



Paul E. Benson, PE

*Senior Air Quality Scientist
Transportation Policy and Planning*

Mr. Benson joined STI in December 2010 after a 40-year career with the California Department of Transportation (Caltrans). He is a registered Civil Engineer in California and the developer of the CALINE 3 and 4 microscale air quality dispersion models. During his lengthy Caltrans career, he specialized in air quality modeling, materials quality assurance, and applied statistics, including experiment design. He was active in transportation research at the national level, chairing the Transportation Research Board (TRB) standing committee on Transportation and Air Quality (1991–1997) and the Long Term Pavement Performance Expert Task Group on Data Analysis (1996–2000). In 2011, he was honored by the TRB by being named an Emeritus member of the Transportation Air Quality Committee (ADC20).

In the field of air quality analysis, Mr. Benson designed and directed complex near-roadway tracer studies involving both freeway and intersection configurations. His analyses of these data led to development of the U.S. Environmental Protection Agency (EPA) approved models, CALINE 3 & 4. He obtained National Cooperative Highway Research Program funding for modal emissions testing and model development (NCHRP Panel 25-11), and chaired this panel and the associated NCHRP Panel (26-6) on Intersection Air Quality Modeling. He also served on the TRB Committee for the “Study of Impacts of Highway Capacity Improvements on Air Quality and Energy Consumption.” That committee led to TRB Special Report 245, Expanding Metropolitan Highways—Implications for Air Quality and Energy Use.

During his tenure with Caltrans, Mr. Benson developed and conducted classes on impact analysis for project-level air quality studies. His innovative applications of microscale air quality models included light rail park and ride lots, cut-and-cover freeways, and airborne asbestos impacts near rural unpaved roads. He added algorithms for estimating near-road nitrogen dioxide (NO₂) and PM impacts to his 1984 CALINE 4 model, anticipating the eventual need for these tools. Under his guidance, Caltrans developed a carbon monoxide screening procedure that used the concept of “worst-case meteorology.” In 1988, he organized one of the first national conferences to bring together transportation and air regulatory professionals: Transportation & Air Quality—Common Ground. This conference recognized that the goals of the transportation and regulatory communities shared common solutions (e.g., HOV lanes, ramp metering, and modal choice).

In the field of materials quality assurance, Mr. Benson was responsible for establishing test precision limits for numerous California test methods and designing the interlaboratory correlation program used by Caltrans to certify laboratories and testing technicians. In 1999, he developed a statistical model to estimate weld strength from radiographic images in response to the need for an emergency (earthquake-driven) evaluation of over 300 structures in California. More recently, he led a team that developed a conceptualized approach to materials management for Caltrans that included an interactive, web-based system for controlling materials quality and rating contractors and suppliers.

Education

- MS, Civil Engineering, University of California at Davis
- BS, Civil Engineering, University of California at Davis

Memberships

- Transportation Research Board (Emeritus member, Transportation Air Quality Committee – ADC20)
- Transportation Research Board (Past Chair, Transportation Air Quality Committee – ADC20)
- Transportation Research Board (Past Member, Management of Quality Assurance Committee – AFH20)
- Transportation Research Board (Past Chair, Strategic Highway Research Program ETG on Data Analysis)
- American Society of Civil Engineers (Past Member, Environmental and Energy Aspects of Transportation)

For a list of publications, see sonomatech.com/ResPub/PEBpub.pdf.