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Input Types for Road Traffic **SP Net info 88**

Uploaded: 26.03.2011
Latest revision:

When specifying traffic volume you can select between the 5 input types shown in Fig 1.

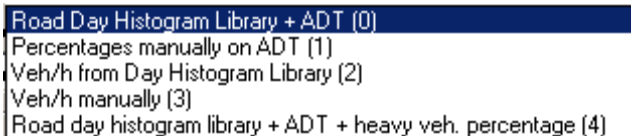

Fig 1 The 5 input types

The input needed to complete the specification of road traffic depends on the selected input type and the chosen calculation standard. Furthermore some input types need links to library records.

The contents of this Net Info are as follows:

RTN. Defining Road Day Histograms

The System library > Road Day Histograms > Others contains a lot of 'standard' roads that you in the usual way can copy to the project library in order to link to them from the road 'Emission calculation' mask. Please be aware that you pick only records based on standard 3: Guide du Bruit and RTN96, otherwise you will not be able to see the records from the road property window (in ver 7.0 the producer forgot to add 'RTN96' after Guide du Bruit, the screen dump Fig 2 is from ver 7.1). If you create your own record you must in the same way remember to select Guide du Bruit/RTN96. The traffic data can be absolute (in vehicles per hour) or normalised e. g. to 100 % for the total number of vehicles.

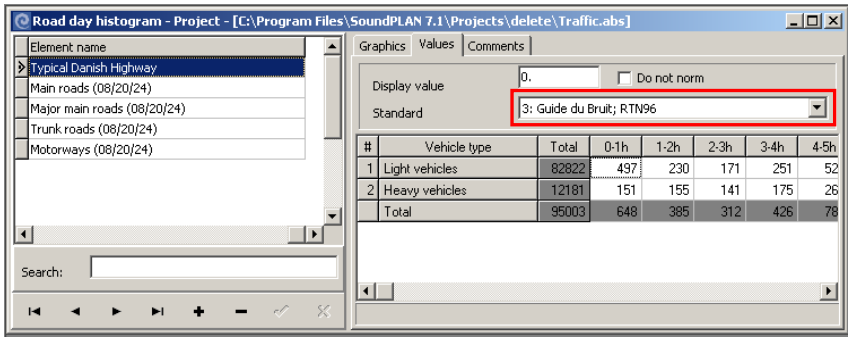

Fig 2 Road Day Histogram library for RTN96

RTN. Defining Day Histograms

Day Histogram records are usually used to specify activity of point, line or area sources in industry noise projects. However, it is possible to create links from the road 'Emission calculation' mask to records in this library. The most convenient unit to use when creating the records is U/h (Units/hour = number of vehicles per hour), see Fig 3.

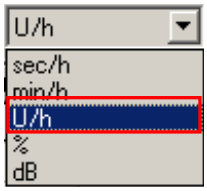

Fig 3 Selection of unit in Day Histogram library

You need to create a record for both light and heavy vehicles. A screen shot from the library is shown in Fig 4.

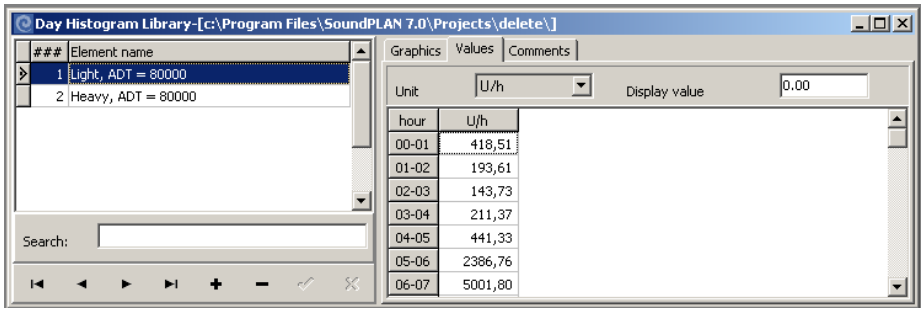

Fig 4 Day Histogram library with two records

Special note for users of RTN96:

In the old days – before Version 7 – the program offered two different ways to calculate the emission: the 'normal' way intended for calculation of Leq,24h only and another based on time slices for calculation of Lden. From Version 7 on SoundPLAN will default split the 24 hours into a number of time slices. If you intend to calculate only Leq,24h and not Lden you can leave it with one time slice like shown in Fig 5.

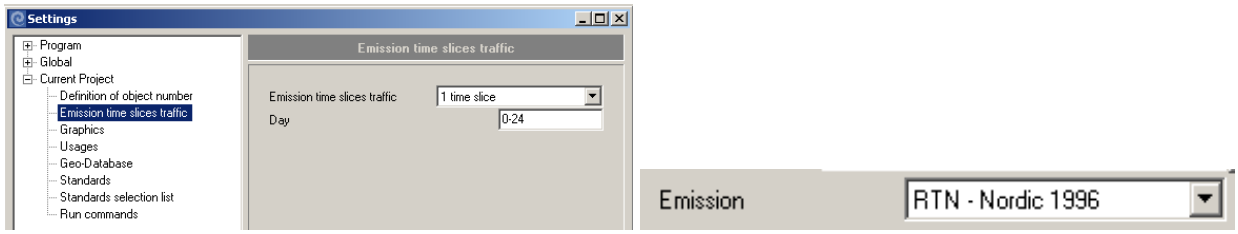

Fig 5 Definition of time slices and emission calculation

If you convert and old Leq,24h-project into Version 7 format, the conversion will select the emission calculation shown in Fig 6. It is strongly recommended not to use this setting for new projects since it leaves out some newer tools, e. g. calculation of Lmax,5th. Use instead the emission calculation without (***), see figure on the previous page, and if you for some reason wish to exclude the possibility to calculate Lden, then leave it with one time slice as in Fig 5.

Fig 6 Outdated emission calculation

RTN96. Input type (0): Road Day Histogram Library + ADT

The percentage of each vehicle type (light and heavy) per time slices (day/evening/night or eventually only day/night) is taken from the selected Road Day Histogram record. All that is left to be done is to key in the relevant average daily traffic ADT [Veh/24h]. The factor k is hourly traffic divided by ADT. The input mask might end up like in Fig 7:

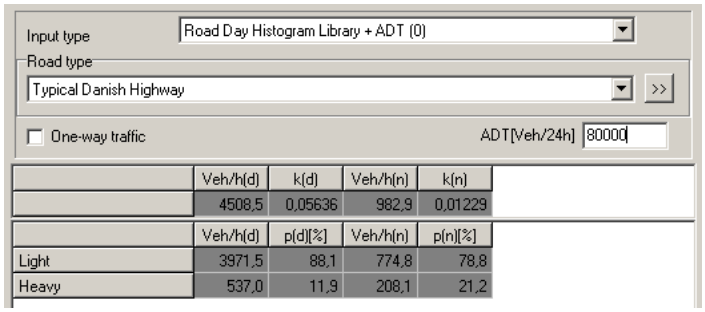

Fig 7 Input data with input type (0): Road Day Histogram Library + ADT

RTN96. Input type (4): Road Day Histogram Library + ADT + heavy veh. Percentage

The total number of vehicles per time slice (the upper row in the table Fig 7 and Fig 8) is taken from the Road Day Histogram record and kept constant no matter what percentage of heavy vehicles on 24 hours basis p(24h) is keyed in. When adjusting p(24h) for heavy vehicles the percentage of heavy vehicles per time slice is scaled proportionally so for two different settings of p(24h) there will be the same relation between the two p(d)_heavy percentages as for the two p(24) percentages. Since the total number of vehicles per time slice must be kept constant Veh/h for light vehicles is calculated by simple subtraction. Fig 8 shows an example in which p(24h)_heavy is adjusted to 13%.

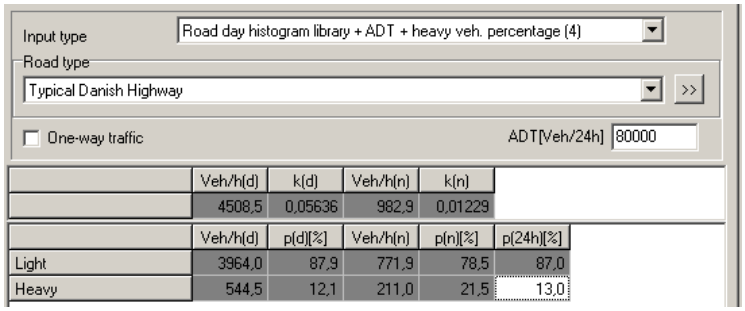

Fig 8 Input data with input type (4): Road Day Histogram Library + ADT + heavy veh. Percentage

RTN96. Input type (1): Percentages manually on ADT

Also with this input type the total number of vehicles per time slice is taken from the Road Day Histogram record. But only as default values; these numbers can be changed whereas they were kept constant with input type (4). Besides this also the percentage of each vehicle type per time slice can be adjusted, meaning that no matter the selected library record you can end up with any distribution of each vehicle type per time slice you want. Fig 9 shows an example with the same percentages as in Fig 8. Please note that changing the total number of vehicles per hour (Veh/h(d) or Veh/h(n)) makes the factors k(d) or k(n) change accordingly so ADT does not change.

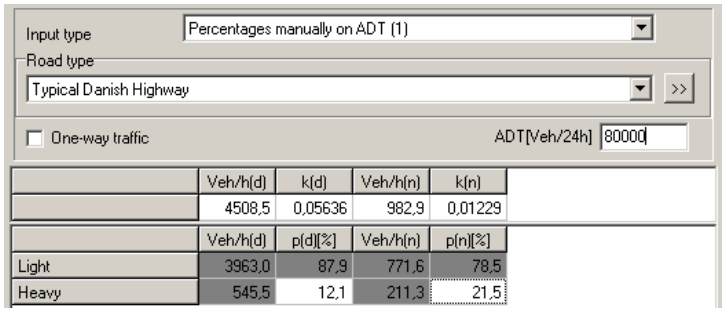

Fig 9 Input data with input type (1): Percentages manually on ADT

RTN96. Input type (3): Veh/h manually

If available input data are number of vehicles per type and per time slice, input type (3) is the most convenient type to use. An example giving the same ADT (except for the rounding) as above is shown in Fig 10.

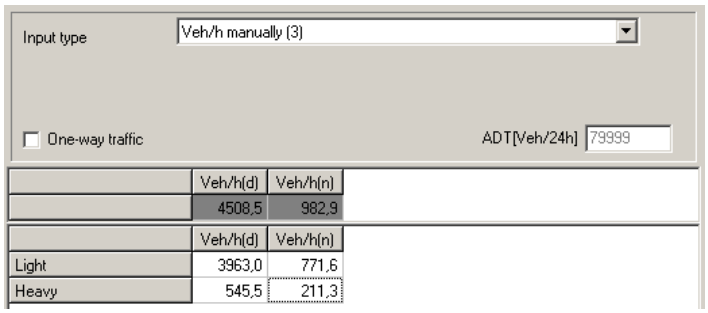

Fig 10 Input data with input type (1): Veh/h manually

RTN96. Input type (2): Veh/h from Day Histogram Library

From the 'Emission calculation' window it is possible to create links to records in the Day Histogram library. The input mask might look like in Fig 11. The records used to produce this screen shot were created with the same traffic as in the Road Day Histogram use to produce Fig 7.

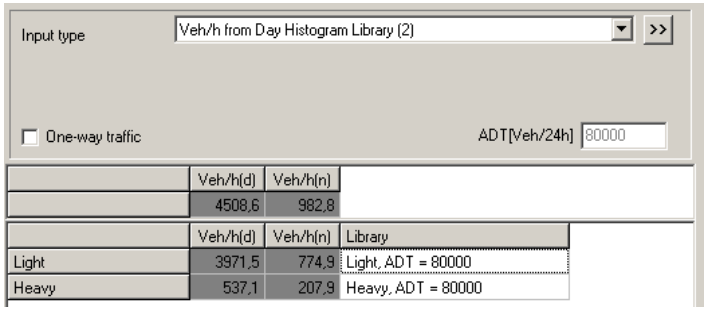

Fig 11 Input data with input type (2): Veh/h from Day Histogram Library

Special note for users of NORD2000

NORD2000 is said to belong to the 'third generation' of noise calculation standards. In this context General Prediction Method belongs to first generation and RTN96/NMT96 to the second.

In a lot of aspects NORD2000 is complex compared to our second generation standards. This holds too when defining traffic volume. The implementation of NORD2000 in SoundPLAN makes it possible for the user to define new (future) vehicle categories. With the old standards the characteristic parameters that govern the emission are hidden behind the user interface and all the user needs to do is to key in the traffic volume. In NORD2000 an 'extra' library has been introduced. This is the vehicle library in which the vehicle categories are defined. A record in the Road Day Histogram library MUST link to a record in the NORD2000 Vehicles Library.

In small and medium size projects – where it is manageable to create the roads manually – it can be recommended to leave it to SoundPLAN to create the two libraries and the link between them. Simply go straight to GeoDatabase and create the first road. This will make the program copy the two relevant library files (N2kVehicles.abs og N2kTraf.abs) from your Global library into the project folder. Or if you haven't yet established these libraries in your global library the program will produce the project libraries by copying the two files from the System library.

If you on the other hand plan to import your roads via external data (shape files, ASCII files) the two libraries must be created first so you can refer to the relevant records during the import. In that case launch the libraries from the SoundPLAN Manager and load records into them by copying from the Global or System library. Start with the vehicle library since the histogram needs links to that.

Because of the link between the two libraries it is IMPORTANT that those two files are allowed to 'stay together' as a pair. You should never replace one of them by what you think is a 'better' (maybe updated?) library from another project. You risk the links suddenly refer to wrong records.

NORD2000. Defining Vehicles categories

The System library contains the official Nordic vehicle types, see Fig 12. Especially the 3 first records are widely used in Danish road noise projects.

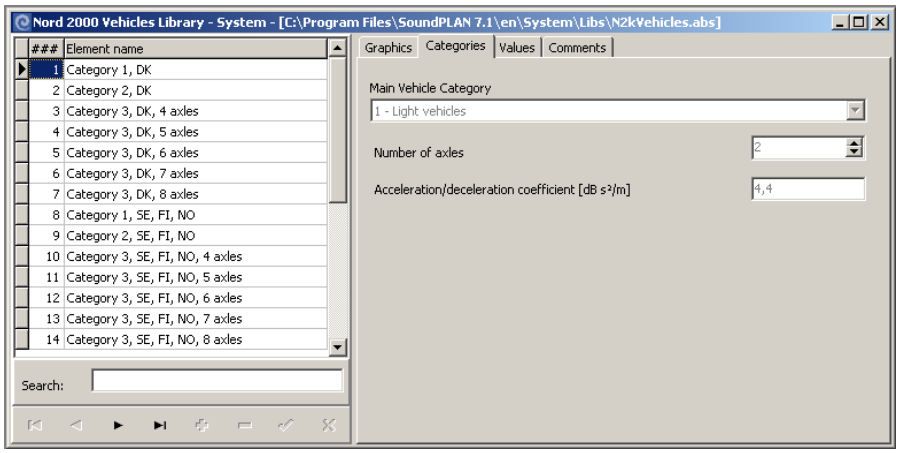

Fig 12 NORD2000 Vehicles Library

NORD2000. Defining Road Day Histograms

If the predefined road types do not fit your needs you can create a new record in the usual way (click '+'), give the record a name and click '+' left to 'Vehicle Types' the relevant number of times (most likely 3) in order to be able to link to the relevant categories. Under Vehicle type a roll down menu appears like shown in Fig 13.

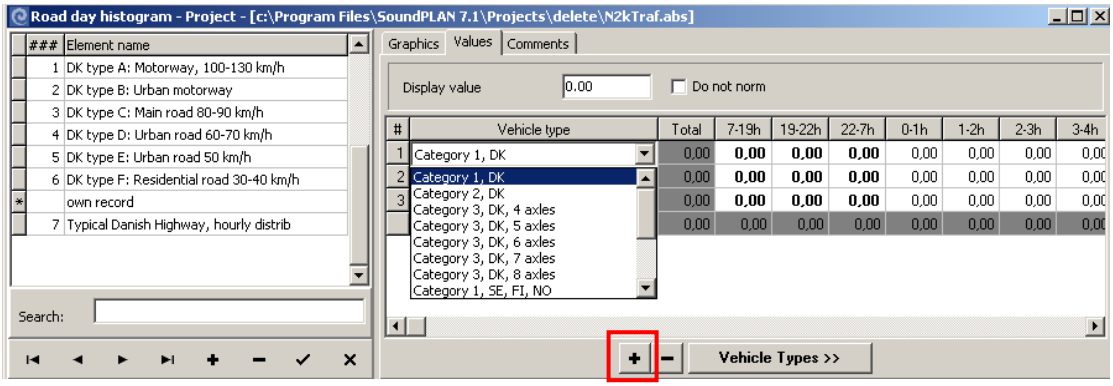

Fig 13 NORD2000 Road Day Histogram library, ready to create link to a vehicle category

If your traffic data are number of vehicles per time slice you can key in the numbers in the first 3 x 3 cells and the program will fill out the hourly distribution automatically. If your input is hourly traffic from a spreadsheet you can use copy and paste to fill out the table.

NORD2000. Defining Day Histograms

Day Histogram records are usually used to specify activity of point, line or area sources in industry noise projects. However, it is possible to create links from the road 'Emission calculation' mask to records in this library. The most convenient unit to use when creating the records is U/h (Units/hour = number of vehicles per hour), see Fig 14.

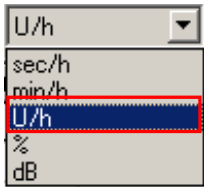

Fig 14 Selection of unit in Day Histogram library

You must create a record for all vehicles categories you want to work with. A screen shot from the library is shown in Fig 15.

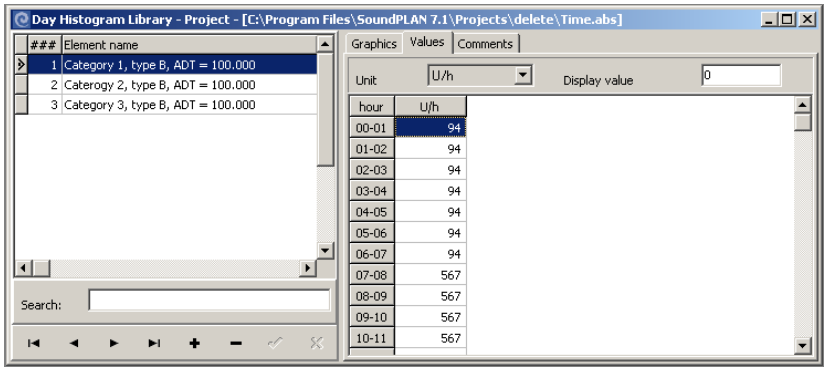

Fig 15 Selection of unit in Day Histogram library

NORD2000. Input type (0): Road Day Histogram Library + ADT

This input type gives you the same percentage of each vehicle type per slice as in the selected Road Day Histogram record. For a given average daily traffic ADT the number of vehicles per hour Veh/h for each category per time slice is found by proportionally scaling: For two different values ADT(1) and ADT(2) you get the same relation Veh/h(1) : Veh/h(2) as for ADT(1) : ADT(2). With a Danish road type B and ADT = 100.000 you end up with the distribution shown in Fig 16.

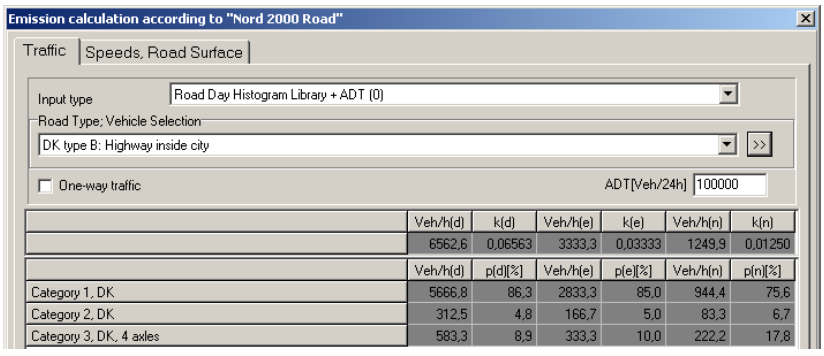

Fig 16 The Emission calculation mask wit input type (0): Road Day Histogram Library + ADT

NORD2000. Input type (4): Road Day Histogram Library + ADT + heavy veh. Percentage

This input type offers the possibility to adjust the distribution of categories on a 24 hours basis, p(24). The distribution over the 24 hours of the total number of vehicles (the upper row in the table Fig 17) is kept constant and equal to the distribution in the selected road type record no matter what percentages are keyed in. The default values for p(24) reflects the distribution of categories in the selected road type record. Adjusting the percentages for category 2 and 3 will cause the program to scale Veh/h and p per time slice proportionally for those two categories. Since the total number of vehicles per time slice must be kept the same, the number of category 1 vehicles per hour is calculated by simple subtraction. Consequently there will no longer be the same distribution over day, evening and night for category 1 vehicles as in the selected road type.

	Veh/h(d)	k(d)	Veh/h(e)	k(e)	Veh/h(n)	k(n)	
	6562,6	0,06563	3333,3	0,03333	1249,9	0,01250	
	Veh/h(d)	p(d)[%]	Veh/h(e)	p(e)[%]	Veh/h(n)	p(n)[%]	p(24h)[%]
Category 1, DK	5362,5	81,7	2666,6	80,0	850,0	68,0	80,0
Category 2, DK	500,0	7,6	266,7	8,0	133,3	10,7	8,0
Category 3, DK, 4 axles	700,0	10,7	400,0	12,0	266,7	21,3	12,0

Fig 17 The Emission calculation mask wit input type (4): Road Day Histogram Library + ADT + heavy veh. Percentage

NORD2000. Input type (1): Percentages manually on ADT

With this input type it is possible to adjust the percentage of each category for day, evening and night individually.

	Veh/h(d)	k(d)	Veh/h(e)	k(e)	Veh/h(n)	k(n)
	6562,6	0,06563	3333,3	0,03333	1249,9	0,01250
	Veh/h(d)	p(d)[%]	Veh/h(e)	p(e)[%]	Veh/h(n)	p(n)[%]
Category 1, DK	5250,1	80,0	2766,7	83,0	1024,9	82,0
Category 2, DK	525,0	8,0	233,3	7,0	112,5	9,0
Category 3, DK, 4 axles	787,5	12,0	333,3	10,0	112,5	9,0

Fig 18 The Emission calculation mask wit input type (1): Percentages manually on ADT

Further it is possible to change the total number of vehicles in each time slices. TAKE CARE, ADT is not updated.
This input type also needs link to the vehicle library. Since it is possible to adjust the distribution of vehicles in every possible way you can select any predefined road type that contains the relevant categories.

NORD2000. Input type (3): Veh/h manually

This input type is the most convenient to use if available input data are number of vehicles per category and per time slice. Like with input type 'Percentages manually on ADT' you can create the needed link to the vehicles library by picking any predefined road type with the relevant categories.

	Veh/h(d)	Veh/h(e)	Veh/h(n)
	6562,5	3333,3	1250,0
	Veh/h(d)	Veh/h(e)	Veh/h(n)
Category 1, DK	5666,7	2833,3	944,4
Category 2, DK	312,5	166,7	83,3
Category 3, DK, 4 axles	583,3	333,3	222,2

Fig 19 The Emission calculation mask wit input type (3): Veh/h manually

NORD2000. Input type (2): Veh/h from Day Histogram Library

Also with this input type you must pick a 'starting point' under Vehicle selection' in order to make the relevant categories appear in the input mask. The only thing now left is to link to the records in the Day Histogram library.

	Veh/h(d)	Veh/h(e)	Veh/h(n)	
	6562,5	3333,3	1250,0	
	Veh/h(d)	Veh/h(e)	Veh/h(n)	Library
Category 1, DK	5666,7	2833,3	944,4	Kategori 1, type B, ADT=100.000
Category 2, DK	312,5	166,7	83,3	Kategori 2, type B, ADT=100.000
Category 3, DK, 4 axles	583,3	333,3	222,2	Kategori 3, type B, ADT=100.000

Fig 20 The Emission calculation mask wit input type (2): Veh/h from Day Histogram Library