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Innovative application of quality methods to assess the homogeneity of the noise level distribution generated by F-16 multirole aircrafts

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Abstract: The assessment of the nuisance of aviation noise in the environment surrounding the airport is usually based on measurements of the mean equivalent sound levels A. Due to the combustion engines with high power concentration used in military aviation, it is also reasonable to measure the instantaneous increases in the sound pressure level. Therefore, a research question was raised about differences in this level for various aircraft engines of the same type, i.e. F100-PW-229, to assess their size and statistical significance. The aim of the article is to discuss the attempt to check the significant difference between the parameters of the acoustic level generated by the F-16 multirole aircraft engines. Statistical methods dedicated to assessing production stability, ie. Shewhart card, were put to use. The essence of the card is the observation of the average value track. The components of the track are: the central line (it corresponds to the expected values of the statistical parameters) and the designated external control lines - upper and lower. They show the expected tolerance for the discrepancy of results considered stable. The measurements were carried out for 32 engines of the F-16 Block 52+ aircraft. The parameters of noise in the point system and in the octave distribution were subjected to analysis using the Shewhart card. The results of the analysis allowed to determine the size of the discrepancy and the level of compliance of analogous results. They can be an attitude to further research on the characteristics of this type of noise.

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