

Focus on BGIA's work

Institut für Arbeitsschutz der Deutschen Gesetzlichen Unfallversicherung

Edition 0118 · 1/2009

617.0-BGIA: 638.81

Ergonomics at sewing workplaces

Problem

Elevated sickness rates and levels of the corresponding absenteeism have been observed for years in the German sewing industry. The main group of diseases observed in this area are those of the musculoskeletal system, particularly of the spine and the upper extremities. Under their prevention mandate, the BGs responsible for the leather industry and (at that time) for the textile and clothing industry (now the BG ETE) therefore launched a research project with the aim of developing an ergonomic sewing workplace and a practical guide to setting up ergonomic sewing workplaces.

Activities

The project, which was funded by the DGUV, was conducted in collaboration with the Munich University of Applied Sciences and the Schwan engineering office in Frankfurt. In eight selected sewing businesses, physiological strain parameters such as pulse rate and electrical muscle activity were measured in conjunction with body postures and movements during typical sewing tasks. The body postures and movements of the upper extremities, head, spine, and lower extremities were recorded continuously by means of the CUELA measurement system developed at the BGIA. In addition, environmental conditions such as lighting, noise and climatic conditions were measured. The subjective impression of the strain for the sewing operatives involved and their disorders and diseases were documented. Based upon the measurement results, an ergonomically improved model sewing workplace was developed, which was then installed in a number of sewing businesses.



The newly developed ergonomic sewing workplace; sewing operative fitted with the CUELA measurement system

Results and application

It was possible to demonstrate and quantify for the first time the typical stress situations at sewing workplaces, such as the performance of work in extreme joint angle positions, static postures, continually repeated movements, and the application of high forces. These results were incorporated during development of the ergonomic workplace, the characteristics of which included the following (cf. figure):

- Extension of the legroom
- Sewing with changing body postures (seated or standing) is possible
- Support for the arm and hand
- Reduction of awkward postures of the upper body

The comparison between the strain and stress profiles revealed a substantial improvement in the trunk posture and a reduction in arm and shoulder postures at extreme joint angles for tasks performed at the ergonomic workplace. The reduction in physical strain was also measurable. Following a period to adjust, acceptance of the new workplace among the sewing operatives is very high; subjective assessment by the test subjects also confirms the reduction in stress and strain brought about by the modified work situation.

The results of the research project have been incorporated into a guidance document (BGI 804-2) and are thus available directly to parties working in the field. The ergonomic sewing workplaces are available commercially and have since been installed at over 20 German companies, over half of which are small and medium-sized enterprises (SMEs). Following their installation, some companies observed particular personnel and economic benefits. An example was a medium-sized textile service company which in 2007 was awarded a prize in the European competition for the prevention of work-related musculoskeletal diseases. Following conversion of a total of 40 sewing workplaces, sick leaves in this company fell by 16%; at the same time, productivity rose by approximately 15%. The costs of the conversion were recouped after only a few months.

Area of Application

Textile and garment industry, leather industry, industrial sewing plants

Additional Information

- Ellegast, R. P.; Herda, C.; Hoehne-Hückstädt, U.; Lesser, W.; Kraus, G.; Schwan, W.: Ergonomie an Näharbeitsplätzen. BIA-Report 7/2004. Ed.: Hauptverband der gewerblichen Berufsgenossenschaften (HVBG), Sankt Augustin 2004
www.dguv.de/bgia, Webcode d6353
- BGI 804-2: Ergonomie an Näharbeitsplätzen – Ratgeber für die Praxis. Carl Heymanns, Cologne 2005
www.arbeitssicherheit.de

Expert Assistance:

BGIA, Division 4: Ergonomics – Physical environmental factors

Literature Requests:

BGIA, Central Division

“Focus on BGIA's Work”

Published by:
BGIA – Institut für Arbeitsschutz der
Deutschen Gesetzlichen Unfallversicherung
Alte Heerstr. 111
53757 Sankt Augustin
Germany
Edited by: Dr R. P. Ellegast
Phone: +49 2241 231-02/Fax: +49 2241 231-2234
e-mail: bgia@dguv.de
Internet: www.dguv.de/bgia