

Vibro-acoustic interactions of a dynamic system – the case of two contra-rotors

Jaroslav Robert Blaszcak

Abstract: The paper presents results of vibroacoustic investigations of a dynamic system consisted with two contra-rotating rotors. Such solutions are used nowadays in modern aeroengines and ventilation fans. Lately, they are also popular in propeller systems of modern drones, especially for transporting packages and, as planned, people. Such solutions should be very reliable (for example when delivering human organs to hospitals) and they are found to be highly efficient, however their work in hard conditions causes emissions of higher levels of noise, what can be crucial in smart cities. The main aim of the researches was to provide an analysis allowing for identification of the main sources of noise in such designs and to propose solutions for noise reduction. Additionally, vibrations of the presented dynamic system were measured to check any influence of such phenomena on the emitted noise levels. The data were obtained during test sessions inside acoustic free-field conditions. All researches were conducted inside a modern aeroacoustic anechoic chamber, especially designed for such tests.

¹⁾ Jaroslav Robert Blaszcak, Ph.D.: Lodz University of Technology, 90 - 924 Lodz, ul. Wolczanska 219/223, Poland (PL), Jaroslav.Blaszcak@p.lodz.pl.