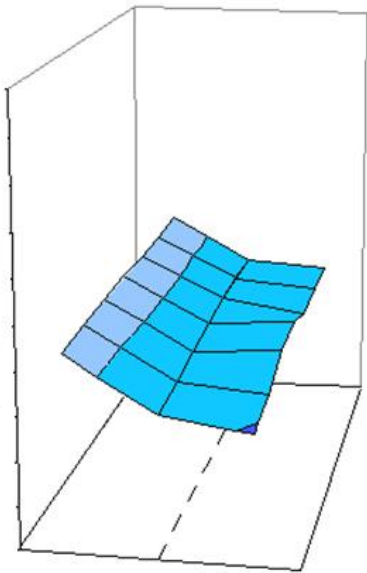


**Florida Department of Transportation**

# **Automated Cross-Slope and Drainage Path Method**

**User's Guide**



2013

***DISCLAIMER***

*This user's guide is based on Florida DOT's (FDOT) practice using International Cybernetics Corporation's (ICC) equipment and WinRP 2.1.2.1 data processing software, which may or may not be different from the equipment and software used by other highway agencies.*

## Automated Cross-Slope and Drainage Path Method

### INTRODUCTION

Pavement surfaces deteriorate from their original design due to wear and surface deformation, resulting in areas with poor drainage characteristic and surface water entrapment. Rutting characterized by permanent pavement deformation and shallow cross-slope are major contributors to surface water entrapment. Depending on other pavement surface properties and geometric factors, these conditions may cause or contribute to hazardous conditions such as hydroplaning and roadway departure, which also depends on other pavement surface properties and other factors.

The Automated Cross-Slope and Drainage Path program calculates the drainage path, the distance water travel on a pavement surface before it exits the roadway, and generates results in tabular and graphical form. It identifies locations on a roadway prone to water retention or with inadequate cross-slope characterized by areas with relatively long drainage path lengths. The user can then use the results to determine appropriate corrective action(s).

The method uses a conventional high-speed inertial profiler equipped with a Position and Orientation System to collect the data, and the Automated Cross-Slope Analysis Program (ACAP) for data analysis and reporting. The results allow for the identification of cross-slope deficiencies, better assessment of pavement surface geometry, and identification of trouble spots, which are then used to develop mitigating solutions.

The ACAP was developed in Excel, using the Visual Basic for Application (VBA) programming language (Figure 1). With ACAP the end user can import and simultaneously process cross-slope, longitudinal grade, and rut data. Using this information, ACAP uses these data to calculate drainage path and to identify areas that do not meet certain thresholds. ACAP outputs the results in tabular as well as graphical form and computes descriptive statistics for user-defined pavement segments.

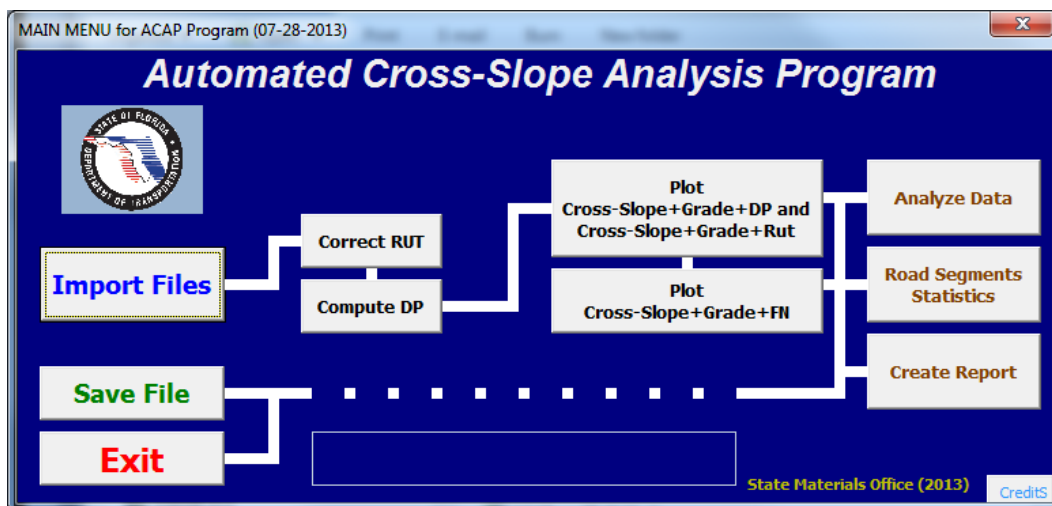


Figure 1. ACAP Program

## DRAINAGE PATH CALCULATION

Drainage path length (DP) is the distance water travels before it leaves a pavement surface. This relative measure is a function of cross-slope, longitudinal grade, and pavement drainage width. DP is calculated using the following equation:

$$DP^2 = W_C^2 \left[ 1 + \left( \frac{S_G}{S_C} \right)^2 \right] \quad (1)$$

where,

DP = drainage path length (ft)

$W_C$  = pavement drainage width (ft)

$S_C$  = cross-slope (ft/ft)

$S_G$  = longitudinal grade (ft/ft)

The DP, which is computed at discrete station locations, increases with increasing longitudinal grade and pavement width. DP decreases with increasing cross-slope. A pavement area characterized by a long DP is susceptible to cause or contribute to hydroplaning.

## DATA COLLECTION EQUIPMENT

The equipment used for data collection consists of a high-speed profiler meeting ASTM E950 Class II requirements or better. The host vehicle is also equipped with a Differential GPS with  $\pm 1$  m accuracy, and a Position and Orientation System capable of collecting cross-slope and vertical grade data with a  $\pm 0.2\%$  minimum accuracy. A minimum of 0.001 mile and 0.01 mile sampling interval is required to process cross-slope and rutting data, respectively.

## REQUIREMENTS TO RUN ACAP

- (1) Windows XP or later
- (2) MS Excel 2007
- (3) Display Monitor Resolution set to *1280 x 1024*
- (4) Minimum 2 GB of RAM

## DATA ANALYSIS

This section describes the steps for cross-slope, longitudinal grade, and drainage path evaluation. The program was developed to work with data file format specific to the profilers used by FDOT. Therefore, to analyze data using ACAP, the input files must be in the exact same format as shown in Appendix A.

#### 4.1 PART A – Data Collection

1. Ensure the data collection instruments (i.e. height sensors, Distance Measuring Instrument, accelerometers, Inertial Measurement Unit, etc.) are properly verified and calibrated according to the manufacturer's recommendations. Check host vehicle tires are inflated to the proper pressure.
2. Use the file naming convention described below when setting up file names in the data collection system:  
[SECTION][LANE].[TYPE][SUBSECTION]  
*Example: 57002R2.C01, where:*  
57002 designates the roadway SECTION ID; R designates the LANE surveyed (use R for Northbound or Eastbound lane, and L for Southbound or Westbound lane); 2 designates the lane number counting from the inside lane out, with 1 designating the passing lane; C identifies a cross-slope data file; and 01 represents the first subsection. A similar file must be set up for each lane to be surveyed.
3. ACAP requires the following three input files for each lane with the same file structure shown in Appendix A:
  - **CROSS-SLOPE AND VERTICAL GRADE** (example: **57002R1.C01**),
  - **EVENTS** (example: **57002R1.Z01**),
  - **RUTTING** (example: **57002R1.801**).

*Note:* Sample input files will be provided as part of the package to assist the end user in setting up their own data file format for the ACAP.

#### 4.2 PART B - Data Processing

The binary data collected with data collection equipment has to be processed with equipment vendor's software to output ASCII files presented in Appendix A. For ICC's data collection equipment, user enters preset values for cross-slope and vertical grade, events, and rutting in ICC WinRP software as shown in Appendix B.

#### 4.3 PART C – Data Post Processing

1. Launch the ACAP by executing the *ACAP version 07.28.13.xls* file. This becomes the main template file.
2. In Microsoft Excel, find **Trust Center Settings** in **Excel Options**, select **Macro Settings** and:
  - select **Enable all macros**,
  - check mark **Trust Access to the VBA project object model**.
3. **Maximize** the Microsoft Excel window.
4. Click the **START** button inside the main file. The ACAP will load the main menu, as shown in Figure 2.

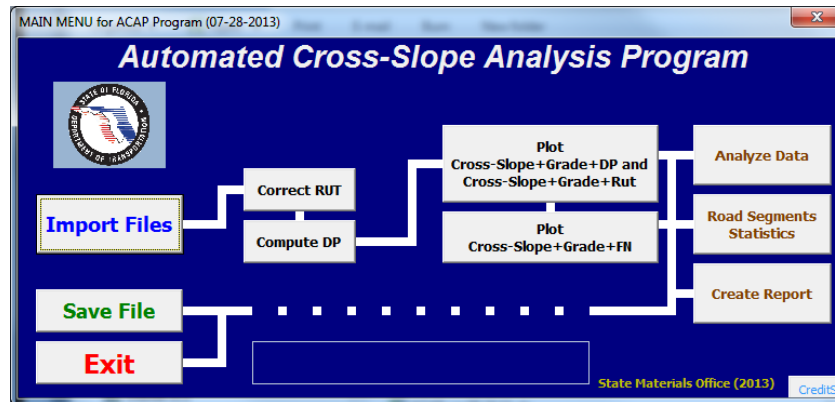


Figure 2. Main Menu of ACAP Program

5. Click the **Import Files** radio button to import the CROSS-SLOPE AND VERTICAL GRADE (.Cxx), RUTTING (.4xx), and EVENT (.Zxx) files. Sample input files are provided as part of the package and are located in the **Sample Input Files** folder.

*Note 1:* ACAP can analyze up to three lanes in each travel direction. Each travel direction must be processed separately.

*Note 2:* If a 3-lane roadway is analyzed, all 3 lanes must be imported first before executing Step 6.

6. Click on the **Correct RUT** radio button. In this step, the program calculates the distance offset to the middle of each 0.01 mile interval. It also clears the records of any section breaks (e.g. bridges).
7. Click on the **Compute DP** radio button. The program requests the user to enter the **start** and **end** Milepost (MP) for each lane. Then, the program calculates the DP per Equation 1. For the sample test runs provided, use **start MP** = 3.069 and **end MP** = 16.949.

*Note 3:* DP is calculated for the milepost limits common to all imported lanes.

8. Click on the **Plot Cross-slope+Grade+DP and Cross-slope+Grade+RUT** radio button. In this step, the program requests the user to enter the following project information:
  - Project Number (required; example **57003**)
  - Financial Project Number (if applicable; otherwise, leave blank)
  - Road Number (required; example **SR-9**)
  - Survey Date (required; example **05/25/2009**)
  - Direction (required; example **E** for Eastbound)

Program will plot the results in tabular and graphical form, as seen in Figure 3 and 4.

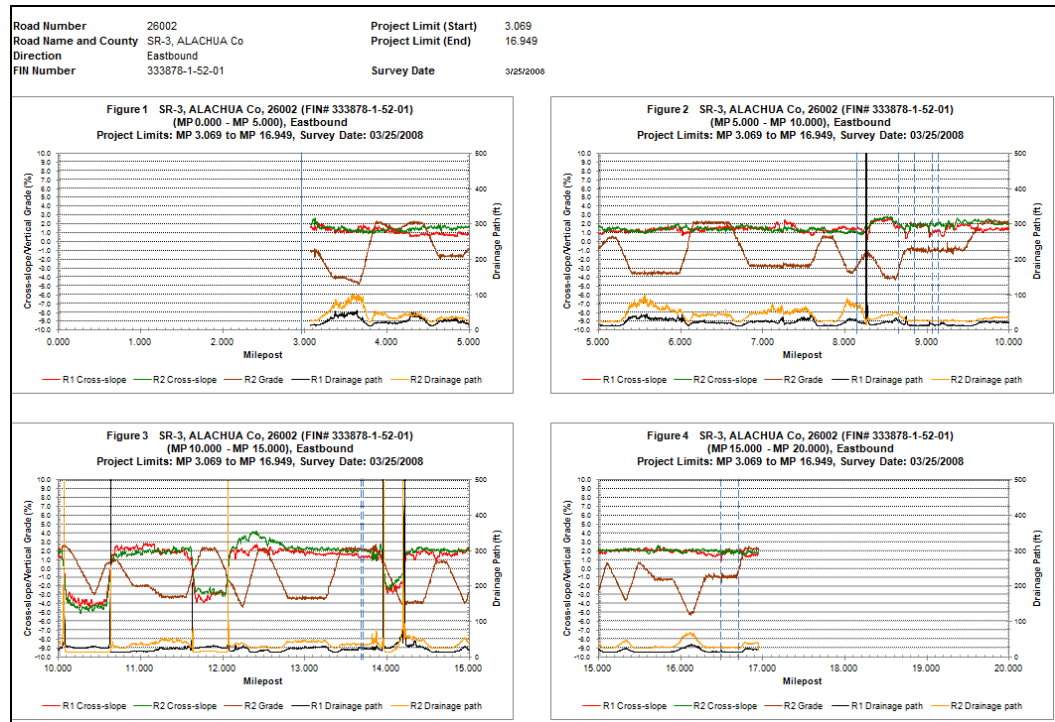


Figure 3. Example Graphical Output from ACAP

| Road Number | 26002           | Road Name and County | SR-3, ALACHUA Co   | Direction | Eastbound |
|-------------|-----------------|----------------------|--------------------|-----------|-----------|
| FIN#        | 333878-1-52-01  | Survey Date          | 03/25/2008         |           |           |
| Milepost    | Cross-slope (%) | Grade (%)            | Drainage Path (ft) |           |           |
| 3.07        | 1.90            | -1.01                | 27                 |           |           |
| 3.08        | 2.03            | -1.15                | 28                 |           |           |
| 3.09        | 2.10            | -1.01                | 27                 |           |           |
| 3.1         | 2.43            | -1.13                | 26                 |           |           |
| 3.11        | 2.52            | -1.03                | 26                 |           |           |
| 3.12        | 2.41            | -1.27                | 27                 |           |           |
| 3.13        | 2.68            | -0.87                | 25                 |           |           |
| 3.14        | 2.00            | -1.26                | 28                 |           |           |
| 3.15        | 2.23            | -1.10                | 27                 |           |           |
| 3.16        | 1.81            | -1.12                | 28                 |           |           |
| 3.17        | 1.62            | -1.01                | 28                 |           |           |
| 3.18        | 1.53            | -1.62                | 35                 |           |           |
| 3.19        | 1.42            | -1.69                | 37                 |           |           |
| 3.2         | 1.41            | -1.73                | 38                 |           |           |
| 3.21        | 1.57            | -2.08                | 40                 |           |           |
| 3.22        | 1.58            | -2.18                | 41                 |           |           |
| 3.23        | 1.53            | -2.32                | 44                 |           |           |
| 3.24        | 1.56            | -2.51                | 46                 |           |           |
| 3.25        | 1.60            | -2.50                | 44                 |           |           |
| 3.26        | 1.69            | -2.79                | 46                 |           |           |
| 3.27        | 1.65            | -2.93                | 49                 |           |           |
| 3.28        | 1.79            | -3.11                | 48                 |           |           |
| 3.29        | 1.71            | -3.14                | 50                 |           |           |
| 3.3         | 1.73            | -3.35                | 52                 |           |           |
| 3.31        | 1.56            | -3.61                | 61                 |           |           |
| 3.32        | 1.69            | -3.58                | 56                 |           |           |
| 3.33        | 1.59            | -3.87                | 63                 |           |           |
| 3.34        | 1.54            | -4.03                | 67                 |           |           |
| 3.35        | 1.56            | -4.15                | 68                 |           |           |
| 3.36        | 1.38            | -4.08                | 75                 |           |           |
| 3.37        | 1.35            | -3.86                | 73                 |           |           |
| 3.38        | 1.24            | -4.10                | 83                 |           |           |
| 3.39        | 1.38            | -3.94                | 73                 |           |           |
| 3.4         | 1.47            | -4.03                | 70                 |           |           |
| 3.41        | 1.47            | -4.08                | 71                 |           |           |
| 3.42        | 1.40            | -3.89                | 71                 |           |           |
| 3.43        | 1.41            | -4.08                | 73                 |           |           |
| 3.44        | 1.66            | -4.05                | 63                 |           |           |
| 3.45        | 1.76            | -4.01                | 60                 |           |           |
| 3.46        | 1.63            | -4.05                | 64                 |           |           |

Figure 4. Example Tabular Output from ACAP

#### 4.4 PART D: Data Analysis

1. **Threshold Data Analysis** – Click the on the *Analyze Data* radio button from the Main Menu (Figure 2). The **Threshold Data Analysis** input window will appear (Figure 5). Change preset default threshold values, if needed, and use the buttons [CS Only] for cross-slope evaluation, [DP Only] for drainage path evaluation, [RUT Only] for rut evaluation, and [DP RUT] for combined drainage path and rutting evaluation and plot the results based on the preset threshold values. The program generates a plot of areas that exceed user entered threshold values as shown below as shown in Figure 6.

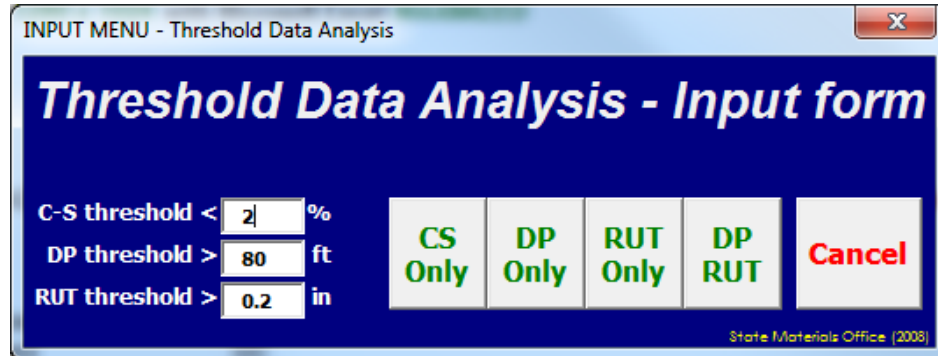


Figure 5. Data Analysis Input Form

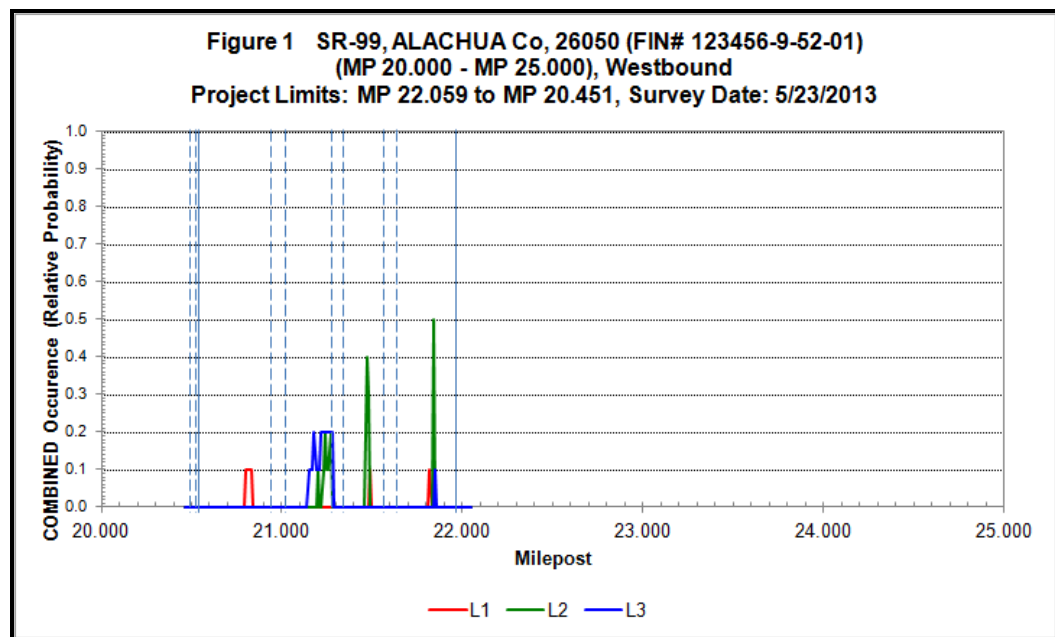


Figure 6. Resulting graph from data analysis based on preset threshold values

After finishing this step, click on the **Cancel** radio button to return to the Main Menu (Figure 2). Do not click on the  radio button.



2. **Road Segments Statistics** – Click on the **Road Segments Statistics** radio button and the **Road Segment Analysis and Reporting** window, shown in Figure 5, will open.
  - Click on the **Add Segment** radio button. In the **Road Segment Analysis** input window (Figure 7), enter the limits and geometric feature of the segment to be analyzed by inputting the **Start MP** and **End MP**, select **Segment Type** from drop down menu (Straight Section, Super-Elevation, Horizontal Curve, Bridge, and No Data - excluded) Use the **Note** space to enter any comments. Repeat this step for each segment to be added.
  - Click the **Analyze and Report Segments** radio button. In this step, the program will calculate the minimum, maximum, and average statistics for cross-slope, grade, drainage path, and rutting for all added segments (Figure 8).

The screenshot shows a software window titled "INPUT MENU - Road Segment Analysis". The main heading is "Road Segment Analysis and Reporting for C-S, DP, and Rutting Data". The interface includes several input fields: "Start MP" with the value 22.059, "End MP" with the value 21, "Segment Type" set to "Straight Section" in a dropdown menu, "DP cutoff" with the value 39, and "Position" with the value 101. There is a "Note" text area containing "Rutting reaches up to 0.4 inch." and an "Overwrite" checkbox. At the bottom, there are four buttons: "Add Segment" (green text), "Delete Segment", "Analyze and Report Segments" (blue text), and "Cancel" (red text). A small copyright notice "State Materials Office (2008)" is visible in the bottom right corner.


Figure 7. Road Segment Statistics Input Menu

*Note 4:* The analysis report will show up as a new worksheet tab located at the bottom of the Excel workbook window and will look like the example report shown in Figure 6.

*Note 5:* When a **Super-elevation** segment type is selected, the **Start MP** and **End MP** must be selected such that area with 0% cross-slope (i.e. transition points at the beginning and end of super-elevation) is included within the **MP** range.

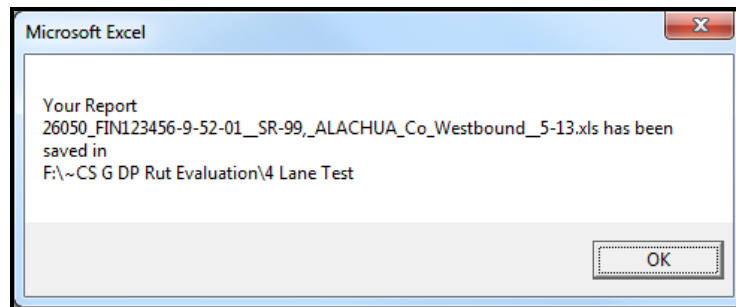
| REPORT   |                   |   |                              |
|--|-------------------|---|------------------------------|
| <b>Road Number</b>   | 26050             | <b>Project Limit (Start)</b>  | 22.059                       |
| <b>Road Name and County</b>  | SR-99, ALACHUA Co | <b>Project Limit (End)</b>  | 20.451                       |
| <b>Direction</b>   | Westbound         | <b>Note</b>   | 0.01-mile interval reporting |
| <b>FIN Number</b>  | 123456-9-52-01    | <b>Survey Date</b>  | 5/23/2013                    |
| <b>Section: 1 (MP 22.059 to MP 21):</b>                                      |                   |   |                              |
| <b>Straight Section.</b>   |                   |   |                              |
| L1 Cross-slope: Min= -6 %, Max= 3.1 %, Mean= -0.4 %, St.Dev.= 3.03 %.        |                   | <b>Note:</b><br>Drainage Path (DP) shown in the graphs is computed as:<br>$DP = \sqrt{(w)^2 [1 + (g/c)^2]}$ where<br><b>w</b> - lane(s) width water is drained from<br><b>g</b> - grade<br><b>c</b> - cross-slope |                              |
| L1 Drainage Path: Min= 12 ft, Max= 541.2 ft, Mean= 30.5 ft.                  |                   |   |                              |
| L1 Rutting: Min= 0.00 inch, Max= 0.12 inch, Mean= 0.01 in, St.Dev.= 0.02 in. |                   |   |                              |
| L2 Cross-slope: Min= -6.3 %, Max= 2.5 %, Mean= -0.6 %, St.Dev.= 2.92 %.      |                   |   |                              |
| L2 Drainage Path: Min= 12.2 ft, Max= 8228.6 ft, Mean= 49.6 ft.               |                   |   |                              |
| L2 Rutting: Min= 0.00 inch, Max= 0.21 inch, Mean= 0.03 in, St.Dev.= 0.04 in. |                   |   |                              |
| L3 Cross-slope: Min= -6.1 %, Max= 2.5 %, Mean= -0.6 %, St.Dev.= 2.99 %.      |                   |   |                              |
| L3 Drainage Path: Min= 12 ft, Max= 5220.1 ft, Mean= 55.5 ft.                 |                   |   |                              |
| L3 Rutting: Min= 0.00 inch, Max= 0.07 inch, Mean= 0.01 in, St.Dev.= 0.02 in. |                   |   |                              |
| L1 Average Vertical Grade= -0.7 %.   |                   |   |                              |
| <b>User Note: Rutting reaches up to 0.4 inch.</b>                            |                   |   |                              |

Figure 8. Report of Road Segment Statistics

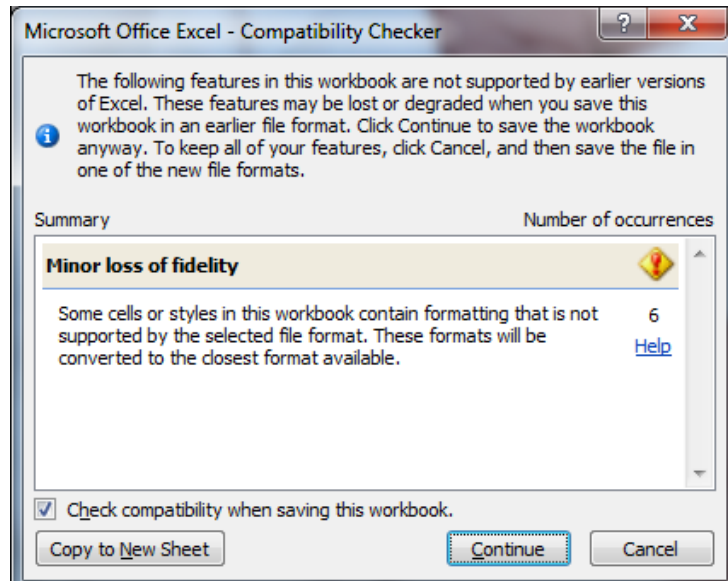
- Click the **Cancel** radio button to return to the previous Main Menu (Figure 2). Do not click Road Segment Statistics menu's  button!

## 4.5 PART E – Reporting

1. **Create Report** – Click the **Create Report** radio button from the main menu. The program will create an output of the main report document. The **Report** file does not contain any input data, only the outputs in tabular and graphical form. When the report is generated, an information window opens, as shown below, with the output file name and its directory path. Click the **OK** radio button.



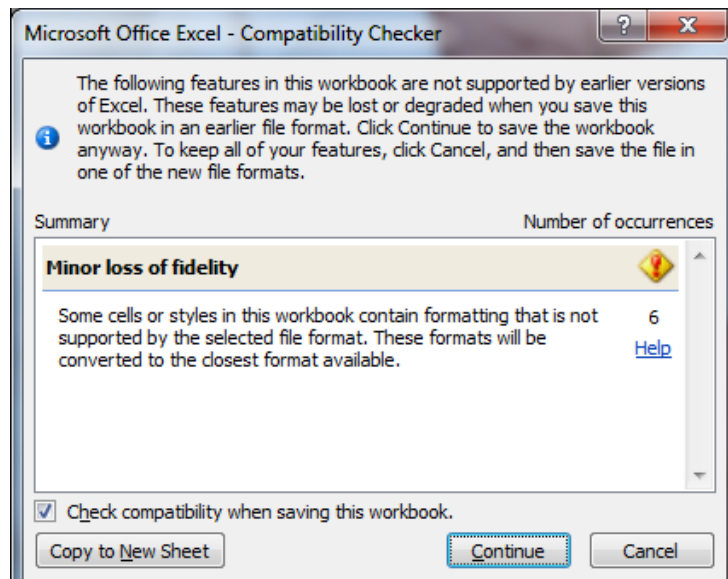
*Note 6:* If the window shown below pops-up, click the [**Continue**] button:



2. **Save File** – click the **Save File** radio button. The program prompts the user to provide the directory path for saving the main file, saves it, and exits MS Excel.

*Note 7:* Before executing the **Save File** function, make sure that the main template file (not the Report file) is active.

*Note 8:* If the window shown below pops-up, click the **Continue** radio button:



3. **Exit** – if you click the **Exit** radio button, the ACAP will terminate the MS Excel without saving the main template file.

## APPENDIX A

### (1) CROSS-SLOPE AND VERTICAL GRADE (\*.Cxx) file structure:

COUNTY: 26 DATE COLLECTED: 03/25/2008  
 ROUTE: SR3/I-99 TIME: 14:18:16  
 DIRECTION: East (+) OPERATOR: Kyle Kroodsma  
 LANE: R1 DRIVER: Kyle Kroodsma  
 VEHICLE: FDOT DCF: 3720.0  
 UNITS: ENGLISH WAVELENGTH-LONG: none  
 SECTION: 002 RPT VERSION: 2.1.2.1  
 SUB SEC: 000 MDR VERSION: WP3.7.6.0  
 FIN: 123456-1-52-01 SENSOR CAL DATE: 03/18/2008  
 SAMPLE DISTANCE: 6.130 in (9) ACCEL CAL DATE: 03/25/2008  
 PROFILE DISTANCE: N.A. AVG SPEED: 0.0 mph  
 OUTPUT FILE NAME: E:\Data\26002\_03-25-08\R1\0M080325150306FDOT\_MDR\26002R1.C01

| Miles<br>Ref Post | Deg<br>Slope | Deg<br>Grade | Feet<br>Radius Curv | Deg<br>Rad Curv Dir | Deg<br>IMU Slope | Deg<br>Sensor Slope | Deg<br>IMU Grade | Deg<br>Sensor Grade |
|-------------------|--------------|--------------|---------------------|---------------------|------------------|---------------------|------------------|---------------------|
| 2.602             | 0.898        | -0.440       |                     |                     | 1.380            | 0.482               |                  |                     |
| 2.603             | 0.833        | -0.390       |                     |                     | 1.330            | 0.497               |                  |                     |
| 2.604             | 1.019        | -0.340       |                     |                     | 1.260            | 0.241               |                  |                     |
| 2.605             | 0.970        | -0.310       |                     |                     | 1.180            | 0.210               |                  |                     |

### (2) EVENT (\*.Zxx) file structure:

COUNTY: 26 DATE COLLECTED: 03/25/2008  
 ROUTE: SR3/I-99 TIME: 15:03:06  
 DIRECTION: East (+) OPERATOR: Kyle Kroodsma  
 LANE: R2 DRIVER: Kyle Kroodsma  
 VEHICLE: FDOT DCF: 3720.0  
 UNITS: ENGLISH WAVELENGTH-LONG: 300 ft  
 SECTION: 002 FIN: 123456-1-52-01  
 SUB SEC: 000  
 COMMENT1: RPT VERSION: 2.1.2.1  
 AVG SPEED: 60.5 mph MDR VERSION: WP3.7.6.0  
 SAMPLE DISTANCE: 6.130 in (9) SENSOR CAL DATE: 03/18/2008  
 PROFILE DISTANCE: N.A. ACCEL CAL DATE: 03/25/2008  
 OUTPUT FILE NAME: E:\Data\26002\_03-25-08\R2\0M080325150306FDOT\_MDR\26002R2.Z01

| REF POST | DMI DIST | DMI    | TIMER  | CODE     | MESSAGE | SRC |
|----------|----------|--------|--------|----------|---------|-----|
| 2.602    | 0.000    | 0      | 0      | DMI_ON   |         | 4   |
| 2.666    | 0.064    | 5937   | 7447   | LnWidth  | 12      | 1   |
| 2.681    | 0.079    | 7319   | 9173   | LnMarkRg | 1       | 1   |
| 3.069    | 0.467    | 43440  | 55175  | REF_RST  |         | 100 |
| 3.069    | 0.467    | 43440  | 55175  | SECTION  |         | 100 |
| 8.259    | 5.657    | 526157 | 670390 | SECTION  |         | 4   |
| 8.798    | 6.196    | 576373 | 734442 | RGH_OFF  |         | 4   |

### (3) RUTTING (\*.8xx) file structure:

COUNTY: 26 DATE COLLECTED: 03/25/2008  
 ROUTE: SR3/I-99 TIME: 15:03:06  
 DIRECTION: East (+) OPERATOR: Kyle Kroodsma  
 LANE: R2 DRIVER: Kyle Kroodsma  
 VEHICLE: FDOT DCF: 3720.0  
 UNITS: ENGLISH WAVELENGTH-LONG: 300 ft  
 SECTION: 002 FIN: 123456-1-52-01  
 SUB SEC: 000  
 COMMENT1: RPT VERSION: 2.1.2.1  
 AVG SPEED: 60.5 mph MDR VERSION: WP3.7.6.0  
 SAMPLE DISTANCE: 6.130 in (9) SENSOR CAL DATE: 03/18/2008  
 PROFILE DISTANCE: N. A. ACCEL CAL DATE: 03/25/2008  
 OUTPUT FILE NAME: E:\Data\26002\_03-25-08\R2\0M080325150306FDOT\_MDR\26002R2.801

| MILES |       | IN            |            | IN/MI      |       | AVG   |     | COMBINED |      |          |
|-------|-------|---------------|------------|------------|-------|-------|-----|----------|------|----------|
| FROM  | TO    | ROUGH<br>DIST | RUT<br>AVG | RUT<br>STD | IRI 1 | IRI 2 | IRI | RN 1     | RN 2 | RN       |
| 3.069 | 3.079 | 0.010         | 0.13       | 0.020      | 46    | 59    | 52  | 4.24     | 4.18 | 4.21 (R) |
| 3.079 | 3.089 | 0.010         | 0.13       | 0.035      | 58    | 57    | 57  | 4.15     | 4.13 | 4.14     |
| 3.089 | 3.099 | 0.010         | 0.12       | 0.017      | 50    | 53    | 52  | 4.02     | 4.21 | 4.11     |
| 3.099 | 3.109 | 0.010         | 0.07       | 0.019      | 60    | 55    | 58  | 4.10     | 4.18 | 4.14     |
| 3.109 | 3.119 | 0.010         | 0.06       | 0.016      | 64    | 82    | 73  | 3.87     | 3.89 | 3.88     |

*Note 5:* \* represents name of the file and **xx** represents a number between 0 and 99. The user is advised to use “01” only.

## APPENDIX B

(1) CROSS-SLOPE AND VERTICAL GRADE (\*.Cxx) presets in ICC WinRP:

The screenshot shows the ICC Road Profiler Reporting software interface. The 'Report' dropdown is set to 'Slope/Grade (Applanix)'. The 'Output' section shows 'Clear Output Directory' and 'Output File Ext' set to 'C'. The 'Configuration File' is 'C:\Program Files (x86)\ICC\WinReport\IC\_Cross Slope MI.ini'. The 'Interval' tab is selected, showing options for 'Show Dmi Adjustments', 'Ignore Image Offsets', 'Change Image4 Skip to Image3 Skip', and 'Do Not Apply Skip Algorithm'. The 'GPS Receiver' is set to 'Applanix'. The 'Control' tab is also visible, showing 'Filter Options' with 'Wavelength' set to 300.000 and 'Filter Type' set to 'Colangent'. The 'Event Options' section shows 'Add Section End' checked, with 'Distance' set to 52.800. The 'Profile Interval Ctrl' section shows 'Interval' set to -1.000 and 'Moving Avg' set to 12.000.

(2) EVENT (\*.Zxx) presets in ICC WinRP:

The screenshot shows the ICC Road Profiler Reporting software interface. The 'Report' dropdown is set to 'Event Data'. The 'Output' section shows 'Clear Output Directory' and 'Output File Ext' set to 'Z'. The 'Configuration File' is 'C:\Program Files (x86)\ICC\WinReport\IZ\_Event MI.ini'. The 'Interval' tab is selected, showing options for 'Show Dmi Adjustments', 'Ignore Image Offsets', 'Change Image4 Skip to Image3 Skip', and 'Do Not Apply Skip Algorithm'. The 'GPS Receiver' is set to 'Applanix'. The 'Control' tab is also visible, showing 'Filter Options' with 'Wavelength' set to 300.000 and 'Filter Type' set to 'Colangent'. The 'Event Options' section shows 'Add Section End' checked, with 'Distance' set to 52.800. The 'Profile Interval Ctrl' section shows 'Interval' set to -1.000 and 'Moving Avg' set to 12.000.

### (3) RUTTING (\*.8xx) presets in ICC WinRP:

The screenshot displays the ICC Road Profiler Reporting software interface. The main window is titled "ICC Road Profiler Reporting" and features a menu bar with options: File, Parameters, PI Reporting, PI Gph Options, Gph Options, Print Options, and Help. Below the menu bar, there are tabs for Reports and Graph, with a "Process Input File(s)" button. The interface is divided into several sections:

- Report Section:** Includes dropdowns for Report (Interval Report), Style (General), and Units (Miles). It also has buttons for "Clear Output Directory", "Output File Ext" (set to 4), "Print Report", "Display Report", "Print Display", "Add Rpt Type to File Name", "Add Wavelength", and "File Suffix".
- Output Section:** Contains "Load" and "Save" buttons, and a "Configuration File" path: "C:\Program Files (x86)\ICC\WinRP\4\_IRI\_RN\_RUT 0.010 MI MPSV2.ini".
- Interval Reporting Options:**
  - ☒ **IRI**: Includes "Avg/HCS" (Avg IRI), "Scale" (in/mi), and "IRI Mov Avg" (IRI MA Len: 30.0, Tolerance: 0.00).
  - ☒ **Rutting**: Includes "Type" (Neg Rut/Zero), "Algorithm" (Default), "Max Rut" (Mov Avg Interval: 24,000, Max Rut Tol: 2,000), and "Use Old Print Format".
  - ☐ **Faulting**: Includes "Expanded Fault Data", "NEDOT Format", "Wheel Path" (Right), "Min. Height" (0.100), and "Range Interval" (0.100).
  - ☒ **Ride Number**.
  - ☐ **Speed**, ☐ **GPS**, and ☐ **Texture**.
- Filter Options:**
  - ☒ **Filter Options**: Includes "Wavelength" (300,000), "Moving Avg" (1), "Filter Type" (Cotangent), "Apply 250mm Mov Avg", "Use Elev File Format", "DOS Filter", and "Max Delta Profile" (0.25000).
- Report Controls:**
  - ☒ **Section Control**, ☒ **Roughness Control**, ☒ **Interval Control**, ☒ **Interval Reset**, ☒ **New Section on RefAdd**, ☒ **Use Speed File**, ☒ **Error Summary**, and ☐ **Include Error Status**.
  - Interval**: 0.010, **Spd Limit**: 15.00.
- Event Options:**
  - ☒ **Add Section End**, ☐ **Move Roughness Events** (Distance: 52,800), ☐ **Move RefRst/SectEnd Events** (Distance: 52,800), ☒ **Use Offset from File**, and ☐ **Edit Mode**.
- Profile Interval Ctrl:**
  - ☐ **Profile Interval Ctrl**: Includes "Interval" (5,000) and "Moving Avg" (12,000).