

A new statistical framework for estimating localized CO concentrations, ASCE Journal of Transportation Engineering, 126(5):426-434 (2000)

The US EPA specifies that level-of-service (LOS) D intersections must undergo detailed micro-scale carbon monoxide (CO) modeling using the recommended software such as CAL3QHCr, which requires an in-depth knowledge of micro-scale dispersion modeling of pollutants. In this study, a new statistical framework is introduced that is intended to replicate the micro-scale modeling results achieved with CAL3QHCr. The new framework provides an important means for assessing air quality impacts during the design phase of a transportation project, without having to acquire the modeling skills and/or dispersion modeling knowledge necessary to execute CAL3QHCr. To develop the framework approximately 23,000 CAL3QHCr simulation scenarios were generated by varying the input values of the major design and dispersion modeling factors. The input values, together with the corresponding output values of CAL3QHCr simulations, were used to specify a statistical model. The proposed model was then validated using field meteorological conditions for five cities in California. The study results show that the proposed model can be easily and reliably used by traffic engineers to predict potential CO exceedances at the planning stage.