

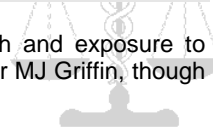
## Vibration

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### **Proceedings of the First American Conference on Human Vibration**

One conference presentation was selected for reporting here. It clearly states the limited knowledge base available for the accurate regulation of vibration exposure. There is little doubt that vibration exposure can be harmful. However, in our view, current Regulation of exposure must have been developed on the basis of something other than just objective scientific evidence. Such Regulation may be of questionable relevance to proof of negligence and causation in civil cases.

The conference included a great many presentations on the links between health and exposure to vibration. The overall situation on what was not known was summarised by Professor MJ Griffin, though he was right to state that not everyone would agree with his summary.



#### Hand Transmitted Vibration

##### *What we know we know*

We know that exposures to hand-transmitted vibration result in various disorders of the hand, including abnormal vascular and neurological function. Not all frequencies, or magnitudes, or durations, of hand-transmitted vibration cause the same effects.

##### *What we do not know*

We do not know that the frequency weighting in current standards reflects the relative importance of different frequencies and axes of vibration in producing any specific disorder. We do not know whether the energy-based daily time-dependency inherent in  $A(8)$  reflects the relative importance of vibration magnitude and daily exposure duration. Consequently, the relation between  $A(8)$  and the years of exposure to develop finger blanching, as in an appendix to ISO 5349-1 (2001), is not well-founded.

We do not know, or at least there is no consensus on, the full extent of the disorders caused by hand-transmitted vibration (e.g. vascular, neurological, muscular, articular, central), or the pathogenesis of any specific disorder caused by hand-transmitted vibration, or the roles of other factors (e.g. ergonomic factors, environmental factors, or individual factors). We know that acute exposures to hand-transmitted vibration cause both vascular and neurological changes analogous to the changes seen in those occupationally exposed to hand-transmitted vibration, but we do not yet know how the acute changes relate to the chronic disorders.

#### Whole body vibration

##### *What we know we know*

We know that many persons experience back pain and that some of these are exposed to whole-body vibration. We know that in the population at large, occupational exposures to whole body vibration are not the main cause of back problems. We know vibration and shock can impose stresses that could supplement other stresses.

##### *What we may claim to know*

Measurement methods and evaluation methods have been defined in which the frequencies, directions and durations are weighted so as to predict the relative severity of different vibrations and indicate the magnitudes that might be hazardous.

##### *What we do not know*

We are not able to predict the probability of any disorder from the severity of an exposure to whole-body vibration. We do not know whether there is any disorder specific to whole-body vibration, or what disorders are aggravated by exposure to whole-body vibration. We do not know the relative importance of vibration and other risk factors in the development of back disorders.

##### Comment

Specific regulation of both forms of vibration is available as a result of the physical agents directive. If Professor Griffin is right it may seem that the scientific rationale for these regulations is suspect. They may represent a "best guess", in which case their validity should be reviewed until there is some certainty.

Previous experience of such "best guess" regulation is that judges in civil cases are tempted to assume a causal link between breach of regulation and, a seemingly relevant disease or disability. A Claimant is

not expected to prove the impossible when making a case for causation but it would seem wrong to assume that regulation is either accurate or effective if complied with and wrong to assume that breach is related to outcome unless there is good balanced evidence in support of the regulation. Such evidence should be given an airing, if it can be found.

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