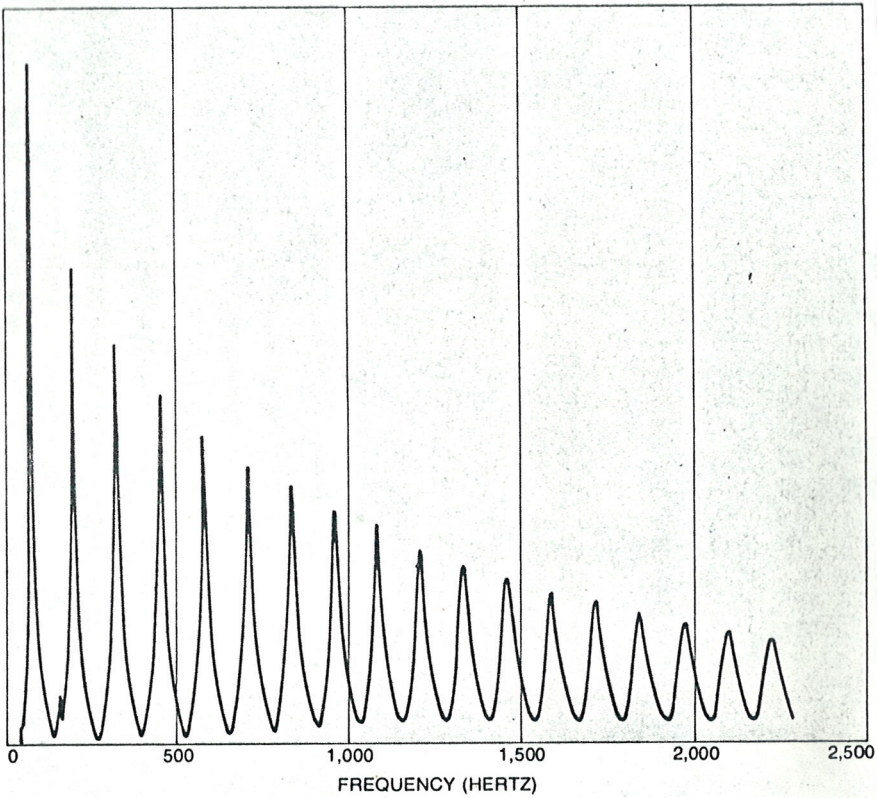


INPUT IMPEDANCE

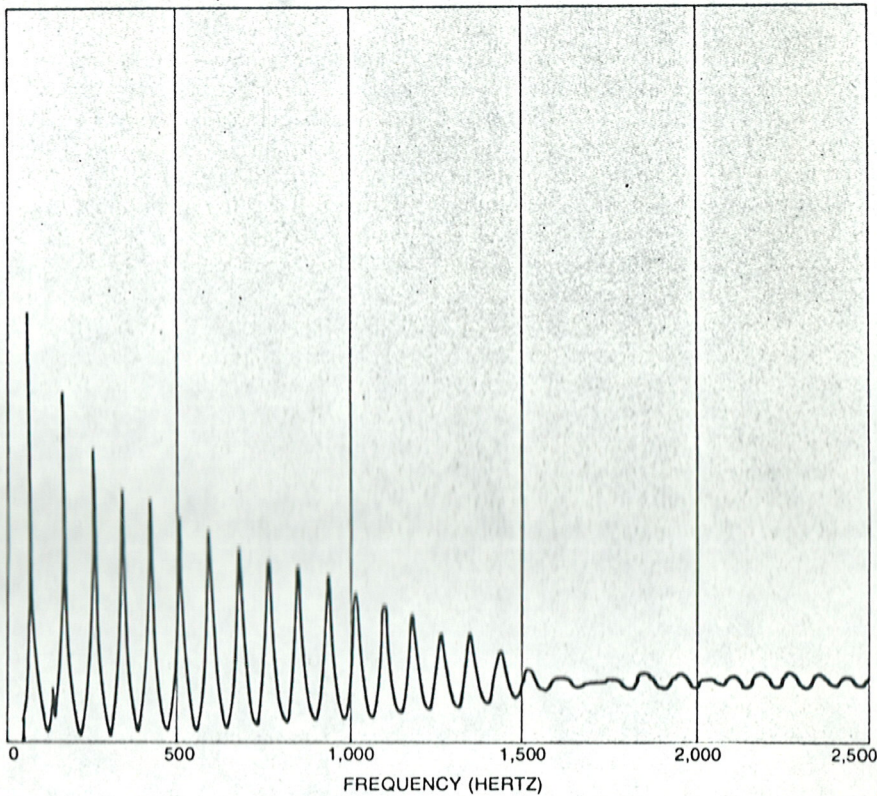
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32/7



IMPEDANCE PATTERN OF SIMPLE CYLINDRICAL PIPE 140 centimeters long shows peaks evenly spaced at odd multiples of 63 hertz. The higher the frequency, the greater the loss of wave energy to the walls of the pipe through friction, hence the steady decline in the height of the peaks. Less than 1 percent of the input energy is radiated into the room.

INPUT IMPEDANCE

Dia
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ADDITION OF TRUMPET BELL TO PIPE lowers the overall height of the impedance peaks and squeezes them together. Whereas the pipe alone produces 16 peaks in a span of 2,000 hertz, the pipe-plus-bell system compresses the first 16 peaks into a span of 1,400 hertz. Beyond 1,500 hertz more and more of the acoustic energy leaks through the bell barrier.