# Analysis Procedure Manual – July 2009

Change Sheet – July 2009

## Chapter 2, Page 18, 2.4.1 Transportation

**Changed:**

**Traffic Engineering Operations Section (TEOS)**

This section prepares specifications, maintains standards for traffic devices and related facilities, and provides design expertise in materials, operations and construction support services. The TEOS consists of four central units under the authority of the State Traffic Engineer: Traffic Standards and Asset Management (TSAM), Traffic Engineering Services Unit (TESU), Intelligent Transportation Systems (ITS) Unit and Traffic Signal Services Unit (TSSU).

**To:**

**Traffic–Roadway Section (TRS)**

This section prepares specifications, maintains standards for traffic devices and related facilities, and provides design expertise in materials, operations and construction support services. TRS consists of five central units under the authority of the State Traffic Engineer: Roadway Engineering, Office of Project Letting (OPL), Geometronics, Traffic Standards and Asset Management (TSAM), and Traffic Engineering.

## Chapter 2, Page 19, 2.4.2 Other ODOT Groups

**Changed:**

**Roadway Engineering**

**To:**

**Region Roadway Engineering**

## Chapter 2, Page 20, 2.4.2 Other ODOT Groups

**Changed:**

**Bicycle and Pedestrian Program**

This program provides technical assistance within the Department and to local officials regarding walkway and bikeway design (construction and maintenance), issues grants to local officials regarding bicycle and pedestrian issues and reviews construction plans and TSPs to ensure that bicycle and pedestrian needs are met.

# To:

**Bicycle and Pedestrian Program**

This program is a group within TRS and provides technical assistance within the Department and to local officials regarding walkway and bikeway design (construction and maintenance), issues grants to local officials regarding bicycle and pedestrian issues and reviews construction plans and TSPs to ensure that bicycle and pedestrian needs are met.

## Chapter 5, Section 5.2.1, Pages 5-3 and 5-4, Calculating Crash Rates

**Changed:**

For reporting crash rates on state highways, ODOT uses the segment crash rate. ODOT does not have an established standard intersection crash rate to compare with as a baseline. The ODOT CAR Unit publishes an annual document called the *Oregon State Highway Crash Rate Tables*. In this document crash rates for given segments of all state highways are calculated and listed for each of the last five years. In addition to this a variety of summaries of crash rates for state highways considering fatalities and different highway types, as well as information about the data used in the crash rate calculations, is provided.

Of particular interest is Table II, which shows comparative five-year crash rates for freeways and non-freeways on the state highway system, by urban and rural area and by primary and secondary designation. This table is often used in crash analysis to compare the segment crash rate calculated for a study highway to the statewide average rate shown in the table for a comparable highway type. In the selection of the appropriate highway type for comparison, the analyst must determine whether the study highway segment is classified as a freeway or non-freeway, is located within an urban or rural area and is on the primary or secondary highway system (a listing of primary and secondary highways is included after Table IV). Note that the category “State Highway System” provided alongside the primary and secondary system categories in Table II is merely a combination of the primary and secondary highway systems and should not be used for most crash rate comparisons.

When comparing a statewide average rate to a segment crash rate for a study highway, simply exceeding the statewide average rate should not be interpreted as proof that a section is hazardous. A segment crash rate that exceeds the statewide average crash rate should merely be considered as an indication that further investigation is necessary. It should also be stated that cost effective improvements to increase safety could still be identified even with a segment crash rate lower than the statewide average.

When an intersection crash rate may be appropriate to report, a rule of thumb is that intersections with a crash rate of 1.0 or greater is generally considered to be an indication that further investigation is warranted. . This is not to say whether a location is "bad" if over or "okay" if under 1.0. It should also be stated that cost effective improvements to increase safety could still be identified even with an intersection crash rate lower than the statewide average.

Another analysis tool that ODOT uses is the Safety Priority Index System (SPIS) which provides an alternative method of ranking for intersections and segments of roadways on State Highways. SPIS incorporates crash rate, frequency and severity components to provide a single index to compare a roadway or intersection.

The top 5% SPIS ranking requires the Region Traffic offices to conduct a safety investigation each year to determine if there is an appropriate safety
Analysis Procedures Manual 5-3 December 2007 improvement fix to the problem. The SPIS ranking can be determined by contacting the appropriate Region Traffic Office for assistance or at the following intranet website
http://intranet.odot.state.or.us/tstrafmgt/PSMS/SPIS/spis.htm The Traffic-Roadway Section is contracting with Oregon State University and Portland State University to develop a Safety Investigations Manual which is planned to be available in Fall of 2009.

**To:**

For reporting crash rates on state highways, ODOT uses the segment crash rate. ODOT does not have an established standard intersection crash rate to compare with as a baseline. The ODOT CAR Unit publishes an annual document called the *Oregon State Highway Crash Rate Tables*, available at
http://www.oregon.gov/ODOT/TD/TDATA/car/CAR_Publications.shtml.
In this document crash rates for given segments of all state highways are calculated and listed for each of the last five years. In addition to this a variety of summaries of crash rates for state highways considering fatalities and different highway types, as well as information about the data used in the crash rate calculations, is provided.

Of particular interest is Table II, which shows statewide average crash rates for each of the last five years, for freeways and non-freeways on the state highway system, by urban and rural area and by primary and secondary designation. This table is often used in crash analysis to compare the segment crash rate calculated for a study highway to the statewide average rate shown in the table for a comparable highway type. In the selection of the appropriate highway type for comparison, the analyst must determine whether the study highway segment is classified as a freeway or non-freeway, is located within an urban or rural area and is on the primary or secondary highway system (a listing of primary and secondary highways is included after Table IV). Note that the category "State Highway System" provided alongside the primary and secondary system categories in Table II is merely a combination of the primary and secondary highway systems and should not be used for most crash rate comparisons.

## Example 5-1 Crash Rate Calculation and Comparison

A principal highway segment in a rural area has experienced 22 reported crashes over the last 3 years. The segment ADT is 23,000 and length is 1.6 miles.

$$\text{Rate} = \frac{\text{Number of Crashes X 1,000,000}}{\text{Length (in miles) X ADT X (Yrs X 365)}}$$

$$= \frac{\text{22 X 1,000,000}}{\text{1.6 X 23,000 X 3Yrs X 365}}$$

= 0.55 Crashes per Million Vehicle Miles (MVM)

As shown in Figure 5-XX, the statewide average crash rates are as follows:

| | |
|---|---|
| 2005 | 0.67 |
| 2006 | 0.69 |
| 2007 | 0.68 |
| Average | 0.68 |

The segment crash rate of 0.55 is less than the average statewide rate of 0.68.

## Figure 5-1 Statewide Crash Rate Table

**TABLE II:** FIVE-YEAR COMPARISON OF STATE HIGHWAY CRASH RATES

Table II presents a comparison of state highway crash rates for the past five years, for urban and rural areas, by functional classification. Mileage is shown for the current data year only.

*See Table IV for information on official highway mileage and VMT data.*

| JURISDICTION AND FUNCTIONAL CLASSIFICATION | MILES* | 2007 Rate | 2006 Rate | 2005 Rate | 2004 Rate | 2003 Rate |
|---|---|---|---|---|---|---|
| **TOTAL STATE HWY SYSTEM** | **7,455.23** | **0.85** | **0.85** | **0.87** | **0.79** | **0.98** |
| Interstate Freeways | 729.57 | 0.38 | 0.39 | 0.41 | 0.38 | 0.42 |
| Other Fwys/Expressways | 52.26 | 0.73 | 0.78 | 0.80 | 0.78 | 0.87 |
| Non-Freeways (combined) | 6,673.40 | 1.27 | 1.26 | 1.25 | 1.13 | 1.45 |
| Other Principal Arterials | 3,281.04 | 1.28 | 1.29 | 1.28 | 1.16 | 1.52 |
| Minor Arterials | 1,964.61 | 1.20 | 1.14 | 1.14 | 1.02 | 1.20 |
| Urban Collectors | 8.69 | 1.10 | 0.68 | 1.19 | 1.23 | 2.08 |
| Rural Major Collectors | 1,382.20 | 1.25 | 1.11 | 1.14 | 0.93 | 1.25 |
| Rural Minor Collectors | 36.86 | 0.64 | 0.66 | 1.30 | 0.32 | 1.30 |
| Rural Local | 0.00 | 0.00 | 16.52 | 4.23 | 2.68 | 8.06 |
| **URBAN HWY SYSTEM** | **821.51** | **1.12** | **1.14** | **1.16** | **1.08** | **1.46** |
| Interstate Freeways | 176.15 | 0.48 | 0.48 | 0.51 | 0.50 | 0.61 |
| Other Fwys/Expressways | 52.26 | 0.73 | 0.78 | 0.80 | 0.78 | 0.87 |
| Non-Freeways (combined) | 593.10 | 2.05 | 2.06 | 2.04 | 1.84 | 2.69 |
| Other Principal Arterials | 512.29 | 2.06 | 2.06 | 2.05 | 1.85 | 2.72 |
| Minor Arterials | 72.12 | 2.03 | 2.09 | 1.93 | 1.75 | 2.36 |
| Urban Collectors | 8.69 | 1.10 | 0.68 | 1.19 | 1.23 | 2.08 |
| **Urban Cities** | **565.77** | **1.24** | **1.28** | **1.29** | **1.22** | **1.68** |
| Interstate Freeways | 114.87 | 0.53 | 0.56 | 0.57 | 0.57 | 0.67 |
| Other Fwys/Expressways | 45.54 | 0.74 | 0.77 | 0.79 | 0.78 | 0.90 |
| Non-Freeways (combined) | 405.36 | 2.38 | 2.38 | 2.39 | 2.18 | 3.33 |
| Other Principal Arterials | 363.20 | 2.37 | 2.37 | 2.38 | 2.17 | 3.35 |
| Minor Arterials | 40.51 | 2.61 | 2.59 | 2.48 | 2.27 | 3.08 |
| Urban Collectors | 1.65 | 1.95 | 1.84 | 1.78 | 1.51 | 1.68 |
| **Suburban Areas** | **255.74** | **0.73** | **0.71** | **0.76** | **0.64** | **0.72** |
| Interstate Freeways | 61.28 | 0.32 | 0.27 | 0.33 | 0.28 | 0.37 |
| Other Fwys/Expressways | 6.72 | 0.64 | 0.85 | 0.96 | 0.78 | 0.61 |
| Non-Freeways (combined) | 187.74 | 1.17 | 1.21 | 1.20 | 1.00 | 1.04 |
| Other Principal Arterials | 149.09 | 1.19 | 1.21 | 1.23 | 1.03 | 1.08 |
| Minor Arterials | 31.61 | 1.09 | 1.31 | 0.94 | 0.66 | 0.51 |
| Urban Collectors | 7.04 | 0.86 | 0.42 | 0.94 | 0.84 | 3.10 |
| **RURAL HWY SYSTEM** | **6,633.72** | **0.61** | **0.60** | **0.61** | **0.54** | **0.63** |
| Interstate Freeways | 553.42 | 0.28 | 0.28 | 0.31 | 0.25 | 0.25 |
| Non-Freeways (combined) | 6,080.30 | 0.83 | 0.80 | 0.80 | 0.72 | 0.86 |
| Other Principal Arterials | 2,768.75 | 0.72 | 0.72 | 0.69 | 0.64 | 0.77 |
| Minor Arterials | 1,892.49 | 1.03 | 0.95 | 1.00 | 0.88 | 1.03 |
| Rural Major Collectors | 1,382.20 | 1.25 | 1.11 | 1.14 | 0.93 | 1.25 |
| Rural Minor Collectors | 36.86 | 0.64 | 0.66 | 1.30 | 0.32 | 1.30 |
| Rural Local | 0.00 | 0.00 | 16.52 | 4.23 | 2.68 | 8.06 |
| **Rural Cities** | **219.71** | **1.13** | **1.01** | **1.03** | **1.09** | **1.34** |
| Interstate Freeways | 14.05 | 0.24 | 0.14 | 0.25 | 0.07 | 0.07 |
| Non-Freeways (combined) | 205.66 | 1.32 | 1.20 | 1.18 | 1.28 | 1.61 |
| Other Principal Arterials | 110.36 | 1.19 | 1.13 | 1.08 | 1.19 | 1.51 |
| Minor Arterials | 53.45 | 1.71 | 1.33 | 1.34 | 1.76 | 1.87 |
| Rural Major Collectors | 41.60 | 1.30 | 1.37 | 1.45 | 0.95 | 1.73 |
| Rural Minor Collectors | 0.25 | 0.00 | 4.57 | 0.00 | 0.00 | 0.00 |
| **Rural Areas** | **6,414.01** | **0.58** | **0.58** | **0.59** | **0.51** | **0.59** |
| Interstate Freeways | 539.37 | 0.28 | 0.29 | 0.31 | 0.25 | 0.26 |
| Non-Freeways (combined) | 5,874.64 | 0.79 | 0.77 | 0.77 | 0.68 | 0.80 |
| Other Principal Arterials | 2,658.39 | 0.68 | 0.69 | 0.67 | 0.61 | 0.71 |
| Minor Arterials | 1,839.04 | 0.99 | 0.93 | 0.98 | 0.83 | 0.97 |
| Rural Major Collectors | 1,340.60 | 1.24 | 1.08 | 1.10 | 0.92 | 1.20 |
| Rural Minor Collectors | 36.61 | 0.69 | 0.36 | 1.40 | 0.35 | 1.40 |
| Rural Local | 0.00 | 0.00 | 16.52 | 4.23 | 2.68 | 8.06 |

* Couplet and Roadway 3 data are included. Frontage road and connection data are excluded.

## Chapter 7, Section 7.3.7, Page 7-39 Non-coordinated Signals

**Added as the second sentence:** If simulation is going to be needed, existing signal timing will be necessary for the calibration process. Otherwise, unless…

## Chapter 11, Section 11.1, Page 11-1 Purpose

**Added:**

- Input for Air Quality Analysis

## Chapter 11, Section 11.3, Page 11-17

Added:

**11.3 Input for Air Quality Analysis**

*Note: This is an interim section, to be expanded.*

Similar to noise analysis, ODOT is responsible for ensuring that state transportation projects are developed within the Federal Highway Administration's air quality policies and procedures. To conduct the air quality analysis necessary for measuring compliance, the ODOT Geo-Environmental Section, or air quality consultant, requires specific data from the project traffic analyst. This request is typically made through the "Air and Noise Traffic Requirements Check List" shown in Figure 11-1, which is filled out by the air quality consultant or Geo-Environmental Section staff and delivered to the project traffic analyst.