DesignBuilder SOFTWARE

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Detailed Outline

The proposed elements of the course are shown below under the header of the day on which it is expect that we will cover the material. The actual timing of each element may differ from this on the day.

Day 1 - Setting up the Model and Simulation Basics

Day 1 will cover the basics of entering DesignBuilder simulation models, running simulations and reviewing results. More specifically:

Basics, terminology etc.

Blocks, partitioning blocks into zones, setting model data, inheritance, navigating the model.

Importing DXF and BMP floor plan data

Consideration of DXF units, removing unnecessary details.

DXF restrictions e.g. files must be 2D, not 3D dxf output by E+.

DXF compatibility (R-11 or earlier).

Scaling and aligning floor plans

Creating blocks by tracing over DXF data

Controlling wall thickness, block height, block form, auto-complete etc

Moving DXF data

Block types

Creating voids

Partitioning blocks by tracing over DXF data

Using partitions to zone blocks

Automatic zoning

Rezone block

Controlling partition thickness

Hanging partitions - comparison with internal mass

Virtual partitions

Avoiding snapping to DXF partition lines where these may compete with existing DesignBuilder block and partition snap points

Using Outline Blocks

Using outline blocks to create a roof gable block

Convert to standard blocks

Using Snaps, Drawing Guides, Measure and Construction Lines

Axis snaps

Parallel and Normal snaps
End point/midpoint snaps
Edge snap
DXF snap
Increment snap
Drawing guides
Protractor
Measure tool and construction lines

Block manipulation

Changing block type and other geometric parameters for existing blocks
Stretching, drag face, cutting tool
Interblock partitions and other block connection surfaces.

Controlling adjacency

Effect of adjacency Auto detection, block, zone or surface level definition
Adjacency to ground - boundary condition
Adiabatic

Creating openings: windows, doors and vents using model data

Facade types
Percentage glazing, window spacing, frames etc

Creating openings: windows, vents, doors, sub-surfaces and holes by drawing at the surface level.

Move, copy, delete openings at building level

Model data overview

Activity
Constructions – combined and separate
Openings
Lighting
HVAC

Using local shading devices:

Overhangs, Side fins, Louvers.

Using standard, adiabatic and ground component blocks

Remote shading - including effect of reflection from windows.
Modify adjacencies of touching building blocks

Using window shading devices

Internal, external and mid-pane blinds, electrochromic glazing, transparent insulation.

Using model options

HVAC, natural ventilation, schedules etc., advanced options, calculation options.

Creating custom components

Constructions, glazing, shading devices etc. - understand difference between model components and library components.

Templates

Clarify distinction between templates and components.

Templates as the source of all data - header at the top of each tab.

Understand most important templates: activity, constructions, glazing, lighting, HVAC

Program options

Learning mode

Automatic backups

Language

Single zone mode.

Switching between single zone and whole building mode.

Model data management

Load data from template

Clear data

Reload data

Understand zone types

Quick way to set a space as unoccupied, unconditioned.

Standard, glazed cavity, unoccupied/unconditioned, plenums.

Used for modeling plenums, Trombe walls, double facades and other glazed cavities

Visualization

Graphics card requirements

Initializing – hardware vs software

Day 2 – EnergyPlus Simulations continued

Day 2 builds on the experience gained on Day 1 to learn more applications of the software to real world design processes.

Calculated natural ventilation:

Window, vent and door operation (opening and closing).

Modelling cracks - switching infiltration modelling on/off.

Model a simple stack example.

Heating and Cooling Design System sizing

How to size heating and cooling systems using DesignBuilder

System sizing options.

Simple HVAC

Based on EnergyPlus ideal loads system.

Minimum fresh air data and other system control zone data associated with the activity set on the activity tab.

Setting minimum fresh air.

Compact HVAC

Basic introduction to the 5 Compact HVAC types.

Daylighting calculations

One or two daylighting zones per zone

Stepping/continuous dimming

Positioning sensor

Simulation results

Understanding simulation output.

Zone heat balance.

Export results

Export DB data to file or report topic

Compiling reports from report topics

Using report topics as a quick easy way to compare results for various design options