

Week 7_Prize Kabahinda

Question 1

Solar radiation.

It is defined by an electromagnetic radiation emitted by the sun. The energy flow within the sun results in a surface temperature of around 5800 K, so the spectrum of the radiation from the sun is similar to that of a 5800 K blackbody with fine structure due to absorption in the cool peripheral solar gas.

This radiant energy is measured as solar irradiance. When all of the radiation is measured it is called the Total Solar Irradiance (TSI); when measured as a function of wavelength it is the spectral irradiance.

Light of different wavelengths reaches different parts of the Earth's atmosphere. Visible light and infrared radiation reach the surface, warming the surface to livable conditions.

As sunlight passes through the atmosphere, some of it is absorbed, scattered, and reflected and this is called diffuse radiation. Reflected radiation is when the sun is reflected on the earth. When the sun's rays are vertical, the earth gets all the energy, therefore the regions located in areas where the sun rays are vertical receive the most sun throughout the year. However, the more slanted the sun's rays are, the longer they travel through the atmosphere, becoming more scattered and diffuse. Since the earth is round, some regions never get a high sun, and because of this, these areas receive no sun at all during part of the year.

In conclusion, solar radiation depends on time of day, geographic location, weather and the landscape.

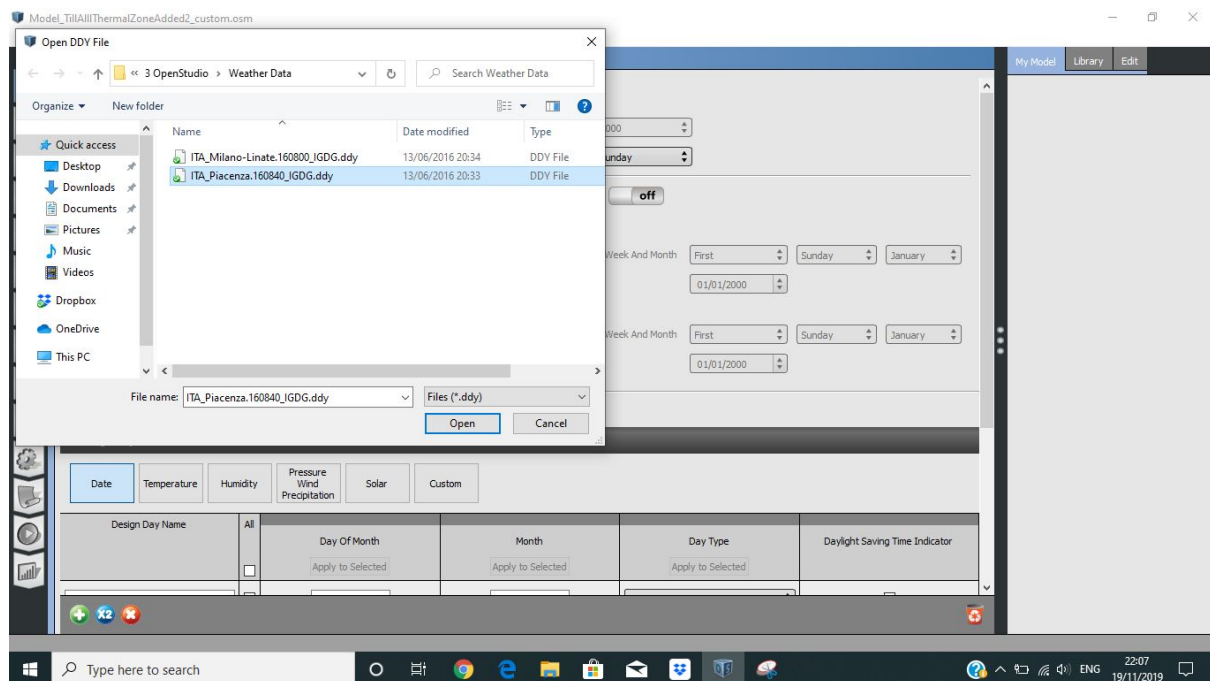
Question 2

The screenshot shows the 'Weather File & Design Days' window in the EnergyPlus software. The window is titled 'Model_TillAllThermalZoneAdded2_custom.esm'. It has a menu bar with 'File', 'Preferences', 'Components & Measures', and 'Help'. The main interface is divided into several sections:

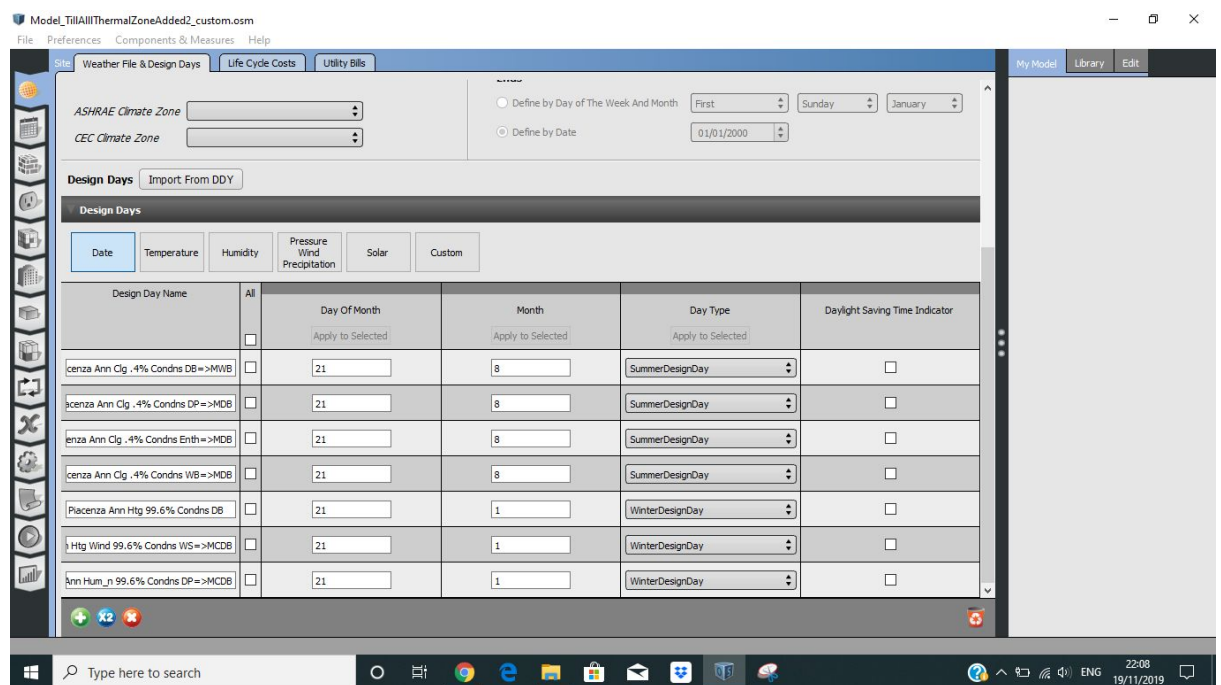
- Weather File:** Includes fields for Name, Latitude, Longitude, Elevation, and Time Zone. A link to 'Download weather files at www.energyplus.gov' is provided.
- Measure Tags (Optional):** Includes dropdown menus for 'ASHRAE Climate Zone' and 'CEC Climate Zone'.
- Design Days:** Includes a button 'Import From DDY' and a table for design days.
- Select Year by:** Includes radio buttons for 'Calendar Year' (set to 2000) and 'First Day of Year' (set to Sunday).
- Daylight Savings Time:** Includes a toggle switch set to 'off'.
- Starts:** Includes radio buttons for 'Define by Day of The Week And Month' (set to First, Sunday, January) and 'Define by Date' (set to 01/01/2000).
- Ends:** Includes radio buttons for 'Define by Day of The Week And Month' (set to First, Sunday, January) and 'Define by Date' (set to 01/01/2000).

The 'Design Days' table has columns for 'Design Day Name', 'Day Of Month', 'Month', 'Day Type', and 'Daylight Saving Time Indicator'. The 'Design Day Name' column has a dropdown menu with 'All' selected. The 'Day Of Month', 'Month', and 'Day Type' columns have 'Apply to Selected' buttons. The 'Daylight Saving Time Indicator' column has a dropdown menu with 'All' selected.

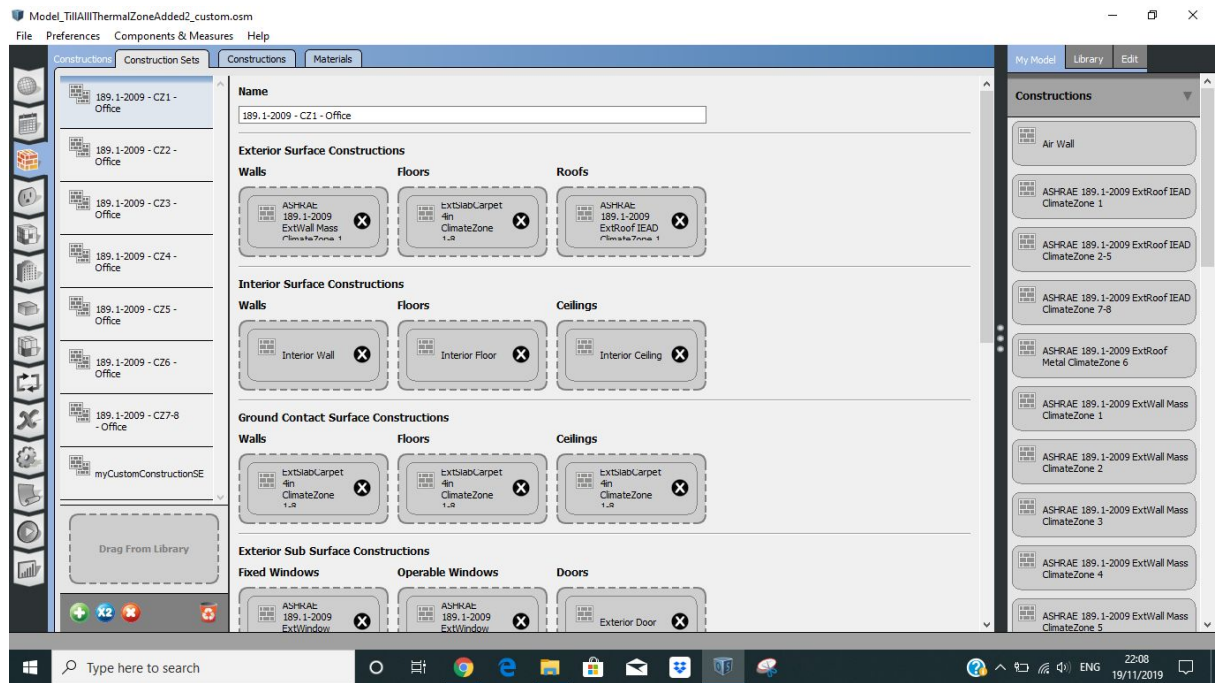
1. Open the file and choose 'Import from DDY'



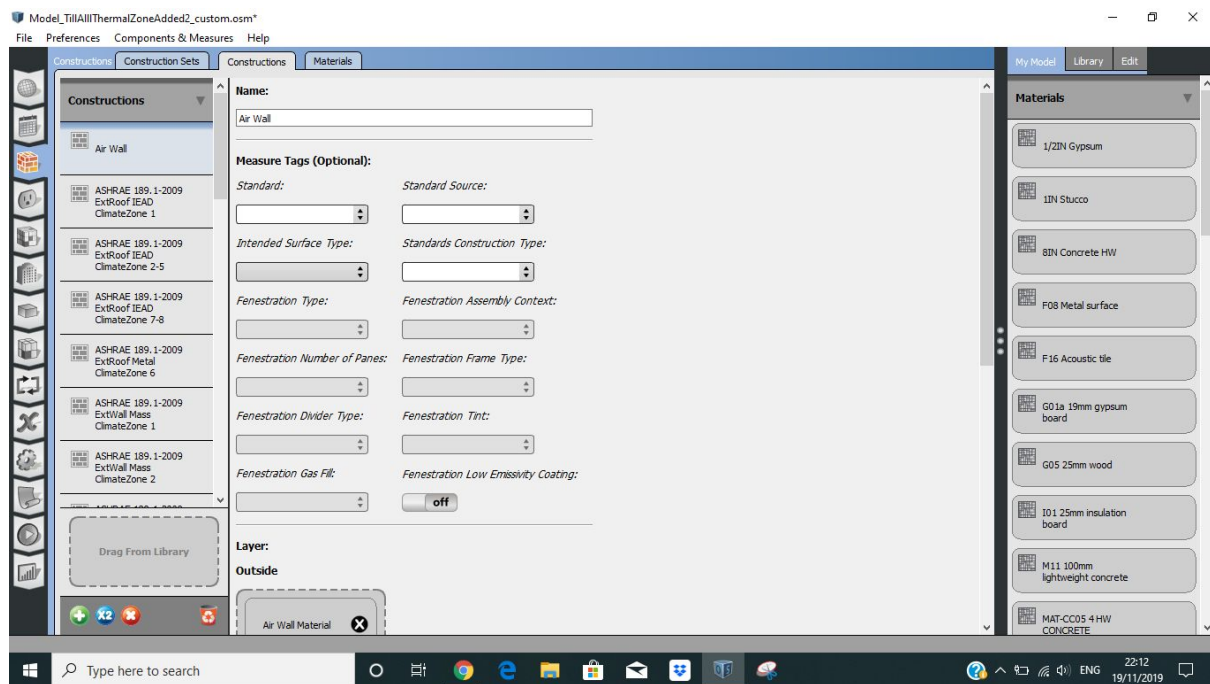
2. Choose the 'weather data' folder and import weather data of piacenza to the open studio file

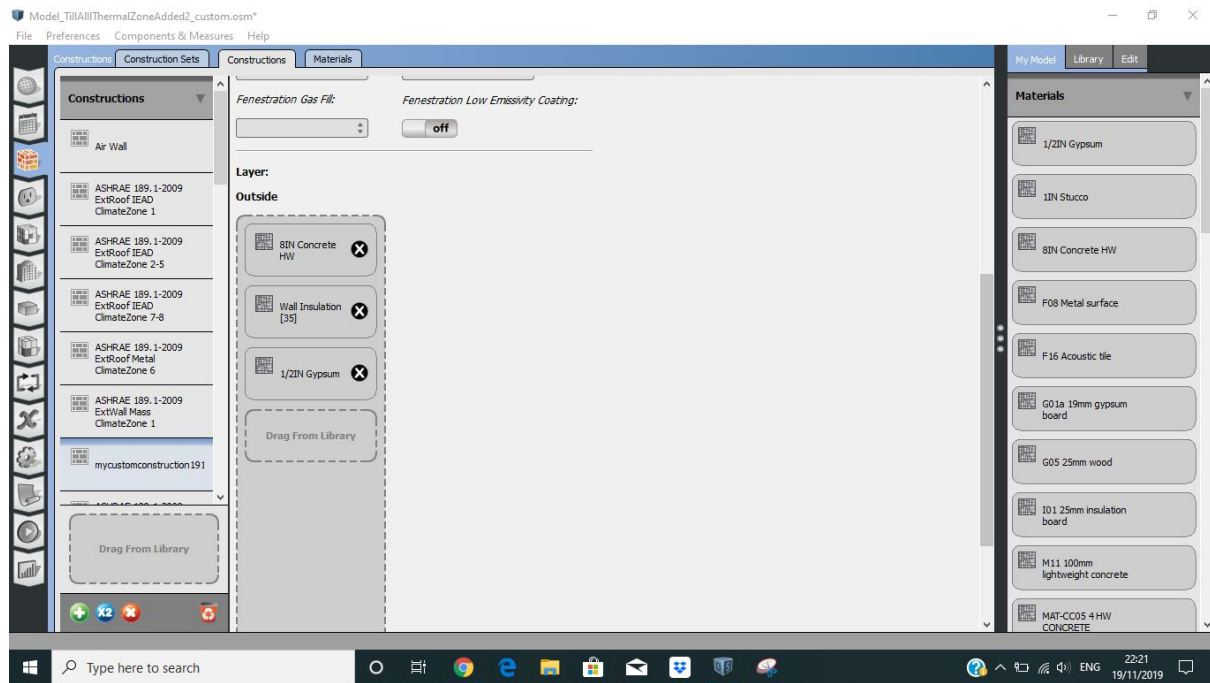


3. Run simulation

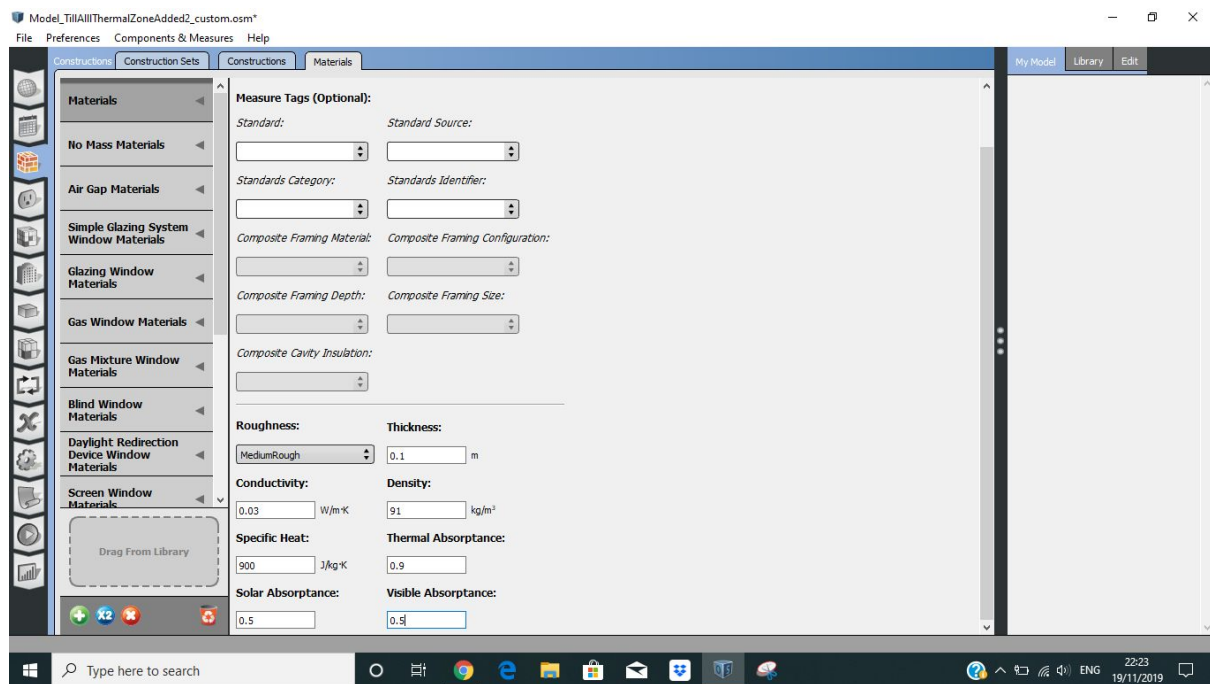


4. To create a custom construction wall, we Select 'construction sets', choose '189.1-2009- CZ1', duplicate the external wall and create one.

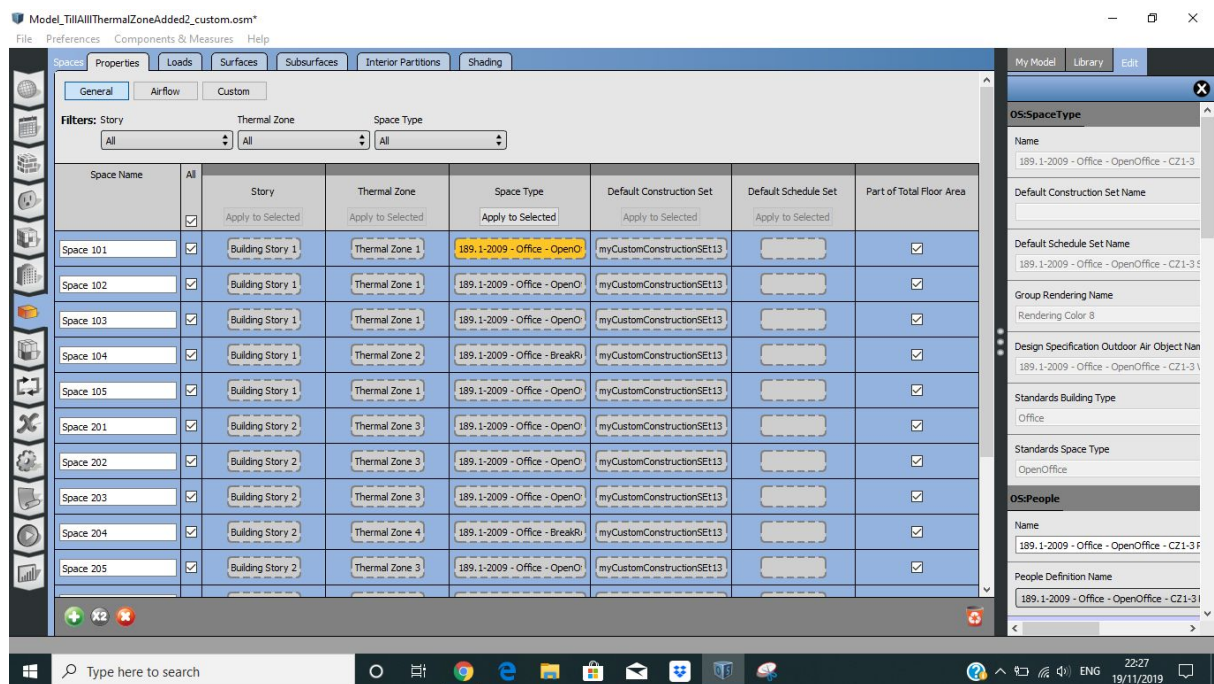
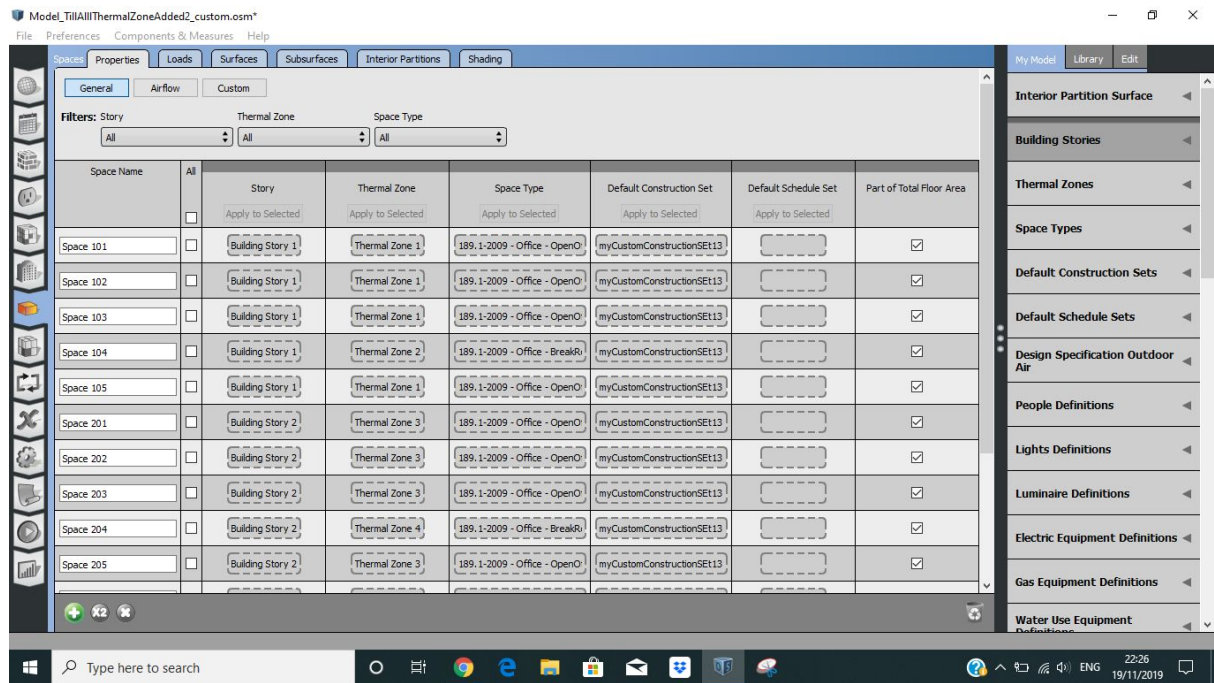




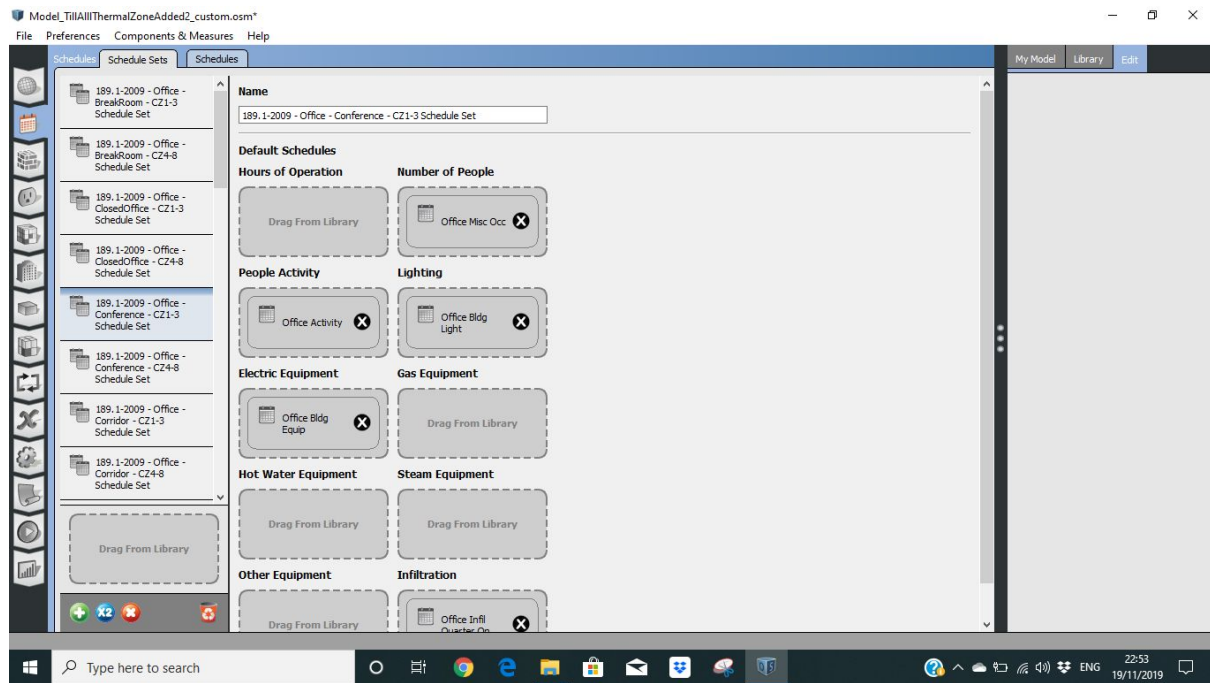
5. We choose ' constructions' and change/add materials to our preference for the custom wall.



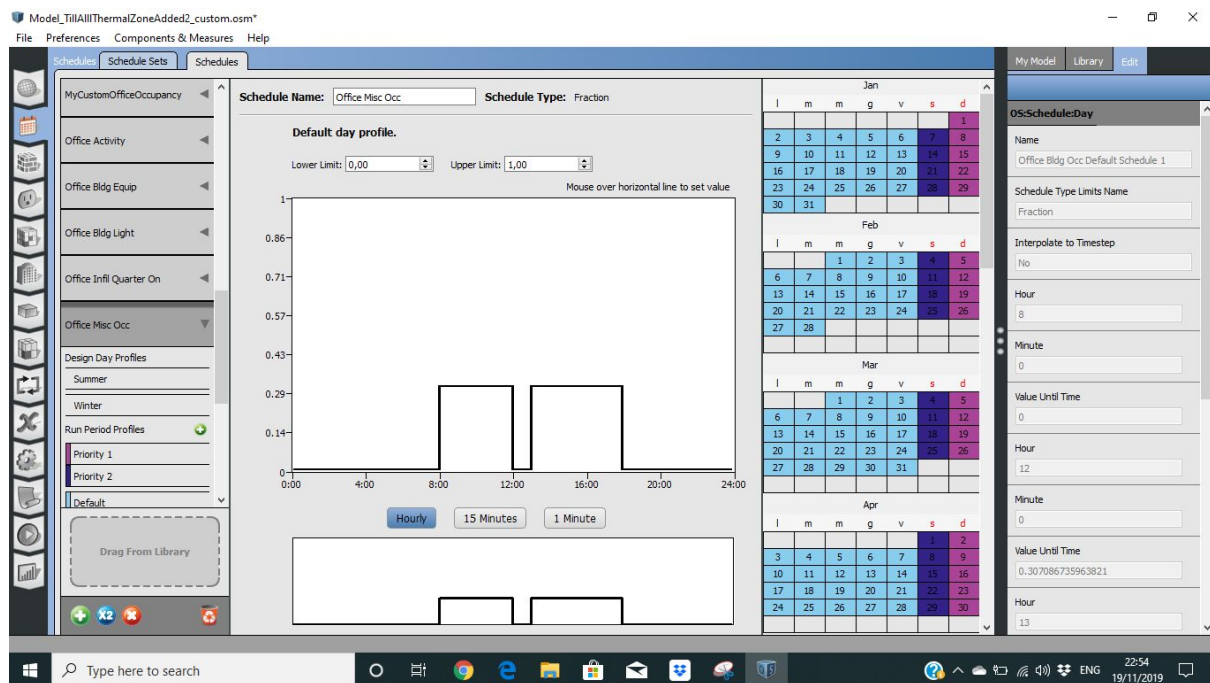
6. Select 'materials' and add the specifications of the materials for the custom construction wall.

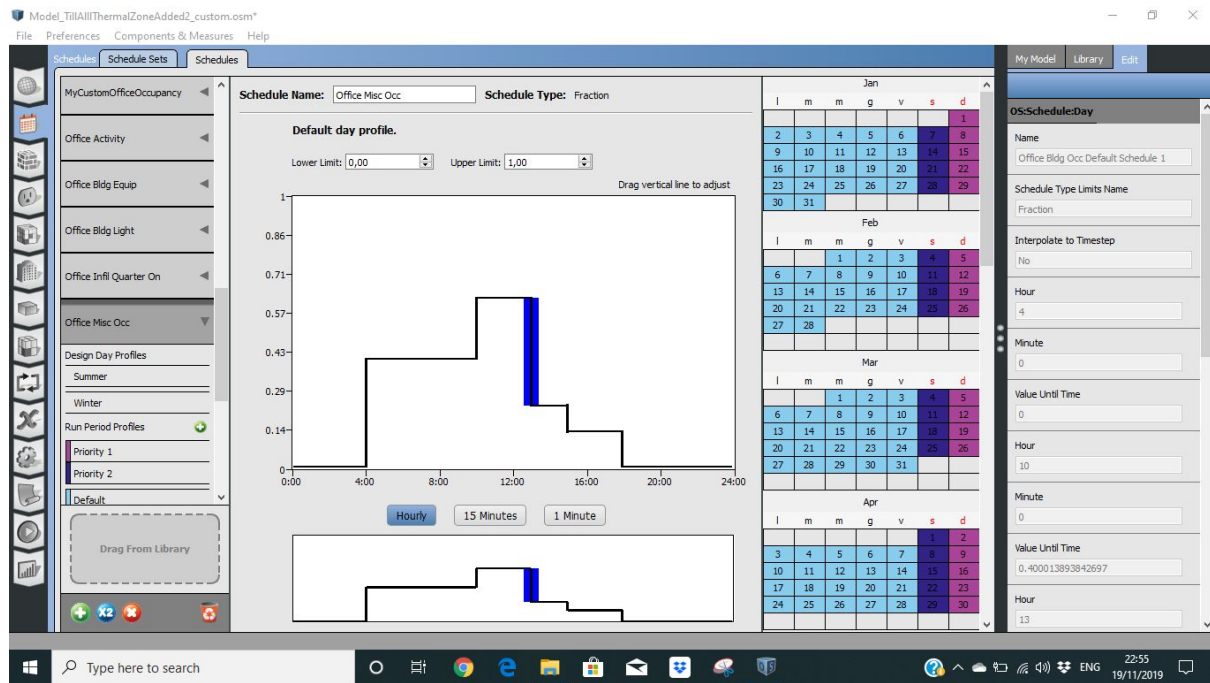


7. To specify the properties of the space, we choose 'spaces' and select 'properties', select 'All' and in space name 'space 101' click on its 'space type'

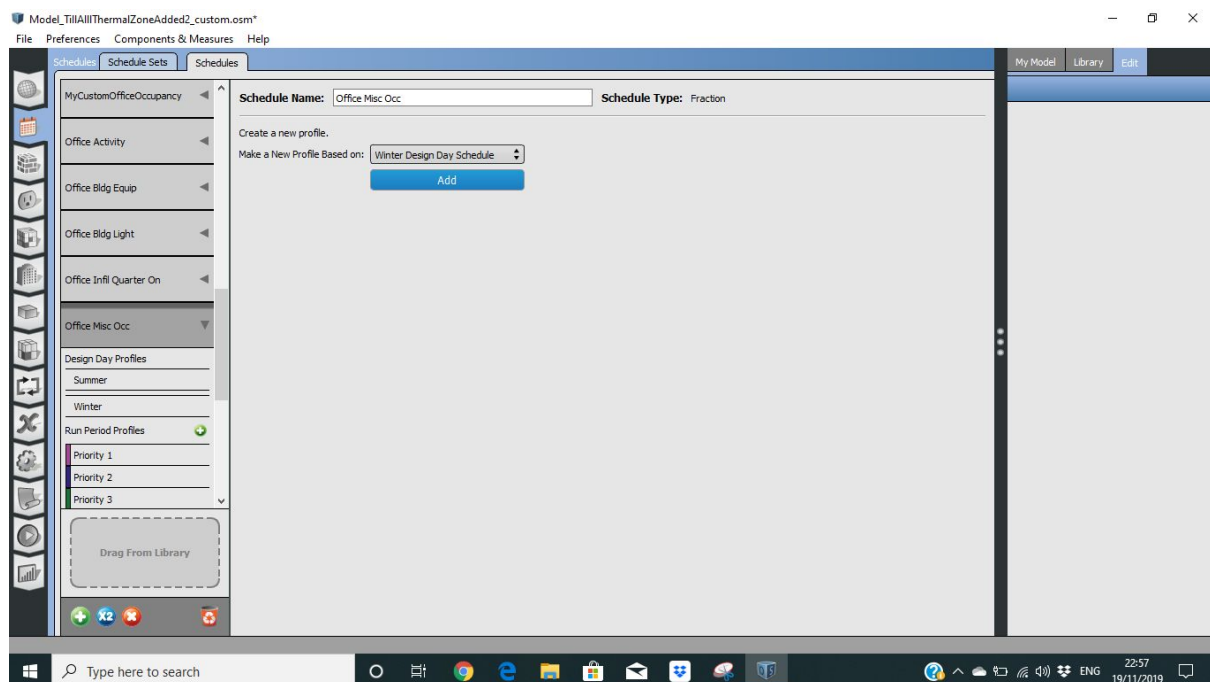


8. We then choose a schedule of the room that will be used in future and select the number of occupants, occupation hours, equipment that will be used. We select 'Schedules', then 'schedule sets' and choose the schedule set for 'office-conference- CZ1'





9. We click on 'Office Misc' and choose a schedule according to different situations.



10. Choose 'run period profiles', create a new profile and add a new schedule according to the weather preference.