

ERRATA for *Highway Safety Manual*

February 2012

Dear Customer:

Recently, we were made aware of some technical revisions that need to be applied to the *Highway Safety Manual*, 1st Edition.

Please replace the existing text with the corrected text to ensure that your edition is both accurate and current. Users who purchased the CD-ROM do **not** need to make the revisions noted in bold. Corrections that were included in the June 2011 errata are in blue ink.

AASHTO staff sincerely apologizes for any inconvenience.

Errata to *Highway Safety Manual*, 1st Edition

Page	Existing Text	Corrected Text
Volume 1		
3-17	The term $e^{(-0.4865)}$ is used in Equation 3-4.	Change the term to $e^{(-0.312)}$.
3-21	Answer to Example 1: “Using Equation 3-7, expected crashes . . .”	Change to “Using Equation 3-3 and a calibration factor = 1.0, expected crashes . . .”
3-21	Answer to Example 2: Using Equation 3.8 . . .	Change the answer to “Using Equation 3.7 . . .”
3-33	2nd to last equation on page began with $\hat{\mu}_{\text{year } 4} = (5 + 7 - 11 + 9) / (0.87 + 0.71 + 0.64 + 1) = 32 / 3.22 = 9.94$ estimate of crashes for the last year:	Change to the following: $\hat{\mu}_{\text{year } 4} = (5 + 7 + 11 + 9) / (0.87 + 0.71 + 0.64 + 1) = 32 / 3.22 = 9.94$ estimate of crashes for the last year:
4-17	The Coefficient of Variation for Segment B1 is shown as $CV_{B1} = \frac{\sqrt{7.7}}{5.7} = 0.53$.	The denominator should be 5.2: $CV_{B1} = \frac{\sqrt{7.7}}{5.2} = 0.53$
4-35	In the table showing Ranking Based on RSI, the Average RSI Cost for Intersection 6 is \$48,900.	The Average RSI cost for Intersection 6 should be \$42,800.
4-42	The calculation of crash frequency variance shown in the table in Step 3 indicates the variance for Signal is 10.5 and the variance for TWSC is 18.8.	The variance for Signal should be 13.75, and the variance for TWSC should be 10.5.
4-46	In Table 4-10, the heading for last column is “Average 3-Year Expected...”	Change this heading to “Average 3-Year Predicted . . .”
4-46	Eq. 4-16 is incorrect.	Replace Eq. 4-16 with the following: $\sigma = \sqrt{kN_{\text{predicted}}^2}$
4-60	In Eq. 4-26, the last item under “where” is $N_{\text{predicted},1(FI)}$.	Change this item to $N_{\text{predicted},n(FI)}$.
7-7	In Section 7.4.3.4, item 1-a-ii is shown as $(P/F, i, y) = (1 + i)(-y)$.	Change this item to $(P/F, i, y) = (1 + i)^{(-y)}$.
7-14	Table 12 is referenced in the last paragraph.	Change the reference to Table 7-5.
7-17	In Step 4, Eq. 7-13 is shown as: $AM_{(\text{total})} = AM_{(PDO)} \times AM_{(FI)}$.	Change Eq. 7-13 to $AM_{(\text{total})} = AM_{(PDO)} + AM_{(FI)}$.
7-18	Following Eq. 7-14, at the end of second line of the where list, the $(P/F, i, y)$ is calculated as $(1 + i) - y$.	Change this calculation to $(1 + i)^{(-y)}$.
7-19	In Table 7-10, Columns 2 and 4 need to be revised, as does the heading for Column 2.	Substitute Table 7-10 with the attached revised table.

Errata to *Highway Safety Manual*, 1st Edition

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7-19	The first line under Results states, “The estimated present value monetary benefit of installing a roundabout at Intersection 2 is \$33,437,850.”	Change the amount to \$5,675,500.
9-8	Step 2 of Figure 9-2 states, “Calculate the predicted crash frequency for each site summed over the entire before period.”	Change “predicted” to “expected.”
9-21	Eq. A-10 is referenced in the last column in the table under Step 6.	Change the reference to Eq. 9A.1-11.
9-41	Eq. 9A.2-16 is shown as Safety Effectiveness = $100 \times (1 - R)$.	Change this equation to Safety Effectiveness = $100 \times (1 - OR)$.
Volume 2		
C-14	After Figure C-3, a heading was inadvertently omitted.	Add the heading “C.6.3 Safety Performance Functions (SPFs)” immediately following Figure C-3.
C-14	The term $e^{(-0.4865)}$ is used in Eq. C-4.	Change the term to $e^{(-0.312)}$.
C-15	C.6.3 Crash Modification Factors (CMFs)	Renumber the heading as “C.6.4 Crash Modification Factors (CMFs).”
C-18	C.6.4 Calibration of Safety Performance Functions to Local Conditions	Renumber the heading as “C.6.5 Calibration of Safety Performance Functions to Local Conditions.”
C-18	C.6.5 Weighting Using the Empirical Bayes Method	Renumber the heading as “C.6.6 Weighting Using the Empirical Bayes Method.”
10-23	The 3rd row about (CMF_{3r}) in Table 10-7 references Table 10-7.	Change this reference to Equation 10-13.
10-23	The 6th row about (CMF_{6r}) in Table 10-7 references Table 10-11.	Change this reference to Equation 10-17.
10-25	The calculation $0.98 + 6.875$ is used in an equation within the last row in Table 10-9.	Change the calculation to $0.98 - 6.875$.
10-42	A 1,2000-ft horizontal curve radius is used in the 5th bullet under the heading The Facts.	Change the horizontal curve radius to 1,200 ft.
11-10	The second sentence of Step 12 reads, “Otherwise, proceed to Step 14.”	Change “Step 14” to “Step 13.”
11-31	Paragraph 1, line 7 refers to Table 13-9.	Change this reference to Table 13-13.

Errata to Highway Safety Manual, 1st Edition

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11-33	Eq. 11-18 is shown as $CMF_{li} = \frac{0.016 \times skew}{(0.98 + 0.16 \times skew)} + 1.0$	Change the denominator as follows: $CMF_{li} = \frac{0.016 \times skew}{(0.98 + 0.016 \times skew)} + 1.0$
11-33	Eq. 11-19 is shown as $CMF_{li} = \frac{0.017 \times skew}{(0.52 + 0.17 \times skew)} + 1.0$	Change the denominator as follows: $CMF_{li} = \frac{0.017 \times skew}{(0.52 + 0.017 \times skew)} + 1.0$
11-34	Eq. 11-20 is shown as $CMF_{li} = \frac{0.053 \times skew}{(1.43 + 0.53 \times skew)} + 1.0$	Change the denominator as follows: $CMF_{li} = \frac{0.053 \times skew}{(1.43 + 0.053 \times skew)} + 1.0$
11-34	Eq. 11-21 is shown as $CMF_{li} = \frac{0.048 \times skew}{(0.72 + 0.48 \times skew)} + 1.0$	Change the denominator as follows: $CMF_{li} = \frac{0.048 \times skew}{(0.72 + 0.048 \times skew)} + 1.0$
11-50	Step 10, Intersection Skew Angle calculates CMF_{li} as follows: $CMF_{li} = \frac{0.016 \times skew}{(0.98 + 0.16 \times skew)} + 1.0$ $CMF_{li} = \frac{0.016 \times 30}{(0.98 + 0.16 \times 30)} + 1.0 = 1.08$	Change this calculation to $CMF_{li} = \frac{0.016 \times skew}{(0.98 + 0.016 \times skew)} + 1.0$ $CMF_{li} = \frac{0.016 \times 30}{(0.98 + 0.016 \times 30)} + 1.0 = 1.33$
11-50	The final calculation in Step 10 is $CMF_{comb} = 1.08 \times 0.56 \times 0.90 = 0.54.$	Change this calculation to $CMF_{comb} = 1.33 \times 0.56 \times 0.90 = 0.67.$
11-50	Step 11, Calculation of Predicted Average Crash Frequency, indicates the results are $= 0.928 \times 1.50 \times (0.54) = 0.752$ crashes/year.	Change these results to $= 0.928 \times 1.50 \times (0.67) = 0.933$ crashes/year.
11-52	Column 2 of the table for Worksheet SP3B lists CMF for Intersection Skew Angle for the Total Crash Severity Level in Row 1 as 1.08 and the Fatal and Injury Crash Severity Level in Row 2 as 1.09.	Change the CMF for Intersection Skew Angle for the Total Crash Severity Level to 1.33 and the Fatal and Injury Crash Severity Level to 1.50.
11-52	Column 6 of the table for Worksheet SP3B lists Combined CMF for the Total Crash Severity Level in Row 1 as 0.54 and the Fatal and Injury Crash Severity Level in Row 2 as 0.44.	Change the Combined CMF in Column 6 to 0.67 for the Total Crash Severity Level in Row 1 and to 0.61 for the Fatal and Injury Crash Severity Level in Row 2.
11-52	Column 5 of the Worksheet SP3C show the values for Combined CMFs are 0.54 for Total Crash Severity Level in Row 1, 0.44 for Fatal and Injury Crash Severity Level in Row 2, and 0.44 for Fatal and Injury Crash Severity Level in Row 3.	Change these values to 0.67, 0.61, and 0.61, respectively.

Errata to *Highway Safety Manual*, 1st Edition

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11-52	Column 7 of the Worksheet SP3C show the values for Predicted Crash Frequency are 0.752 for Total Crash Severity Level in Row 1, 0.286 for Fatal and Injury Crash Severity Level in Row 2, 0.178 for Fatal and Injury Crash Severity Level in Row 3, and 0.466 for Property Damage Only in Row 4.	Change these values to 0.933, 0.396, 0.247, and 0.537, respectively.
11-53	The values in Columns 3, 5, 7, and 9 in the table for Worksheet SP3D are incorrect.	Substitute the table for Worksheet SP3D with the attached revised table.
11-53	In the table for Worksheet SP3E, the values for Predicted Average Crash Frequency listed in Column 2 are 0.752, 0.286, 0.178, 0.466 crashes/year.	Change these values to 0.933, 0.396, 0.247, and 0.537, respectively.
11-55	The values in Columns 2, 3, 4, 7, and 8 for Intersections shown in Worksheet SP4A are incorrect.	Substitute the table for Worksheet SP4A with the attached revised table.
11-55	The final calculation for Intersection 1 is shown as $w = \frac{1}{1 + 0.460 \times (0.752)} = 0.743 .$	Change this calculation to $w = \frac{1}{1 + 0.460 \times (0.933)} = 0.700 .$
11-56	Under the subheading Column 8—Expected Average Crash Frequency, the calculation for Intersection 1 is shown as follows: $N_{\text{expected}} = 0.743 \times 0.752 + (1 - 0.743) \times 3 = 1.330.$	Change this calculation to $N_{\text{expected}} = 0.700 \times 0.933 + (1 - 0.700) \times 3 = 1.554.$
11-56	The values and the reference to Worksheet 3A in the table for Worksheet SP4B are incorrect.	Substitute the table for Worksheet SP4B with the attached revised table.
11-58	The headings and values shown in the tables for Worksheet SP5A and SP5A Continued are incorrect.	Substitute the tables for Worksheet SP5A and SP5A Continued with the attached revised table.
11-59	The calculation for w_0 in Column 9 is shown as $= \frac{1}{1 + \frac{1.968}{4.347}}$ $= 0.688$	Change the calculation to $= \frac{1}{1 + \frac{2.109}{4.528}}$ $= 0.682$
11-59	The calculation for N_0 in Column 10 is shown as $= 0.688 \times 4.347 + (1 - 0.688) \times 9 = 5.799.$	Change the calculation to $0.682 \times 4.528 + (1 - 0.682) \times 9 = 5.950.$

Errata to *Highway Safety Manual*, 1st Edition

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11-59	The calculation for w_1 in Column 11 is shown as $= \frac{1}{1 + \frac{2.009}{4.347}}$ $= 0.684$	Change this calculation to $= \frac{1}{1 + \frac{2.076}{4.528}}$ $= 0.686$
11-59	The calculation for N_1 in Column 12 is shown as $= 0.684 \times 4.347 + (1 - 0.684) \times 9 = 5.817.$	Change this calculation to $= 0.686 \times 4.528 + (1 - 0.686) \times 9 = 5.932.$
11-59	The calculation for $N_{expected/comb}$ in Column 13 is shown as $= \frac{5.799 + 5.817}{2}$ $= 5.808$	Change this calculation to $= \frac{5.950 + 5.932}{2}$ $= 5.941$
11-60	The values shown in the table for Worksheet SP5B are incorrect.	Substitute the table for Worksheet SP5B with the attached revised table.
11-61	The first sentence in the section on Results reads, “The predicted average crash frequency for the proposed four-lane facility project is 4.4 crashes per year, and the predicted crash reduction for the project is 8.1 crashes per year.”	Change the numbers to 4.5 crashes per year for the predicted average crash frequency and 7.8 crashes per year for the predicted crash reduction.
11-61	The values in Table 11-26 are incorrect.	Substitute Table 11-26 with the attached revised table.
12-12	The second sentence of Step 12 reads, “Otherwise, proceed to Step 14.”	Change “Step 14” to “Step 13.”
12-43	Paragraph 1, line 2 of Section 12.7.2 refers to CMF_{4i} .	Change CMF_{4i} to CMF_{6i} .
12-86	Paragraph 1, Line 1 of the section on Results refers to “the unsignalized intersection in Sample Problem 4.”	Change “unsignalized” to “signalized.”
12-114	Column head (7) of <i>Worksheet 2C Continued</i> refers to Worksheet SP4B.	Change the reference to Worksheet 2B.
12-115	Column head (7) of <i>Worksheet 2E Continued</i> refers to Worksheet SP4B.	Change the reference to Worksheet 2B.
A-5	In Table A-2, the row for Presence of Lighting for Chapter 11 shows the “X” in the Required column.	The “X” should be in the Desirable column.
A-5	In Table A-2, the row for Sideslope for Chapter 11 shows the “X” not aligned in the Required column.	The “X” should be in the Required column.