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# NOISE INDICES FOR AIRCRAFT NOISE EVENT ASSESSMENT ANALYSIS WITH THEIR DEPENDENCE FROM MEASUREMENT ISSUES AND IMPACT ASSESSMENT

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**Abstract.** In Poland equivalent sound levels $L_{Aeq,\ DAY}$ and $L_{Aeq,\ NIGHT}$ are used for noise control around the airports [1, 2]. Both of them are quite efficient for the airports with >10 000 flights annually, but for not so active airports their use to control the acoustic climate is questionable. Very often the maximum sound levels $L_{Amax}$ is used for such purposes, but few questions exists concerning the measurement issues and impact assessment. However, a clear definition of this indicator is difficult. The use of each type of indicator ($L_{Amax\ SLOW}$, $L_{Amax\ FAST}$, $L_{Amax\ IMPULS}$, $L_{Aeq\ max\ 1s}$) has different consequences. Commonly used is the value of $L_{Amax\ FAST}$. However, the most formal indicator $L_{Amax\ SLOW}$.

During the measurements the options "Fast" or "Slow" may provide the difference between measured results up to 7 dBA. The usage for monitoring purposes is possible due to some effective possibilities for the source identification and more accurate time fix of the noise event. But for impact analysis the metric $L_{Amax}$ is quite poor, there are many other metrics are looking more effective than $L_{Amax}$. SEL is also useful metric, which is recommended somewhere to be used for noise event analysis and assessment. Where the continuous monitoring stations air noise is only possible to use $L_{Aeq\ max\ 1s}$.Based on analysis of aircraft noise measurement results of many authors present ways of converting.

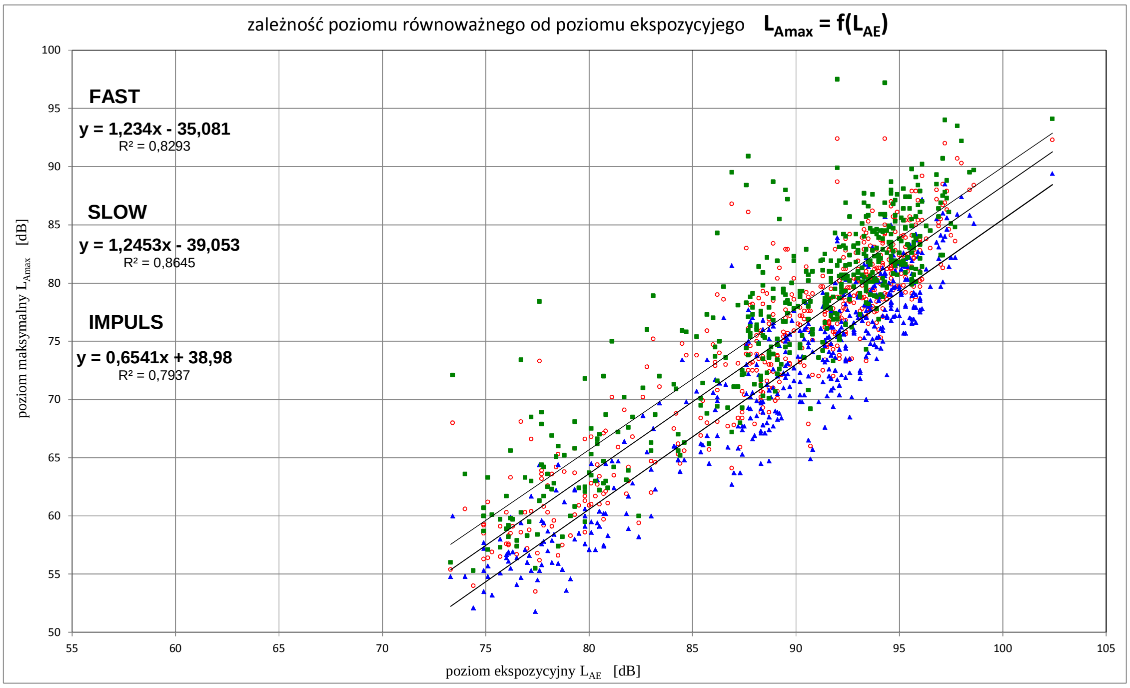


Fig. 1.The influence of the time constant

First of all a summa for SEL of the particular events provide directly a value for equivalent noise level or noise index of any type. In impact analysis SEL is known descriptor for awakening analysis provided by noise.

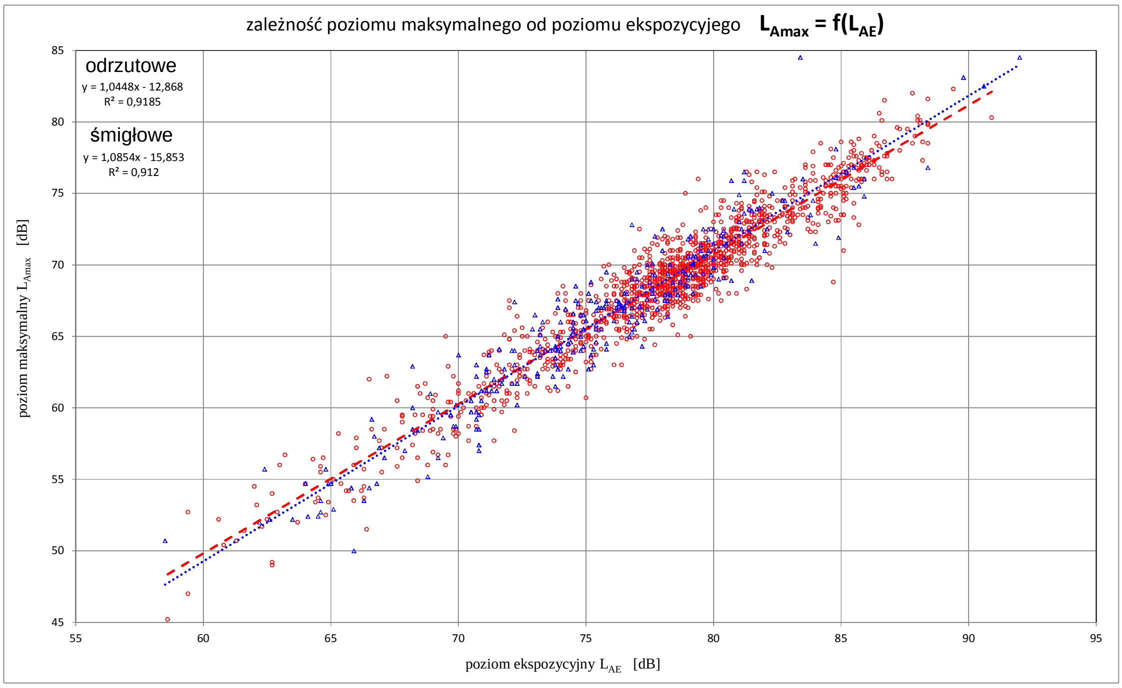


Fig. 2.The influence of the type of aircraft

For the average day per year:

$$L_{DWN} = 10\ \lg\left[\frac{12}{24}10^{0.1\,L_D} + \frac{4}{24}10^{0.1\,L_W} + \frac{8}{24}10^{0.1\,L_N}\right];$$

For day:

$$L_D = 10\ \lg\left[\frac{1}{T_D}\sum_{k=1}^{d} N_D\ \ 10^{0.1\,L_{AEk}}\right];$$

For evening:

$$L_W = 10\ \lg\left[\frac{1}{T_W}\sum_{k=1}^{W} N_W\ \ 10^{0.1\,L_{AEk}}\right];$$

For night:

$$L_N = 10\ \lg\left[\frac{1}{T_N}\sum_{k=1}^{n} N_N\ \ 10^{0.1\,L_{AEk}}\right].$$

Reference time during the average day: $T_D$ = 43 200 s – for day; $T_W$ = 14 400 s – for evening; $T_N$ = 28 800 s – for night. The average number of events per year: $N_D$ – for day; $N_W$ – for evening; $N_N$ – for night; $L_{AEk}$ – average noise exposure level SEL for the time of day, evening or night.

## References

[1] Directive 2002/49/EC of The European Parliament and of The Council of 25 June 2002 relating to the assessment and management of environmental noise. Official Journal of the European Communities, L 189, 18.07.2002.