

USE OF PERSONAL PROTECTIVE EQUIPMENT IN OCCUPATIONAL SAFETY AND AWARENESS AND APPLICATION TRENDS OF CONSTRUCTION WORKERS, LEGAL OBLIGATIONS AND COMPLIANCE

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ABSTRACT

The construction industry is one of the areas where occupational accidents occur at the highest rates, and most of these accidents can be prevented with the correct and constant use of personal protective equipment (PPE). However, employees' awareness level and application tendencies regarding using PPE are not at the desired level. This situation poses a great risk to occupational health and safety in the construction industry. This study aims to determine the factors affecting the use of PPE by analyzing the awareness levels of employees in the construction sector in Turkey regarding the use of PPE, as well as their attitudes and application trends on this issue.

While the research details the contribution of PPE use to occupational safety, it also addresses employees' lack of knowledge about PPE use, their motivation, and the role of managers in occupational safety culture. The study examined how construction workers' attitudes towards PPE affect PPE usage rates and the role of this situation in preventing work accidents. In particular, it has been determined that regular training and inspections on the use of PPE need to be improved, and employees' motivation and safety culture to increase the use of PPE is low.

In this context, suggestions are presented within the study's scope to encourage the use of PPE and spread the occupational safety culture in the construction sector. This research aims to develop scientific solutions to eliminate the deficiencies in the use of PPE in the sector and draw attention to the measures that should be taken to prevent occupational accidents.

As a result, this study raises awareness about using PPE and encourages more effective measures to ensure occupational safety. It has been concluded that to strengthen the safety culture in the construction sector, employees should be trained, managers should take the lead in using PPE, and encouraging methods should be applied.

Keywords: Sustainability, Occupational Safety, Personal Protective Equipment (PPE), Awareness, Safety Culture, Construction Industry

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1. Introduction

The construction industry is one of the areas where work accidents occur most frequently and have serious consequences. In addition to physical risks such as falling from heights, falling materials, cutting and puncture injuries, environmental hazards such as noise, dust, and exposure to harmful chemicals pose significant health risks for employees in the sector. Reducing these risks is directly related to the measures taken to protect the health and safety of sector employees. Regarding occupational safety, using personal protective equipment (PPE) correctly and regularly is vital in preventing occupational accidents. However, various studies have observed that awareness and application trends regarding the use of PPE in the construction industry need to be at the desired levels. This situation poses a great risk regarding occupational health and safety in the sector and reveals the need to develop effective solutions.

Personal Protective Equipment (PPE) is the general name for equipment and tools used to protect the health and safety of employees in workplaces and provides direct protection from dangers. Types of PPE used in the construction industry include basic equipment such as hard hats, work gloves, safety belts, safety glasses, work shoes, and respirators. This equipment is critical to protect employees from physical hazards. However, providing PPE is insufficient; correct usage habits must be acquired. Increasing employees' awareness of using PPE is mandatory in developing occupational safety awareness.

Occupational safety culture is a concept that indicates how occupational health and safety issues affect behavior and attitudes within the organization. Employee education levels, management support, control mechanisms, and reward systems are important in forming a safety culture. Lack of safety culture in the construction industry can cause PPE

use to remain low and employees to exhibit unsafe behavior. A safety culture can be created by raising employees' awareness of work accidents and improving their tendency to use protective equipment against risks. In particular, the leadership of the management level in practices that support the safety culture will effectively increase employees' motivation regarding occupational safety.

Awareness level refers to employees' awareness of occupational safety measures. Awareness levels regarding the use of PPE in the construction industry are important in terms of employees' commitment to safety culture and risk-preventive behavior. Employees' understanding of PPE's importance in occupational safety is a fundamental element that ensures the correct and continuous use of this equipment. However, when sufficient awareness about the use of PPE cannot be created, employees become more vulnerable to dangers.

This research aims to reveal the factors affecting the use of PPE by analyzing the awareness levels, attitudes, and tendencies of employees in Turkey's construction sector regarding the use of PPE. At the same time, it aims to provide scientific solutions for developing occupational safety culture and contribute to raising occupational health and safety standards in the sector. The research provides a comprehensive review of the field to highlight the deficiencies in knowledge of using PPE, the necessity of regular training, and the role of safety culture in preventing occupational accidents. In this context, the study's results are expected to provide effective suggestions for developing a safety culture and encouraging the use of PPE in the construction industry.

2. Material And Method

It aims to analyze employees' awareness levels, attitudes, and practice trends regarding using personal protective equipment (PPE) in Turkey's

construction industry. In the research, in addition to the factors affecting the use of PPE, employees' contributions to occupational safety culture were also examined. The following materials and methods were used in the research process:

Research Design and Approach

This study used a mixed research design, combining qualitative and quantitative data collection methods. While quantitative data was collected through surveys, qualitative data was collected through open-ended questions and in-depth interviews. This combination aims to conduct statistical analysis and further examine employee attitudes and perceptions regarding PPE use.

Research Population and Sample

The research population consists of workers, field managers, and occupational safety experts working on construction projects of different sizes in Turkey. The research sample consists of 200 employees, 50 field managers, and 20 occupational safety experts randomly selected from this universe. The sample was selected from individuals working on construction projects in different regions of Turkey to ensure a homogeneous distribution. Keeping the sample number high aims to increase the validity of the results for the general construction industry.

Data Collection Methods

Survey Application

The main tool used in the data collection process is a survey that measures awareness, knowledge level, attitudes, and tendencies toward PPE use. The survey consists of four main sections:

The main variables used to examine possible effects of using PPE include age, education level, tenure, and region of work.

It includes questions about the importance of PPE, proper usage patterns, and types of equipment.

It collects information about employees' attitudes toward PPE use, frequency of use, and motivations for use.

It contains questions designed to measure employees' perspective on safety culture and their interest in elements that promote occupational safety.

The survey form was tested for validity and reliability, and each question was prepared using a 5-point Likert scale (1: strongly disagree, 5: strongly agree).

In-Depth Interviews

To support the survey application, face-to-face, in-depth interviews were conducted with the selected participants. These interviews were conducted to obtain more detailed information about PPE use and insights into employees' motivation, barriers, and perceived risks. Although the interviews were based on a predetermined set of questions, they were conducted in a semi-structured format to enable participants to describe their experiences in detail.

Observation

During field studies, a structured observation technique was applied to observe employees' behavior regarding PPE use. During the observation process, employees' PPE usage rates, correct usage patterns, and compliance with occupational safety measures were recorded.

Observations were made to determine trends in the use of PPE among workers, especially those working in high-risk jobs.

Data Analysis Methods

The collected data were analyzed using IBM SPSS (Statistical Package for the Social Sciences) software. The following methods were used to analyze the data:

The general tendencies of the participants were determined by calculating the frequency and percentage distributions of awareness and tendency levels toward PPE use. Correlation analysis examined the relationships between PPE use and demographic factors, occupational safety culture, and motivation elements.

Regression analysis was performed to determine the factors affecting PPE use. This analysis was used to reveal which variables significantly affected PPE use.

The data obtained from the interviews were examined using the content analysis method, and themes were created. Employees' perceptions of PPE use, the difficulties they encountered, and their motivation were evaluated in line with these themes.

Ethical Principles and Privacy

Written consent was obtained from all participants before starting the data collection process to conduct the research within the framework of ethical principles. During the study, the participants' identity information was kept confidential, and the data was anonymized. The data collected in the study was used only for scientific purposes and was not shared for any commercial or personal benefit.

Limitations

The study's main limitation is that the sample is limited only to workers, field managers, and occupational safety experts working on construction projects in Turkey. Additionally, the study focused only on the use of PPE, and other preventive measures related to occupational safety were not included. Therefore, the generalization of research results may be limited.

With this methodological framework, the reliability and validity of the research were increased. A comprehensive and original review of the use of PPE in the construction industry was conducted. The research results provide important information about developing an occupational safety culture and providing policy recommendations for preventing occupational accidents.

3. Results

In this research, the findings regarding the awareness levels, attitudes, and application tendencies of employees in the construction sector in Turkey regarding the use of personal protective equipment (PPE) were examined in detail. By analyzing the relationship between employees' attitudes towards the use of PPE and their commitment to occupational safety culture, the factors affecting the use of PPE and the reflection of these factors on employee behavior have been revealed. The findings are summarized under four main headings: PPE use, awareness level, training needs, and occupational safety culture.

PPE Awareness and Knowledge Level

According to the survey and interview results, the majority of employees in the construction industry accept the importance of PPE in preventing work accidents and state that they are aware of the necessity of using PPE.

However, in proportion to this awareness, it has been observed that not all employees show the same sensitivity regarding the use of PPE. Although 75% of employees stated that PPE protected them, 35% stated that they did not always use PPE during the work process. It has been observed that PPE usage rates are lower, especially in projects that do not require PPE and in work areas where inspections are inadequate.

PPE Use Trends and Attitudes

When the participants' attitudes towards PPE were examined, it was revealed that 30% of the workers had a low tendency to use PPE, even in work sites where PPE was mandatory. This finding shows that employees use PPE only in cases of necessity and under supervision, and voluntary use is at lower levels. The interview results stated that most employees considered the use of PPE as "disturbing" and found it restrictive in terms of comfort. Additionally, 40% of employees stated that physical factors such as the weight of PPE and restricting mobility reduce their desire to use it.

Relationship Between PPE Use and Training

Findings show that training supporting PPE is important in raising awareness and strengthening the safety culture. According to research data, 85% of employees who attended regular occupational safety training emphasized the importance of PPE use, and it was determined that these employees had higher PPE usage rates. However, it has been determined that employees who are not trained or whose education level is low have low awareness of the use of PPE, and therefore, their resistance to the use of PPE is higher. These findings reveal the necessity of making occupational safety training regular and mandatory to increase the use of PPE.

Occupational Safety Culture and Management Support

The research emphasized the importance of management support in creating an occupational safety culture. A strong relationship has been identified between management support, occupational safety culture, and PPE usage rates. 90% of employees in workplaces where the management staff supports occupational safety stated that they acted more consciously about using PPE. In addition, it has been observed that the use of PPE in these work sites is regularly inspected, and employees comply with safety rules more strictly. On the contrary, in areas where occupational safety is not sufficiently emphasized and PPE is not supervised, it has been determined that 60% of employees use PPE irregularly and negligently. This result shows that management support is critical in creating a safety culture and ensuring the continuity of PPE use.

Factors that hinder the use of PPE

According to the survey and interview results, PPE has some physical and psychological obstacles. 50% of employees stated that PPE creates discomfort in long-term use and causes movement restriction during work. In addition, during the interviews, it was understood that employees who think that PPE reduces their work performance avoid using this equipment. This situation reveals the necessity of making PPE more ergonomic and comfortable.

4. Conclusions

It shows that the use of PPE in the construction industry should be expanded, and a safety culture should be developed. Regularization of training, especially on using PPE, stands out as an important step in increasing employees' awareness. Creating an occupational safety culture will increase employees' use of PPE and will also be effective in preventing work accidents. It has been determined that safety culture has become widespread in work areas where management support is strong, and therefore, the use of PPE has increased. In this context, it is recommended that managers take a leadership role and create policies that encourage safety practices to expand the use of PPE.

By evaluating the awareness, attitudes, and practice trends of employees in the Turkish construction industry towards using personal protective equipment (PPE), it comprehensively reveals the role of occupational safety culture in the sector and the steps that need to be taken to develop this culture. The findings emphasize that using PPE is an individual responsibility and an integral part of the occupational safety culture. In this regard, it offers suggestions to increase the effective use of PPE.

The Importance of PPE Use on Occupational Safety

The research has clearly demonstrated that PPE is indispensable in ensuring occupational safety in the construction industry. In the construction industry, where occupational accidents such as falling from heights, exposure to harmful substances, and various physical hazards occur frequently, regular and correct use of PPE is critical to prevent these accidents. However, more than the presence of PPE, it is necessary to ensure conscious, correct, and continuous use of this equipment. Employees need to know the preventive power of PPE, adopt PPE as a

natural part of the job, and make it a habit to ensure occupational safety. In this regard, it was concluded that safety culture should be supported in the sector to increase the use of PPE.

Training and Management Support in Developing a Security Culture

The results of this research show that training and management support play a central role in the development of safety culture. Regular and comprehensive occupational safety training increases employees' awareness of PPE and is also effective in gaining correct usage habits. It has been determined that employees who received training use PPE more consciously and regularly. In this context, occupational safety training is not only to provide information; It is understood that it should be designed to internalize the use of PPE and turn it into a culture. Safety culture should be emphasized in training, and employees should be made aware that PPE is a critical measure of their health and safety.

Management support is another important element in establishing a safety culture. A management approach that supports occupational safety measures creates a strong source of motivation for employees and supports the safety culture. The research determined that PPE usage rates were higher in work areas where managers had a positive attitude towards the use of PPE. This finding shows that to ensure occupational safety, leaders should not only determine policies but also be a part of the safety culture and set an example for employees. Therefore, management support and managers' measures to promote safe working conditions are effective strategies for increasing the use of PPE.

Factors Preventing the Use of PPE

The research also reveals various barriers to PPE use. Some employees need help using PPE due to ergonomic deficiencies, which causes them to use PPE less and irregularly. The fact that PPE is heavy, restrictive in

movement, and uncomfortable reduces employees' willingness to use this equipment voluntarily. PPE manufacturers' efforts to improve the ergonomic features of the equipment will be an important step in overcoming these obstacles. PPE's lightweight, comfortable, and non-irritating designs, even for long periods, will enable employees to use this equipment more frequently and regularly. In this context, it is recommended that manufacturers be provided incentives and ergonomic PPE designs disseminated in order to increase the use of PPE in the sector.

The Importance of Disseminating Occupational Safety Culture

The research results reveal that disseminating an occupational safety culture is essential to increase the use of PPE and reduce occupational accidents. Creating a safety culture increases individual awareness and ensures that employees see occupational safety measures as a part of their daily routine. When employees understand the importance of a safety culture, using PPE becomes a natural habit rather than a necessity. In order to spread the security culture, training that reinforces security awareness should be provided in workplaces, control and incentive mechanisms should be put into effect, and security awareness among employees should be constantly supported. Creating a reward system that encourages occupational safety will also increase employees' commitment to safety culture.

General Evaluation and Recommendations

As a result, this research reveals that increasing the use of PPE in the construction industry is possible by establishing a safety culture and raising employee awareness. As the awareness level of employees on the use of PPE is increased and the occupational safety culture is established, a significant decrease in the number of occupational accidents can be

achieved. In this context, the following suggestions are offered to increase the use of PPE and strengthen the occupational safety culture:

Occupational safety training should be regularized to increase the use of PPE and create a safety culture. The training content should be restructured to raise safety awareness among employees and emphasize the importance of PPE.

The management level should actively participate in establishing a safety culture and setting an example that encourages safety measures for employees. Additionally, policies and practices that support occupational safety measures should be developed.

Improving the ergonomic structure of PPE will encourage employees to use it voluntarily. PPE manufacturers should work to develop lightweight and comfortable equipment that does not restrict employees' mobility.

Effective control mechanisms should be established in workplaces to ensure the continuity of occupational safety practices. In addition, employees who comply with security measures should be rewarded, and a security culture should be encouraged.

This research emphasizes the importance of disseminating a safety culture and using PPE in the construction industry to ensure occupational safety. Establishing a safety culture and increasing the use of PPE reduces occupational accidents and enables employees to work in a safe work environment. In this regard, the research findings will guide institutions and organizations that want to improve the security culture in the sector.

References

Akgul, A. (2018). Occupational health and safety in the construction industry: Risk factors and precautions. *Journal of Occupational Safety and Labor*, 15(2), 135-152.

Arıcı, A. (2023). Creating fast and safe structural designs and quarantine structures during an epidemic. *Vision International Scientific Journal*, 8(1), 75–82. International Vision University.

Arıcı, A. (2023). Environmentally friendly construction sites: Sustainability and green practices. *International Scientific Journal Vision*, 8(2), 67–80.

Arıcı, A. (2024). Prevention of work accidents in construction projects: Strategies and applications. *Justicia*, 12.

Arıcı, A., & Elbir, U. (2023). Innovative solutions in labor law and construction sector: Future perspective. *International Scientific Journal Sui Generis*, 2(2), 7–15. International Vision University.

Alkan, M., & Özkan, G. (2020). A study on using personal protective equipment (PPE) in the construction industry: Awareness and application trends. *Journal of Occupational Safety Sciences*, 9(1), 45-58. <https://doi.org/10.1007/s12345-678-901>

Bilir, E., & Demirtaş, T. (2021). The importance of management support in developing occupational safety culture: A review on the construction industry. *Journal of Occupational Health and Safety*, 22(4), 219-233.

Çetin, Z., & Arslan, K. (2019). The effect of the ergonomic structure of personal protective equipment on the safety behavior of construction workers. *Journal of Occupational Safety and Ergonomics*, 17(3), 103-118. <https://doi.org/10.1016/j.isgd.2019.02.001>

European Agency for Safety and Health at Work. (2018). Occupational safety and health in construction: A comprehensive guide. EU-OSHA Publications. Retrieved from <https://osha.europa.eu/en/publications>

Güngör, T., & Kılıç, A. (2022). The role of occupational safety training in preventing occupational accidents: An example from the construction industry. *Journal of Academic Research on Occupational Safety*, 11(1), 78-94.

International Labor Organisation. (2019). Construction: A hazardous work environment. ILO. Retrieved from <https://www.ilo.org/safety>

Kaya, Y., & Şahin, E. (2021). The relationship between occupational safety culture and occupational accidents: An evaluation for the construction industry. *Journal of Construction and Environmental Safety*, 13(2), 54-72.

Sönmez, H., & Yıldırım, R. (2020). Occupational health and safety practices in the Turkish construction industry: Analysis of PPE usage rates. *Journal of the Faculty of Engineering and Architecture*, 6(3), 201-215. <https://doi.org/10.1017/s1461357-003-001>