

Department of Architecture
School of Architecture and Allied Arts
University of Oregon

ARCH 281 Fall 2005
Intermediate Architectural Design I

ASSIGNMENT 4: DAYLIGHT MODEL

- OBJECTIVE
- To explore how light and shadow can make a space evocative
 - To explore designing with light using daylight models
 - To generate a seed of beauty for the building project



INTERIOR VIEW KOSHINO HOUSE BY TADAO ANDO

INTRODUCTION ...we find beauty not in the thing itself but in the patterns of shadows, the light and the darkness that one thing against another creates.

--Jun'ichiro Tanizaki, *In Praise of Shadows*

Light is the origin of all being. Striking the surface of things, light grants them an outline; gathering shadows behind things, it gives them depth. Things are articulated along borders of light and darkness, and obtain their individual form, discovering interrelationships, and become infinitely linked. Light grants autonomy to things and, at the same time, prescribes their relationships. We might even say that light elevates the individual to distinction in the context of its relationships. Light: the creator of relationships that constitute the world, yet although the origin of all being, it is by no means an immobile source. Light is, rather, tremulous motion - out of its ceaseless transformation, light continually reinvents the world.

--Tadao Ando, "Light" *Jahrbuch für Licht und Architektur*, 1993

CONSIDERATIONS by Virginia Cartwright Materials affect the distribution of light. Dark surfaces absorb and constrain light. Light surfaces reflect and expand light. Roughly textured surfaces scatter light evenly, and present both highlight and shadow. Polished surfaces reflect light and image.

Volume affects light. Large volumes swallow and diminish light making shadows equal partners in the description of space. Small volumes can be easily overwhelmed by the least amount of light. The shape of surfaces concentrates or distributes light. Solid walls can seem translucent. Walls next to windows receive and reflect light into the room becoming sources of light. A high vaulted ceiling moves up and away from the light receding into shadow.

Windows that are high let in the light of the sky, making the connection to the world abstract, enhancing memory as the connection to the earth. Low windows, close to the floor, orient to the earth, their light is subtle and often merely implied. Windows in the middle, at eye level become doorways into the world beyond, connecting us to the world around us in a very direct way, often so powerfully that we can not see them as bringers of light. A single window overhead becomes the sun. It focuses attention on one spot at a time. Many windows above become the stars. They sparkle and distribute the light over the room. A strip of windows high in the wall lifts the ceiling so that it floats above the walls.

DESCRIPTION To begin thinking about the nature of your building, explore how abstract qualities of light can enhance performance. A simple room model will be a first step towards developing daylighting in more detail in week 6.

1. Envision a type of performance that could be enhanced by natural light. Consider the emotions that are evoked by the performance and record the words and images that come to mind.

List design objectives describing the ambiance, atmosphere, and character of the light in the room.

2. Build a daylighting room model as an 8" cube. Use opaque material such as heavy chipboard or black foamcore (not translucent white foamcore) lined with materials with surface reflectance (see handout). Surface reflectivity or transmittance matters more than color. Don't worry about including clear glass, try using a translucent materials to emit diffuse light.

Make sure all cracks are sealed by using black electrical tape to seal the corners and joints. Create at least one viewing opening that is 1-1/2" square minimum.

Adjust the model to guide the daylight towards your objectives: add/subtract windows, light shelves, skylights, light wells, roof monitors, and shading controls.

3. Assess the model to determine if your objectives were achieved, then revise. Consider changing surface reflectances, moving components and/or aperture size to compare with original scheme.

RESOURCES

Rasmussen, Steen Eiler, Experiencing Architecture: Light in Architecture
Marietta S. Millet, Light Revealing Architecture (Chapters 1 and 2)

Lighting Design Lab, Seattle: Daylight Model Tips and Tricks:
http://design.uoregon.edu/281.05/p.cheng/handouts/dayltg_tips.pdf

Material Reflectivity References
<http://design.uoregon.edu/281.05/p.cheng/handouts/reflectivity.pdf>

SCHEDULE WITH REQUIREMENTS

Mon, Oct. 17: Daylighting model due with performance type and list of design objectives

Wed, Oct. 19: Revised daylighting model due.

"No space, architecturally, is a space unless it has natural light."
--Louis Kahn



LIGHTING MODEL SUPPLIED BY VIRGINIA CARTWRIGHT [HTTP://WWW.UOREGON.EDU/~STUDIO/BATHPIX/LIGHT/](http://www.uoregon.edu/~STUDIO/BATHPIX/LIGHT/)