A1: OpenBIM

Describe the use case you have chosen

This assignment focuses on providing a quick and easy estimate over the required ventilation in a whole building and from this being able to assess the Air Handling Unit size and other useful information. This will be the baseline and depending on how far the group gets more and more details can be added to the calculation to make it more complex.

Who is the use case for?

The use case is meant to be used as a consultant tool for architects and engineers to give an estimate for the ventilation needs in terms of indoor climate.

What disciplinary (non BIM) expertise did you use to solve the use case?

Ventilation needs, building pollution, heat loads from occupancies, equipment and solar radiation.

What IFC concepts did you use in your script (would you use in your script)?

The group want to at first use IFC extraction of floor areas to give an easy estimate of the ventilation rate. When more detail to the script will be added, the wall construction and the window properties can be extracted. Not an IFC concept, but we want to give the user the ability to choose which indoor climate class they want to be in. Currently the script is only able to extract the floor areas and write in into an excel file whilst providing with the corresponding names/numbers. Next up for the script is to extract wall properties.

What disciplinary analysis does it require?

Detailed calculation on the solar radiation coming through the windows, and the heat loss through the façade and internal heat gains is needed for the calculations to be correct as these are very much influencing factors.

What building elements are you interested in?

Floors, walls, roofs and windows are the necessary building elements we need to analyze and extract data from for reasons described in the previous sections.

What (use cases) need to be done before you can start your use case?

A rough calculation of the ventilation can be done with only the architectural IFC file as floor area is the minimum requirement.

What is the input data for your use case?

As a minimum the floor area. Afterwards more and more detail can be added for example heat loads as described earlier. Then in the end depending on how much time is left we would add: window size, window properties, wall size, wall properties, slabs toward ground properties, slabs toward ground size, window orientation, building location to the calculations to make is as precise as possible.

What other use cases are waiting for your use case to complete?

While we need the architectural use case to begin on this case, they would vice versa use this case as the ventilation concept could use up space and therefor room dimensions could be changing. Code Validation would wait for this case to know what building code sections to document and so on. Lastly indoor climate depending on the focus point for example: PPD/PMV, temperature, energy and acoustics.

BPMN file

File also included on the github page.