

ISO/FDIS 11226: EVALUATION OF STATIC WORKING POSTURES

Nico Delleman^A, Mark Boocock^B, Bronislaw Kapitaniak^C, Peter Schaefer^D, and Karlheinz Schaub^E

^A TNO Human Factors, P.O. Box 23, 3769 ZG Soesterberg, The Netherlands (delleman@tm.tno.nl)

^B Health and Safety Laboratory, HSE, Broad Lane, Sheffield S3 7HQ, U.K.

^C Université PMC, Faculté de Médecine Pitié-Salpêtrière, Département de Physiologie, 91, boulevard de l'Hôpital, 75634 Paris Cedex 13, France

^D Technische Universität München, Lehrstuhl für Ergonomie, Boltzmannstrasse 15, 85747 Garching, Germany

^E Technische Universität Darmstadt, Institut für Arbeitswissenschaft, Petersenstrasse 30, 64287 Darmstadt, Germany

The authors constitute the writing group of ISO/TC159/SC3/WG2 for ISO 11226.

This paper describes ISO/FDIS 11226, the international standard on evaluation of static working postures. The scope, the evaluation procedure, and the current status are described.

INTRODUCTION

Pain, fatigue, and disorders of the musculoskeletal system may result from sustained inadequate working postures that may be caused by poor work situations. Musculoskeletal pain and fatigue may themselves influence posture control which can increase the risk of errors and may result in reduced quality of work or production, and in hazardous situations. Good ergonomic design is a basic requirement to avoid these adverse effects. ISO 11226 contains an approach to determine the acceptability of static working postures. FDIS means final draft international standard. The standard is prepared by ISO/TC159/SC3/WG2.

SCOPE

The standard establishes ergonomic recommendations for different work tasks. It provides information to those involved in design, or redesign, of work, jobs and products who are familiar with the basic concepts of ergonomics in general, and working postures in particular. The standard specifies recommended limits for static working postures without any or only with minimal external force exertion, while taking into account body angles and time aspects. It is designed to provide guidance on the assessment of several task variables, allowing the health risks for the working population to be evaluated. The standard applies to the adult working population. The recommendations will give reasonable protection for nearly all healthy adults. The recommendations concerning health risks and protection are mainly based on experimental studies regarding the musculoskeletal load, discomfort/pain, and endurance/fatigue related to static working postures.

RECOMMENDATIONS

The standard starts with general recommendations. It is stated that work tasks and operations should provide sufficient physical and mental variation. This means a complete job,

with sufficient variation of tasks (for instance, an adequate number of organizing tasks, an appropriate mix of short, medium, and long task cycles, and a balanced distribution of easy and difficult tasks), sufficient autonomy, opportunities for contact, information, and learning. Furthermore, the full range of workers possibly involved with the tasks and operations should be considered, in particular, body dimensions. With respect to working postures, the work should offer sufficient variation between and within sitting, standing, and walking. Awkward postures, such as kneeling and crouching, should be avoided, whenever possible. It is stressed that measures meant to induce variations of posture should not lead to monotonous repetitive work.

EVALUATION PROCEDURE

The main part of the standard consists of specific recommendations to evaluate static working postures. The evaluation procedure considers various body segments and joints independently by one or two steps (figures 1, 2, and 3 show some examples of body segments evaluated). The first step considers only the body angles (recommendations are mainly based upon risks for overloading passive body structures, such as ligaments, cartilage, and intervertebral disks). An evaluation may lead to the result 'acceptable', 'go to step 2', or 'not recommended'. An evaluation result 'acceptable' means that a working posture is acceptable only if variations of posture are also present (refer above). Furthermore, it is stated that every effort should be made to obtain a working posture closer to the neutral posture, if this is not already the case. An evaluation result 'go to step 2' means that the duration of the working posture will also need to be considered (recommendations are based upon endurance data). Extreme positions of joints should be evaluated as 'not recommended'.

ACKNOWLEDGEMENTS

The authors would like to recognize all those who have been involved in discussions during the drafting of this standard, particularly those of the ISO/TC159/SC3/WG2.

REFERENCE

ISO/FDIS 11226 (2000). Ergonomics - Evaluation of static working postures. Geneva, Switzerland: ISO.

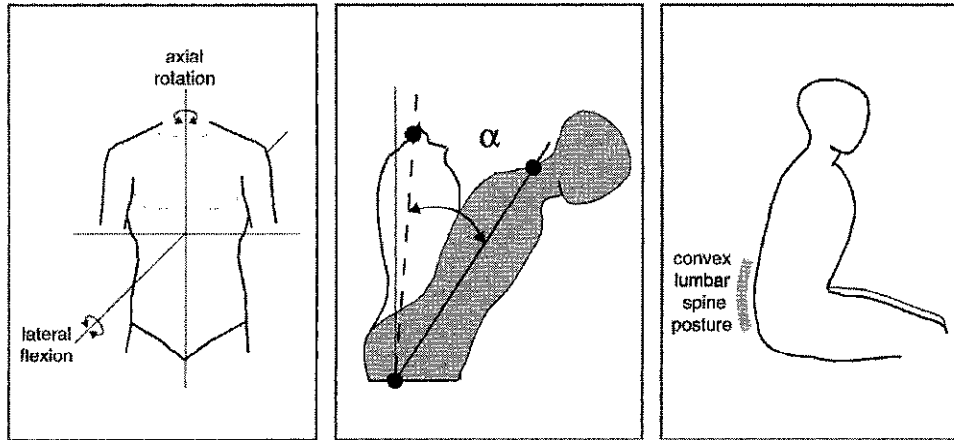


Figure 1. Items for evaluation of trunk posture.

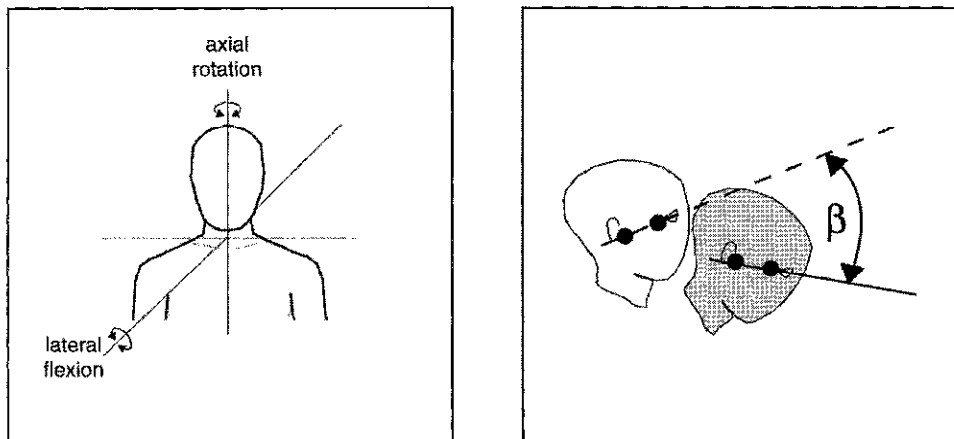


Figure 2. Items for evaluation of head posture.

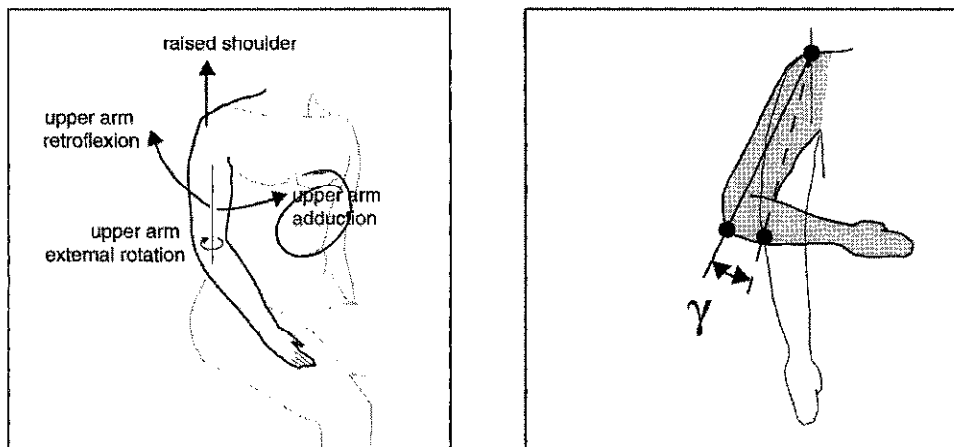


Figure 3. Items for evaluation of shoulder and upper arm posture.