Design of power tools: results of a field study

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Abstract

A study was undertaken to detect common problems in the use of power tools. Features of the tools, tasks and workers were recorded for nearly 200 different tools and 90 workers. Workers were interviewed about their opinions about the tools, accidents that had occurred with them and any pain suffered while using them. Most problems with the tools focus on weight and size.

Introduction

This work is part of a research project aimed at evaluating the ergonomics of power tools in industry. A field study was undertaken to detect common problems that appear in their use, according to the users' opinions. Subjective methods are widely used to analyse and evaluate the ergonomics of tools, either as the only method (Ulin et al., 1993) or as part of a complete methodology using physical, physiological and psychophysical parameters (Bohlemann et al., 1994; Öster et al., 1994; Kadefors et al., 1993). The opinion of workers may give valuable information with which design criteria can be generated and can be used to improve the design of the tools. In this paper the results concerning the opinions expressed by the workers are presented: accidents and discomfort reported, importance and frequency of defects, as well as a brief analysis of their causes.

Material and methods

A field study was undertaken in different sectors (building, mechanics, electricity, gardening, furniture, etc.) and the following data were recorded:

- Features of the workers: size of the hand and the arm, grip force, and other general features.
- Features of the tools: technical features, size, weight and centre of gravity; noise and vibration; material, shape and size of handles and/or grip zones, and different aspects of the trigger switch element.
- Features of the tasks: adopted postures, daily duration of use and the use of gloves.
- Workers' opinions: global opinion of the tool and opinion about the tool's features (either positive or negative).

In D. de Waard, K.A. Brookhuis, and C.M. Weikert (Eds.) (2004), *Human Factors in Design* (pp. 329 - 333). Maastricht, the Netherlands: Shaker Publishing.