



How to build a...

Bowling Ball Heliodon

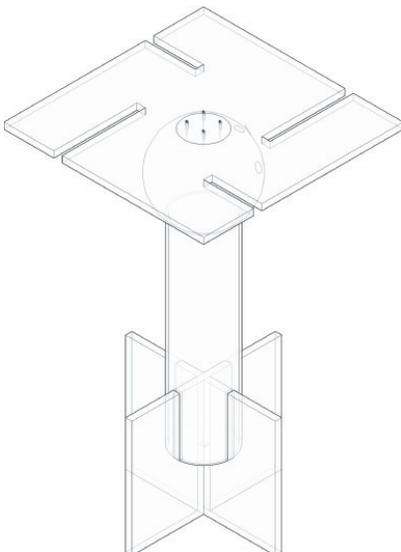
Baker Lighting Laboratory, University of Oregon
 Layout, Text, and Images: Jeff Guggenheim - University of Oregon
 Based on a design by Victor Olgay - University of Hawaii
 Built by Ben Rippe

Materials List

- (2) 14" x 18" x 3/4" plywood
- (1) 24" x 24" x 1/2" plywood
- (1) 6" diameter, 24" long, PVC or ABS pipe
- (1) bowling ball
- (4) 1 1/2" wood screws
- (1) Plasti-Dip rubber spray coating
- (1) masking tape
- (2) C-clamps

Tool List

- Router with 1" bit
- Table Saw
- Drill
- Screw Driver



Introduction

The Baker Lighting Laboratory at the University of Oregon recently built two simple and inexpensive heliodons. The design was based on University of Hawaii's Victor Olgay's "An Inexpensive Heliodon for Teaching the Geometry of Sunlight" (<http://sundial.arch.hawaii.edu/sundial/ECSLabmaterial/simple.htm>).

These heliodons have been excellent tools for teaching solar geometry to beginning environmental control systems students, as well as for quickly testing daylight and sunshade models. The introduction of the bowling ball heliodon to the University of Oregon has proven that a simple tool in the hands of students can help produce innovative designs while reinforcing the importance of passive solar and daylight systems within building designs.

Construction Directions

The heliodon breaks down into three parts; the base, the stand and the horizontal surface.

THE BASE is constructed with two 3/4" pieces of plywood cut to the dimensions of 14" x 18". A 3/4" x 7" slit is cut into the center of the 18" side on both pieces so that they may intersect in a cruciform manner thus creating a sturdy base. This can be accomplished with either a table saw or a router.

-- Directions continue on next page --

Construction Directions Continued

The stand, which utilizes a 6" diameter piece of PVC pipe cut to 24" long, must insert into the wooden base. To accomplish this, place one of the pipe's ends on the wooden base. Make sure that it is centered. Using the pipe's outer rim as a guide, make pencil marks at the four places where the pipe sits on the wooden base. Now, pull apart the two pieces of wood that form the base and cut four ~1¼" x 7" slots at the points marked with pencil. This will allow the pipe to slide into the base.

The horizontal surface is created by attaching the 24" x 24" x 1½" piece of plywood to an old bowling ball. This is accomplished by, first routing 1" slots into the piece of plywood so that when finished the c-clamps can be positioned to clamp down models of different sizes and dimensions. Next, on a table saw, cut part of the bowling ball's face flat. Make sure that this creates a circular flat surface 3" to 4" in diameter. Find the center of the plywood square and then, using the wood screws, attach it to the flat part of the bowling ball. Now mask off the outside of the pipe used for the stand. Leave about 1" between the rim, where the bowling ball sits, and the masking tape. Spray the "Plasti-Dip" in a manner that coats the pipe's rim and creates a non-slip surface for when models are viewed at steep angles.

