

Creating 3D provisions for voids (builder's work) information models using MagiCAD

The process of defining provisions for voids

This document describes process of producing 3D provisions for voids information models from the perspective of the project's building services engineering when using MagiCAD. The production of conventional 2D provisions for voids drawings is described in a separate document.

Initially, the project's structural engineering provides MEP engineering with DWG and IFC files in 3D format. The 3D DWG and IFC files use absolute height position which corresponds with the architectural model. The DWG and IFC files include both the roof slab covering a single storey of the building and all the structures supporting the roof slab.

The building services designer creates storey-specific IFC models which contain only the provisions for voids as empty void provision objects. These are submitted to the structural designer for commenting and approval. Each void provision object should always indicate who has made the provision. The size of the provisions and other relevant tags and data are added to the provision objects as attribute data.

Provisions are made in separate, empty DWG files into which the structural DWG files and the building services DWG files from MagiCAD (including ventilation, piping and cable trays) are imported in 3D format.

Before beginning to define provisions for voids, it should be verified that the structural model and the building services model both use the same, absolute height definition, so that the void provisions (builder's work definitions) are positioned and stored correctly. If the MagiCAD project has been modelled storey by storey using the height position $z = 0$ (WCS), the height definition setting of the MagiCAD reference drawings should be changed to use absolute height position instead. Other option is to move structural model from absolute height level to 0-height level so that they are in the same level with MagiCAD objects.

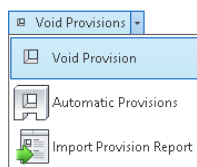
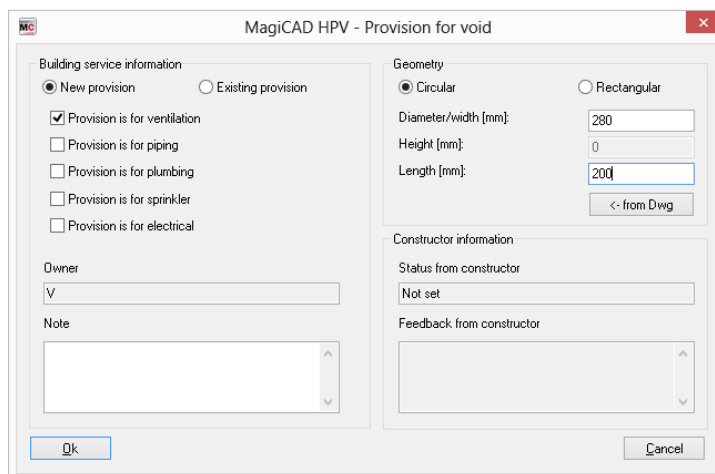
Finally, the void provisions (builder's work definitions) are added to the MagiCAD project. The storey is defined and the storey-specific reference point (or origo) is set.

Before starting to create provisions any conflicts with other design models should be checked and fixed.

Manual and automatic provisions for voids functions

With MagiCAD, provisions for voids (builder's work) can be defined either manually using the Provisions for Voids tool or automatically using the Automatic Provisions function.

When defining provisions manually, specify the geometry (diameter, width and height) for the provisions. In order to make the provisions easier to locate later on, the depth of the provisions should always be slightly greater than the thickness of the wall (e.g. approx. +10 - 25 mm). It is also important to define the owner of each provision in accordance with the project guidelines and procedures.

MagiCAD HPV - Provision for void

Building service information

New provision Existing provision

Provision is for ventilation
 Provision is for piping
 Provision is for plumbing
 Provision is for sprinkler
 Provision is for electrical

Owner:

Note:

Geometry

Circular Rectangular

Diameter/width [mm]:
 Height [mm]:
 Length [mm]:

Constructor information

Status from constructor:
 Feedback from constructor:

Image 1: Defining provisions manually

The second option is to use MagiCAD's Automatic Provisions function for defining all the provisions. When the provisions are generated automatically, the accuracy of each provision should always be verified manually afterwards. To create provisions automatically for MEP objects in a particular area, just select the area using the Automatic Provisions function and the provisions are created for all objects that are located in the selected area.

Editing void provisions

The owner-related descriptions can be changed using MagiCAD's project management features. The amount of space that is provisioned around the duct or pipe can also be defined by using the functions **Offset for rectangular objects** and **Offset for circular objects** in MagiCAD's *Provisions for Voids Options*.

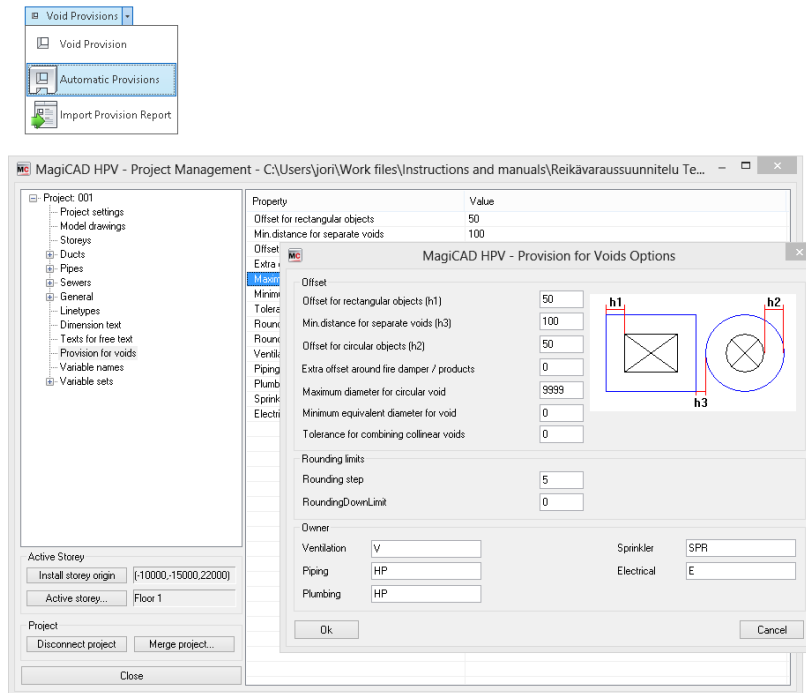


Image 2: Provisions for Voids Options

Adding reference lines to void provision objects

When the void provisions have been modelled to the DWG drawings, reference lines are added to the provision objects and the horizontal position of the objects is verified. If necessary, the information content used with the reference lines and the sizing method should be checked with the structural designer. The reference lines can be added using MagiCAD's Dimension Text tool. The reference line styles for provisions for voids can be found from the General section. The reference line attributes can be edited in the same way as, for example, air terminal attributes.

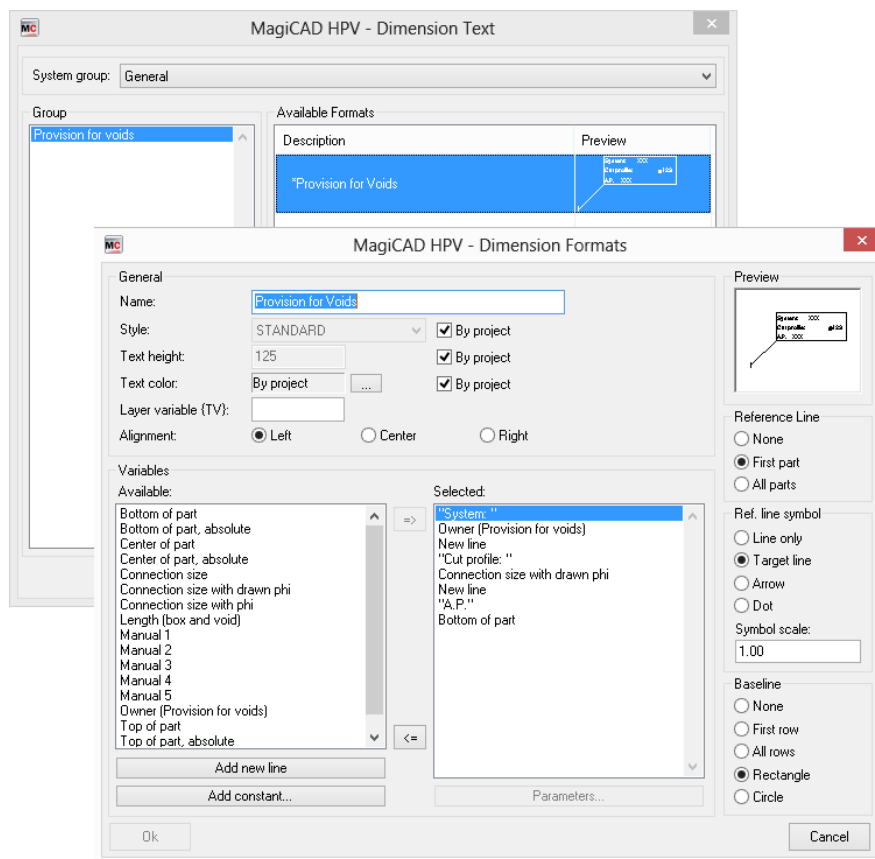


Image 3: Editing dimension text formats

The horizontal sizing of the void provision objects is done using AutoCAD's Linear Dimension tool. The void provisions are sized primarily based on the grid in the structural drawings (i.e. the module lines) and only secondarily based on existing structures, which is a viable option mainly in renovation projects.

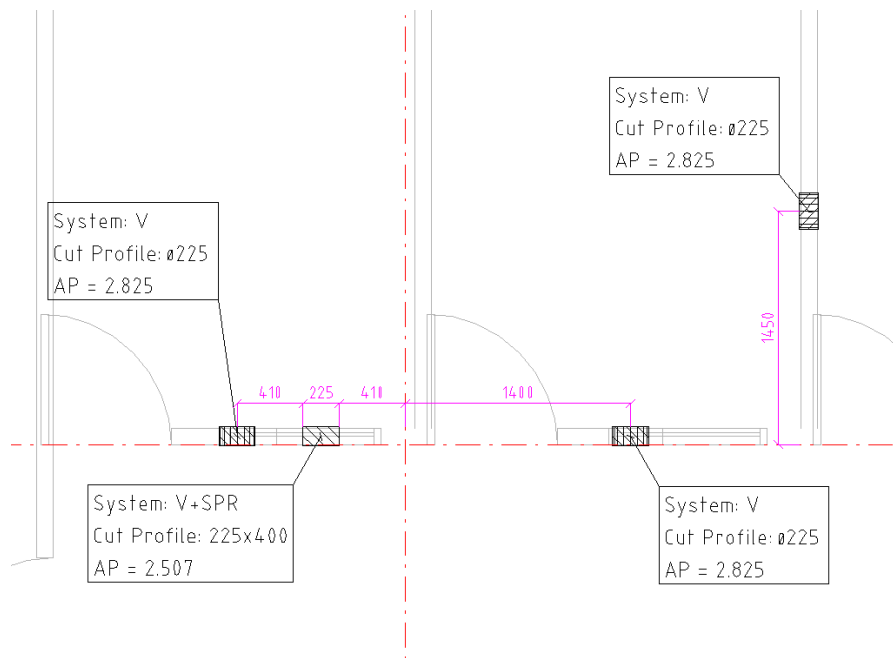


Image 4: Example of a void provision drawing

Round void provisions are sized based on the center point of the provision and rectangular provisions based on the edge of the provision in relation to the closest module line in the structural drawing. The reference line should clearly indicate at least the provision's physical shape and owner, as well as the height position of its lowest edge.

Exporting void provision files in IFC format

When the void provisions have been modelled to the DWG drawings, storey-specific IFC files are produced based on them. These files are then submitted to the structural designer.

The IFC files are created by using MagiCAD's IFC Export function. The setting of the storey-specific reference point (or origo) should be WCS. The size of the provisions and other relevant tags and data can be saved as attribute data by selecting **Provisions for Voids** from the *Property Settings*.

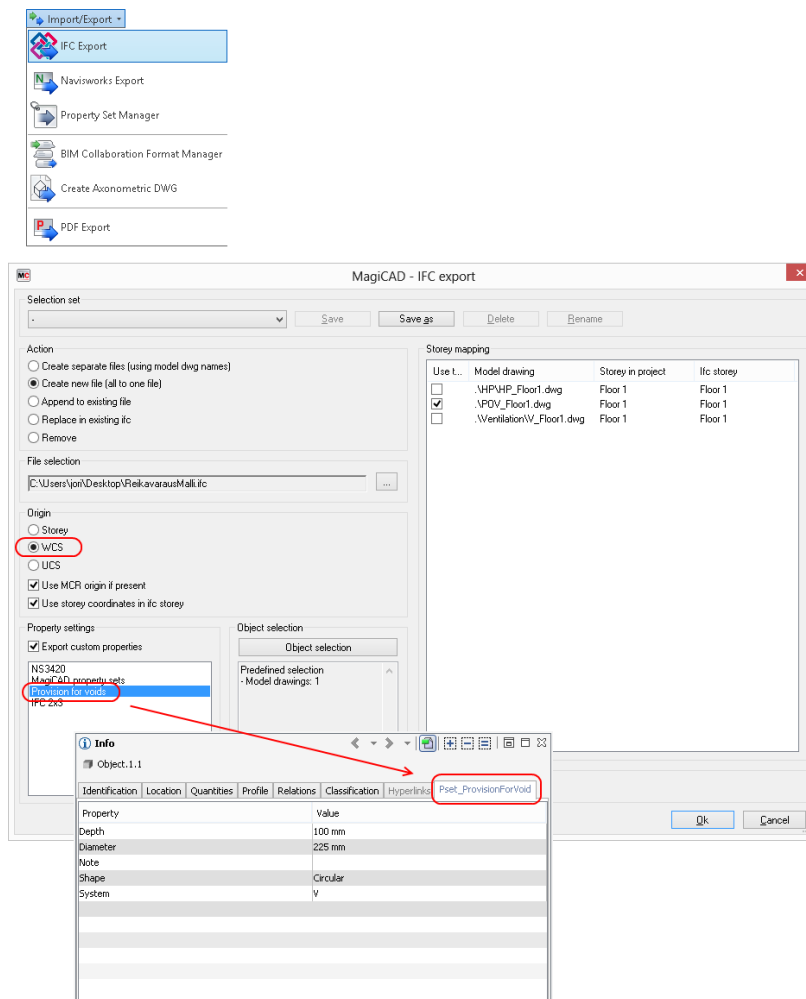


Image 5: IFC export

Commenting and editing provisions for voids

Structural designer comments the provisions for voids and provides the building services designer with an XSR file. If the structural designer does not provide an XSR file, the commenting process must be agreed upon separately.

The building services designer opens the XSR file using MagiCAD's Import Provision Report tool. Based on the report, the building services designer will know which provisions require editing or changes. The void provision data also contains the comments which the structural designer has attached to each individual provision.

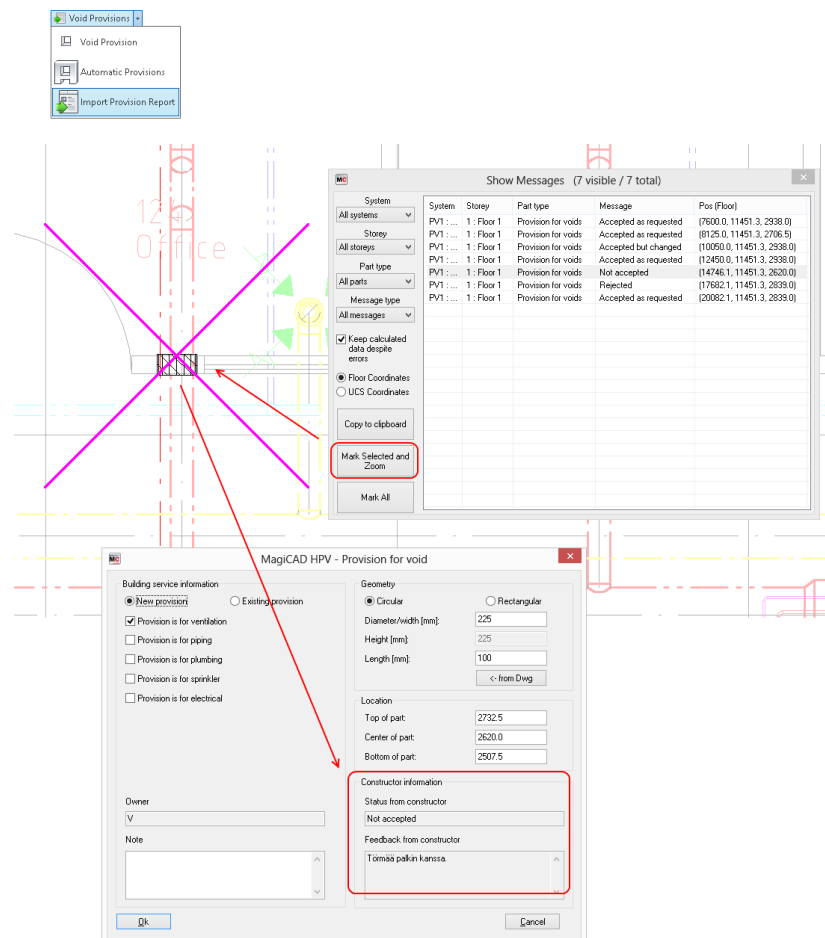


Image 6: XSR import

The building services designer edits the original void provision drawings based on the instructions provided by the structural designer. New IFC models are created based on the revised void provision drawings, which are then submitted again to the structural designer.

This process is continued until all void provisions have been approved by both the structural designer and the building services designer.

Important aspects to be considered when editing void provision drawings:

- The names of IFC files should never be changed during the process

- The building services designer must edit (not delete or replace) the void provisions commented by the structural designer. This way it is possible to make sure that the GUID tags of the objects are retained and are visible also to the structural designer as changed objects (instead of new).

Our localised technical support serves MagiCAD users via email and telephone

Our experienced technical support team is always happy to help you get the most out of your MagiCAD for Revit and AutoCAD. All you need to do is take a screenshot of your problem and send it via email to the support representative near you. Find your closest technical support representative at <http://www.magicad.com/en/content/technical-support>.