Vibration Injury Network

Research Network on Detection and Prevention of Injuries due to Occupational Vibration Exposures

Second International Conference on Whole-Body Vibration Injuries

Appendix X5C to Final Report

May 2001

EC Biomed II concerted action BMH4-CT98-3291

Report on

SECOND INTERNATIONAL CONFERENCE ON WHOLE-BODY VIBRATION INJURIES

7-9 November 2000, SIENA, Italy

organised by

Department of Prevention
National Health Service
AUSL 7 of Siena

In cooperation with:

National Institute of Occupational Safety and Prevention (ISPESL) Rome (Italy)

Institute of Occupational Medicine – University of Siena - Siena (Italy)

Sponsored by:
EC Vibration Injury Network
Research Network on Detection and Prevention of Injuries due to Occupational Vibration Exposure

Under the auspicies of Tuscany Region; Province of Siena; City of Siena

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In cooperation with*:*

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Objective

The vibration experienced by some vehicle and machine operators has long been suspected to be a cause of injuries. There are now guides, standards and proposed legislation intended to protect workers from excessive exposure to whole-body vibration and mechanical shock. Seating standards seek to minimise the transmission of vibration and shock to the body.

The purpose of this multi-disciplinary conference has been to provide an opportunity to exchange information on the potential for injury from whole-body vibration and mechanical shock, to increase understanding of the mechanisms of injury, to improve methods of investigating the effects of whole-body vibration and shock, and to disseminate understanding of means of preventing injury.

This conference follows the First International Conference on Whole-Body Vibration Injuries held at the University of Southampton , 15-17 September 1997.

Main topics of the papers presented at the Conference involved:

- epidemiology
- physiological measurements and pathological investigations
- biodynamic measurements
- models and analogues
- measurements and evaluation of exposures
- seating dynamics
- other preventative measures
- guidelines and standards
- compensation & legal implications

A special session of the Conference has been dedicated to preventative measures and the promotion of the transfer of knowledge from the laboratory to the field.

At this regard an invited talk concerning the amended proposal on the minimum health and safety requirements regarding the exposure of workers to the risks arising from physical agents has been presented by Antonis Angelidis on behalf of the European Commission.

Main results of the Vibration Injury Network work packages associated with preventative measures were also presented in this special session. In particular they focused on:

– Guidelines for Whole-Body Vibration Health Surveillance. (Lundström R., Bovenzi M., Hulshof C., Magnusson M., Pope M., Verbeek J.)
– Survey of technical preventative measures to reduce whole-body vibration effects when designing mobile machinery. (Donati P.)
– Criteria for recognition of whole-body vibration injury as occupational disease: a review. (Hulshof C.T.J., Van der Laan G.J., Braam I.T.J., Verbeek JHAM)
– Whole - Body Vibration database on the Internet. (Lundström R.)

Some of the papers presented at the conference have undergone peer review and will be published in the Journal of Sound and Vibration.

The organisation of the conference was supported by the European Commission under the BIOMED 2 Concerted Action BMH4-CT98-3291 (*Vibration Injuries Network).*

Participants

Eighty persons took part at the Conference, from the following sixteen countries:
Brazil. Canada, Denmark, Greece, Finland, France, Germany, Italy, Japan, Poland, Sweden, The Netherlands, UK, Ukraine, USA, Yugoslavia.

Papers

Thirty four papers have been presented at the conference. Twenty seven of them have been submitted to the *Journal of Sound and Vibration* for publication. The complete list of papers that were presented at the conference is shown in Table 1.

Table 1 - List of papers presented at the conference.

Epidemiology
Palmer K., Coggon D., Syddall H., Griffin M. J. Occupational exposures to whole-body vibration in Great Britain and their relation to low back pain.
Rehn B., Lundström R., Nilsson T., Bergdahl I.A., Ahlgren C., Sundelin G., From C., Järvholm B. Musculoskeletal symptoms among drivers of all-terrain vehicles.
Magnusson M., Hoy J., Mubarak N., Nelson S., Sweerts de Landas M., Pope M The effect of whole body vibration on forklift drivers
Bovenzi M., Pinto I., Stacchini N. Low back pain in port machinery operators.
Effects of exposure to WBV
Stayner R. Whole-Body health effects - Vibrations or shock?
Ishitake T., Matoba T. Frequency weighting for the effects of exposure to whole-body vibration on gastric motility.
Magnusson M.L., Smith F., Pope M. Magnetic Resonance Images of helicopter pilots with and without low back pain.
Sarwar C., Dudnyk I., Partas O., Subhash P., Yegorova N., Dudnyk V., Vamben A. Some clinical and roentgenological (X-Rays) symptoms of vibration disease among carrier dump-drivers.
Biodynamics
Blüthner R., Seidel H., Hinz B. On the myoelectric response of back muscles to vertical random whole-body vibration with different magnitudes
Rakheja S., Boileau P.E., Stiharu I. Seated occupant apparent mass characteristics under automotive postures and vertical vibration.
Matsumoto Y, Griffin M.J. Effect of muscle tension on non-linearities in the apparent masses of seated subjects exposed to vertical whole-body vibration.
Mansfield N.J., Griffin M.J. Effect of posture and vibration magnitude on apparent mass and pelvis rotation during exposure to whole-body vertical vibration.
Milic Z. Demic M., Lukic J. Some aspects of the investigations of the random vibration on human fatigue.
Prevention
Lundström R., Bovenzi M., Hulshof C., Magnusson M., Pope M., Verbeek J. Guidelines for Whole-Body Vibration Health Surveillance.
Donati P. Survey of technical preventative measures to reduce whole-body vibration effects when designing mobile machinery.

Angelidis A. Amended proposal on the minimum health and safety requirements regarding the exposure of workers to the risks arising from physical agents (vibration).
Nelson C.M., Brereton P.F. Whole-body vibration risk in the context of European Union directives.
Hulshof C.T.J., Van der Laan G.J., Braam I.T.J., Verbeek JHAM Criteria for recognition of whole-body vibration injury as occupational disease: a review.
Harazin B. A new draft of the occupational limits for the whole-body vibration in Poland.
Lundström R. Whole - Body Vibration database on the Internet.
Measurement and evaluation of exposure
Paddan G., Griffin M.J. Evaluation of exposure to whole-body vibration in work vehicles
Voss P., Møberg N. Development of test code for vibration emission of mobile workplaces in airports: "airport ground support equipment".
Tsujimura H., Taoda K., Kitahara T., Nishiyama K. Evaluation of forklifts and working environment on whole - body vibration
Martin B.J., Foulke J., Armstrong T.J. Truck vibration in typical steel mill operations.
Doria A., Cossalter V. Riders sensitivity to motorcycle vibrations.
Bagesteiro L.B., Balbinot A., Tamagna A. A study of the vibration levels on urban buses in Porto Alegre – Brazil.
Bagesteiro L.B., Balbinot A., Tamagna A., Araujo D. A preliminary study of the drivers/seat interface to driver's shoulder transmissibility on urban buses in Porto Alegre – Brazil.
Diligenski D., Demic M. Influence of speed and road surface type on bus passenger vibrational comfort.
Seating and suspension systems
Boileau P.E., Rakheja S., Wu X. A body mass dependent mechanical impedance model for applications in vibrations seat testing.
Lemerle P., Boulanger P., Poirot R. A simplified method to design a suspension cab for counterbalance trucks.
Seidel H., Hinz B., Menzel G., Blüthner R. Effects related to random whole-body vibration on a suspended seat with and without backrest.
Lewis C.H., Griffin M.J. An active anthropodynamic dummy for the evaluation of the dynamic performance of seats.
Paddan G.S., Griffin M.J. Effect of seating on exposures to whole-body vibration in work-vehicles.
McManus S. J., StClair K.A., Boileau P.E., Rakheja S., Boutin J. Evaluation of the vibration and shock attenuation performance of a semi-active magneto-rheological fluid damper.