

BEYOND

SMART CITIES

ENERGY SIMULATION OF HIGH PERFORMANCE GREEN BUILDINGS

FOR ENERGY AND GREEN BUILDING SPECIALISTS

KRISHNAJI PAWAR, LEED AP BD+C, GSAS CGP, ISO 14001:2015, GCP

ENERGY SPECIALIST CURRICULUM

ENERGY MODELING SPECIALIST

BEYOND SMART CITIES

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BUILDING GEOMETRY AND PLANS

FOR ENERGY AND GREEN BUILDING PROFESSIONALS

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LEARNING OBJECTIVES



Building Geometry and Plans

AutoCAD and Visual DOE Or Energy Plus Style Nomenclature Standards

AutoCAD Prep

Importing into Visual DOE

AutoCAD and Visual DOE Style Nomenclature Standards

Visual DOE naming

ENERGY MODELING SPECIALIST

BEYOND SMART CITIES

AUTOCAD AND VISUAL DOE STYLE NOMENCLATURE STANDARDS



AutoCAD files

- ✓ Trace file: originalfilename_v1.dwg
- ✓ Polygon file: originalfilename_v2.dxf
- ✓ Save under: Qxxx\ENERGY MODELING\AUTOCAD\

AutoCAD layer names

- ✓ Trace layer: trace Use color: 210
- ✓ Polygon layer: bpoly00, bpoly01, bpoly02... etc.
Respective color sequence: 11, 21, 31...etc.

Visual DOE or Software files

- ✓ Simulation file: Qxxx_YYMMDD.gph, e.g.
Q0009_080203.gph
- ✓ Save under: Qxxx\ENERGY MODELING\SIMULATION\

VISUAL DOE OR SOFTWARE REPORTS



- ✓ Report types: (SS-F) Zone Demand Summary, (LS-A) space Peak Loads summary, (LV-A) General Project and building Input, (LS-D) Building Monthly loads Summary

- ✓ Report file: Qxxx_YYMMDD_basecase +
name_reporttype.pdf e.g.
Q0009_080203_basecase+reheat_architecturaldetails.pdf

- ✓ Save under: Qxxx\ENERGY MODELING\REPORTS\

AUTOCAD - VISUAL DOE OR IMPORTATION



AutoCAD Prep

- 1.Open wanted drawing.
- 2."Save As" in the in the "AutoCAD" folder under the "Energy Modeling" folder, but adding "_v1.dwg" to the original file name.
- 3.Check units to make sure units are set to inches.
⇒When it asks you to rescale say yes.
- 4.Use the "layoff" command to hide unwanted layers
- 5.Create new layer named "trace" with color index number of 210.
- 6.Isolate this layer
- 7.Trace zoning using either line or pline
⇒USE SIMPLE GEOMETRY (e.g. do not use 20 small lines to approximate a curve when you could use 3 or 4...Visual DOE likes simple!)
- 8.After tracing, hide all layers except the trace layer
- 9.Copy the trace lines that you have drawn with respect to 0,0 and paste them into a new AutoCAD file (Create new, and use Imperial Template).

AUTOCAD - VISUAL DOE OR DOE IMPORTATION

AutoCAD Prep+

10.Paste these lines with 0,0 as the base point.

11.Explode all of the pasted lines

12.Use the "overkill" command to remove any unwanted lines

•Make sure the bottom three check boxes are checked.

13.Next, create a new layer named "bpoly" (if you have multiple layers use bpoly01, bpoly02...etc) and use the "bpoly" command to create polygons in a sequence so that each polygon is adjacent to another.

•Do not leave a middle zone for the last polygon, VisualDOE will not accept a "hole".

14."Save As", replace " _v1" with " _v2" and save it as an "R12/DX2 DXF" file.

IMPORTING INTO VISUAL DOE OR DOE SOFTWARE

AutoCAD Prep+

1. Open Visual DOE and begin importing the wanted drawing by adding a custom block.

2. Click on the "+" sign and select DXF

3. Select "Open DXF File"Go to the AutoCAD folder under Energy Modeling and select your _v2.dxf file.

4. Choose the "bpoly"layer and click "Add all"

VISUAL DOE OR DOE SOFTWARE NAMING

BLOCKS

Floor number

00

groundfl

Room name

14 char. limit

ROOMS

Floor number

00

unconditioned

toilet

Room name

14 char. limit

0A

bedroom

Location

VISUAL DOE OR DOE SOFTWARE NAMING +

Location

A

B

D

C

1

2

3

4

5

6

7

8

9

10

A

B

D

C

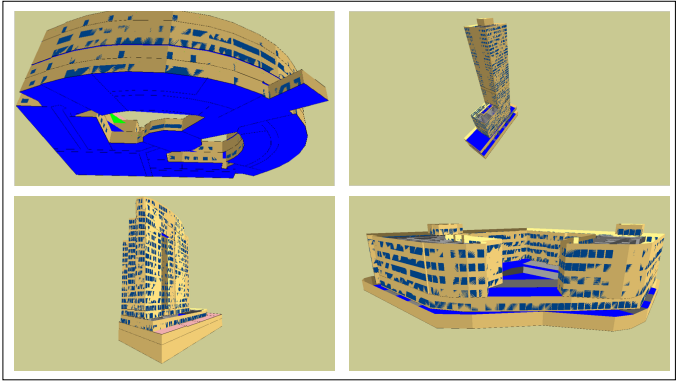
BUILDING GEOMETRY AND PLANS

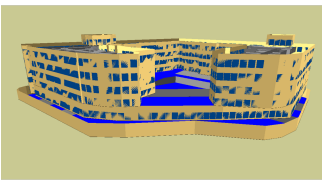
Front View

Side View

3D Model

2D Plan





WHY ARE ENERGY ADVISORY AND ENERGY MODELLING SIMULATION SO IMPORTANT FOR YOUR BUSINESS?
CONSERVE ENERGY, CREATE SAVINGS AND ENHANCE PERFORMANCE

Heat and Mass Transfer

Energy Efficiency and Sustainability

Oil and Gas

Simulation Software

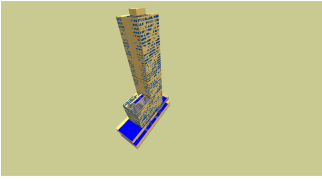
Structural Analysis

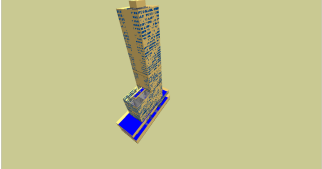
Wind and Microclimate

LEED Certification

Energy Audits

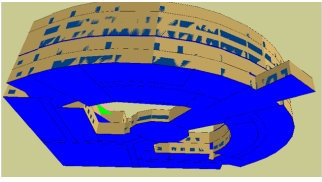
Carbon Footprint





CARBON NEUTRAL BUILDINGS

Simply a building that is carbon neutral and no "net" carbon dioxide (CO₂) is sent into the atmosphere.



The model is also a powerful tool for determining the cost effectiveness of energy efficiency measures. From this analysis, we can determine if a measure is worth the investment and thus employ only the best ideas

