Editorial

Hand-Arm Vibration Risk

Occupational exposure of the hand to vibration has long been known to lead to a complex of vascular and sensorineural disturbances in the hands that may be accompanied by musculo-skeletal disorders in the upper extremities, now known collectively as the hand-arm vibration syndrome (HAVS). Exposure has been linked to Raynaud's phenomenon, or vibration-induced white finger (VWF), and to neurological symptoms that ultimately affect the senses of touch and temperature. Muscular weakness and reduced hand grip strength are concerns not only as symptoms that detrimentally impact on the daily lives of those affected, but also for potentially increasing the risk of injury when performing heavy manual work with powerful hand-held tools or machines. These subjects have been addressed in a series of international conferences, the most recent of which, *The Twelfth International Conference on Hand-Arm Vibration*, was held in Ottawa in 2011. Short papers from this conference have been published in *Canadian Acoustics*[1].

Workshops addressing key issues have become the hallmark of recent international conferences on hand-arm vibration. In Ottawa, the workshop considered the vibration frequency dependence of VWF risk, recognizing that a change in the frequency weighting used to assess the risk of developing VWF must be well-founded; any change may have a profound effect on the regulation and control of vibration exposure, on the approach to machine design, and on the assumed performance of anti-vibration gloves. This Special Issue of *Industrial Health* contains invited papers selected from presentations made to the Twelfth International Conference and its workshop that addressed the relative risk of developing VWF from vibration at different frequencies.

The papers in this Special Issue present different perspectives. Acknowledged leaders in their fields of research were asked to summarize work that enables one, or more, frequency weightings, or relationships between the hazard posed by vibration at different frequencies, to be proposed for assessing the risk of developing VWF. The perspectives were – experiments with animals and other human surrogates, psychophysical and physiological responses of humans, models based on epidemiologic data or exposure metrics, and biodynamic models from which the power absorbed in parts of the hand can be estimated. The biodynamic models have recently been employed to define frequency dependencies in an Annex to an International Standard[2].

The Special Issue begins with an historical review of attempts to reduce health risks from hand-arm vibration in the European Community, which as well as being instructive to jurisdictions contemplating control of this occupational hazard, sets the scene for the other papers in this collection. The Special Issue concludes with a review of the discussions at the Ottawa workshop.

The guest editors would like to express their sincere thanks and appreciation to the authors and anonymous reviewers for their contributions of time and effort to make this Special Issue possible. We believe that the contents of this volume will inform the debate on the assessment of health risks from hand-arm vibration exposure, and ultimately contribute to the reduction of workplace injury.

References

1) Proceedings of the twelfth international conference on hand-arm vibration (2011). Brammer AJ, Eaman MJ (Eds.), Canadian Acoustics **39** (2), 3–120.
2) ISO/DIS 10068 (2011) Mechanical vibration and shock – Mechanical impedance of the human hand-arm system at the driving point. International Organization for Standardization, Geneva.

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