Modelica model for OFFICE CELL- FACTSHEET

SHC TASK 56

- DYMOLA (v 2019)
- Modelica lib. (v 3.2.2)
- Buildings lib. (v 5.0.1)

Short description

DYMOLA simulation environment was used to develop the numerical model of a typical office space using models from the Modelica library and Buildings library. Here infiltration, ventilation, shadings, internal gains and occupancy schedules are characterized as reported in Deliverable DC1 of IEA SHC Task 56 (http://task56.iea-shc.org/publications).

How to install it?

To run the simulation, a licensed version of DYMOLA is required (https://www.3ds.com/products-services/catia/products/dymola). To start the simulation, unzip the folder and load the Modelica package.mo file.

How is the model structured?

The office space is modelled using a single thermal zone, which is connected to blocks representing models for ventilation, heating, cooling, internal gains and infiltration. Light-blue lines represent air streams, red lines represent convective heat exchange and yellow lines represent climate data. The climate data is read from an external file by the block weaDat, whereas building assemblies and material properties are described in the blocks located at the upper right corner.

Results for the main components of the thermal balance can be found in the blocks located at the lower right corner. The output of the simulation is a .mat file, where the values of all variables can be found for each timestep.
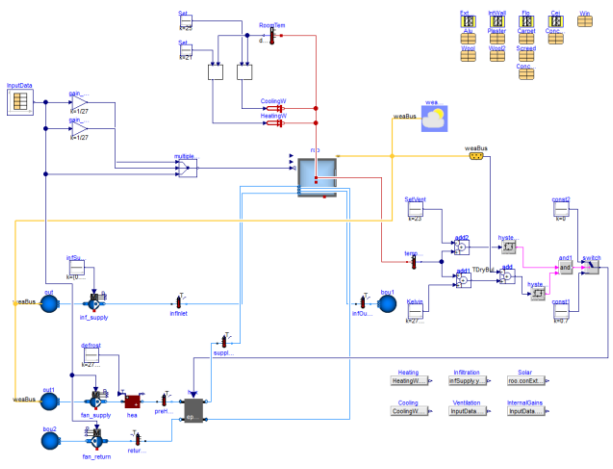
How to run and modify the model?

To open the model, first you need to download the Buildings library from https://simulationresearch.lbl.gov/modelica/. Then you need to load in Dymola both the Buildings library and the Modelica package included in the .zip file.

To modify climate, be aware that the weather data format is the Typical Meteorological Year (TMY3) as obtained from the EnergyPlus web site at https://energyplus.net/weather. These data, which are in the EnergyPlus format, need to be converted as described in library documentation.

To customize the simulation, a set of parameters can be modified by clicking on "setup" in the "simulation" tab.

To modify building assemblies and material properties, you can edit parameters in the blocks located at the upper right corner.
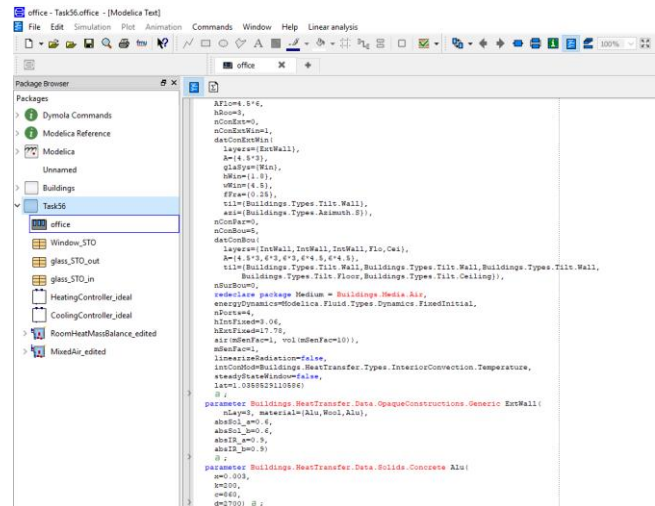
Strengths

- Modelling of arbitrary heating, ventilation and air-conditioning (HVAC) system topologies
- Rapid prototyping of new building and district energy systems
- Analysis of the operation of existing building systems

- Reuse of models during operation for functional testing, for verification of control sequences, for energy-minimizing controls, fault detection and diagnostics