

UPDATES TO TPB'S TRAVEL DEMAND FORECASTING MODELS: GEN2 MODEL

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Agenda

- Overview of TPB's Gen2 production-use and developmental models
- Recent Gen2 Model developments
- Plans to finalize Gen2/Ver. 2.4 Model as a production-use model



Overview

- COG/TPB staff maintains at least two regional travel demand models
 - One adopted, production-use model
 - Updated on a regular basis
 - Used extensively by TPB member agencies
 - Usually becomes the adopted, production-use model implicitly by action of the TPB, e.g., approval of the air quality conformity (AQC) analysis
 - One or more developmental models
 - Guided by the strategic plan for model improvement, developed in 2015 with consultant assistance



Overview

- Gen2 production-use models
 - Gen2/Ver. 2.3.75: Current production-use model, adopted by the TPB on October 17, 2018
 - Gen2/Ver. 2.3.78: Expected to become the next adopted production-use model in April 2020 upon the TPB's approval of the 2020 Amendment of Visualize 2045
 - Model transmittal package as well as documentation will subsequently become available



Overview

- Gen2 developmental models
 - Gen2/Ver. 2.5: Currently on hold, and not expected to be used in production
 - Gen2/Ver. 2.3.84: Presented at the 1/24/2020 TFS
 - Gen2/Ver. 2.3.85 or a subsequent version: Will be re-branded as Gen2/Ver. 2.4 Model
 - Gen2/Ver. 2.3.85 PT: Created for preliminary investigation of Cube Public Transport (PT)



Recent Developments: Milestones (1)

- Gen2/Ver. 2.3.82:
 - Updated external trip distribution based on 2014 AirSage data
 - Modified external trip generation
 - Re-calibrated trip distribution Friction Factors
 - **Cut down number of iterations in trip distribution**
 - Additional model changes
- Gen2/Ver. 2.3.83:
 - Provided preferential treatments to commuter rail in path building to reflect the additional amenities associated with commuter rail travel
- Gen2/Ver. 2.3.84:
 - Recalibrated the Nested Logit Mode Choice model
 - Underwent comprehensive model validation and sensitivity testing



Recent Developments: Milestones (2)

- Gen2/Ver. 2.3.85:
 - Sensitivity testing indicated a minuscule but unintuitive reversal of directionality of VMT change in Ver. 2.3.84
 - e.g., adding a lane on the American Legion Bridge resulted in a 0.019% increase in 2014 regional VMT in Ver. 2.3.75 but a 0.004% decrease in Ver. 2.3.84
 - Subsequent investigation pinpointed specific model change that caused the reversal:
 - Reduced number of iterations in trip distribution (TD) resulted in imperfect TD model convergence in Ver. 2.3.84
 - Reverting to original number of iterations in TD resulted in more intuitive directionality of VMT change
 - e.g., adding a lane on the American Legion Bridge resulted in a 0.018% increase in regional VMT in Ver. 2.3.85



Recent Developments: Documentation

- Milone, Ronald, and Meseret Seifu. MWCOG/TPB Memorandum to DTP Technical Staff. “External Trip Distribution Model Update.” December 4, 2019
- Milone, Ronald, and Meseret Seifu. MWCOG/TPB Memorandum to DTP Technical Staff. “External Trip Distribution Model Update: Select-Link Analysis Comparison of the Ver. 2.3.66 and Ver. 2.3.82 Models.” December 12, 2019.
- Milone, Ronald, and Meseret Seifu. MWCOG/TPB Memorandum to Files. “Technical Updates in the V2.3.82 Model Application.” December 12, 2019.
- Feng Xie. MWCOG/TPB Memorandum to Files. “TPB Version 2.3 Travel Demand Model: Re-Calibrating the Nested-Logit Mode Choice Model Following the Updates to Commuter Rail Person Trip Targets.” December 18, 2019.
- Meseret Seifu. MWCOG/TPB Memorandum to Files. “Year-2014 Validation and Sensitivity Tests of TPB Version 2.3.84 Travel Model.” March 3, 2020.
- Meseret Seifu and Feng Xie. MWCOG/TPB Memorandum to Files. “Sensitivity Tests of TPB Version 2.3.85 Travel Model”, in process.



Plans for Gen2/Ver. 2.4 Model

- TPB staff plan to rebrand Gen2/Ver. 2.3.85 or a subsequent version as Gen2/Ver. 2.4
- TPB staff plan to make Gen2/Ver. 2.4 a production-use model without a TPB action
- TPB staff will prepare a Gen2/Ver. 2.4 transmittal package, which will involve:
 - Executing model runs for all analysis years included in the Gen2/Ver. 2.3.78 transmittal package, using the same model inputs
 - Comparing Ver. 2.3.78 and Ver. 2.4 model outputs for QC/QA
- TPB staff will also update user's guide to document all the new features of Gen2/Ver. 2.4 Model
- Planned release date of the Gen2/Ver. 2.4 Model will be in Fall of 2020



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