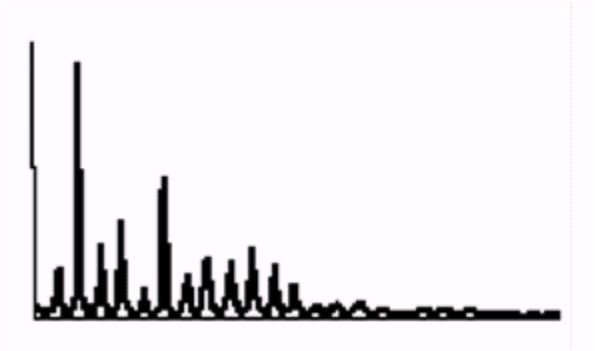
Mechanical looseness harmonics

The amplitudes of these harmonics are usually relatively small compared to the vibrations at 1 x rpm and the usual full integer harmonics. The harmonic peaks may be so small that they appear to be almost negligible, but the fact that they do produce definite peaks at definite frequencies is significant since at such frequencies the usual amplitudes are zero or almost zero. The small but definite peaks is then considered "higher than usual." With FFT or similar type analyzer, these small amplitude peaks are easier to discern if the amplitude is on a log scale rather than linear.



The type of looseness described here is between a machine's bottom and its supporting base, or looseness of a bearing inside its housing. When the machine is stopped, the bearing may "feel" tight in the housing but "not tight enough" for the forces that occur while running. The most commonly reported harmonic frequencies are not the usual full integer multiples of rpm. Instead, they produce harmonics of ½x, 1 ½x, 2 ½x, 3 ½x, 4 ½x rpm and so on. Most often only one or two of these "strange" harmonics are produced. For example in one situation, only the ½x rpm harmonic may be produced, in another, the ½x and the 2 ½x rpm but not the 1 ½x rpm.