

# Investigation of dangerous infrasound and audible noises on OSH, produced by the vibrancies of diesel engines using biofuels, in the work-environment of sustainable engineering projects

Panagiotis K. Marhvilas and Gavriil D. Chaitidis

*Democritus University of Thrace, Department of Production and Management Engineering, Greece*

## Abstract

Every vehicle's engine is one of the most important sound sources of a variety of frequencies. By studying the oscillation frequency of the sound source, we can draw conclusions about the frequencies of the sound signals produced and their effects on the human safety/health that is exposed to the corresponding produced sound waves, in the working environment of sustainable engineering projects. This research provides evaluation of experimental results regarding the exposure to infrasound (infrasonic) noise (i.e. below the lower limit of human audibility) and audible noise of the operator in diesel engine motors when a specific amount of biodiesel is used as fuel in normal working conditions. The results showed that in specific rpm (2000) there is emission of sound frequencies below of (or close to) 20 Hz (~10 Hz - 23 Hz). They are characterized by an amount of infrasound effecting the operator, and may cause possible negative results on the sense of hearing, during the driving inside the closed cab of a vehicle (or carriage) at a workplace, and consequently there is an increased risk for the occupational safety and health (OSH). The measured detectable noise levels can conceivably deploy inaudible effects. Investigated diesel motors produce significant levels of noise close to infrasonic level and also show a tendency to go beyond the occupational exposure limits. Low frequency sounds can cause unusual or unpleasant feelings in people despite the fact that they cannot be perceived. Although the last decade there has been an explicit technical improvement in abatement of infrasound subjected at the vehicle's drivers' workplaces there were no regulations regarding the infrasound produced, because there is a variety of fuels that can be combusted by a vehicle (Biodiesel, LPG, CNG).

**Keywords:** Biodiesel, Vibration, Infrasound, Noise, Occupational Safety and Health