Exercise 01 – Building Energy Simulation (Using MIT Design Advisor)

Objective: To learn and appreciate the technique of building energy simulation using the online tool MIT Design Advisor

Procedure:
  (a) Use a computer or suitable device to get access to the online tool.
  (b) Develop a base case model using the input data as shown below.
  (c) Study the input requirements and how to set up the model on MIT Design Advisor.
  (d) Prepare three alternative designs as shown below to evaluate the building energy performance for three different scenarios.
  (e) Examine the results and compare the performance of the three alternative designs.

MIT Design Advisor :   http://designadvisor.mit.edu/design/

Input Data (base case): (using SI units)

Location: Hong Kong

Occupancy and equipment: Office building, 9am-6pm, 0.1 people/m^2, lighting 500 lux, equipment 10 W/m^2

HVAC: Mechanical cooling & heating, indoor 24±1 ºC, RH 60%, fresh air 15 L/s/person, air change rate = 2

Thermal mass: lightweight

Building geometry: Entire floor (4 facades + core) well-mixed air between zones, orientation N-S/E-W, 30 m x 30 m

Roof: bitumen roof

Room properties: 30 m (W) x 30 m (L) x 3.5 m (H), façade facing east, window 50% of exterior wall area, no shading devices, clear glass

Wall: commercial low insulation, R-value 3 m^2. K/W

Alternative Designs: (3 nos.)

  1. Lighting: 400 lux
  2. Person density: 0.25 people/m^2
  3. Roof: Green roof