SYSKA HENNESSY GROUP

Consulting + Engineering + Technology + Construction

Building Facades – Integrating Comfort and Energy Performance

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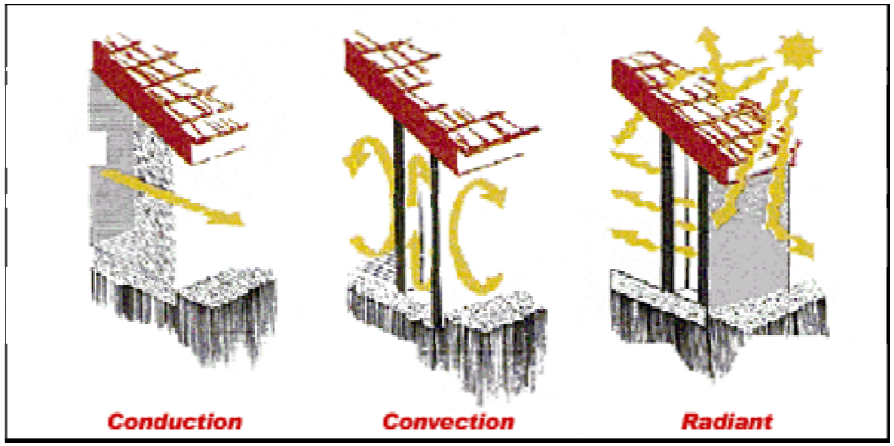
SUSTAINABLE DESIGN & HIGH PERFORMANCE BUILDING TECHNOLOGY

Why is this Important for the HVAC System?

- Interactions with Façade
  - Solar control
  - Conduction
    - Heat loss and gain
    - Condensation
  - Convection
    - Infiltration
  - Radiation
    - Thermal comfort
  - Daylight
    - Glare control
    - Electric lighting control
  - Operability
    - For natural ventilation

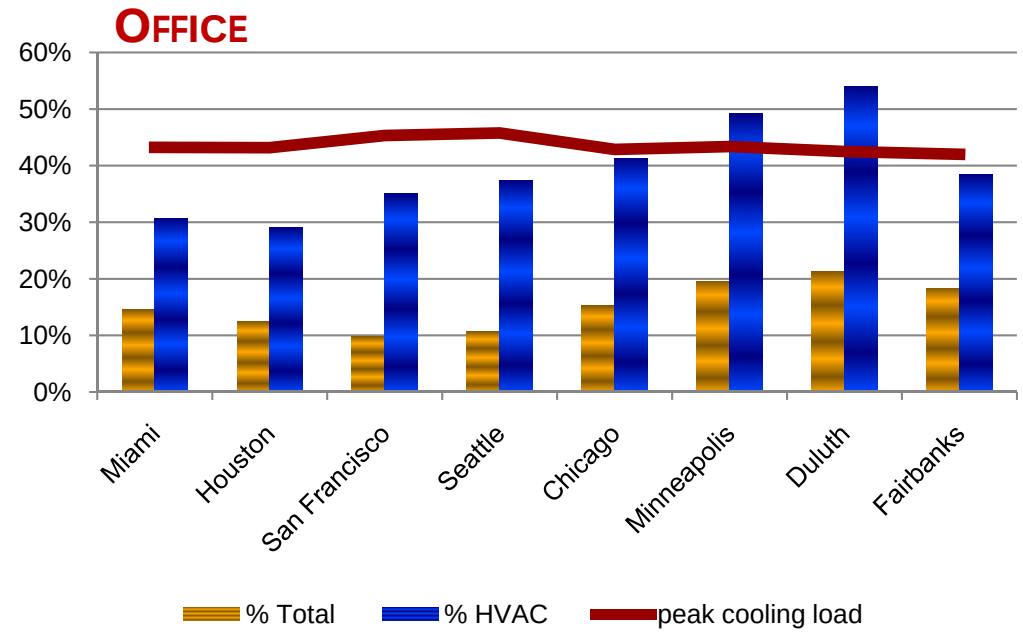
- The HVAC system provides for:
  - Ventilation for occupants
  - Indoor pollutant dilution
  - Indoor air quality
  - Thermal comfort of occupants
    - Temperature
    - Relative humidity

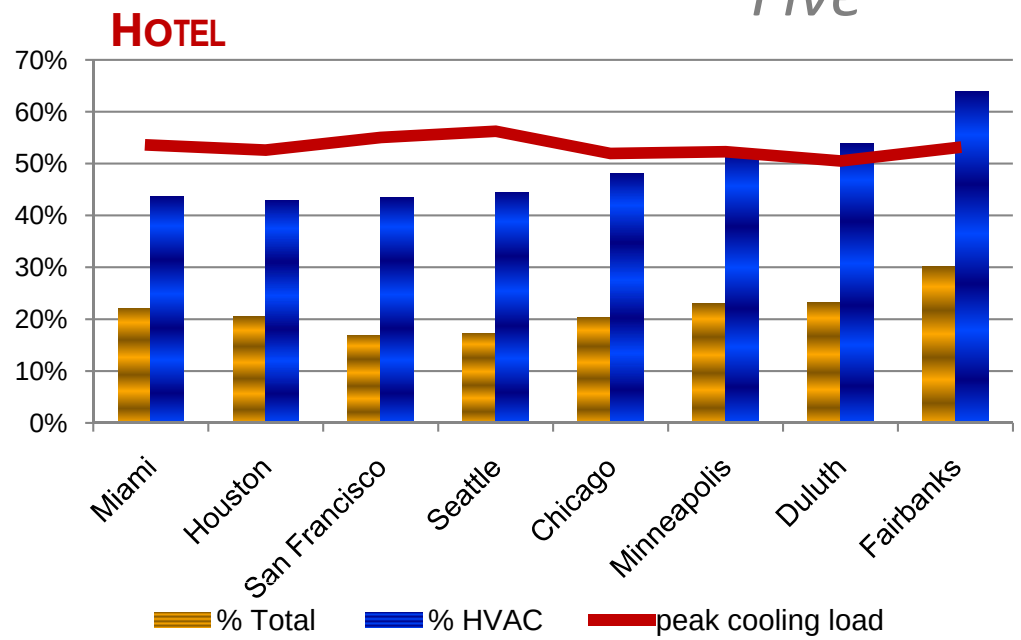


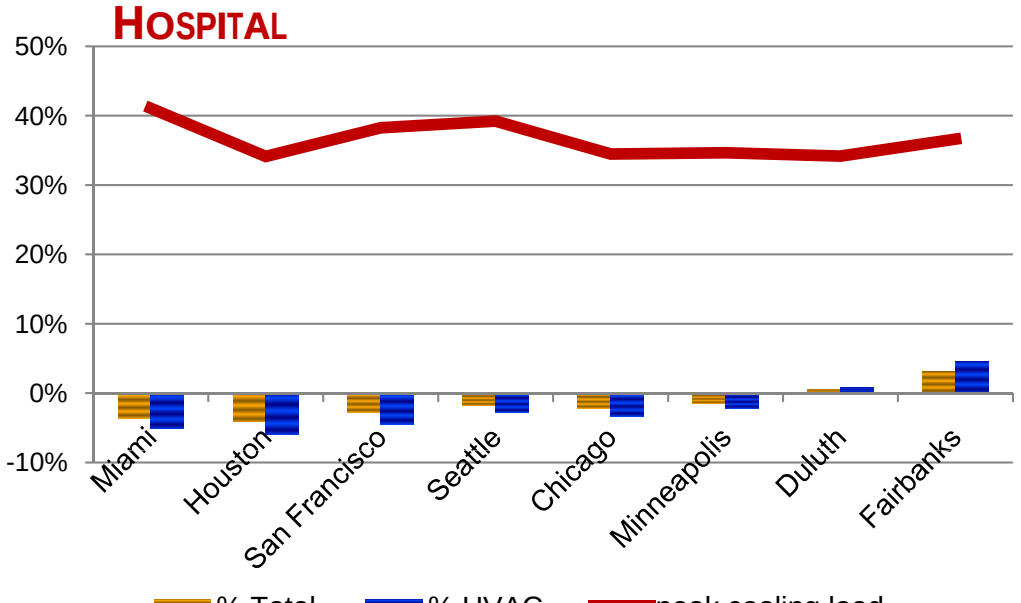
Top 5 Concerns of this Mechanical Engineer:

Five –

- One Size Does NOT Fit All
  - Building use and occupancy
  - Climate

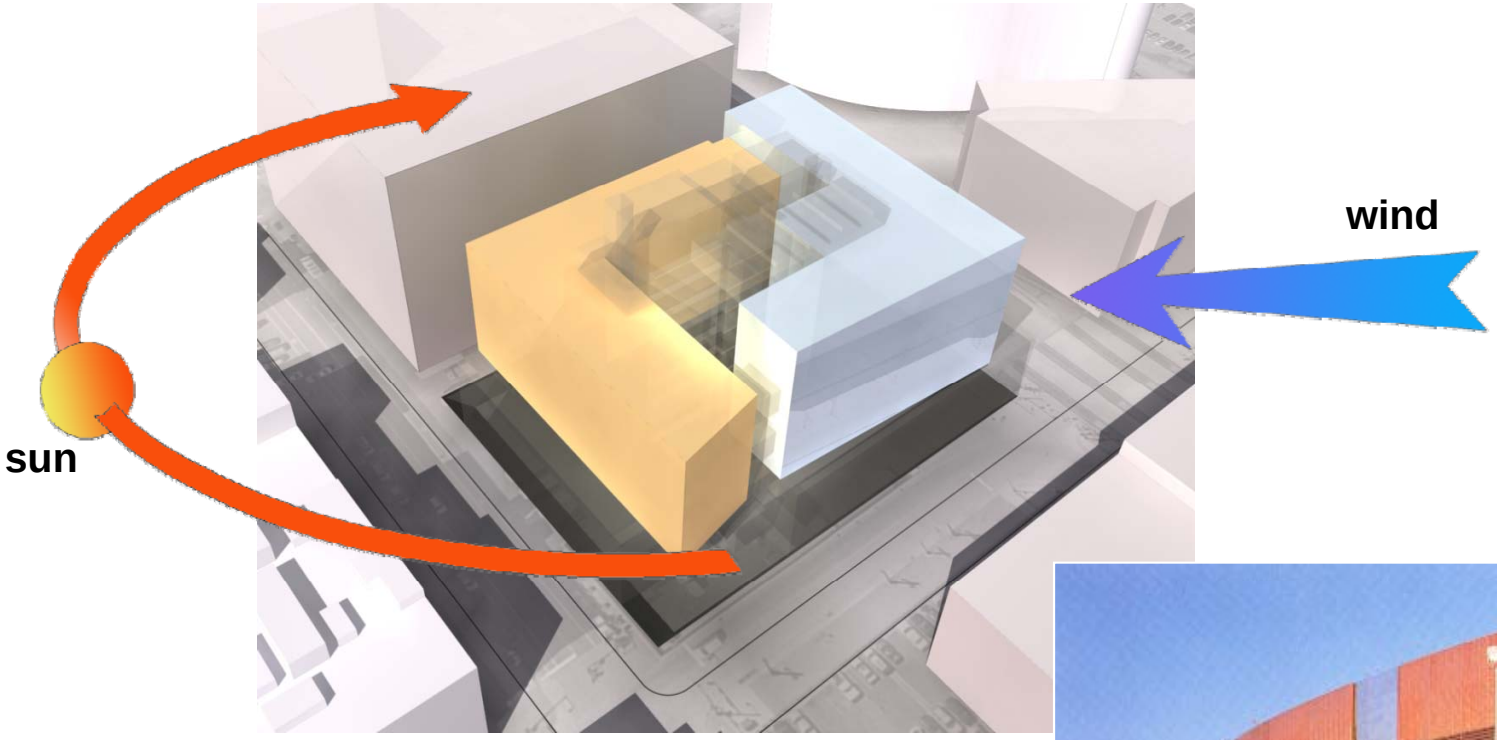






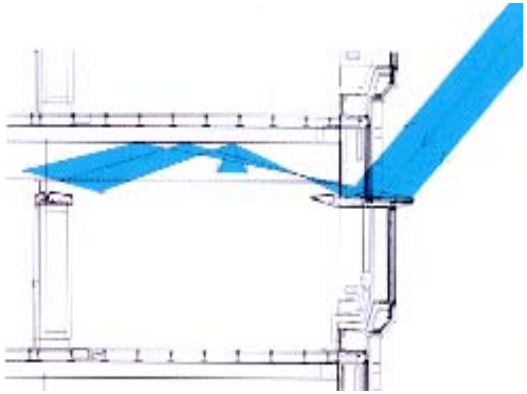
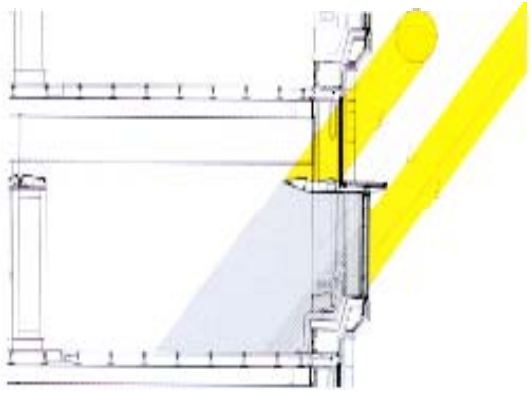
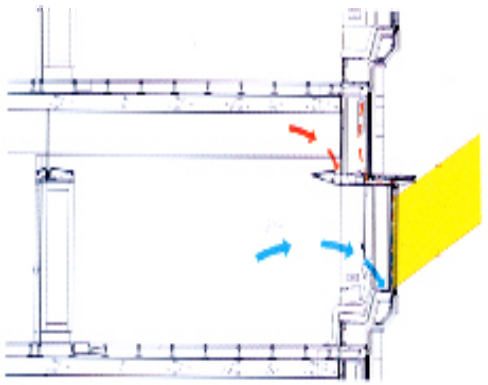
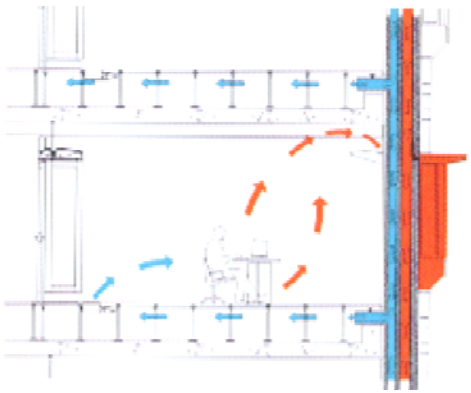
Top 5 Concerns of this Mechanical Engineer:
Four –

- One Size Does NOT Fit All
- Solar Orientation



Top 5 Concerns of this Mechanical Engineer:
Three –

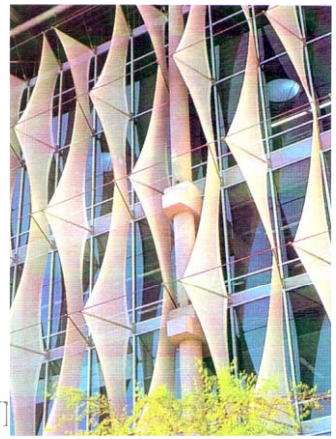
- One Size Does NOT Fit All
- Solar Orientation
- Façade Performance Properties
  - Proper definitions and understanding
    - SC vs. SHGC
    - Window Assembly Performance vs. Center of Glass
    - Wall Assembly Performance vs. Insulation Performance
    - Light to Solar Gain Ratio – LSG
    - Thermal Bridging Effects
    - Thermal Mass Effects

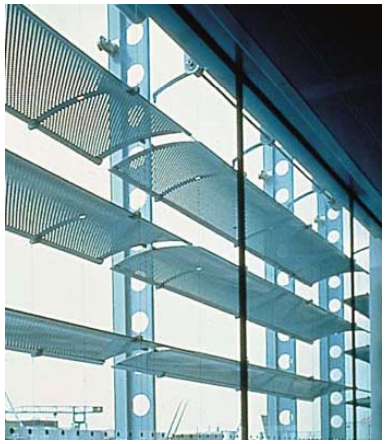





Top 5 Concerns of this Mechanical Engineer:

Two –

- One Size Does NOT Fit All
- Solar Orientation
- Glazing Properties
  - SC vs. SHGC
  - Assembly Performance vs. Center of Glass
  - Thermal Bridging
  - Light to Solar Heat Gain – LSHG
- Static vs. Dynamic Systems
  - Shading Systems
  - Window Systems





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SUSTAINABILITY to design for the future

Top 5 Concerns of this Mechanical Engineer:

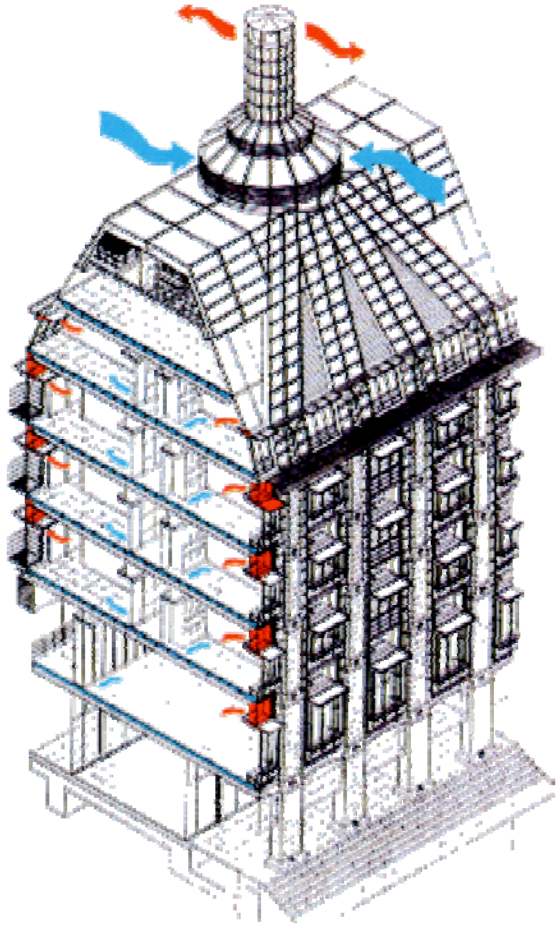
One –

- One Size Does NOT Fit All
- Solar Orientation
- Glazing Properties
  - SC vs. SHGC
  - Assembly Performance vs. Center of Glass
  - Thermal Bridging
  - Light to Solar Heat Gain – LSHG
- Static vs. Dynamic Systems
  - Shading Systems
  - Window Systems
- Balance – Energy With Daylight With Views With Health With Architecture

HVAC System Selection

- Now we can decide what the HVAC system we are selecting to serve the building

- Is it:
  - Natural ventilation?
  - Mixed mode?
  - Under floor air distribution?
  - Chilled beams – active and passive?
  - Radiant heating and cooling?
  - Overhead VAV?
  - Fan coil units?



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