2023 Carbon Monoxide (CO) Categorical Hotspot Finding

Public Webinar

March 1, 2023

U.S. Department of Transportation
Federal Highway Administration

Outline

- Introduction
- Regulatory Background
- Modeling Method
- How to Apply the Finding
- Documentation Requirements
- Questions

Introduction

- 2023 CO Categorical Hotspot Finding released on January 31, 2023.
    - Update to MOVES3
    - Other enhancements
- Supersedes the 2017 finding
    - Based on MOVES2014
    - MOVES3 grace period ended January 9, 2023.

https://www.fhwa.dot.gov/environment/air_quality/conformity/policy_and_guidance/cmcf_2023/index.cfm

Regulatory Background

- January 24, 2008, transportation conformity rule added CO categorical hot-spot finding provision at **40 CFR 93.123(a)(3)**:
  - "DOT, in consultation with EPA, may also choose to make a categorical hot-spot finding that §93.116(a) is met without further hot-spot analysis for any project described in paragraphs (a)(1) and (a)(2) of this section based on appropriate modeling."

Thursday,
January 24, 2008

Part IV

Environmental Protection Agency

40 CFR Parts 51 and 93

Transportation Conformity Rule Amendments To Implement Provisions Contained in the 2005 Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA–LU); Final Rule
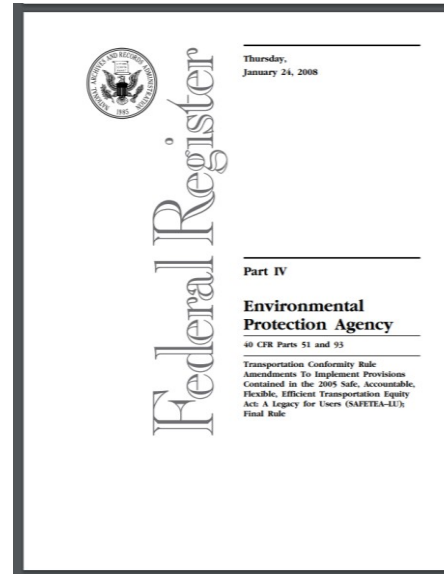
- Original Finding – February 12, 2014
  - Used MOVES2010b
- 2017 Finding – July 17, 2017
  - Used MOVES2014a
  - Superseded original finding
- 2023 Finding – January 31, 2023
  - Uses MOVES3
  - Supersedes 2017 Finding

Modeling Method

Modeling Method: Overview

- Models Used:
  - MOVES3 for CO emission rates
  - CAL3QHC dispersion model

- Enhancements:
  - Four scenarios based on road grade and truck percentage
  - Rural areas added
  - Expanded acceptable ranges for other parameters

- Skewed Intersection Design

2023 Finding Scenarios

Scenario	Road Grade*	Truck Percentage**
High Grade High Truck Percentage	1% <upgrade≤ 6%	2% < trucks ≤ 20%
Low Grade High Truck Percentage	0% ≤ upgrade ≤ 1%	2% < trucks ≤ 20%
High Grade Low Truck Percentage	1% <upgrade≤ 6%	0% ≤ trucks ≤ 2%
Low Grade Low Truck Percentage	0% ≤ upgrade ≤ 1%	0% ≤ trucks ≤ 2%

*The highest grade from all upgrade roadway links at the project intersection should be used.

**The highest truck percentage (single unit and combination trucks) from all links at the project intersection should be used. Note this definition differs from previous findings, which used percent heavy-duty diesel trucks.

- Most sensitive parameters used to define scenarios
  - Grade
  - Truck Percent
- All 4 scenarios are available for:
  - Urban
  - Rural

Expanded Acceptable Ranges

Parameter	2017 Finding Acceptable Range	2023 Finding Acceptable Range
Analysis Year	≥ 2017	≥ 2022
Area Type	Urban	Urban or **Rural**
Road Grade (%)	≤2%	**≤6%**
Truck Percent (%)	≥5% (heavy-duty diesel trucks)	**≤20%**
Temperature (°F)	≥ -10°F	≤ 70°F
Speed (mph)	≥ 25 mph	**15 mph ≤ speed ≤ 45 mph**
Peak Hour Approach Volume (veh/hr)	≤ 2640	≤ 2640
Peak Hour Level-of-Service (LOS)	A-E	A-E
Intersection Angle	= 90° (perpendicular intersections only)	**≥ 75°**
Number of through lanes (one direction)	≤ 4	≤ 4
Number of left turn lanes (one direction)	≤ 2	≤ 2
Lane Width (feet)	= 12 ft.	**≥ 10 ft.**
Median Width (feet)	= 0 ft. (no median)	**Any (≥ 0ft)**
Persistence Factor	≤0.7	**Any (0.0-1.0)**
1-Hour CO Background Concentration (ppm)	≤32.6	≤ 32.0
8-Hour CO Background Concentration (ppm)	≤7.3	≤ 6.9

How to Apply the Finding

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Application Options

- Option 1 – use tables in Appendix
  - User selects proper scenario
  - Limited to persistence factors of 0.7 and 1.0
- Option 2 – use spreadsheet tool (replaces online tool)
  - Automatically selects a scenario based on user inputs
  - Can enter an exact persistence factor between 0.7 and 1.0.

Option 1: Tables from Appendix

Table 3: Acceptable Ranges for Parameters Common to All Scenarios

Parameter	Acceptable Range
Analysis Year	≥ 2022
Area Type	Urban or Rural
Road Grade (%)	≤6%
Truck Percent (%)	≤20%
Temperature (°F)	≤ 70°F
Speed (mph)	15 mph ≤ speed ≤ 45 mph
Peak Hour Approach Volume (veh/hr)	≤ 2640
Peak Hour Level-of-Service (LOS)	A-E
Intersection Angle	≥ 75°

Parameter	Acceptable Range
Number of through lanes (one direction)	≤ 4
Number of left turn lanes (one direction)	≤ 2
Lane Width (feet)	≥ 10 ft.
Median Width (feet)	Any (≥ 0ft)
Persistence Factor	Any (0.0-1.0)
1-Hour CO Background Concentration (ppm)	≤ 27.7 or use Table 4 for less restrictive values
8-Hour CO Background Concentration (ppm)	≤ 1.7 or use Table 4 for less restrictive values

Option 1: Tables from Appendix

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Table 4: Acceptable Ranges for Parameters that Vary by Scenario

Intersection Scenario	High Grade High Truck		Low Grade High Truck		High Grade Low Truck		Low Grade Low Truck	
Urban/ Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural
Grade	1% < upgrade ≤ 6%		0% ≤ upgrade ≤ 1%		1% < upgrade ≤ 6%		0% ≤ upgrade ≤ 1%	
Truck Percentage	2% < trucks ≤ 20%		2% < trucks ≤ 20%		0% ≤ trucks ≤ 2%		0% ≤ trucks ≤ 2%	
Allowable 1-Hour CO Background (PPM)	≤ 29.8	≤ 27.7	≤ 31.3	≤ 29.6	≤ 30.8	≤ 28.9	≤ 32.0	≤ 30.3
Allowable 8 Hour CO Background Concentration (PPM) – Persistence Factor ≤ 0.7	≤ 5.36	≤ 3.89	≤ 6.41	≤ 5.22	≤ 6.06	≤ 4.73	≤ 6.90	≤ 5.71
Allowable 8 Hour CO Background Concentration (PPM) – Persistence Factor ≤ 1.0	≤ 3.80	≤ 1.70	≤ 5.30	≤ 3.60	≤ 4.80	≤ 2.90	≤ 6.00	≤ 4.30

Option 2: Use Spreadsheet Tool

- Fill out user input tab with parameters from your project

- If parameters fall within acceptable range, they will be shaded green,
  - Otherwise, they will be shaded red, and the finding cannot be used.

- Inputs for truck percent, grade, and area type are used to select scenario and fill in the output section on the right.

- Demo the spreadsheet tool

Documentation Requirements

Information to Include in Project-Level Conformity Documentation

- Explain that the project-level conformity determination **relied on FHWA's CO categorical hot-spot finding** which has met all the requirements for a CO hot-spot analysis including: 40 CFR 93.110, 93.111, 93.116(a), and 93.123.
- Document that the existing **interagency consultation and public involvement process** required by 40 CFR 93.105 was used to determine that the use of the CO categorical hot-spot finding is appropriate for the project.

- Clearly show how the project sponsor was able to rely on FHWA's CO categorical hot-spot finding, such as:
  - Project parameters fall **within the acceptable ranges** given in the appendix or spreadsheet tool.
  - Include references for where the **project information** relied on for the finding can be found.

Questions?

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