



**Comments on "Precise model measurements versus theoretical prediction of barrier insertion loss in presence of the ground" [J. Acoust. Soc. Am. 73, 44–54 (1983)]**

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## Comments on "Precise model measurements versus theoretical prediction of barrier insertion loss in presence of the ground" [*J. Acoust. Soc. Am.* **73**, 44-54 (1983)]

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Some of the theoretical curves in the article by J. Nicolas *et al.* [*J. Acoust. Soc. Am.* **73**, 44-54 (1983)] appear to be erroneous.

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In a recent paper,<sup>1</sup> Nicolas *et al.* measure and calculate the effect of a thin screen on the ground. The insertion loss is calculated by means of accurate and computationally cumbersome formulas for diffraction around a screen originating from Hadden and Pierce.<sup>2</sup> Similar calculations are carried out on the basis of the more conventional approximate solution to diffraction around a thin screen as given by Bowman *et al.*<sup>3</sup> The latter approximation (which involves two Fresnel integrals and is computationally feasible) is found by Nicolas *et al.* to be very inaccurate for most of the situations investigated.

It appears, however, that some error must be present in the computer program used by Nicolas *et al.* since a similar program developed at the Danish Acoustical Institute (work sponsored by the Danish Council for Scientific and Industrial Research) has yielded results very similar indeed to those obtained from the accurate Hadden and Pierce formula. For instance in the situations treated in Fig. 6 in Nico-

las *et al.*<sup>1</sup> the difference between a correct Bowman *et al.* type calculation and a Hadden and Pierce type calculation is vanishingly small, the maximum deviation being approximately 1 dB, whereas Nicolas *et al.* find deviations exceeding 10 dB. Results which are inconsistent with the low degree of accuracy claimed by Nicolas *et al.* have also been obtained by Kawai.<sup>4</sup>

<sup>1</sup>J. Nicolas, T. F. W. Embleton, and J. E. Piercy, "Precise model measurements versus theoretical prediction of barrier insertion loss in presence of the ground," *J. Acoust. Soc. Am.* **73**, 44-54 (1983).

<sup>2</sup>W. J. Hadden and A. D. Pierce, "Sound diffraction around screens and wedges for arbitrary point source locations," *J. Acoust. Soc. Am.* **69**, 1266-1276 (1981).

<sup>3</sup>J. J. Bowman, T. B. A. Senior, and P. L. E. Uslenghi, *Electromagnetic and Acoustic Scattering by Simple Shapes* (North-Holland, Amsterdam, 1969).

<sup>4</sup>T. Kawai, "Sound diffraction by a many-sided barrier or pillar," *J. Sound Vib.* **79**, 229-242 (1981).