

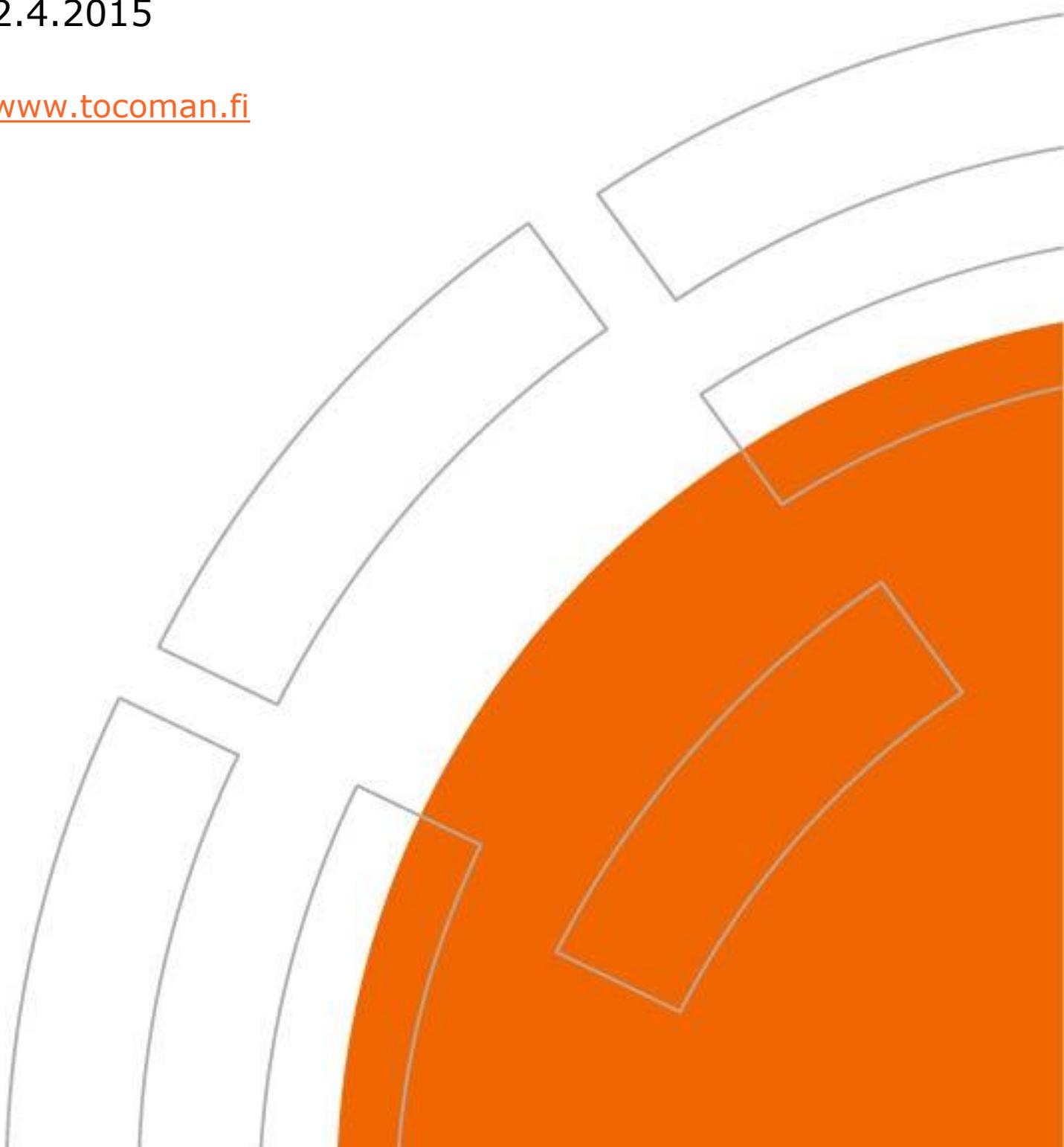
# TOCOMAN

## BIM

Manual

2.4.2015

[www.tocoman.fi](http://www.tocoman.fi)



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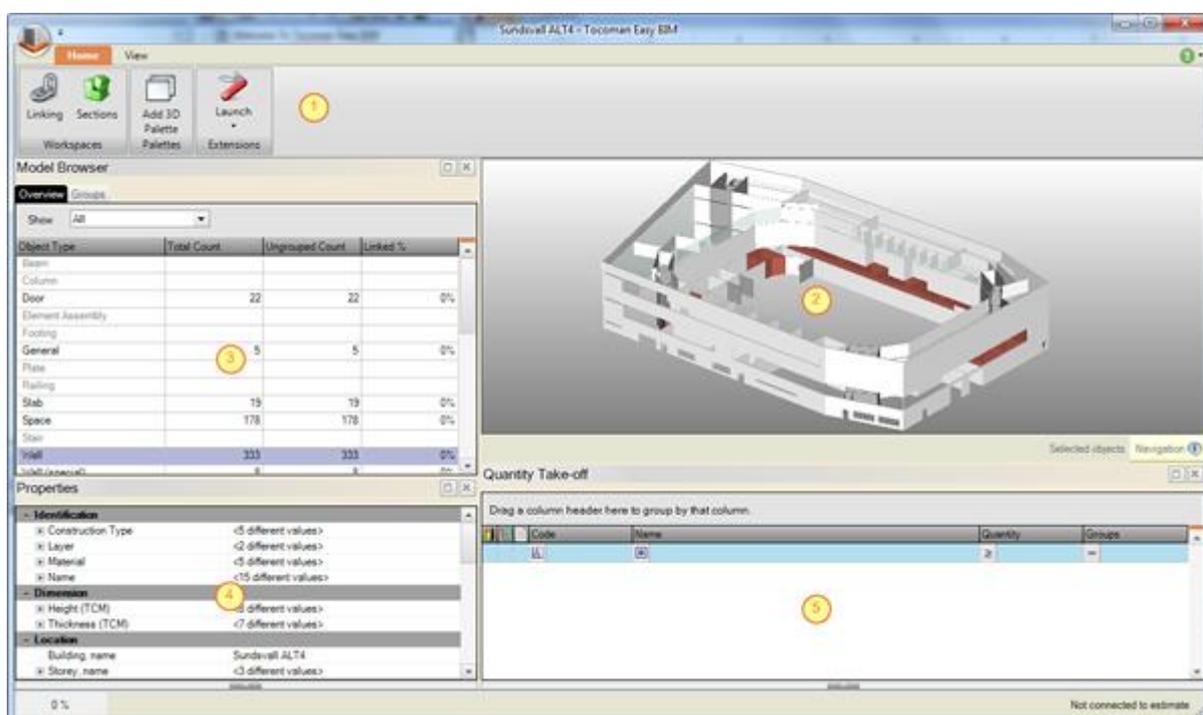
## Opening a Model

Application supports either importing an IFC model or opening a Tocoman Easy BIM model. Both actions can be done either using the shortcuts at startup screen or application menu at the upper left corner.

## Workspace

### About the Workspace

The application's main workspace is divided into five different tools or palettes: ribbon, 3D View, Model Browser, Properties and Quantity Take-off.



### Ribbon (number 1)

Contains almost all functionality related to the other tools. The ribbon always contains Home and View tabs. If either Model Browser or Quantity Take-off palette has been selected, then the ribbon displays also an additional tab, which contains functionality related to the active palette.

### 3D View (number 2)

The view is used to visualize various selections in the different palettes. It always displays the contents of the active palette - Model Browser, Properties or Quantity Take-off. The active palette is marked with orange header text. The view has a popup menu, which can be used e.g. to isolate individual objects.

### Model Browser and Properties (numbers 3 and 4)

Model Browser is used to analyze and group the model contents. It works together with Properties palette, which displays the properties of the selection in Model Browser palette.

Both palettes enable to create new building elements to Quantity Take-off palette or calculate quantities to existing items in it. Both actions happen by dragging and dropping information from the palettes into the Quantity Take-off palette.

### Quantity Take-off (number 5)

The palette links the building information model with the cost estimate. It contains the information in the cost estimate, which is used to calculate the quantities from a building model.

## Model Browser

### Overview Tab

Model Browser's Overview tab can be used to analyze the model in various ways. It contains a list of application's supported object types and their status related to quantity take-off - are objects e.g. linked to some item in the cost estimate.

The screenshot shows the 'Model Browser' window with the 'Overview' tab selected. A dropdown menu is set to 'All'. The table below lists various object types with their total counts, ungrouped counts, and the percentage of items linked to the cost estimate.

Object Type	Total Count	Ungrouped Count	Linked %
Beam			
Column			
Door	22	22	0%
Element Assembly			
Footing			
General	5	5	0%
Plate			
Railing			
Slab	19	19	0%
Space	178	178	0%
Stair			
Wall	333	333	0%
Wall (special)	8	8	0%
Window	20	20	0%

Selecting an object type from Model Browser's Overview tab will display their properties in the Properties palette.

- Identification	
⊕ Construction Type	<5 different values>
⊕ Layer	<2 different values>
⊕ Material	<5 different values>
⊕ Name	<15 different values>
- Dimension	
⊕ Height (TCM)	<8 different values>
⊕ Thickness (TCM)	<7 different values>
- Location	
Building, name	Sundsvall ALT4
⊕ Storey, name	<3 different values>
- Quantity	
⊕ Area, side, gross (IFC)	22276,108m2
⊕ Area, side, gross, average (TCM)	11171,237m2
⊕ Area, side, gross, larger (TCM)	11303,825m2
⊕ Area, side, gross, smaller (TCM)	11028,652m2

### Using the model filters

Model filters enable to limit the visual and data content to a certain building, section and/or storey. The filters are located in the ribbon's View tab. Selecting values will calculate the model again and modify the values, which user sees in the Model Browser palette.

### Groups Tab

Model Browser's Groups tab contains the objects groups, which have been created for quantity take-off purposes. Selecting a group will display its properties in the Properties palette.

The screenshot shows the 'Model Browser' window with the 'Groups' tab selected. The 'Object' dropdown is set to 'Object'. The main area shows a tree view of objects. The 'Wall' object is expanded, showing a table with the following data:

Name	Count
42A Ytterväggar.ALT3; solid fyllning 100	3
42A Ytterväggar.ALT3; solid fyllning 350	22
43C Innerväggar.ALT3; block, isolering 200	13
43C Innerväggar.ALT3; solid fyllning 100	11
43C Innerväggar.ALT3; solid fyllning 120	13
43C Innerväggar.ALT3; solid fyllning 200	271

## Modify the Columns

Columns in the Model Browser's groups tab can be shown or hidden using the table's popup menu.

1. Right click on top of the table
2. Select Columns item from the menu
3. Check columns which you want be visible in the table

## Organize the Information

Information in the Model Browser's groups tab can be organized hierarchically.

1. Select a column from the table
2. Drag and drop the column above the table
3. Repeat the process to other columns if needed
4. Information is displayed as a hierarchical tree

You can also return the columns into the table using a drag and drop.

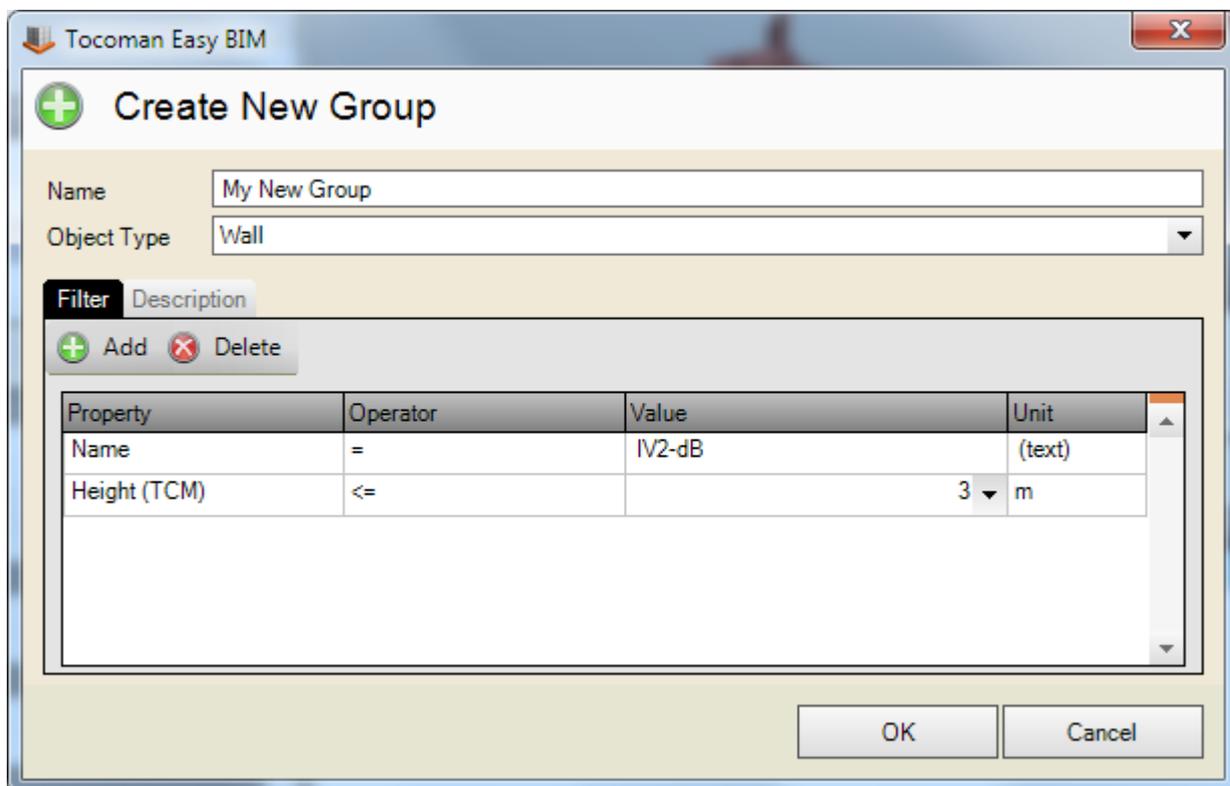
## Filter the Information

Information in the Model Browser's groups tab can be filtered using rules. Each column has a separate filter row, which enables to set the operator (equals, starts with etc.) and the value.

1. Select the operator
2. Enter the value
3. Only matching rows will be displayed

## Create Groups Manually

Create New Group tool enables user to create detailed object groups manually. User can select any number of criteria for the group's filter.



The process is following.

1. Click Add button (plus) in Model Browser's context tab (located in the ribbon)
2. Specify Name for the group
3. Select Object Type (e.g. wall)
4. Select Filter tab
5. Add properties and values into the filter
6. Click OK button

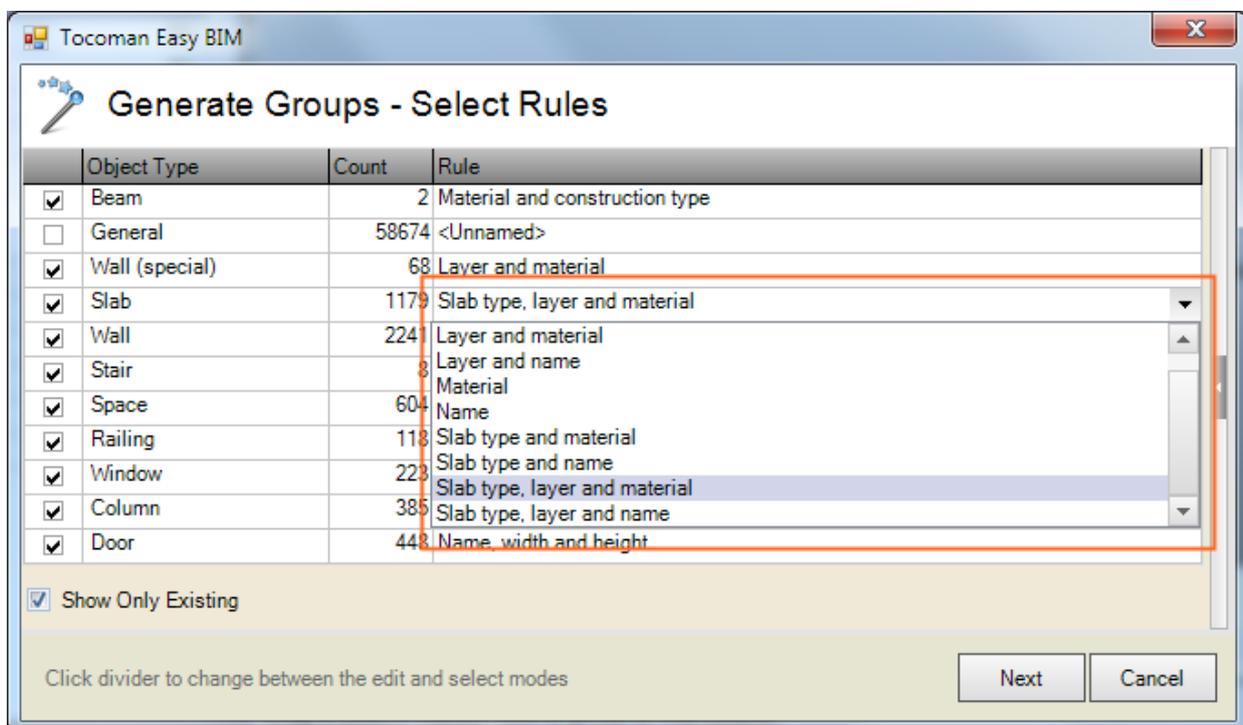
The new group will appear into the Model Browser palette.

## Generate Groups Automatically

Generate Groups tool enables user to create multiple groups at the same. They are created according a grouping rule set in the tool. The application contains predefined grouping rules for normal use cases, but user can also create his own rules. The rules are specific for an application, which was used to create the IFC file. Currently application supports this for ArchiCAD, Revit and Tekla. All other models use generic rules.

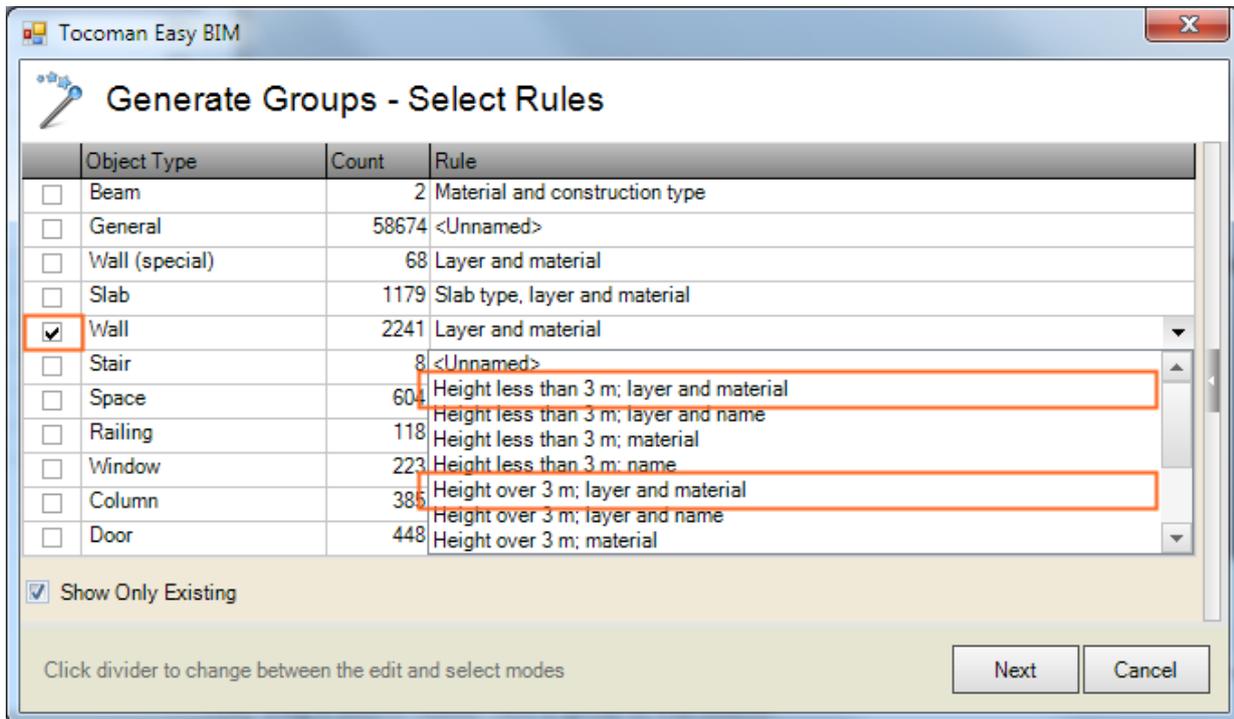
### Selecting Rules

The rules are specific to a certain object type and user can select one for each. The tool contains also a special rule called <Unnamed>, which will be available always. It can be used to store temporary rules, which user doesn't want be part of the list in the future.



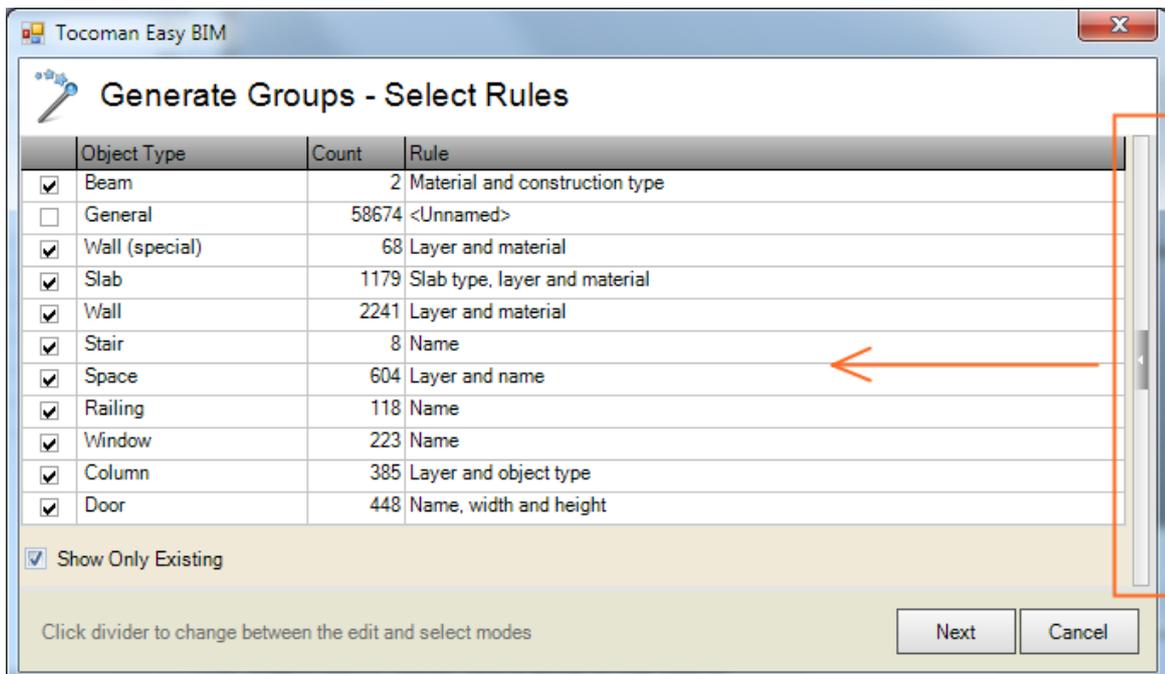
The user can control which object types are grouped using the check boxes in the table. Quite often it is required to group only single object type to which the application offers a shortcut. It can be located by right clicking on top of table and selecting it from the popup menu.

If user wants to group separately objects, which have certain property value, it can be done by using two grouping rules for the object type. In that case the user needs to run the tool twice and select a different rule each time. It isn't necessary to limit the grouping into a single object type, but it will make the process little bit faster especially with large models.

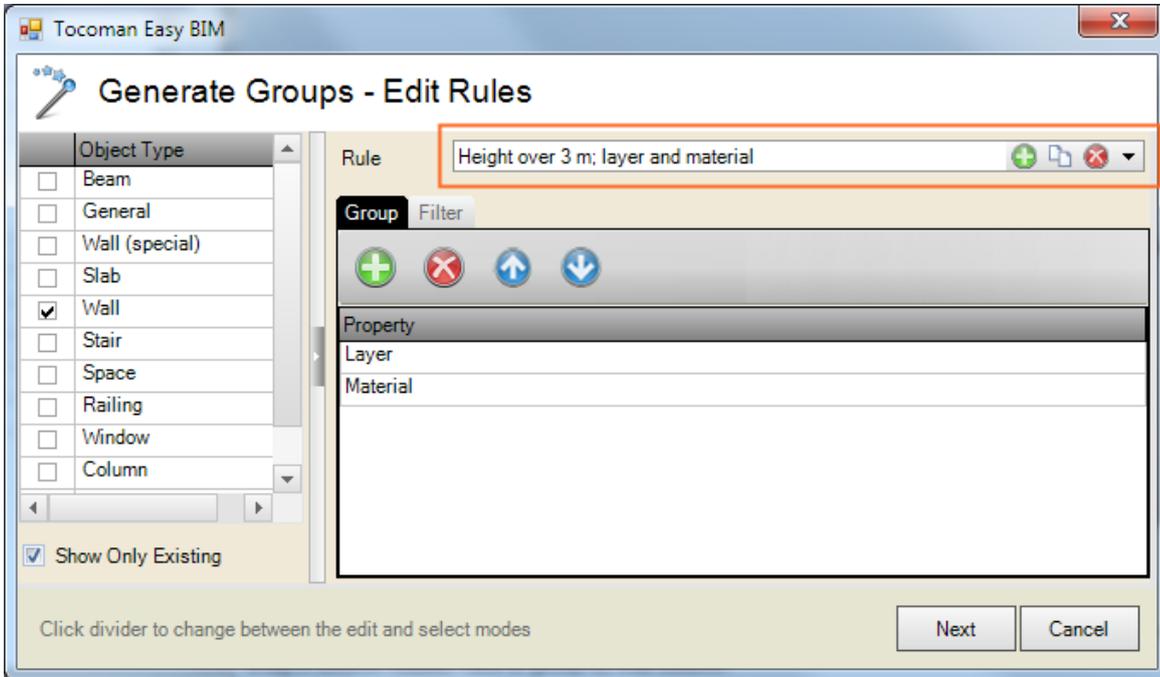


## Editing Rules

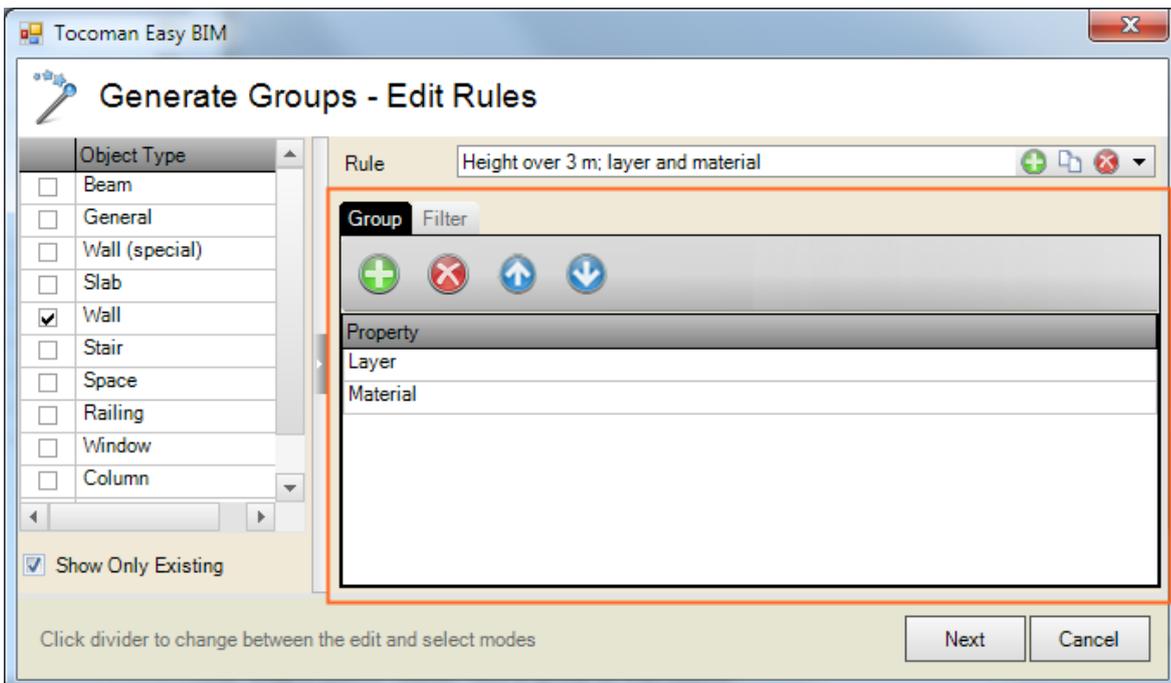
Editing mode can be opened using the divider. User can either click the button in the middle or drag the divider into correct location.



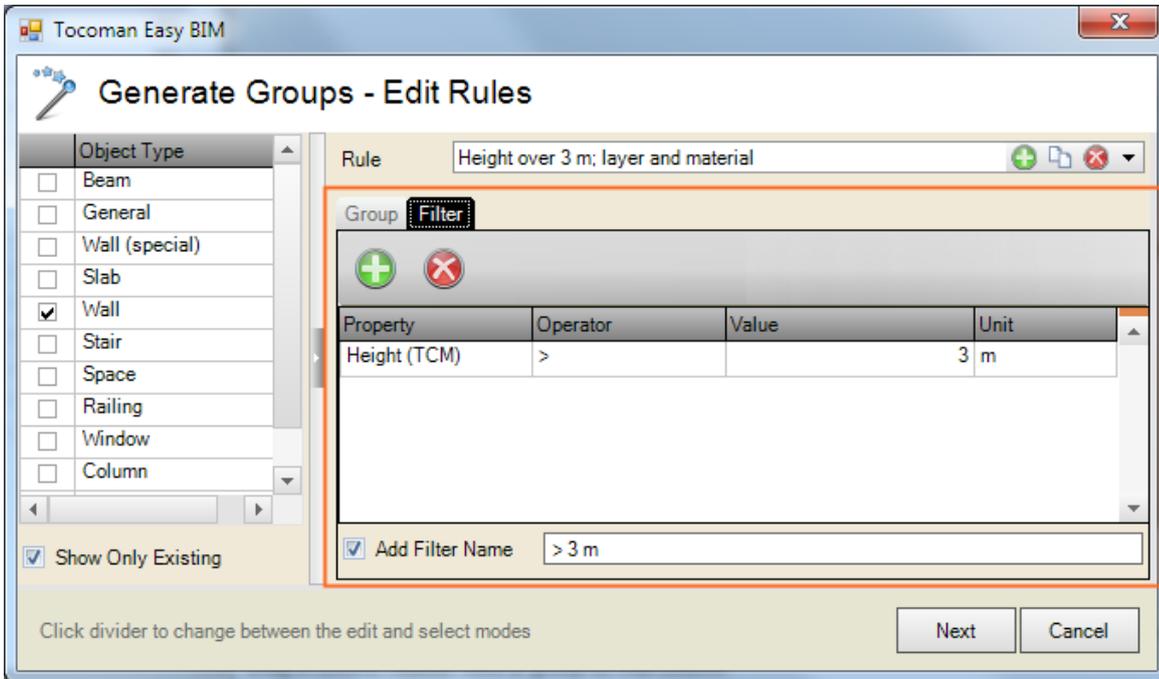
The rule is selected from the top of editing area. The selection tool also contains buttons for adding a rule, making copy of an existing rule or deleting a rule. Please notice that user cannot delete the <Unnamed> rule.



In the Group tab user can specify, which properties are used for the grouping. The order of the properties define how group's name is generated.

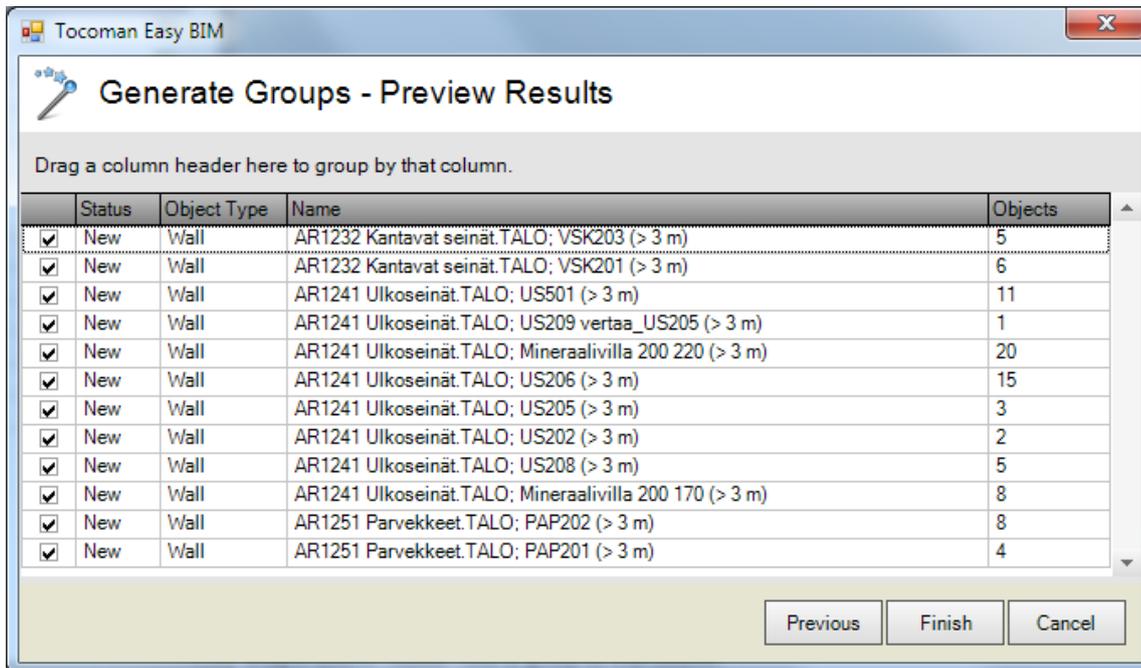


In the Filter tab user can limit the objects, which will be grouped according the rule. The filter works in the same way as in Create New Group tool. The only difference is that user can add information about the filter into group's name. This will be added into the end of the name in parenthesis.



## Preview Groups

Before groups are created, the tool displays a preview of the results. If the results contains groups, which already exist, they will be shown in the preview with a grey color and with status Existing. These groups are not created again. Only groups with status New will be created. The user can also remove certain groups from the results using the check boxes in the table.



### Using the model filters

Model filters enable to limit the visual and data content to a certain building, section and/or storey. The filters are located in the ribbon's View tab. Selecting values will calculate the model again and modify the values, which user sees in the Model Browser palette.

It is important to understand that model filters also affect the way, how groups are generated. The groups will be generated only based on the information limited by the model filter. This means that all construction types might not be part of the results. The application will warn the user, if he tries to create groups while a model filter is active.

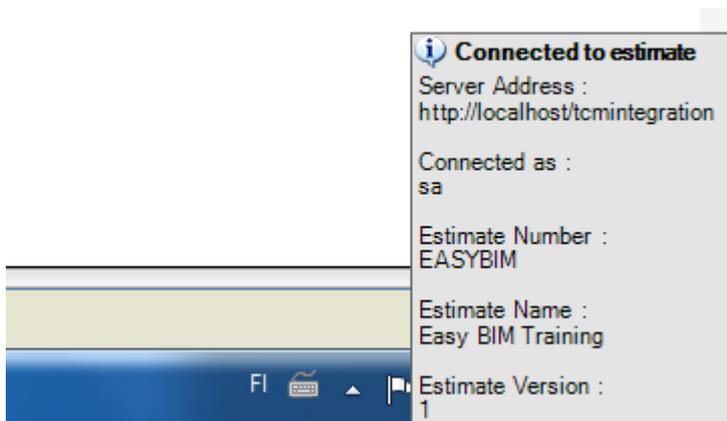
## Quantity Take-off

### Connect to Cost Estimate

The connection with a cost estimate can be established before or after you start to calculate quantities. The process is following in both cases.

1. Click Connect to Estimate button in Quantity Take-off's context tab (located in the ribbon)
2. Login into you Tocoman server
3. Select the cost estimate

The application will notify you after the connection is made. If the estimate contains building elements and components, they will be loaded into the building information model. User can always check the current connection from the lower right corner of the application.



## Changing the Cost Estimate

The ribbon also contains a button to change the model's connection to another cost estimate. After the connection is changed, the application will synchronize the estimating items between the building information model and the new cost estimate.

## Creating a New Building Element from the BIM

The process is following.

1. Select Overview tab from the Model Browser palette
2. Select an identification property from Properties palette
3. Press F2 button + drag and drop it to Quantity Take-off palette
4. Specify code, name and unit for the new building element

## Linking BIM to an Existing Building Element

The process is following.

1. Select Overview tab from the Model Browser palette
2. Select an identification property from Properties palette
3. Drag and drop it to a building element in Quantity Take-off palette

## Utilizing Groups for Linking

Groups can be used to create new building elements from BIM or link BIM to existing building elements. The process is similar to what is described above. The only difference is that the drag & drop is done from Model Browser's Groups tab instead of Properties palette.

## Modify the Columns

Columns in the Quantity Take-off palette can be shown or hidden using the table's popup menu.

1. Right click on top of the table
2. Select Columns item from the menu
3. Check columns which you want be visible in the table

## Organize the Information

Information in the Quantity Take-off palette can be organized hierarchically.

1. Select a column from the table
2. Drag and drop the column above the table
3. Repeat the process to other columns if needed
4. Information is displayed as a hierarchical tree

You can also return the columns into the table using a drag and drop.

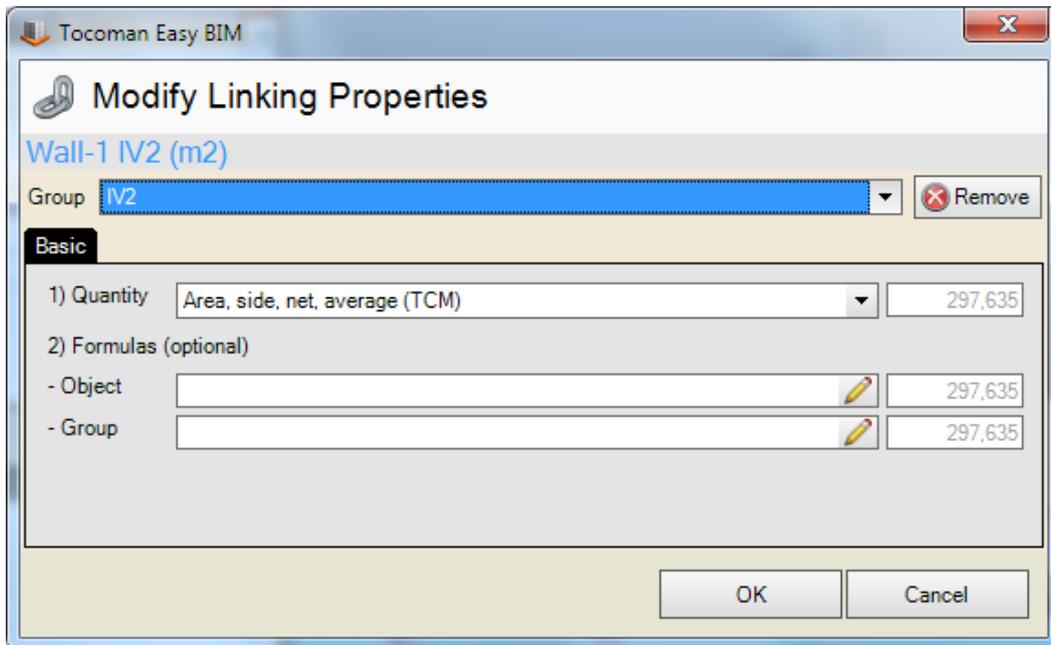
## Filter the Information

Information in the Quantity Take-off palette can be filtered using rules. Each column has a separate filter row, which enables to set the operator (equals, starts with etc.) and the value.

1. Select the operator
2. Enter the value
3. Only matching rows will be displayed

## Linking Properties

The application automatically specifies the most likely quantity based on the unit in the cost estimate. This information can be modified later e.g. by double clicking the building element in the Quantity Take-off palette. This will open the Linking Properties dialog.



Using the dialog, user can modify the property used as the quantity or adjust it using either object or group specific formulas. If building element is linked to multiple groups, then user can modify them separately or all at the same time using the Edit All button (not visible in the image above).

It is also possible to calculate quantities at the component level from the building model. This requires that the model is connected with a cost estimate containing building elements with components.

### Formulas

Following formulas can be used with the quantity take-off. The basic quantity is always "X". It is dependent on the property, which you select as the basis for the linking (Quantity selection in Linking Properties).

#### Basic

Operator	Description
+	Add - $X + 2 = 17$ , if $X = 15$
-	Decrease - $X - 2 = 13$ , if $X = 15$
*	Multiply - $X * 3 = 45$ , if $X = 15$
/	Divide - $X / 3 = 5$ , if $X = 15$

**Logical**

Operator	Description
IIF	Comparing values, IIF(rule;true;false) - IIF(X<20;0;1) = 0, X = 15 - IIF(X<20;0;1) = 1, X = 25
>	Larger than
>=	Larger or equal than
<	Smaller
<=	Smaller than or equal
=	Equals
<>	Different than
AND	Both rules need to be valid
OR	Either of the rules need to be valid

**Other**

Operator	Description
PI	Value of PI
SQR	Square root - SQR(X) = 2, if X = 4
MIN	Minimum value - MIN(X;1) = 1, if X = 2
MAX	Maximum value - MAX(X;1) = X, if X = 2

**Update Recipes**

If your cost estimate changes during the quantity take-off, the application enables user to update it. The contents can be updated using the Update Recipes button in Quantity Take-off's context tab (located in the ribbon).

Synchronization of the recipes manages following situations.

1. Building element and/or component has been added into the estimate
2. Building element and/or component has been removed from the estimate
3. Building element and/or component has different unit in the estimate

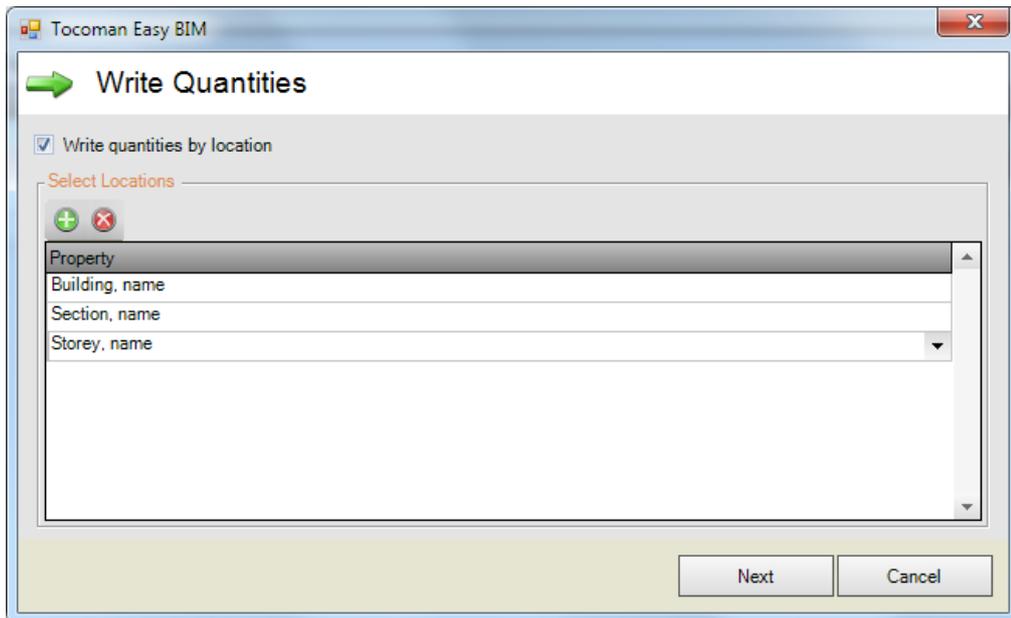
In case 1 the application simply adds the new item into the building information model. In cases 2 and 3 it is required to delete existing links to those building elements and/or components, which have been changed. The application will notify user about this.

**Write Quantities**

Quantities can be written either as the total value or divided by the location. If no locations are defined in the estimate, only the former option is available.

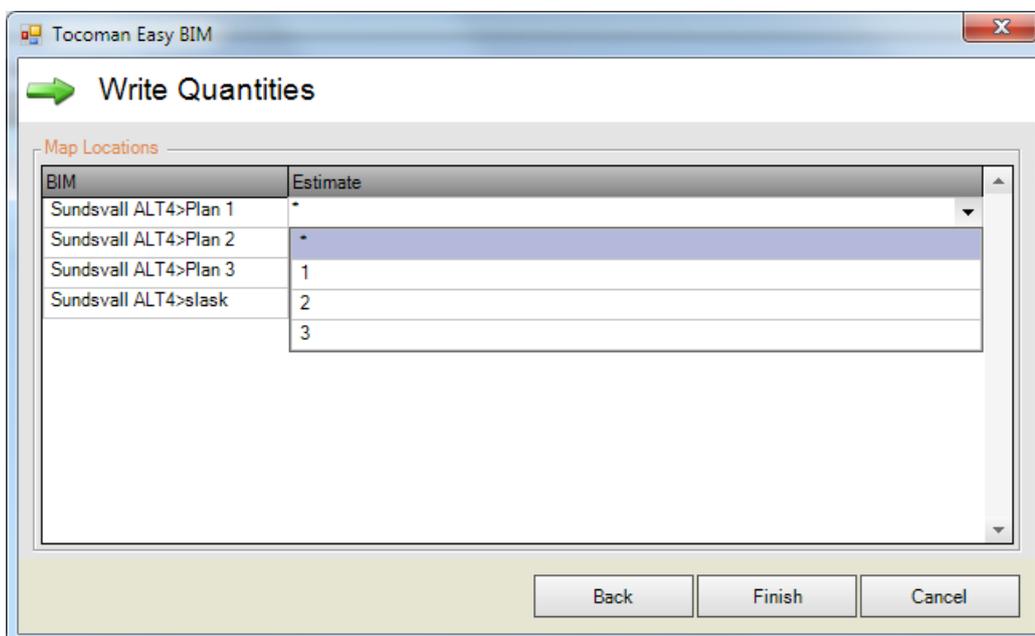
**Step 1**

User needs to select, if he wants to publish total quantities or divide them by location. If he chooses to divide them by location, then user needs to define those properties that are used as locations. The application will propose only those properties, which are suitable for the purpose. The user can decide, which properties will be used and what is the hierarchy between them.



## Step 2

The second step is to map values in the building information model with the locations in the cost estimate. These values might be different due to various reasons. These deviations can be managed easily using the mapping feature.

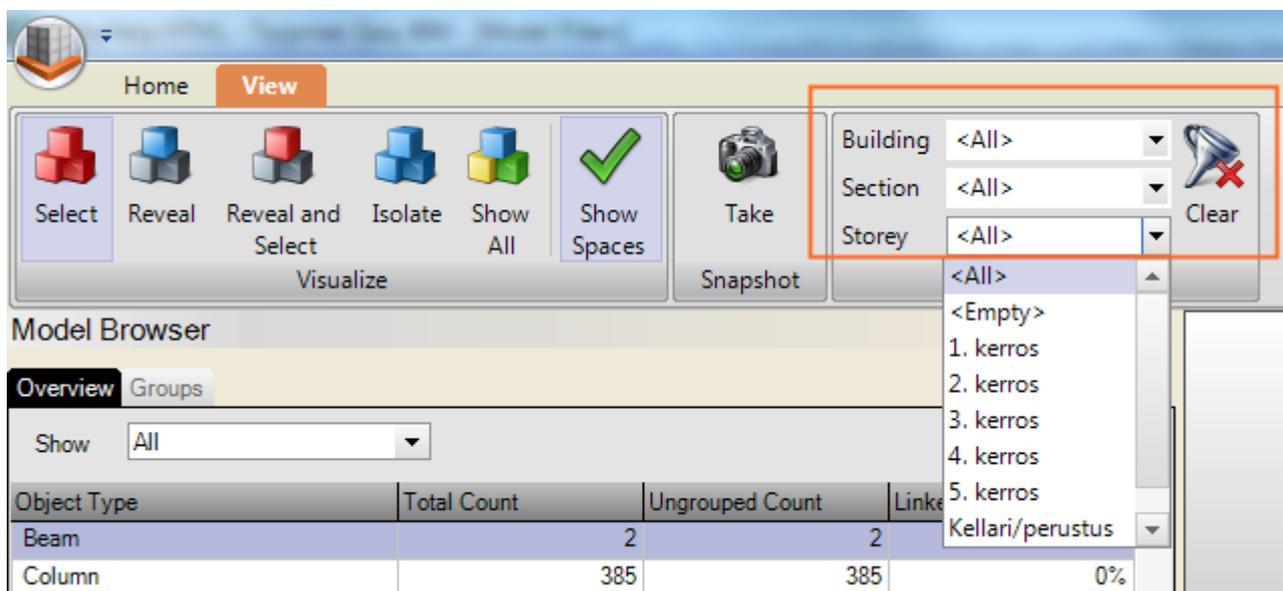


**Using the model filters**

Model filters enable to limit the visual and data content to a certain building, section and/or storey. The filters are located in the ribbon's View tab. Selecting values will calculate the model again and modify the values, which user sees in the Quantity Take-off palette. This re-calculation also affects the quantities, which will be written into the cost estimate. The application will warn the user, if he tries to write quantities while a model filter is active.

**Model Filters**

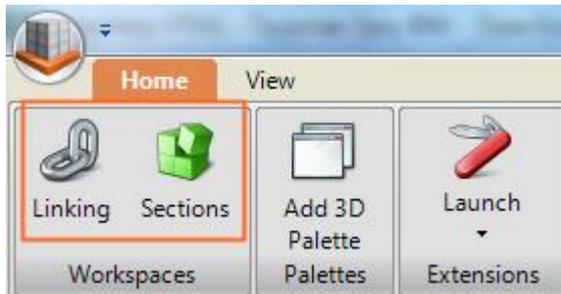
The application enables to limit the visual and data content according to the building, section and/or storey. This functionality is called Model Filters and they are located in ribbon's View tab.



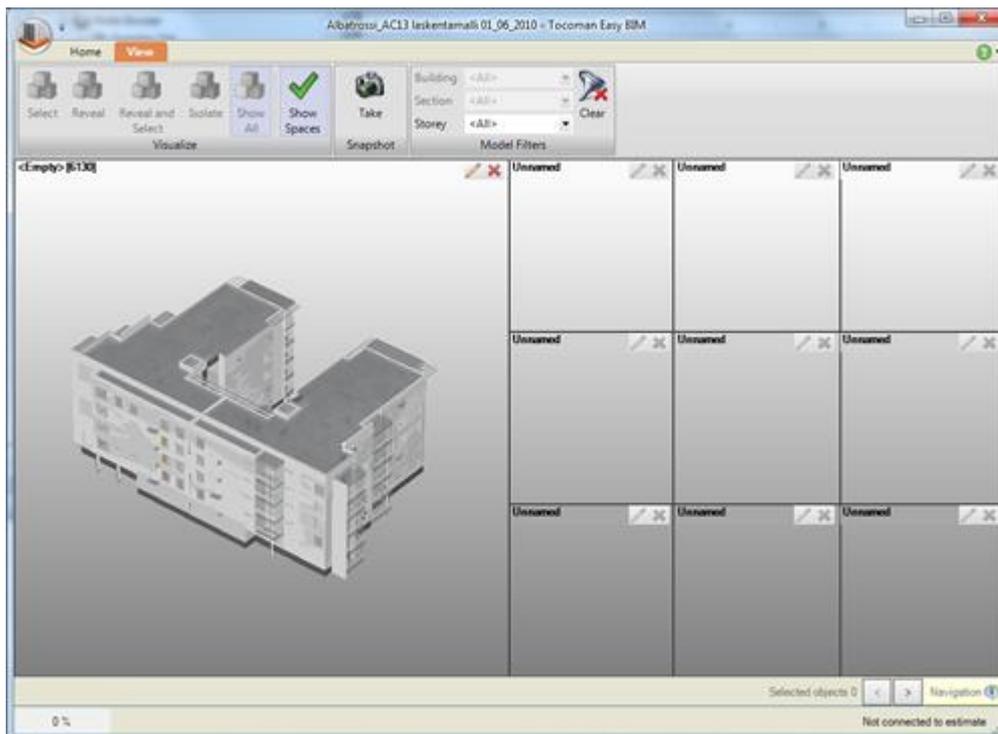
Information about the building and storey come directly from the IFC file. The section are defined in the application (read more). User can select a combination of building, section and storey information, which will be visualized in the 3D View. The information in Model Browser, Properties and Quantity Take-off palettes is updated in the same way.

## Specifying Sections

The application has two work spaces: linking and sections. The latter is used to specify the building sections. User can open it from ribbon's Home tab by selecting the Sections tool.



The Sections tool offers a user interface to divide the building into sections. It can be done either by selecting individual objects or selecting an area and then drag and dropping the selection into proper "bucket (building section)".



## Selecting Individual Objects

The process is following.

1. Select one or more objects
2. Drag and drop the objects into selected bucket / section

## Selecting Area

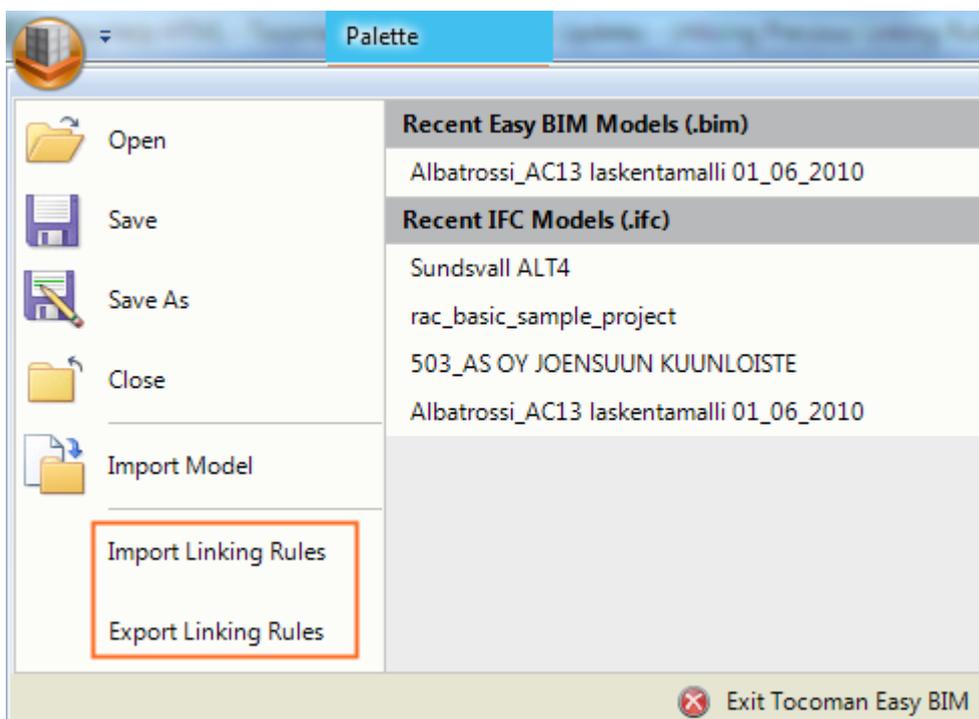
The process is following.

1. Press "A" to start the area selection
2. Select an area
3. Drag and drop the objects into selected bucket / section

## Model Updates

### Utilizing Previous Linking Rules

The application creates dynamic "calculation rules" (or "linking rules") while user is doing the quantity take-off. These rules can be used in multiple versions of the same model.



The process is following.

1. Export the rules from model version 1
2. Import the rules into model version 2
3. Check if new construction types have been added into the building design
4. Create links for the new construction types (if such have been added)
5. Update the quantities in your cost estimate

## Utilizing the Model Browser

Model Browser's Overview tab enables you to analyze only those objects, which are not already grouped. If you have an updated model version, this means objects that have changed since the last version, if you are using the same linking rules as before.

The feature is located in the upper left corner of the Overview tab.

The screenshot shows the 'Model Browser' window with the 'Overview' tab selected. A dropdown menu labeled 'Show' is set to 'Ungrouped'. Below it is a table with the following data:

Object Type	Total Count	Ungrouped Count	Linked %
Beam			
Column			
Door	22	0	0%
Element Assembly			
Footing			
General	5	5	0%
Plate			
Railing			
Slab	19	0	0%
Space	178	0	0%
Stair			
Wall	333	0	0%
Wall (special)	8	0	0%
Window	20	0	0%

If you use the Ungrouped feature, then the 3D View and Properties palette will show only objects, which have not been calculated. This enables user to easily identify, which objects are added between the model versions and update the quantity take-off accordingly.