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Occupational safety and accident prevention in small workplaces with special reference to occupational health services

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PEKKARINEN, A., UKKOLA, K., TOLONEN, M. and HASSI, J. Occupational safety and accident prevention in small workplaces with special reference to occupational health. *Scand. j. work environ. & health* 5 (1979): suppl. 2, 45—49. This safety survey included 84 work establishments regarded in advance as hazardous. The workplaces employed a total of 1,450 persons, two-thirds being directly involved in the production of goods. In 1976, some 200 accidents occurred in these workplaces, 180 of them in industrial places of work. The survey gave a general picture of the safety hazards to be encountered in small places of work. Many failures were attributed to the obvious lack of knowledge among the proprietors, supervisors, and workers. Therefore, to be successful, occupational safety and accident prevention must include training concerning comprehensive safety and loss prevention and an accident investigation program. Emphasis on occupational health services can by no means act as a substitute for training in aspects of safety. In general, but by no means invariably, the role of occupational health personnel is, because of their educational background, likely to be rather limited with respect to accident prevention. As a group, they do not possess knowledge and experience related to engineering control to such a degree as to warrant their becoming safety inspectors. Even providing them with extensive postgraduate training in these aspects seems impractical. Nevertheless "safety" cannot be regarded as an area of expertise totally separate from that of occupational health. Now that health specialists are visiting places of work, and they are acquiring some knowledge of safety, they may make a significant contribution to occupational safety, at least in some places of work, by paying attention to selected accident prevention topics. In the present survey certain environmental factors (e.g., lighting, general orderliness, etc.), materials handling, some obvious hazards involved in the use of equipment, and recent accidents proved to be feasible focus points in this respect.

Key words: loss control, occupational health services, occupational safety, work accidents.

Accidents are the most common cause of disability arising from work. Generally, it

is anticipated that occupational health services will contribute effectively to occupational safety and accident prevention, too. This situation poses a challenge to occupational health personnel.

The purpose of this study was to survey the occupational safety aspects at small work establishments and to evaluate the role of municipal occupational health services in accident prevention.

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Fig. 1. Distribution of environmental risks at the surveyed workplaces according to the main divisions of economic activity.

Fig. 2. Distribution of lifting risks at the surveyed workplaces according to the main divisions of economic activity.

Fig. 3. Distribution of the risks involved in the use of technical equipment according to the main divisions of economic activity.

MATERIAL

On the basis of known accident frequency rates for different types of economic activity and other data collected from the labor inspectorate prior to and during preliminary visits, 84 of the 163 small workplaces included in a comprehensive survey concerning occupational health services in municipal health centers (6) were selected for investigation.

Thus the sample comprised mainly work establishments regarded a priori as hazardous from a safety point of view. These firms had also been included in the hygienic survey of 99 workplaces (1); only 15 firms were omitted, because no specific safety risks were expected in them. The 84 companies surveyed employed 1,450 persons, out of which 1,070 were engaged in the production of goods and articles. At the same time the cooperation between the employers and employees in safety matters, the training of safety personnel and past labor inspections were analyzed in all 163 workplaces. The accidents reported in 1976 from the 84 workplaces surveyed were also analyzed.

METHODS

The survey focused on the evaluation of risk factors in the work environment, in materials handling, and in the use of equipment. Occupational hygiene factors, e.g., noise, lighting, etc., which may influence work habits have been dealt with in another report (1), and the ergonomic aspects of lifting and carrying are discussed in the ergonomic study of the same 163 workplaces (7).

The safety of the work environment was rated as an entity with one score, the safety of burden handling by another score, and the technical devices and machines (in daily use) were each scored separately (4). Thus, in the work environment and materials handling, the most dangerous factor at any particular place of work determined the score given.

The rating (0, 0.2, 0.5, 0.8, and 1) was based on faults and defects observed with respect to technical safety guides and

other current recommendations. In addition, the risk involved in any job or the use of any equipment, inspite of proper safety measures, was taken into account in the rating. Examples of these are a circular saw with the edge covered according to instructions, the use of a manual grinding machine, and normal welding. The rating was based on the accident theory that obvious hazards to safety sooner or later cause accidents (4, 5).

RESULTS

Work environment

At least one hazard rated as substantial or great (score 0.5 or greater) was noted in the work environment in 60 % of the 84 places of work. Minor hazards (score 0.2) occurred in 36 of the firms, and insignificant hazards (score 0) at three workplaces (fig. 1).

Examples of the most common or most dangerous environmental risk factors in industrial companies were: cramped spaces; slippery, wet or poor floor surfaces; improper handrails, icy stairs, loading platforms, and out-of-doors work sites; danger of fire and defective fire extinguishing systems; and escape hindrances.

Materials handling

Substantial or great risks were observed with respect to materials handling in 56 % of the firms. Minor risks occurred in 39 %, and minimal hazards in 4 places of work (fig. 2).

Materials lifting by hand or by manual lifting devices involved safety risks (score 0.5 or greater) in the manufacture of wood products, in which 31 % of the employees were exposed to the risk, in the manufacture of metal products, machinery and equipment (20 % of the employers), and in the manufacture of nonmetallic mineral products (14 % of the employers). Substantial or greater risks appeared in only 30 % of the service establishments.

Technical equipment

Technical equipment was used in all the workplaces surveyed. We recorded some 700 pieces of equipment with at least a minor safety risk (fig. 3). Twenty percent of the equipment recorded was defective in comparison with the technical safety guides.

Eye protection was vital for the use of metal- and woodworking machines producing shavings, as well as for the use of grinding machines. The necessity of eye protection was rated by the score 0.2 (even when the protection was proper during the visit).

Intended changes reported by employers

Thirty-three firms (39 %) reported planned alterations in the work environment. They were expected to be accomplished within the next year in 22 firms and within three years in 11 firms. The intended changes included extension of activities (12 firms), the building of new buildings (8 firms), new production or processes (6 firms), reduction of activity or closure (5 firms), and other plans (2 firms).

Reported injuries

Although, on the questionnaire, the employers reported 180 injuries in 1976, the statistics of the National Board of Labor Protection (3) included only 134 injuries from the 84 firms surveyed because minor accidents causing 3 d or less absence from normal employment did not enter these statistics. The absenteeism rate caused by these 134 accidents is presented in table 1.

Table 1. Absenteeism caused by injuries reported to the National Board of Labor Protection in 1976.

Injuries		Length of absence (d)
N	%	
79	59	3—7
42	31	8—30
13	10	> 30
134	100	Total

In the same year the frequency rate of accidents of the 84 firms surveyed was 74 per million man-hours. The corresponding rate of the industrial companies was 84, of the service establishments 22, and of other types of workplaces 85 (2). One-third of the accidents were attributed to the work environment, one-quarter to pieces of equipment, 16 % to exertion of strength, and 14 % to lifting equipment (3). Hand injuries were involved in nearly half of all the accidents, lower limb injuries in 28 %, the body in 17 %, and other parts (head, eyes, etc.) in 8 %.

Cooperation between employers and employees

One hundred (61 %) workplaces (out of the 163) employed less than ten persons; thus they belonged to the municipal labor inspectorate. Only 35 firms (21 %) employed 20 or more persons. The rest, 28 % of the enterprises, had 10—19 employees.

Fourteen firms (out of 63) lacked the workers' safety representative required by law. On the other hand, a safety representative had voluntarily been elected in four work establishments with less than ten persons. These establishments were parts of larger companies with headquarters elsewhere.

Nine firms (out of 35) had not set up the safety committee required by law. At the same time three firms with less than 20 employees had set up such a committee even though it was not required by law.

Only 20 (38 %) of the workers' safety representatives and 20 (12 %) of the safety officers had received some kind of training in safety matters.

Reportedly, 92 (56 %) workplaces had been given a labor inspection. In 71 of these the inspection had occurred in 1976 or 1977. In the rest, 71 firms, a labor inspection had never taken place.

DISCUSSION

The survey included work establishments known in advance to involve safety problems. Therefore the results fully met ex-

pectations, and the survey generated a picture of typical safety problems to be expected at most hazardous small enterprises within a health center area. Safety hazards were encountered in the work environment, in materials handling, and in the use of equipment and machines.

In many small enterprises the full potential of occupational safety cooperation and accident prevention programs had not yet been realized, and, consequently, accident prevention had not been completely successful. Small businesses in particular seem hard pressed to find enough persons trained to inspect the work environment. Both management and workers in small firms seem to be inadequately informed and motivated concerning all aspects of safety. Safety officers, representatives, and committees seem unable to foster safety at work until they receive suitable training and unless top management shows a positive and active attitude towards occupational safety.

Many of the faults noted, in particular in the work environment, seemed unnecessary to us, and, fortunately, they could be eliminated by a rearrangement of the workplace layout. In contrast, the risks arising from crowded spaces, structural factors and the work procedures themselves were more complicated, and no straightforward solutions could be found during the walk-through survey.

We considered the use of outside health personnel rather limited in the promotion of safety at hazardous enterprises. Yet, occupational health personnel may, within the limits of their skill and experience, select some accident-prevention topics related to their qualifications for attention during their visits to the places of work. In this survey such items were certain environmental factors (e.g., crowdedness, disorder, passageways, work platforms, risk of falling, risk of sprinkling), materials handling (lifting technique and manual lifting equipment and their use), and, in addition, some obvious risks involved in the use of technical equipment and machines. In contrast, occupational health personnel are hardly able to inspect the appropriateness and condition of safety items (unless they have been suitably trained).

In short, occupational health personnel should alert the management and workers to safety hazards, but in cases outside their qualifications they should draw on the expertise of engineers and occupational hygienists. Sound occupational safety policy in small firms requires, in our opinion, the director's concern for safe operations. Safety should be a part of everyday practice that also provides for the approval of appropriate safety standards, the planning of accident prevention, persistent motivation, and the training of personnel. The fostering of safety at small places of work depends, according to the results of this survey, greatly on the attitudes of the proprietor, on technological and financial developments, and also on the training of supervisors and workers. Also the role of the labor inspectorate in accident prevention (3) seems to us to be more important than the role of outside health personnel.

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