

# Update Documatation 8.1

The screenshot displays the SoundPLAN software interface, divided into several functional areas:

- Top Left:** A window titled "pdf in Bitmap konvertieren" (convert pdf to bitmap) showing a map of an industrial area with a red bounding box. Below it, the dimensions are listed as "map-Abmessungen 1094 \* 922 px (~ 3,8 MB)".
- Top Middle:** A noise map showing sound propagation paths (purple lines) and noise contours (green and blue shaded areas) over a site plan.
- Top Right:** A detailed architectural site plan with various buildings and streets labeled.
- Bottom Left:** A table of simulation parameters for "lights industrial noise - RHSP0121.res: auditorium".
 

Receiver	Leq/dB(A)	STI	Sigma(Leq)/dB(A T30/s)	EDT/s	Roo
er L-17	54,7	0,43534	0,1	1,0	1,0
er L-18	54,7	0,44266	0,1	1,0	1,0
- Bottom Middle:** A graph showing the decay of sound pressure level over time. The y-axis represents sound level in dB (0 to 50) and the x-axis represents time in seconds (0.1 to 2.0). The title is "Receiver: Receiver A-01 Source: Loudspeaker left".
- Bottom Right:** A diagram titled "Lärm am Arbeitsplatz" (noise at the workplace) showing a floor plan with noise sources and receivers. Below the diagram is a data table showing noise levels at different times.
 

Time	6-7h	7-8h	8-9h	9-10h	10-11h	11-12h	12-13h	13-14h	14-15h	15-16h	16-17h	17-18h	18-19h	19-20h	20-21h	21-22h	22-23h
100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0
70,4	70,4	70,4	70,4	70,4	67,4	70,4	70,4	70,4	70,4	70,4	67,4	70,4	70,4	70,4	70,4	70,4	70,4
30,0	30,0	30,0	30,0	30,0	30,0	30,0	30,0	30,0	30,0	30,0	30,0	30,0	30,0	30,0	30,0	30,0	30,0
71,1	71,1	71,1	71,1	71,1	68,1	71,1	71,1	71,1	71,1	71,1	68,1	71,1	71,1	71,1	71,1	71,1	71,1
77,8	77,8	77,8	77,8	77,8	74,8	77,8	77,8	77,8	77,8	77,8	74,8	77,8	77,8	77,8	77,8	77,8	77,8
30,0	40,0	30,0	30,0	30,0	30,0	30,0	30,0	30,0	30,0	30,0	30,0	30,0	30,0	30,0	30,0	30,0	30,0
71,8	71,8	71,8	71,8	71,8	70,7	71,8	71,8	71,8	71,8	71,8	70,7	71,8	71,8	71,8	71,8	71,8	71,8
20,0	20,0	20,0	20,0	20,0	20,0	20,0	20,0	20,0	20,0	20,0	20,0	20,0	20,0	20,0	20,0	20,0	20,0
76,7	76,7	76,7	76,7	76,7	75,7	76,7	76,7	76,7	76,7	76,7	75,7	76,7	76,7	76,7	76,7	76,7	76,7
50,0	60,0	50,0	50,0	50,0	50,0	50,0	50,0	50,0	50,0	50,0	50,0	50,0	50,0	50,0	50,0	50,0	50,0



# Changes in SoundPLANnoise 8.1

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## Highlights

- ④ Property Explorer 2.0
- ④ Geo-referencing of background graphics with a mouse click
- ④ PDF files as background graphics
- ④ Streamlined and improved import of road data
- ④ Documentation of industrial sources in the Geo-Database without the need to first calculate the situation
- ④ Deleting of multiple elements in the library

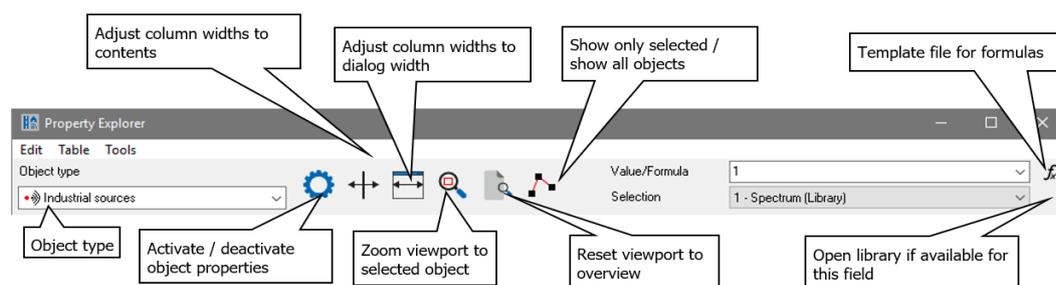
## Overview of the modifications

- **General**

- In the SoundPLAN Manager under **HELP -> REMOTE SUPPORT SESSION** you now find a direct access to Teamviewer, so that some hotline questions can be solved faster than in the past.
- The Geo-Database dialogues are now adapted to use of multiple monitors or ultra-wide monitors. For different monitor configurations (for example 3 monitors in the office, 2 in the home office and only a single notebook screen when on the road) the positions of dialogues are recognized, and all text and dialogue boxes will be reset to the visible area on screen.

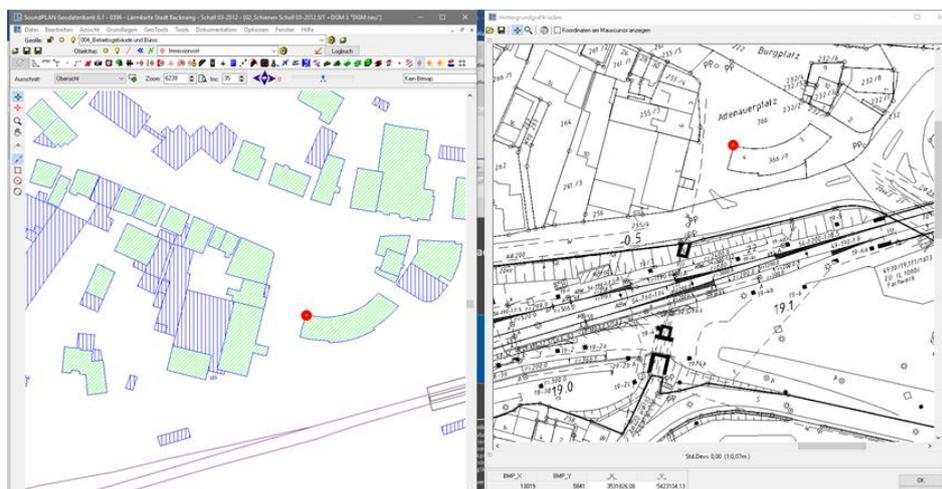
- **Geo-Database**

### Property Explorer 2.0



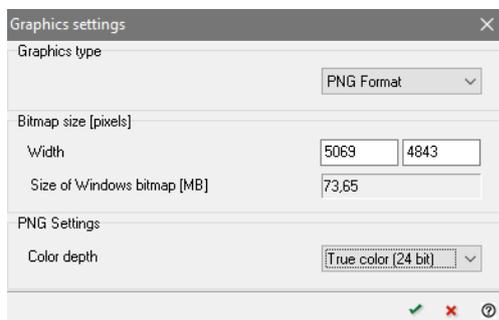
- The entry of values and formulas now has a separate facility from the management of selection lists. For this reason, it is no longer necessary to change from value/formula to selection. Simply enter the formula in the field **VALUE/FORMULA**.
  - In a text file accessible with the button  you can save formulas for all projects in the Globdata folder and when needed use **Ctrl+C** and **Ctrl+V** to copy/paste the formula in the formula entry of the property explorer.  
As the formulas in the property explorer only allow single line formulas, it is prudent to save the formulas in the text file the same way. To allow a bit more general use, the "own" column can be substituted with x#. The property explorer will insert the correct column number for the substitute command.
  - Column Geo-file – Assigning objects to the files where they are stored is now also possible with a formula.
  - The value for formulas in selection lists and yes/no columns is displayed in the selection column.
  - In the column header a unit line was inserted (via **TABLE -> SHOW UNITS** this line can be switched on/off)
  - Columns with interdependencies (for example % car and % truck) are now shown correctly in the property explorer, there are no inconsistencies between the object dialog and the object property explorer.
- Better transparency in the presentation of objects with the potential of changing attributes at any given coordinate (for example road/ rail)





In the Geo-Database zoom in on the desired reference point and click on it. The coordinates are transferred into the reference point referencing dialogue. Use the mouse wheel to zoom in on the reference point and click to synchronize the coordinates. Proceed the same way with the second reference point. It is irrelevant whether you first click on the reference point in the Geo-Database or in the in the referencing dialog. The reference points are presented in the Geo-Database and in the referencing dialog.

- In the referencing dialog you can zoom with the mouse wheel and also move the viewport when you move the mouse while keeping the mouse wheel pressed.
- In the geo referencing dialog use the button  to transform the coordinate system in a single background graphic.
- With the button **SAVE AS** in the geo referencing dialog you can select the button **OPTIONS** to modify the size of the graphics file. This is helpful when the graphics are very large and threaten to exceed the available memory. The geo referencing files are recalibrating the control points so that it is possible to use this modified graphics in the Graphics without extra alterations.



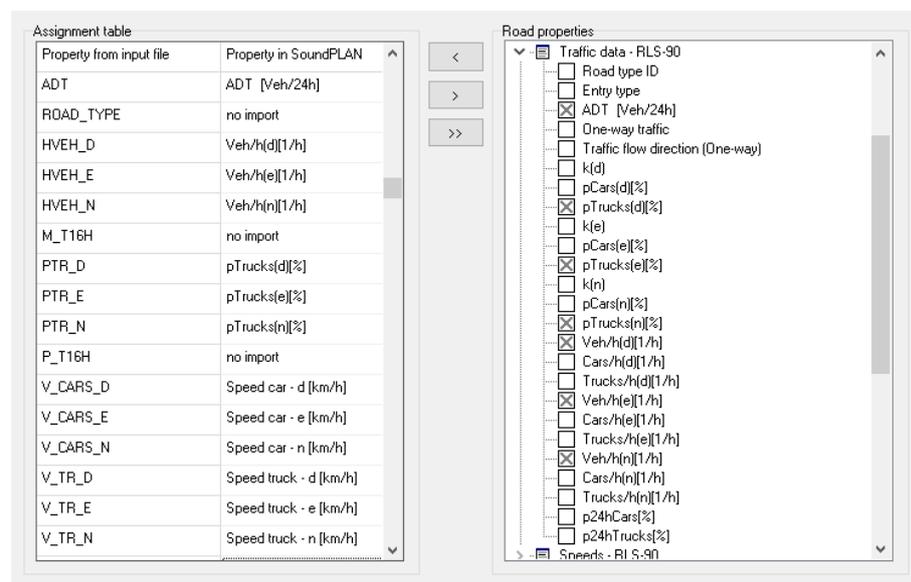
- Depending on the type of graphics file there are additional controls. For BMP, TIF and PNG you can alter the color depth, for JPG the compression.
- **World files** (tfw, jgw, pgw) or SoundPLAN geo referenced \*.grf graphics can be opened via **FUNDAMENTALS -> BACKGROUND BITMAP -> LOAD WORLD FILE(S) (GEO REFERENCING)**. If you keep **Shift-** or **Ctrl-**key pressed, you can load multiple file at once. If a project coordinate system was defined, the transformation dialog opens so that you can transform the background bitmap to conform with the project coordinate system. This way you can read already geo referenced bitmaps and transform them to a different coordinate system.

## Import/Export

- **Road import** (Shape, ASCII): All dependent properties are automatically calculated there is no need any more to generate new columns for example to calculate the % of cars from the total vehicle count and the % of trucks.

Traffic data to be imported can be assembled from data fields available for various data entry types. This means that you can select the data in the import file and SoundPLAN will interpret the data and set the import type. In case there are problems with the import, you can find the description in the Geo-Database logbook.

Example: A dbf or ASCII file contains the average daily traffic and hourly vehicle numbers (M) and the percent of trucks (p) for individual time slots. The assignment table then looks like the screen capture below:

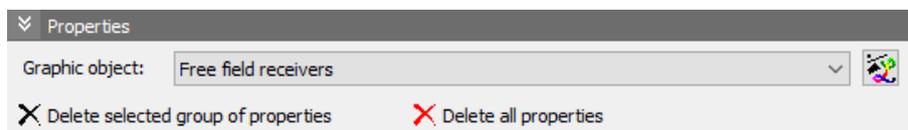


- Importing data associated with assigned properties (Shape, ASCII) there is a change when the assignment of default properties is terminated. Instead of having undeclared values the assignment dialog is re-opened so that you can correct the assignments of properties from the import file to the properties in the SoundPLAN objects.
- In the **Shape file import** it is now possible to jointly import data contained in multiple import files as long as they all have the same object type and property definition.
- **OSM Import** was accelerated considerably.
- In the **OSM Import** now the zip code and city are also imported (additional text data 2+3).
- Import via a search key: In the **dbf import** OK is grayed out when there is no search key, the **ASCII import** dispatches an error message if neither coordinates nor a search key was assigned.
- In the **ASCII import** errors will cause the program to display the line number where the error in the import data was found. Such errors in specific lines can occur for example a wrong search key was detected or a line after the TAB column separator was empty. With the line number errors can be found easily and repaired. In the repair it is helpful to have an editor that displays the line numbers (for example Notepad++ - Download <https://notepad-plus-plus.org/>).

- The assignment dialog of the **Shapefile Export** was simplified, entire branches of the properties can be jointly activated/deactivated. It is also possible to activate/deactivate individual properties.
- **kml Geometry Export**. Open the kml export with **Ctrl+K** OR FILE -> EXPORT -> KML. With the shortcut your standard-kml-viewer (often Google Earth) is opened directly and zooms in on the viewport defined by the coordinates in the objects to be exported. With the menu entry you additionally can enter a file name to for example pass on the presentation to a client. It is possible to export buildings, noise protection walls, roads, rail tracks, parking lots, industrial buildings and also point-, line- and area sources. All objects are exported with absolute elevations. In case the SoundPLAN model has an elevation that is less than the Google Earth Modell, the objects will vanish in the ground. This can be avoided by using a Google Earth (in Google Earth via „Tools -> Options“, field „elevation boost“.

### Improvements with the entry of individual objects

- With the general objects point, line, area and measurement tape the object dialog is suppressed.
- Coordinates entered for an object now can be undone with **ESC**.
- The Geo-Database upon closing a situation saves which object type and active Geo File was used last and upon opening this situation will resume with this setting.
- The graphic-object-type now can be assigned (or defined) directly from the object dialog. Change to this setting with the symbol in the left bottom of the tree view.

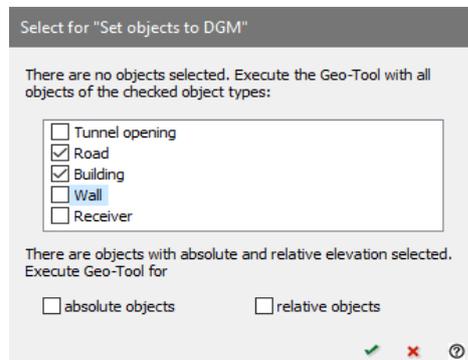


- In addition, the last defined graphics object type will be used when processing the next object of the same type.
- Roads emission calculation: The k-factors (M/DTV) for individual road type in accordance to table 3 of the German RLS-90 are now decoupled from the percentage of trucks so that own entries will not overwrite the road type and the percentage of trucks settings will remain when the road type is modified.
- Change direction of entry: When changing the direction of entry for a road, the properties for bridge width, walls, road cross section, wall heights, reflection loss, additional wall elements and berms with defined slope are now reset to the correct coordinates.
- For traffic lights (signals) (German RLS-90) the position of the traffic light is shown in the Geo-Database when the object type with properties is activated with the button .
- Data entry for sources: For mean frequency data entry it is now possible to obtain dB-filtering. When projects are converted to 8.1, sources with a mean frequency are set by default to dB(A). In the calculation core under the tab *settings* the same filter must be set (dB(A)), otherwise the calculation will abort.
- Under **DOCUMENTATION** -> **SOURCES** the spectra and day histograms of all sources and parking lots contained in the situation are all listed without the need to calculate the situation first.
- Objects that are associated with a local coordinate system now in the object dialog show both the local and the world coordinates.

Geometry							
Height definition <input type="checkbox"/> absolute							
	X [m]	Y [m]	LX [m]	LY [m]	LHabs [m]	Habs [m]	Hrel [m]
1	36196,40	29497,39	0,35	-0,11	-0,26	265,02	-0,25
2	36197,10	29481,90	0,35	-0,14	-0,26	265,02	0,10
> 3	36208,25	29482,41	0,38	-0,15	-0,26	265,02	0,21
4	36207,55	29497,89	0,38	-0,11	-0,26	265,02	-0,06
5	36196,40	29497,39	0,35	-0,11	-0,26	265,02	-0,25

## Geo-Tools and DGM

- **Geo-Tool-Dialogs** and the pre-selection of object types needed for individual Geo-Tools are now using the same selection procedure.



The Geo-Database only interferes when nothing was marked, or a possible error is detected.

There are error messages or logbook entries when for example a DGM is required but not selected or none of the objects required for a certain tool are found in the data or objects are marked that a certain tool cannot process.

- If no DGM is loaded and a Geo-Tool requiring a DGM is started, you can directly load the DGM before the Geo-Tool is executed.
- **Clean up area geometry:** „Clean up building geometry“ was generalized and now is available for all area type objects, it can be found under **GEO-TOOLS -> MORE GEOMETRY TOOLS -> CLEAN UP AREA GEOMETRIES**.

**Generate wall height from top edge** was augmented for walls with the settings for **HORIZONTAL WALL TOP**, **CONSTANT ELEMENT HEIGHT** and **SEGMENT HEIGHT**. The parameters can also be combined with one another.



When you select **HORIZONTAL WALL TOP** the program -if necessary- will insert an additional coordinate at the end of the wall to make sure the horizontal top is correct. The base height of the wall is defined as such that the maximum wall surface is generated. **CONSTANTE ELEMENT HEIGHT** is setting the element height at the end of the wall in such a way that the wall has a constant height, the height of the top of the wall may be variant. **USE SEGMENT HEIGHT** uses the height of the segments and the number of stacked

elements of your choice and sets the base height of the wall to assure that the section's height is a multitude of the segment height. The gap between the bottom of the lowest element and the DGM is regarded as a non-reflective base. All three parameters can be combined.

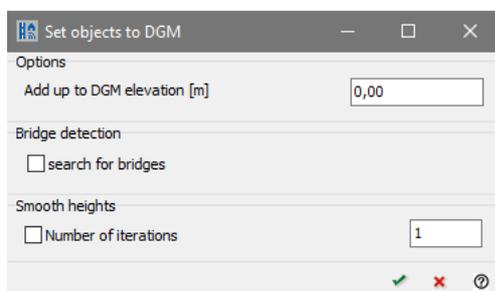
Additionally, you can use the option **IGNORE EXISTING WALL HEIGHTS**. This setting sets the diffracting edge to the z-coordinate, even if a wall height is defined explicitly in the properties. When you deactivate the checkmark and the wall height is greater than zero, the top of the wall will be lifted by the wall height.

- **Bridge detection:** There are now two tools to help with the identification of bridges for roads and railways. One of them can be used when the road/rail gradient is known and the other for when the gradient is not established. Both tools require a DGM that is well fitted to the road/rail.

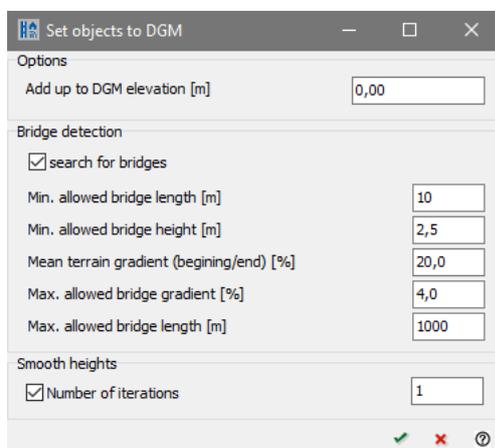
The recognition of a bridge with known gradient can be found under **GEO-TOOLS -> MORE ELEVATION TOOLS -> BRIDGE DETECTION**.



The tool to detect the bridges without knowing the gradient was integrated in the tool to place objects on a DGM: **EDIT -> SET OBJECTS TO DGM**.



When roads or railways are contained in the data, you can click the checkmark **SEARCH FOR BRIDGES** and then define the parameters used in the search.

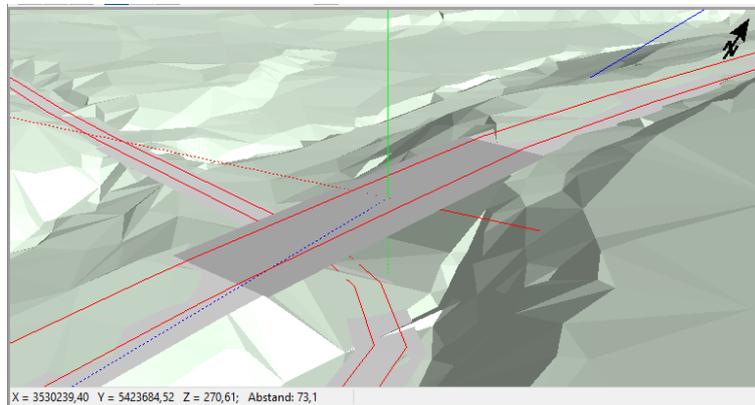


- **Control bridges:** The logbook writes a protocol where bridges are found and what length the bridges have.

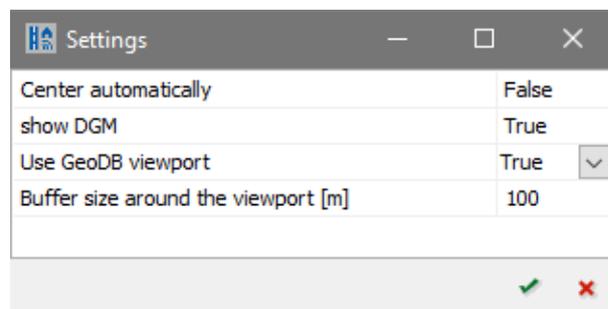
As a warning for the user to check there are messages in the logbook about geometrical situations where the bridge is smaller than half the minimum length or is

one of the embankments has an incline that is consistently smaller than 30°. All other bridges are inserted as a hint. Bridges having a warning associated with them should be manually checked.

In addition to the logbook the 3D-graphics (**Ctrl+F10**) should be opened. With a double click on an entry in the logbook the program jumps to the position of the bridge in the 3D graphics, the view is rotated so that you see the bridge in the side view.



- 3D Graphics in the Geo-Database: Depending on the project size the DGM will be rendered only for the existing view in the Geo-Database. For this reason, the loading times are much shorter for big projects. Via the settings you can define a buffer around the visible area for which the DGM is to be rendered.



- If the situation in the Geo-Database has a DGM that was re-calculated in the calculation core, you will be asked after the calculation finished if you want to re-load the DGM.
- The Geo-Tool „Create embankments“ has been replaced with the calculation run „Calculate objects into DGM“. Activation in the Geo-Database: **FUNDAMENTALS -> DGM -> CALCULATE OBJECTS INTO DGM. (Alt+Ctrl+D)**

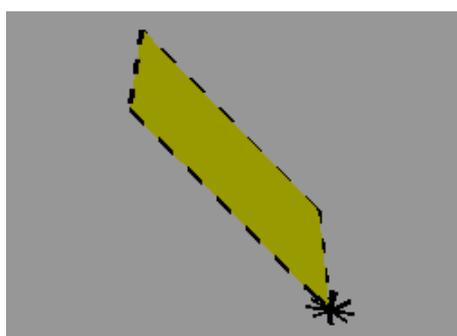
### Pre-Flight geometry check / Logbook

- The geometry check now investigates receivers to make sure a warning is dispatched when receivers associated with a building are higher than the upper edge of the building.
- The logbook now can also load a logbook from the calculation core. With this it is now possible to process errors directly that were not found in the pre-flight geometry check.

### Industrial building and room acoustics

- Sources and receivers inside industrial buildings have received their object numbers back.

- If the geometry of industrial buildings is modified, the program will attempt to retain the child elements of the industrial building, however complex roof structures are discarded, the industrial building will revert to a flat roof.
- Rotation of objects in the industrial building: Tools **MOVE MARKED OBJECTS** was augmented with a rotation angle, the text adjusts. For a free geometrical rotation, press the **Ctrl**-key and move the mouse to the red diamond. As soon as the cursor changes into the „rotation symbol“ keep the left mouse button pressed and rotate the object with movements of the mouse.
- By selecting [Li+Cd](calc)-R in the properties of outside sources and transmissive areas, you can automatically calculate the diffusivity term Cd for “hallout” simulations according to ISO 12354-4 (not for VDI 3670). Cd is included in the calculation of the internal level and is not shown separately.
- In addition to vertical and horizontal objects you now also have **slanted objects**  to your disposal.

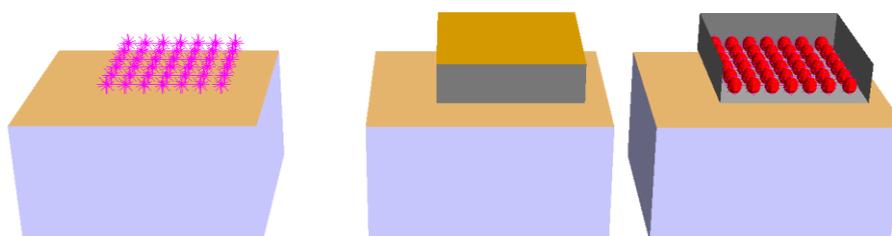


Coordinates			
x [m]	y [m]	z [m]	fixed
12,900	2,400	0,01	<input checked="" type="checkbox"/>
10,600	2,400	5,00	<input type="checkbox"/>
10,600	3,300	5,00	<input type="checkbox"/>
12,900	3,300	0,01	<input checked="" type="checkbox"/>

Enter the area and the distance to the ground. In the second step you select two coordinates from the coordinate list so that a plane can be defined. Enter the elevation of an additional coordinate. For a triangle, this coordinate will be the third coordinate, for a rectangle the elevation for the coordinates not marked as fixed will be set. If the object contains more than 4 coordinates or is a shape that is not rectangular, the elevations are interpolated.

It is also possible to uncheck the checkmark „fixed“ to raise or lower the entire object. If additional coordinates are inserted, the elevations will be set by the program so that all of the coordinates remain on a plane.

- If your project requires a containment of fans/air conditioners in front of the facade or on the roof, you can import the outside geometry with the sources into a building itself. Open up a new industrial building that fully contains the sources. Adjust the elevations so that all outside objects are higher than the floor of the new industrial building. Change from the tab *general properties/room* to the tab *editor*. Click on the symbol **IMPORT** . All point, line and area sources as well as buildings, walls and floating screens that are completely within the new industrial building will be imported.



For sources the spectra and day history will be transferred. Buildings are converted into horizontal and vertical objects. The reflective and transmissive properties must be defined later on for all the new objects.

- Working with background bitmaps was improved. It is now possible to assign one or multiple bitmaps to facades, the ground or the areas of a roof, they can be selected via pick list.



With + additional bitmaps can be assigned/loaded and with – they can be removed from the pick list.

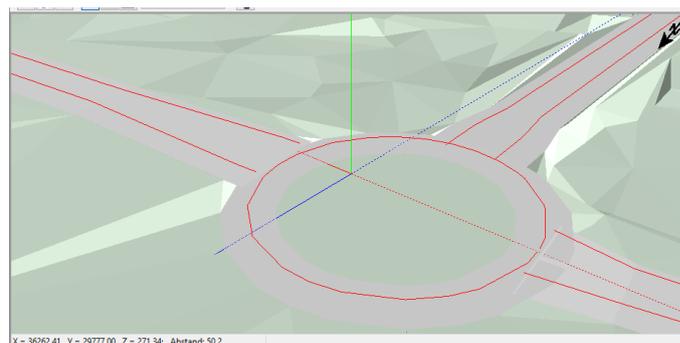
Additionally it is also possible to assign PDF files here and have them converted into a graphic, see „PDF as background graphics“, page 18.

- **Library**

- Deleting multiple elements from a library: With **Ctrl+** left click on the elements you want to delete and then use the red “minus” sign in the navigation bar to delete them. Multiple consecutive elements can also be marked with **shift** and the arrow keys, all elements are marked with **Ctrl+A**.

- **Calculation Core**

- Following the recommendation of the DIN/VDI standardization group NA 001 BR-02 SO, the calculation of the average height of the line of sight above ground  $h_m$  for the alternate calculation procedure of the ISO 9613-2 was defined in a slightly different way than how SoundPLAN calculated this value in the past (The ISO 9613 does not have a definition how to calculate  $h_m$ !). This change can lead to slight changes in the results, especially if the terrain elevation for source and receiver are very divergent.
- Facade Noise Map calculation: The setting to calculate „receivers 2 m in front of the facade“ was taken out.
- Road/railway edge correction during the calculation of the DGM: If roads or railway tracks are part of a DGM calculation, the program will check if at intersections the road/rail edge of one road/rail will fall within the surface area of another road/rail. If there are coordinates found laying in another road/rail area, they will be discarded during the triangulation. This new procedure will avoid error warning messages showing possible conflicts even though the road/rail master alignment was derived by placing the coordinates on top of the DBM.



- The DGM calculation now also will incorporate parking lots, area sources and berms that were entered with absolute elevations. If this is the case the program can

suppress elevation points within the confines of these objects. For berms the calculated lines of the berm top (front and back of the top) are incorporated into the DGM, for parking lots and area sources the coordinates of the perimeter. Additionally you can check the box „road center divider“, if the elevations within the central reservation shall be incorporated into the DGM or not.

- With the new calculation run „Calculate objects into DGM“ you can use an existing DGM and augment it with additional information of several object types (road edges, edges of railway tracks, parking lots, area sources and berms).

Calculation type:  
 Geometry | Calculate objects into DGM

Data:  
 "007\_Berm at railway.geo" "003\_Roads Prognosis.geo"

DGM:  
 "RDGM0004.dgm"

Calculate embankments

Slope downwards / upwards: 1:

Additional distance to object edges [m]:

Object types to be used for DGM calculation

- Road edges
- Railway edges
- Parking lot
- Area source
- Berms

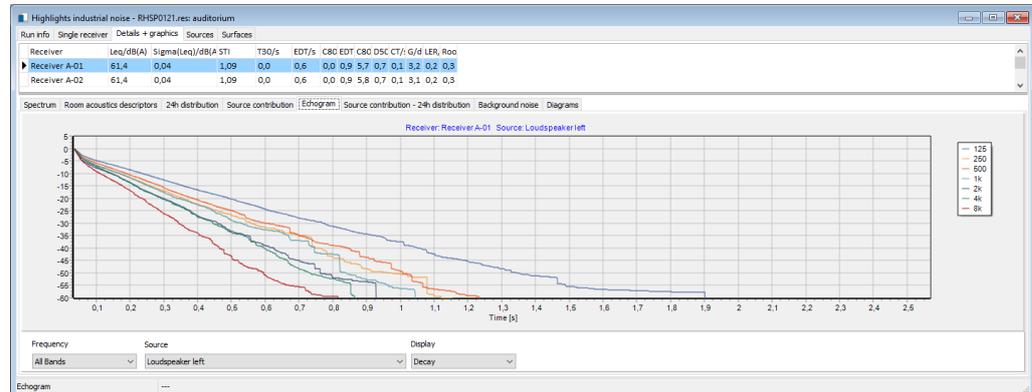
Additionally, embankments can be incorporated into the DGM. The program will search for embankments up to a distance of 100 m from the road/railway edge. In order to create the embankments, the height of the fill/depth of the cutting must be greater than 0.5 meters for a distance of 5 meters along the road/rail edge. This calculation run replaces the Geo-Tool „Create embankments“ and also can be started from the Geo-Database via **FUNDAMENTALS -> DGM -> CALCULATE OBJECTS INTO DGM (Alt+Ctrl+D)**

### Room acoustics

- In the absorption spectra it becomes a requirement to define a scattering coefficient for each frequency in the absorption library (minimal value 0.005). If no valid coefficient is found, the calculation will terminate. With the button in the absorption library the scattering coefficient can quickly be estimated from the surface roughness.
- The calculation speed for the room impulse response was increased.
- For Grid Noise Map calculations the calculation of the reverberation time now uses a linear regression method to allow faster convergence and to save memory space. With these new algorithms we can avoid running out of memory as it was sometimes the case in the past.
- For single receivers and measurement path this linear regression method is now the default setting. For the calculation of echograms in accordance to the Schroeder method in the tab *EPS* please check the appropriate box.
- The calculation was also accelerated with the new options in the calculation properties:
  - Under the tab *Grid Noise Map* you can define a minimum distance between a grid point and the surfaces.
  - Receivers equal to the background noise can be ignored (tab *Indoor noise*).
  - The near field correction can be deactivated (tab *Indoor* noise).
- Diverse improvements, more informative error and warning messages.
- Resume calculation is now a bit more flexible.
- Clarity C50 is a new result that can be simulated.

- **Result table – room acoustics**

- The echogram of the room impulse response is available as a diagram in the result table. You can select weather you want to see the raw data, the decay time or an additional regression line. Additionally, choose single frequency / single source or all frequencies all sources.



- Extended documentation of the material properties and the equivalent absorption areas.
- Documentation of user defines and source defined sounds and signals.

- **Distributed Computing**

- The port numbers for the control of Distributed Computing are now preset to different value for the 32 bit and 64-bit versions. This allows the concurrent use of both SoundPLAN versions with Distributed Computing. 32-bit version: 58132 for the control and 58131 for the master; accordingly, the 64-bit version uses 58164 and 58163. All other settings remain identical for both versions.

- **Distributed Updates**

- In the dialog „distribute updates“ there is now a button **DOWNLOAD UPDATE** that will fetch the latest update from the external update web page.

- **Spreadsheet**

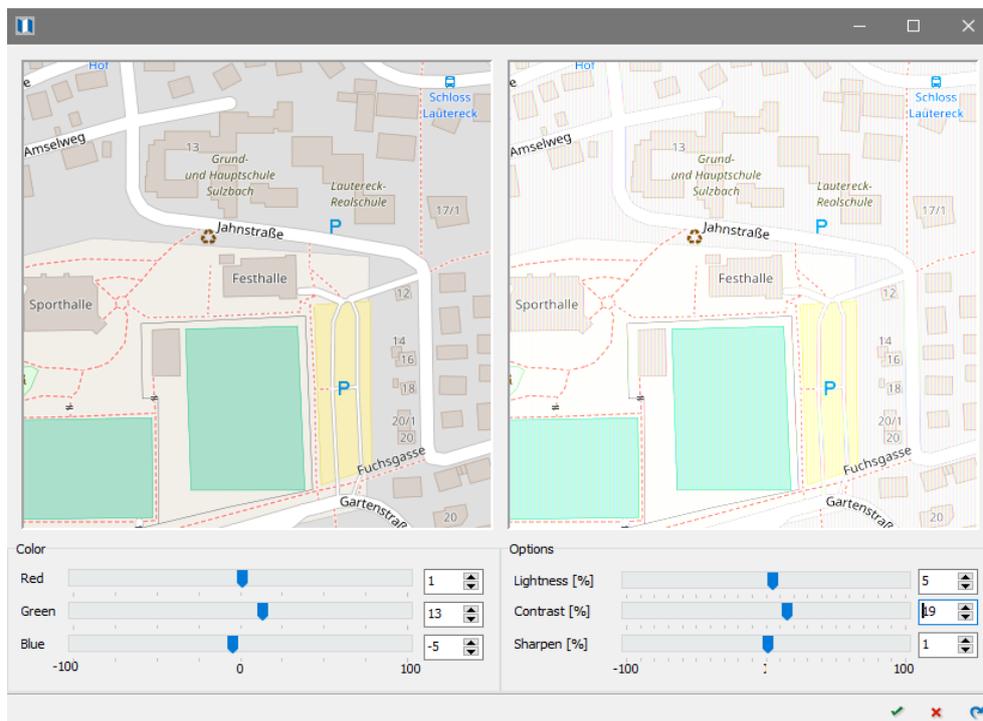
- Rounding: instead of the mathematical round the „normal“ round function now will round down values below 0.49999 from 0.5 the value will be rounded up.
- Improved error messages when an error is detected in a formula. The cursor will jump to the cell causing the error. The error description contains the line number where the error was detected.
- All value and Boolean columns in the table can now act as filter columns. Additionally, you can define a column to check for conflicts.

Filter column	18: Prognosis Day in dB(A)	▼
	<input checked="" type="checkbox"/> use filter for all time slices	
Conflict column	14: Limit Day in dB(A)	▼

- **Graphics**

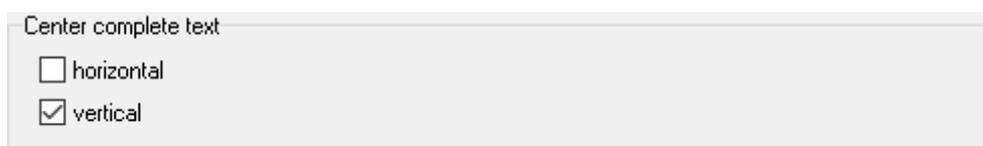
- With **Shift+Ctrl+C** you can copy a sheet or plan directly to the clipboard.
- When taking a legend from one sheet into other sheets it is now possible to alter the legend texts of the plan object types for derived object types. Manual changes to legend texts contained in the legend will not automatically overwritten.

- A new plan will not insert a legend if the check box „amend“ is deactivated or if no object type has the box „Show in legend“ clicked.
- Brightness, contrast, clarity and color components of bitmap files can now be post processed in a graphics box.

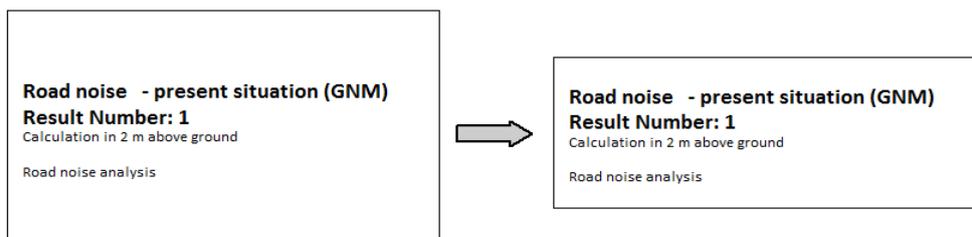


- Additionally, this tool allows the user to select and convert PDF files. See „PDF as background graphics“, page 18.
- The entire text in text boxes can be centered horizontally and vertically even if the text contains complex paragraph layout.

In the parameters to set the properties of boxes the tab edge contains the parameter to center the content, in this case the frame width will be ignored.

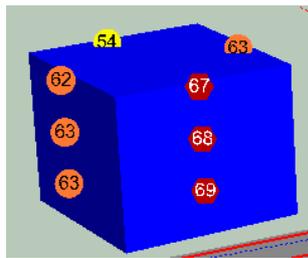


When enlarging shrinking the text box, the text font is adjusted accordingly.

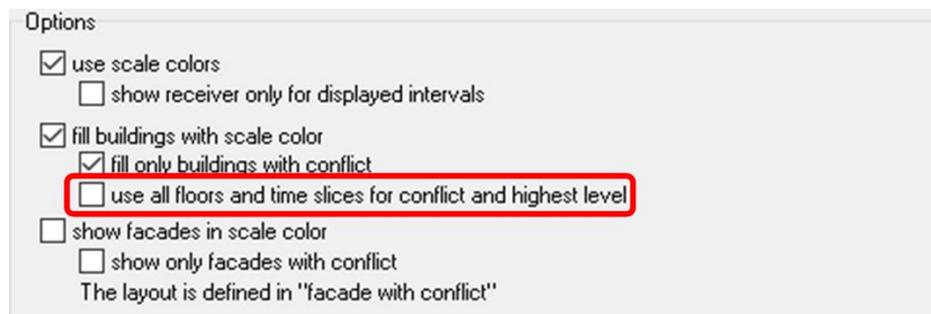


- When you use nested text boxes, please observe that the text boxes are not checking the visibility, if there is a free space it may be sensible to fill these areas with empty text boxes that are „fitted“ to the gap.

- For the level description in 3D the text color will be inverted if the contrast to the scale colors make this necessary.



- The anchor position of the line connecting the facade receivers to the single receiver result table will not be moved if you press the **Ctrl** key when moving the table.
- In the symbol bar of the sheet tree you can duplicate multiple sheets by clicking on the symbol . This way you can save a sheet under a new name and then load it using the right mouse button into a map of the sheet -> FILE SELECTION to modify the time slot without loading the sheet.
- The preview bitmap in the sheet tree now is saved in a bigger size than before (400 pixel for the longest side). For already existing sheets this bitmap is only updated to the new size after loading the sheet and saving it. You can modify the settings in PARAMETER -> BASE SETTINGS in the tab *Sheet*.
- Facade Noise Map: If you want to show the buildings in scale color it is now possible to search for conflicts amongst all floors of the building and for all time slots.



- In the file operations the extended formula entry now has a more uniform syntax for the calculation types. For the Grid Noise Map the syntax is as follows:

GNM(No, time slice No. [,group no][,frequency No][:time step])

Additionally, the keys for the calculation types are simplified

- GMN -> GNM
- GMO -> GOP
- FMN -> FNM

- **BA-facade**

- Like in other places of the program it is now possible to select PDF files as background bitmap, see „PDF as background graphics“, page 18

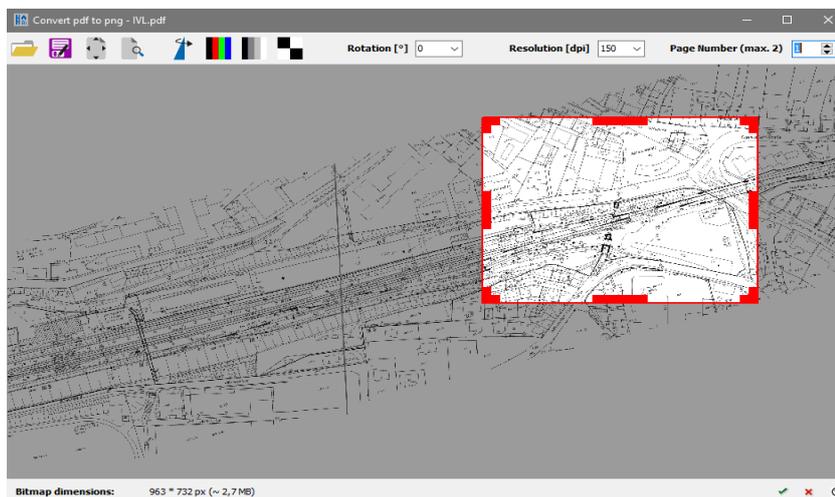
- **New module: Noise at workplace**

The new module noise at workplace is a powerful tool to assess the noise exposure of workers who are exposed to different noise levels at different places during the work day. The noise dosage is calculated, and documents see page 19 „Noise at Workplace“.

## Modifications in detail

### PDF as background graphics

Plans available in PDF files format can now be used directly as a background bitmap in the Geo-Database, the industrial building, BA-Façade and a graphics box in the SoundPLAN graphics. If the PDF file contains multiple pages you can select which page to convert for the background bitmap; additionally, you can save view ports - for example to cut out the plans description box or to save the top view and the projections of buildings in separate files.

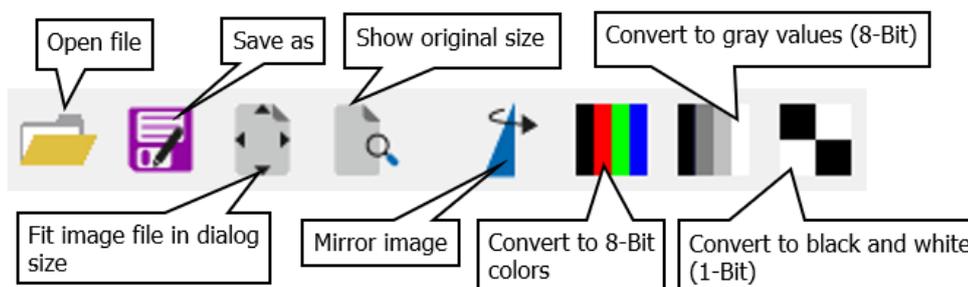


Click on the green checkmark or press the enter key to convert the entire page into a bitmap. By default, the file name for the bitmap is the same as the name of the PDF file, however you can also customize the file name.

To convert only a portion of the PDF page, please use the left mouse button to pull open a frame around the area you wish to convert. If this area is sufficient, click on the green checkmark and enter a file name for the graphic.

 If you want to convert multiple parts of the same page, use the mouse to mark this portion and then select **SAVE AS** and enter a file name. In this case the PDF convert dialog remains open. Move the frame to the next area you want to save. If you re-use the frame, the size of the bitmap will remain the same size, if you need a different area, pull open a new frame with the mouse. With **Esc** or by clicking outside the frame, reset the selection.

Further options:



Select to show the file either in **ORIGINAL SIZE** OR **FITTED TO DIALOG SIZE**. **MIRROR PICTURE** is useful for example if you want to change the assignment of the bitmap of a ceiling in the industrial building to show the view from above.

The PDF section is first converted to a 24-bit bitmap as at this time the required number of colors of the PDF file is not known. If the color resolution exceeds your needs or the PDF has less unique colors, you can reduce the color depth of the bitmap to make the file smaller.

Additionally, you can rotate the PDF file and change the resolution of the conversion. For most PDF files the default setting of 150 dpi is sufficient.

In the status line of the dialog you can see the dimensions and the estimated size of the bitmap in MB / kB.

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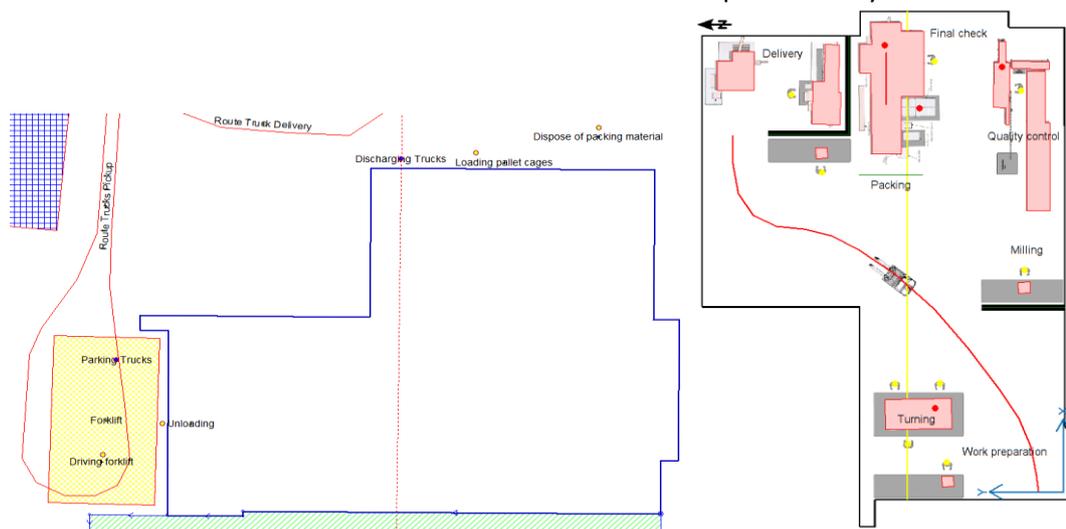
## Noise at Workplace

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Noise at Workplace is a powerful tool to assess and document the noise dosage of workers exposed at different stations/locations to varying noise levels. The graphical presentation of the situation helps with the assignment of work stations to workers. Each worker can be assigned multiple work stations, they can be in the same industrial building or a different industrial building or outside of the building. The duration of the work at different stations is set individually for each worker.

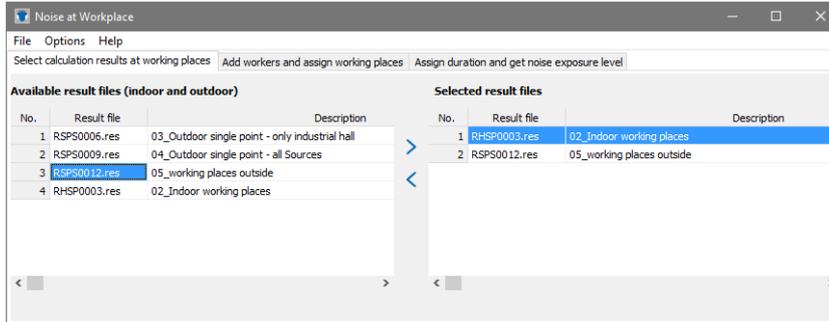
Noise at Workplace at the moment is part of the industrial noise module but SoundPLAN reserves the right to at a later stage when additional tools for noise at work are developed, convert this module into a separate module with its own price. During the life time of SoundPLAN 8.1 Noise at Work will for sure remain part of industry noise.

To prepare the assessment of the noise exposure for workers, the sound pressure level for all work stations must be calculated. Each work station is represented by a receiver.



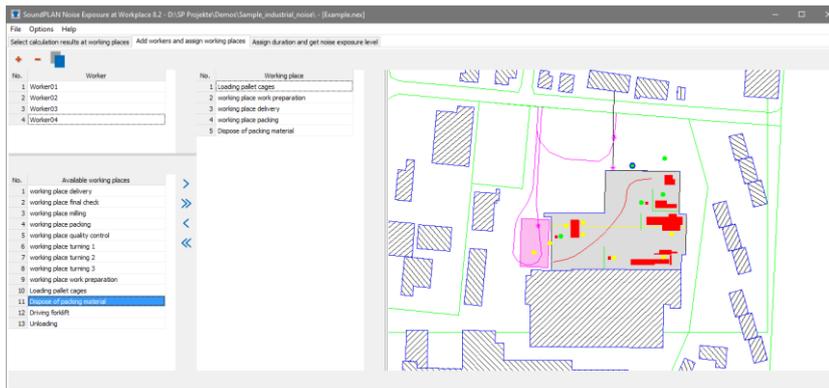
For work stations outside please calculate the single receivers for environmental noise outside, for work stations in a factory building an Indoor Single Point calculation is required.

After the pre-calculation for the work station, start Noise at Workplace from the SoundPLAN Manager EXECUTE -> NOISE AT WORKPLACE.



In the tab *selected calculation results at work stations* the left side hosts all single point receivers for inside and outside. Using a double click or the blue arrow, transfer the required calculation runs to the right side.

Click on the second tab to *add workers and assign them to work stations*.



The top left offers a red + to add additional workers. With a click „worker01“ is highlighted in blue, you can now assign a new name to this worker.

In the lower list the work stations (activity, job) from the assigned calculation results are listed. Assign the activities over the course of the work day to the workers at the various work stations. Individual activities are assigned with a double click or the blue double arrow, multiple activities require marking them with the **Shift** key for individual and the **Ctrl** key for consecutive activities.

The graphics on the right show all work stations assigned to the worker in green, work stations not assigned to the highlighted worker are presented in yellow. With a double click on a work station you can also assign this work station to the active worker.

The Assessment of the noise dosage is done under the tab *assign duration and get noise exposure levels*.



The table on the bottom contains a list of all work stations assigned to individual workers along with the sound pressure levels found at these work stations. For each worker the proportional work time is listed for each work station for each hour.

Set the **DURATION** to min/h or %. Additionally, assign a noise reduction for example to accommodate work stations where hearing protection is required.

The **DURATION** describes the length of the averaging time which is part of the assessment of the noise exposure limit. The allowable **LIMIT** is the constant noise level equivalent over a period of an 8-hour shift. Most standards foresee a noise limits between 80 and 90 dB(A) for the duration of 8 hours. If the noise dosage is exceeding the limit, the duration must be reduced, or noise protection must be used to avoid violating the noise dosage limit. The **HALVING PARAMETER** is the value in dB, used for doubling the noise level / noise exposure time. In the literature the most common value for this parameter is 3 dB. If the USA OSHA deviated from this rule and set this parameter to 5 dB.

From this parameter and the work time at various work stations the table calculates the noise exposition level  $L_{ex}$  and the noise dosage for each worker.

Both tables can be copied using the left mouse button into the clipboard to be inserted in your documents and presentations.