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The role of the industrial medical doctor in planning and implementing ergonomic measures at workplaces

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Abstract

An ergonomic measure can be effective in the treatment of musculo-skeletal disorders such as low back pain and cervicobrachial disorders. However, they have not yet been developed or implemented to their full potential at workplaces. One reason for this is that workers are rarely given the opportunity to be trained for ergonomic methods of improvement or to put these methods into practice in the work environment. An industrial medical doctor (industrial doctor), whose duties include planning and implementing ergonomic measures, as is the case in Japan, can play an important role in encouraging such improvements in the workplace. The purpose of this paper is to outline the role of the industrial doctor in planning and implementing ergonomic measures for reducing low back pain, and in fostering worker participation in the improvement process. A case study involving the maintenance division of a steel mill is used to illustrate the role of the industrial doctor. The role is summarized as follows: (1) Educate workers on the main causes of musculo-skeletal disorders in the workplace. (2) Propose to workers practical ergonomic principles to be implemented. (3) Propose participatory improvement methods to workers. (4) Propose to workers practical, simple and low-cost measures including supports. (5) Continuously restate and reinforce the goal of the ergonomic measures to workers. (6) Advise managers to cooperate in the process and budgeting.

Relevance to industry

This study is related to developing practical methods for ergonomic improvements in the workplace. © 2001 Elsevier Science B.V. All rights reserved.

Keywords: Industrial medical doctor; Ergonomics; Participatory improvement; Steel mill; Low back pain

1. Introduction

An ergonomic measure can be effective in the treatment of musculo-skeletal disorders such as low back pain and cervicobrachial disorders. However, they have not yet been fully implemented in workplaces. An effective solution to this

type of problem is for an ergonomist to train workers to participate in implementing ergonomic measures in the workplace (Kawakami, 1999). In Japan, the industrial medical doctor (industrial doctor) employs ergonomic measures as well as other types of medical treatments for treating work-related health problems, as shown in Table 1. (Udo, 1999; Udo et al., 1998). Ergonomics is one of the main measures used by the industrial doctor for preventing musculo-skeletal

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Table 1

Industrial doctor's strategies of health management/cures for occupational musculo-skeletal disorders in Japan

Category	Item
Ergonomics	Job organization, work space, floor condition, heavy materials, working height, sitting posture (chair)
Hygienic engineering	Vibration, cold, chemical factors
Work administration	Job rotation, recovery/work ratio, duration of work
Supports	Low back, knee joint, wrist, finger
Working techniques	Lifting techniques, working posture, work/rest
Lifestyle	Exercise, diet, rest, commuting
Braces	Corset, knee, wrist and finger braces
Physical therapy	Exercise, acupuncture, laser therapy, heat therapy, traction therapy
Chemical therapy	Antiphlogistic/analgasic drugs, muscle relaxants, tranquilizers, poultices, nerve blockers

disorders, along with hygienic engineering, work administration and supports. Therefore, the role of the industrial doctor in developing ergonomic measures in the workplace is an important one. The purpose of this study is to outline the role of the industrial doctor in planning and implementing ergonomic measures for reducing low back pain, and in fostering worker participation in the improvement process. This is illustrated using a case study of the maintenance division of a steel mill in which such ergonomic measures were implemented.

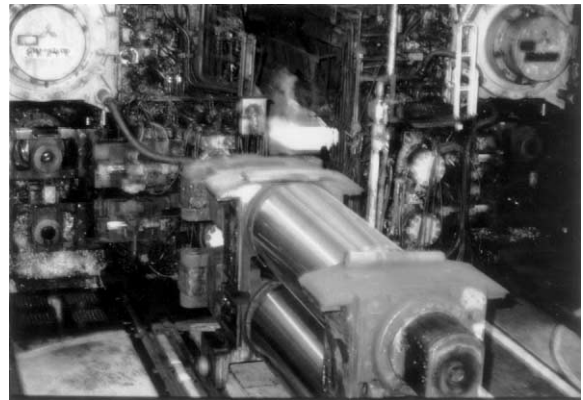


Fig. 1. Hot strip mill and spare rolls.

2. Low back pain observed in the maintenance division of a steel mill

This section deals with low back pain observed in the maintenance division of a hot strip mill. The maintenance division includes the group that disassembles and cleans roll-bearing stands (chocks) as well as the group that replaces the rolls in these chocks. Hereinafter, the first group will be referred to as the disassembling group, and the second as the replacing group.

A hot strip mill processes steel slabs into strips. The condition of the roll surface influences the quality of the strips produced. The used rolls, along with their chocks (used-roll set), are replaced with repaired rolls and chocks (repaired-roll set), based on the quality of the strips produced, or

when any roll marks or other damages are observed.

In the hot strip mill, as shown in Fig. 1, spare repaired-roll sets are prepared and subsequently exchanged for used-roll sets. The used-roll set is carried to the roll shop by a lift. The replacing group removes a clamp and chock from the roll, and installs a repaired roll in the chock. After the replacement process, the repaired-roll set is carried back to the hot strip mill as a spare.

There are three types of rolls: work rolls, intermediate rolls and back-up rolls. Work rolls are exchanged most frequently. The strip mill has six pairs of work rolls which are exchanged on an average of 8.5 times a day.

The disassembling group takes apart about 360 chocks per year, in order to clean, grease and

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