THE ERGONOMIC DESIGN OF WORKPLACES AND WORK ORGANISATION IN A SMALL TO MEDIUM SIZE ENTERPRISE

Organisation

Keulahütte GmbH

Professional Association of Mechanical Engineering and Metalworking Industries (Maschienenbau- und Metall-Berufsgenossenschaft)

Introduction

At Keulahütte, a small to medium sized enterprise (SME) engaged in foundry and metalworking, an analysis of the company's workplaces showed that fettling was connected with a very high level of strain on the musculoskeletal system. Fettlers had to handle heavy loads (18 – 20 kg). They had to adopt stressful trunk bending positions to perform many of their tasks. Awkward postures had to be adopted when taking parts out of and placing them into crate pallets. In addition, the heights of the workbench and grinding machines were not adjustable according to the workers' heights. The environment, lighting and noise conditions were poor. Furthermore, there was no policy for breaks and job rotation.

Aims

This example addresses the main problem in fettling workplaces: the high physical load and non-optimal work schedule that may result in physical overload and MSDs. The project aimed to control the causes of hazards and risks, to improve the general working conditions by introducing ergonomics measures as well as the implementation of the requirements of ergonomics standards and norms. The aim was to achieve sustained benefits for both the employees and the enterprise: a significant reduction in the very heavy physical work and strain on the workers, an improvement in safety and health, and an increase in the company's profitability. In addition, it was considered important to describe the solution process (interdisciplinary formation of groups, partners, procedures, methods used) to provide suggestions and assistance for practitioners in SMEs dealing with similar problems.

Figure 1 Awkward postures put extreme strain on the musculoskeletal system

Awkward body postures, heavy lifting and carrying, and working in forced postures can lead to work-related musculoskeletal disorders (MSDs) which may result in large amounts of time-off and even in employees having to give up work. The high costs of this are hard to compensate for, especially in SMEs.

What was done, and how

Initially, detailed assessments were made to assess the levels of stress and strain experienced by workers. The assessments undertaken included:

- a survey of workers;
- checklists to identify physical and psychosocial risks;
- evaluation of noise and the environment;
- quantitative estimation of carrying, lifting, pushing and pulling by means of the key indicator method;
- ergonomics measurements using the computer-assisted recording system CUELA.

Based on the results, the following solutions were developed and implemented over four years:

- dimensional adaptation of the workplaces;
- use of lifting and tipping tables;
- introduction of height-adjustable workbenches and grinding machines;
- use of crates with better access;
- introduction of job rotation and a reconfiguration of the breaks system;
- improvement of the lighting and ventilation systems.

The measures were carried out by Keulahütte GmbH, in close cooperation with practitioners, academics and accident insurance bodies:

- the Professional Association of the Mechanical Engineering and Metalworking Industries (MMBG);
- the Professional Institute of Occupational Health and Safety (BGIA);
- the Technical University Dresden;
- the Swiss Accident Insurance Institution (Suva / CH);
- the German Initiative for New Quality of Work (INQA).

All relevant employees of the company (management, employees, employee representatives, safety and health experts) were included in the preparation and implementation. Workers were given time to familiarise themselves with the new working conditions.

Following the implementation, further measurements were performed to ensure that the measures had improved the working conditions without introducing new areas of strain.

A brochure was produced describing the solution process, the interdisciplinary formation of the groups and the methods used. This can be used to provide suggestions and assistance for practitioners dealing with similar problems.

Figure 2 Tipping and lifting tables lighten the load for the workers

What was achieved

The project achieved sustained benefits both for the workers' safety and health and for the company's profitability. The heavy physical work and strain on workers and particular on their musculoskeletal system has been significantly reduced. The musculoskeletal stress from adopting postures with the trunk bent to angles greater than 20° was almost completely eliminated. The high number of tasks involving handling heavy loads of more than 15 kg was significantly reduced. The introduction of short breaks relieved the workers from heavy stress and strain, and the reconstruction of the lighting and ventilation systems improved the general working conditions.

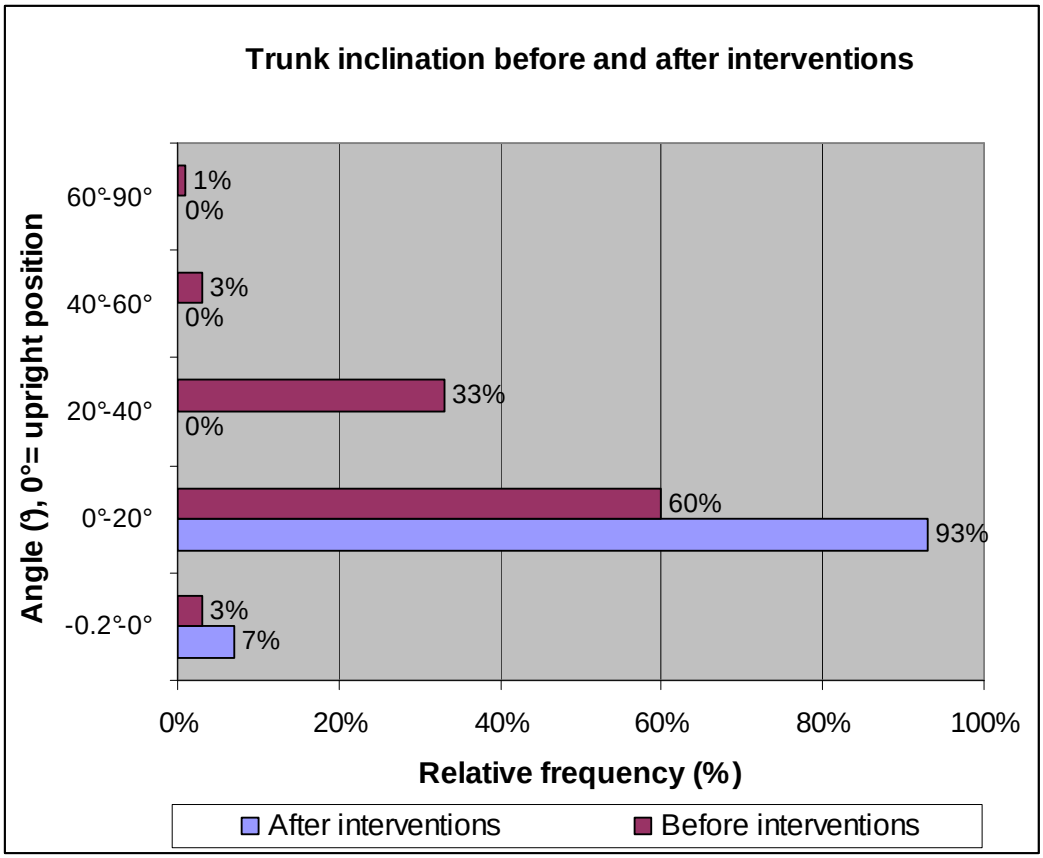

Figure 3 Effect of interventions on trunk inclination

The costs of the technical devices (lifting/tipping table, height-adjustable workbench) and the reconfiguration of the workplace (readjustment of the grinding machines, ventilation and lighting system) amounted to about EUR 16,000 which is considered to be a reasonable investment for a small to medium size enterprise. The benefits for the company cannot be measured directly in the short term, but will become clear in the longer term. After a period

of one year the study group will meet again to analyse how the situation has developed. The following questions will be answered:

- Has the rate of lost days due to unfitness for work reduced?
- Has the quality of work and the employees' motivation improved?
- Has there been a positive effect on the operating result of the enterprise?

If the company earnings and the workers' well-being have improved due to the solutions implemented, it will be clear that the investment has paid off.

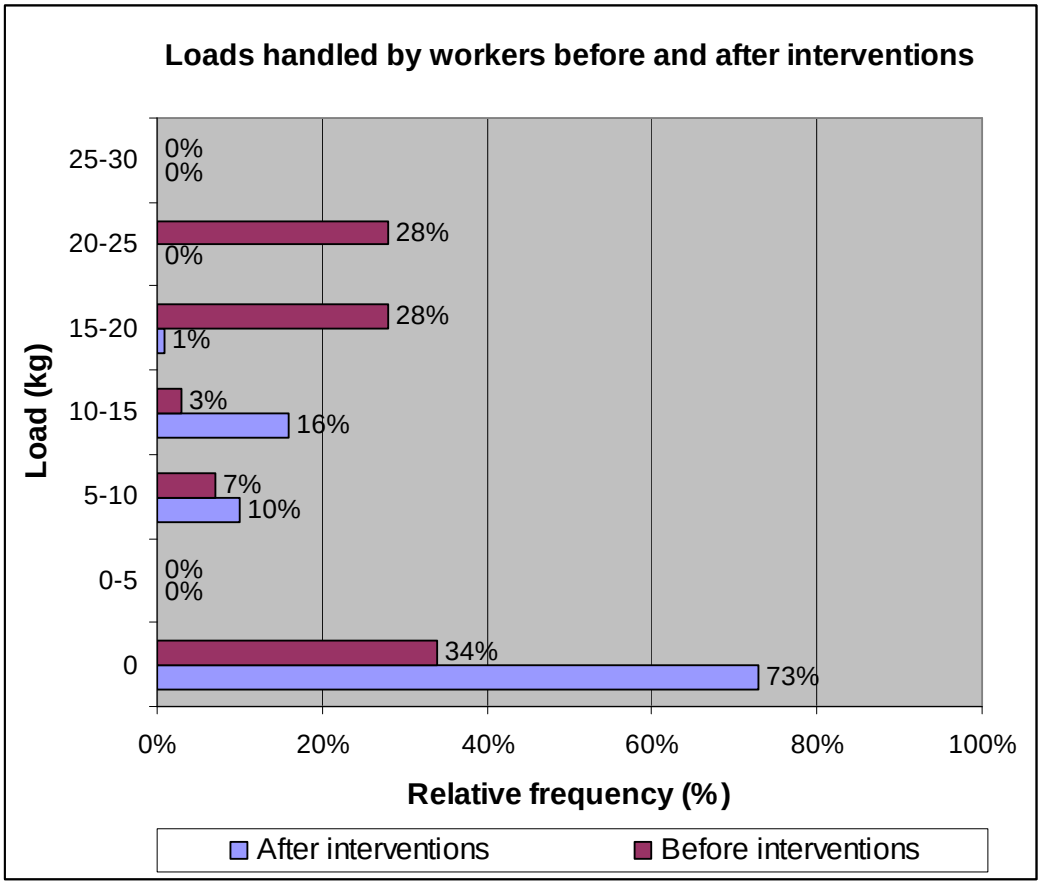

Figure 4 Effect of interventions on load handled

Further information

Project partners

Keulahütte GmbH

Geschwister-Scholl-Straße 15, D – 02957 Krauschwitz, Germany

Maschinenbau- und Metallberufsgenossenschaft (MMBG)

Elsterstraße 8a, D – 04109 Leipzig, Germany

Expert panel

- Berufsgenossenschaftliches Institut für Arbeitsschutz (BGIA)
- Technische Universität Dresden
- Schweizerische Unfallversicherungsanstalt Suva (CH)
- Initiative Neue Qualität der Arbeit INQA / TIK “Produktion”

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Information material

A very detailed brochure describing the project development and implementation has been produced.

http://www.inqa.de/Inqa/Navigation/publikationen,did=187282.html

The printed version can be obtained from:

Initiative Neue Qualität der Arbeit

Infozentrum, Friedrich-Henkel-Weg 1 – 25, D – 44149 Dortmund

Transferability

The model workplace for fettlers can be adapted for all similar installations, welding and metalworking workplaces. The practical solution can be applied without any problems to similar workplaces in SMEs in all sectors both nationally and in other EU Member States.