Tunnels often have a bad name for air quality, some deservedly. A new report next year by the World Road Association (WRA), aims to set tunnel air quality standards for a range of airborne pollutants. Dr. Fathi Tarada, co-chairman of the WRA Working Group on Air Quality, Ventilation and Fire, also managing director of Mosen, explains.

Although the report focuses on the application of emissions standards, it is widely recognised that no matter how well a tunnel ventilation system is designed, it is important that it is operated properly in order to maintain a reasonable air quality both within the tunnel and also in the immediate vicinity of the portals. This requires reliable in-tunnel air quality measurement, and a responsive control system for the ventilation system.

System types
The new WRA report does not discuss the merits and drawbacks of alternative ventilation systems, since these have already been covered in previous publications. However, every ventilation system has its limitations, and these can complicate its operation and control during congested periods. For example, semi-transverse ventilation systems such as those employed in older London tunnels including the Rotherhithe Tunnel have ‘dead zones’ where the longitudinal air velocity is close to zero, and the concentrations of pollutants are therefore high. Longitudinal ventilation systems with jet fans or Saccardo nozzles do not have this drawback, but generally have their highest pollution concentrations at the discharge portal. Fully-transverse ventilation systems can provide a high level of air quality throughout the length of a tunnel, but are by far the most expensive option in terms of construction and operating costs.

Through an improvement in the design, operation and control of tunnel ventilation systems, we can look forward to a day when we can breathe easily while driving through tunnels, and when tunnels finally lose their poor reputation for air quality. The new WRA report may allow us to go one step closer towards that goal.