Society of Production Engineering

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40th INTERNATIONAL CONFERENCE ON PRODUCTION ENGINEERING – SERBIA 2025

Nis, Serbia, 18th - 19th September 2025

University of Nis
Faculty of Mechanical Engineering

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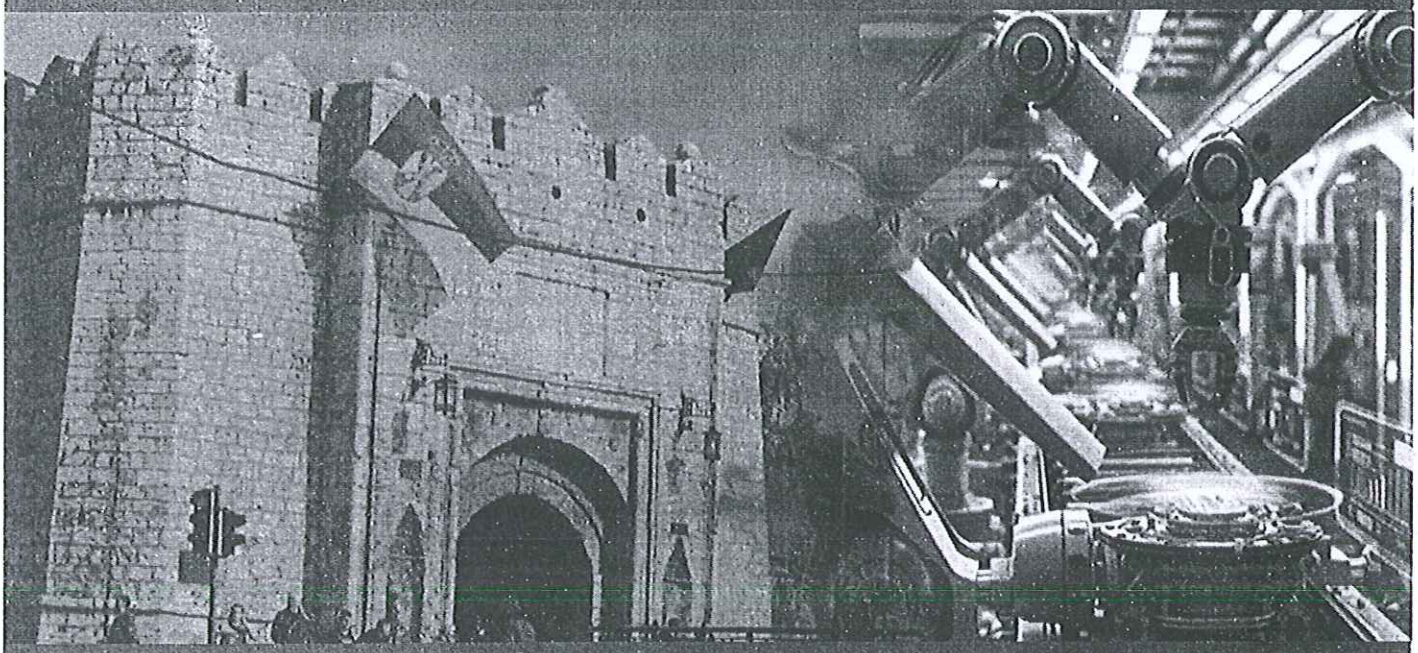

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ACCURACY OF SOUND POWER DETERMINATION USING DIFFERENT SOUND INTENSITY METHODS: A CASE STUDY ON A VACUUM PUMP

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Abstract: *This study presents the measurement and analysis of the sound power emitted by a vacuum pump using two sound intensity-based methods in accordance with ISO 9614: the discrete point method and the scanning method. The sound intensity measurements were conducted under two airflow conditions (5 l/min, 15 l/min) in the frequency range from 200 to 6000 Hz range. The results indicate a high level of agreement between the two methods in terms of the frequency distribution of sound power, with the discrete point method yielding slightly higher values due to more detailed spatial sampling. The maximum observed difference between the methods was 2.4 dB, recorded at 250 Hz and 400 Hz. The highest sound power levels occurred between 1000 and 2000 Hz, which corresponds to the typical spectral range of mechanical noise. The result showed that noise emission's loudest source is the rear face of the pump, likely due to the position of the electric motor cooling fan. These findings validate both techniques for use in describing noise emissions from similar equipment.*

Keywords: *sound power, sound intensity, vacuum pump.*