

Floating Walls/Buildings and Screens

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None of our old Nordic standards – GPM, RTN96, NMT96 – deal with transmission underneath an obstacle. Only diffraction above a screen that reaches the terrain can be estimated. Besides that, GPM and NMT96 takes the horizontal diffraction around the barrier ends into consideration. Some basic elements in NORD2000 could theoretically be used to estimate the transmission through gaps and underneath lifted barriers, but it is not described in detail how to do it.

The wish to quantify the transmission underneath an obstacle or through a gap becomes relevant in a lot of situations, see Fig 1.



Fig 1 Transmission under screens or through archways often occurs

To model situations like these the SoundPLAN team has developed the floating screen object type and the possibility to let noise protection walls ‘float’ (= be lifted above ground). From version 7.4 we can even let buildings ‘float’. The programmers’ approach has been to handle the diffraction underneath an obstacle as close as possible to the way the current standard describes the diffraction above the obstacle (as a function of e. g. the extra path length or effective barrier height).

No matter how sensible that sounds, you must be aware that strictly speaking these features do not comply with our standards. On the other hand, it is obvious that the conflict is due to a shortcoming in our standards. In ‘real life’ transmission under obstacles does occur, our standards just cannot handle it!

This Net Info does not cope with the schism. It is not for us to tell you what to do. Our job is to inform you what happens if you use the floating screen object type or let walls or buildings float.

Floating screens

A floating screen may look like the one shown in Fig 2. The screen is the ‘main’ element; it will in most cases be horizontal, but it doesn’t need to be since you can tilt it by defining different elevations for the corners. The screen can take the form of any polygon, but the points must stay inside a single plane. The height of the walls along the edges of the screen can take positive as well as negative values (reaching upwards or downwards respectively from the screen), and it can vary along the edge of the screen. The walls can be assigned with absorbing properties just like ordinary noise protection walls. The bottom of the screen is non-reflecting, and the presence of the floating screen does not affect the ground properties of the area covered by the screen.

If a floating screen blocks the view from source to receiver, the program will search in a vertical plane through source and receiver for the shortest path above and underneath the object. If the selected standard includes side diffraction the transmission around the object is considered too. From the found extra path lengths the final screening is calculated.

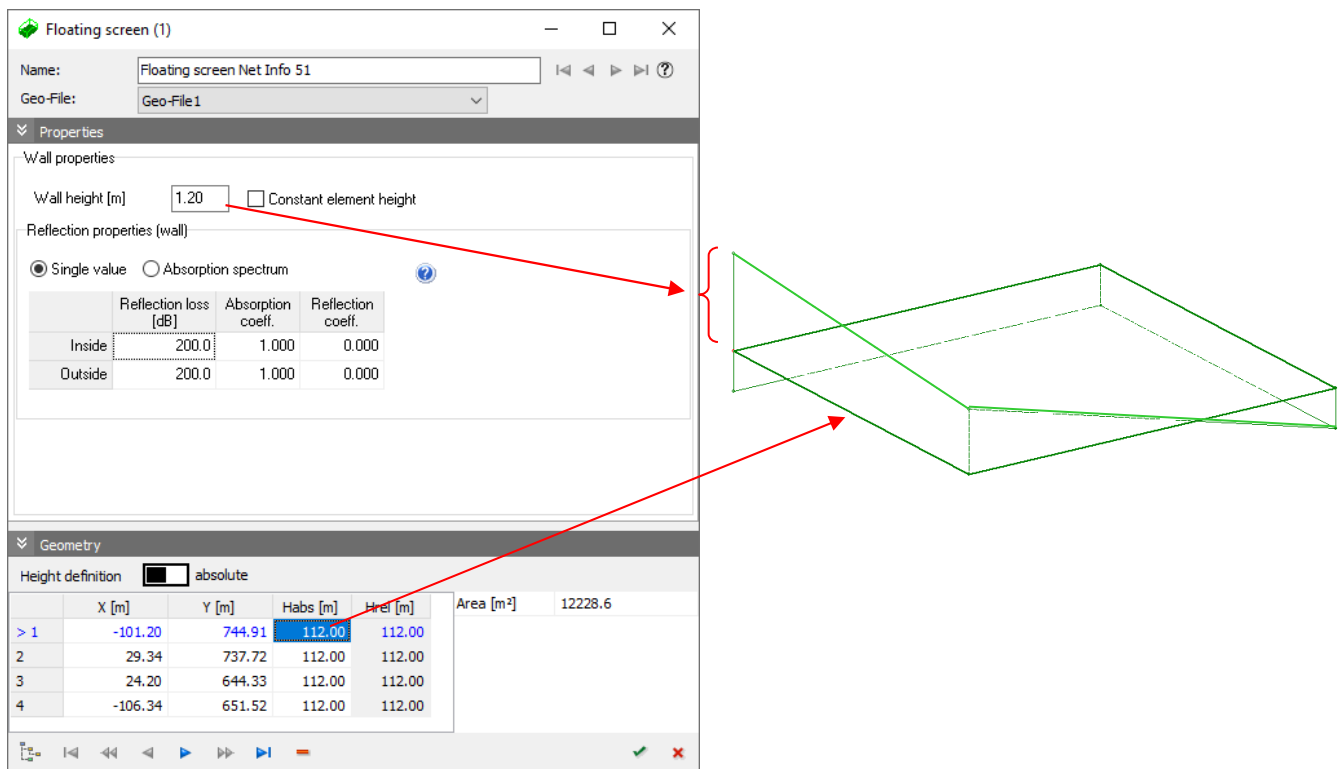


Fig 2 Definitions of a floating screen

Fig 3 shows a cross section map through a (rather crazy) floating screen.

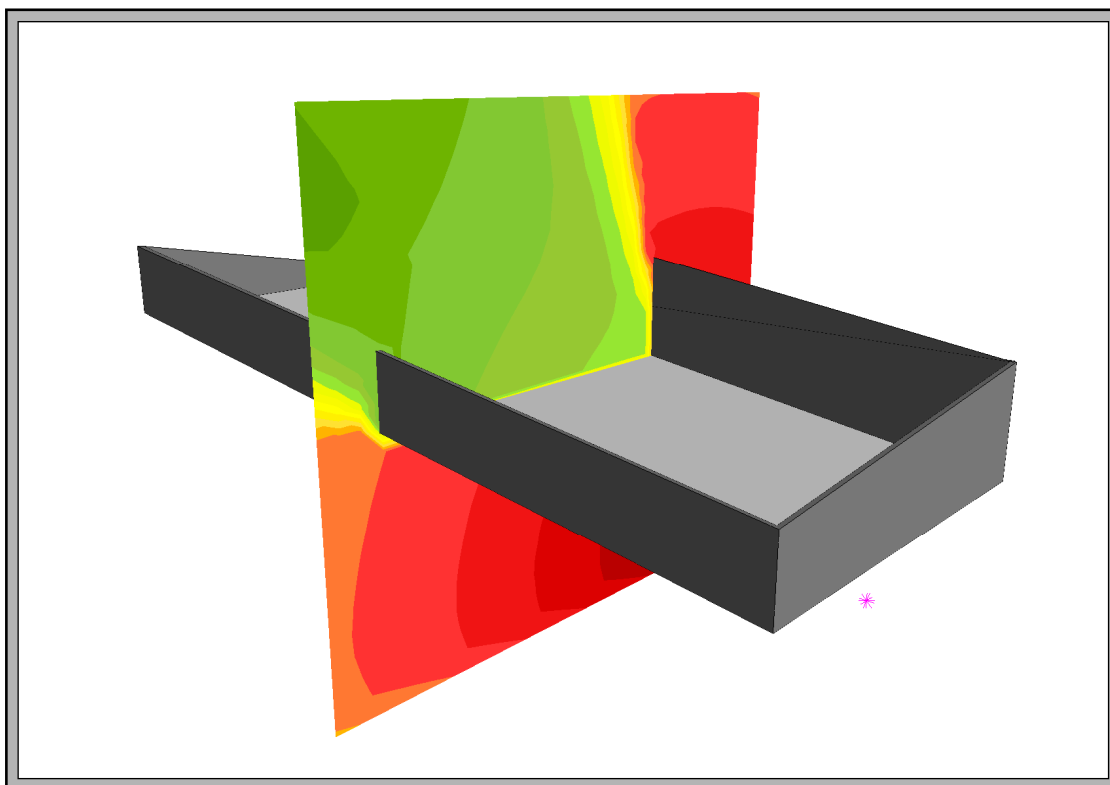


Fig 3 Cross section map through a floating screen

Floating walls and buildings

From Version 7 on noise protection walls can be rather freely designed. Elements can be stacked on top of each other and a declining angle relative to the previous element can be defined. The first (= lowest) element must be vertical but can be given a very little height if needed. If additional elements are vertical, they can be assigned with a reflection loss of their own, whereas reflections from slanting elements cannot be handled with the Nordic standards. See Fig 4.

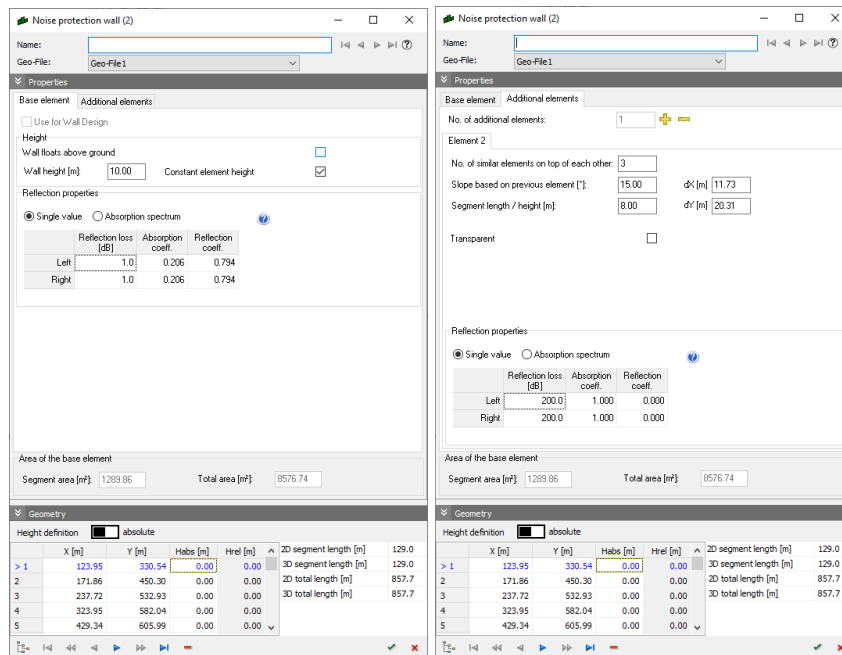


Fig 4 Definition of floating noise protection walls

The screening effect of non-vertical walls which are not floating can still be calculated in full agreement with the Nordic standards since the calculation is based on the shortest extra path length.

Floating buildings were introduced with Version 7.4 and can be used to model e. g. buildings resting on pillars in order to give room for car parking, see Fig 5. Floating industrial buildings are planned to be introduced later in version 7.4.



Fig 5 A 'floating' building