



Software for Architecture,
Engineering and Construction



Open BIM **COVID-19**

User guide

Guide for using the Open BIM COVID-19 tool for the application of protection measures against the spread of the COVID-19 virus.



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1 Introduction

The aim of this document is to explain the functioning of the Open BIM COVID-19 tool for the design and analysis of safety measures against COVID-19 in architectural spaces.

Please remember that the location of the elements described in this guide may vary depending on the version of the program you have installed on your computer

2 Description

As a result of the COVID-19 pandemic caused by the SARS-CoV-2 virus, the majority of national governments in affected countries have enforced mobility restrictions to prevent the spread of the disease. **Open BIM COVID-19** is a tool that permits users to establish and check the conditions necessary for the reopening of businesses and workplaces to ensure maximum safety for employees and users.

This application is integrated into the Open BIM workflow through the **BIMserver.center** platform.

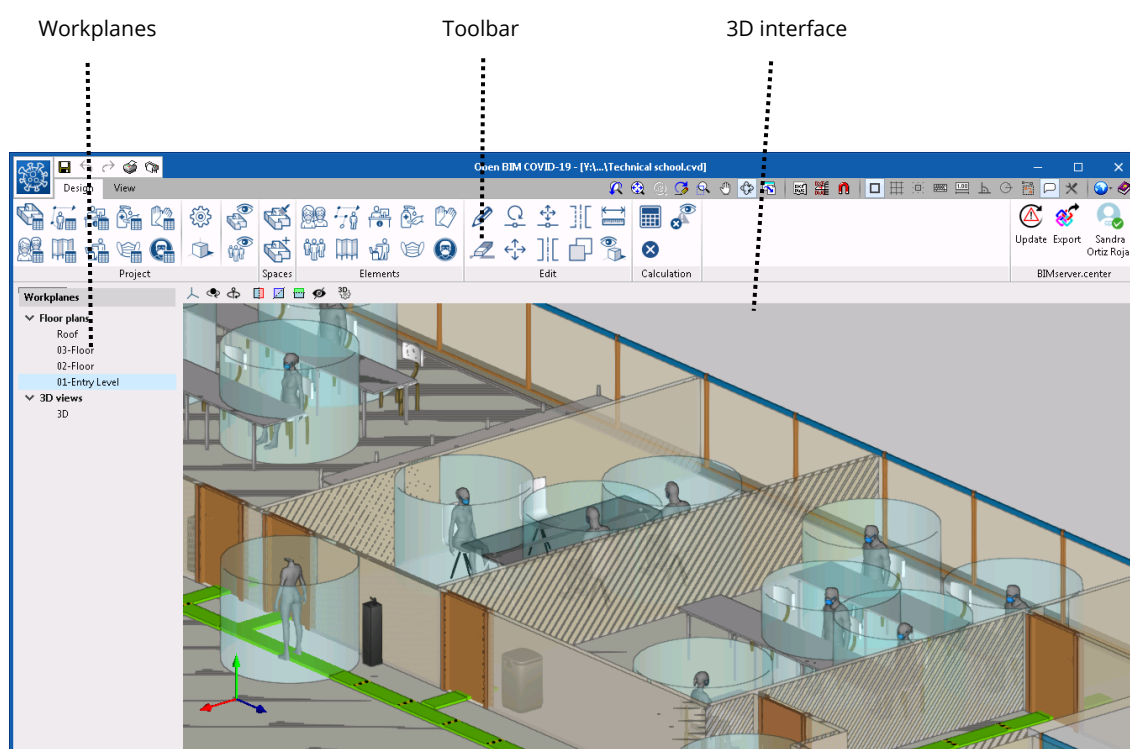
3 Scope of application

Open BIM COVID-19 is an application that complies with general regulations, and therefore is not restricted to specific national regulations or building use.

The main aim of the application is to facilitate the creation of a safety plan for establishments whose use by workers and/or attendance of the general public is foreseen.

4 User interface

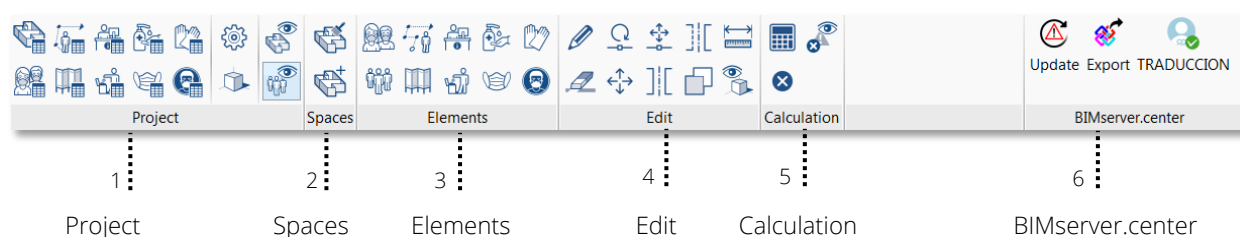
The user interface is divided into three parts: the toolbar at the top with three tab groupings, *Design*, *view* and *Bill of quantities*; the 3D work area to the right and the workplane control to the left.



Main screen of the Open BIM COVID-19 program

4.1 Toolbar

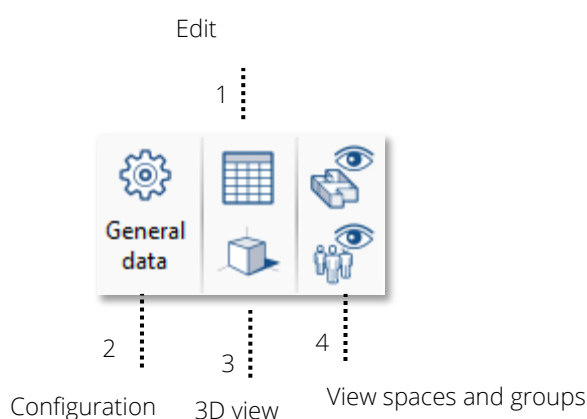
The toolbar is divided into 7 different groups: *Project*, *Spaces*, *People*, *Elements*, *Edit*, *Calculation* and *BIMserver.center*. The first 6 groups enable users to work in the Open BIM COVID-19 application, whilst the last group allows the work to be exported to and synchronised with the BIMserver.center collaborative platform.



4.1.1 Project

The *Project* group allows the elements previously inserted in the project to be edited, configured and viewed. This group permits 4 different functions to be carried out in the project:

1. Edit the elements previously inserted in the model
2. Configure the general options
3. 3D view of the BIM model
4. View the colour assigned to spaces and groups of people



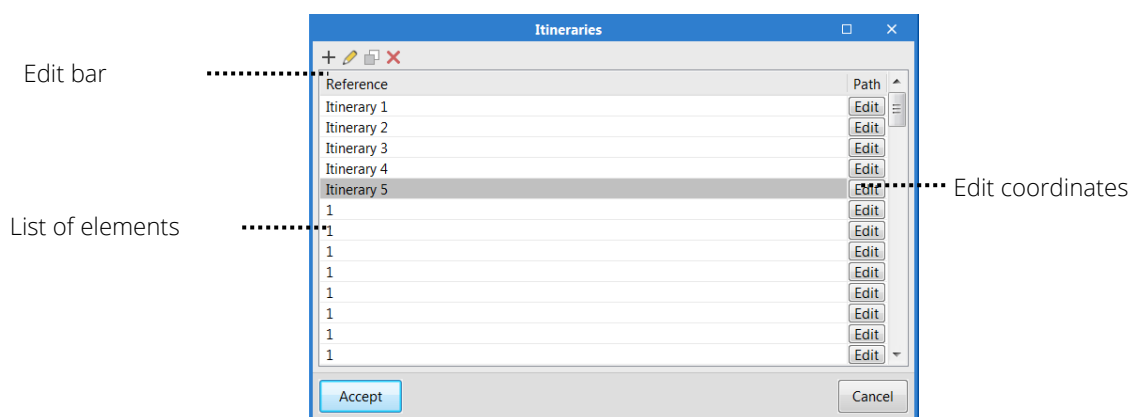
4.1.1.1 Editing the elements introduced into the project

See below a list of all the elements introduced in the project, organised by type:



- | | |
|--------------------|-----------------------|
| - Spaces | - Bins |
| - People | - Hydroalcoholic gels |
| - Itineraries | - Masks |
| - Separators | - Gloves |
| - Reception points | - Signs |

When accessing each one of the icons, an *Edit* window will open for the elements of each type. The edit bar is located in the top left, where users can add, edit properties, copy elements and delete them from the project. On the right, users can edit the geometric properties (X and Y coordinates) and locate an element.



4.1.1.2 General configuration

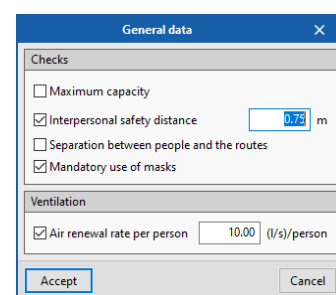


Allows users to edit and predefine the requirements and checks to be carried out in the calculation, according to the country's regulations or the protection criteria indicated by the technician.

Maximum capacity. It is possible to indicate a maximum number of people that can be introduced into the project, according to the requirements in the different national de-escalation plans.

Interpersonal safety distance. In order to maintain social distancing, the application allows users to establish a cylindric safety zone around people. The value of the radius of the cylinder can be entered in this field.

Separation between people and the itineraries. Upon activating this option, it will check that the safety spaces of the people do not interfere with the path of the itineraries.

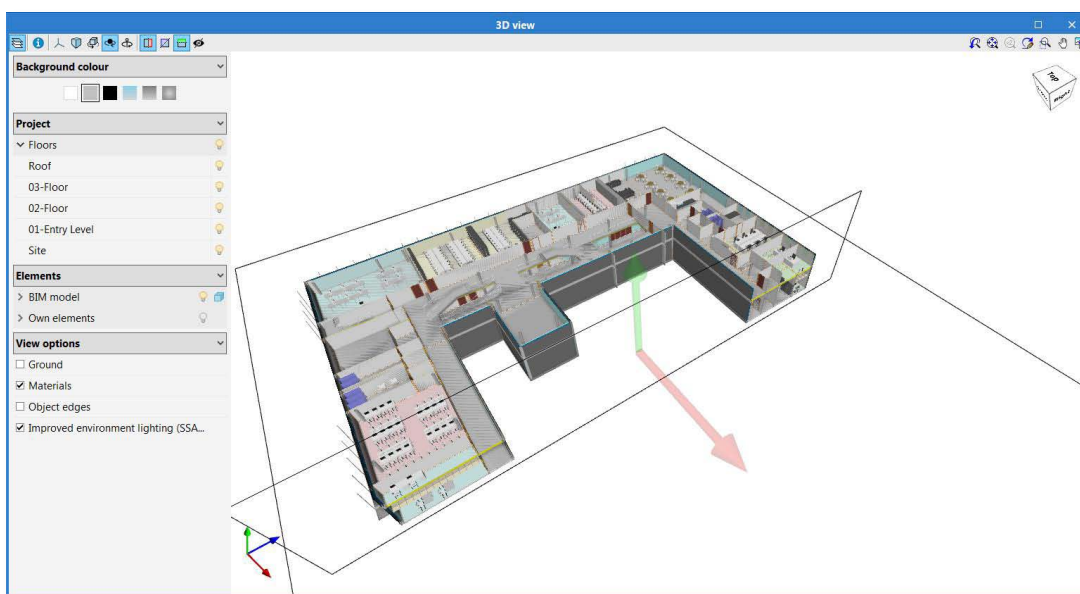


Mandatory use of masks. By activating this option the program will check that all people introduced in the model are wearing masks.

Air renewal rate per person. With this field the user can indicate how the *Air renewal flow rate* required for each space in the project will be calculated.

4.1.1.3 3D view

Opens a new window with the 3D view environment of the project. On the left side, all the BIM layers of the project can be seen, together with the protection elements against COVID-19.



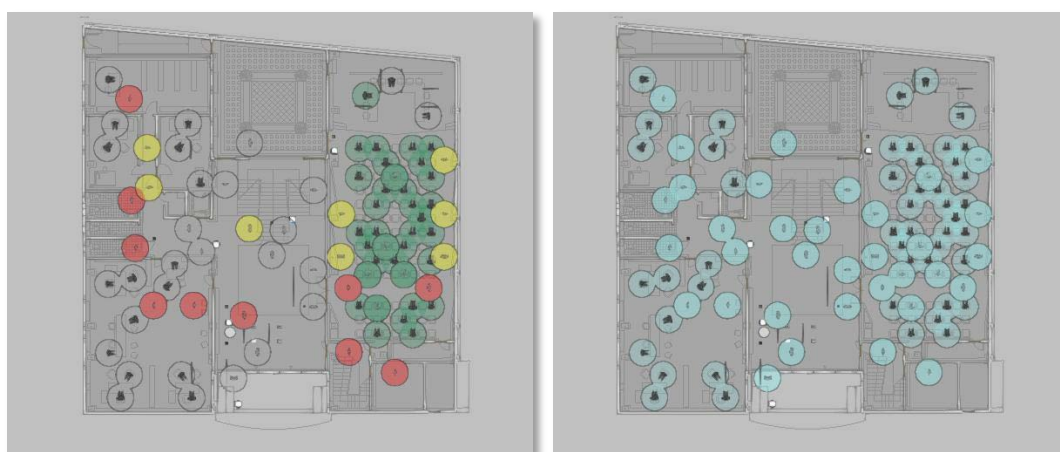
View of the 3D environment with BIM layers in the Open BIM COVID-19 program

4.1.1.4 View the colour of spaces and groups of people

View groups of people according to user-defined colours. ON/OFF



The Open BIM COVID-19 program allows users to **assign groups of people and view them by colour**, in order to obtain graphical analysis of the safety measures against COVID-19.



Comparative view of groups of people by colour

View spaces according to user-defined colours. ON/OFF






The Open BIM COVID-19 program allows users to define **spaces** and **view them by colour**, in order to obtain graphical analysis of the safety measures against COVID-19.



Comparative view of spaces by colours

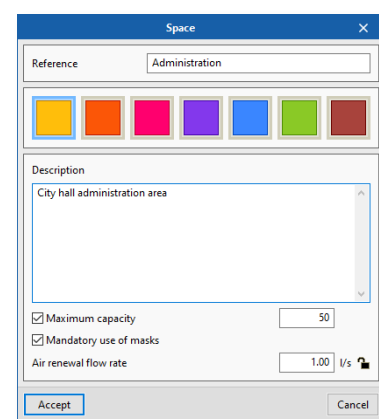
4.1.2 Spaces

| | |
|---|--|
|  | Spaces are defined from the previously defined BIM project. |
|  | Spaces can be manually defined by entering them directly into the Open BIM COVID-19 program. |
|  | Allows users to select and edit the previously entered space |





The second group *Spaces* in the toolbar allows users to subdivide the building into different rooms or spaces.

If the job is linked to a project on the BIMserver.center platform with an architectural model in IFC format that contains areas, it is possible to transform them into spaces that belong to the calculation model of the Open BIM COVID-19 application.

Users can specify the maximum capacity for each individual space. This value replaces the capacity set in the general data of the project. It is also possible to indicate the mandatory use of a mask in this space, or if an air flow renewal rate provided by a ventilation system is needed.



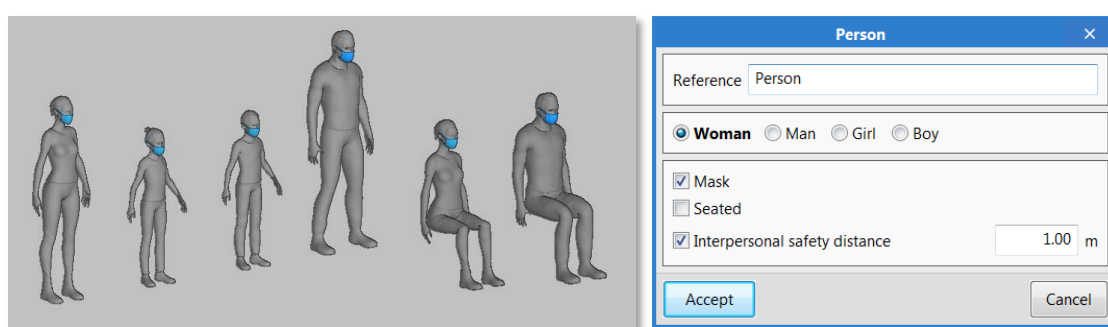
4.1.3 *People and groups of people*

| | |
|---|---|
|  | Introduce a person , who will be the main element to protect against COVID-19. |
|  | Assign the desired parameters to one or multiple people |
|  | Allows a group of people to be defined, as well as identifying the group with a colour |
|  | Assign one or multiple people to a previously defined group |

When inserting a person, the program displays a dialogue box where users must indicate whether it is a woman, a man, a boy or a girl. It also permits users to define if the person is standing, seated or lying down, if they are wearing a mask, as well as the interpersonal safety distance. To enter the element the workplane on which the person will be positioned must be selected. Next, with the pink lever, it is possible to rotate the person introduced.

The interpersonal safety distance can be entered for a specific person so that it replaces the distance defined in the general project data.

The people are used to calculate the capacity of the project, as well as of the space where they are located.

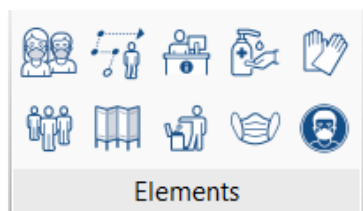


Types of models of people that can be entered

Groups of people can be used to avoid checking the interpersonal safety distance between cohabitants.

4.1.4 Elements

The fourth group in the toolbar, *Elements*, allows the introduction of protection elements against COVID-19.

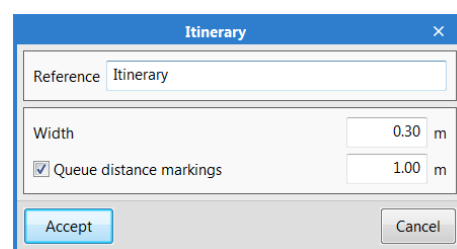


4.1.4.1 Itinerary

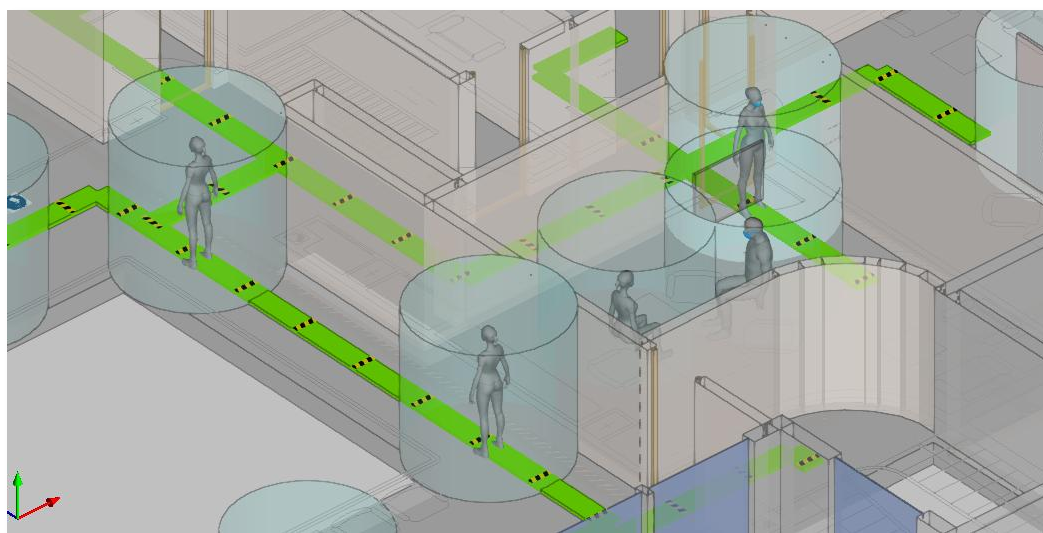


Introduce an **itinerary**. With the mouse cursor the itinerary indicated by the user is traced, to reduce possible COVID-19 infections.

The itineraries allow safe circulation routes to be established in the establishment.



In the dialogue box, the width of the path and queue distance markings can be adjusted.



View/display of the itineraries in the 3D environment

4.1.4.2 Separator



Introduce a **separator**. This allows different people to be physically isolated to avoid possible COVID-19 infections. The height and thickness of the separator can be adjusted.

4.1.4.3 Protection elements

The last 6 icons of the third group allow the active protection elements against COVID-19 to be introduced. That is, those elements that imply an action by the user.



Introduce a **reception point**. The reception points indicate the location of supply points for protection elements (masks, gloves, hydroalcoholic gel etc.) for the users of the establishment.



Introduce a **bin**. Bins with an automatically closing lid that can be located at the exit of establishments to dispose of elements that have been in direct contact with users.



Introduce a **hydroalcoholic gel dispenser**. Hydroalcoholic gel is able to disinfect the hands of the users of the establishment. The application allows users to introduce this product in a container or as a fixed dispenser.



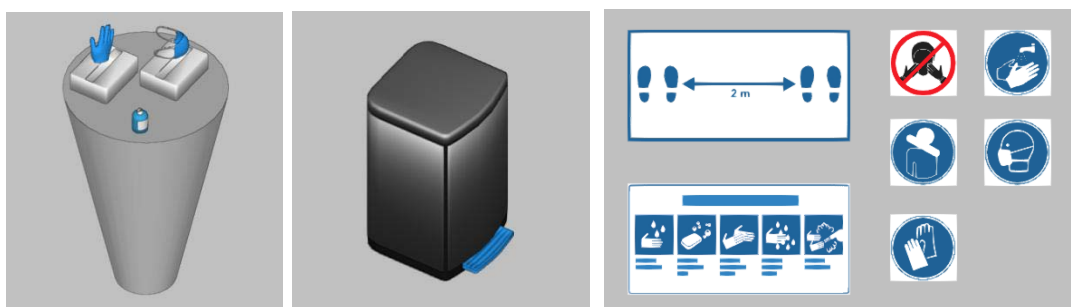
The fourth icon of the second row introduces a **mask dispenser**. The use of masks is recommended when it is not possible to maintain safety distancing in closed spaces.



Introduce a **gloves dispenser**. In some establishments it is advisable to use gloves, such as when choosing fruit and vegetables at the shops.



The fifth icon of the second row introduces a **sign**, whose width can be changed for any of the signs: Hand washing, Mask, Gloves, How should you wash your hands? Avoid touching your face, Recommendations when coughing or sneezing, etc.













Types of active protection elements against COVID-19

4.1.5 Edit

4.1.5.1 Edit commands

The fifth group in the toolbar contains grouped edit commands for the project. With these, the program allows users to adjust, modify, delete, copy and view previously inserted elements in the project.

Below is a table showing each one of the functions:

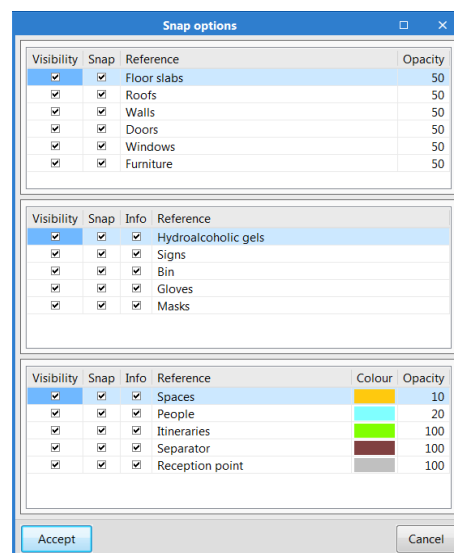
| | | | |
|---|----------------------------|---|--------------------------|
|  | Edit |  | Move an element |
|  | Delete |  | Move a group of elements |
|  | Rotate an element |  | Symmetry (move) |
|  | Rotate a group of elements |  | Symmetry (copy) |
|  | Copy |  | Measure lengths on plan |

4.1.5.2 Visibility and snap options



This icon controls the visibility and snap options of the project. That is, by selecting/unselecting the boxes we can activate/deactivate the visibility and snap of the different project layers.

This allows users to personalise the way they work and their visibility options according to the specific needs of the project. Furthermore, the colour and the opacity of the layers can be controlled.



4.1.6 Calculation



The Open BIM COVID-19 application enables a calculation to be performed to determine and evaluate if the protection measures against COVID-19 are sufficient, and if not, what protection actions to take

Once the calculation is completed, **Open BIM COVID-19** has several ways to display the data obtained so that users can analyse the results in the most efficient way according to their needs.



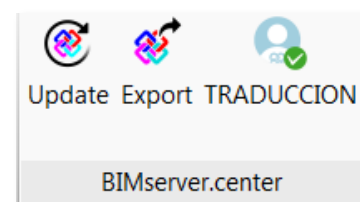
With this icon, the application displays warnings and errors in case any of the requirements previously indicated by the user are not met. On the other hand, in the different views of the work area, it is possible to view if people's safety spaces interfere with each other or with the itineraries. In the case that there is interference, the space will be marked red, whilst those spaces that comply with the distances will be marked green.



View of safety distance calculations and checks

4.1.7 BIMserver.center

The group to the far right, **BIMserver.center**, allows the project to be synchronised with the collaborative work tool BIMserver.center. In addition, this enables the project to be stored in the “cloud” so that it to be accessed from any device.

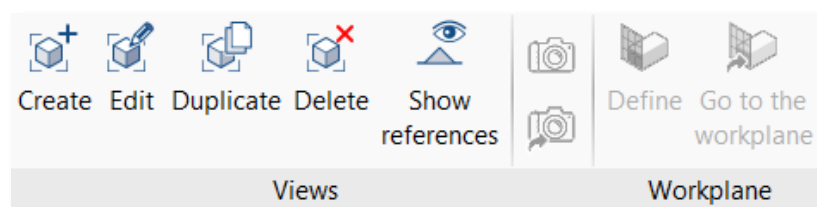


- **Update:** Brings the latest versions of the files stored on the platform to the Open BIM COVID-19 work environment.
- **Export:** Sends the model of the protection elements against COVID-19 to the platform.
- **User:** Shows the user that is connected to the platform.

5 Workplanes

The views are full or partial representations of the application’s design model. It is important to note that the components of the model are not linked to the views, so that they can be created, modified or deleted without affecting the underlying data structure.

The *views* group located in the toolbar of the applications contains the following options:



- **Create.** Create a new 2D or 3D view of the model.
- **Edit.** Modifies the properties of the current view.
- **Duplicate.** Copies the current view.
- **Delete.** Deletes the current view.
- **Save the start scene.** Establishes the current position of the view as the start scene. This scene will be used to generate the graphical documents of the project.
- **Go to start scene.** Position the current view in the position of the start scene.
- **Show references.** Upon choosing this option, references to other views will be shown in the active view.

5.1.1 Types of views

It is possible to generate different types of 2D and 3D views of the project. Each one is oriented to facilitate user interaction with the model in a different way.

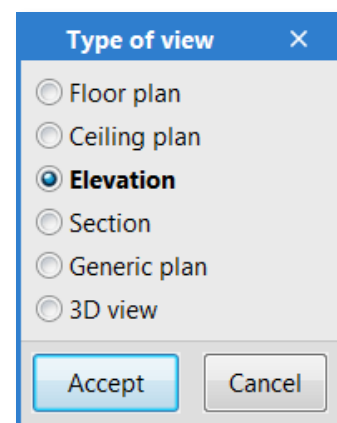
Floor plan: on a horizontal plane seen from above.

Ceiling plan: on a horizontal plane, but in this case seen from below.

Elevation: on a plane that is perpendicular to the horizontal plane of the job.

Section: cut of the building perpendicular to the horizontal plane of the job.

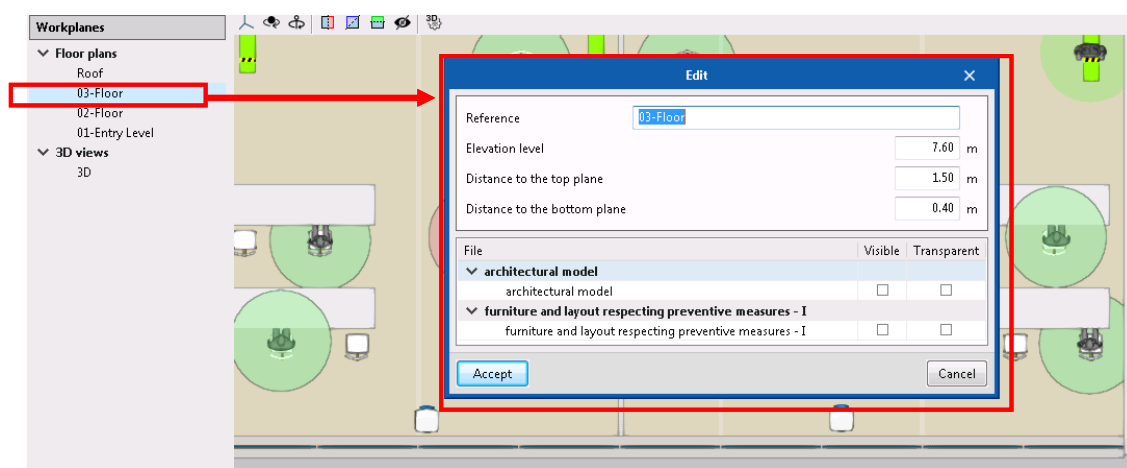
Generic plan: the view is generated from a plan located anywhere in space. To create a generic plan, in the definition of the view three non-aligned points must be indicated that make up this plan.



5.1.2 Visibility of model layers

In the configuration panel of a view it is possible to indicate the layers of the digital model of the building that come from an associated BIMserver.center project, which will be displayed in the work area.

Double clicking with the left button on the workplane will open a window where the layers of the model can be activated/deactivated, for example Furniture, Structure, Installations, etc.



Configuration of the visibility of model layers in the workplane panel

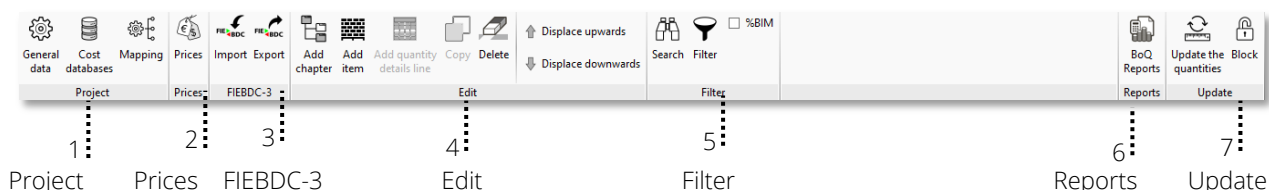
5.1.3 Range of vision




All the view types, except the 3D view, are associated with an **area delimited by two planes, a top and a bottom plane**, which determines the elements that will be represented in the view. In the view configuration panel, it is possible to specify the distance to the top and bottom plane from the origin of the view.

In elevation, section and general plan views: the top plane is perpendicular to the direction of vision in a positive direction. The bottom plane is the same, but in a negative direction.

6 Bill of quantities

In the third tab *Bill of quantities*, the user will find tools oriented to the generation and management of the quantities and bill of quantities of the protection installation against the spread of COVID-19. Here, the user can collect the quantities from the model and, from that information, generate real items. The toolbar is organised into 7 groups.

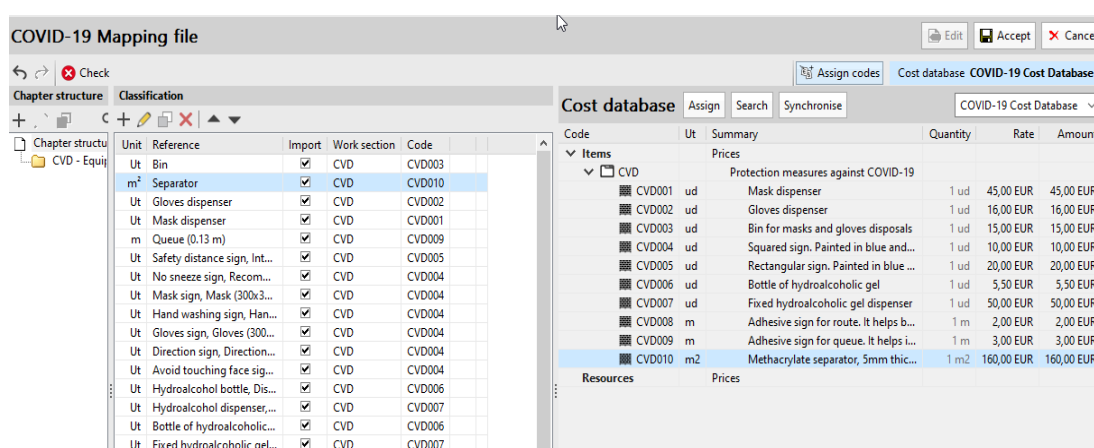


| | |
|---|--|
|  | General data. Defines the general configuration of the whole project. It allows the currency to be chosen for the bill of quantities, the decimal places that will be used in the bill of quantities, the structure of totals and subtotals, as well as the relative percentages of the project (general expenses, industrial profit, etc). |
|  | Cost databases. Creates a cost database with the unit cost of each project item or element. It also allows the database to be organised into chapters and subchapters. The generated cost database can be saved and used in other projects. |
|  | Mapping. The program extracts a report with all the project elements organised by their reference names. The user then sets the mapping rules, assigning a cost database code to each reference, i.e. an associated unitary cost. The mapping tiles can be saved and used in other projects at a later date. |

The program allows the automatic mapping of all elements of the job, associating them with a unitary price or an item. The following steps must be followed for the elements:



1. Define the **cost database** for the project, or import a previously created cost database.
2. Assign **unitary prices** to the elements entered in the project.

Once the mapping has been correctly defined it can be used in other projects.



Report of elements in the project, organised according to the reference name

Cost database

| | |
|---|---|
|  | Assign codes. View the cost database window |
|  | Assign. Allows a unitary price from the cost database to be assigned to elements entered in the project. |



The program allows the bill of quantities to be exported in *FIEBDC-3* format to work with them in bill of quantities programs such as Arquimedes.



With the **BoQ reports** icon, the program allows users to extract bill of quantities reports of the active project.

The bill of quantities documentation can be extracted in various types of reports (Quantities, Cost breakdown structure, Priced bill of quantities, Detailed priced bill of quantities and BoQ summary), exportable in HTML, DOCX, PDF, RTF and TXT format.



Update the quantities. Allows both the mapping file and the cost database to be updated and generates an updated report of the Bill of quantities.

7 Drawings and reports



The application allows a **justification report** to be generated with the elements that make up the safety plan against the spread of COVID-19. It also includes the checks that have been carried out based on the requirements indicated by the user, such as the maximum capacity in the building and the areas. This document can be printed directly from the program or exported to various formats (TXT, HTML, RTF, DOCX, PDF).

Finally, Open BIM COVID-19 is able to extract **detailed plans** of the safety plans against the spread of COVID-19. As is the case with the justification report, in addition to being able to directly print the plans, the program allows them to be exported to various formats (DWG, DXF, PDF, XPS).