King, P.[1], J. Vanos[1], A. Middel[2]. *Initial Radiative and Pedestrian-Scale Thermal Responses of TiO_2 Fog Seal Pavement Across Diurnal Phases.*

Cool pavement technologies are increasingly deployed to mitigate spatial variability in near-surface thermal conditions within urban environments, yet their impacts on radiative, surface, and near-surface thermal conditions are not fully characterized. We deployed two MaRTy carts to quantify differences in diurnal thermal response shortly after installation of a titanium dioxide (TiO_2) based Fog Seal, comparing its performance with adjacent conventional asphalt. Measurements included surface temperature, mean radiant temperature (MRT), and air temperature at 0.5, 1.0, 1.5, and 2.0 m heights, capturing pedestrian-relevant thermal conditions.

Results from a single overnight deployment spanning evening, nocturnal, and peak solar regimes show that the fog seal surface was consistently cooler than asphalt by 1.3–1.5 °C. MRT responses, however, varied strongly with radiative context, with modest nighttime reductions and a pronounced daytime increase under peak solar loading. Vertical air temperature differences were comparatively small. Calculated surface radiative properties, including Solar Reflectance Index (SRI), place the fog seal between conventional asphalt and higher-albedo products, helping explain observed surface cooling alongside increased daytime radiative exposure. These results highlight short-term tradeoffs between surface cooling and human-relevant thermal exposure following cool pavement application in arid urban environments.

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