

**FACERS
Legislative Meeting
Daytona Beach
November 20, 2008**

**Crash Data Management and
Analysis (CDMS)**

**Bob Wallace, P. E., AICP
Demian Miller, AICP
Charles Shultz**



November 20, 2008



Tindale-Oliver & Associates, Inc.

Today's Discussion

- ☐ **Clients and Service Areas**
- ☐ **Why TOA's Safety Team**
- ☐ **Questions and Answers**



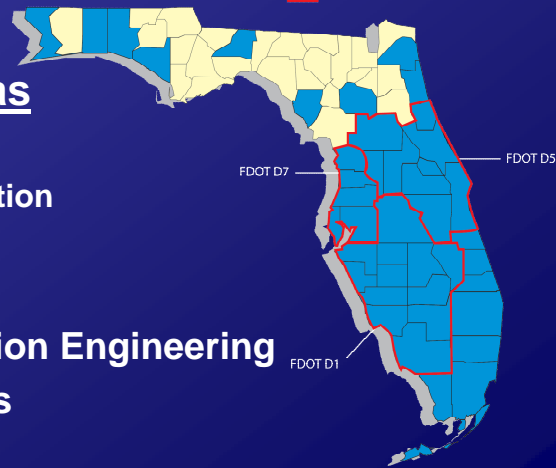
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Clients

TOA Florida Experience
FDOT Districts

Service Areas

- ☐ Planning
 - Transportation
 - General
- ☐ Transit
- ☐ Transportation Engineering
- ☐ Impact Fees
- ☐ Safety



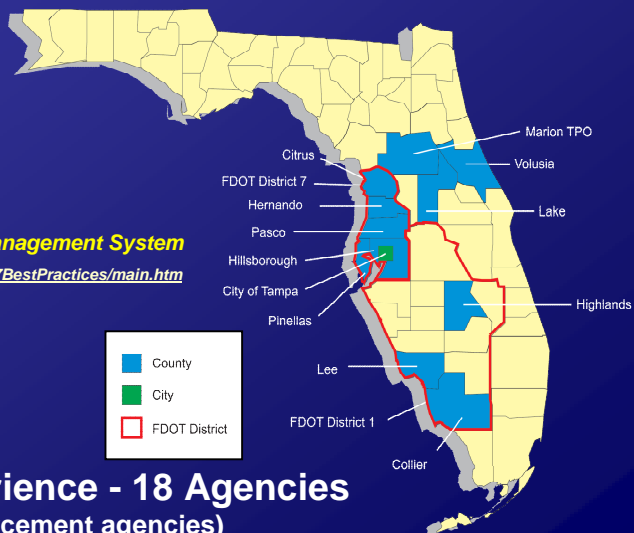
Safety Clients

**USDOT-FHWA National Roadway
Safety Awards Winner**



FDOT District 7: Crash Data Management System

<http://www.roadwaysafetyawards.org/2007BestPractices/main.htm>



TOA Experience - 18 Agencies
(includes enforcement agencies)



Why TOA's Safety Team

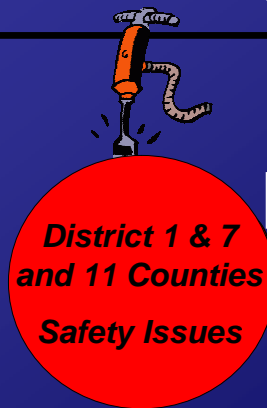
Tindale-Oliver Safety Team Provides:

- ☐ Crash/Safety Data Experts
- ☐ Create Safety Plans
- ☐ Innovative Solutions
- ☐ Data Driven Projects



TOA's Two Tier Approach

**Top-Down
Approach to
Safety**



Problem Location

Counter Measure Counter Measure Counter Measure

**Bottom-Up
Approach to
Safety**

Location Location
Location Location Location

Countermeasure



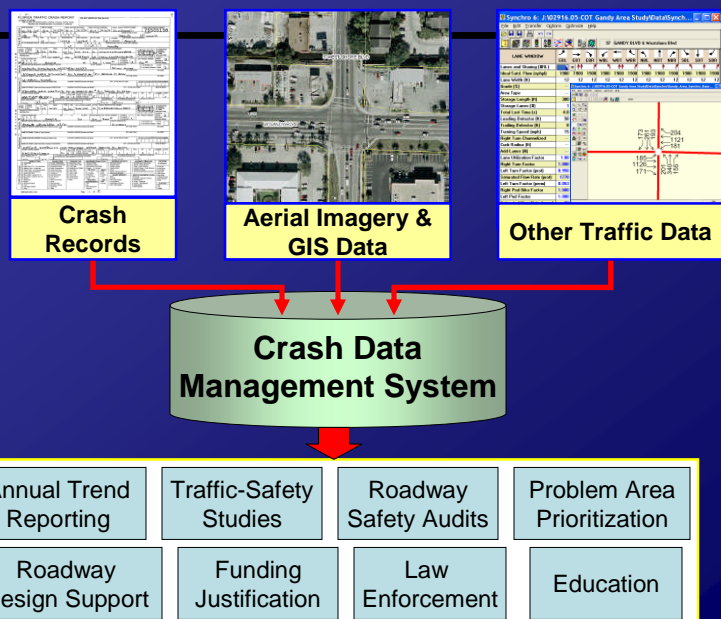
Tindale-Oliver's Safety Approach

Data Driven Analysis TOPICS:

- ☐ **CDMS – What is It?**
- ☐ **How Does CDMS Support Safety**
- ☐ **Data and Analysis Tools**
- ☐ **Data and Analysis = Projects**



What is Crash Data Management?





Tindale-Oliver's Safety Approach

Data Driven Analysis TOPICS:

- ☐ CDMS – What is It?
- ☐ **How Does CDMS Support Safety**
- ☐ Data and Analysis Tools
- ☐ Data and Analysis = Projects




How Does CDMS Support Safety?

- ☐ Crash Data is Used For
 - ☐ Road Safety Audits
 - ☐ Safety Studies
 - ☐ Roadway Design Support
 - ☐ Benefit Cost Calculations
 - ☐ Project Prioritization
 - ☐ Funding Justification

The image shows a screenshot of a Florida Traffic Crash Report form. The form is titled 'FLORIDA TRAFFIC CRASH REPORT' and includes fields for 'CRASH DATE', 'CRASH TIME', 'CRASH LOCATION', 'CRASH TYPE', 'CRASH SEVERITY', 'CRASH CIRCUMSTANCES', 'CRASH ANALYSIS', and 'CRASH PREVENTION'. The form is filled out with handwritten and printed information, including a crash number '71505158'.

	<h2>Key Benefits...</h2>
	<ul style="list-style-type: none"> ❑ Better Decisions, Less Time ❑ Projects and Funding Opportunities <ul style="list-style-type: none"> ▪ Identify New Projects Efficiently ▪ Prioritize Projects ▪ Identify Locations for FDOT Funds <ul style="list-style-type: none"> • High Risk Rural Roads (HRRR) • Safe Routes to School (SR2S) • High Crash Spot Review • Access Management Review

	<h2>Tindale-Oliver's Safety Approach</h2>
	<p>Data Driven Analysis TOPICS:</p> <ul style="list-style-type: none"> ❑ CDMS – What is It? ❑ How Does CDMS Support Safety ❑ Data and Analysis Tools ❑ Data and Analysis = Projects

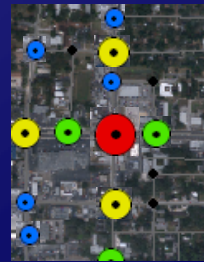


Data and Analysis Tools

Crash Data Management System

- ☐ Create Data Layers
- ☐ Data Filtering
- ☐ Collision Diagramming
- ☐ Standard Reports
- ☐ Charts and Graphs
- ☐ Data Export Tools

Refer & Update



Data and Analysis = Projects

- ☐ Collision Diagram Tool
- ☐ Crash Data Tools (Volusia County)
- ☐ Projects by Countermeasure
- ☐ High Risk Rural Roads Projects
- ☐ Road Safety Audits



Data and Analysis = Projects

- ☐ **Collision Diagram Tool**
- ☐ **Crash Data Tools (Volusia County)**
- ☐ **Projects by Countermeasure**
- ☐ **High Risk Rural Roads Projects**
- ☐ **Road Safety Audits**



GIS Based Collision Analysis Tool

Collision Analysis Tool Features

- ☐ **GIS Integration**
- ☐ **Corridor Diagramming**
- ☐ **Crash Grouping and Symbology**
- ☐ **Drag and Drop Editing**
- ☐ **Charting Against Population**
- ☐ **Aerial Photography in Reporting**
- ☐ **Easy Filtering, Selecting, and Editing**



Quick Demonstration

GIS Based Collision Diagram Tool



Data and Analysis = Projects

- ☐ Collision Diagram Tool
- ☐ **Crash Data Tools (Volusia County)**
- ☐ Countermeasure to Projects
- ☐ High Risk Rural Roads Projects
- ☐ Road Safety Audits

Elementary Walk Zones (Volusia County)

**Identify Problem/
Study Area**
Select Crash Data – 993
crashes selected


**All Volusia
County
Crashes**

↓

**S. Daytona
Elem. Walk**

Elementary Walk Zones (Volusia County)

Data Filter
Select Pedestrian/Bike
Crash Data – 13 crashes



Elementary Walk Zones (Volusia County)

Volusia County CDMS - [Main: Form]

File Edit Insert Records Window Help AddNew PDF

Volusia County

Crash Data Management System Menu

Data Management

Import PRIDE Data

Update DB From Data Entry

Move Crash Report Images

Export Last 6 Months to BH

Update Image Link to Image Archive

Summary Layers

Update Standard Summary Layers

Or

Date Range

FROM TO

Create Summary Layers (Date Range)

Database Size

Size: 648 MB Action: No Action Needed

CDMS Reports

Select From the Following Report Items

Top Intersection Locations

☐ Top 20
☒ Top 50
☐ Top 100

☒ Annualized Weighted Frequency Report
☒ First Harmful Event by Year
☒ Contributing Cause by Year

Crash Data Summary

☒ Include All
☒ Crash Type Summary
☒ Temporal Trends
☒ Environmental Trends

☒ Fault Vehicle
☒ Driver Character
☒ Roadway Character

Report Title:

S Daytona Walk Zone Ped/Bike Crashes

Report Memo:

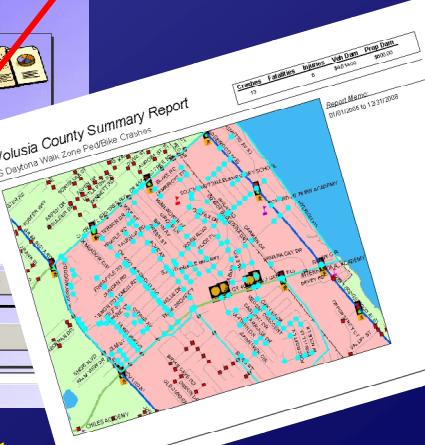
01/01/2005 to 12/31/2008

Create User Defined Report

STATS REPORT

Volusia County Summary Report

S Daytona Walk Zone Ped/Bike Crashes




Crashes

13

Page 1 of 13

Create User Defined Report

Standardized Reports



Elementary Walk Zones (Volusia County)

Copies Crash Reports And Data Sub-Set

Selected Crashes

00141732.TIF

00461655.TIF

00461696.TIF

00461910.TIF

00466673.TIF

00466943.TIF

00466991.TIF

00466999.TIF

00475888.TIF

00660107.TIF

00660150.TIF

Name	Size	Type	Date Modified
00141732.TIF	95 KB	TIF Image	6/13/2005
00461655.TIF	123 KB	TIF Image	6/13/2005
00461696.TIF	121 KB	TIF Image	6/13/2005
00461910.TIF	95 KB	TIF Image	6/13/2005
00466673.TIF	100 KB	TIF Image	6/13/2005
00466943.TIF	114 KB	TIF Image	6/13/2005
00466991.TIF	104 KB	TIF Image	6/13/2005
00466999.TIF	101 KB	TIF Image	6/13/2005
00475888.TIF	129 KB	TIF Image	6/13/2005
00660107.TIF	116 KB	TIF Image	6/13/2005
00660150.TIF	98 KB	TIF Image	6/13/2005

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November 20, 2008

FACERS Legislative Meeting
Crash Data Management and Analysis

11

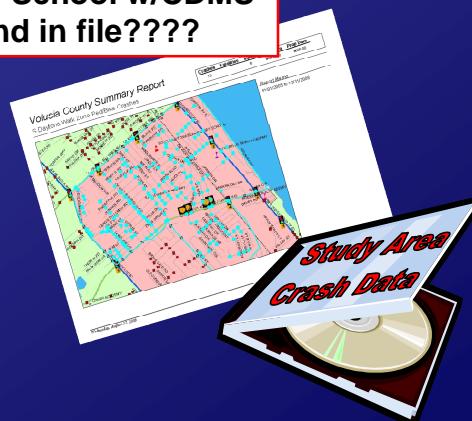


FLORIDA TRAFFIC CRASH REPORT										DO NOT WRITE IN THIS SPACE									
LONG FORM																			
DATE OF CRASH: 01/13/01 TIME OF CRASH: 10:15 AM TIME OFFICER ARRIVED: 01/14/01 01:14 PM										SHIRT: 01/13/01 T-SHIRT: 01/13/01									
REPORT MADE BY: 10768 NEXT REPORT: 01/14/01										1. DOWNGRADE: 01/13/01									
TYPE OF CRASH: 1										2. DOWNGRADE: 01/13/01									
1. DOWNGRADE: 01/13/01										2. DOWNGRADE: 01/13/01									
3. DOWNGRADE: 01/13/01										4. DOWNGRADE: 01/13/01									
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7. DOWNGRADE: 01/13/01										8. DOWNGRADE: 01/13/01									
9. DOWNGRADE: 01/13/01										10. DOWNGRADE: 01/13/01									
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25. DOWNGRADE: 01/13/01										26. DOWNGRADE: 01/13/01									
27. DOWNGRADE: 01/13/01										28. DOWNGRADE: 01/13/01									
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83. DOWNGRADE: 01/13/01										84. DOWNGRADE: 01/13/01									
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89. DOWNGRADE: 01/13/01										90. DOWNGRADE: 01/13/01									
91. DOWNGRADE: 01/13/01										92. DOWNGRADE:									

- ❑ Exports Cra
- ❑ Links Exce



**Identify Problem/Study Area
To Export Images & Report
~ 15 minutes per School w/CDMS
to pull by hand in file????**





Data Driven Analysis to Projects

Elementary Walk Zones (Volusia County)

SR2S Status:

- 9 applications submitted past 3 years
- 3 approved (\$888,725)
- 1 awaiting Feasibility approval



Quick Demonstration

FDOT Formatting With Export Tool



Data and Analysis = Projects


- ☐ Collision Diagram Tool
- ☐ Crash Data Tools (Volusia County)
- ☐ **Projects by Countermeasure**
- ☐ High Risk Rural Roads Projects
- ☐ Road Safety Audits



Data Driven Analysis to Projects

Potential Projects by Countermeasure Excel File
District 1 and 7

This process finds locations where crashes could be mitigated by applying a specific countermeasure




Data Driven Analysis to Projects

Potential Projects by Countermeasure – District 1 Demo

Methodology

☐ Choose Countermeasures with Client



Protected Left Turn

Back Plates


Signalize Stop Control

Access Management

DUI (Enforcement)


Street Lighting


High Speed Rear-ends (Flashers)




Pedestrian (Signage and Markings)

Run-Off Road (Rumble or Shoulders)







Data Driven Analysis to Projects

Potential Projects by Countermeasure – District 1 Demo

Methodology

☐ Choose Countermeasures with Client

Protected Left Turn

Back Plates

Signalize Stop Control

Access Management

DUI (Enforcement)

Street Lighting

High Speed Rear-ends (Flashers)

Pedestrian (Signage and Markings)

Run-Off Road (Rumble or Shoulders)



Data Driven Analysis to Projects

Potential Projects by Countermeasure – District 1 Demo

Methodology

- ☐ Define Crashes that Could be Mitigated for all selected Countermeasures

Protected Left Turn for Example

Traffic Control = 'TRAFFIC SIGNAL'
First Harm = 'ANGLE' OR 'LEFT-TURN'
Site Location = 'AT INTERSECTION'
Vehicle Movement = 'MAKING LEFT TURN'

SQL:

```
SELECT CASEID FROM Reports_Table WHERE (TRFCONT1='TRAFFIC SIGNAL')  
AND (FSTHARM1='ANGLE' OR FSTHARM1='LEFT-TURN') AND (SITELOC='AT  
INTERSECTION') AND (F_VEHMVMT='MAKING LEFT TURN' OR N_VEHMVMT=  
'MAKING LEFT TURN')
```



Data Driven Analysis to Projects

Potential Projects by Countermeasure – District 1 Demo

Methodology

- ☐ Compile/Summarize Crash Data by Intersection
- ☐ Create a Crash Summary Report for Each Location
- ☐ Create User Friendly Deliverable (Macro Excel File)



Quick Demonstration

Potential Projects by Countermeasure



Data Driven Analysis to Projects

Potential Projects by Countermeasure District 1

Data Analysis

To

Projects

A screenshot of a spreadsheet titled "2006 to 2008 District 1 High Crash Spot Review". It contains multiple columns with data, including some highlighted in red and yellow.

A screenshot of a project list table. The columns include Project Number, Project Name, Project Location, Project Status, Project Cost, and Project Description. The table lists several projects, some of which are highlighted in red and yellow.



Data and Analysis = Projects

- ☐ Collision Diagram Tool
- ☐ Crash Data Tools (Volusia County)
- ☐ Countermeasure to Projects
- ☐ **High Risk Rural Roads Projects**
- ☐ Road Safety Audits



Data Driven Analysis to Projects

High Risk Rural Roads Off System (FDOT District 7)

- ☐ Evaluate HRRR Candidates Off State Road System
 - District 7 has Limited Rural Roads
 - District 7 and Local County Coordination
 - Uses Off System Data to Identify Potential Projects

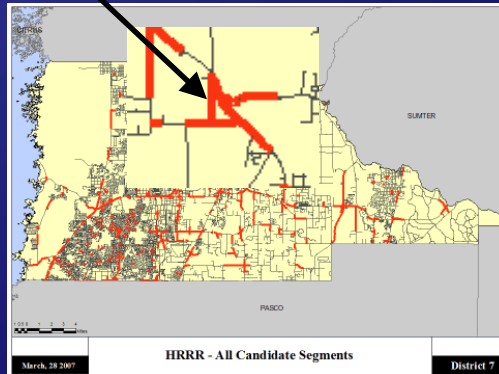


Data Driven Analysis to Projects

High Risk Rural Roads Off System (FDOT District 7)

Fatal/Incapacitating

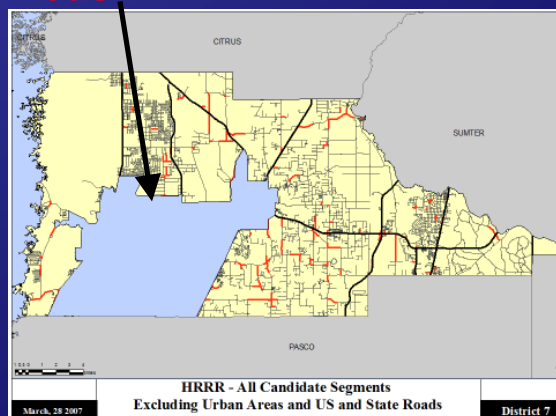
Crash rate ≥ 0.25



Data Driven Analysis to Projects

High Risk Rural Roads Off System (FDOT District 7)

Remove Urban Areas





Data Driven Analysis to Projects

High Risk Rural Roads Off System (FDOT District 7)

Final HRRR Candidate Project Location List

Preliminary HRRR Candidate List

Table 1 shows the preliminary HRRR candidate list for District 7. The segments from this list cover 29 miles of roadway with 65 associated crashes with an accident severity of Fatal or Incapacitating Injury. Map 1 shows the locations of the HRRR segments by HRRR segment number.

Top 15 Locations

Table 1- HRRR Candidate List

HRRR Segment	County	On Street	From	To	2005 AADT	Segment Length	MVMT	Fatal/Incapacitating Crashes	Fatal/Incap. Crash Rate
1	Hernando	Citrus Way	Parsons	Ponce De Leon	4619	6550	3.5011	6	0.4284
2	Hernando	Citrus Way	Ponce De Leon	Access Rd	2548	8000	1.4097		
3	Hernando	Citrus Way	Powell Rd	Ayers Rd	2900	15200	3.0472	6	0.4923
4	Hernando	Citrus Way	Cortez Blvd	Powell Rd	4500	14500	4.5107	5	0.2771
5	Hernando	Citrus Way	Cortez Blvd	Spring Lake Way	5000	8500	2.9553	3	0.2536
6	Hernando	Spring Lake Dr	Cortez Blvd	Hayman Rd	6200	19000	8.5434	9	0.2763
7	Hernando	Like Lindsey Rd	Citrus Way	Annunziata Ave	1180	6690	0.5485	4	1.8232
8	Citrus	Citrus Ave	Dunellon Rd	Erma Ct	8500	11500	6.7573	7	0.2590
9	Pasco	Lock Road	Bellamy Bros Blvd	Jessamine Rd	1571	27000	2.9063	7	0.6020
10	Pasco	Barton Rd	Parrish Grove Rd	Frazer Hill Rd	4841	2500	0.8366	3	0.8965
11	Pasco	Clay Rd	Greenwood Loop	Wells Rd	4534	16430	5.1497	8	0.3884
12	Pasco	Prospect Rd/Handcart Rd	Clinton Ave	Kiefer Rd	2600	16000	2.8758	7	0.6085
13	Pasco	Prospect Rd	Clinton Ave	Handcart Rd	2600				
14	Pasco	Prospect Rd	Prospect Rd	Kiefer Rd	2600				

Assumed Volume



Data Driven Analysis to Projects

High Risk Rural Roads Off System (FDOT District 7)

Data Analysis

To

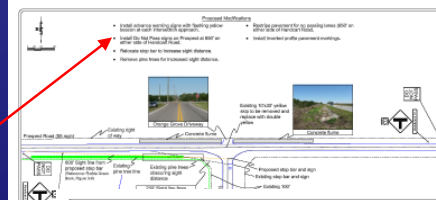
Projects

Preliminary HRRR Candidate List

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13	Pasco	Prospect Rd	Clinton Ave	Handcart Rd	2600				
14	Pasco	Prospect Rd	Prospect Rd	Kiefer Rd	2600				



Proposed Modifications

- Install advance warning signs with flashing yellow beacon at each intersection approach.
- Install Do Not Pass signs on Prospect at 650' on either side of Handcart Road.
- Relocate stop bar to increase sight distance.
- Remove pine trees for increased sight distance.
- Restripe pavement for no passing lanes (650' on either side of Handcart Road).
- Install inverted profile pavement markings.



Data and Analysis = Projects

- ☐ Collision Diagram Tool
- ☐ Crash Data Tools (Volusia County)
- ☐ Countermeasure to Projects
- ☐ High Risk Rural Roads Projects
- ☐ Road Safety Audits



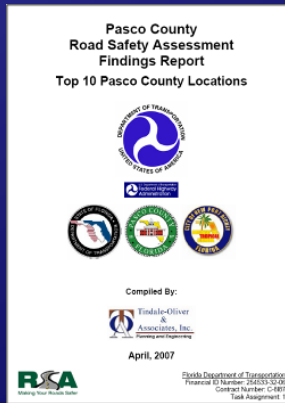
Data and Analysis = Projects

- ☐ Collision Diagram Tool
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- ☐ Countermeasure to Projects
- ☐ High Risk Rural Roads Projects
- ☐ **Road Safety Audits**



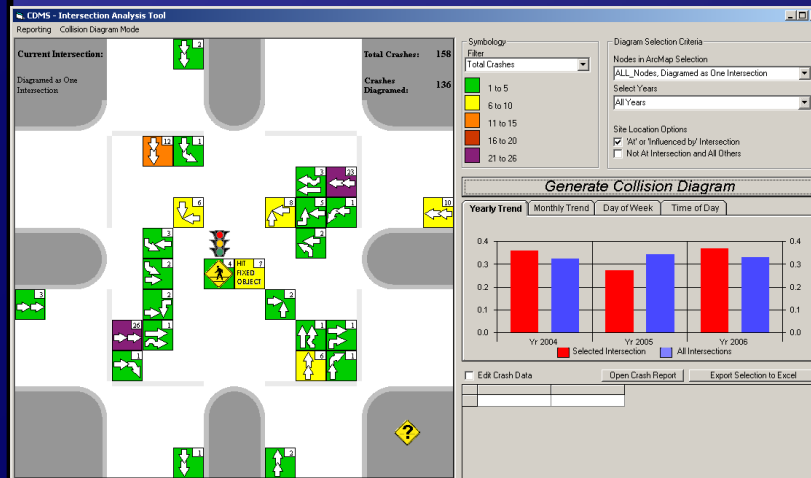
Road Safety Audit Support

- ❑ Provide Crash Data Packets Per Location
- ❑ Coordinate RSA Team
- ❑ Findings Report
- ❑ Tracking of RSA Findings and Recommendations



Road Safety Audit Support

Road Safety Audit Support – Intersection Diagrams





This aerial map displays Hillsborough Avenue from mile post 2.65 to 2.95. The map is overlaid with a grid of crash data. A vertical line at mile post 2.75 indicates a specific location. To the left of this line, there are three symbols: a green square with a white arrow pointing right, a yellow diamond with a black pedestrian symbol, and a red diamond with a black pedestrian symbol. To the right of the line, there are four symbols: a yellow diamond with a black arrow pointing right, a green square with a white arrow pointing right, a yellow diamond with a black arrow pointing right, and a green square with a white arrow pointing right. The map also shows various street names and a scale bar at the bottom right.

Map 6

Hillsborough Avenue
 Section Number: 10030000
 Mile Post: 0.00 - 3.15
 Date Range: January 2008 - June 2008
 (Excludes Rear-End and At-Signaled Intersection Crashes)

Crash Diagram Symbol

Accident (Background Color)

- Severe Injury
- Fatal
- Property Damage Only

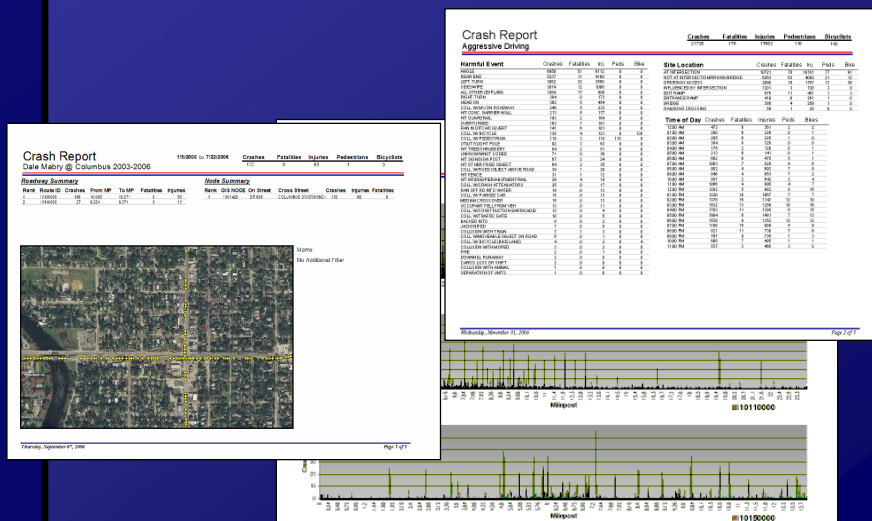
Signalized Intersection
 (Crashes excluded from diagram)

Vehicle Movement

Scale: 0 50 100 200 Feet



RSA Support – Crash Data Summary Reports





Road Safety Audit Support

Road Safety Audit Support

Ridge Rd (CR 587) @ Leo Kidd Ave



Before...

Before:

- ☐ “Congested” overhead street name advance sign, route markers and lane use signs
- ☐ Close signal spacing



After

- ☐ Improved visibility of signals with reflective back plates & simplified overhead sign
- ☐ Pavement lane use arrows

...After



Why TOA's Safety Team

Tindale-Oliver Safety Team Provides:

Crash/Safety Data Experts

Innovative Solutions

Create Data Centric Safety Plan

Unique Ideas and Approach



Thank You

Contact Info

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