ABPS
Animated Building Performance Simulation

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CONTEXT

SOFTWARE: NURBS based modeling
**CONTEXT**

**TOOLBAR:** For Rhinoceros 4.0 and Grasshopper 6.0

**PLATFORM:** Rhinoscripting (a language based on VBScript)
NECESSARY FILES: Skies, .epw, .map, material.rad, .rvb
**CHALLENGE 1:** Naming Convention

**INTENT:** Maintain function given “spaces”

**PROCESS**

The “tag” is part of your filename, up to the first [space]. The rest of the name is truncated.

Example 1: Tutorial Model.3dm >> Tutorial
Example 2: trial 1.3dm >> trial 1.3dm >> trial
Example 3: trial 2.3dm >> trial 2.3dm >> trial
**PROCESS**

**CHALLENGE 2: Directory Convention**

**INTENT:** Maintain freedom of user storage

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**User Folder**

- OK: `C:\Radiance\GSD_Rhino\trial1`

- NOT OK: `C:\Documents and Settings\user\My Documents\trial 1`

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**Storage Folder**

- Default

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**NOTE:** Files are overwritten
CHALLENGE 3: Materials

INTENT: Allow user layer-conventions

1. Assigning materials by layer
2. Rhino’s material index
   a. Not standardized
   b. Inability to recall reliably
3. Use color instead
4. Material names are for user identification and export
1. Point ordering for geometry output
2. Material association
1 PROJECT INFO

**FUNCTION**: name, directory, location

**FILES**: xyzinfo.dat file, .wea file
2 NODES

**FUNCTION:** Create point grid

**FILES:** xyz.pts
3 MATERIALS

**FUNCTION:** Assign materials to Layers

**FILE:** material.rad (copied)
**FUNCTION**: Sets Radiance parameters

**FILE**: parameters.dat

Select a parameter to change and Exit to accept defaults or finish (ab ad as ar aa Exit): ab

Enter new -ab value <5>: |
5 METRICS

FILES: Test-dependent
5 METRICS

IMAGE FILE: xyzimg.bat, xyz.rif…
**5 METRICS**

**DAYLIGHT FACTOR**: Performs DF
**FILES**: xyz.bat, xyz.dat, xyz.rad, etc.

![Image of animated building performance simulation](image)

Daylight Factor Analysis:
- Mean Daylight Factor = 8.98
- 84.9% of Area > 2% Daylight Factor
5 METRICS

**DAYLIGHT AUTONOMY**: Performs DA
**FILES**: xyz.bat, xyz.rad, xyz.da, etc.

*Animated Building Performance Simulation*

*Daylight Autonomy Analysis*

Mean Daylight Autonomy = 75.8
DEMO USING RAD CONF.3DM
WHY?

1. Design Validation
2. Design Evaluation / Optimization
3. Rapid Iterations at all phases of design
1. Materials Management
2. Additional Metrics
3. Vertical Surfaces
4. Loading of saved results
5. Sky Options
REFERENCES

The scientific basis of the daylighting design sequence as described in this document is provided under:
http://isites.harvard.edu/fs/docs/icb.topic466783.files/Daylighting%20design%20sequence.v1.pdf

Free online references:


Daylighting Guide for Canadian Commercial Buildings:  

Daylighting Schools:  
http://www.innovativearchitecture.net/pdf/daylightguide_8511.pdf
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Harvard Graduate School of Design:
The GSD has been putting special attention to the advancement of environmental building performance, supporting a number of researches in the matter. www.gsd.harvard.edu

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