ABSTRACT

Title: Predicting Health Cause-Effect on Hand Arm Vibration Exposure among Hand-Held Grass-Cutting Workers in Malaysia
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Abstract:

Prolonged exposures to hand-transmitted vibrations from grass-cutting machines have been associated with increasing occurrences of signs of occupational diseases related to the hand-arm vibration syndrome (HAVS). However, there are no specific processes available that cover the subjective and objective health cause-effects of the hand arm vibration risk factors during onsite operations. Most of the existing vibration control measures have not extensively integrated administration and engineering techniques to be utilized as health prediction screening models. Therefore, the main objectives of this study are (1) to measure the health subjective and objective risks during normal working conditions among hand-held grass-cutting workers and (2) to determine the significant correlation of the subjective and objective measurement variables of the Hand Arm Vibration Exposure Risk Assessment (HAVERA) on hand arm vibration symptoms and disorders. The study was conducted in two stages: evaluation of the HAVERA variables (Stage 1) and development of the health prediction cause-effect model of the HAVERA process using multiple linear regressions and feed forward neural network programming (Stage 2). In the onsite measurement, the daily vibration value depicted an exceeded exposure action value of 2.5 m/s2 for both hands; and experiences of any finger colour change were claimed by 80% of the 204 subjects. This shows that the HAVERA process provided a good indication of HAVS which are reported as vascular, neurological and musculoskeletal disorders. In the right and left hand prediction model development, the results of the neural network model demonstrated a higher reliability performance as compared to the linear model for hand grip strength and hand numerical scoring assessment. The prediction of the HAVERA model using the neural network method has been developed for monitoring health conditions due to hand-transmitted vibrations among hand-held grass-cutting workers in Malaysia.