

BIM-SPEED competition - evaluation criteria

What would be your strategy to evaluate user comfort in each project? Please, provide a brief description (max 1000 characters).

Number of responses: 7

Text answers:

As there is only one IFC file for each competition entry, the model will be limited one (or in best case some) design domains and a comprehensive analysis is not possible and the jury needs to rely on the analysis given the participant. Therefore the strategy needs to be based on the report included in the entry. The reports should also provide information about how user comfort is implemented in the IFC model so that the jury can verify the results from the model.

Individual user comfort is closely related to the well-being when individuals have the psychological, social and physical resources they need to overcome a particular psychological, social and/or physical challenge. For assessment purposes, the following factors should be evaluated:

1. thermal comfort, which expresses satisfaction with the thermal environment.
2. indoor air quality, which is influenced by the quality of ventilation in a building.
3. visual comfort, which includes the provision of natural light, outdoor views, reduction of glare, etc.
4. noise disturbance, such as excessive noise or other acoustic disturbances that may have a negative impact on health or quality of life.
5. ergonomics, which refers to the design of workplaces, products and systems to best suit those who use them. In addition, to improve interaction with the environment and products and to prevent or limit the risk of illness or injury.

- 1) First, I start by analysing the report. I check if there is a dedicated paragraph to covers this criterion.
- 2) I look for several sub-topics to take into account when we deal with user comfort.
 - Type of residential occupation

- Individual triggering / monitoring for space heater
- Air characteristics: acceptable humidity ratio and airflow speed
- Valid occupation and environment assumptions – Air and Water temperature, Hot domestic water consumption

User comfort = How effectively the competitors use the platform?

Check the IFC and other materials provided by the competitors, also checked how they use the collaboration platform, the tools ect. every period. Compare every period will show how they use and how they can use comfortably the platform.

In order to evaluate this user comfort properly we need to have a global approach and view over the project.

First we need to know the situation before starting the project in terms of comfort: feeling, needs.

Then we should appreciate the furnished effort to enhance the comfort.

Last we should analyse the results and sustainability of the used BIM strategy in terms of costs and real mid and long term benefits.

User comfort could be assessed based on thermal, acoustic, visual and olfactory comfort.

Projects could be compared using standard indicators for residential buildings:

- thermal comfort (ASHRAE 55 standard and EN ISO 7730)
- acoustic comfort (based on LEED Acoustic Performance credit specifications)
- visual comfort (based in LEED Interior Lighting and Daylight and Quality Views credit specifications)
- olfactory comfort (Particulate Matter and inorganic gases, odors, ASHRAE Standard 62.1–2016)
- adaptive opportunity (user control over the environment)

One more indicator would be the quality of the architectural design concept (originality of the proposal, spatial planning, blend with the surrounding environment)

From the participants, I would expect an analysis on the comfort based on transient thermal conditions that take into account external climate and building flexibility. New approaches and concepts, as alliesthesia, should be adopted and metrics should be taken into account for considering the shift from "optimal" conditions in favour of a more flexible use of energy.

**What would be your strategy to evaluate whether each project has applied sustainable renovation strategies?
Please, provide a brief description (max 1000 characters).**

Number of responses: 7

Text answers:

The reports should also provide information about how a sustainable renovation strategy is implemented in the IFC model. One model per entry limits results as there is not a possibility to demonstrate how sustainable renovation strategies are carried out across different design disciplines.

The optimal retrofit solutions are a compromise between a number of energy-related and non-energy-related factors that need to be considered. Hence the analyses:

1. how was the building performance improved?
2. how was the sustainable retrofit carried out?

First, I list equipments and materials and solutions applied to the project.

Then I check through an analysis grid, how sustainable are proposed solutions compared to alternative/existing solutions:

- 1) Energy sustainability – Systems should reduce Primary Energy consumption. A local renewable source of Energy would be a bonus.
- 2) Carbon impact – On short term, new equipment/material includes carbon footprint information. On mid-term, building carbon impact is reduced (eg. select less carbonized source of energy).
- 3) Financial sustainability - Operating costs are kept under control.

In the beginning, check list should created based on sustainable solutions and criterias (like WELL, LEED/BREEAM), and based on this give a 1-5 mark (best -5) to each different project.

Checking based on the simulation, report, and discriptions what competitors provide.

To be sustainable each renovation strategy has to follow three majors aspects:

1. Impact of the people
2. Impact of the environment

3. Impact of the costs

All these aspects have to follow a reasonable and reasoned approach.

Evaluation as described in LEED credit “Building Life-Cycle Impact Reduction”:

- Building and Material Reuse
- Conduct a life cycle assessment of the project’s structure and enclosure
- Use of products and materials for which life-cycle information is available and that have environmentally, economically, and socially preferable life-cycle impacts.

Also there could be a set of criteria checklist, that should be modified according to the climate zone (south, central, northern Europe)

In the projects evaluation, I would consider solutions aimed at reducing the use of energy both the provenience of the materials, i.e. for the facade insulation, and during the building lifecycle. Projects that propose the use of shadings, efficient energy devices for energy generation (e.g. heat pumps, CHP...), energy storages (both thermal and electric), renewable energy technologies (solar thermal collectors, photovoltaic...), advanced control strategies will be considered as adopting sustainable renovation strategies. In addition to this, specific KPIs as the total Primary Energy consumption/reduction, energy self consumption etc would be used for the final evaluation.

What would be your strategy to evaluate time and costs savings by using the platform, considering that each project could be different and may achieve time and cost savings that are incomparable between projects. Please, provide a brief description (max 1000 characters).

Number of responses: 7

Text answers:

This evaluation is, again, is based on the report since the time and cost savings are not provided by the platform rather than how the participant has utilized the platform. The participant needs to also provide a comparison to other processes – the cost and time savings are not absolute, they are always relative.

In the design phase:

Rapid iteration of design elements including building form, sustainability, client preferences, municipal regulations, budget and more based on analysis and simulations such as energy analysis already in the design phase to reduce subsequent energy consumption.

In the construction phase:

Linking project planning with construction design and simulation, as well as visualisation during construction and digital fabrication. Extracting information from BIM to prefabricate components to improve the project schedule, reduce costs, improve site safety and achieve greener construction practices by reducing material waste.

In the building management phase:

Reuse building models and data to optimise and manage building operations. Analyse tools for the data-intensive models to optimise resources, reduce waste and lower whole-life maintenance and operation costs. Using intelligent 3D models to support space management and perform spatial validation for tenant accounting.

I go through the following steps:

- 1) I start by listing the main workloads during renovation project corresponding stage.
- 2) I select the first main tasks, with highest workload (~10). I use Pareto principle that 20% of tasks should represent 80% of the time spent.
- 3) I compare traditional process to business cases covered during the project with the platform.
- 4) If possible and accurate enough, I calculate a ratio of savings. Result would be expressed as X man.days and Y% time saved to be able to compare projects.

First, Jury have to get familiar with the BIM-SPEED platform, to see, how this platform can help and save time and cost.

After this, I think Jury/Organizers should create a checklist together, what can give a basic evaluation method.

This case all Jury will have similar method and evaluation points, so the result should be more coherent

To evaluate the benefits of the use of this platform we have to be able to appreciate the following points:

1. Ease of use
2. Intuitive and uncomplicated
3. Fast and stable
4. Measurable benefits

Independently of the size of a project its owner has to feel a real benefit by the use of the platform.

Propose a rating system for each project by comparing time required per m2. Same applies with cost savings, but original input must be modified by comparing cost per m2 with average local prices.

It is my understanding the cost refers to the study cost, not the construction.

Due to the variety of cases and applications and due to the lack of a methodology for this kind of evaluation, I would reward the teams that use the platform only as a mean for data exchange, data storing, data visualization and that continue adopting the platform during the building operation.

Considering the overall evaluation process, how BIM-SPEED partners could prepare the submitted files (i.e. IFC file, report and visual material) to ease the evaluation process by the jury members? Please, provide a brief description (max 1000 characters).

Number of responses: 7

Text answers:

All the modelling details and deliverables included in the IFC-file should be documented in the report as it will be the starting point for all evaluations. The report should also enough guidance on the model qualities and modelling processes in order to make the evaluation possible. The participant should understand, that it is not the job of the jury to make analysis but to evaluate them.

Partners need to support common tools and methods that facilitate project evaluation, especially of the planning process, thus avoiding the subjectivity of this task.

The role of model checking should be similar to the criteria used to select a contractor in standard public procurement methods, as well as in some new methods that are in line with BIM processes.

Submission can be a zip folder containing all requested files.

About file transfer, a standard cloud storage solution would be the simplest way (eg. Google Drive, DropBox, Microsoft SharePoint). It could also be a

WeTransfer temporary link in order to each jury member to download files.

A naming convention for all files submitted would be welcomed to have information on type of files and project name quickly without opening it.

Like every BIM project, BIM-SPEED Should have an EIR or BEP created by the Client (Organizers of the competition). This EIR/BEP should explain what kind of information the IFC should contain, what kind of material and report should be prepared. This document kind of bible. The competitors have to follow this criteria.

Based on this, Organizers/Jury easily can create a check list, what Everybody has to follow during evaluation. This Check list should include strict points, and a freely interpretable criterion to give a little freedom to the Jury.

All the projects should be built and transmitted in a similar manner.

The participants need to receive a clear road map to work with.

The should transmit an IFC file with predefined attributes and parameters, a report of the achieved results showing all the benefits:

- benefits for the project,
 - benefits for the people, the assets and the environment
- and
- benefits of the platform usage

Visual material can also be helpful.

Participants could be required to use one of the BIMSpeed tools for assessment so as to have a standardized results sheet that will facilitate the evaluation procedure. A specified tool could be formed for this purpose. This tool should also rate the collaboration process between the team members.

The visual material should show the building in its surrounding context, before and after the renovation and key diagrams indicating the renovation strategy.

In regards to the .ifc file, participants could submit an MVD according to BuildingSmart Standards (<https://technical.buildingsmart.org/standards/ifc/mvd/mvd-database/>)

I think that the submitted files should be organized by the different aspects that want to be evaluated. A first starting point could be the same structure given to this questionnaire, that is:

- user comfort
- sustainability (energy aspects)
- time and cost savings.

The platform should be able to summarize the main key factors that will be used for the evaluation process.