ROLE OF PERSONAL PROTECTIVE EQUIPMENT IN FIRE FIGHTERS' ACCIDENTS

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INTRODUCTION

Protectors enable fire fighters to work more effectively and closer to a dangerous place, but they may also have side effects (1). They may make the work heavier and awkward (2,3,4), or degradation of their properties may deacrease their protective performance (5,6). In the accident sequence, the role of personal protective equipment is also twofold. Personal protective equipment may contribute to the release of the hazardous energy or may have some other effect that contributes to the accident by means of side effeots. The energy released can injure to the fireman if he neglects the use of protective equipment or if the equipment provides insufficient protection.

Some earlier studies have assessed the role of personal protective equipment in fire fighters' accidents (7,8,9). Most of these accidents were associated with the use of SCBA.

The aim of this study was to:
- evaluate the function of protective clothing and other personal protective equipment during accidents,
- examine the needs for developing and improving of protective clothing and other protective equipment, and
- judge fire fighters' readiness to use protective equipment correctly.

MATERIAL AND METHOD

The accident material studied comprises the reports of Finnish fire fighters' accidents filed with Finnish insurance companies in 1980-1985, and which led to at least three days of absence from work (N=801); also included were the fatal and serious accidents recorded since 1977 (N=27).

The relevance of personal protective equipment was first evaluated from the reports. Reports where personal protective equipment were considered to be relevant in the accident sequence were classified into three categories: 1) no personal protective equipment was used in the situation, 2) the protection performance of personal protective equipment was insufficient, but they may have had an alleviating effect, and 3) personal protective equipment seemed to have been a factor contributing to the accident situation by means of side effects.

RESULTS AND CONCLUSIONS

About half (N=396) of the accidents occurred during fire fighting and rescue situations when fire fighters were wearing turnout equipment. Personal protective equipment was evaluated to have been relevant in 59 % of those accidents.

In about one-third of the accidents that occured in alarm situations, the injuries - mostly burns - would have been less

severe if the injured person had been protected better by protective clothing and other protective equipment. Host injuries of this type could have been prevented or alleviated by improving the protection given by the protective clothing to the upper parts of the body and to the hands.

Protectors were evaluated to have been a contributing factor most commonly in slipping and tripping accidents, accounting for 23 % of the accidents in alarm situations and in 17 % of the station accidents. Lighter and more flexible protective shoes and, especially in tasks at the station, shoes with better friction properties would reduce the number of such accidents.

In the course of eleven years, from 1977 to 1988, six firemen died, five at the scene of fires. Two victims neglected the use of SCBA in reported serious accidents, the use of SCBA involved problems in three cases, and the protection performance of clothing was insufficient in accidents leading severe *burns*. The reports on serious accidents show that there is a need for more training to control risk-taking behavior and to ensure that the use of personal protective equipment is standard procedure occuring at a subconscious level in every situation. changes in regulations are also needed to guarantee sufficient protection.

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