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A2_5 Can Babies Kill

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Abstract

In this paper, we investigate the killing power of a babies scream and how the number of babies effects the killing power. We compare the decibels generated by the scream of individual and a group of babies, to the decibels needed to cause damage/kill a human, for a range of distances. We find that a huge number of babies are needed to maim/kill a human, with about 4×10^7 babies, at close proximity, are required to start to cause fatalities. 10^9 babies is found to cause fatalities, up to 3 m away.

Introduction

A sound wave is produced from oscillations of particles in the air, caused by differing pressures. High pressures lead to increased oscillations amplitudes, resulting in louder sounds. A babies scream is well known to be one of the worst things to hear at any time of day. An individual baby's scream is found to have an average decibel value of about 110 dB [1]. Whilst this value alone will not cause any long lasting damage to the human body, it will definitely cause some emotional trauma. It is found that sound at 150 dB [2], will start to have permanent effects on the human body, like burst ear drums or even small brain damage. At 185 dB [2], the pressure from the sound will be so great, that exposure could start to be fatal.

Equations

To start, it is assumed that the sound generated from the babies, originates from a single point. This makes it easier, combining each sound from the babies. We have also assumed that the babies scream at their maximum and are all identical. The total sound intensity, L_T, of all babies at the origin is:

$$L_T = L_0 + 10log_{10}N \tag{1}$$

Where L_0 is the maximum intensity of the babies scream, (110 dB), and N is the total number of babies [3]. The relationship between the sound intensity, L, and distance is given by:

$$L = L_T - 20log_{10}\frac{R_2}{R_1} \tag{2}$$

Where R_1 is the distance from the source to the initial location, and R_2 is the distance to the second location. R_1 is the reference point and is taken to be a standard of 0.5 m. R_2 is the distance to the observer [4]. Combining equations 1 and 2 together finally gives:

$$L = L_0 + 10log_{10}N - 20log_{10}\frac{R_2}{R_1} \tag{3}$$

Results

Equation 3 can be plotted with a varying amount of babies. Values for N, shown in the legend of Figure 1, are used as they provide the best visual results and can be more easily distinguished between each curve. It can be seen that 4×10^4 babies will start to give permanent damage to the observer at about 1 m. The distance that this will happen at increases non-linearly with each rise in baby amount. When the baby amount reaches 4×10^7 the safe distance to not receive damage increases to 32 m. Figure 1 also shows that human life is put in danger when the number of babies reach 4×10^7 or greater. Specifically for baby amounts of 10^9, the no-kill distance extends to about about 3 m away.

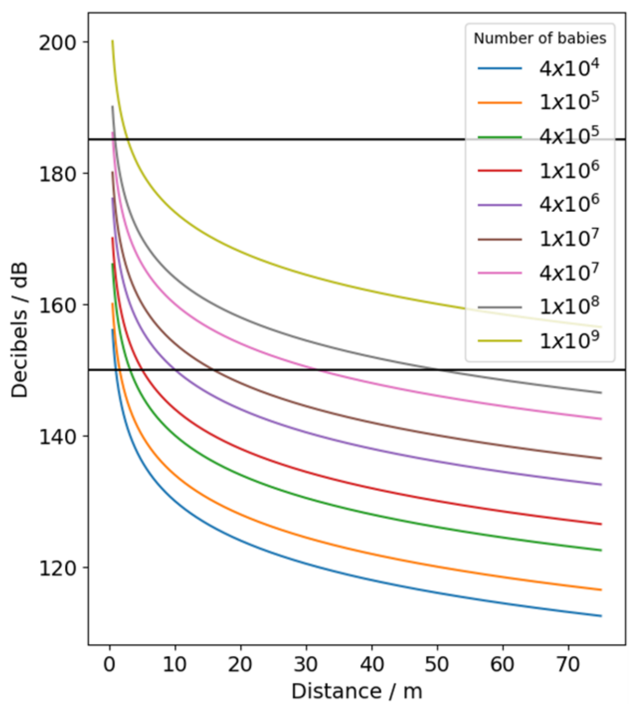

Figure 1: Plot of sound pressure in dB against distance from the source, for a range of differing amounts of babies. Horizontal lines at 150 dB and 185 dB, representing the sound intensity to maim and kill a human respectively.

Conclusion

To conclude, a tremendous amount of babies would be needed to cause any sort of damage. A single baby does not cause any long lasting damage. However, ten million babies are needed to start to cause enough pressure to kill a human being at close proximity. The likelihood that a human is surrounded by enough babies is almost zero, but this proves that one should avoid this scenario if presented with it. The model used is not perfect, so for future study, investigations into how this scenario would change can be undertaken. For example, if the babies are not taken to be a single point source, each baby could be modeled at a differing distance to the observer, (like that in a stadium). This would increase the accuracy of the scenario.

References

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