

Dissection of line and area sources

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During calculations of industrial line and area sources (and roads/railroads according to some standards) SoundPLAN needs to know how to split the sources into small segments that can be replaced by point sources. The parameters controlling this dissection are set on the index card Dissection in the settings of e. g. GPM1982/GPM2019.

First step towards the final sectioning is an overall splitting into screened and unscreened parts as illustrated in Fig 1.

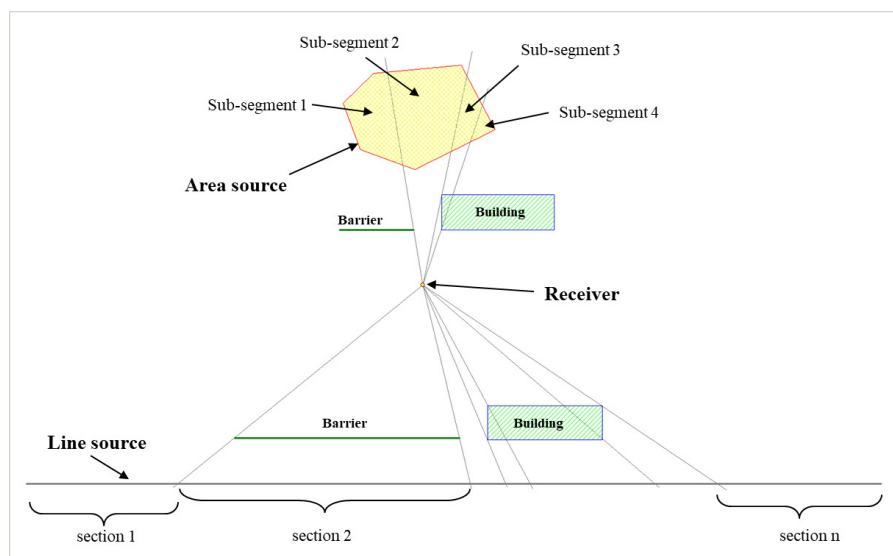


Fig 1 The source is split into screened and unscreened parts

Next each section/sub-segment is further divided according to the parameters defined on the Dissection index card of the standard settings, see Fig 2.

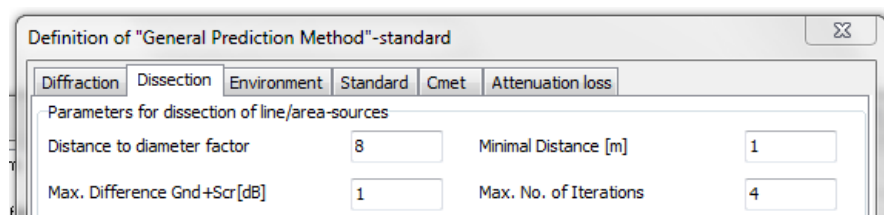


Fig 2 Dissection parameters in GPM

The parameter 'Distance to diameter factor' defines the maximum size of the segment relative to the distance between source and receiver. The size of the source – the 'diameter' – is the maximum distance between any two points within the segment. The distance between source and receiver is measured from the centre of gravity of the source. E. g Distance to diameter factor = 2 means that the size of the source cannot exceed half the distance between source and receiver.

The default value of 'Distance to diameter factor' is 8 which is a much higher resolution than required by most guidelines. The purpose for this high factor is to obtain stable results in calculations done with Tolerance set for total level.

For receivers close to a line - or an area source, the source will be split into a huge number of segments according to the 'Distance to diameter factor'-criterion. For grid calculations it might even happen that the receiver is inside the area source! The regular 'Distance to diameter factor'-criterion must in these cases be disabled. This is done with the 'Minimal Distance'. Within this distance the 'Distance to diameter factor'-criterion is overruled causing the calculation

results in areas near the sources to be less accurate. In projects without crucial receivers near line - or area sources this feature could be used to keep calculation time down.

The distance from source segment to receiver is not the only parameter considered during the dissection process. The propagation conditions for all parts of the segment must be (almost) the same; otherwise the segment cannot be replaced by a single point source. Therefore, SoundPLAN calculates the ground effect and the screening for the transmission from each end point/corner of the segment to the receiver. The maximum allowed difference between the sum of those two corrections is user definable. The default value is 1 dB. If the criterion is not met, the segment is divided further. Here as well it is possible to stop a dissection/iteration process that would go on beyond what makes sense. The default number of iterations is 4.

In general, the default set of parameters on the index card Dissection is a fair compromise, and they need rarely to be changed. However, in projects with line or area sources adjacent to areas with crucial noise limits it might be relevant to adjust the parameters. Or maybe you should consider keeping the source just a little bit away from the border to the neighbouring area. E. g. the parking lot of an industry plant might be situated next to a residential area, but the acoustic centre of the cars will never get closer than approx. 1 m to the dividing line between the two areas.

If you have changed the values on the index card Dissection and cannot remember the default figures, a click on the button 'Defaults' will reset the parameter.