



Contribution ID: 9

Type: **not specified**

Shaping daylight: The Komorebi effect via the Radiance mist material in renovation architecture

Friday 25 August 2023 15:00 (15 minutes)

This presentation revolves around the renovation of an old farm in Marvao, Portugal, transformed into a residential complex. This case study signifies a collaborative effort between Transsolar and DECA Architecture, aiming to simulate the Komorebi effect—a Japanese term denoting the interplay of sunlight streaming through the leaves of trees—within the redesigned space.

Our methodology fosters a unified approach, converging the architects' vision and clients' desires with a rigorous daylight and visual comfort analysis. The ultimate goal is to create a space harmoniously integrating nature and architectural design, vividly echoing the Komorebi effect. This approach enables optimal spatial configuration, yielding uniform daylight distribution, minimal glare, and the successful replication of the Komorebi effect, all while upholding the project's overarching sustainability concept.

A distinguishing aspect of our approach is the application of the Radiance Mist material in simulations. This medium enables light particles to scatter, visually representing the Komorebi effect and simulating the appearance of light beams traversing a medium like fog or mist, a task typically requiring the construction of scale mock-ups and fog machines.

Despite the Radiance Mist material being well-documented in "Rendering with Radiance" and other sources, its application in daylight simulations remains a complex process, one often limited to Radiance experts. We present a simplified application pathway within an actual project using Radiance through Solemma's Climate Studio (CS), a state-of-the-art environmental performance analysis software.

CS streamlines the radiance rendering process, enhancing efficiency, and swiftly allowing for the creation of stunning visual representations. Our findings highlight the advantages of using Solemma's Climate Studio in conjunction with Rhinoceros 3D for accurate light divergence evaluation.

This presentation is targeted at daylight professionals proficient in Radiance, Rhino 3D, and Grasshopper, and extends to students, researchers, and practitioners in Architecture, Climate Engineering, and Building Physics. It aspires to contribute to the broader discourse on daylight utilization, its impact on energy demand, visual comfort, and the complex integration of daylight within sustainable building design.

Keyword 1

Radiance Mist Material application

Keyword 2

Simulating Komorebi effect

Keyword 3

Unified Approach to Daylight Analysis

Keyword 4

Visual comfort and Sustainability

Keyword 5

Environmental Performance Analysis Software

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Session Classification: Presentations

Track Classification: Planning with daylight