Abstracts

Effects of Trains on Cutoff Frequency and Field in Rectangular Tunnel as Waveguide

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Effects of trains in a rectangular tunnel on the cutoff frequency and field were determined at the range of VHF, UHF, and SHF bands by the finite-element method. According to this study, the tunnel is a transmission channel of high-pass type waveguide. The tunnel and the trains were assumed to be infinitely long and fully conductive. Generally speaking, the trains in the tunnel lowered TE/sub nm/ wave cutoff frequencies and raised TM/sub nm/ cutoff frequencies. Closer monitoring, however, has shown that the above results may be reversed, depending on the conditions. The field is represented by contour lines. Thus, its change is clearly shown by a change in the distribution of the lines caused by the train in the tunnel. Although the train changed field distribution for both TE/sub nm/ and TM/sub nm/ mode, greater changes were usually observed in higher order mode fields.

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