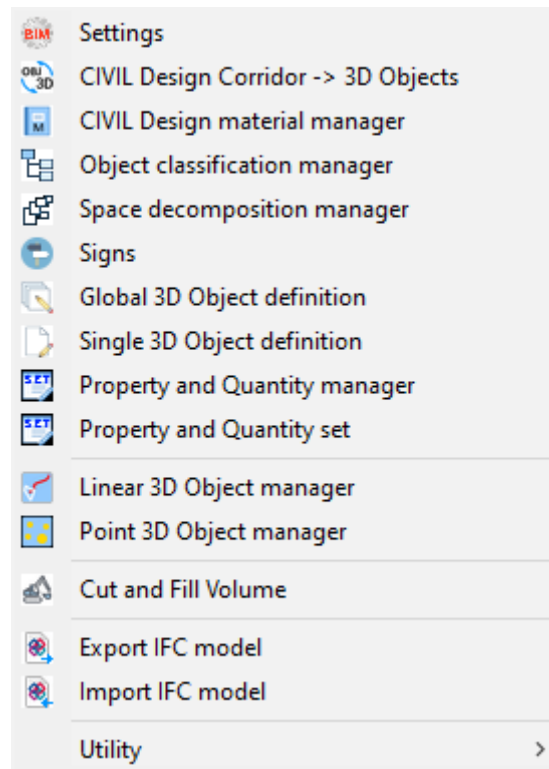


23. BIM

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23.1. BIM Menu

In the CIVIL Design menu, you can find the submenu of the BIM functions, as showed below:

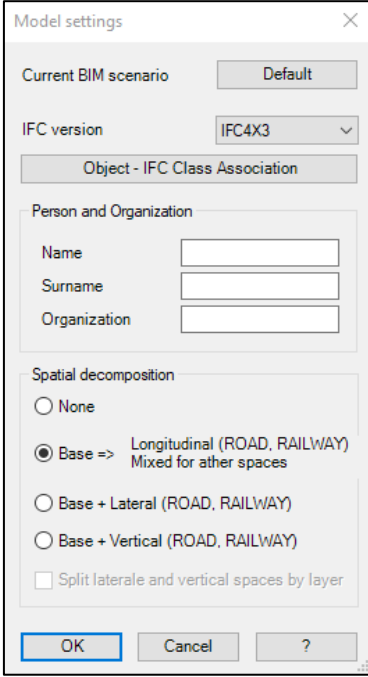


23.2. Settings (*cdbimset*)

The command allows to define general settings among the BIM functions.

Format: *cdbimset*

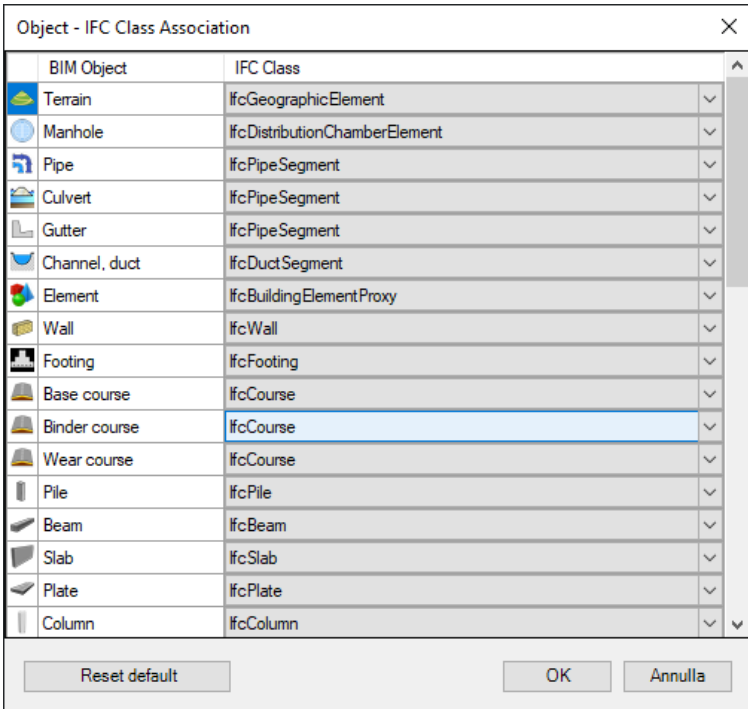
The command opens the following dialog:



The 'Model settings' dialog box contains the following elements:

- Current BIM scenario:** A button labeled 'Default'.
- IFC version:** A dropdown menu currently showing 'IFC4X3'.
- Object - IFC Class Association:** A button to open the association dialog.
- Person and Organization:** A section with three text input fields labeled 'Name', 'Surname', and 'Organization'.
- Spatial decomposition:** A section with four radio button options:
 - ☐ None
 - ☒ Base => Longitudinal (ROAD, RAILWAY)
Mixed for other spaces
 - ☐ Base + Lateral (ROAD, RAILWAY)
 - ☐ Base + Vertical (ROAD, RAILWAY)
- A checkbox labeled 'Split laterale and vertical spaces by layer' (disabled).
- Buttons:** 'OK', 'Cancel', and a help button '?'.

The user can select the IFC version to use in the model (IFC 4 or 4x3). Following this selection, you can customize the association among Objects and Classes by clicking on the button "Object – IFC Class Association". IFC version is always saved into working dwg file.



The 'Object - IFC Class Association' dialog box displays a table mapping BIM Objects to IFC Classes. The 'Binder course' row is highlighted.

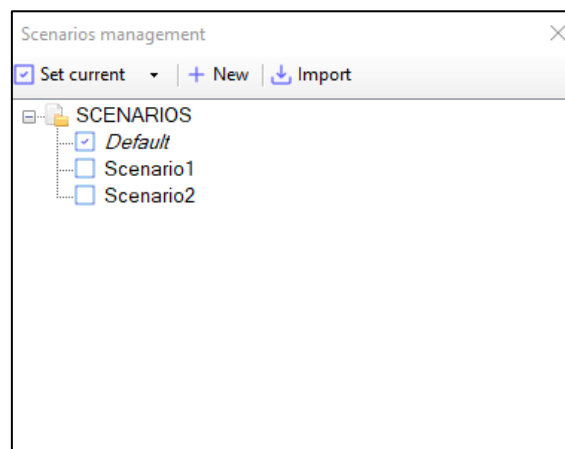
BIM Object	IFC Class
Terrain	IfcGeographicElement
Manhole	IfcDistributionChamberElement
Pipe	IfcPipeSegment
Culvert	IfcPipeSegment
Gutter	IfcPipeSegment
Channel, duct	IfcDuctSegment
Element	IfcBuildingElementProxy
Wall	IfcWall
Footing	IfcFooting
Base course	IfcCourse
Binder course	IfcCourse
Wear course	IfcCourse
Pile	IfcPile
Beam	IfcBeam
Slab	IfcSlab
Plate	IfcPlate
Column	IfcColumn

Buttons at the bottom: 'Reset default', 'OK', and 'Annulla'.

You can customize other information as Author, Organization and the level of spatial decomposition to use in the design with the following values: none, longitudinal, longitudinal + lateral or longitudinal + vertical. If you want to detail this concept, you can read about the command space management at paragraph 23.6. These informations are global for all projects.

The button at the top right allows you to define work scenarios other than the *Default* one. By scenario we mean the set of the following information of the BIM project:

- Object– IFC Class Association
- Materials
- Classifications
- Global Object Definition Styles
- Properties and Quantities



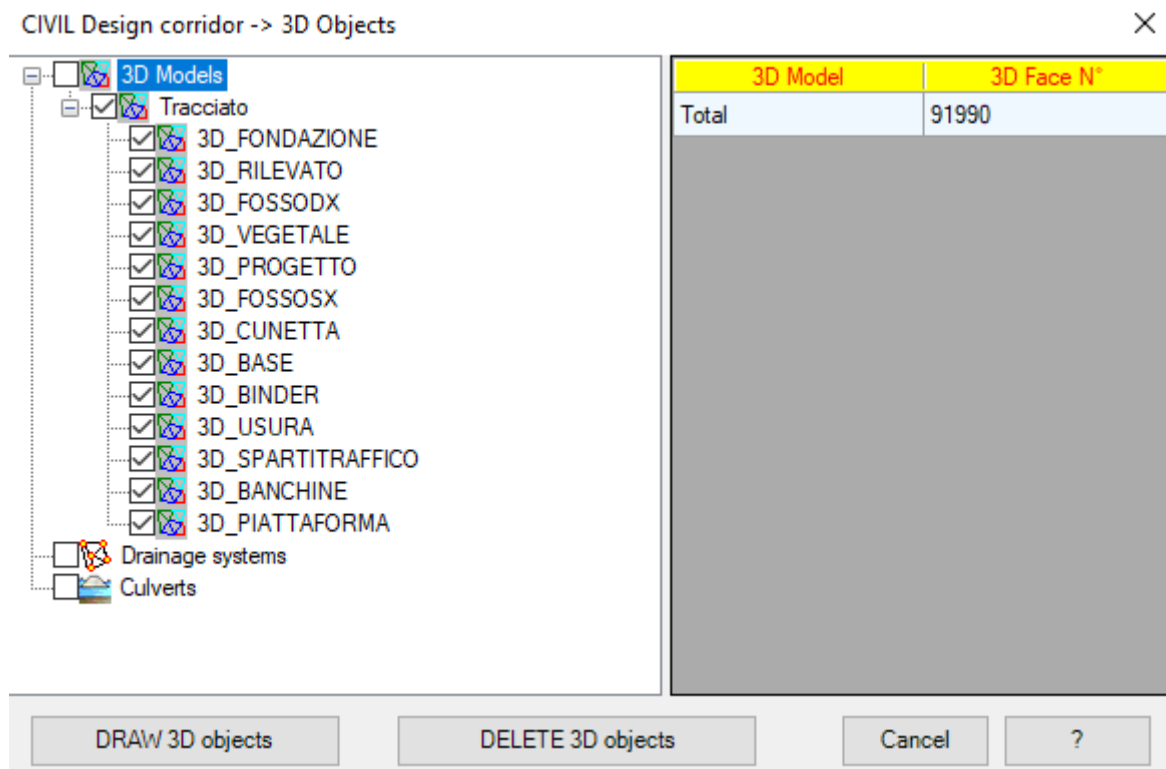
The "New" button allows the creation of a new scenario with the possibility of inheriting some characteristics from the *Default* scenario. To set a scenario as current, press the "Set current" button: other functions accessible from the button are the elimination and archiving of the scenario. An archived scenario can be shared with other users and imported with the "Import" button.

23.3. CIVIL Design Corridor -> 3D Objects command (cd3dobj)

The command creates BIM objects starting from objects created by the command Automatic Design Planimetry (3DSEZAUT). If the command finds closed surfaces, it creates 3D Solids, otherwise it creates Mesh surfaces.

Format: CD3DOBJ

Initially, the command shows a dialog with an information Tree containing the draw entities which can be transformed in 3D solids/surfaces.



You will see the alignments which contain elements inside layers with prefix 3D_, the drainage systems created by the commands of the solution Sewerage system, drainage systems and culverts. Selecting one item in the information tree, in the right side of the dialog, you can view the details of the corresponding objects in the drawing.

With the button "DRAW 3D Objects" you start the creation of the 3D solid elements and of the meshes ticked in the information tree.

The button "DELETE 3D Objects" allows to delete 3D solids and meshes created in a previous run of the creation command.

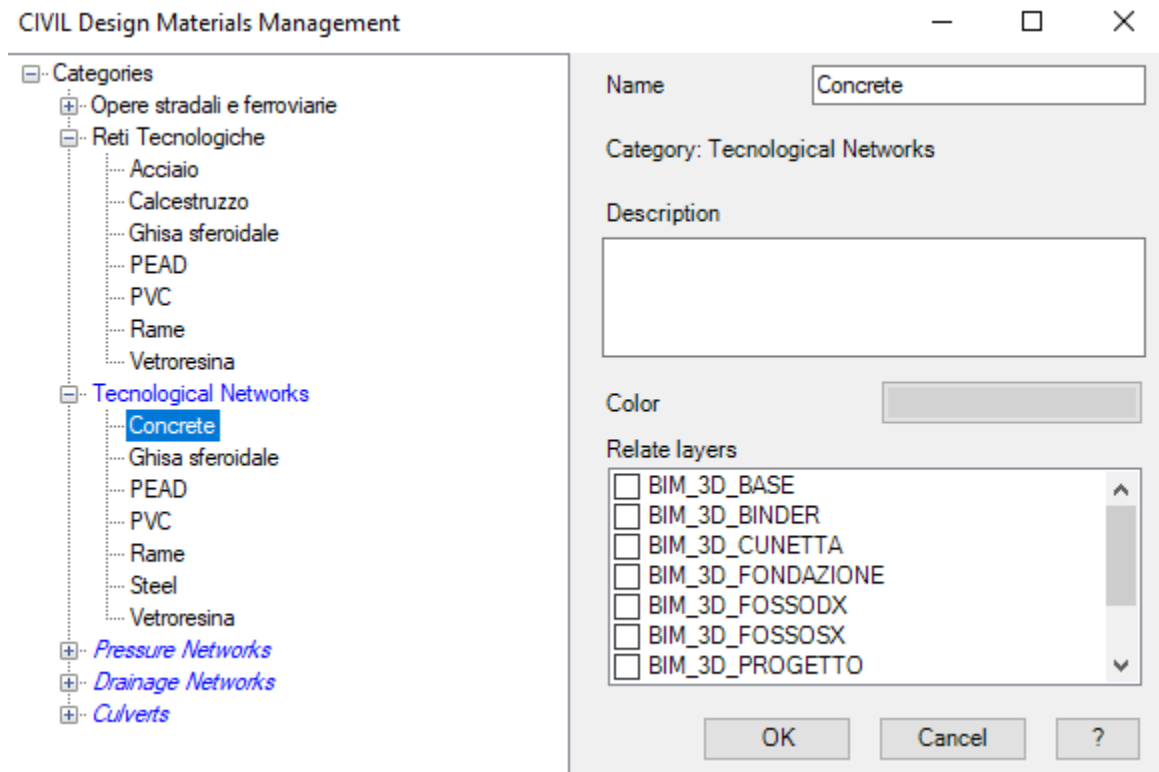
Layers of the created 3D objects:

- For the objects created from layers with prefix 3D_, they will be created in layers with the same name but with the prefix BIM_
- For the objects of drainage systems, they will be created in layers with prefix BIM_SEWER3D-NetName.
- For culverts, the 3D objects will be created in layers with prefix BIM_CULVER3D.

23.4. CIVIL Design material manager command (*cdbimmat*)

The command allows the management of the materials linkable to objects with a subdivision in categories.

Format: CDBIMMAT



From the tree in the left side, with right mouse button, you can add/delete materials and categories. The categories shown in italic, associated with hydraulic elements, are not modifiable because its materials are managed by specific commands of the hydraulic design.

A material is defined by a name, a description and a colour, customizable from the user. Moreover you can associate a layer set to every material and the program can associate automatically the objects in the layer set with that material.

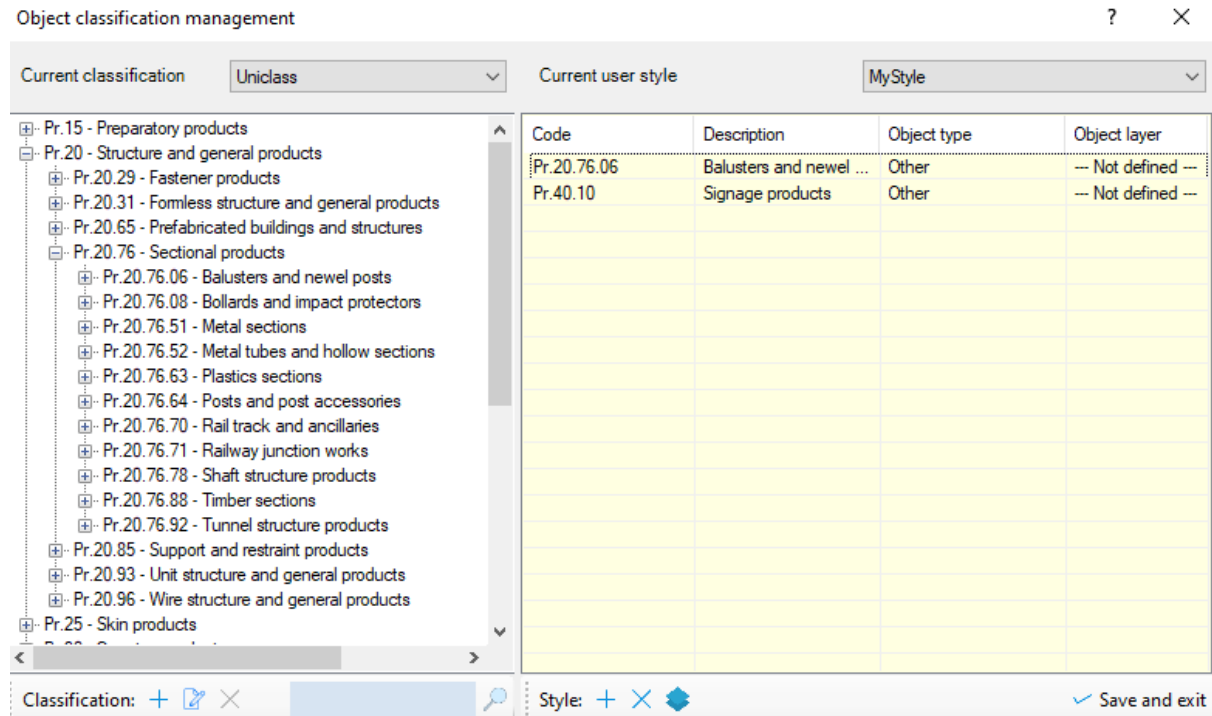
With the right mouse button on a material instance, you can add the material to the material archive of the current dwg. The user can decide later if he wants to define the 3D objects with the materials of CIVIL Design or with the CAD materials: in reading the BIM objects the program shall give precedence to the eventual CAD material and then to CIVIL Design one.

By the button Property you can open a dialog which allows to define the properties of the selected material; every property set is formed by a list of elements composed with name, unit, type and value, definable by the user. At first run of the command, the program creates a default property set. Later, for every material, you can modify the property set, delete it or create other property sets

23.5. Object classification manager command (*cdbimclass*)

The command allows to create classification styles beginning from other general classifications.

Format: CDBIMCLASS



The installed classifications in CIVIL Design are two: UNICLASS and OMNICLASS from UK and USA. When you want to use a classification, you need to define a style of classification with a set of classification items for objects used in the project that you want to develop. Initially you have to select a classification and then:

- Click on button “+” of the style to create a new style.
- Find the classification item in the left tree, with the eventual help of the search bar below. Then you can drag the selected item from the tree to the right side yellow table.
- In the row table, select the object type for the selected item and the layer from the drawing which will contain the objects of that type.

At the end of the creation process for a customized style, click on the button Save and exit.

If you need to use a classification different from UNICLASS and OMNICLASS, you can create your base classification. Click on the button "+" of the Classification bar and the program will show a dialog which allows to insert general data of classifications (name, description, source, ...) and requests a text file with the items of the classification. In the same dialog you can read how to format the text file for the classification.

Add new classification



Name	<input type="text"/>
Description	<input type="text"/>
Source	<input type="text"/>
Edition	<input type="text"/>
Edition date	<input type="text"/>
Web site	<input type="text"/>

TXT classification file

The file must contain for each line the code and the description of the product separated by the tab symbol.
To obtain this file, just fill in two columns of an Excel sheet, copy and paste them in the notepad and save the TXT file.

The code must be of an alphanumeric type, it must start with a macro-category that is common to all the elements and must have the character "." as a separator of the sub-categories. Example:

```
Pr.15      Category1
Pr.15.1    Subcategory1
Pr.15.1.1  Product1
Pr.15.1.2  Product2
.....
```

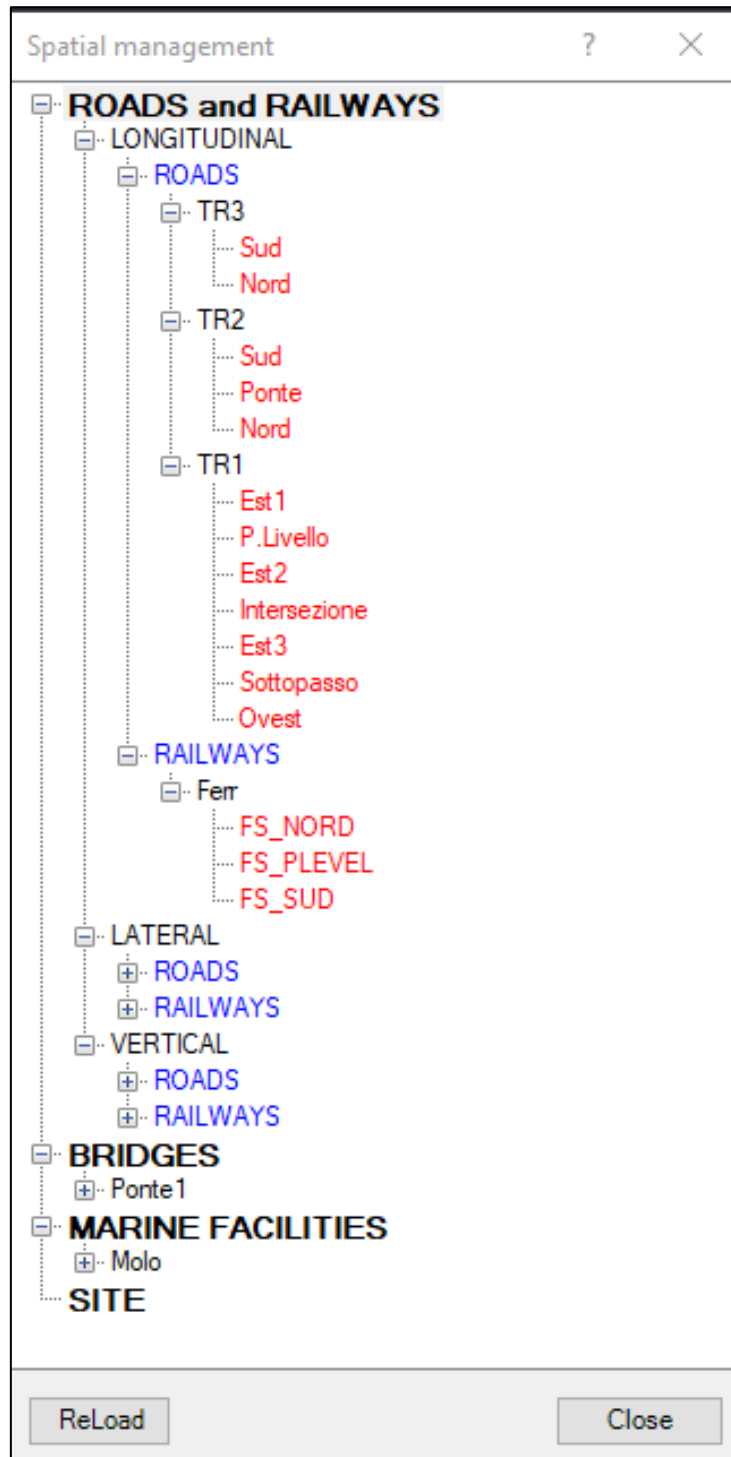
No file selected

23.6. Space decomposition manager (*cdbimspaces*)

The command allows the spatial subdivision of a 3D Infrastructure (Road or Railway) following the spatial subdivision defined in IFC version 4.3

Format: `cdbimspaces`

The command opens a modeless dialog which allows the interaction between the user and the drawing.



The main tree is subdivided in ROADS and RAILWAYS, BRIDGES, MARINE FACILITIES, SITE. In the node ROADS and RAILWAYS you can see the three decompositions LONGITUDINAL, LATERAL (Longitudinal + Lateral) and VERTICAL (Longitudinal + Vertical).

23.6.1. Longitudinal Subdivision

Inside the subdivision LONGITUDINAL there is the list of alignments contained in the drawing. Before to keep on, the user should define the longitudinal spaces; this operation is executed by the command "Alignments -> Controlled 2D/3D Corridor Design" (CD3DSA). Starting the command for the alignment TR1, in the card CENTRAL SECTION you can define the longitudinal spaces with decision based on stations (chainages).

It will be necessary to assign a unique name to every space and to set the space type among those current. The next image shows the subdivision. You can note that the same subdivision is present also in the previous image for the alignment TR1.

Controlled Corridor Design/3D Model

ALIGNMENT

- Name = TR1
- Start chain. = 0.0000
- End chain. = 682.1696
- Progetto 2D/3D
 - Impostazioni Disegno
 - Central section
 - Edge elements
 - Automatic grading extension
 - Custom variables
 - 3D Point Object

Drawing settings

Discretization step [m]	1.0000
Max. distance for model intersection searching [m]	35.0000
Ground model type	DTM
Draw 2D corridor design	<input type="checkbox"/>
Draw 3D Model	<input checked="" type="checkbox"/>
Draw 3D Polyline	<input type="checkbox"/>
Draw section frames	<input type="checkbox"/>

LEFT GRADING LEFT EDGE EL. **CENTRAL SECTION** RIGHT EDGE EL. RIGHT GRADING

Chainage [m]	CD-T section template block	Longitudinal space name (BIM)	Longitudinal space type (BIM)	Block source
0.0000	CARR_SING_SOLID	Est1	ROADSEGMENT	Current draw
16.3205	CARR_SING_SOLID	P. Livello	RAILWAYCROSSING	Current draw
24.5148	CARR_SING_SOLID	Est2	ROADSEGMENT	Current draw
73.2752	CARR_SING_SOLID	Intersezione	INTERSECTION	Current draw
88.3477	CARR_SING_SOLID	Est3	ROADSEGMENT	Current draw
300.0000	CARR_SING_SOLID	Sottopasso	ROADSEGMENT	Current draw
350.0000	CARR_SING_SOLID	Ovest	ROADSEGMENT	Current draw
682.1696				Current draw
*				

Load Section Template block... Export Import Save and Exit OK Cancel

By selecting the node LONGITUDINAL you will see, below in the same dialog, an information control explaining how to operate in this subdivision. For instance, an important function is to move 3D objects from a space to another one by the operation of Drag&Drop.

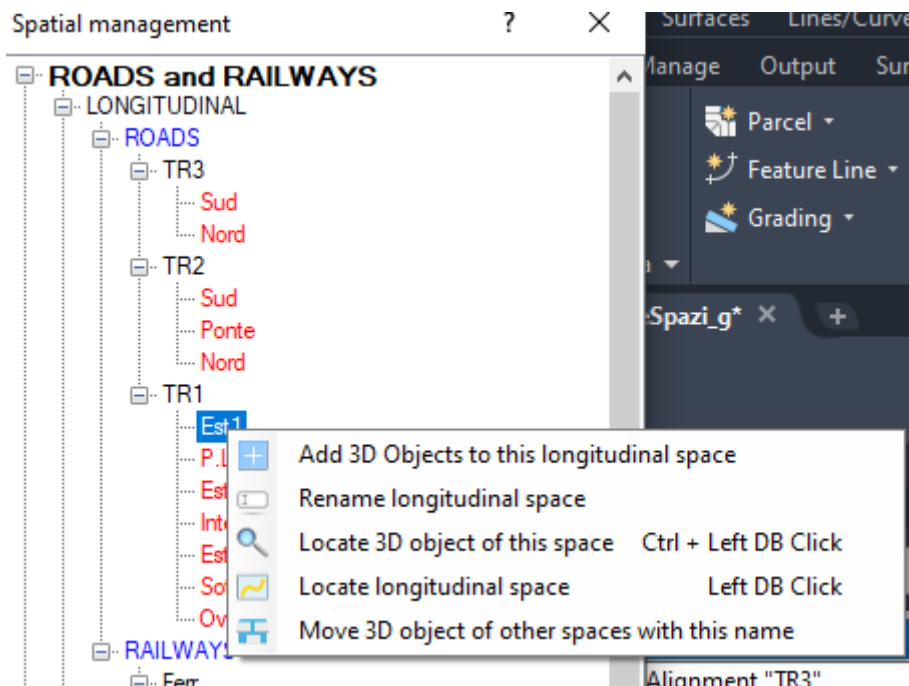
Instead, by moving to a longitudinal space, you will see an information table with data about this space. For instance, by selecting the space "Intersection" of the alignment TR1 you will see, below in the same dialog, the following information:

Space name	Intersezione
Space type	INTERSECTION
Start Chain. [m]	73.275
End Chain. [m]	88.348
Objects 3D Num.	14
Interference	...

The space between its initial and final station represents an INTERSECTION, it contains 14 objects and clicking on the three points in the row Interference you will see that this space Interferes with the alignment TR3 and an Interference type with value "Crosses".

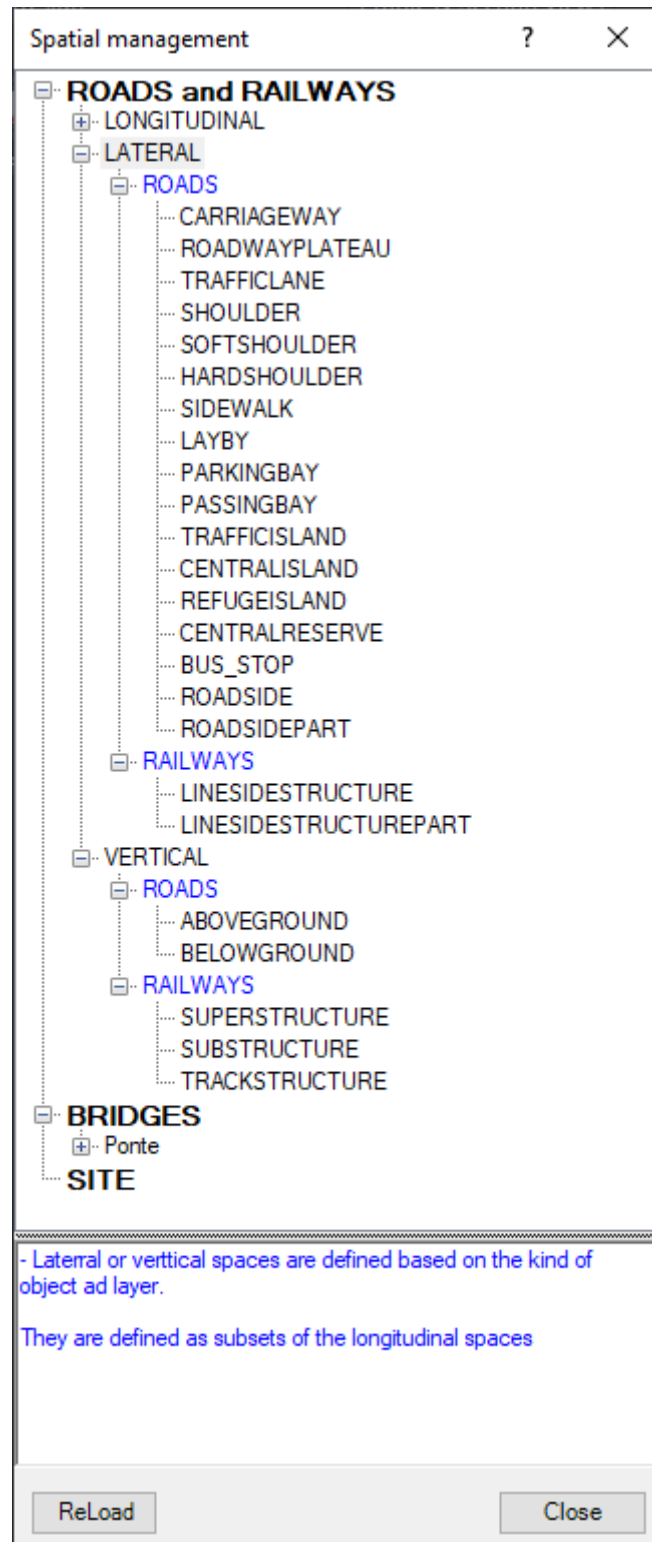
Interferes with space	TR3
Interference type	Crosses
OK	Cancel

All these informations are inserted by the user when he defines the space with the command tools. By building the 3D model with the command "Alignments -> Controlled 2D/3D Corridor Design", the objects are automatically assigned to the relevant space. Further functions are present in the single longitudinal/lateral/vertical space by using the contextual menu (for instance select the LONGITUDINAL > ROADS > TR1 > Est1 space with the mouse right button):

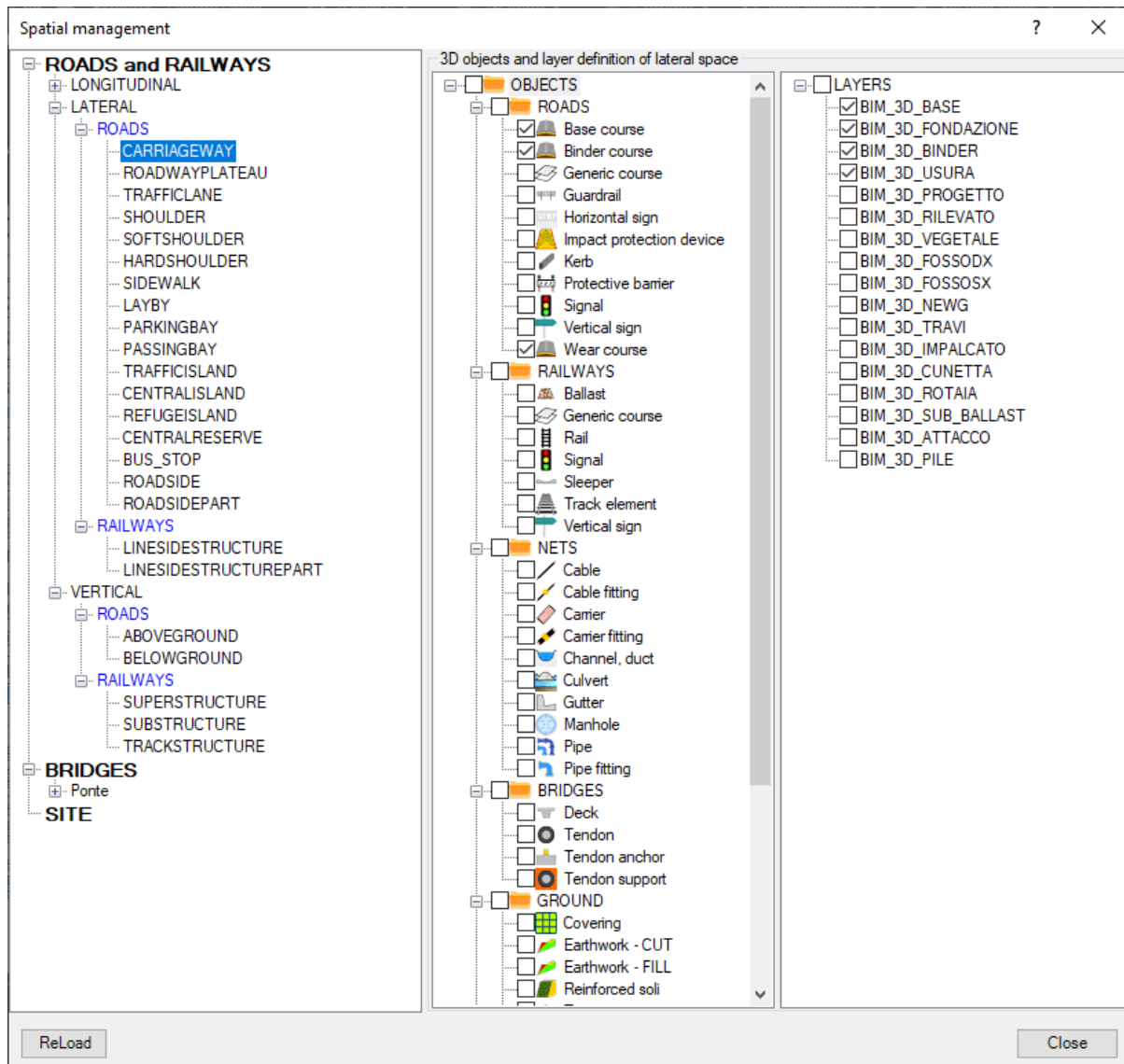


23.6.2. Lateral or Vertical Subdivision

By seeing the data tree till the bottom we find other types of spatial subdivision. The subdivision Lateral or that vertical are added as subgroup of longitudinal subdivision with selection based on object type and its layer.



Based on the subdivision type and on the infrastructure type (road or railway), the space names are predefined and fixed by the IFC standard. By selecting a space, the dialog becomes wider and allows to associate objects and layers, as shown in the following figure.



For instance, in the space type CARRIAGEWAY are inserted the objects Base course, Binder course, Wear course which are in the layers BIM_3D_BASE, BIM_3D_FONDAZIONE, BIM_3D_BINDER, BIM_3D_USURA.

The user can customize the different space types by defining, for each space, objects and layers. Remember that it doesn't exist any lateral or vertical subdivision without that longitudinal.

In order that the spatial decomposition could be exported correctly following the IFC standard, you need to set it by the command Settings in BIM submenu

23.6.3. Other Spaces

The command CDBIMSPACES includes three other spaces. The spaces BRIDGES and MARINE FACILITIES where the user can add the structure by assigning to it a name and insert the relevant 3D objects. These spaces are not linked with alignments and decomposition can be mixed (longitudinal, lateral, vertical and region)

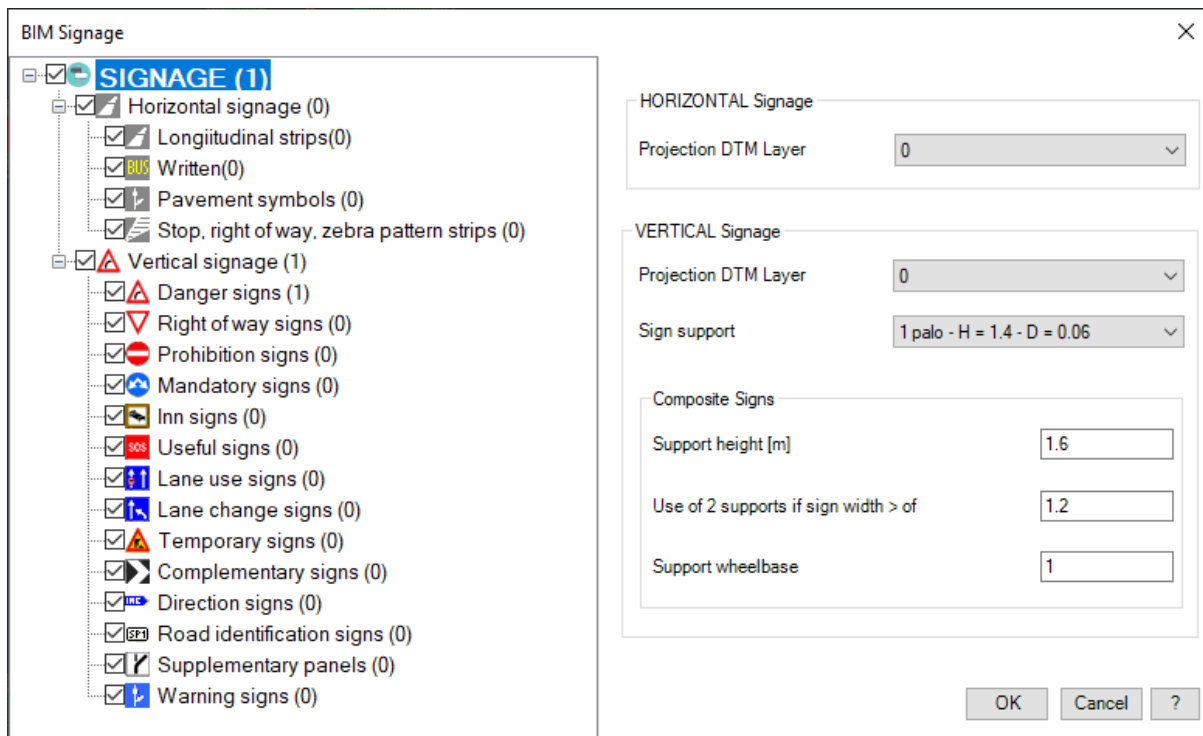
At last the space SITE where there is a list with all objects not belonging to any other space and not spatial decomposed.

23.7. Signs (*cdbimsign*)

The command allows to create 3D objects for road signs starting from 2D signs created by the module add-on "Road Signs" of CIVIL Design.

Format: *cdbimsign*

The command requests the selection of the 2D horizontal and/or vertical signage. After, the program opens the following dialog:



In the left tree you can see the number and the type of the selected signs. By the check controls you can exclude signs from the creation of 3D matching objects.

In the right part of the dialog, you should set the digital models for the projection of horizontal and vertical signage. In the case of the vertical signs, you should specify also the support type.

If the user has created the 2D support for the vertical signage, the 3D sign will be created in the planimetric position of this support, otherwise the reference point will be those used as insertion point of the sign. The Z coordinate of the insertion is calculated by projecting the point on the selected DTM.

You should set more settings for modular warning signals.

By clicking the button Ok the program will start the phase of 3D object creation. The duration of this operation depends on the number and type of selected signs. The horizontal signage uses more time to be transformed in 3D objects.

For the vertical signs that include texts customizable by the user, so that these texts could be transformed in 3D objects, you need to use the command "Modify entity > Explode text/Block attributes" (CDTXTEXP). it is recommended to perform a near zoom on the 2D sign and then to proceed with the command execution which will request the selection.

The obtained signage will be placed in layers whose names have prefix BIM_SIGN_ and will ready to be exported in the IFC standard.

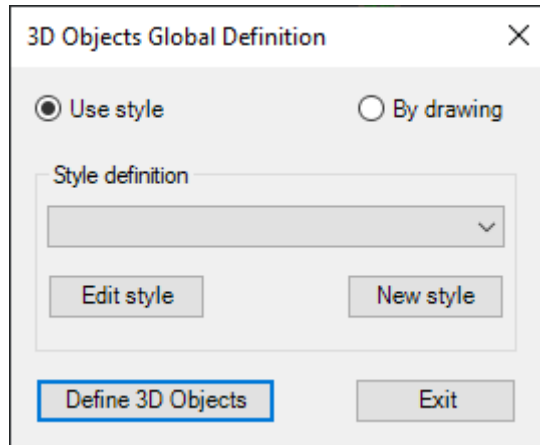
1

23.8. Global 3D Object definition command (*cddef3dobjs*)

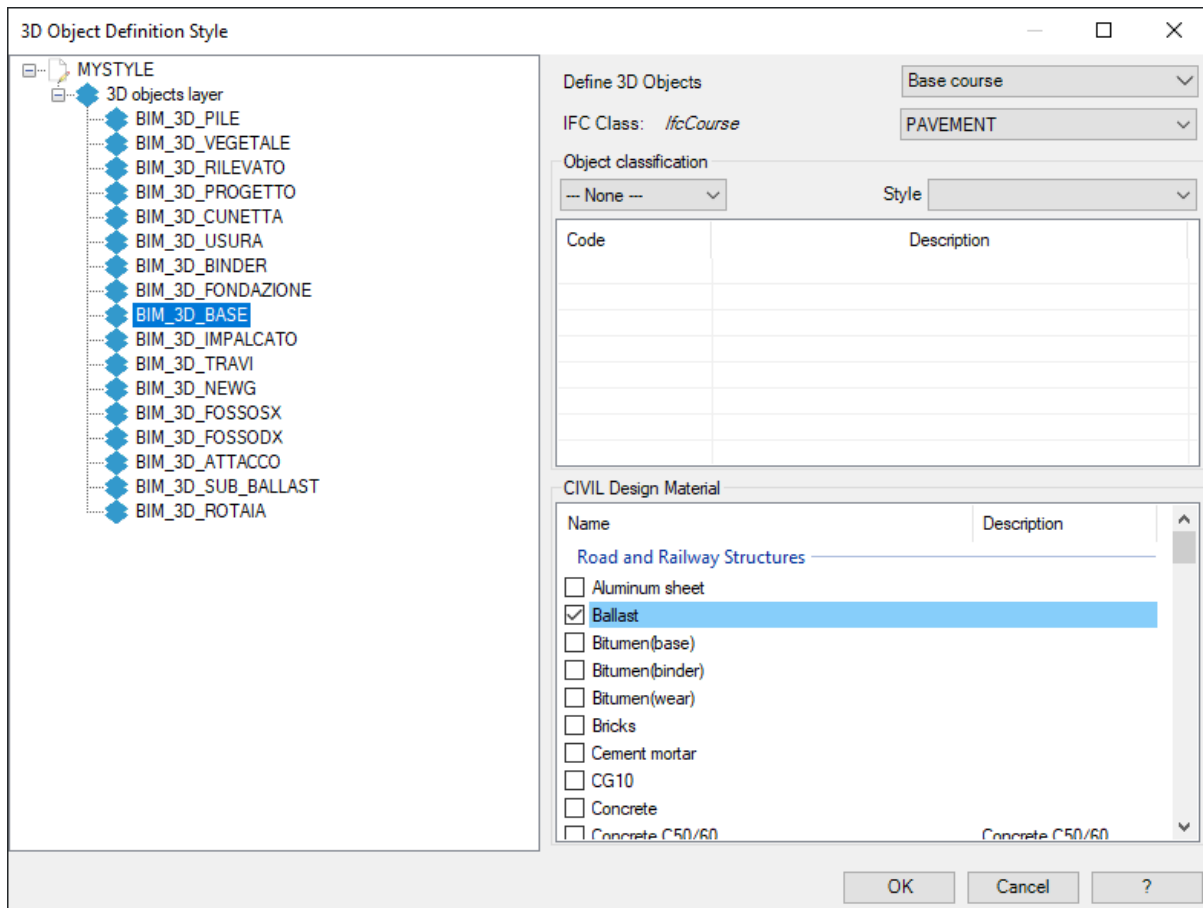
The command allows to define typology, material and classification of the BIM objects contained in a layer.

Format: *CDDEF3DOBJs*
Select 3D objects: *All(Enter) / Partial(P):*

The command opens the following dialog:



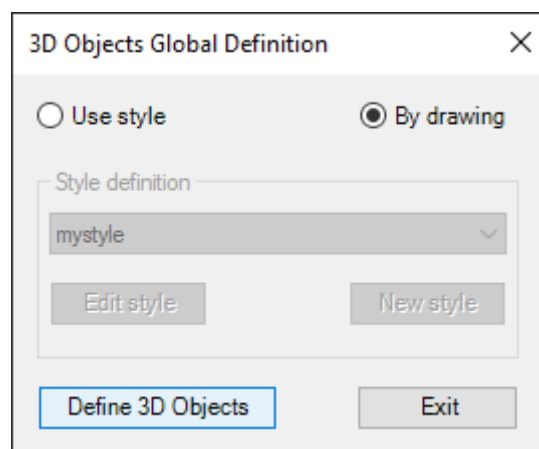
The definition can be executed in two ways: by using a style previously created and set up or by using the drawing, with the manual setting the information for each BIM layer. In the thirist case, "Use style", you should Select a style already defined (for instance mystyle created with New style button) and click the button "Edit style" which will open the following dialog:



The left side tree lists all the layers containing 3D objects. For every layer the program tries to associate automatically the object type, the code of the current classification and the material, all based on the settings of the previous commands. Anyway, the user can modify the present settings of the layer by changing the product classification and the material.

If you exit from the dialog with Ok, the changes will be stored in its style. If you want to apply these settings to the drawing objects, you should click on the button "Define 3D Objects".

If you use the definition "By drawing", as in the following figure



With click on the button "Define 3D Objects" you obtain the same setting dialog previously showed and if you exit with Ok, the data will be saved directly on every object in the drawing.

23.9. Single 3D Object definition command (*cddef3dobj*)

The command requests to select a 3D solid or a mesh surface and allows to associate an object type, a classification and a material to the selected element and other geometric parameters.

Format: *CDDEF3DOBJ*

Select a 3D solid or a Mesh:

Single 3D object definition

Define 3D object: Ballast

IFC Class: IfcCourse BALLASTBED

Object classification: OmniClass Style: Ferrovia_omniclass

Code	Description
<input type="checkbox"/> 23.39.15.15.1...	Railway Traction Line Pylons
<input type="checkbox"/> 23.39.15.11.13	Railway Rails
<input checked="" type="checkbox"/> 23.39.15.13	Railway Platform Components
<input type="checkbox"/> 23.13.31.11	Structural Concrete
<input type="checkbox"/> 23.39.15.21.13	Railway Sleeper Cars
<input type="checkbox"/> 23.11.21.21.15	Channels

CIVIL Design Material

Name	Description
Opere stradali e ferroviarie	
<input type="checkbox"/> Acciaio	
<input type="checkbox"/> Acciaio zincato	
<input type="checkbox"/> Argilla trattata	
<input type="checkbox"/> Asfalto stampato	
<input checked="" type="checkbox"/> Ballast	
<input type="checkbox"/> Bitume modificato	
<input type="checkbox"/> Bitume tradizionale	
<input type="checkbox"/> Bitume(base)	

Length: 0.000

Area: 874.038

Volume: 1,360.062

Reference alignment: TR1

☒ Export reference into IFC

Extend definition to other 3D objects: Not extend

OK Cancel ?

The command allows to assign the definition, or to modify it, for a single object.

Besides the data about classification and material, you can set an object length and eventually its reference in an alignment.

Area and volume are directly calculated by the solid or by the mesh.

The object definition can be extended to other 3D objects, following different ways:

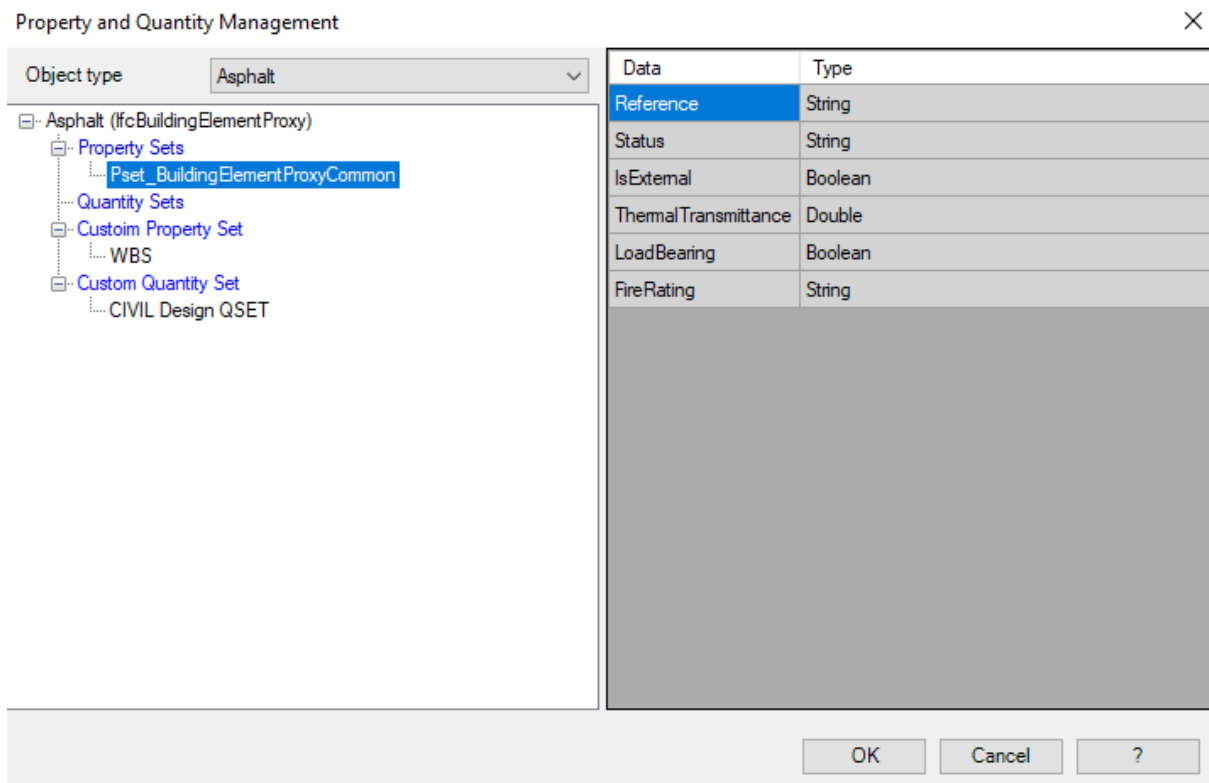
- object type, classification, material or a combination of them;
- reference to the alignment: you can request the calculation of reference for other objects on the selected alignment or on the alignment associated to each object.

23.10. Property and Quantity manager commad (*cdbimpqman*)

The command allows the management of a table with data about properties and quantities to assign to different 3D object types.

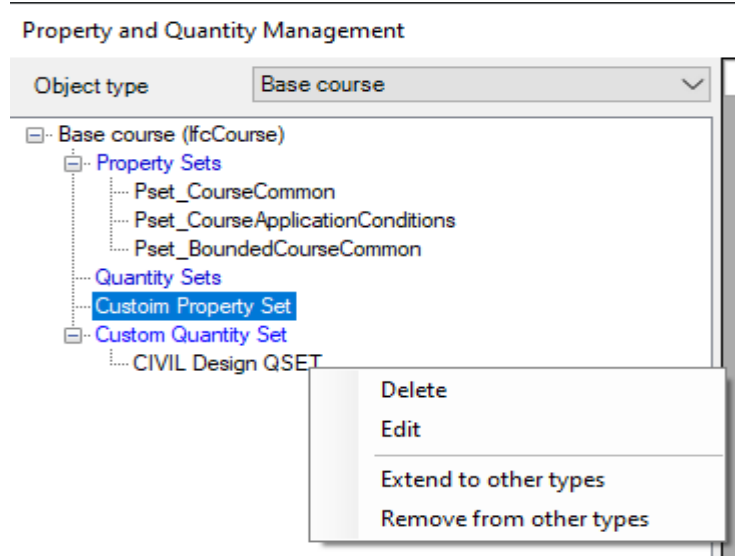
Format: CDBIMPQMAN

The command shows the following dialog:



From the dropdown list in upper dialog you select the object type that you want to characterize. In the root of the left tree you see the name of the object and between parenthesis the associated IFC class. In blue color you see four sublevels. *Property Sets* and *Quantity Sets* contain properties and quantities following IFC standard, which you cannot modify. *Custom Property Set* and *Custom Quantity Set* contain properties and quantities all customizable.

If you want to add, modify or delete a table with custom properties or custom quantities, you can use the functionalities called by the right mouse button on the tree item for a custom Property/Quantity.



Besides the commands Delete and Modify, there are two functions Extend and Remove to other types. This is useful when, after you defined a property for a type, you want to set the same table also for other object classes in IFC.

A table with properties or quantities has a name and fields. Every field is defined by a name and by a data type.

For property tables the possible data types are String, integer, Double (Real) and Boolean.

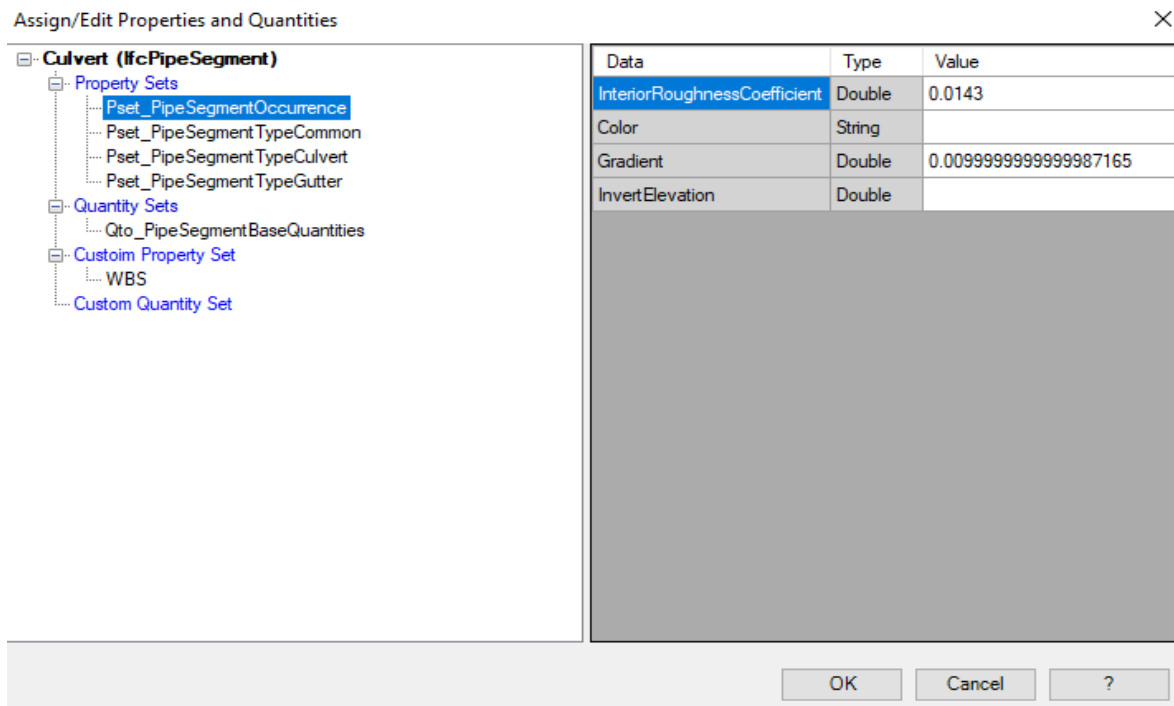
For quantity tables the possible data types are Length, Area, Volume, Weight, CD_Length, CD_Area, CD_Volume. If you select the last three types, when you insert data (see next chapter), the fields will be populated automatically with the values for length, area and volume of the CAD 3D object, if already usable.

23.11. Property and Quantity set command (*cdbimpqset*)

The command allows to assign properties and quantities to a selected object.

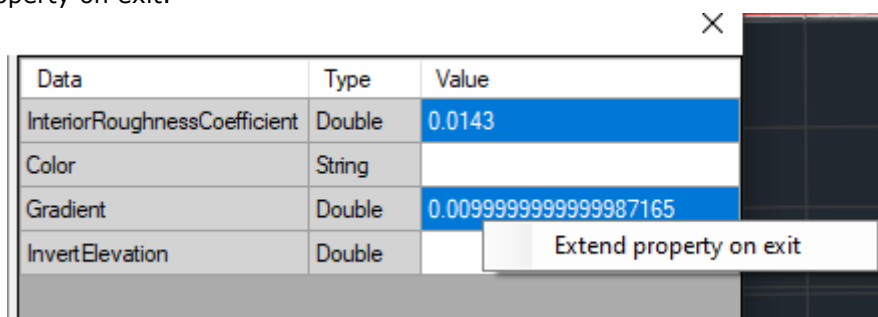
Format: CDBIMPQSET
Select a 3D object...

After the selection of the 3D object, you will see the following dialog:



As you can see the dialog is the same of the previous command linked to management of properties and quantities, but in this case you see only tables associated to the selected object type and with an added column for the value which the user can assign in each field.

The command allows to extend to other 3D objects in the drawing the value of the fields in tables. To do this you can select the values to extend in the wished table and click on right mouse button - > Extend property on exit.



Now the fields in the first table column (Data) will become red. Leaving the dialog with OK, in the command bar you will see the following request:

"Extend data (O)nly to objects "IfcPipeSegment" or to (A)ll objects?<O, A>(O)"

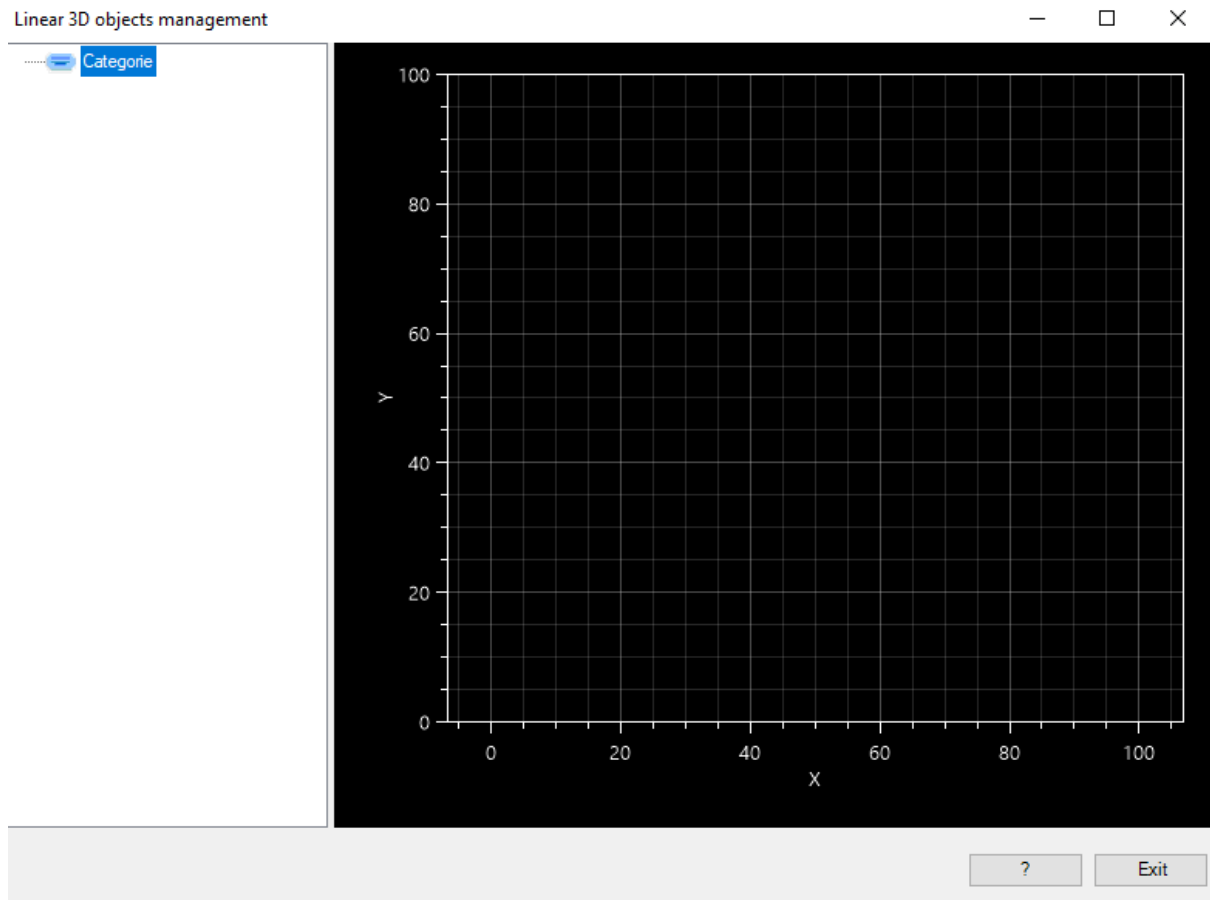
If you select "O", the extension shall be applied only the selected objects of the same type which has been selected in the command start (IfcXXX). Instead, if you select "A", the extension will be applied to all selected objects. The option "A" is enabled only for tables of properties and quantities defined by the user.

23.12. Linear 3D Object manager command (*cdsweepsez*)

The command allows to manage 2D sections from which you can create 3D objects by extrusion along a path.

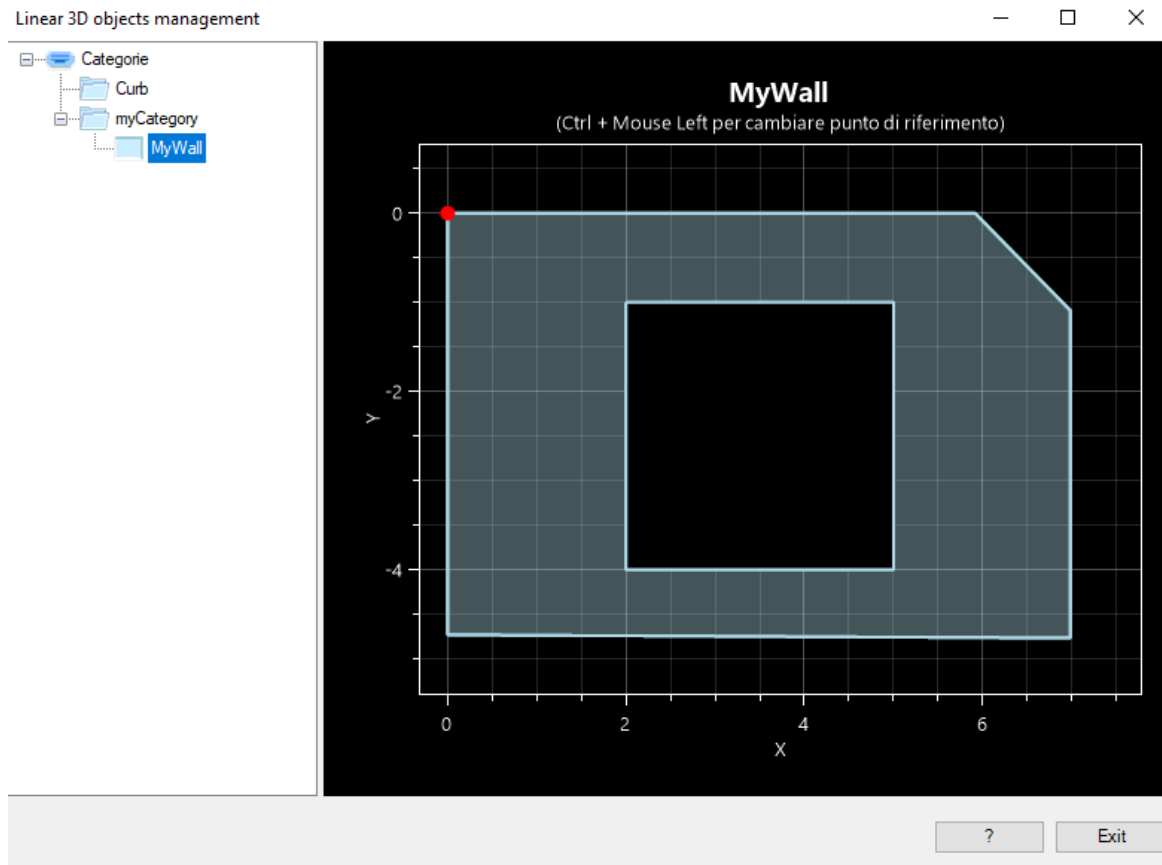
Format: CDSWEEPSEZ

The command will show the following dialog:



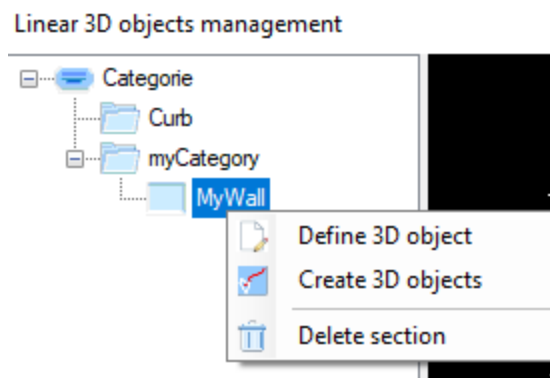
The left tree shows the categories defined by user and containing the 2D sections. The creation steps follow this procedure:

- 1) Create a 2D section on the drawing: the section is defined by one or more contour polylines and, in the case of closed contours, by one or more hole polylines.
- 2) Click with right mouse button on the tree item Categories -> Add category: set the category name.
- 3) Click with right mouse button on the new created category → Add section from drawing: the program asks to select the contour polylines and next the eventual closed polylines for the holes.
- 4) Set the section name.
- 5) The 2D section is drawn in the dialog chart.



The red circle shows the reference point by which the section will slide orthogonally to a 3D polyline as path to create the 3D solid of extrusion. This red point can be changed by the user selecting another section vertex with CTRL+Click on left mouse button.

You can define the 3D solid properties with right mouse button as described below:



- 1) Define a 3D object: you will see the dialog described in paragraph 23.6.
- 2) Create 3D objects: the command shall focus on drawing with the request to select the 3D polylines as path for extrusion of the 2D section.
- 3) Delete the section.

If the 2D section is open the created object will be a MESH.

If the 2D section is closed the created 3D object will be a 3D SOLID.

If the 3D object was not drawn, the cause could be the dimension of the 2D section, too large for a correct extrusion along the selected path.

The 2D sections, defined by the command, are saved in a subfolder of CIVIL Design main folder, with text files in: "\\CDBIM\\SweptSections".

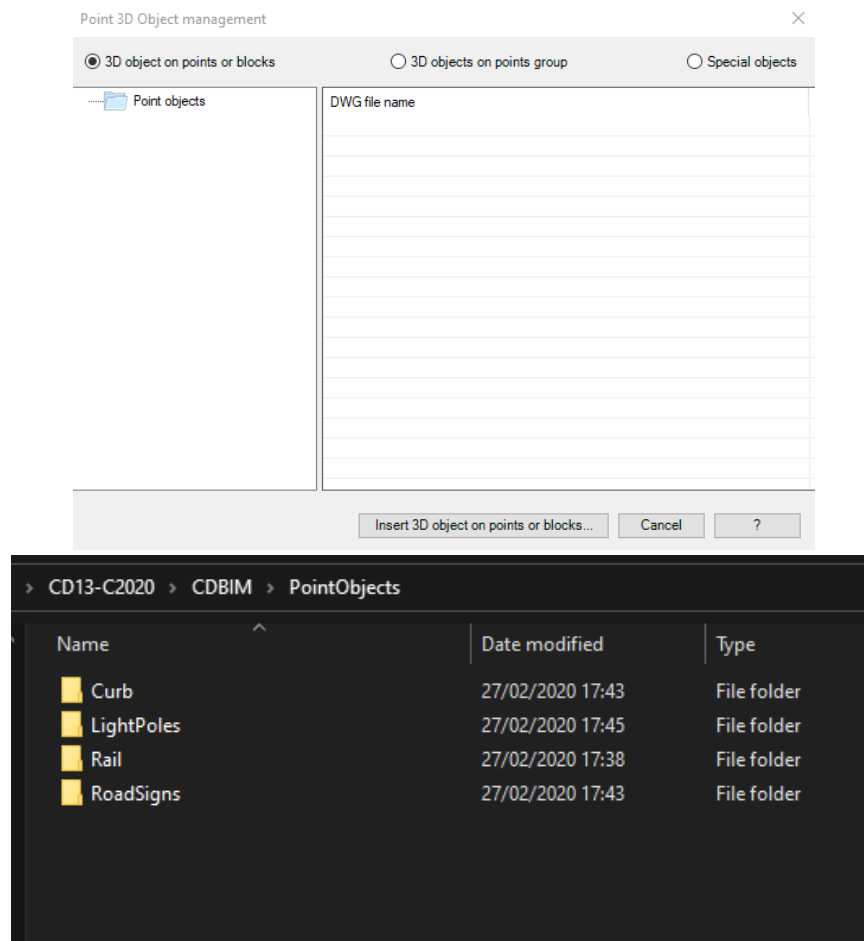
23.13. Point 3D Object manager command (*cdinsert3dobj*)

The command allows to insert 3D objects, defined in external DWG files, on CAD points or on points of CIVIL Design, managed by Survey point command.

Format: CDINSERT3DOBJ

In the beginning, this command needs DWG files containing, each one, a 3D object composed by a MESH and/or 3D SOLIDS of AutoCAD. These elements can be defined also by the command explained in par. 23.6.

At first run of the command, it creates the following subfolder of CIVIL Design main directory: "\\CDBIM\\PointObjects\\". In this folder the user can create other subfolders where he can store his DWG files with the 3D objects and in this way he composes his 3D archive. A sample of the command dialog and the associated subfolder structure in File Explorer is shown in the following figure:



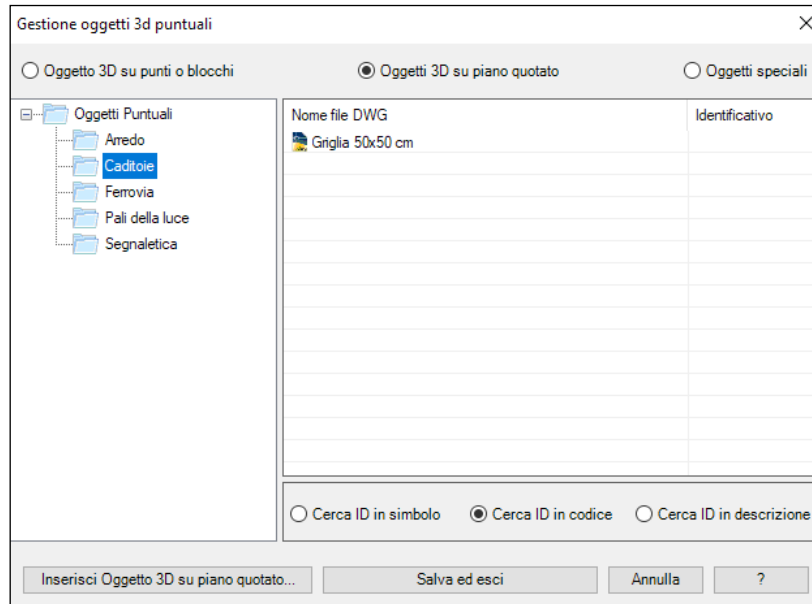
From the radio buttons in dialog top you can select the way how to insert the 3D objects:

- *3D Objects on points or blocks.*

In command exit the program shall ask to select points and/or CAD blocks where inserting the 3D objects contained in the selected DWG, shown in the table, right side of the dialog. In the case of blocks, the inserted object is rotated as the associated block.

- *3D objects on topographic points.*

In this case the dialog is the following:

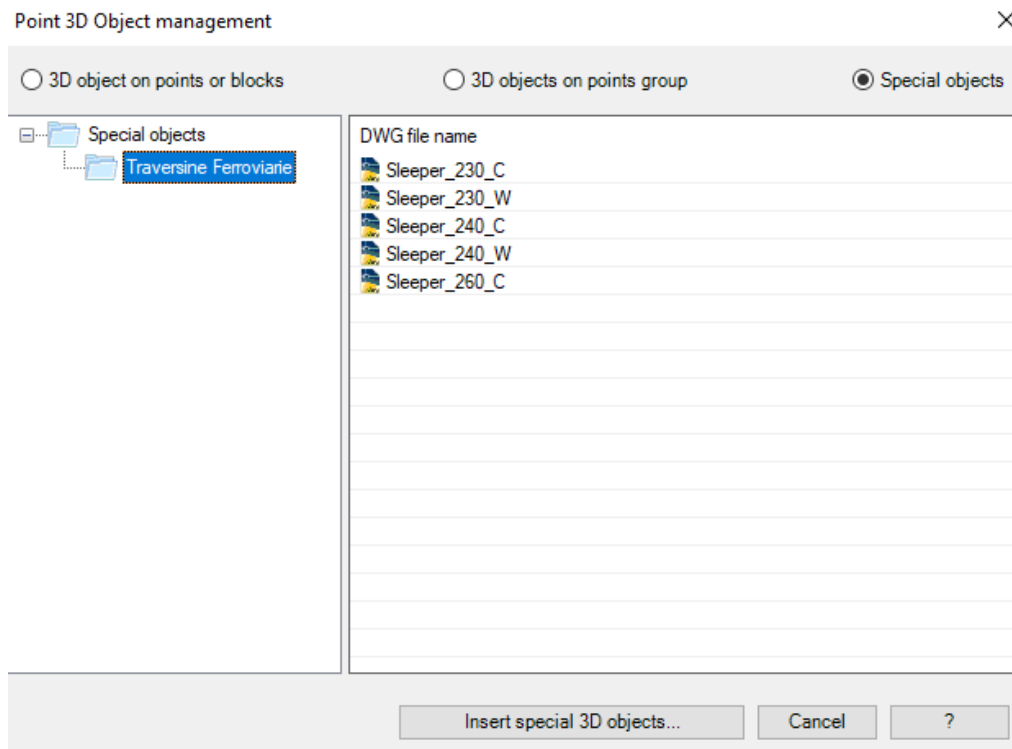


In the right side, the table with DWG of the different folders has a column "Identifier" where you have to insert the ID which the program will search, following the selection below the table, i.e. search in symbol, search in code or in the field description of a CIVIL Design point block. In a first phase the user can assign the IDs to different DWGs and click on the button Save and exit to save the data. In this way of insertion, the program shall ask to select the points of a topographic group and shall insert 3D objects from DWGs as results of the ID search in point blocks. The inserted objects are rotated with the same rotation of the points. If you want to create points aligned with the direction of a polyline you can use the command "Handle points -> Points on Polyline".

- *Special Objects.*

With this option in the left tree you can see the folders associated with the 3D objects which request detailed operations for their insertion.

- Railway sleepers



In the above table there are three standard types of sleeper, that of 230, 240 and 260 cm, in Concrete (suffix C) and in wood (suffix W). In command exit the program asks to select a reference left polyline and a reference right polyline. These 3D polylines are the superelevation polylines created by the command "Calculate rotations". In this command you have to specify the step of the polylines (segment length) which in this case is the step of sleepers (0.60 cm).

23.14. Cut and fill Volume command (*cdbimvol*)

The command calculates volumes of cut and fill operations, beginning from a DTM model of the terrain and one or more meshes of the design model.

Format: CDBIMVOL

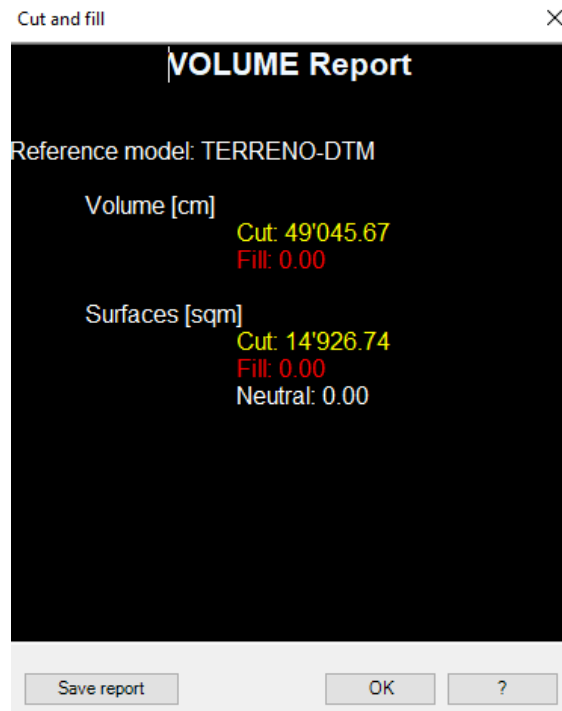
New computation (ENTER) / Query (i+ ENTER):

- New computation

With a new calculation the program asks to select a 3DFace from the reference model (surface or terrain), then the program asks to select design MESHES. After the selection, it starts the calculation phase which ends with the red MESHES for Fill, those yellow for Cut and white for neutral situation. These entities can be queried by the CIVIL Design editor and replay with the calculation results. Otherwise you can use the following "Query" function of this command.

- Query

The program asks to select the MESHES for volume computation. Then you will see the following dialog with results:



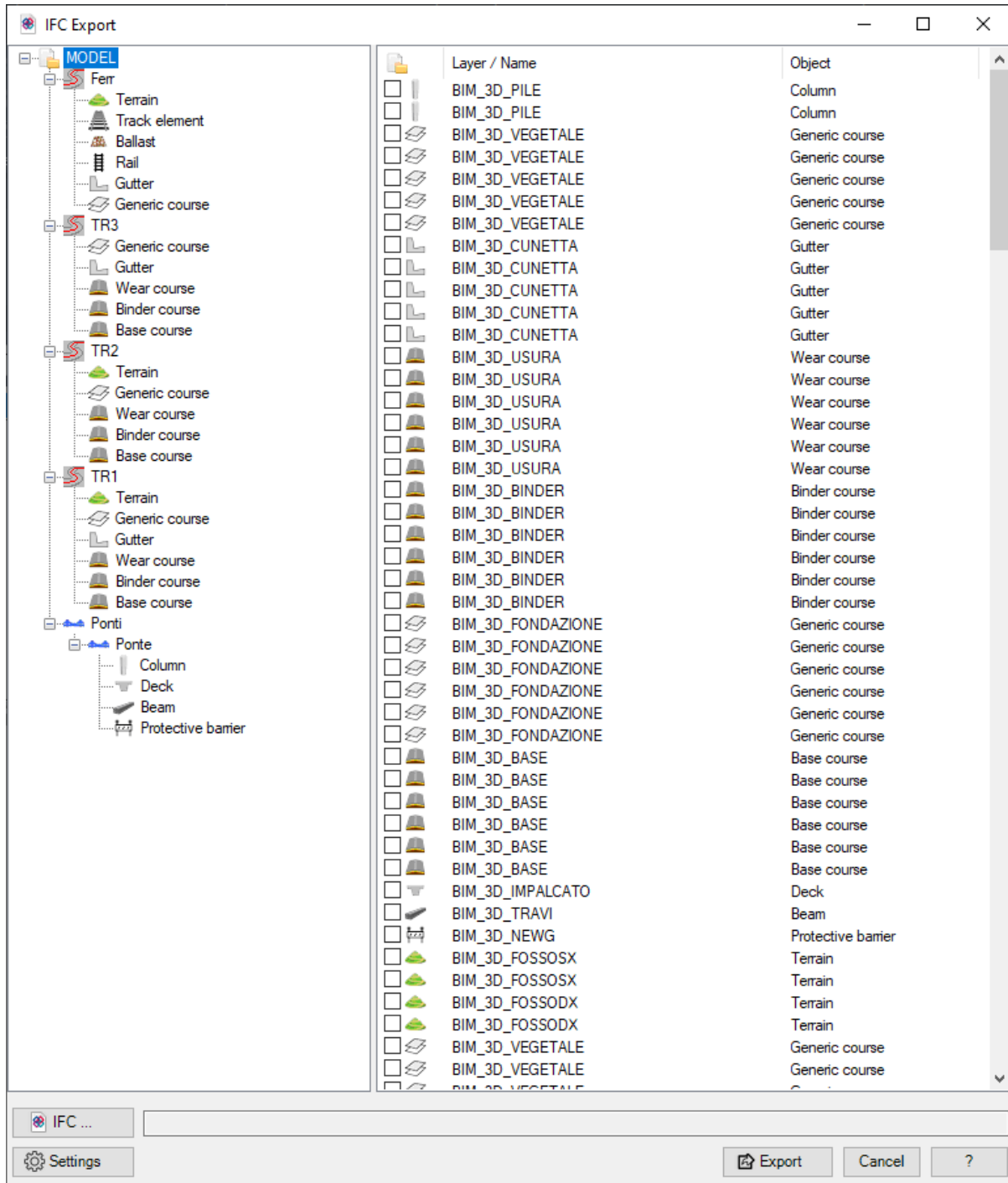
This function is useful because it shows the sum of calculation for the selected elements. It is possible to save the report as rtf format.

23.15. Export IFC model command (*cdifc*)

The command allows to export 3D objects of the BIM model in IFC format.

Format: CDIFC

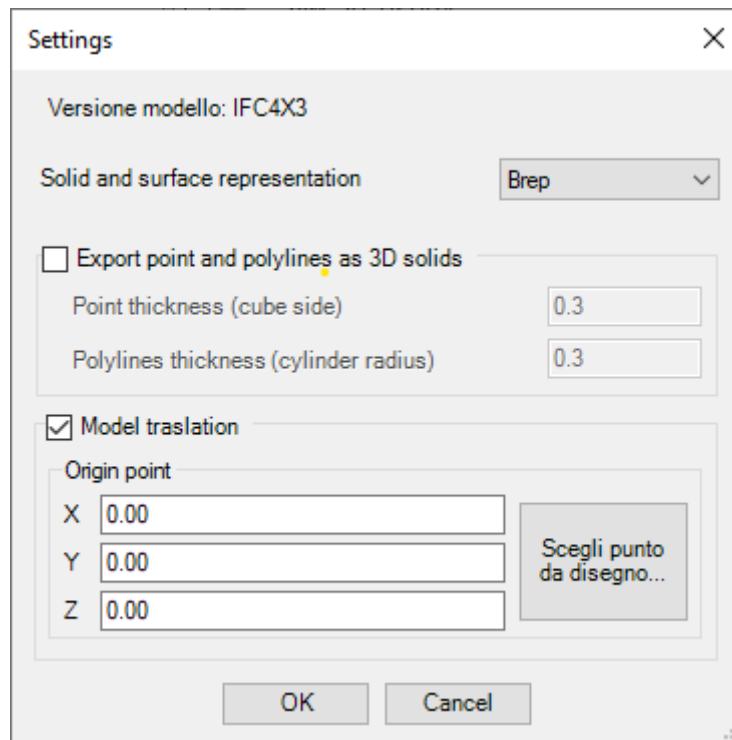
The command opens the following dialog:



In the table of the right side the program lists all the object types found in the drawing. If you select an element in the left tree, in the right table you will see the associated elements. You can select the elements which you want to export by ticking on each check box.

If you want to create the IFC file, you need to select at least one element to export and the destination file path.

By clicking on the button "Settings" you see the following dialog:



The IFC version for export is defined by the command BIM > Settings (CDBIMSET).

You can define the representation type for solids and meshes. The 3D objects are exported only with Body Brep or Body Tessellation representation.

You can export in IFC format also points and polylines. To obtain this result the points must be in a layer with prefix BIM_PNT_, whereas the 2D and 3D polylines must be in a layer, respectively, with prefix BIM_2DP_ and BIM_3DP_.

In the case of the CIVIL Design topographic group, the name of the topographic group must have the prefix BIM_. The option "Export points and polylines as 3D solids" allows to export points as cubes with the side length defined in the dialog and the polylines as prisms with circular base with radius length defined in the dialog.

If the points or the polylines come from the import of a Shape file or contain generic data tables (see the chapter 25), these informations are exported in IFC file as a Property Set.

At last, the model can be translated from a reference point. This operation is necessary if you want to import the IFC model in REVIT platform, because in that environment there are short limits in the size of the design area.

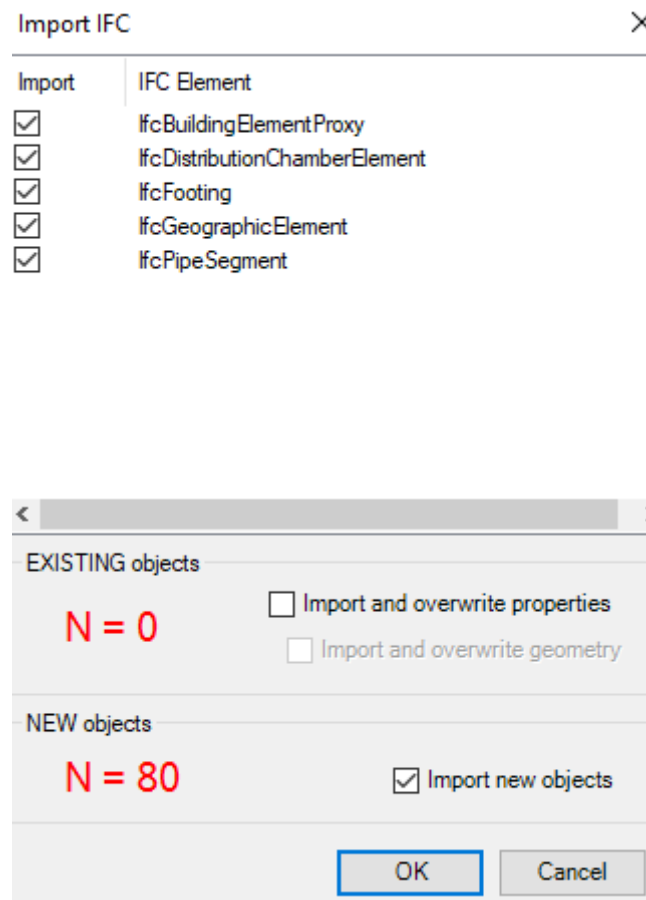
WARNING: IF YOU USE BRICSCAD, WITHOUT ANY OTHER FUTURE UPDATES, YOU HAVE TO CONVERT 3D SOLID TO MESH, BEFORE YOU CAN EXPORT IFC MODEL

23.16. Import IFC model (*cdimpifc*)

The command allows to import some objects from an IFC model.

Format: CDIMPIFC

The command starts with the request to select the IFC file which you want to import. After the selection and click on "Import" button, the command reads the file and then shows the following dialog:



In the upper list the command shows all types of IFC objects which are recognized. With the ticks on the checkbox of the Import column, you can select what you want to import.

In the lower side of the dialog, you see two sections, the first for the objects read from file and already in the DWG (EXISTING) and the second for the objects coming from the import (NEWS); in the first case you can select if you want to substitute the properties with those read from file. If you have selected the option "Import and overwrite properties" you can decide if you want to substitute the object geometry, read from file, or to maintain the object geometry present in DWG. In the case of new objects you can select if you want to import them.

You should note that a recognized object for import could not be actually imported because the geometric representations are multiple in IFC format. The command recognizes the following representations:

- Body Brep
- Body Tesselation
- Body Area Extrusion (partially)
- Body Disk Extrusion

23.17. Utility Menu

This submenu contains the following commands:

23.17.1. 3D Face -> Mesh (*cd3dftomesh*)

The command creates a mesh starting from a selected 3DFace set.

Format: CD3DFTOMESH
Select the 3DFaces...

The mesh is created in a layer with the name composed by the prefix BIM_ and suffix equal to the name of the layer containing the 3DFaces.

23.17.2. 3D Face -> Solid 3D (*cd3dftosolid*)

The command tries to create a 3D solid starting from a selected 3DFace set.

Format: CD3DFTOSOLID
Select the 3DFaces...

The command tries to create a 3D solid starting from a selected 3DFace set. To obtain this result, the selected 3DFaces must form a closed object, otherwise the command creates a mesh.

The solid or the mesh is created in a layer with the name composed by the prefix BIM_ and suffix equal to the name of the layer containing the 3DFaces.

23.17.3. 3D Face -> Solid with thickness (*cd3dftosolidthick*)

The command creates a 3D solid by extruding in vertical direction the selected 3D Faces and with the set thickness.

Format: CD3DFTOSOLIDTHICK
Insert the thickness:
Select the 3DFaces...

The extrusion takes place in the negative z-axis direction for positive thicknesses, otherwise in the positive z-axis direction. Not all values of the thickness are compatible with the solid creation, because it depends on the altimetry position of the 3DFaces.

The solid is created in a layer with the name composed by the prefix BIM_ and suffix equal to the name of the layer containing the 3DFaces.

23.17.4. 3D Sections ->3D Objects (*cdloft*)

The command creates a 3D solid starting from 3D sections by unifying them along a straight or by interpolation (fitting)

Format: CDLOFT

23.18. CIVIL Design BIM variables

By the command "CIVIL Design Variables" (SETVARCD), you can edit the following variables linked to the BIM settings.

CDBIMS3DMOD

It creates 3D SOLIDS from 3DFACES as element conversion... →SURFACE
→MESH

If the variable is set with the value "SURFACE", the program converts the 3DFaces in CAD Surfaces and from those surfaces it creates the solid.

If the variable is set with the value "MESH", the program converts the 3DFaces in a MESH, then it transforms the obtained mesh in CAD Surfaces and from these it creates the solid.

This variable is used in BIM procedures which create 3D Solids. In general, if the solid cannot be created from the 3DFaces, the program tries to create a mesh.

The first method, with the "SURFACE" value, is more expensive in terms of computation time, but its success rate is higher than the second method. However, the second method has the advantage to be faster than the first in the object creation.