The Calibrator:
An SPF Calibration and Assessment Tool

Quick Reference Guide

■ SETTING UP TO RUN THE TOOL

- The tool was developed for Microsoft Excel versions 2007 and later, running on Windows Operating Systems with the SOLVER add-in installed.
- The file was built with macros, so you may see warnings about macros needing to be enabled or 'trusting' the document before using it.
- Other issues that may be encountered include Trust Center settings. The Trust Center can be accessed by navigating to (File, Options, and Trust Center). In the Trust Center options, click on Macro Settings and adjust according to your organizations policy. Microsoft also releases updates that can occasionally break ActiveX/Macros.

■ WHAT THE TOOL CAN DO

- Assess the performance of the HSM Predictive Method as a whole on local data.
- Assess the performance of the uncalibrated HSM Part C SPFs on local data.
- Assess the performance of SPFs and CMFs from other sources on local data.
- Calibrate existing SPFs to local data using the HSM calibration procedure.
- Calibrate the dispersion parameter of an existing SPF to local data.
- Compare the performance of multiple SPFs.
- Identify the most appropriate SPFs and CMFs to apply from a list of alternatives.

■ WHAT THE TOOL CANNOT DO

The tool is NOT for developing original SPFs or for creating the required datasets for calibration.

■ REQUIREMENTS FOR IMPORTING DATA

1. The user must create an Excel spreadsheet with calibration data on a tab labeled "Data."
2. The data for each site must be in a single row with crash counts and all variables required to apply the selected SPF and CMFs in columns.
3. If multiple years of data are included, then the crash counts in each row of the data file must represent the sum of crashes across all years and the file should contain a column indicating the number of years included. The tool only computes a single calibration factor, so if the user desires multiple calibration factors (e.g., one for each year), then the user will need to prepare a separate file for each year and run the process separately.
4. The imported file should only include sites to which the calibrated SPFs will be applied.
5. If predefined SPFs are to be applied, then the column headings must match the variable names (case sensitive) for the predefined SPFs.
6. No sites should have missing values for the variables required to apply the SPF or CMFs.

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▪ OPTIONS FOR ENTERING AND APPLYING SPFS AND CMFS

- SPFs may be entered manually by a user (user-defined), or may be selected from available HSM and AASHTOWare Safety Analyst™ models predefined in the tool.
- SPFs may require the use of CMFs, which can be defined as individual formulas within the tool or pre-calculated with associated values embedded in the imported data.
    - If CMFs are embedded in the imported data, then the user must edit predefined SPFs to include the CMF(s) multiplicatively.
    - If CMFs are not already embedded in the data, then the user must define these CMFs in the tool.
- In manually entering an SPF equation, users can enter variables by typing the variable name and ensuring it is enclosed with square brackets (e.g., [AADT]) or by selecting the variable from the 'Variable List' and then double-clicking in the right box of the 'Model Formula.'
- After entering an SPF, CMFs, and the dispersion formula, or making edits to an existing SPF, the user must click "Save as new SPF" to create a new SPF or "Replace SPF" if the edited SPF is to retain the same name before estimating the calibration factor or calibration function.
- A single calibration factor or a calibration function can be separately estimated.
- Users can assess multiple SPFs simultaneously for the same dataset. All SPFs can be selected simultaneously by clicking the "Select All Models" button. A subset of SPFs can be selected by holding down the "Control" button (or equivalent, depending on your computer) while selecting those SPFs.
- An existing SPF can be selected for application or edited by double-clicking the SPF name in the 'Available Models' box.
- Users can delete SPFs by selecting the SPF name in the 'Available Models' box and then clicking the "Delete Selected Model" button.

▪ MODEL ASSESSMENT WITH CURE PLOTS AND ASSESSMENT TABLES

- If CURE plots or assessment tables are generated and subsequently an additional variable is selected and a new CURE plot or assessment table is generated, then the original plots or tables will be lost. For this reason, all variables for which a CURE plot or assessment table is desired should be selected together.
- Multiple variables can be selected for assessment by holding down the "Control" button (or equivalent, depending on your computer) while selecting those variables.
- The fitted value is a key CURE plot assessment variable. It is indicated as "Model NameCalibration" in the assessment variable list (e.g., SA-RUR-2U-KABCOCalibration is the column of fitted values for the AASHTOWare Safety Analyst™ SPF for total crashes on rural, two-lane, undivided roads).

▪ HANDY REFERENCES

- Highway Safety Manual, First Edition, Volume 2, Appendix A.
- User's Guide to Develop Highway Safety Manual Safety Performance Function Calibration Factors.
- Safety Performance Function Decision Guide: SPF Calibration vs. SPF Development.
- Safety Performance Function Development Guide: Developing Jurisdiction-Specific SPFs.
- The Art of Regression Modeling in Road Safety.
- Srinivasan, R., M. Colety, G. Bahar, B. Crowther and M. Farmen. 2016. Estimation of Calibration Functions for Predicting Crashes on Rural Two-Lane Roads in Arizona.

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