

Exploring the shade benefits of Building Shade enhanced by Structural and Tree Shade for Pedestrian Comfort and Heat Stress Reduction in the South-Central Corridor

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Abstract:

In Phoenix—a city characterized by its hot, arid climate—shade is a critical component in designing pedestrian-friendly streetscapes. While tree shade often faces maintenance, water usage, and infrastructure challenges, building shade is an underutilized resource that can significantly reduce surface temperatures, reduce heat stress at the pedestrian level, and enhance public health. This study focuses on innovative shading strategies along a half-mile stretch of the South-Central corridor, an area envisioning a transition from industrial and commercial uses to a vibrant, transit-oriented downtown. During record-breaking temperatures in October 2024, street-level heat data and surface temperature measurements were collected using Kestrel meters at both sun-exposed and shaded reference locations. The analysis highlighted significant temperature differences, emphasizing the urgent need for effective shade planning to mitigate heat stress. The project prioritizes 'shadescaping'—the strategic implementation of building shade, structural additions like overhangs, and natural tree canopies. While tree shades are commonly preferred, their associated challenges in urban settings are notable. Consequently, this speculative study advocates for building forms as primary shading devices, designing pedestrian-friendly spaces tailored to the harsh conditions of the Sonoran Desert. Five innovative building shading strategies, three overhang strategies, and a combination of structural and natural shading techniques are proposed to optimize pedestrian comfort. Referencing Transit-Oriented Development (TOD) principles, the study refines the design of new and existing structures, rethinking their form, orientation, and height to improve shading efficacy. This dual approach not only enhances the pedestrian experience but also contributes to the broader discourse on sustainable urban development

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