Crystal Palace Lighting Simulation

Sponsored by
The Institute for Advanced Technology in the Humanities at the University of Virginia
Crystal Palace facts and figures

- Designed by Joseph Paxton
- Erected for The Great Exhibition of the Works of Industry of All Nations (Worlds Fair)
- Completed May 1, 1851 in Hyde Park, London
- Largest building in the world, 19 acres under roof
- Housed 13,973 exhibitors
- Destroyed by fire in 1935
Crystal Palace
historical significance

- Integrated Building Systems
- Manufactured Kit of Parts
- Cultural shift from value on ornate and hand crafted to mass produced manufactured goods
proportions derived by available glass size
typical roof bay
typical bay dimensions
typical building bay
bay to whole
roof structure
daylight control
typical bay with vents
drain detail
kit-of-parts
cultural shift
but what was it like?
Design Workshop

master.tif

rad

image

WEB

scan.jpg

formZ

text

OBJ

FACT

Electric Image

Moving Image

Museum of London

VRML
scene= win1.rad

Uncomment and set base file name correctly for "materials" file, if you are using one. By default, the name-based material definitions in "dw.mat" or any second mat library will override the color-based material definitions in your project.mat, because dw.mat comes later in the command line.

materials= master.mat

The octree is generated automatically. The following line just defines the name of the octree, so Radiance can keep track of it properly.

OCTREE= win1.oct

Uncomment and adjust "oconv" options _if_necessary_ in the following line. For instance, if Radiance gives an error "Set Overflow in oconv", try repeatedly doubling the -r value below until either 1) your rendering works, or 2) you get a different error.

oconv -r 1024

PICTURE defines the base filename for output images.

PICTURE= win1

For typical perspective views, the view parameters are extracted manually from FZ. See the viewmaster.txt file for help.

Example View Parameters: view= -vtv -vp -169.308 -146.681 17.0199 -vd 109.551 96.3275 0.080116 -vu 0 0 1 -vh 70 -vv 70 -vs 0 -vl 0

#view= XyZl
view= -vtv -vo 367 -vp 159 -337 70 -vd 0 525 0 -vu 0 -0 1 -vh 50 -vv 50 -vs 0 -vl 0
#view= yl -vo 30
# Read dimensions from the FZ model to set zone of interest, interior or exterior. The zone of interest defines the region of the model for which lighting calculations will be optimized, and if the type is interior, it also defines the limits of the scene for parallel projections.
Radiance

- Difficult to use
- Poor integration with standard modelers

✓ Free
✓ Photometrically accurate

What else is available if you want visual accuracy but don’t need the numerics?
Maxwell Render
http://www.maxwellrender.com

✓ New render engine based on physics of light

✓ Ease of use - graphic interface!

✓ Integrates with major 3D applications
  3dsMAX, Viz, Maya, Lightwave, Rhino, SolidWorks, ArchiCAD,
  Cinema 4D, formZ and SketchUp

✓ Windows, Mac and Linux

⭐ No lighting numerics, yet...
Links

- Main Site: http://www.iath.virginia.edu/london/model
- Lighting Simulation: http://www.iath.virginia.edu/london/model/cpls.html
- Documentation: http://www.iath.virginia.edu/~spw4s/CP/CrystalPalace2.html
Project Team

- Chris Jessee, Researcher - modeling and rendering
- Michael Levenson, Monuments Project Director
- Worthy Martin, Associate Director IATH
- Will Rourk, Researcher - modeling
- Sarah Wells Staff - documentation
- Ying Yao, Staff - rendering and documentation

Sponsored by
The Institute for Advanced Technology in the Humanities at the University of Virginia