

Guest-editorial

The quality of products, and of the management processes for their production, represents an important criterion with which a company can set itself apart from competitors. This, among other things, is one reason why nowadays the evaluation and certification of products, companies, and people have become quite popular. Also, the International Ergonomics Association (IEA) is currently developing standards for Ergonomic Quality in Design (EQUID) which primarily intend to promote ergonomics principles and the adaption of a process approach for the development of products, work systems and services. Whereas certification criteria are being defined which require the comprehensive and systematic application of human factors considerations throughout the product development cycle, up to now no specified, generally applicable criteria in EQUID exist which address concretely the ability of products to meet user needs and their compatibility with user limitations and capabilities. Probably, in the future this will be difficult to achieve. Furthermore, certification bodies all too often use only formal and clearly understandable criteria because “real” quality is difficult to quantify.

Since the term ergonomics – which suggests quality – is sometimes used haphazardly in a trend which may be called “Ergomania,” skepticism about so-called ergonomic products is appropriate. People often think that, if they understand, for instance, the size of a person’s hand for a hand-held product, then they can call it an ergonomic product. Yet, beneath the surface of a pretty design, the quality of a product which claims to be ergonomic is often questionable. Ergonomics is more than just anthropometric considerations, as too many engineers and designers think. According to the definition of the IEA, it is a scientific discipline concerned with the understanding of interactions among humans and other elements of a system and a profession that applies theoretical principles, data, and methods to design in order to optimize human well-being and overall system performance. Thus, it is important to assess the ergonomic quality of products, hand-held tools and computer input devices via interaction through working processes that represent reality. Well-designed working tools can be expected to reduce or eliminate fatigue, discomfort, accidents and health problems and can lead to improvements in productivity and quality. Furthermore, absenteeism, job turnover, and training costs can positively be influenced by the working tools and the environment. Not all these short-term and long-term issues of working tools can be quantified in pragmatically oriented ergonomic research approaches. But multi-channel electromyography, which enables the measurement of the physiological costs of the muscles involved in handling tools during standardized working tests, and subjective assessments of experienced subjects enable a reliable insight in the essential ergonomic criteria of working tools and products. In this respect it is advantageous to provide a test procedure, in which working tests can be carried out alternately both with test objects and reference models.

After the introductory paper, in which the use of advanced multi-channel electromyographic methods for ergonomic field and laboratory studies is described in detail, the following papers show the efficient application of a developed computer-based system for the measurement of muscle strain, i.e. the physiological costs associated with various models of hand-held tools and two versions of keyboards. The results are not always congruent with the subjectively assessed fatigue and complaints, and both estimated and experienced assessment (pre and post test values) of the ergonomic quality of the test and

reference objects. Furthermore, comfort and discomfort, for example, as well as complaints in various body parts cannot be measured via physiological methods. Therefore, it is essential to carry out tests with both objective and subjective measurements of stress and strain, whereby performance and the demanded tasks, respectively, have to be held constant.

In conclusion, I wish to express my sincere appreciation to Professor Biman Das for his editorial assistance in the preparation of this special issue. This has contributed especially to improve the readability of the manuscripts.

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