Improving Design Decision-Making Through A Re-Representation Tool For Visual Comfort Consideration In Dynamic Daylit Spaces

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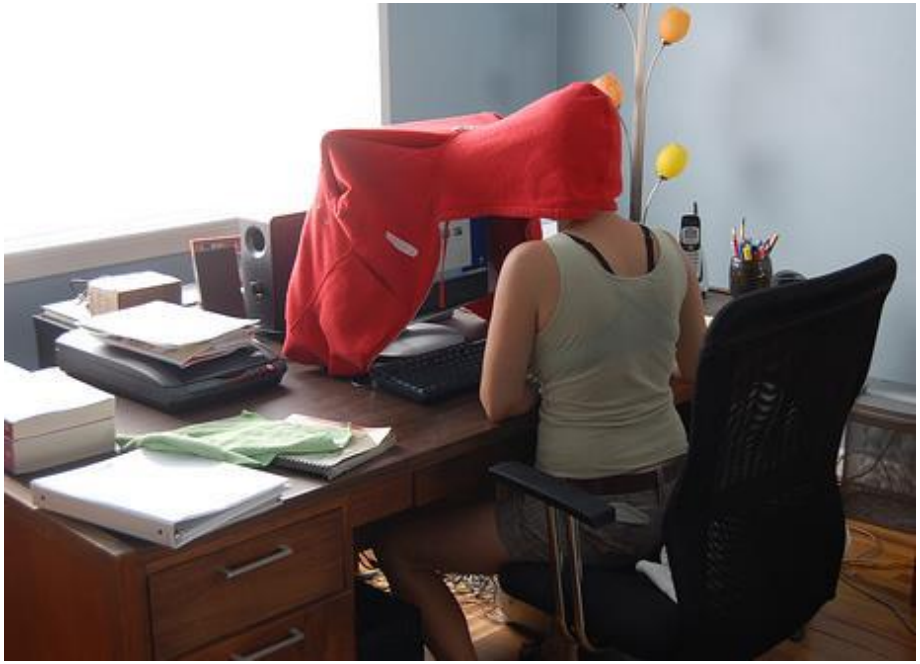
Introduction



Visual Comfort

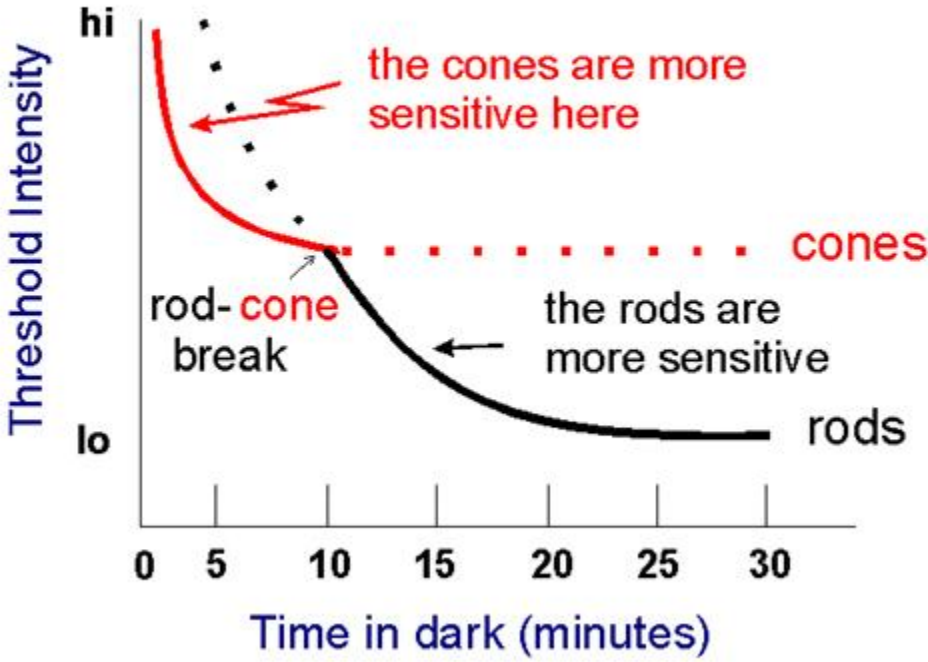
"That state of mind that expresses satisfaction with the visual environment."

Walter Grondzik

Visual comfort is one of the key elements of lighting quality. Discomfort is most often caused by an excessive contrast in perceived brightness.

Visual Adaptation

Visual system limits



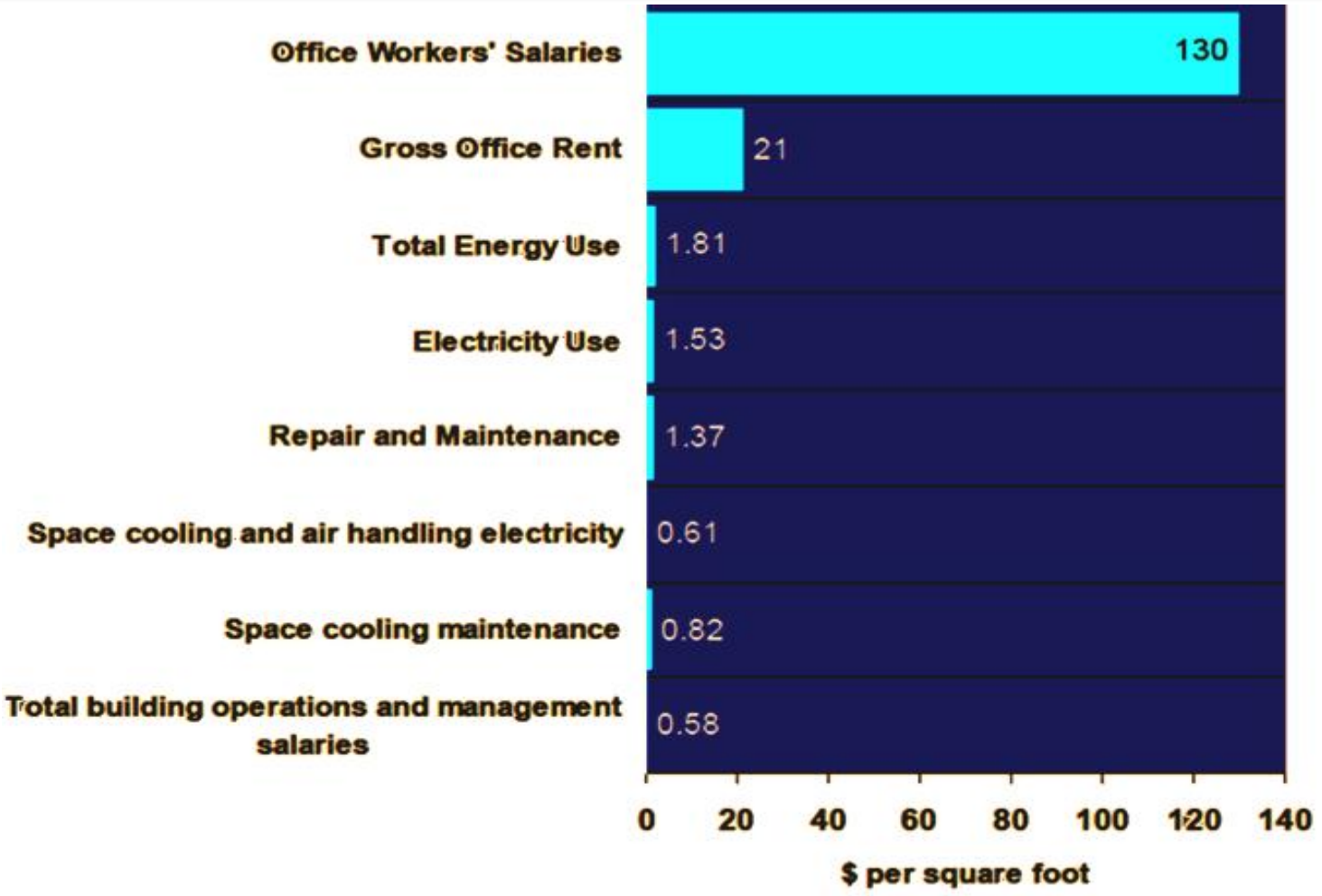
Visual adaptation

Aspects of Visual Discomfort

Visual Discomfort Aspects

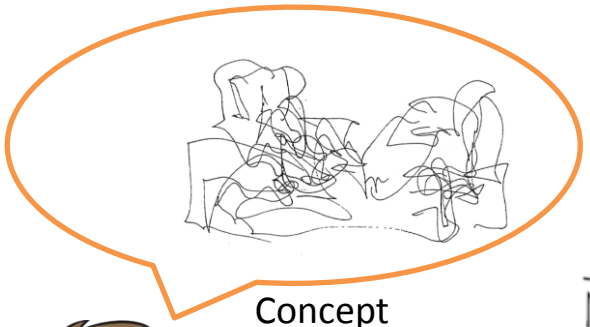
- **Glare**
  - **Disability Glare**
  - **Discomfort Glare**
- **Light Quality**
  - **Color**
  - **Contrast**
- **Amount of Light**
  - **Distribution**

Why Study Visual Comfort??



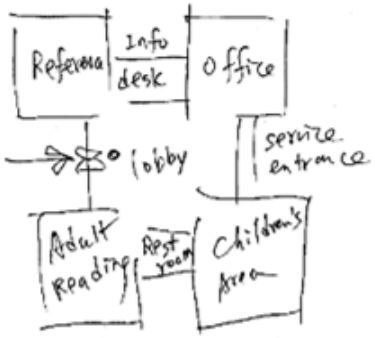
A study showed that occupants' salary represent the highest cost among all building energy consumption cost. Over a 30-year life, salaries account for 94% of a building's total cost (Council, 2003)

Visual Comfort Evaluation

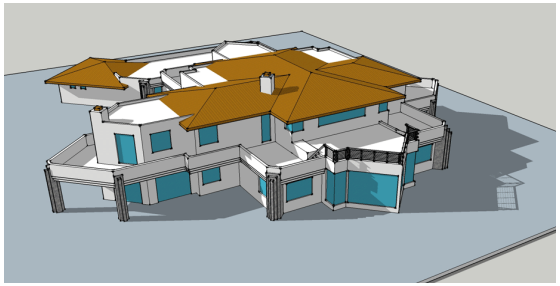


Concept

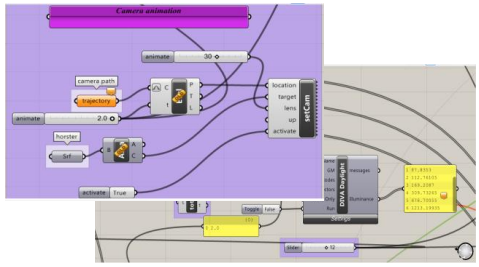
Architect



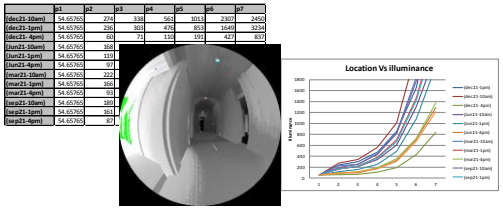
Schematic Design



3D-mass & Circulation



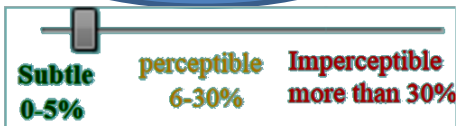
Visual Comfort Analysis and Simulation



Visual Comfort Aspects Evaluation

Redesign

Visual Comfort Condition



Tool Development Journey

Visual Comfort Evaluation Tool- Framework

Tool Framework Overview

1- Data input

- 3D-Model
- Geographical location
- Sky condition
-Date and time
- Materials properties
- Building orientation
- Surroundings
-Examined space
- Circulation path

2- Analysis and simulations

A-Light distribution Evaluation (Illuminance)
Useful Daylight Illuminance

Peek hour(s) and location(s)

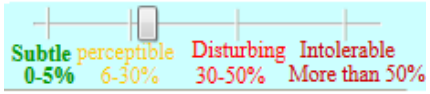
B- Contrast Evaluation (Luminance)
Luminance contrast ratio

C- Glare Evaluation (Luminance)
Daylight Glare Index and Daylight Glare Probability

Results and Conclusions

3- Final Evaluation

Discomfort occurrence

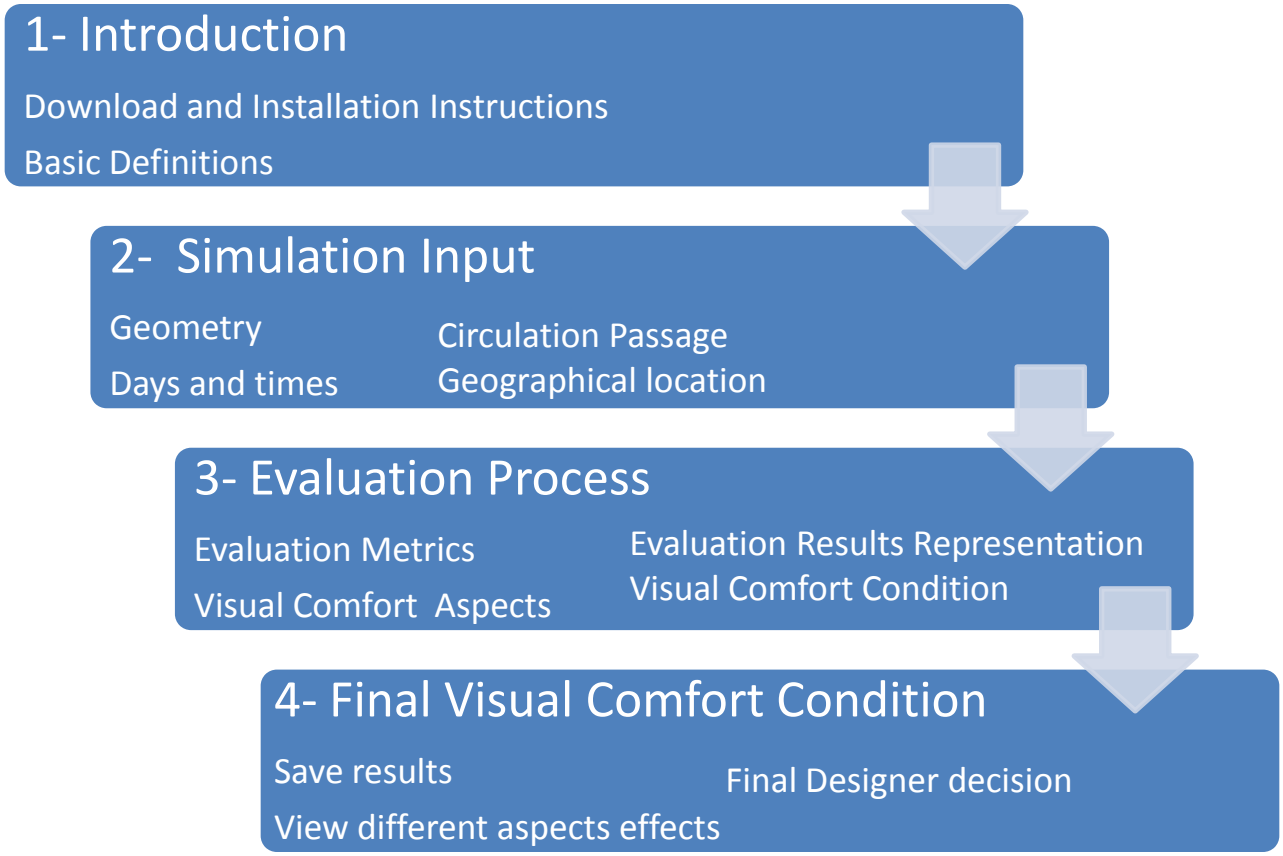


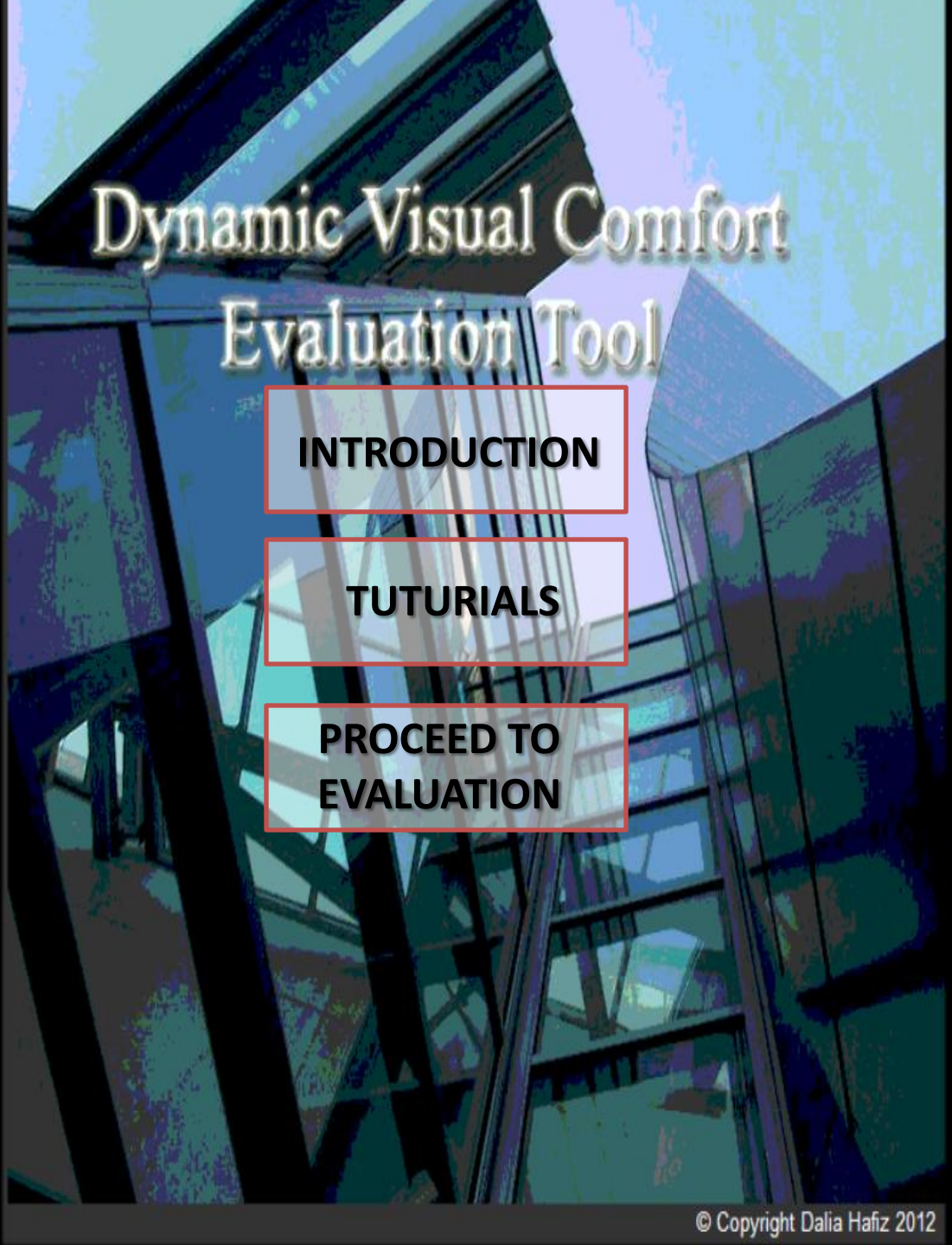
Final visual discomfort condition

4- Designer decision

Redesign

Visual Comfort Evaluation Tool




Dynamic Visual Comfort
Evaluation Tool
INTRODUCTION
TUTURIALS
PROCEED TO EVALUATION
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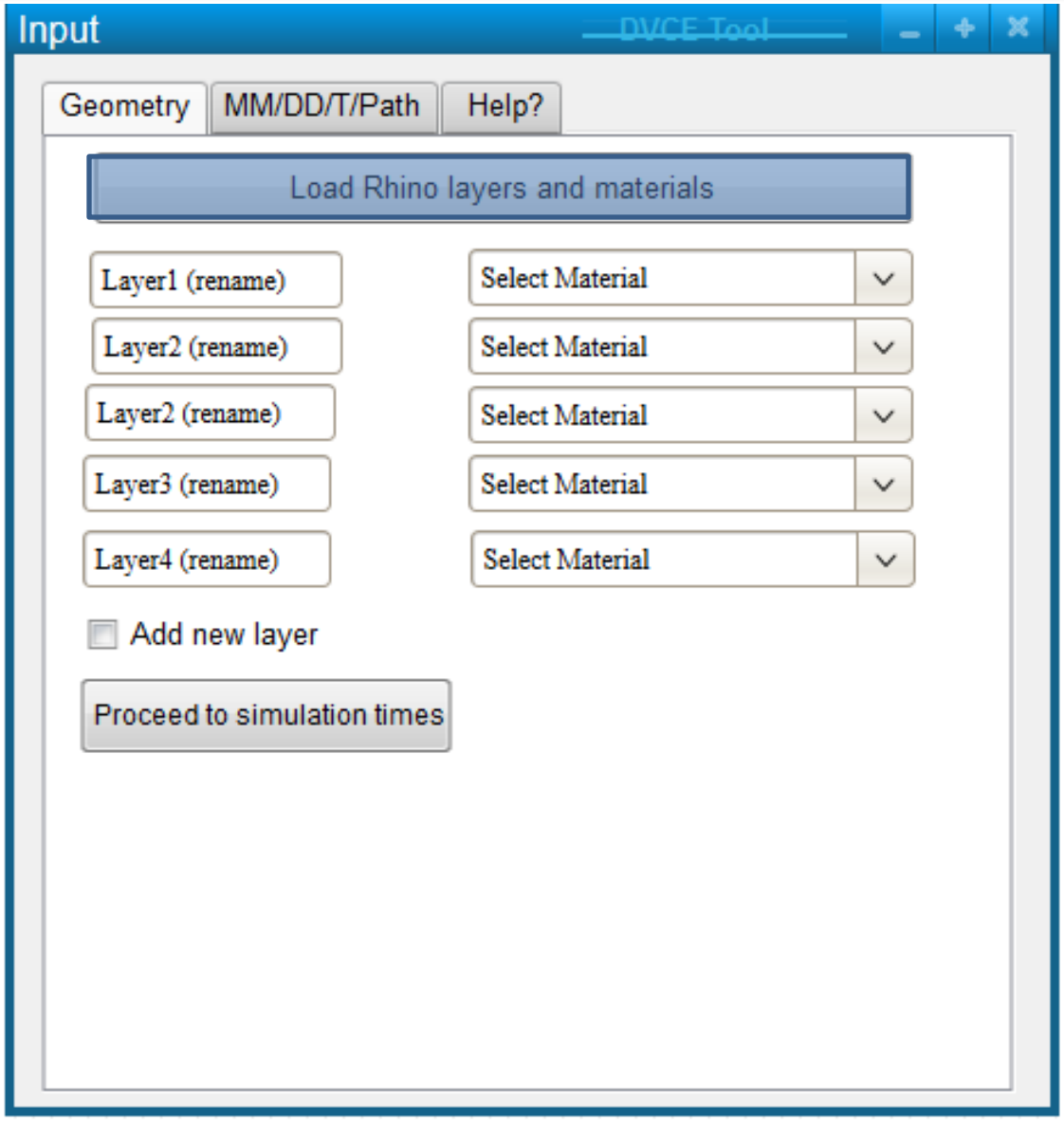
Visual Comfort Evaluation Tool



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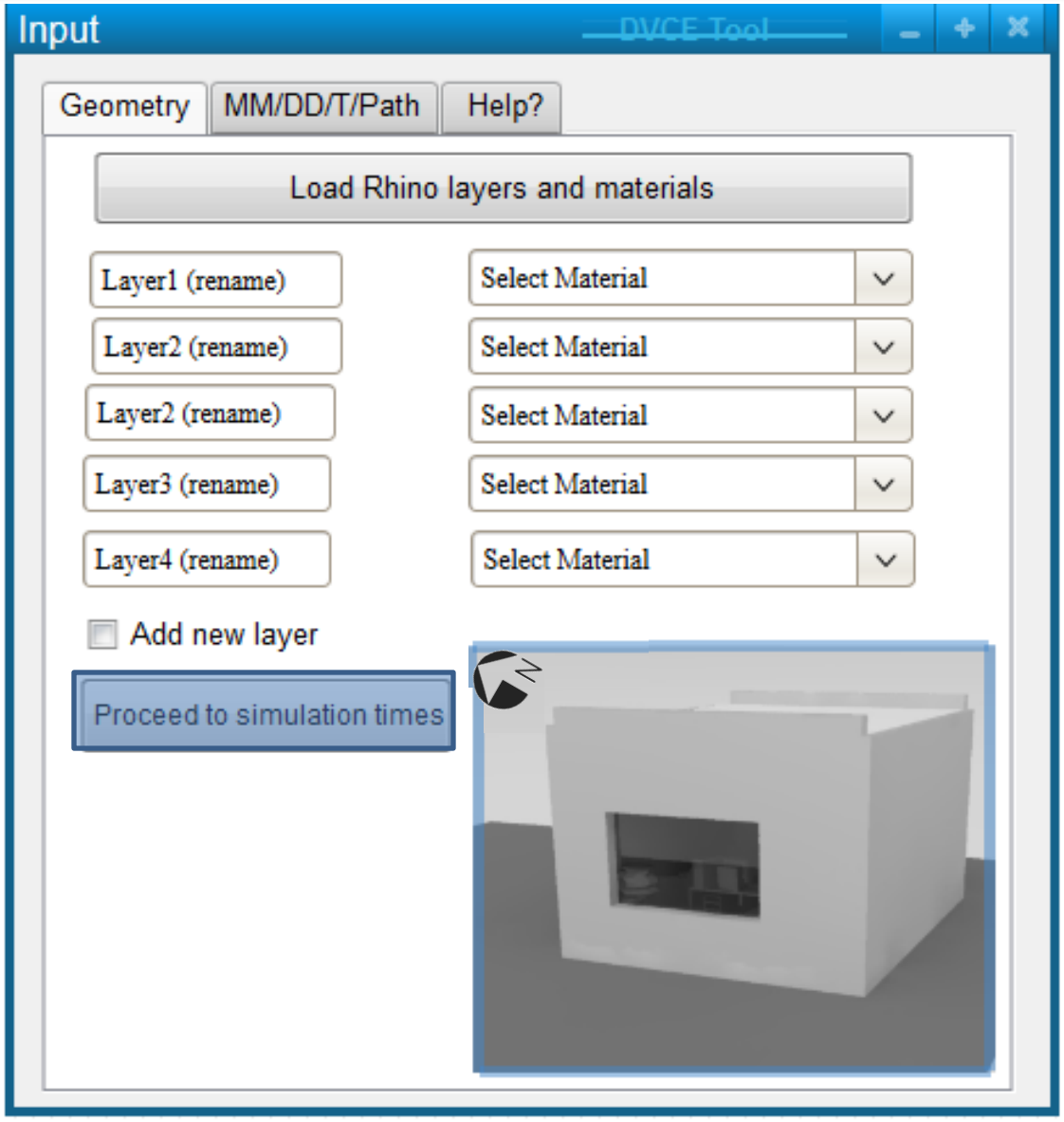

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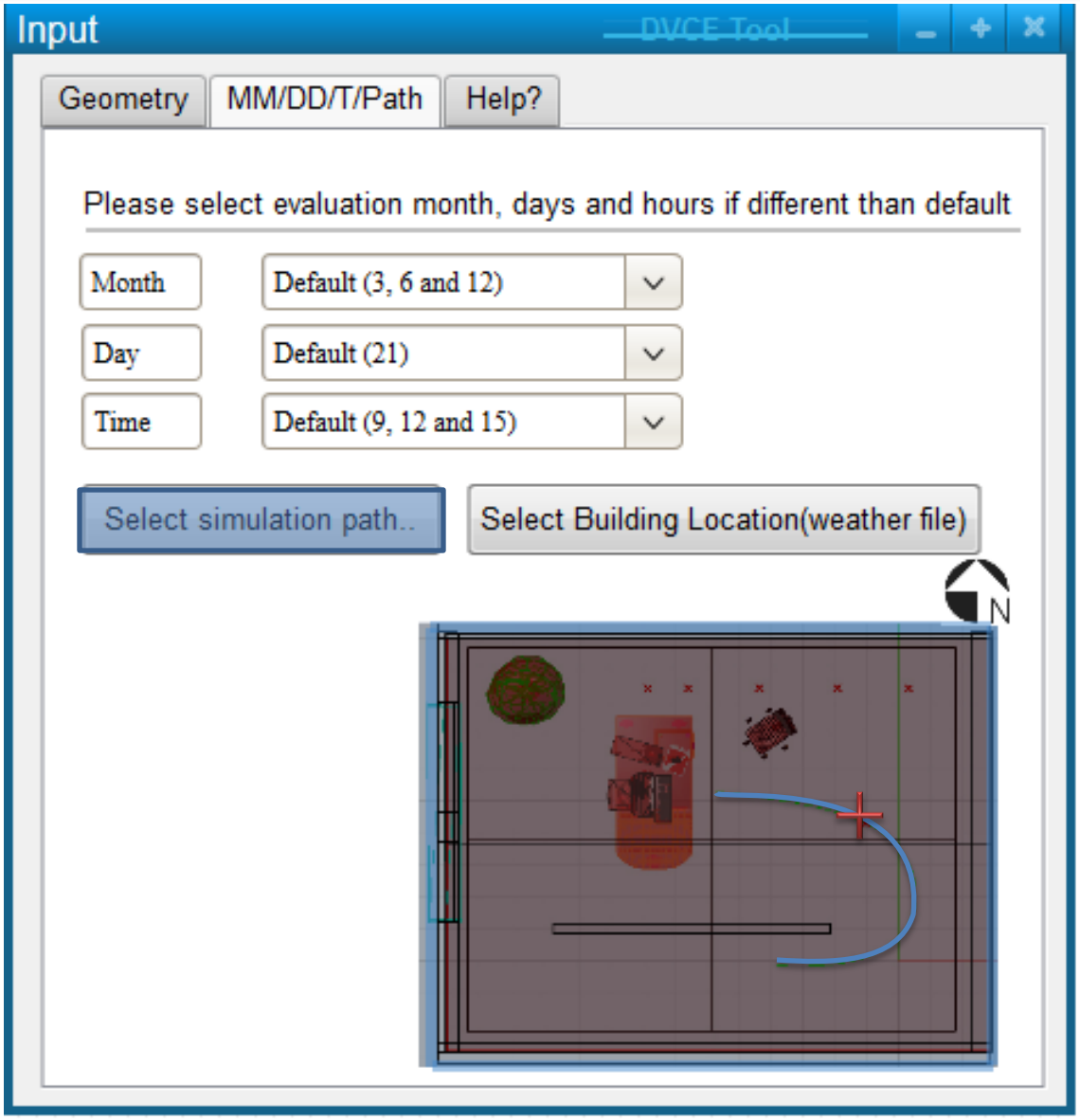

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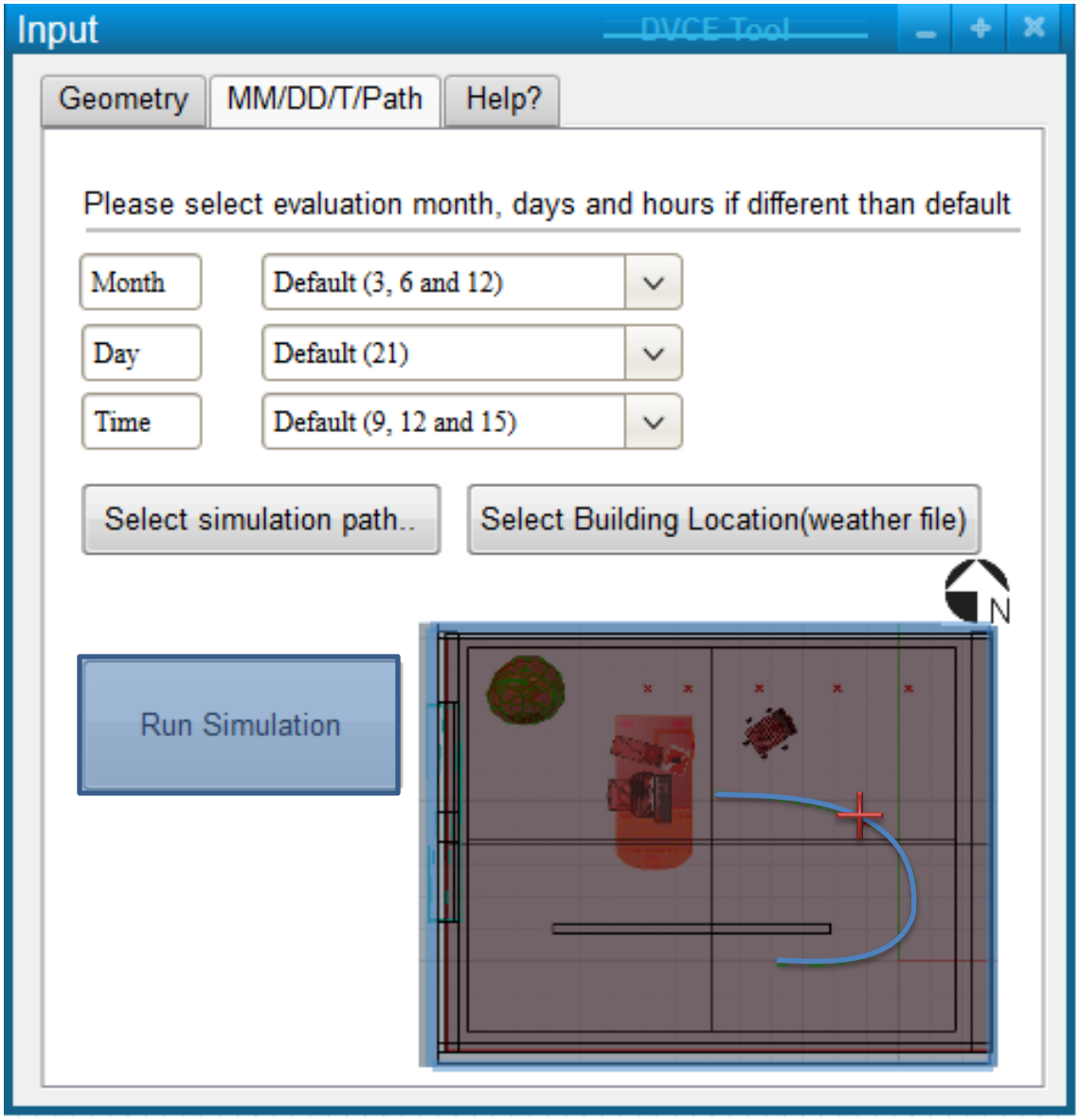

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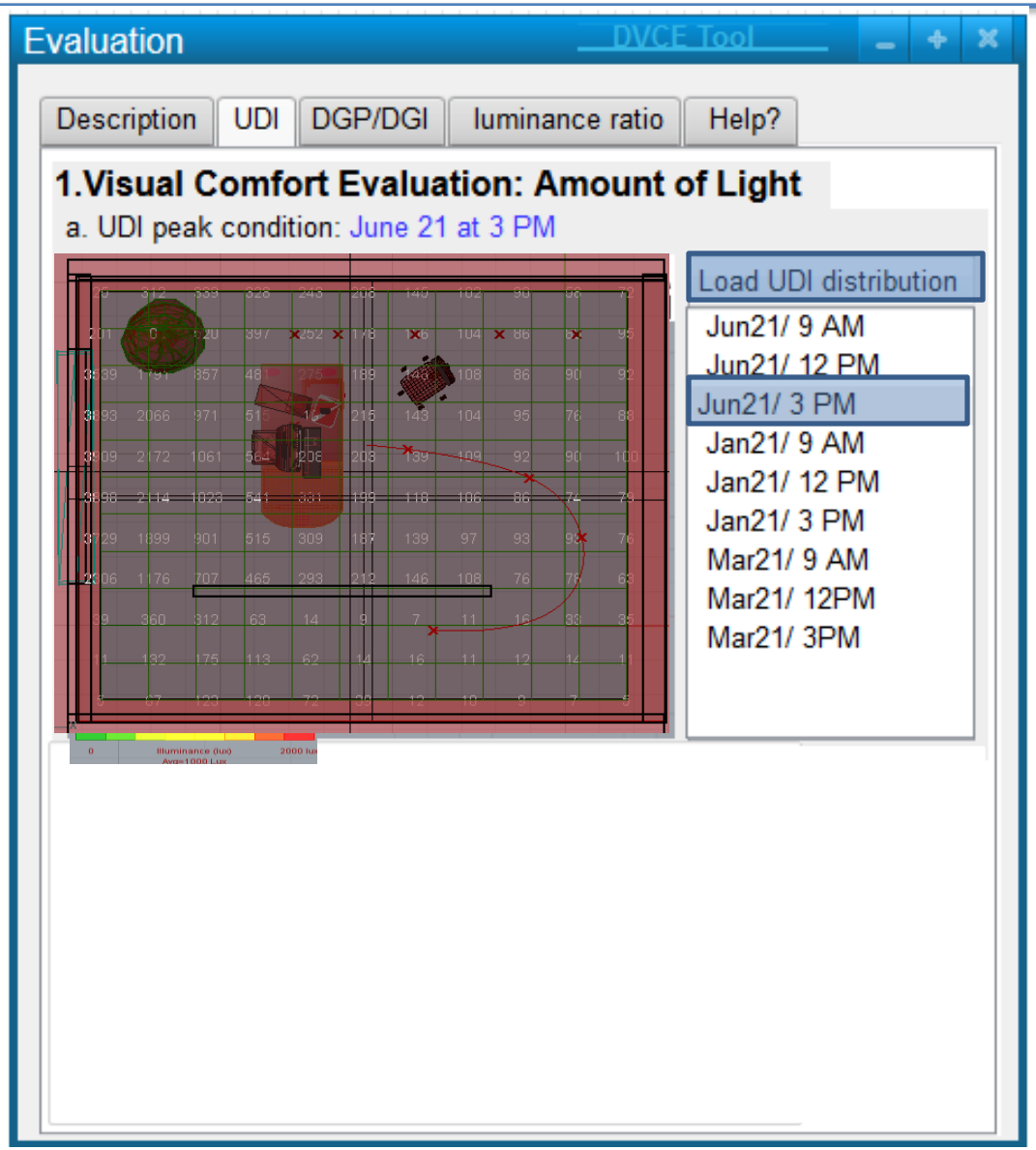

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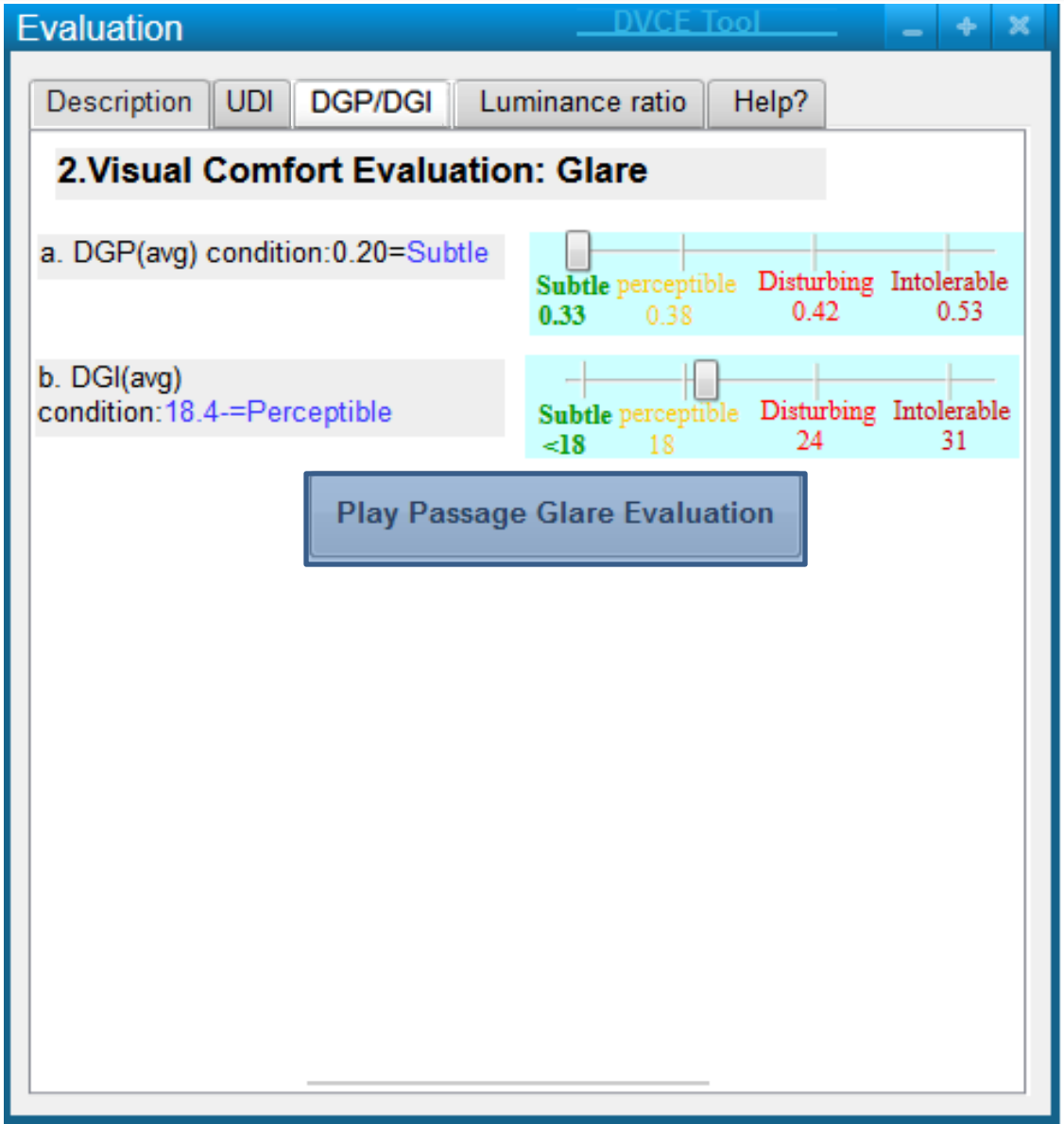

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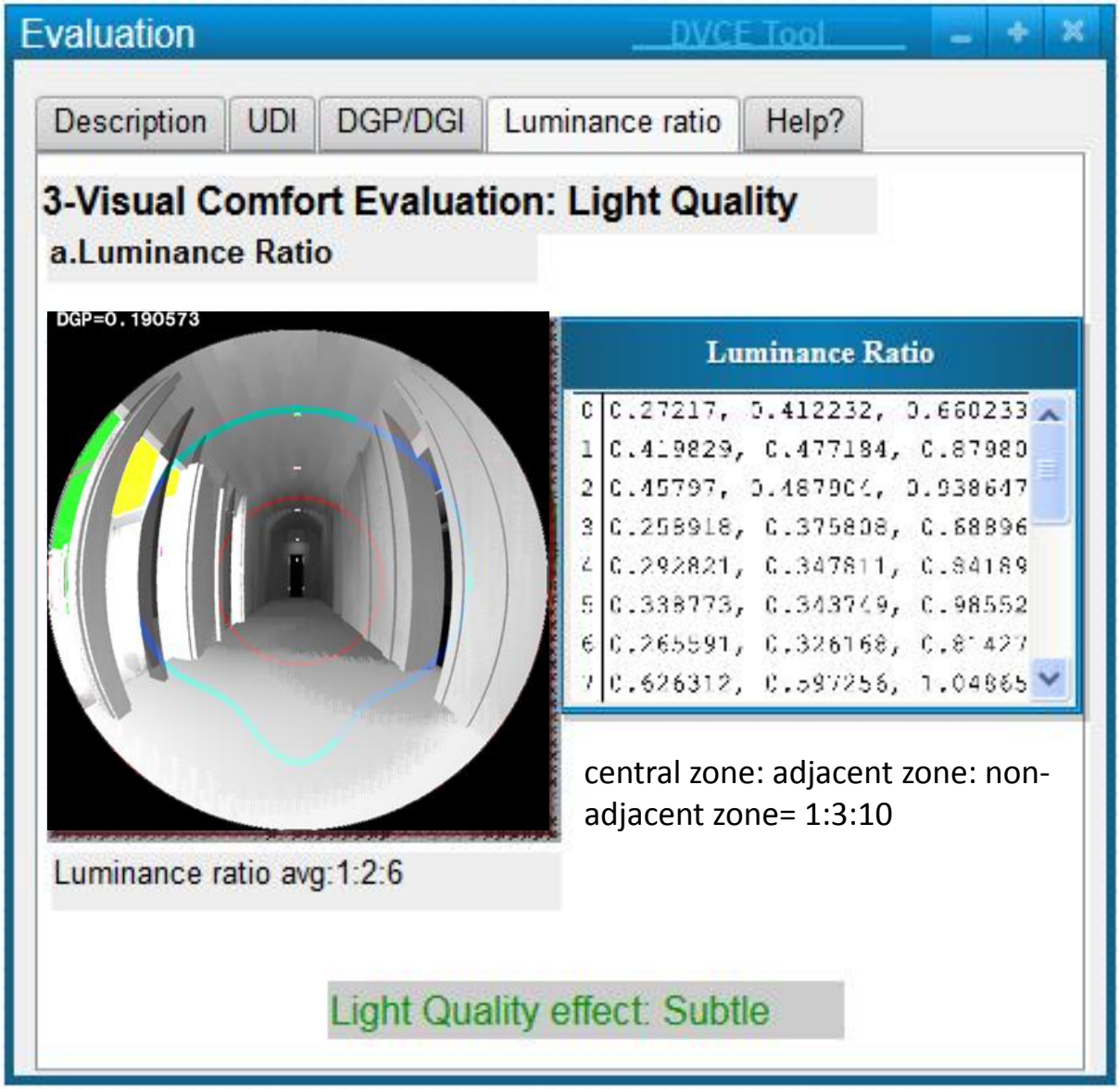

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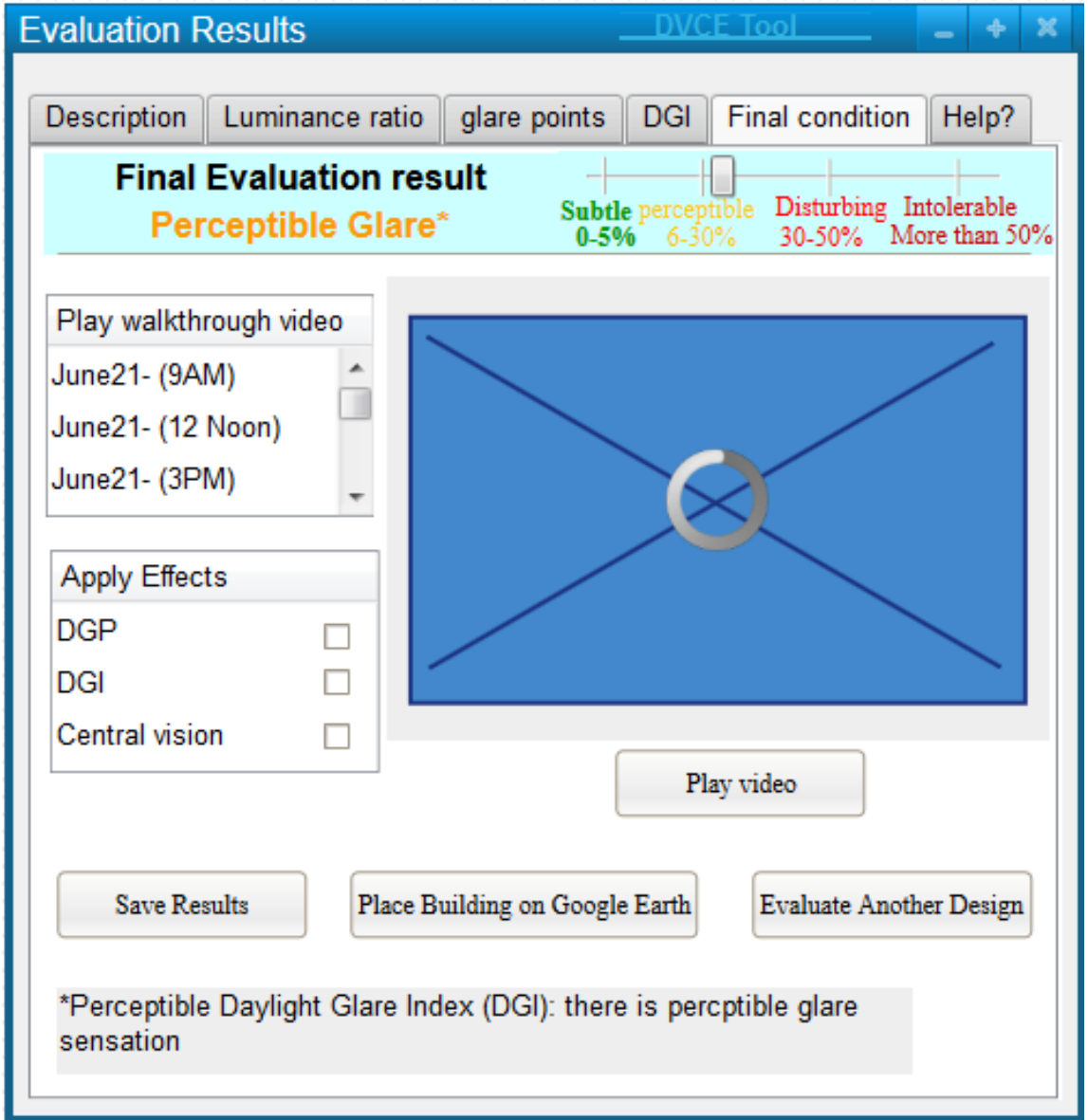

THANK YOU!

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