

Import of dxf-data

SP Net info 1

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Apart from simple test cases no 3D model is created without import of external data. Point data in txt, asc, xyz or las-format are increasingly used to build the terrain model. When it comes to traffic sources import of Shape files is the most commonly used import type. That leaves us with a few general objects like buildings, barriers, berms and (in few cases) ground absorption areas that normally are documented in dxf format (if documented in digital form at all).

The dxf format is a common platform for exchanging data between CAD applications (such as AutoCAD, DraftSight) like the Shape format is a common format for GIS software (like ArcGIS, MapInfo). The import of CAD data into SoundPLAN is based on dxf. The native format for several CAD applications, the dwg-format, SoundPLAN cannot handle.

Import of dxf files will establish only the geometry of objects (x,y,z); no properties (like traffic flow, number of inhabitants, barrier height, object name and number etc etc) will accompany the coordinates (with text as an exception, see below). The imported objects will in the first place be imported as one of the general object types: points, lines or areas. It is a job for the user to convert the imported objects to the relevant SoundPLAN object types.

After the import all relevant properties must be added. The program offers a possibility to calculate a few – but very important – properties from the basic coordinates (see below), but in general it is manual work to add the properties.

Restrictions:

To be importable the dxf file should be saved in the format AutoCAD version 2002 or older. Normally also younger formats are accepted by SoundPLAN, but there is a risk that some objects are not recognized and therefore not imported.

No matter the format, the objects in the dxf file must not be 'blocked'. If they are, you should 'explode' the objects before saving in dxf format.

Polylines cannot be attached with the feature 'cubic/solid 3D' in AutoCAD, otherwise they will not be imported into SoundPLAN.

Line objects (elevation lines, road/railroad master alignment etc) must be of type 'polylines'; if lines have been smoothed into 'splines' in AutoCAD, SoundPLAN cannot handle them. Therefore, before saving the file in AutoCAD these splines must be converted into polylines (with a splinedit command).

Hints: If you cannot get hold on an AutoCAD license to check for splines, you can open the dxf file with WordPad or Notepad and search for 'SPLINE'. If the file contains a <0> followed by <SPLINE> and <5> as shown in Fig 1, it indicates that the file includes splines.

Elevation lines produced in Microstation should be 'lines' and not 'linestrings'.

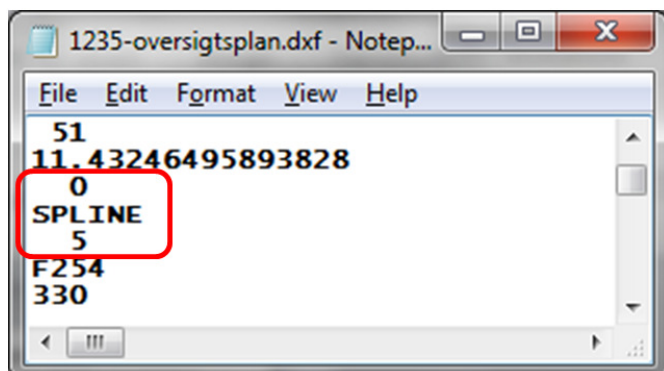


Fig 1 Notepad has revealed a spline

Importing the data:

The import menu is reached via File in the GeoDataBase. Data are organized alphabetically in layers; select the layers that are relevant for your model. If the layer names together with the preview don't make it obvious which layers to import, it might be wiser to leave the cursor on 'All layers' and afterwards get rid of unwanted data.

Below the preview some basic information about the data can be seen, see Fig 2. Especially the min/max coordinates might be useful if you do not already know which coordinate system was used.

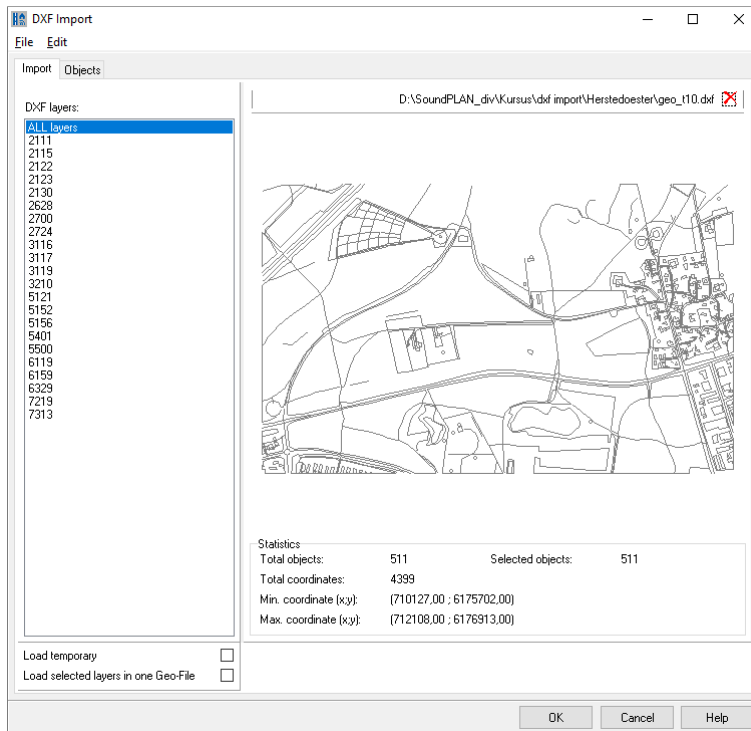


Fig 2 The import window

The imported data can be saved layer by layer in temporary geofiles named 'TMP_layer name.geo'. TMP-geofiles will not be saved when you close the situation. This way to handle the files might be convenient if you first want to inspect each layer in the GeoDatabase and from experience know that most of the layers are irrelevant for your model. The useful layers/TMP-geofiles must be saved in permanent geofiles before you leave the situation.

If you instead tick 'Load selected layers in one Geo-File' data from the imported layers will be merged into a single geofile.

If you don't tick either 'Load temporary' nor 'Load selected.....' the data will be saved layer by layer in permanent geofiles named 'DXF_layer name.geo'.

In case the preview reveals that the dxf file covers an area that is too wide, you can drag a square in the preview window with your left mouse key held down. Data totally outside this square will not be imported. If you regret the selection, click the red cross in the upper right corner of the window.

Hint: If a dxf file includes a layer named <0>, you should always include that in the import, even if the preview does not show any contents in the layer. It is a widespread habit among AutoCAD people to save in this layer information that is needed for initialization.

On the index card Objects further conditions for the import can be set:

1. Objects with $z = 0$ can be excluded
2. Lines saved as individual segments can be connected if end and start points have identical coordinates ('Connect lines')

3. The density of points on imported circles and arcs can be set to low, middle or high
4. Intermediate points on straight lines (+/- 5 cm) can be ignored ('Reduce point density on lines')
5. Points with assign text label that states the elevation can be converted into elevation points during import, see Fig 3 (lines with assign text labels cannot be handled the same way since there is no way to detect which label belongs to which line, sometimes even the human eye can be in doubt)
6. The size of imported Geometry text can be set during import, see Fig 3
7. Coordinates can be transformed

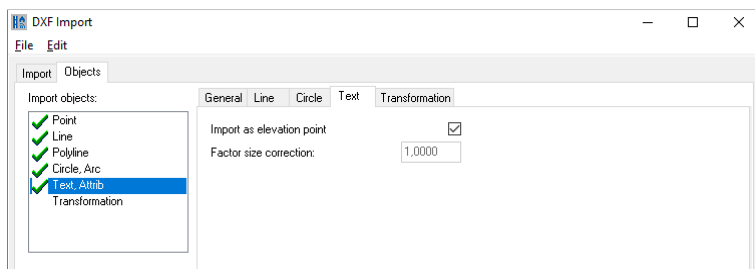


Fig 3 Additional conditions for the import

Hint: If the dxf file is produce by an architect, the unit of length is most probably mm and not metres as expected by SoundPLAN. If so, the coordinates must be transformed by a factor of 1000. The transformation can be done either during import or afterwards in the GeoDatabase using coordinate transformation, see Fig 4. Be aware that the transformation tool only works on x and y. If the z coordinate also is in mm, it must be divided by 1000 afterwards using a coordinate operation. If the transformation is done during import and includes text, please remember to scale also the text (on the index card Text), otherwise your text will shrink or enlarge depending on the scale.

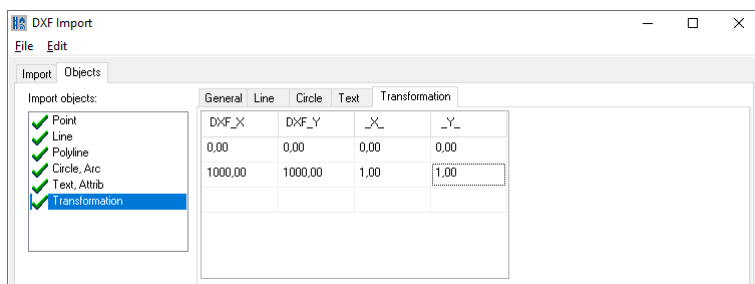


Fig 4 Transformation from mm to m

If the dxf file includes buildings with z-values, these values most likely are the elevation of the roof and not of the base of the building. In case the building has a slanted roof construction, the z-coordinate represents more likely the elevation of the gutter than of the ridge. Since there is no fixed convention for this, it must be recommended to ask the data supplier. Depending on the z-coordinate the function 'Calculate object height form top edge' under Geo-Tools might add a realistic and individual height to the buildings instead of the default 6 m. The same feature can be used to calculate the height of a noise protection wall in case the imported z-coordinate represents the wall top.

In case the imported building objects state the building height as the z-coordinate, you must first create a temporary DGM with flat terrain at elevation 0 and use that when you perform 'Calculate object height from top edge'. That will drop the buildings on flat ground but with correct height. Next you must 'move' them to the real DGM by using the function 'Set objects to DGM' under the Edit menu while the real DGM is loaded.

Warning: After importing you should always inspect the result in Front view / Side view or 3D Map to reveal outlying z-values. If the dxf file represents a small part of a big area and objects along the edge of the extracted area were hard cut, the software might have inserted -99 or -999 for the missing z-coordinate. If possible, you can ask the supplier for a soft cut extract or a bigger area than your actual project area.