Collision Diagrams
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Introduction
COLLISION DIAGRAMS

The purpose of collision diagrams is to graphically represent crashes at a particular location. A collision diagram represents the crash type, severity, speed, light conditions, and road conditions for each individual crash report. After a collision diagram is drawn, one may be able to identify potential problem areas with the location through reoccurring patterns. Collision Diagrams are just one of the many tools used to help develop a better understanding of the areas that may need to be looked at for a particular location.
Base Mapping

Base mapping is one of the more critical parts of a collision diagram. When drawing a collision diagram for site specific evaluations, the following protocol should be used in order of priority:

1. If a signal plan exists, use it and delete unneeded items. (Signal plans will be provided)
   - Keep pavement edge lines, lane lines, pavement markings (arrows, stop bars), street names, and speed limits.
   - Signal plan will also be used to show signal information on collision diagram. This will be gone over later in the presentation.
**Base Mapping (cont)**

2. If an aerial exists (google maps, etc), use the aerial and trace over the existing line work (this allows more consistency in lane configurations and skew angles).

3. Free hand as a last resort, but at a minimum the lane configurations and skew angles should be as close as possible to actual. If no other visual of the intersection exists, the DMV crash report drawings can be used.
How to Load and Use the Collision Diagram Program
**STEP 1:** Create an input file of crash id’s you wish to plot

- For Intersections and Strips (Preferred method for Greenfield users and others connected to the State network)
  - Complete Intersection or Strip Analysis Report in TEAAS and click “Generate Study”
  - The following box opens

- Check the box next to “Save Crash ID List,” then “OK”
STEP 1: Create an input file of crash id’s you wish to plot

- For Intersections and Strips (For contractors and other users not connected to the State network)
  - Complete Intersection or Strip Analysis Report in TEAAS and click “Generate Study”
  - The following box opens

- Check the box next to “Save Collision Diagram Data File,” then “OK”
Step 1 - Creating Collision Diagram Input File (Method 1)

• Choose name and location and save the text file
Create an input file of crash id’s you wish to plot – Second Method

• If you just have a list of Crash IDs that you want to plot

  • In TEAAS go to the ‘Generate Reports’ tab and click on ‘Generate Collision Diagram File’

  • The following box should pop up:
Copy and paste the crash id’s that you want plotted into the text box on the left
- You can also import a text file of the crash id’s
- Note: If using this method, make sure crash id’s are in order that you want them to be plotted
  - Intersection Crash IDs should be ordered by date
  - Strip Crash IDs should ordered by milepost, then by date
• Click “Generate Data File”

• Choose the name and location for the file to be saved.
Step 1 - Creating Collision Diagram Input File

If opened, the collision diagram file will look similar to one of the following:

If created using “Save Crash ID” list (preferred method for State network users)

OR

If created using “Save Collision Diagram Data File” or the “Generate Collision Diagram File” method
**STEP 2:** Go to MicroStation and load the collision diagram program

- Open MicroStation

  ![MicroStation screen showing file selection]

  - Select Tsu in the user box if it is not already selected
  - Click Open to open MicroStation
There are two ways to load the program:

1. In the key-in window, type in “mdl load collision”

OR

2. Pull down the Utilities menu and select MDL Applications. Scroll through the Available Applications until you see collision. Double-click on collision to bring up the program interface.
Step 2 - Loading the Collision Diagram Program

• The program is now loaded and the following screen should appear (may take a few seconds):
Step 3 - Loading the Input File

• **STEP 3:** Load your crash id input file. Depending on how you created your list of Crash IDs this is done in one of two ways:

  • For lists created using “Save Crash ID List” (Preferred method for Greenfield users and others connected to the State network): Click on the “Load Crash ID File” button.

  • For lists created using “Save Collision Diagram Data File” or the “Generate Collision Diagram File” method (non State network-users): Click on the “Load TEAAS Input File” button.
Step 3 - Loading the Input File

- Navigate to the input file and select “Open”. Once you click “Open”, the program will connect to the TEAAS database and gather the information necessary to plot the crashes in MicroStation. This may take a few seconds.
The program is now ready to use. All of the fields not grayed out can be changed by clicking on the arrow button at the right of the field and selecting another valid value.

-- NOTE: The information on this screen should be checked for each crash. Coding errors could cause some of the information to come in wrong. Also, some crashes can not be plotted in an automated manner. Certain crash types will still have to be plotted manually. More on this will be discussed later in presentation.
Other Notes on Collision Diagrams
Breakdown of Collision Diagram Program Interface

- Can toggle these fields by using the check boxes.
- Button used to select an input file of crash id's.
- Use these buttons to switch between units.
- Use these buttons to switch between crash id's.
- Press the plot button to plot your crash based on the values selected.
- Can change the scale at which the crashes plot to best fit your base map.
- Can toggle these fields by using the check boxes.
Checking Data in Collision Diagram Program

Check data against crash report to make sure it was entered correctly.
## Breakdown of Plotted Crash Components

<table>
<thead>
<tr>
<th>Road Conditions</th>
<th>Injury Indicator</th>
<th>Vehicle Speed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dry</td>
<td>Non-Fatal Injury</td>
<td>9 MPH or Less</td>
</tr>
<tr>
<td>Wet</td>
<td>Fatal Injury</td>
<td>10 to 19 MPH</td>
</tr>
<tr>
<td>Ice</td>
<td></td>
<td>20 to 29 MPH</td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td>30 to 39 MPH</td>
</tr>
<tr>
<td></td>
<td></td>
<td>40 to 49 MPH</td>
</tr>
<tr>
<td></td>
<td></td>
<td>50 to 59 MPH</td>
</tr>
<tr>
<td></td>
<td></td>
<td>60 to 69 MPH</td>
</tr>
<tr>
<td></td>
<td></td>
<td>70 MPH and Up</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Unknown Speed</td>
</tr>
</tbody>
</table>
Crash Types

- Rear End
- Ran Off Road
- Head On
- Angle
- Left Turn – Same Roadway
- Left Turn – Different Roadway
- Backing Up
- Right Turn – Same Roadway
- Right Turn – Different Roadway
- Sideswipe – Same Direction
- Sideswipe – Opposite Direction
- Movable Object
- Bicycle
- Pedestrian
- Animal
Notes on Collision Diagrams

• Some crash types ("Other Collision with Vehicle," "Other Non-Collision," "Unknown") do not have a corresponding crash cell. In the collision diagram program you will need to change the crash type to one that the crash most closely resembles. A note might need to be added for further clarification.

Will not Plot
Crash report describes it as a sideswipe-type crash
Change Crash Type to sideswipe, same direction
Notes on Collision Diagrams

- Occasionally you will need to correct miscoded crash types.

Coded as Left Turn, Same Roadway

From the crash report diagram and narrative, it is apparent that it was actually a Left Turn, Different Roadway

Change the crash type before plotting
Notes on Collision Diagrams

- Some crashes (U-Turns) are not an option on crash report. Open cell library and find what you need.
Notes on Collision Diagrams

- Collision Diagram program has some quirks to it

- Sometimes fault indicator or speeds need to be changed even though the information is entered correctly. This can be done either by changing information in collision diagram program box or by placing the cell, breaking it, and manually moving indicators to correct location.

  - Although we have a fault indicator, if possible change crash number circle to at-fault vehicle as a secondary indicator (not possible with backing-up crash).

- Sideswipe crashes always drawn same way (shows vehicle on right swerving). May need to be changed to accurately reflect which vehicle departed the lane

Cell came in like this

![Image of cell as it came in]

Needed to be changed to this

![Image of cell as it should be changed]
There are different ways to draw collision diagrams so that they are not as cluttered.

- Stacking Numbers – Use if details about two or more crashes are the same (type, fault, road and light condition, speed ranges)
• Use Insets and “Blow Up” - Use if there is a large pattern that can’t be fit into the diagram at a readable size.
• Collision Diagrams are not to scale. We try to be as accurate as possible, but for visual clarity sometimes things need to be changed. (Driveway locations, length of turn lanes, etc)

• If there is information that you think is relevant, put a note next to the crash.
• Signals – Use signal file to help draw simple signal diagram on the collision diagram
• How to make signal diagram

  • ‘Reference’ signal file into collision diagram file

  • Zoom into intersection and copy all the signal head symbols as well as the corresponding numbers. Paste them off to the side. They will probably be spaced far apart and will be needed to moved closer together. Try to keep their placement relative to each other.
• Now copy the “Signal Face I.D.” chart from signal file and place over signal head symbols that you copied.

• Put a box around everything and label it with the Signal ID

• Place on collision diagram. Might need to be resized.
Notes on Printing

- Change all crash cells to line weight of “0” so that speeds are readable after converting to pdf.
- Leave crash cells in color. Stick to black/white for most background drawing features unless color is necessary. The yellow color used for lane lines and signal heads does not show up well when printed. If a “yellow’ color is preferred, use one with more orange in it
- We don’t use any special IPLOT settings. Just print as is.

We are open to any suggestions you have to make Collision Diagrams better.
Appendix
Example of Completed Collision Diagram
Example of Completed Collision Diagram

SS# 02-05-204
Order# 41000011849
Craven County
City of Havelock
BEFORE Period
10/1/03 - 7/31/07
Installation Instructions
ws_update program

ONLY FOR OFFICES OUTSIDE OF GREENFIELD PKWY
Installation Instructions – ws_update program (outside Greenfield only)

-Download UpdateWS program from the weblink below:
  -https://connect.ncdot.gov/resources/CADD/Pages/default.aspx
-This program will allow you to update your MicroStation workspaces with the most current version available
Installation Instructions – ws_update program (outside Greenfield only)

• Unzip the file you just downloaded (UpdateWS.zip):
  - Move UpdateWS.exe to your desktop or other convenient location
- Open the UpdateWS program

- Check the box beside TSU_STDS and click the Update button

- You have now updated your Traffic Safety workspace files with the most current available