

# The Importance of Personal Protective Equipment in Firefighter Safety and Health Efforts in the North Nias District Fire and Rescue Field

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## ABSTRACT

Personal protective equipment (PPE) refers to gear utilized to safeguard individuals from hazards, accidents, and work-related illnesses. It is typically employed in environments where there is a heightened risk of harm to workers and those around them. This equipment encompasses garments and accessories designed to shield workers from hazardous substances, processes, machinery/tools, facilities, and surroundings, thereby reducing the likelihood of accidents and illnesses. PPE should be comfortable to wear and should not impede work in order to provide effective protection. Its primary objective is to prevent work-related diseases. The use of PPE is not limited to workers alone but extends to anyone entering and interacting with the work environment. PPE is intertwined with occupational safety and health (OSH) because it contributes to maintaining OSH standards. OSH, as mandated by labor laws, revolves around ensuring the physical and mental well-being of the workforce, with a focus on accident and illness prevention and management in the workplace.

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## 1. INTRODUCTION

The success of an institution is not only determined by competent human resources but also by the availability of facilities that support the performance of its human resources. According to (Filipa Ferreira et al., 2024), workplace facilities encompass everything used, occupied, and enjoyed by employees, both for job-related relationships and for the smooth execution of tasks. Adequate facilities greatly support the execution of work, especially in extreme conditions. In carrying out extreme tasks in the workplace, occupational safety and health are paramount.

Occupational safety is a means to prevent workplace accidents that can result in various losses such as injuries, disabilities, fatalities, property damage, and damage to equipment, machinery, and the environment at large (Kemdikbud 1970). In finance ministry regulations and the Indonesian Basic Health Law No. 9 of 1960, occupational safety is closely related to increased production and productivity. With high levels of occupational safety, the potential for accidents that cause illness, disability, and death can be reduced by maintaining equipment or machinery.

Workplace accidents are undesired and often unpredictable events that can result in losses of time, property, or even lives during work processes. Common causes of workplace accidents include the use of damaged personal protective equipment (PPE), insufficient safe equipment, poorly designed machinery lacking adequate safety features, unsafe or noisy environments, leading to workers not hearing danger signals, and poor room temperatures causing fatigue, hindering concentration on tasks (Vitranó et al., 2023).

One of the protective measures for workers is the use of Personal Protective Equipment (PPE) during work activities. PPE is equipment capable of protecting individuals by isolating parts or the entire body from potential hazards in the workplace. While PPE may not completely shield the body, it can reduce the severity of potential harm. The control of PPE is the last resort in the hierarchy of risk control, following elimination, substitution, technical controls, and administrative controls. Therefore, a combination of these controls is necessary (Odonkor & Sallar, 2024).

According to (Giménez et al., 2024), occupational safety is a condition where workers remain safe, free from accidents while performing their duties. Occupational safety and health (OSH), according to (Cao et al., 2023) encompass protective equipment, safe workspaces, machinery usage, and the creation of healthy work environments. To ensure safety and health in field operations, it is necessary to use personal protective equipment such as headgear, gloves, respiratory protection (respirators or masks), fall protection, and foot protection. In the concept of OSH, the use of PPE is the last resort in accident prevention because PPE aims to reduce the severity rather than the likelihood of accidents.

According to data from the World Safety Organization (WSO) Indonesia, there are approximately 130,000 accidents each year, resulting in around 2,500 deaths annually. Generally, 85% of workplace accidents occur due to human error, 10% due to the work environment, 3% due to faulty or inadequate equipment usage, and 2% due to other factors. The implementation of safety management, including the use of personal protective equipment, aims to minimize the risk of accidents or hazards in the workplace. PPE is crucial, especially during firefighting activities. Firefighters are at risk of heat exposure from fires and toxic smoke inhalation, sharp objects, slippery surfaces, biological fluids, spilled chemicals, and electric shocks. One essential firefighting equipment is the Portable Fire Extinguisher (APAR) (Bergman Bruhn et al., 2023).

According to North Nias Regent Regulation No. 3 of 2022, in Section Eight, Article 9, it is stipulated that the organizational chart of the Civil Service Police Unit is an integral part of the regent's regulation, especially in the field of firefighting, to carry out its duties and responsibilities. However, despite the prevention, control, extinguishing, rescue, and handling of hazardous and toxic substances, there is only one fire truck unit available in the district, with inadequate equipment such as non-heat-resistant clothing, head protection not meeting Indonesian National Standards (SNI), and masks and gloves not compliant with labor regulations (Zhou et al., 2023). The preliminary observations conducted in the field over approximately one month from February to March revealed that one of the informants found by the researcher was a staff member named Sanaria Nazara. It was observed that the firefighters in the fire and rescue field lacked adequate personal protective equipment, which does not meet Occupational Safety and Health (OSH) standards. This condition hinders firefighters from performing their duties effectively, as the necessary equipment is not readily available, posing a risk to their safety and health. Additionally, according to Law No. 1 of 1970, Article 2, Paragraph 1, employers are obliged to provide PPE to workers or laborers at the workplace in accordance with Indonesian National Standards (SNI). Company leaders should provide all required protective equipment to their subordinates free of charge and provide it to anyone entering the workplace. Efforts to realize occupational safety and health in the firefighting field require the provision of appropriate personal protective equipment as stipulated by the Minister of Manpower and Transmigration Regulation No. PER.08/MEN/VII/2010. However, as of now, the North Nias firefighting department has yet to provide adequate personal protective equipment.

## 2. RESEARCH METHOD

In this research, the method used is descriptive research with a qualitative approach. Descriptive research is an attempt to describe a phenomenon, event, or occurrence that exists now based on data. According to (Tan et al., 2023), research using descriptive method aims to describe or elaborate

on existing phenomena, both natural and human-made phenomena, which include activities, changes, similarities, and differences between one phenomenon and another. In conducting research, selecting an object or research location serves as the foundation for data collection and obtaining relevant information related to the study. The chosen location for this research is the North Nias District Civil Service Police Unit office located at Jl. Gunungsitoli-Lahewa Km.42 Lotu, Postal Code 22856. The research was conducted over a period of 2 months, from September to October 2023.

### 3. RESULTS AND DISCUSSIONS

#### **The actual condition of the completeness and availability of personal protective equipment (PPE) used by firefighters in the field of firefighting in North Nias Regency**

Firefighters are heroes who work to protect the community and property from the dangers of fire, according to Bambang (Sharp et al., 2024). With the statement above, firefighters have a very risky task and require optimal protection to carry out their duties effectively and safely. The PPE referred to, such as fire-resistant clothing, helmets, gloves, heat-resistant shoes, and respiratory equipment, according to (Soykan, 2023), are crucial factors in protecting firefighters from the dangers of heat, smoke, and hazardous chemicals that may be involved in firefighting activities.

With adequate PPE, firefighters can work more confidently and efficiently. In addition, proper use of PPE can also reduce the risk of injury and ensure the long-term health of the firefighters. Therefore, it is important for relevant parties, including the local government of North Nias Regency, to pay serious attention to the provision and maintenance of PPE for firefighters. This effort not only involves procuring high-quality equipment but also regular training to ensure correct usage and a deep understanding of the importance of PPE in safeguarding the safety of firefighters in the field (Abdelrahim et al., 2023).

According to (Ishengoma, 2024), personal protective equipment is equipment that has the ability to protect a person in their work, isolating the worker's body from hazards in the workplace. From the above conclusions, this research result can answer the research question where the actual condition of the personal protective equipment in the field of firefighting in North Nias Regency is not yet in accordance with the Indonesian National Standard (SNI), and according to (Ishengoma, 2024), among them are: Safety helmets, Safety belts and harnesses, Fire boots, Protective shoes, Masks, Ear covers, Safety glasses, Gloves, Face shields, Life jackets, Anti-virus masks, and Heat-resistant protective clothing. And regulations regarding personal protective equipment according to Sa'adah (2017) stating the requirements for personal protective equipment:

- a) Personal protective equipment must provide strong protection against specific hazards for workers.
- b) Personal protective equipment is adjusted to user comfort.
- c) Personal protective equipment must meet existing standards.

The following is a detailed explanation of the actual condition of the completeness of personal protective equipment in the North Nias Regency firefighting sector:

1. Body Protection (Firefighter Clothing). Analysis by researchers from interview results, the clothing worn by firefighters is not in accordance with the personal protective equipment regulations according to (Rantala et al., 2024) because the available clothing is made of thin material that is not heat-resistant and has short sleeves that do not protect the arms of firefighters during firefighting.
2. Head Protection (Firefighter Helmets). Firefighter helmets are generally made of fire-resistant materials such as fiberglass or special thermoplastics. Thus, researchers see that the field conditions already comply with the Indonesian National Standard (SNI) where safety helmets function to protect the head from impacts, blows, falling sharp and heavy objects, protect the head from heat and fire, and keep the head away from chemicals.
3. Hand and Foot Protection. Gloves that comply with SNI are fire and heat resistant to provide protection for firefighter hands. However, in actual conditions, the gloves worn by firefighters are not fire-resistant, and sometimes they do not wear gloves because they are not available. Firefighter Boots already comply with SNI with special soles that are resistant to heat and fuel.

4. Respiratory Protection. Masks are used to protect the respiratory organs because masks can filter out chemicals, dust, vapors, smoke, and gases. Masks that meet OSH requirements such as respirators, cartridges, and canisters. In this case, researchers see that the available and used masks are not suitable because firefighters only use ordinary masks like duckbill masks, aerloop masks. The North Nias Regency firefighting sector has provided firefighting equipment such as Portable Fire Extinguishers (APAR) in every office.

#### **Constraints in the Use of Personal Protective Equipment**

- 1) Worker-related factors such as education, length of service, attitude, knowledge, comfort, age, and supervision by employees are constraints in the use of personal protective equipment according to (Ghahramani et al., 2023).
- 2) Inadequate training, mainly due to irregular training programs and a lack of understanding of the importance of using personal protective equipment before turnover.
- 3) Mobility limitations, especially in situations where quick and precise movements are required, as some personal protective equipment tends to hinder movement.
- 4) Non-compliance with standards in personal protective equipment, such as clothing and helmets not being heat and fire resistant, as well as a low level of compliance with the use of personal protective equipment.

#### **Efforts in Procurement and Utilization of Personal Protective Equipment to Improve Safety and Health of Firefighters in the Fire and Rescue Department of North Nias Regency**

In this study, the main focus is on the efforts in procurement and utilization of personal protective equipment (PPE) for firefighters in the Fire and Rescue Department of North Nias Regency. Data were collected through surveys, interviews, and direct observations of relevant stakeholders in the fire and rescue field (Walters, 2024).

Efforts in procurement and utilization of personal protective equipment are mandated by the Republic of Indonesia Law No. 13 of 2003 concerning manpower, which strengthens worker protection regarding occupational safety and health (OSH) aspects as outlined in Articles 86 and 87. Article 86, paragraph 1 states that every worker has the right to protection of occupational safety and health, moral and ethics, and treatment in accordance with human dignity and religious values. Paragraph 2 emphasizes the implementation of OSH efforts to ensure worker safety and productivity. Article 87 requires every company to implement Occupational Safety and Health Management System (OSHMS) integrated with the company's management system, including audits and improvement of PPE quality (Zabidi et al., 2022).

Evaluation of the effectiveness of available personal protective equipment for firefighters is also conducted in this research. Findings indicate that some PPE used does not meet safety standards, prompting the need for improvement in quality to effectively protect firefighters, particularly in terms of clothing and gloves. It is recommended that procurement efforts be conducted annually to ensure the safety and health of firefighters. Additionally, there is a need to increase awareness and safety education among firefighters. Training programs and workshops can enhance their understanding of fire hazards and the importance of using personal protective equipment (Tian et al., 2024).

Furthermore, efforts should be made to improve the availability and quality of personal protective equipment. Selecting PPE that meets the needs and enhancing regulations related to its use can create a safer working environment.

Based on the analysis and discussion, several recommendations are proposed to enhance the safety and health of firefighters in the Fire and Rescue Department of North Nias Regency (Ekrami et al., 2024):

- 1) Enhancement of Safety Education Programs: Develop and implement more intensive and sustainable safety education programs for firefighters.
- 2) Audit and Improvement of PPE Quality: Conduct regular audits of available PPE and ensure compliance with safety standards.
- 3) Development of Guidelines for PPE Use: Establish clear and understandable guidelines for PPE use and provide training to ensure proper utilization.

- 4) Collaboration with External Parties: Foster collaboration with external stakeholders, such as occupational safety associations and PPE manufacturers, to support efforts in improving safety and health at work. The Fire and Rescue Department of North Nias Regency also collaborates with two individuals per village to gather information on field fire incidents.

Implementation of these recommendations is expected to significantly improve the procurement and utilization of personal protective equipment, thus enhancing the safety and health of firefighters in the Fire and Rescue Department of North Nias Regency.

#### 4. CONCLUSION

Based on the research findings on the actual conditions of the completeness and availability of PPE used by firefighters, it can be concluded that the majority are unavailable. However, there are some important considerations, especially regarding the maintenance and procurement of unavailable or damaged PPE. These improvement efforts can enhance the effectiveness and safety of firefighters in carrying out their duties (Shoaib et al., 2024). In this study, the constraints in using PPE are the main focus. The limitations of personal protective equipment pose obstacles to comfort in field work, such as clothing, helmets, gloves, caps, shoes, masks, and other PPE in the field of fire and rescue in North Nias Regency, which are not in line with Indonesian national standards and labor minister regulations. Recognizing these constraints, steps such as prioritizing and prioritizing the procurement of PPE, increasing product variations, and enhancing user education can be proposed to improve the effectiveness of PPE use and, consequently, enhance occupational safety (Trask & Linderoth, 2023). In order to improve the safety and health of firefighters in the Fire and Rescue Department of North Nias Regency, efforts in the procurement and utilization of personal protective equipment play a crucial role. By providing adequate PPE, improving availability, and providing appropriate training, a safer working environment and more prepared firefighters to face challenges in the field can be achieved. Therefore, it is recommended to continuously improve the understanding of personnel regarding PPE and ensure the availability and optimal maintenance of protective equipment. These steps will support the Fire Department's vision in achieving the highest standards in occupational safety and health.

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