map** link to use this feature.
The example here shows an easy way to query data for an urban freeway interchange.

Please note that some filtering and review of the data will be necessary after using the map search, in this example some crashes on the mainline may be pulled in the query but these crashes may not be needed in the analysis of the data for the traffic interchange.
→ The **spatial regions** such as County, City, COG/MPO, Tribal Area, ADOT District should be selected only **for querying agency data**.

→ **To query Route specific data**, the spatial regions such as County, City, COG/MPO, Tribal Area, ADOT District are optional and do not need to be entered when using the ROUTE data field. Entering these fields may restrict your query or cause a potential conflict and no data may be found.

→ The **Route Type** field is used for the type of road that is entered, highway or local or ramp.

→ To search for ramps the user must manually add ramp to the **Route Type** data field.

→ In the **Route** data field, type the route name and select from the drop down list.
If the user can’t identify the route that is needed based on the drop down selections available in the Route field, they can use the ACIS route explorer.

After clicking on the route explorer link, the user can zoom into the location and click on the route to show the name that is used in ACIS. In the example below, Central Ave in Phoenix was identified as Central Ave (B). This is the route name that should be used in the Route field in ACIS Query form.
After the route is selected, the user can select **Include Both Directions** for routes that are divided.

- To enter a MilePost (MP) segment for a state highway, make sure to enter the offset (if needed) in feet and not miles. In this example, the MP range for the route was entered as 40.5 to 46.8.

**Route**
- Interstate 40 (EB)

**Include Both Directions?**
- Yes

**From Crossing Feature**
- M040

**Offset for 'From' Crossing Feature (in feet)**
- 2,640

**To Crossing Feature (optional)**
- M046

**Offset for 'To' Crossing Feature (feet)**
- 4,224
To query data for a local road segment, enter the route names and the buffer around the beginning and end of the segment.

- In this example, all crashes on Central Ave from Thomas to Indian School will be pulled, for crashes at the Thomas intersection the buffer is 300 feet and the Indian School intersection buffer is 500 feet.
To query Intersection Data, enter the intersecting road in the “From Crossing Feature” field and do NOT enter any route in the field. When the “To Crossing Feature” is left blank the query automatically becomes an intersection query.

The default buffer is 150 feet for an intersection if no value is entered in the offset for “From Crossing Feature”

The user can enter any value here (in feet) for the buffer they want to use, for example, if a roundabout location is queried the buffer may need to be larger

In this example, all crashes that occurred within 1000 feet of this intersection (in all directions) will be pulled in the query.
→ **Output Report As** field select the **EXCEL** as **output type** and then clicking on the **View Report** button
→ The most common output type is **Excel**, since this format will allow the user to view, filter, sort, and do additional analysis on the data by creating charts, graphs, etc. if necessary
→ Other report outputs such as XML, CSV, and PDF are not recommended for data analysis unless the output is being imported into another software.
Crash Analysis using ACIS

The standard detailed report has all the crash-related variables based on the incident id such as location, light and weather condition, direction of travel for each unit involved, violations, physical condition, safety device usage, and body style.

<table>
<thead>
<tr>
<th>Incident ID</th>
<th>Unit Event Sequence Desc1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incident Microfilm</td>
<td>Unit Event Sequence Desc2</td>
</tr>
<tr>
<td>Incident Date &amp; Time</td>
<td>Unit Event Sequence Desc3</td>
</tr>
<tr>
<td>Incident On Road</td>
<td>Unit Event Sequence Desc4</td>
</tr>
<tr>
<td>Incident Crossing Feature</td>
<td>Person Type Desc</td>
</tr>
<tr>
<td>Incident Offset</td>
<td>Person Safety Device Desc</td>
</tr>
<tr>
<td>Incident Injury Severity Description</td>
<td>Person Violation Desc1</td>
</tr>
<tr>
<td>Incident First Harmful Description</td>
<td>Person Physical Desc0</td>
</tr>
<tr>
<td>Incident Collision Manner Desc</td>
<td>Person Physical Desc1</td>
</tr>
<tr>
<td>Incident Light Condition Desc</td>
<td>Person Physical Desc2</td>
</tr>
<tr>
<td>Incident Weather Desc</td>
<td>Person Physical Desc3</td>
</tr>
<tr>
<td>Incident Intersection Type Desc</td>
<td>Person Physical Desc4</td>
</tr>
<tr>
<td>Incident Junction Relation Desc</td>
<td>Person Physical Desc5</td>
</tr>
<tr>
<td>Incident Traffic Way Type Desc</td>
<td>Person Physical Desc6</td>
</tr>
<tr>
<td>Incident File Number</td>
<td>Person Physical Desc97</td>
</tr>
<tr>
<td>Incident Officer Name</td>
<td>Person Physical Desc99</td>
</tr>
<tr>
<td>Unit Body Style Desc</td>
<td>Latitude</td>
</tr>
<tr>
<td>Unit Travel Direction Desc</td>
<td>Longitude</td>
</tr>
<tr>
<td>Unit Action Desc</td>
<td>X</td>
</tr>
<tr>
<td>Unit Road Condition Desc1</td>
<td>Y</td>
</tr>
<tr>
<td>Unit Surface Condition Desc1</td>
<td>Geocode On Road</td>
</tr>
<tr>
<td>Unit Env Condition Desc1</td>
<td>Geocode Crossing Feature</td>
</tr>
<tr>
<td>Unit Defect Desc1</td>
<td>Geocode Offset (miles)</td>
</tr>
<tr>
<td>Unit Number</td>
<td></td>
</tr>
</tbody>
</table>


- When the output is opened in Excel, the Data will be in the **Sheet 1** tab. The data includes all incident, unit and person table fields.
- Rename the **Sheet 1** tab as **All Data**.
The Query Parameters will be in the Sheet 2 tab of the excel file.
Rename the Sheet 2 tab as Parameters.
The Standard Detailed Report output has multiple rows for each crash depending on how many units are involved.

For example, if a crash has 7 units, then there will be seven rows in the excel spreadsheet for this particular crash.

The number of rows in the output report should **not** be interpreted as the number of crashes for the location. It represents the number of units that are involved in all the crashes that were obtained in the query.

In this example Incident ID 3042285 is a 2 unit involved crash.
To obtain the number of crashes, the USER should filter on Unit Number for value 1 in the excel spreadsheet.

The Unit Number is located in column X.

Use the filter in excel to select Unit Number = 1 only.

After the filter is selected, copy all data into a new tab in the excel spreadsheet and rename the tab as Unit 1.

The Unit 1 tab in the excel spreadsheet is an easy way to find the number of crashes and also filter on other incident level criteria such as severity, year, crash type, light condition, first harmful event, etc. as need to study the crash.
Crash Analysis using ACIS

![Excel Spreadsheet](image)

<table>
<thead>
<tr>
<th>Incident ID</th>
<th>Unit Action Desc</th>
<th>Unit Road Condition Desc1</th>
<th>Unit Surface Condition Desc1</th>
<th>Unit Defect Desc1</th>
<th>Unit Number</th>
<th>Unit Event Sequence Desc1</th>
<th>Unit Event Sequence Desc2</th>
<th>Unit Event Sequence Desc3</th>
<th>Unit Event Sequence Desc4</th>
<th>Person Type Desc</th>
</tr>
</thead>
<tbody>
<tr>
<td>304285</td>
<td>Going Straight Ahead</td>
<td>No Contributing Circumstances</td>
<td>Dry</td>
<td>No Contributing Circumstances</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Driver</td>
</tr>
<tr>
<td>304285</td>
<td>Stopped In Trafficway</td>
<td>No Contributing Circumstances</td>
<td>Dry</td>
<td>No Contributing Circumstances</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Driver</td>
</tr>
<tr>
<td>304997</td>
<td>Going Straight Ahead</td>
<td>No Contributing Circumstances</td>
<td>Dry</td>
<td>No Contributing Circumstances</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Driver</td>
</tr>
<tr>
<td>304997</td>
<td>Stopped In Trafficway</td>
<td>No Contributing Circumstances</td>
<td>Dry</td>
<td>No Contributing Circumstances</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Driver</td>
</tr>
<tr>
<td>305680</td>
<td>Going Straight Ahead</td>
<td>No Contributing Circumstances</td>
<td>Dry</td>
<td>No Contributing Circumstances</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Driver</td>
</tr>
<tr>
<td>305680</td>
<td>Making Left Turn</td>
<td>No Contributing Circumstances</td>
<td>Dry</td>
<td>No Contributing Circumstances</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Driver</td>
</tr>
<tr>
<td>307055</td>
<td>Leaving Parking Position</td>
<td>No Contributing Circumstances</td>
<td>Dry</td>
<td>No Contributing Circumstances</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Driver</td>
</tr>
<tr>
<td>307055</td>
<td>Walking Against Traffic</td>
<td>No Contributing Circumstances</td>
<td>Dry</td>
<td>No Contributing Circumstances</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Pedestrian</td>
</tr>
<tr>
<td>307520</td>
<td>Going Straight Ahead</td>
<td>No Contributing Circumstances</td>
<td>Dry</td>
<td>No Contributing Circumstances</td>
<td></td>
<td>1 Motor Vehicle In Transport</td>
<td></td>
<td></td>
<td></td>
<td>Driver</td>
</tr>
<tr>
<td>307520</td>
<td>Going Straight Ahead</td>
<td>No Contributing Circumstances</td>
<td>Dry</td>
<td>No Contributing Circumstances</td>
<td></td>
<td>2 Motor Vehicle In Transport</td>
<td></td>
<td></td>
<td></td>
<td>Driver</td>
</tr>
<tr>
<td>307520</td>
<td>Going Straight Ahead</td>
<td>No Contributing Circumstances</td>
<td>Dry</td>
<td>No Contributing Circumstances</td>
<td></td>
<td>3 Motor Vehicle In Transport</td>
<td></td>
<td></td>
<td></td>
<td>Driver</td>
</tr>
</tbody>
</table>
## Crash Analysis using ACIS

![Excel Spreadsheet](attachment://spreadsheet.png)

### Table: Crash Data

<table>
<thead>
<tr>
<th>Incident ID</th>
<th>Action</th>
<th>Unit Road Condition Desc1</th>
<th>Unit Surface Condition Desc1</th>
<th>Unit Env Condition Desc1</th>
<th>Unit Defect Desc1</th>
<th>Unit Number</th>
<th>Unit Event Sequence Desc1</th>
<th>Unit Event Sequence Desc2</th>
<th>Unit Event Sequence Desc3</th>
<th>Unit Event Sequence Desc4</th>
<th>Person Type Desc</th>
<th>Person Type Id</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>Slow</td>
<td>No Contributing Circumstances</td>
<td>Dry</td>
<td>No Contributing Circumstances</td>
<td>No Contributing Circumstances</td>
<td>1</td>
<td>Motor Vehicle In Transport</td>
<td></td>
<td></td>
<td></td>
<td>Driver</td>
<td>SN</td>
</tr>
<tr>
<td>17</td>
<td>Slow</td>
<td>No Contributing Circumstances</td>
<td>Dry</td>
<td>No Contributing Circumstances</td>
<td>No Contributing Circumstances</td>
<td>1</td>
<td>Motor Vehicle In Transport</td>
<td></td>
<td></td>
<td></td>
<td>Driver</td>
<td>SN</td>
</tr>
<tr>
<td>19</td>
<td>Slow</td>
<td>No Contributing Circumstances</td>
<td>Dry</td>
<td>No Contributing Circumstances</td>
<td>No Contributing Circumstances</td>
<td>1</td>
<td>Motor Vehicle In Transport</td>
<td></td>
<td></td>
<td></td>
<td>Driver</td>
<td>SN</td>
</tr>
<tr>
<td>21</td>
<td>Slow</td>
<td>No Contributing Circumstances</td>
<td>Dry</td>
<td>No Contributing Circumstances</td>
<td>No Contributing Circumstances</td>
<td>1</td>
<td>Traffic Signal Support</td>
<td></td>
<td></td>
<td></td>
<td>Driver</td>
<td>SN</td>
</tr>
</tbody>
</table>

### Notes:
- The spreadsheet contains detailed data on various incidents, including road conditions, environmental conditions, defects, unit numbers, and associated events.
- The data is used for crash analysis and is part of the Arizona Department of Transportation's (ADOT) ACIS system.
# Crash Analysis using ACIS

![Excel Sheet](image)

<table>
<thead>
<tr>
<th>Incident ID</th>
<th>Incident Location</th>
<th>Incident Time</th>
<th>Unit Number</th>
<th>Event Sequence 1</th>
<th>Event Sequence 2</th>
<th>Event Sequence 3</th>
<th>Event Sequence 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>3042285</td>
<td>07 BELL RD</td>
<td>43rd Ave</td>
<td>1</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>3049957</td>
<td>07 BELL RD</td>
<td>43rd Ave</td>
<td>1</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>3056802</td>
<td>07 43RD AVE</td>
<td>Bell Rd</td>
<td>1</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>3070655</td>
<td>07 43RD AVE</td>
<td>Bell Rd</td>
<td>1</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>3075270</td>
<td>07 BELL RD</td>
<td>43rd Ave</td>
<td>1</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>3078591</td>
<td>07 BELL RD</td>
<td>43rd Ave</td>
<td>1</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>3078667</td>
<td>07 43RD AVE</td>
<td>Bell Rd</td>
<td>1</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>3088087</td>
<td>07 43RD AVE</td>
<td>Bell Rd</td>
<td>1</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>3091200</td>
<td>07 BELL RD</td>
<td>43rd Ave</td>
<td>1</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>3095776</td>
<td>07 BELL RD</td>
<td>43rd Ave</td>
<td>1</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>3096668</td>
<td>07 BELL RD</td>
<td>43rd Ave</td>
<td>1</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>
A UNIT is defined as any driver, pedestrian, or bicyclist, this is shown in Column AC (person type desc).

Passenger information is not shown in the Standard Detailed Report output.
Generate Crash Map

- Output Report As field select the MAP or Aerial Map as output type and then clicking on the View Report button
Crash Analysis using ACIS

Zoom in/out in the map / Select crashes / Move around in the map

Left Click on crash dot or legend - Keep Only / Exclude option appears. You can exclude crashes or severity based on your needs and Map will be refreshed.

Hover over the crash to see crash details

Injury Severity Count

Query Parameters

Check the Incident/Unit / Person #’s match the excel data

Crashes displayed by Injury Severity

Share Map Report link, Download the Map Report / Full Screen

Undo, Redo, Refresh, Revert changes (KEEP ONLY/ EXCLUDE) made in Tableau Report
Click on **Share** button on the bottom right corner. Copy the link and paste in the excel data sheet for future reference. The link will open the same map report. The link works only in ADOT network.
→ Create a tab and name it **Links**
→ **Paste** the copied map link path in the excel as shown below
→ **Save** the excel file
→ Click on **DOWNLOAD** button on the bottom right corner. Create a the map report as PDF or image per your needs. Save this file in the same folder where you saved your excel crash data.
Click on **DOWNLOAD** button on the bottom right corner. Create a the map report as PDF or image per your needs. Save this file in the same folder where you saved your excel crash data.
Crash Analysis using ACIS

Generate Crash Charts / Tables

→ Select Site Summary Graphs ACIS Report
Enter the query parameters. The parameters should be same as the Standard Detail Report you ran for the same project site.

Output Report As field select the Visualization as output type and then clicking on the View Report button.
Crash Analysis using ACIS

11 Tabs of Graphs/Charts summarizing the crashes (incident/unit/person) data are generated. Click on the tabs to navigate through all the charts.

Left Click on Chart or Table - Keep Only / Exclude option appears. You can exclude any field you don’t need. The table and charts will be refreshed.

Hover over the Charts/Table to see crash details.
Click on Share button on the bottom right corner. Copy the link and paste in the excel data sheet for future reference. The link will open the same Site Summary Graphs report. The link works only in ADOT network.
In the **Links** tab of the excel data file **PASTE** the copied Site Summary Graphs link path in the excel as shown below

**Save the excel file**
Click on **DOWNLOAD** button on the bottom right corner. Create a the map report as PDF or image per your needs. Save this file in the same folder where you saved your excel crash data.
→ Select “Specific Sheets from this workbook” option in Include field.
→ Click on SELECT ALL. This will select all the 11 tabs.
→ Create a the map report as PDF or Image per your needs. Save this file in the same folder where you saved your excel crash data.
Crash Analysis using ACIS

Best Practices in Downloading, Saving Crash Data from ACIS

- Following the above described steps will help the user to download crash data, crash location maps, summary charts / tables needed to understand the crash location, patterns and understand the safety concerns.
- Saving the files with Project Location name and Query date will help locate the files in future easily.
- Renaming the excel data Tabs. Creating new tabs, naming them and adding UNIT 1 data and links to Map and Site Summary Graphs will help retrieve the same reports without re-running the queries.
- CHECK the Query Parameters, Incident #, Unit # and Person # are same between Excel / Map and Site Summary Graph OUTPUTS.
Best Practices in Downloading, Saving Crash Data from ACIS

➔ If you are querying Crash Data for a BEFORE & AFTER study. Run the BEFORE query for the project site. Create FAVORITE by clicking the Favorite button at the bottom next to View Report button.
Best Practices in Downloading, Saving Crash Data from ACIS BEFORE AND AFTER ANALYSIS

→ When you are running AFTER query, go to Favorites and select on the project site.
→ The query form will open with BEFORE saved query with all the parameters
→ Change the CRASH PERIOD field to after period dates. Rerun the Standard Detail Report and Site Summary Queries.
Best Practices in Downloading, Saving Crash Data from ACIS

- **Copy** the web browser link for the BEFORE query Favorite saved.
- **Paste** in the Parameter Tab of the excel data for future use. This will help reduce Query Form errors if another user is querying the after data.
- **Save** the excel file