Radiance modeling of translucent glazings, a practical approach

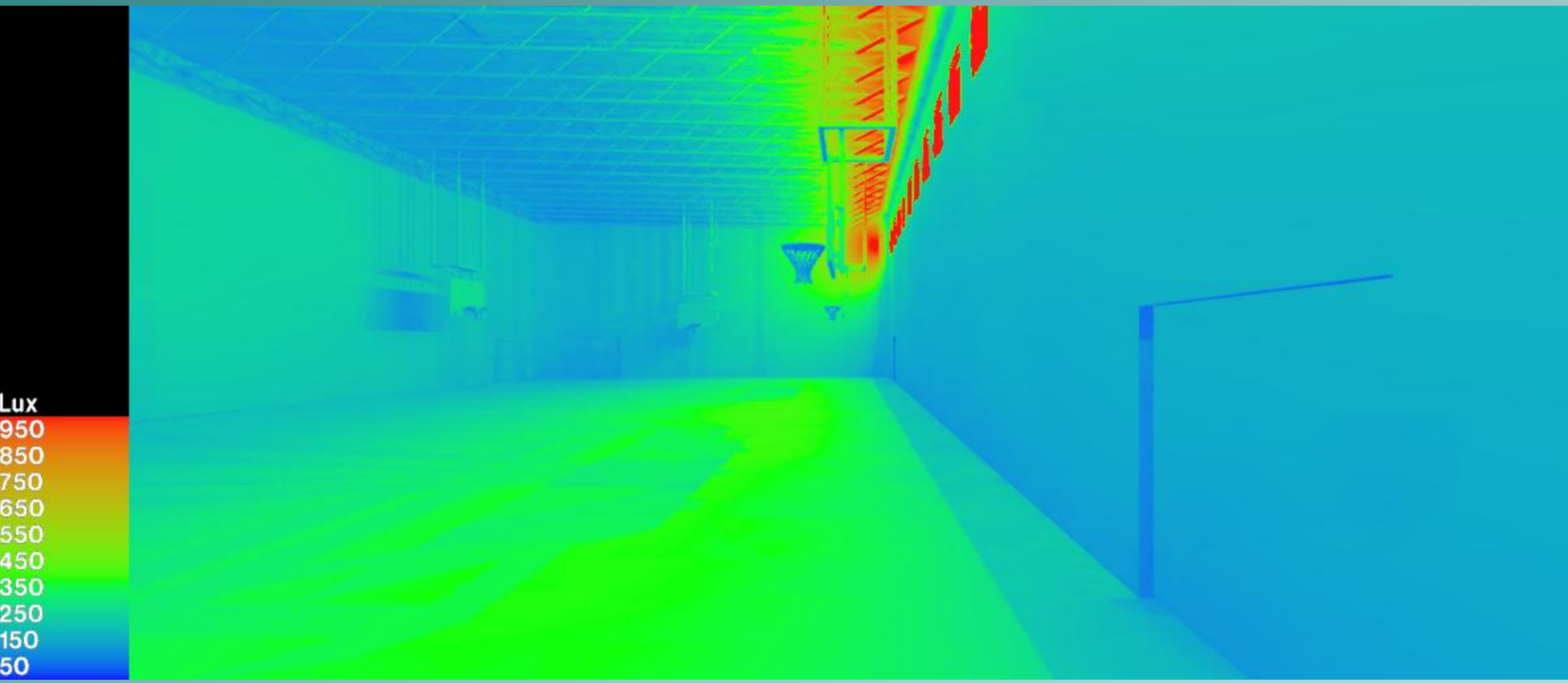
- What we get from radiance modeling
- Why translucent glazings? – a solution to daylighting
- How I measure and model diffusing materials
- My deliverables: quick turnaround reasonable quality renderings.
- Cool time lapse rendering comparisons

Radiance Modelling

We use Radiance as both:

- Selling Tool – for both ourselves and for building design professionals, who have to justify the decision to use Solera in their project.
- Design Tool – With Radiance we can determine the appropriate light transmittance to use, and what changes will be had from different configurations.

Design example:



Why Translucents?

- A different way to introduce natural light

Daylighting: renewed importance

- With current energy concerns daylighting is receiving renewed attention
- LEED program and the daylighting requirements it puts forward are forcing building design professionals to incorporate natural lighting in their projects.

Problem with LEED

- LEED is creating awareness and activity with respect to daylighting, but…
- LEED requirements only stipulate a quantity of daylight. And to meet the requirement a space need not be functional and well lit.

- ‘Traditional’ Daylighting Approaches: both good and bad

  - East-west orientation
  - Northern glass is ok
  - Use overhangs on south
  - Skylights with deep light-colored wells
  - Minimal glazing on east and west
  - Reflectives, dark tints, shades, frit simply block light

Where are all the daylit buildings?

- Victims of project realities
  - Budget
  - Site Considerations
  - Style

Typical Occupant Solution

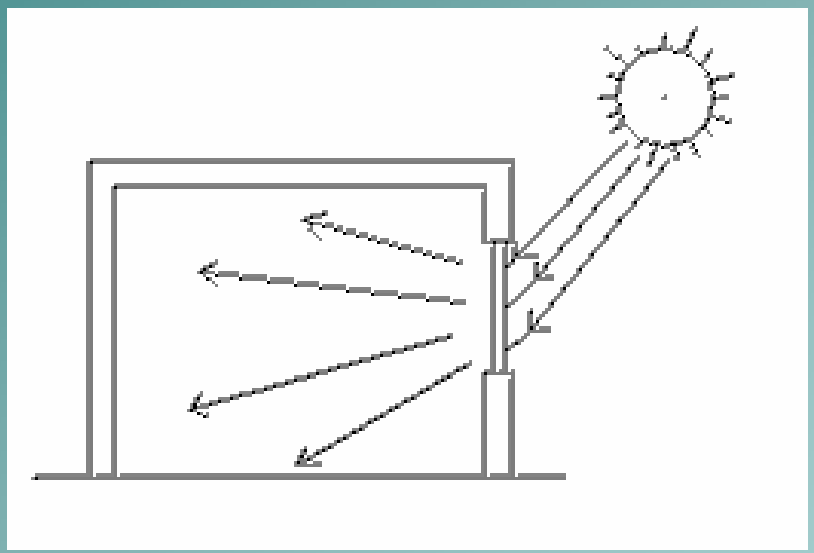
“NO BLINDS!!!!”

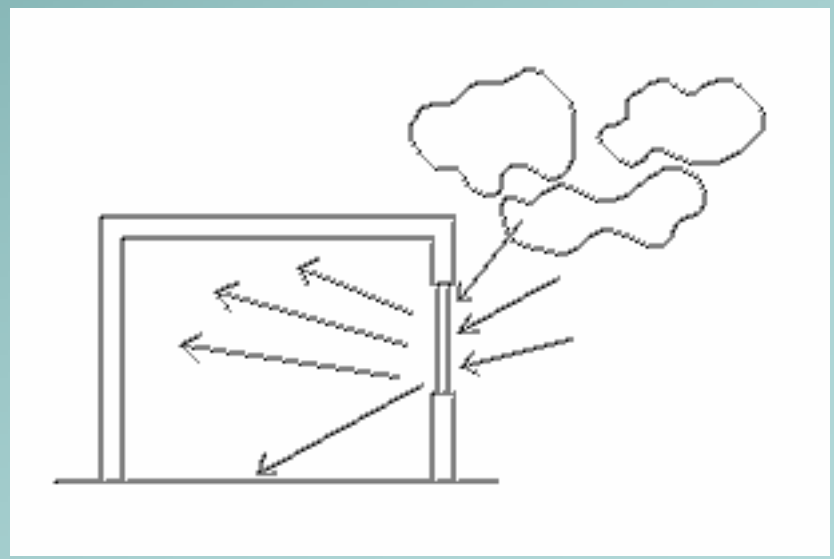
The reality of ignoring daylight

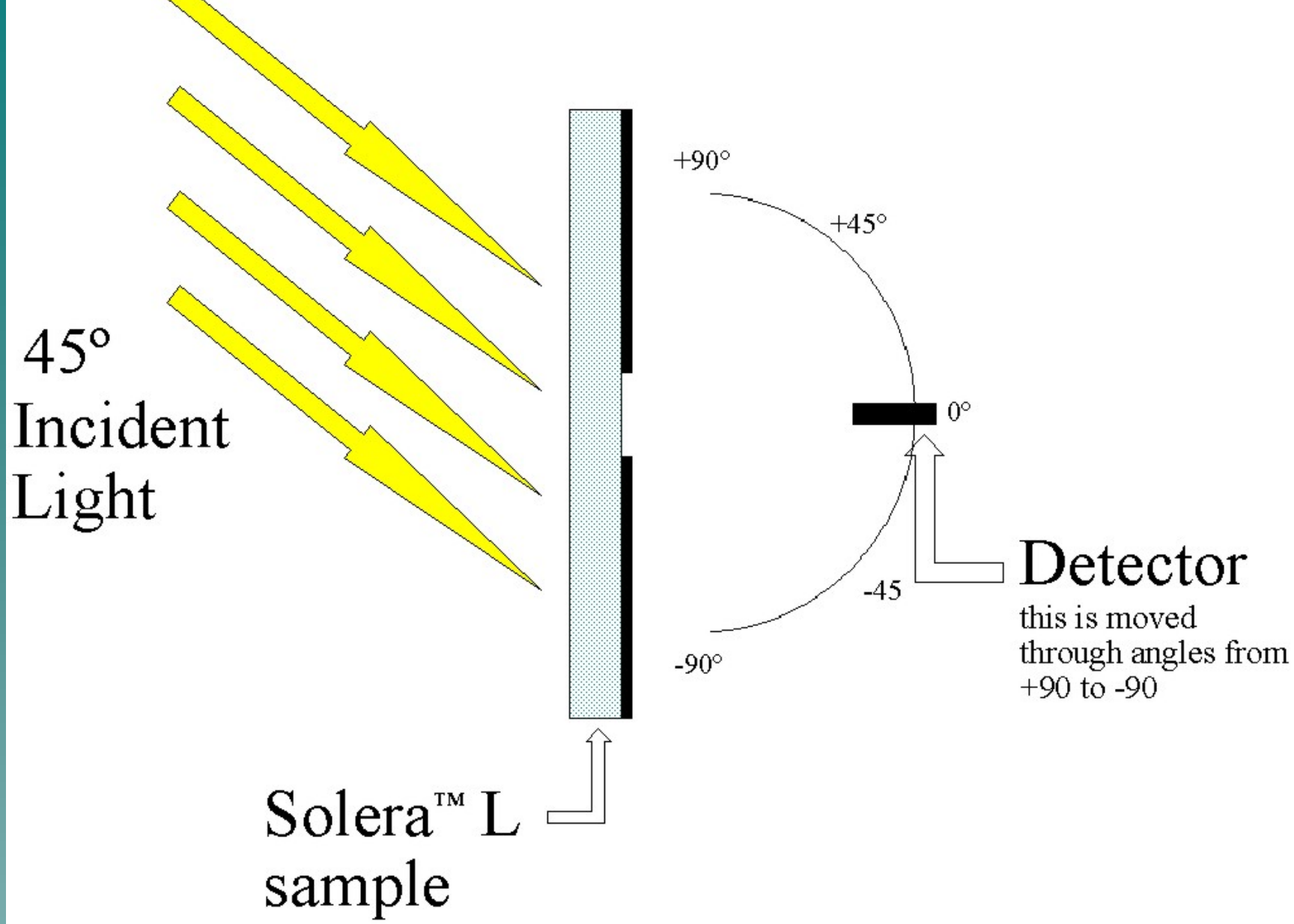
- NRC Canada studies:
  - 65% of window area studied ‘permanently occluded by blinds’
  - Blinds cited as largest reason for failure of projected energy savings

Simple and Cost-Effective Daylighting through Translucence

- Controlled daylight
- Consistent direction / distribution
- Reduced glare
- Improved penetration






45°
Incident
Light
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+45°
0°
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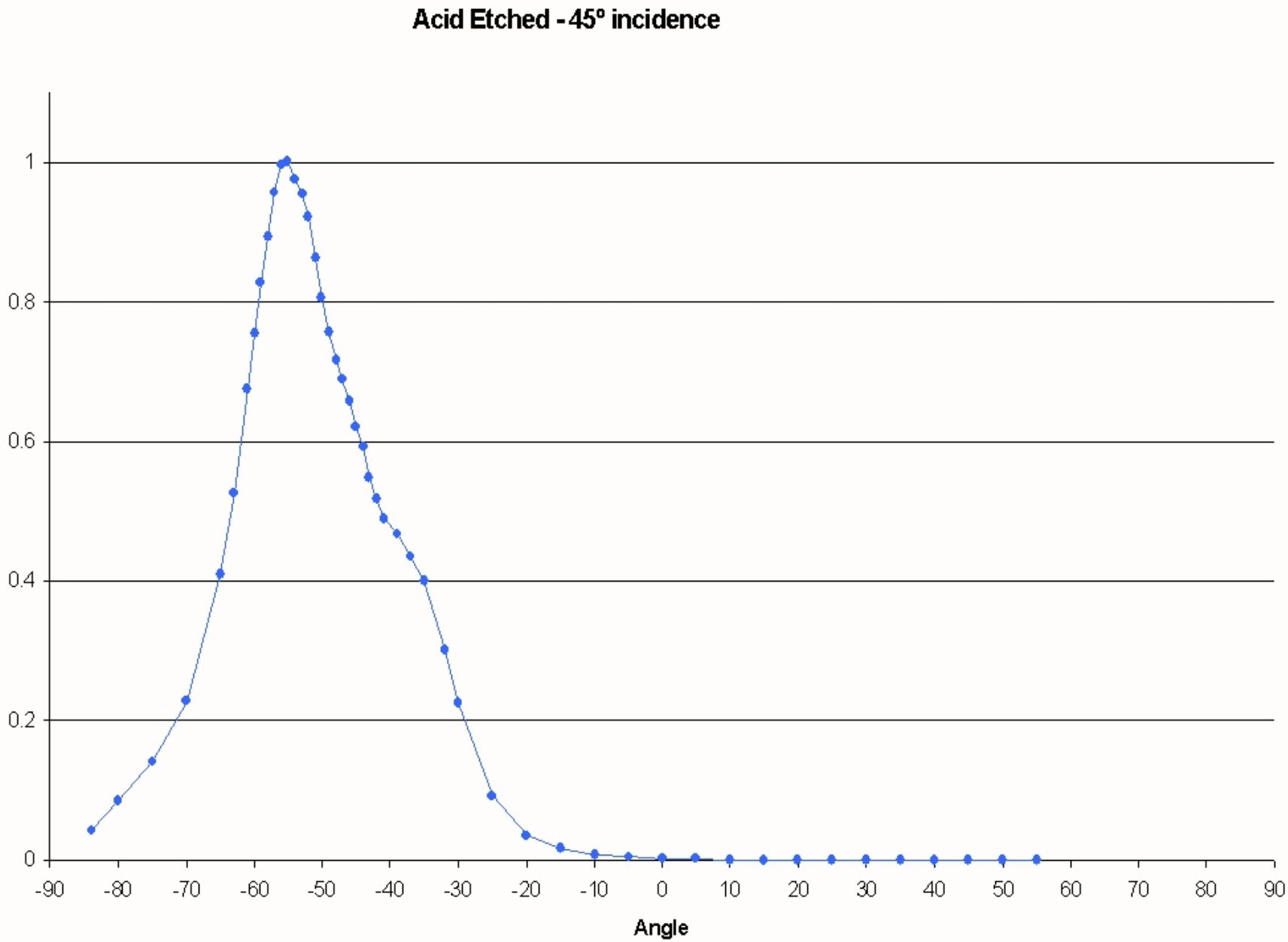
-90°
Detector
this is moved
through angles from
+90 to -90
Solera™ L
sample


Acid Etched - 45° incidence
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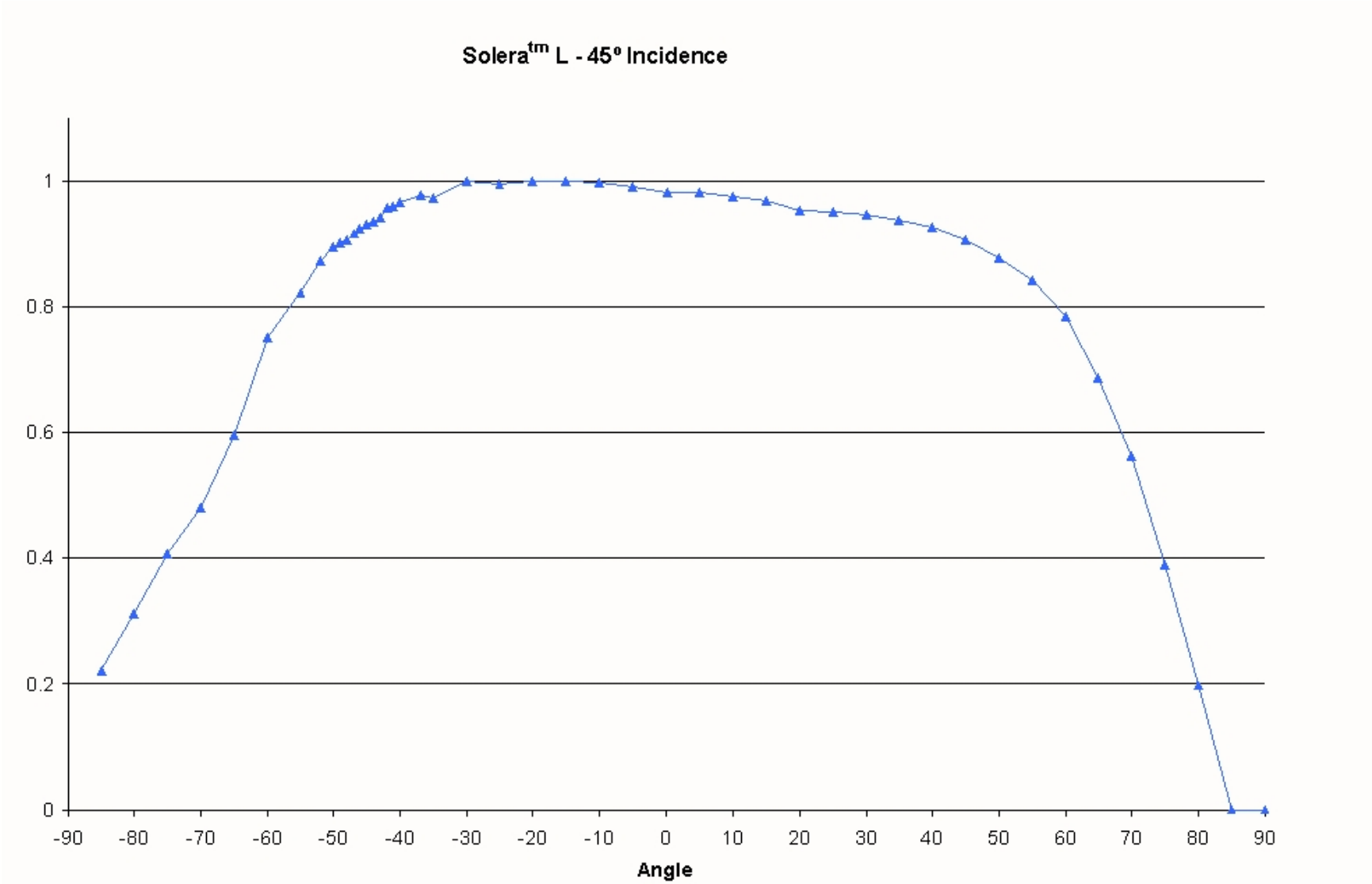
Angle


Solera[tm] L - 45° Incidence
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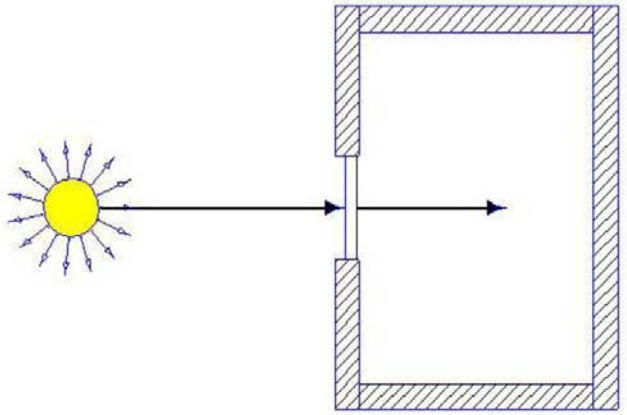
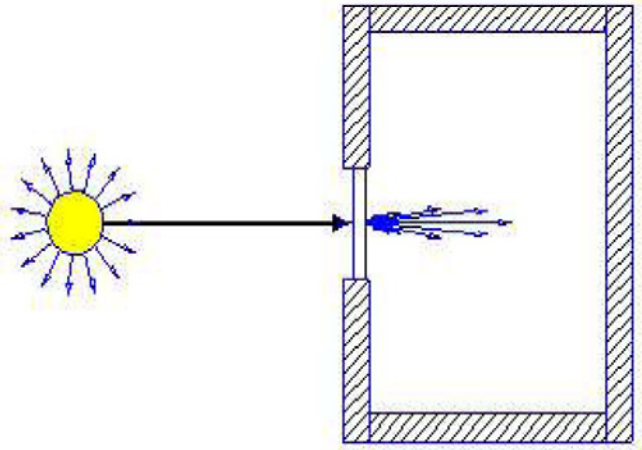
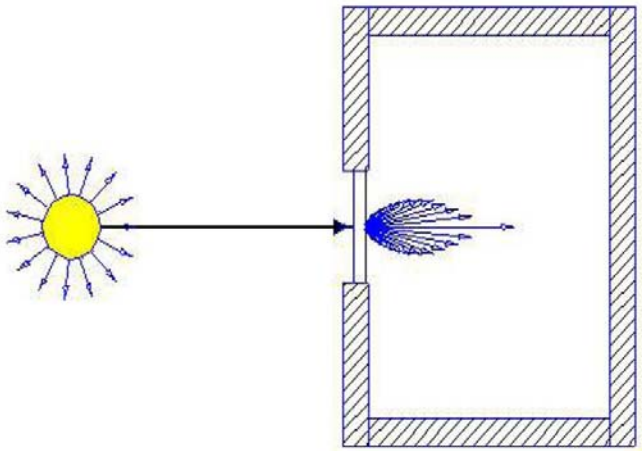
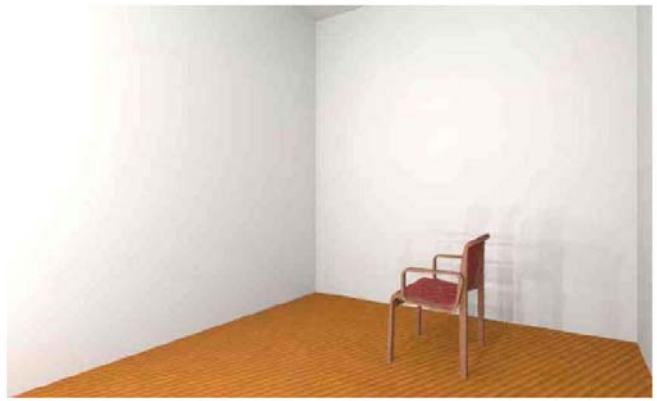
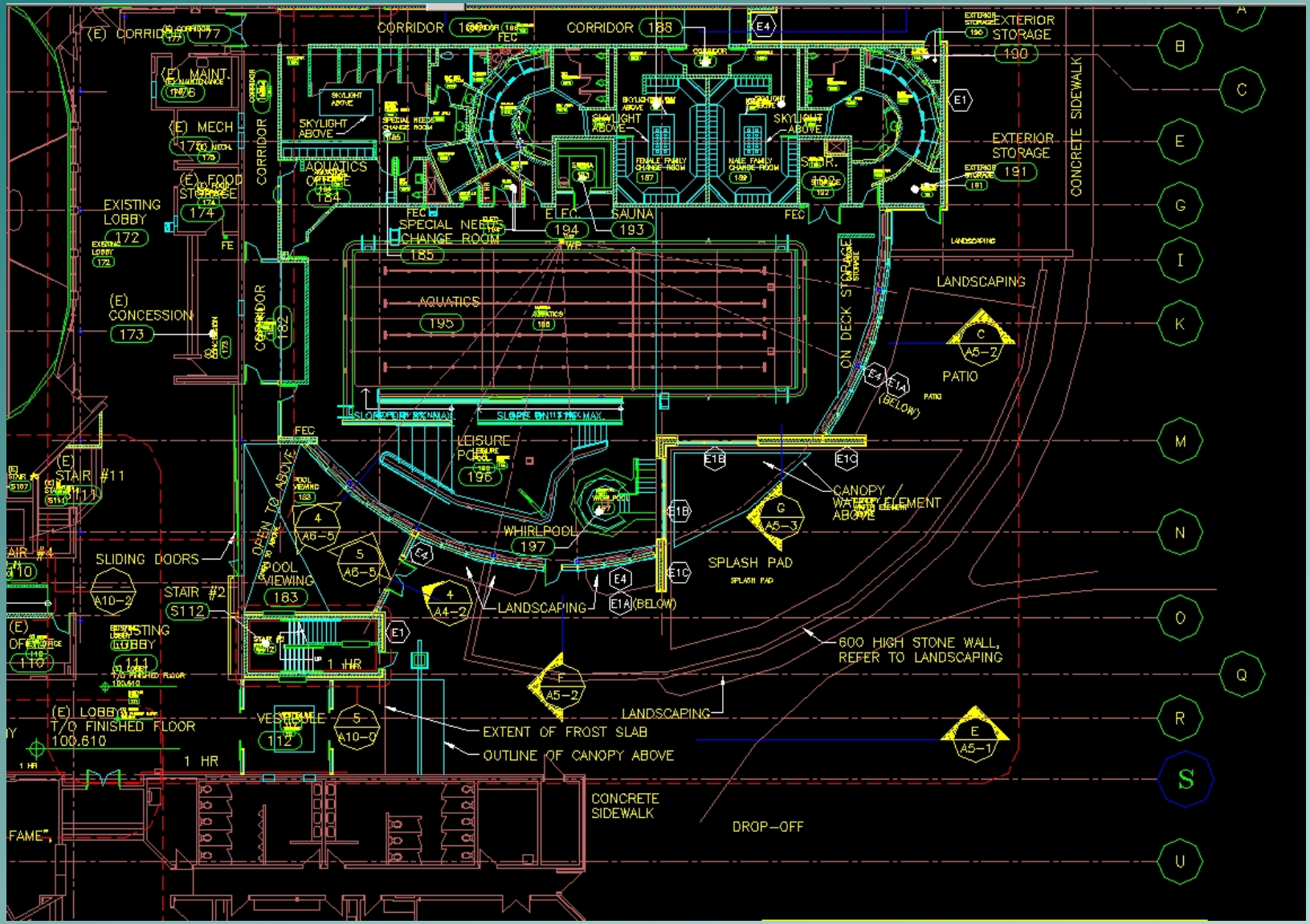




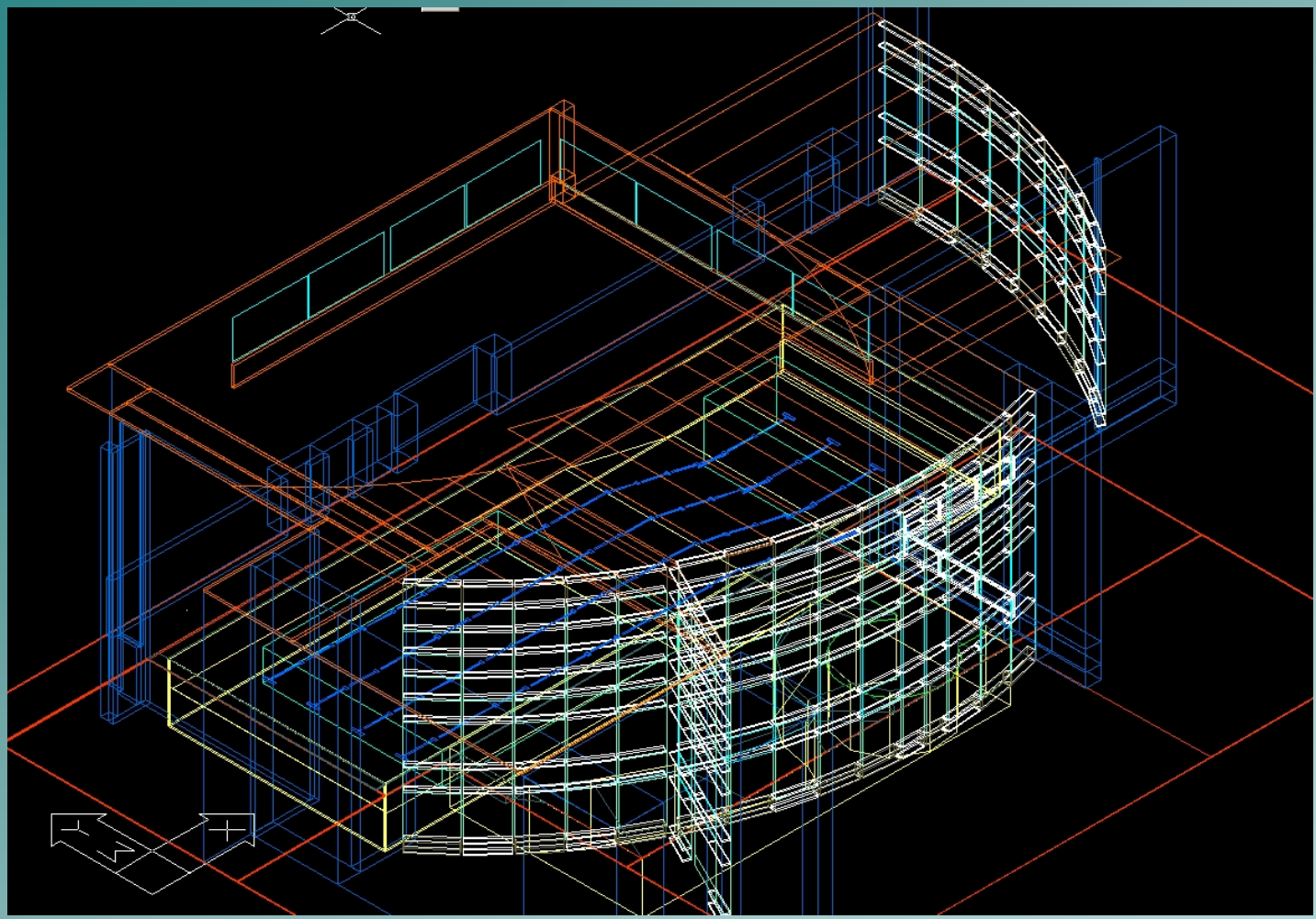


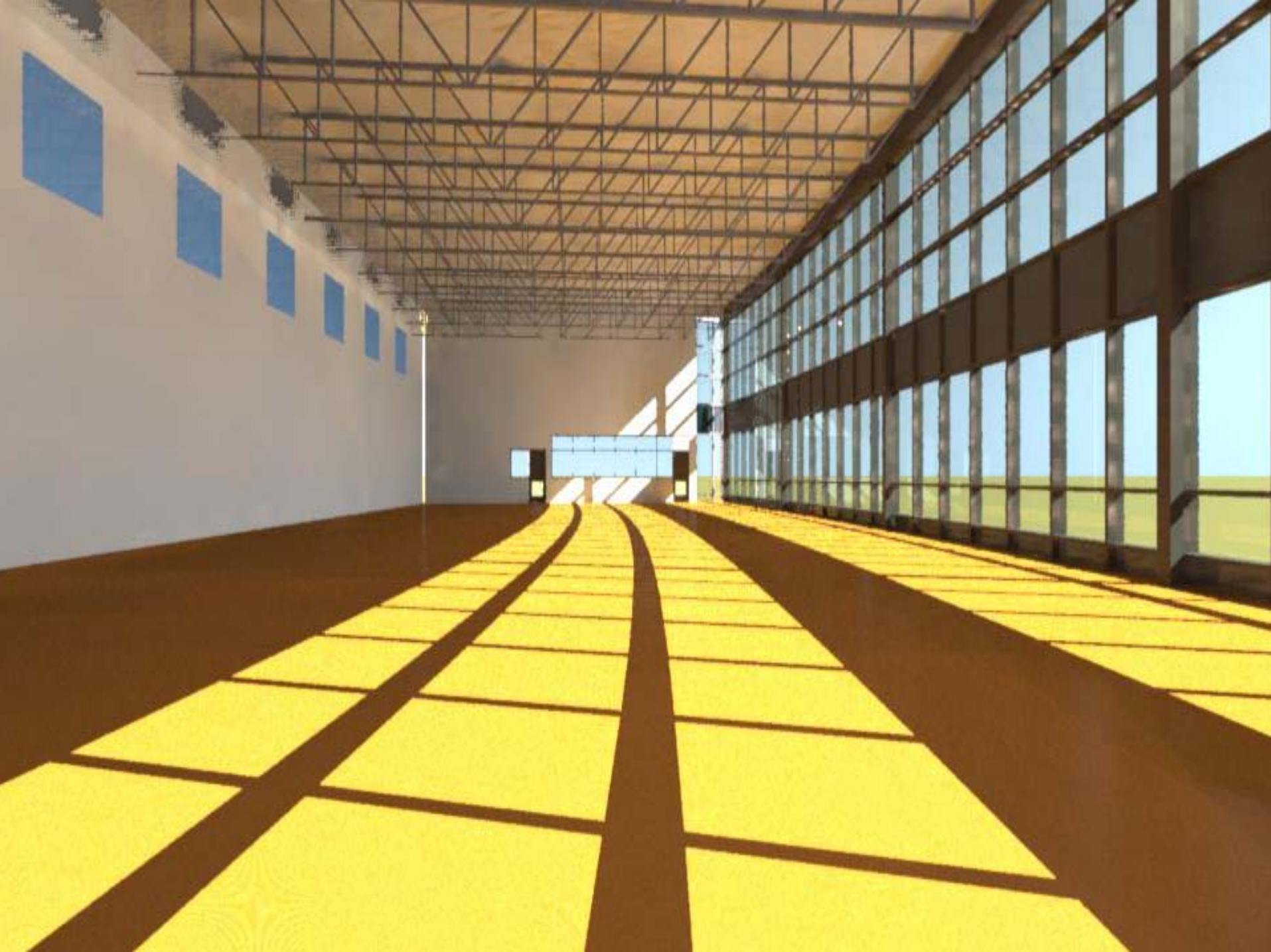


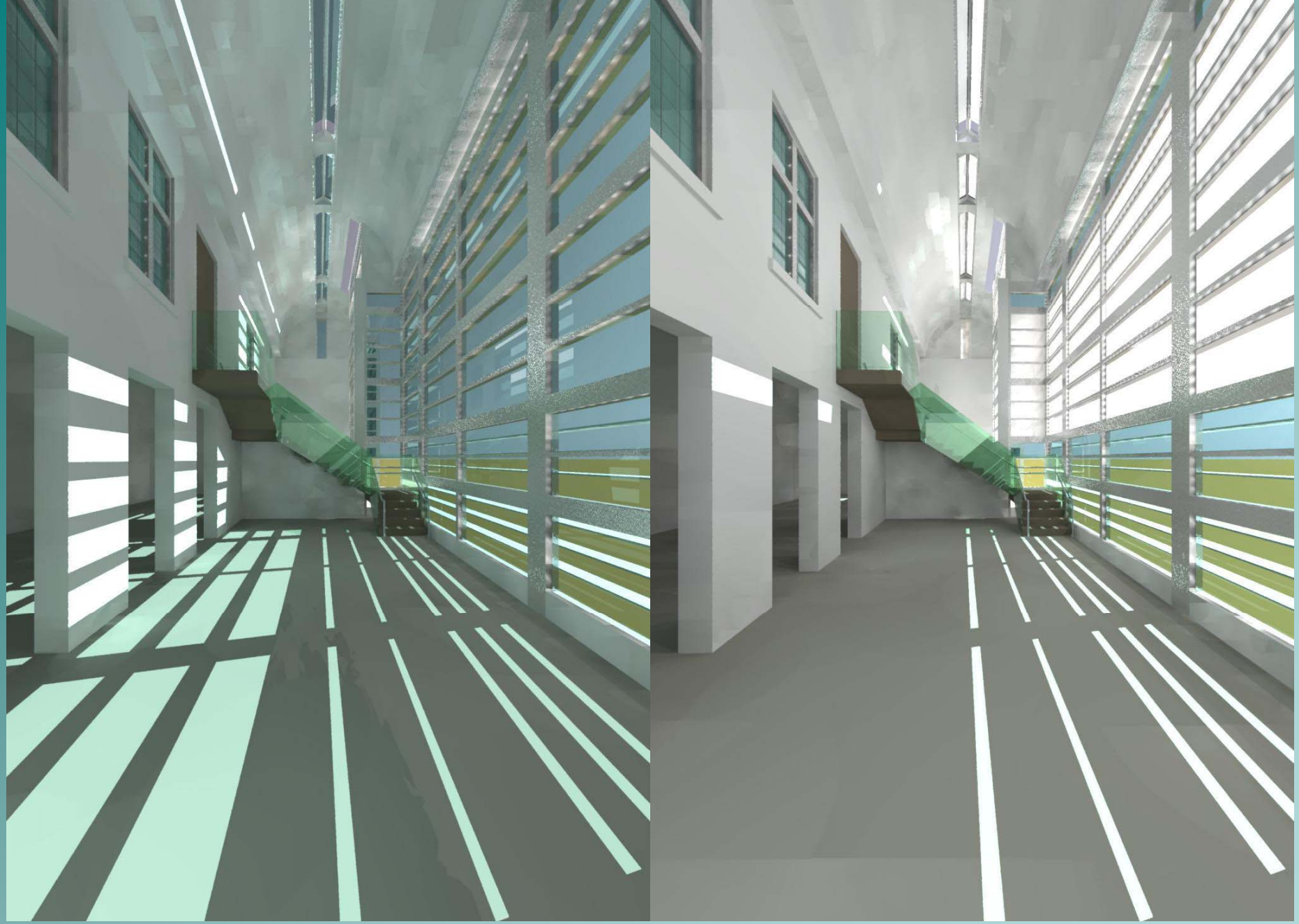
First step: get drawings of the space (typically CAD).

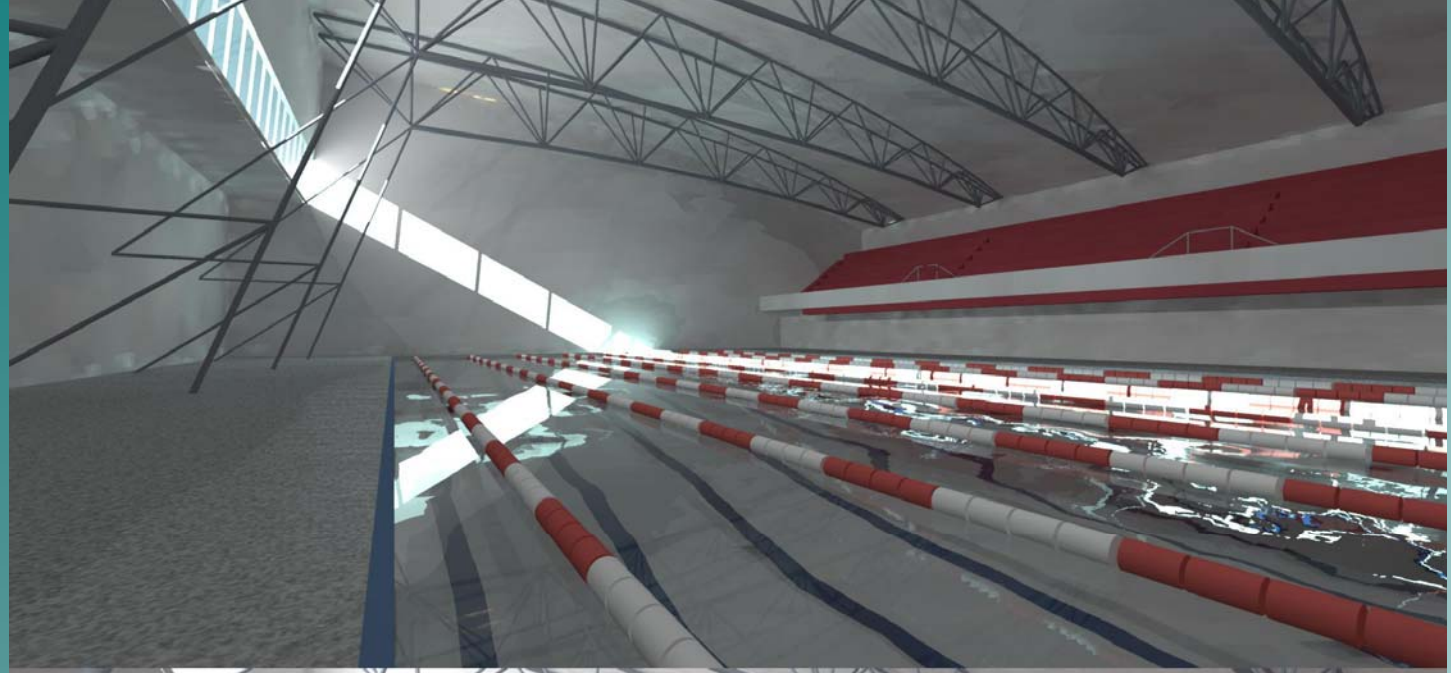


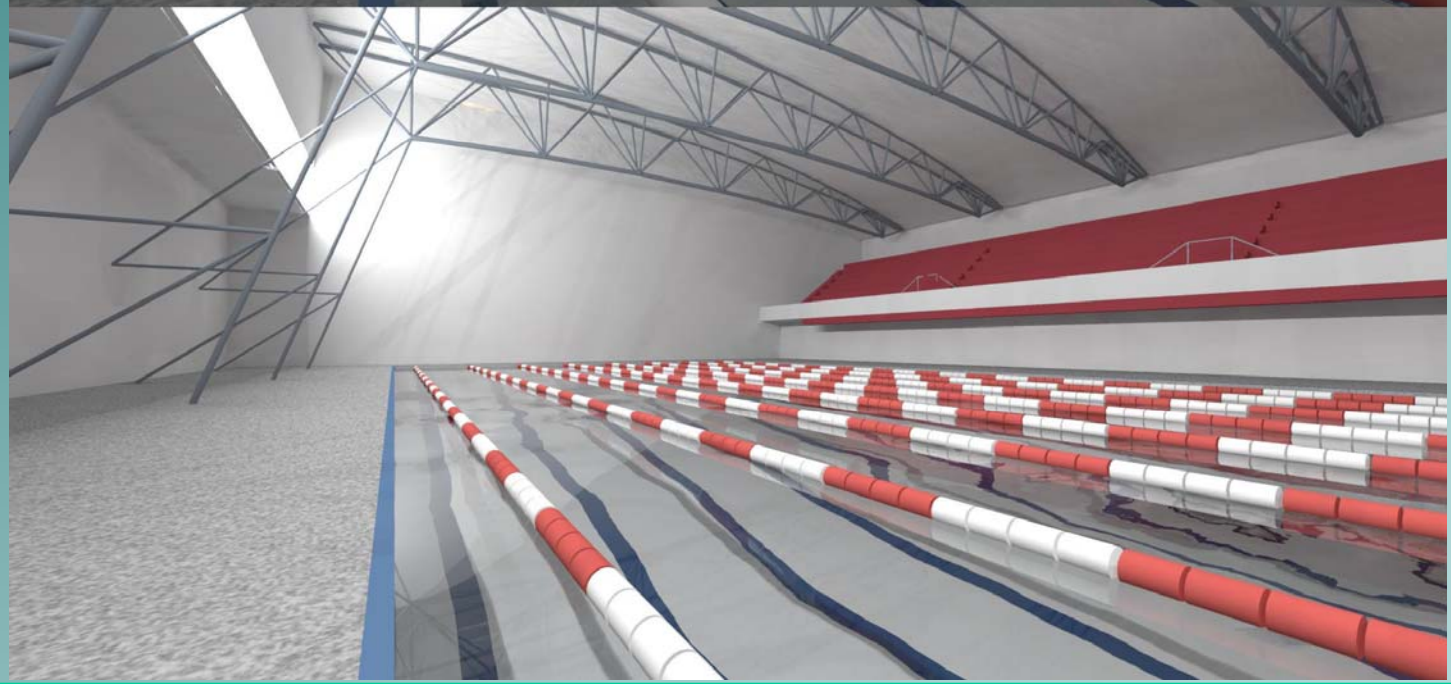
Next we Create a 3D model in Autocad











Kirkwood College, Neumann Monson