
SoundPLAN

Update News 7.3



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SoundPLAN International LLC
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New in version 7.3 - Noise

SoundPLAN is now available as a native 64-Bit-program!

With this version it is now possible to process projects without a limit to the size (depending only on the size of memory installed in your computer). With this development some special tasks (big DGM) and huge projects are possible without any restrictions.

For everyday life we still recommend to also install the 32-bit version as long as two problems for the 64 bit program still exist:

Google Earth at the moment is only available as a 32-bit-version and therefore cannot be started from the 64 bit variant. In some systems OpenGL also is causing some problems in the native 64 bit version.

The 32-bit- and the 64-bit-version can be both installed on the same PC, projects can be opened from either variant. If needed you can edit the project in the 32 bit version to have access to Google Earth and make your calculations in the 64 bit variant to have access to more data space.

Highlights

- ⌚ **System-, project- and global libraries are now administered from a single window**
- ⌚ **(small) wishes from customers have been incorporated**
- ⌚ **The result table has an new, improved preview**
- ⌚ **Result table: Ctrl+C copies data directly into the clipboard**

Highlights for some modules:

- ⌚ **Radar tracks as input for aircraft path for the aircraft noise**
- ⌚ **A module “corona noise” will be available in the course of 7.3**

The version 7.3 not only offers improvements for noise simulations but also offers improved tools for air pollution simulations. These changes are documented in a separate update text.

News in an overview

• General

- Run file table, attribute explorer, library tables and others:

A double click on the „splitter“-cursor between two columns will optimize the column width of the left of both columns.

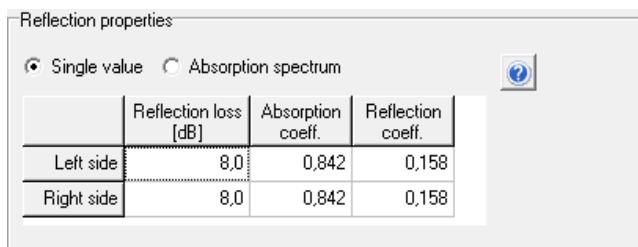
The screenshot shows a table with several columns: ID, Selected, Building type, Name, and Numl. A double-headed arrow cursor is positioned between the 'Name' and 'Numl' columns. A callout bubble labeled 'Double click' points to this cursor. To the right, the table is shown again with the 'Name' and 'Numl' columns merged into a single wider column, demonstrating the result of the double click.

ID	Selected	Building type	Name	Numl	ID	Selected	Building type	Name	Numl
0	1	2	3	4	686	<input type="checkbox"/>	Main building	Thomas More Street 7	27
690	<input type="checkbox"/>	Main building	Thomas More Street 6	22	690	<input type="checkbox"/>	Main building	Thomas More Street 6	22
687	<input type="checkbox"/>	Main building	Thomas More Street 5	26	687	<input type="checkbox"/>	Main building	Thomas More Street 5	26

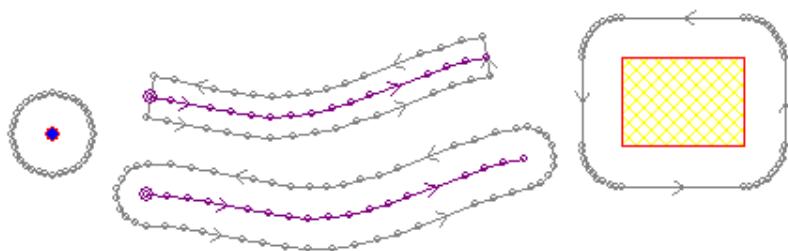
- Turkish coordinate systems have been added to the coordinate and reference systems. If you miss a special coordinate system, please feel free to contact us and we will try to provide it.

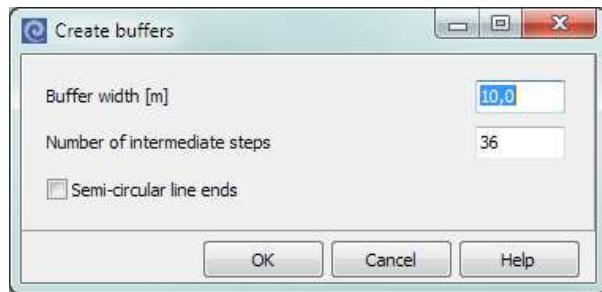
• Geo-Database

- Right mouse button -> **PLACE OBJECTS DIRECTLY ON THE DGM (Shift+Ctrl+D)** directly calls the coordinate function h=DGM. The dialog only requires a confirmation.
- The entry of the **reflection loss** for noise protection walls, bridge walls and walls of floating screens was redefined; see **Fehler! Verweisquelle konnte nicht gefunden werden.**, page **Fehler! Textmarke nicht definiert..**



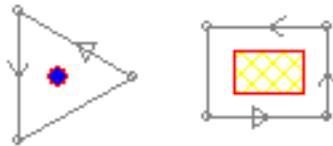
- All saved attribute assignments from Shape files and ASCII import can now be revoked at once using the double arrow .
- For the import of DXF-files the layers now are shown in alphabetical order.
- With the **shift key** pressed the function **capture coordinates** (move a selected coordinate with the right mouse button pressed to another coordinate) will only move the X,Y coordinates but not the elevation to the new location. This is particularly helpful if you have stacked area sources that should be at the same location but different elevations.
- **GEO-TOOLS -> MORE GEOMETRY TOOLS -> CREATE BUFFER** now allows generating buffers around points and existing areas.





The **BUFFER WIDTH** in [m] is the distance between the marked object and the border of the buffer area. Via the **NUMBER OF INTERMEDIATE STEPS** you determine how detailed arcs are generated with regard to 360°. For example if you set 36 intermediate steps for a point object, you will get an approximation of a circle with 36 coordinates (or an angle of 10° between coordinates).

Examples: With the setting 1 intermediate step for area-type objects the corners are not radiused. The setting 3 for a point object will result in a triangle.



The switch **SEMI-CIRCLE LINE ENDS** will cause the ends of a line to be set as a half circle.

- **Shape-file-import:** Shape files with Triangle Strips and Triangle Fans

When an object consists of triangle stripes or triangle fans, most of the time the object is a completely 3D surface approximated with triangles. With the exception of the object types „area“ and „building“ the triangle stripes and triangle fans are ignored.

For the object type „area“ each triangle will become a unique stand-alone triangle. After importing, SoundPLAN does not know any longer that all triangles once formed a single object, that connection has been lost.

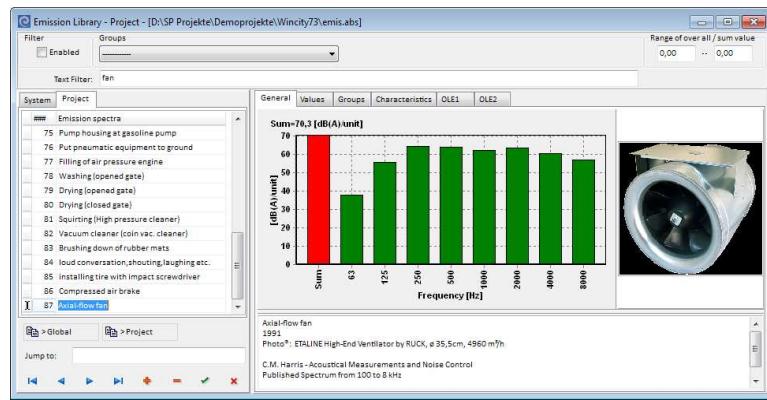
For the object type „buildings“, all triangles of the object are imported. In a second step the program searches for the smallest z-value of the triangles and from this information tries to establish the footprint of the building.

- **Calculation core**

- Modifications in the standard CoRTN and adaptations to how it is applied in North South Wales (Australia), see page 12.
- Aircraft noise in accordance to DIN 45684-2011 and ECAC Doc. 29 3rd Edition
- The file operations with grid and facade noise maps were up to now only located in the Graphics. Now they are additionally included in the calculation core. This way it is possible to save the file operations without restrictions (which was so far only possible for not tiled grid operations). The check box „save“ in the Graphics is therefore obsolete, see „**Fehler! Verweisquelle konnte nicht gefunden werden.**“, page 10.
- There are additional settings for ISO 9613-2, see page 11.

- **Library**

- System-, project- and global library are now hosted in a single window with tabs for each library type.

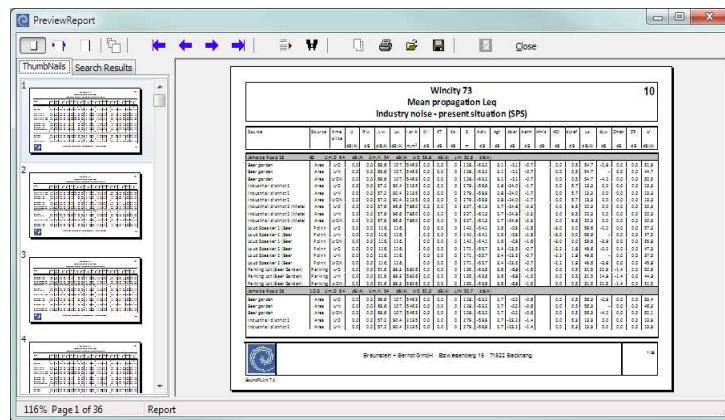


In principle the handling has not changed. With the buttons **COPY TO GLOBAL** and **COPY TO PROJECT** the possibilities of moving data between the different library types became more transparent. The global library is only generated after you copied an element to global.

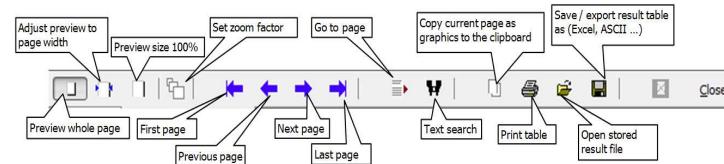
In addition to this the libraries no longer are opened „via COM“ so it is now possible to close the libraries at any given time.

- **Result table**

- **Ctrl+C** copies the currently open table to the clipboard (previously only accessible via menu **TABLE -> EXPORT -> TO CLIPBOARD**). **Ctrl+Alt+C** opens this table directly in Excel.
- New preview and text search:



New symbol bar:



With the text search you can search for any text string contained in the table, for example to search for a specific receiver. Under the tab *search results* you will find all pages where the search string was found. With the check box **MATCH CASE** checked, only texts are found with identical upper/lower case.

Via the symbol the currently active page of the table can be copied to the clipboard as a graphics.

- **Spreadsheet**

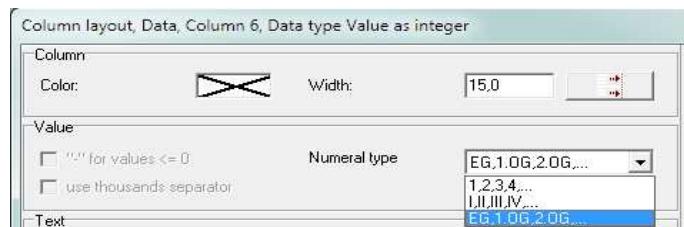
- „Block End“ has received a dedicated reference column (previously the same reference as the „Block Beginning“) so that multiple block end definitions are possible within one block.

- With the keyword **STATPosition** you now can access the statistics from within a formula, for example to use the total number of exposed people within a formula.
- The keyword **NEWcolumn number** in the formula makes it easier to pol a column for a changed content.

If NEW7 then ... means „if a values in column 7 differs from the previous line, then ...“

With this new keyword the keywords „First row“ and „PR“ can often be replaced.

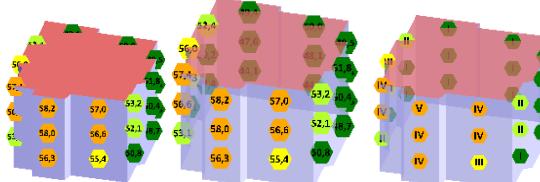
- The presentation of the **floor column 6** (integer column) in the column layout as „ground, 2. Floor, 3. floor“: For the formatted display, you do not need to generate an extra text column for this any longer, the floor description from **OPTIONS -> SETTINGS** in the SoundPLAN Manager are used.



- **Dbf-files** do no longer have to be placed in the project folder to be visible, via **FILE -> OPEN DBF-FILE** you can open the file from any folder.

• Graphics

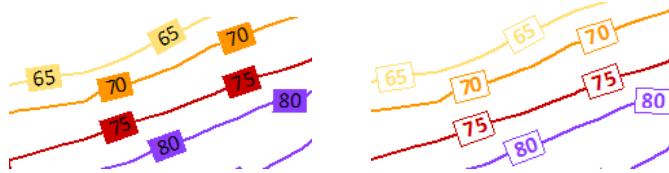
- Noise levels, conflict values or scale interval numbers of a Facade Noise Map can now be presented in the 3D-Graphics as a facade mark.



With the switch **ALIGN TO CONTOUR LINE** the text labels can be either aligned with the contour line or aligned with the sheet.

Via the **DISPLACEMENT** of the text by 1/2, 1/3 or 1/4 of the text label spacing, it is possible to avoid congestion of labels.

Optionally set the text background or text frame in scale color:



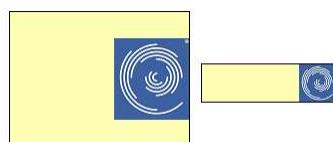
- Within „Edit content“ of a text box, color scale or legend it is now possible to activate the settings for the element.



- When opening a second object type file the windows are reorganized to keep them better organized.
- The printout of graphics to PDF files was optimized (the PDF is now much smaller).
- If a non-aligned color scale is moved out of the plan to a group box with the **Ctrl key** the reference between the scale and the data is maintained. For this reason it is no longer necessary to re-define the scale when the scale is moved with „cut + paste“ into a group box.
- This re-organization has a positive side effect: With **Ctrl Move** you now can change the reference between boxes and their parent element. In the sheet components (**F6**) you can instantly see the new hierarchy. The sheet itself is exempted from this logic, you cannot move entire boxes from other places to this element.
- Aligning **bitmaps in graphics boxes** with the attachment (left, right, top and bottom) was improved. The bitmaps are now remaining true in X and Y.

As soon as the settings for alignment are selected, the mark **FIT GRAPHICS IN THE BOX** becomes active.

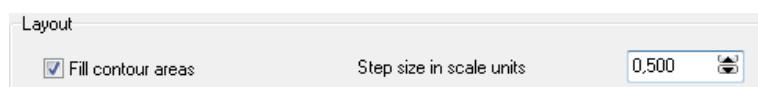
For the alignment to/bottom the picture is located centrally in the parent element. For the alignment left/right the picture is centered vertically.

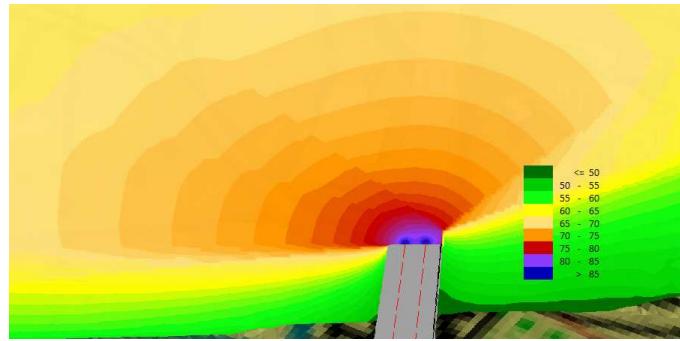


When a parent box is enlarged, the picture will remain centered with the existing scale, if the box is shrunk in size, the picture will be scaled down to fit the new space if it would exceed the size of the parent box.

With shrinking/enlarging the graphics box the ratio of X/Y will not change, if needed the picture is scaled down to make it fit the box.

- If you use the area type presentation of contour lines and activate **additional intervals** in the object types and check the box to **FILL CONTOUR AREAS**, this setting now will also be used for the 3D solid models.





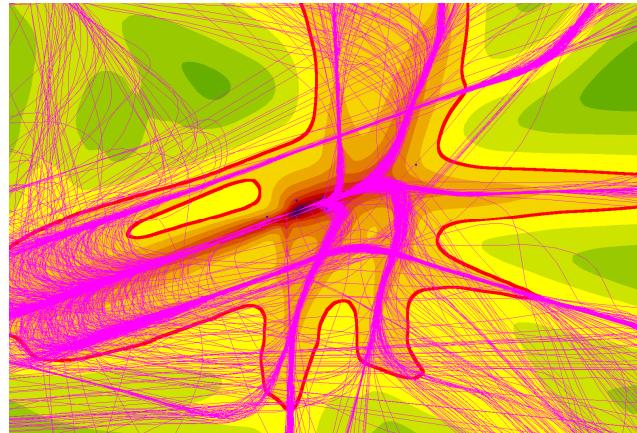
With extra intervals



Without extra intervals

- In the Facade Noise Map it is now possible in the file selection manager to set the lowest noise level for the receivers.
- For Meshed Noise Maps a new text variable is available for the selected frequency or frequency range.
- **BA Facade**
 - The layout types are now saved in the project, it is now possible to work here with project object types and the global object types.
- **Aircraft Noise**
 - Import of radar tracks in the formats Fanamos, Stanly and Topsonic.
 - This way it is now possible to calculate the noise directly on the basis of the imported radar tracks according to the AzB-2008 and ECAC Doc. 29 3rd edition. This is a very efficient and precise procedure to analyse past situations.

The noise maps can be calculated for any single flight or a user defined time frame.



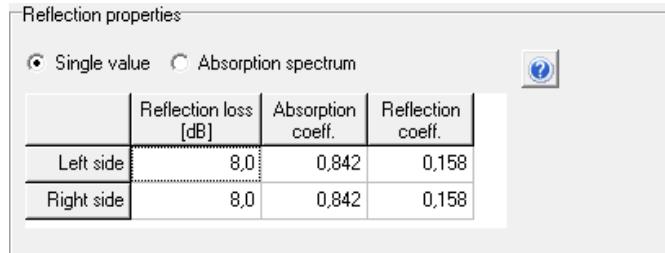
The above map shows the flights for one day.

News in detail

Reflection loss for noise protection walls

In the wall properties the reflective properties of the wall are listed, as walls have two sides, the properties are listed for the left and the right side. (Left and right side as seen in data entry direction).

The reflection loss can be defined either as a single value or as an absorption spectrum from the SoundPLAN-library.



Reflection properties as a single value

The reflection properties are dependent on the material of the wall. You can enter the reflection loss in dB or the absorption coefficient or the reflection coefficient. When you enter a value, SoundPLAN calculates the other two from your entry.

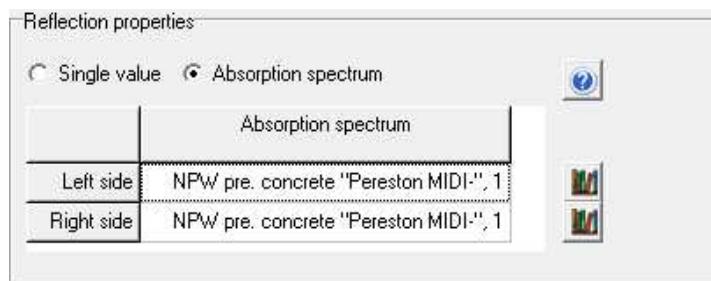
To ignore any reflections use a reflection loss of 200 dB.

For traffic noise you normally do not need a spectral calculation of the reflection, you can use the following reflection loss settings that the German RLS 90 defines:

Wall type	Reflection-loss in dB	Absorption-coefficient α	Reflection-coefficient
Hard (fully) reflective (concrete, glass)	1	0,206	0,794
Absorbent noise protection wall	4	0,602	0,398
Highly absorbent noise protection wall	8 - 11	0,842 - 0,921	0,158 - 0,079

Reflection properties from the absorption library

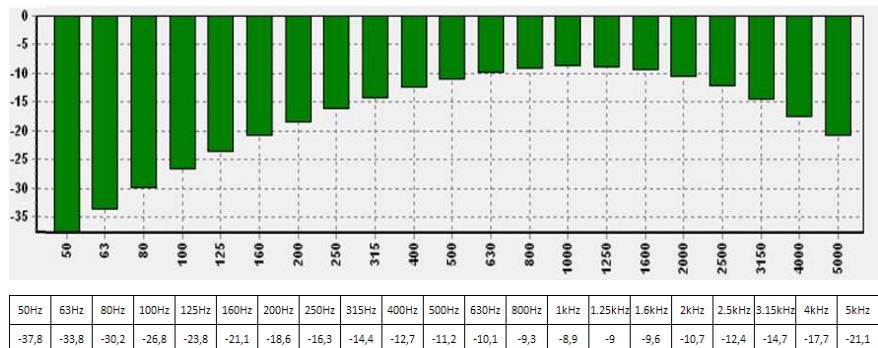
For the spectral calculation of reflection losses (only possible for standards with calculation frequency by frequency) the program will use the data from the absorption coefficient library. Open the absorption library with the symbol button.



The program will either use a single broad spectrum value or use the entire spectrum. When you activate the spectral calculation, the single value will be ignored!

For calculations that contain spectral and non-spectral sources, SoundPLAN applies the following logic: If a wall contains an absorption spectrum, it will be used directly for all sources that are entered with a spectrum. Sources without a spectrum will use a mean absorption value which has been derived from a reference spectrum for traffic noise. The

reference spectrum for traffic noise has been taken from the Japanese road standard ASJ 2008 (Third octaves in dB(A)):



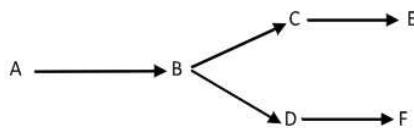
Generating tracks for calculation of Lmax-Rail

From the entered railways SoundPLAN tries to build up tracks to be used for Lmax calculation. The first and last coordinate of a railway is declared as a knot. If two railways have the same first or last coordinate (within a tolerance of 1 cm) they are linked to the same knot. Now each of the knots might have some ingoing links to knots and some outgoing links to knots, depending on the direction of entry.

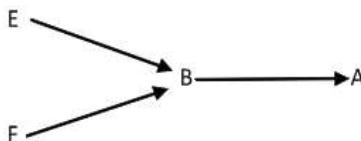
Trains always travel in the direction of entry. The direction of traveling is very important because the speed of trains and the speed of sound are taken into account (except Nord2000 simplified Method).

Tracks are built up by following the knot links, starting at a knot which has only outgoing links.

Examples (the letters stand for knots; the arrows are links to knots):



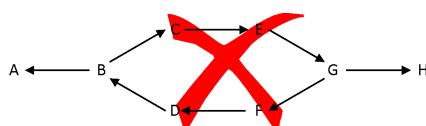
will lead to the two tracks: A>B>C>E and A>B>D>F



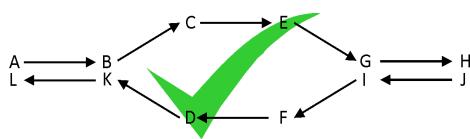
will lead to the two tracks: E>B>A and F>B>A

The knot B represents a switch.

If the railways are entered the way that there is no knot having only outgoing links there is no track at all. Therefore these trains won't contribute to Lmax at all!



If a train object is travelled by trains in both directions you should actually create a parallel train object (with a distance of more than 1 cm) and invert direction of entry. For tracks with switches, this is absolutely mandatory.



The best way to check that all trains have been correctly recognized is to calculate a Grid Noise Map or an animated noise map.

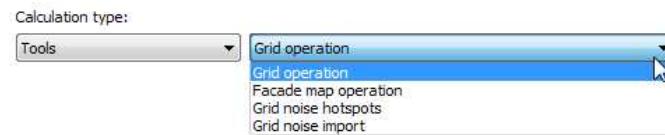
Save file operations

File operations can be executed either in the Graphics and in the Spreadsheet or in the calculation core. If you want to store the result of a file operation, it is mandatory to use the calculation core.

If you have for example calculated road and railway noise independently and want to further evaluate the overall noise level, it is mandatory to store the file operation. Only this way the Spreadsheet and the Graphics can further process the result of the operation. By this it is possible to generate inhabitant or area statistics for summed-up results.

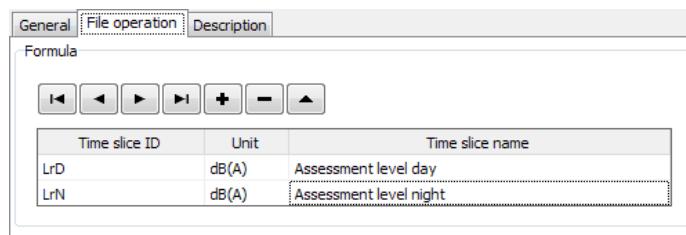
Go to the calculation core and add a new calculation run. In the tab index card *General* enter a run title and select from the calculation type **TOOLS** the **GRID OPERATIONS** or the **FAÇADE MAP OPERATIONS**.

For façade map operations the data entry as well as the DGM selection is invisible. For grid operations you can optionally assign a DGM. This is not necessary, if you use SoundPLAN grid noise maps as base files, because the elevations are automatically taken from the grid noise map. If you anyway assign a DGM the grid elevations are newly determined. The selection of a DGM is sensible, if you use ESRI-ASCII grids (which don't have elevations) as base files. This way ESRI-ASCII grids are supplied with elevations during the grid operation.



Go to the tab index card *File operation* and enter a new file operation with .

A calculation run can host several time slices or different operations.



The dialog to define the file operation is opened automatically. Fill in the file operation as described in "Procedure for the file operations" in the chapter Graphics.

If you define file operations with several time slices, the grid map(s) used as base file(s) must cover the same (calculation) area for grid operations; for façade map operation(s) the façade noise maps used as base map(s) must contain the same receivers.

Enter a time slice ID and a time slice name and change the unit if necessary. This information is displayed in the Spreadsheet and Graphics file selection manager and can be used as text variables in the Graphics.

Optionally you can use the formula of the file operation as time slice name, for example to document the selected operation. To do so activate the check box **USE FORMULA AS TIME SLICE NAME** in the file operation dialog.



Use to edit the file operation of the current time slice. With you add a new time slice and access the dialog to define additional operations.

Use to delete a file operation.

When calculating a facade map operation all information for the receivers is taken from the base file(s). The limits are only filled in if the number of time slices in the file operation definition is the same as number of time slices in the base file(s).

Grid and facade map operations are stored with the file names RROPxxxx.RES (grid operation) or RGOPxxxx.RES (façade map operation).

Hints: If you received ESRI-ASCII grids for different time slices you can import them with the file operations to the SoundPLAN grid structure.

Additional settings for ISO 9613-2

Experts know: ISO 9613-2 is not perfect and has some contradictions. The equations 16 and 17 led to discussions in a concrete case of a development plan. The reason was that a „no“ was filled in in the SoundPLAN declaration of conformity for the implementation of these two equations.

There is the following problem for the use of equation 17 of ISO 9613-2 in a calculation program, which has to deal with simple and complex cases:

The extra path length over one or more edges is a figure of merit in calculating the insertion loss. The extra path length is defined as the difference of direct distance between source and receiver and the shortest path around one or more edges. The shortest path is not necessarily in the cutting plane defined as vertical plane in which source and receiver lie. Therefore in ISO 9613-2 an equation is given to calculate the shortest path length. This equation only holds for parallel oriented edges and not for the general case. In real calculation situations equation 17 can therefore not be used.

That's why SoundPLAN calculates the extra path length in the cutting plane, as is done in most of the other standards. This problem of ISO 9613-2 is well-known amongst experts. Currently a generally satisfying solution is sought for in the frame of the ISO 17534 working group.

As an interim solution SoundPLAN 7.3 offers additional settings:

- a) Evaluate extra path length in vertical plane defined by source and receiver
- b) Evaluate extra path length in vertical plane defined by source and receiver except for single screens acc. to eqn. (16)
- c) Evaluate shortest extra path length for single screens (eqn. (16)) and for multiple screens (eqn. (17), approximate solution)

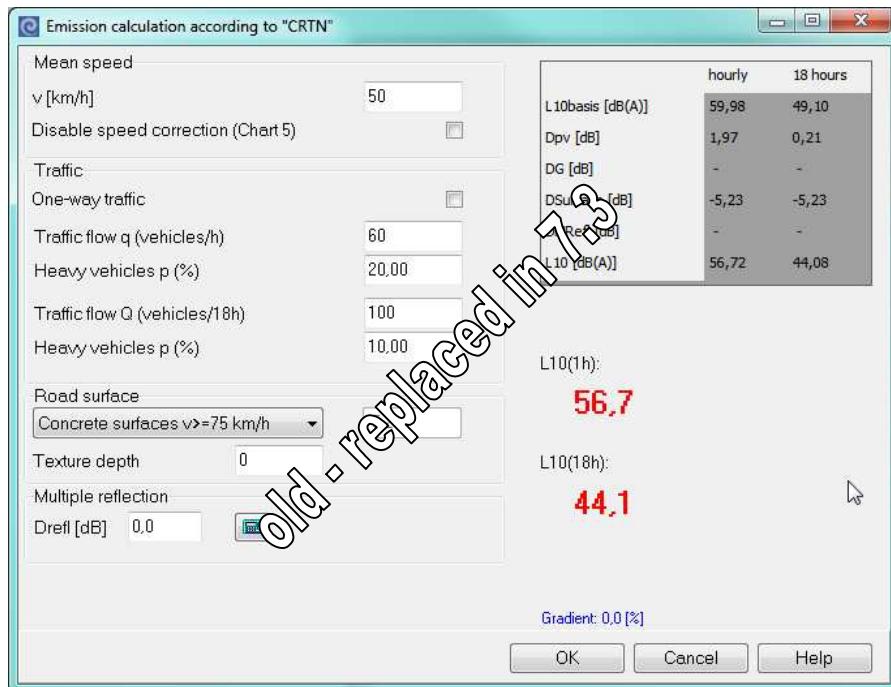
Equation 16 of ISO 9613-2 always holds for single screens nevertheless the default setting sticks to a) because only in this setting continuous changes to double screening can be expected.

Equation 17 of ISO 9613-2 holds only for parallel screens, therefore an approximate solution for the general case has been developed. Here all screens are treated as parallel to the most effective screen. Simulations have shown that the extra path lengths determined by this method are dispersed symmetrically around the true numerically derived extra path lengths within an acceptable range.

In the declaration of conformity for version 7.3 we will check "yes" for equations 16 and 17 but with an annotation.

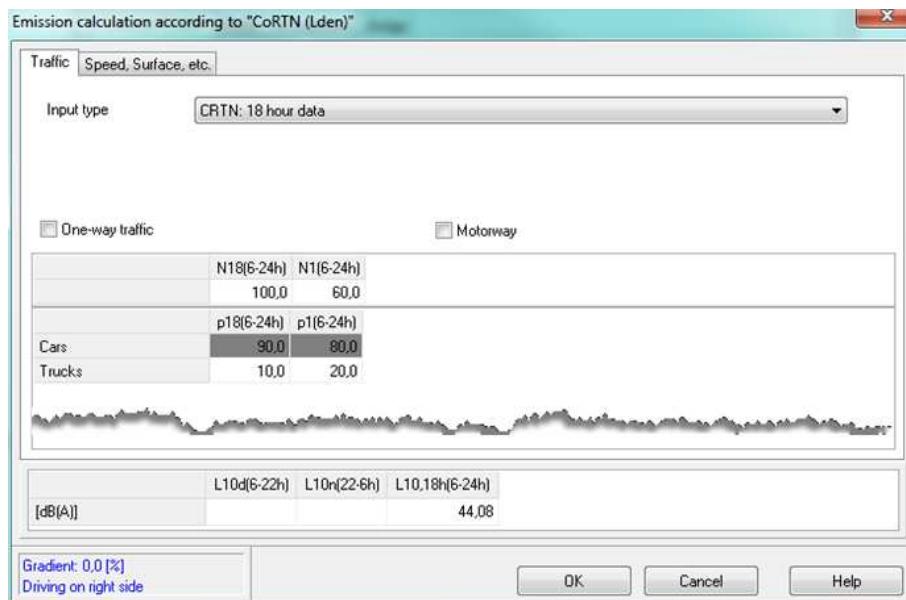
Modifications in the CoRTN

The old CoRTN emission input is no longer available.



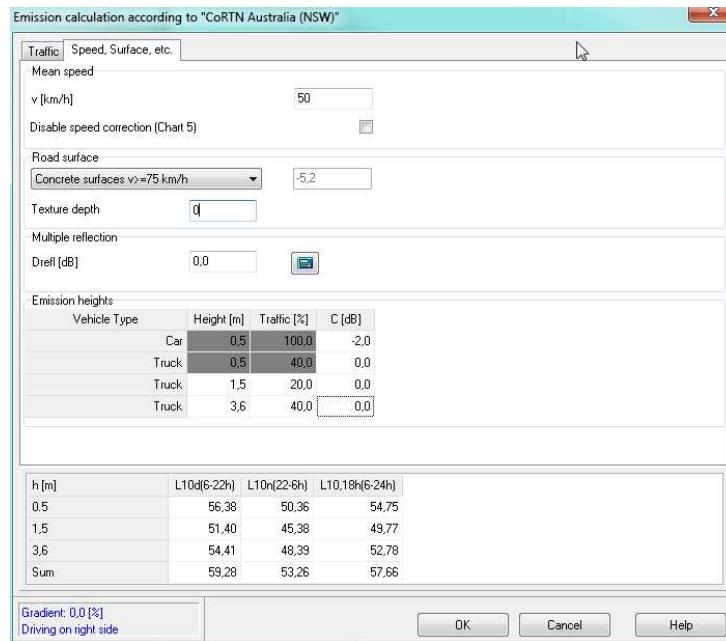
Old input mask 7.2

Old project data is automatically converted to the general CoRTN input mask if the project is opened in SoundPLAN 7.3. The input mask will now show only the L10-emission values. The calculation of Leq-values is performed during the noise propagation calculation since it depends on the L10-value at the receiver.



The propagation calculation has been reworked and improved. Now all annexes of the CoRTN are fulfilled.

On request an adopted version of the CoRTN for Australia (North South Wales) has been introduced.



This includes a new emission input which gives the user the possibility to split the emission of the truck over three source lines with user definable heights. The split is defined in the column Traffic [%]. With the column C[dB] the user can apply a correction for each source line to consider for example corrections due to measurements.

For the noise propagation calculation two new options are now available for the CoRTN.



In the run properties you can choose between two methods to convert the L10-values to Leq. The first option is the original method from TRL (the UK's Transport Research Laboratory). The second is preferred in Australia (North South Wales) and uses the simple formula L10 – 3 dB for the conversion. If you choose this option you have the option to disable the low flow correction at the same time.