

Improved Database for the Assessment of Operator’s Vibration Risk in Agriculture

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Objectives

The European Directive 2002/44/CE includes the definitions of hand-arm and whole-body mechanical vibrations and, among others, establishes the daily exposure limit and action values, giving provisions related to the determination and the risks assessment.

Many studies confirmed that the vibration levels recorded in agricultural tasks are often widely exceeding the limits, as considering the whole body action value on an 8 h period (0.5 m/s^2), as that relevant to the daily exposure (1.15 m/s^2). On the other hand, the working conditions are extremely variable, resulting from the use of many different implements coupled with wheeled or track-laying tractors of various dimensions, engine power, etc. Due to this extreme variability, a careful assessment of a given operator’s vibration risk could be carried out only through direct measurements but, due to the very high time consuming and cost requirements, this is evidently a very unlikely occurrence. So, many attempts were carried out recently to acquire data in order to build suitable databases.

Methods

The most frequent default of the major part of these databases is relevant to a lack of operating condition details, that are fundamentally affecting the vibration levels. In particular, the following main parameters are always to be considered: tractor and implement characteristics (or those of the self-propelled machine considered); task performed; soil conditions; crop/material conditions to be harvested/distributed; travelling speed; fitting of suspension devices (on the tractor, on the cab, at the driver’s place). Taking into account all the described parameters, a series of detailed database tables was then prepared, and the data coming from different sources (included the data available in the ISPESL database on vibration) were introduced, in order to cover a high number of agricultural tasks.

Results

The results show that, as expected, in many situations not only the daily exposure action values, but also the limit values are exceeded. Important warnings belong especially from ploughing, high speed transportation and front loader handling tasks, but more data are strongly needed to cover as widely as possible the variability of the several parameters affecting the vibration risk.

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