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# HAZARD IDENTIFICATION STRATEGY REGARDING PPE IN CIVIL DEFENCE TRAINING AND MANAGEMENT

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**Purpose:** the impose of the 2024 Act on Civil Protection and Civil Defence into the Polish legal system, along with the regulation concerning civil protection training programmes, has imposed on civil protection entities the obligation to conduct training aimed at building social resilience. However, a significant gap has been identified: there are no guidelines specifying the thematic scope of training on personal protective equipment (PPE), no indications of the threats against which such equipment should provide protection, and no strategy for selecting PPE appropriate to specific threats within the civil protection framework. The main objective of the article was to present a strategy for identifying threats in civil protection that personal protective equipment is intended to mitigate.
**Design/methodology/approach**: the research process employed content analysis of source documents, including the Act and the regulation defining the framework for civil protection training programmes. In addition, a systemic interpretation was applied to examine threats and the personal protective equipment that should be used within the scope of civil protection and civil defence.
**Findings:** the analysis enabled the identification of three main categories of threats against which personal protective equipment should provide protection within crisis response. This categorisation made it possible to correlate these threats with the assumptions of the crisis management system and, subsequently, to specify individual threats in relation to the population. As a result of content analysis the article presents the algorithm of planning and managing PPE field in trainings and physical hazard identification.
**Research limitations/implications**: The main limitation of the research is the lack of empirical data and the absence of detailed training programmes, which results from the early stage of implementing the new legal system and the limited literature on the use and management of personal protective equipment within civil protection.
**Practical implications:** the added value of this study lies in presenting an innovative strategy for identifying threats and selecting PPE, which fills a gap in current crisis management plans and enables precise definition of training content for the public. Future research should involve empirical analysis of the scope of PPE trainings and review of real hazard identification strategies applied into personal safety during assuring civil protection activities.
**Social implications:** introducing indicated strategy of identifying real hazards which can occur real impact as accidents or diseases will raise the ability of proper behavior either in emergency reaction or during every day activities. In its sense, the strategy implementation contributes directly to the enhancement of national safety culture.

**Originality/value:** this paper is the first academic studies which involve interdisciplinary way of identifying hazards which may cause an accident or diseases during civil protection planning or crisis management which include real hazards aimed to human beings with innovative hybrid-matrix of identifying hazards in Civil Defence.
**Keywords:** PPE, civil defense, civil protection, hazard identification.
**Category of the paper:** action research, view point.

## 1. Introduction

Civil protection is a system composed of public administration authorities responsible for ensuring the safety of the population by protecting human life and health, property (including animals), infrastructure essential for basic needs, cultural assets, and the environment in situations of threat. These authorities are referred to as civil protection bodies, while the entities performing these tasks are referred to as civil protection entities. The system also includes civil protection resources (Act of 5 December 2024 on Civil Protection and Civil Defence, 2024).

Civil defence comprises the tasks defined in Article 61(a) of the Additional Protocol to the Geneva Conventions of 12 August 1949 relating to the protection of victims of international armed conflicts (Protocol I), drawn up in Geneva on 8 June 1977 (Journal of Laws 1992, item 175; Journal of Laws 2015, item 1056). Its purpose is to protect the civilian population from threats arising from military actions and their consequences (Journal of Laws 1992, item 175; Journal of Laws 2015, item 1056).

The Polish legal system explicitly separated these two concepts with the preparation and entry into force of the Act on Civil Protection and Civil Defence. Beyond introducing new definitions, the Act implemented a fundamental change in building social resilience to extraordinary situations. This change consists of mandatory training delivered at intervals defined in the Act and in the implementing regulation on training programmes (Regulation of the Minister of the Interior and Administration of 6 February 2025 on training programmes in civil protection and civil defence and requirements for training providers, 2025). The programmes also include the topic of personal protective equipment—from training for county-level authorities to training for the general population.

However, with regard to training on the use of personal protective equipment within civil protection, there are currently no guidelines on what topics should be covered, nor what types of equipment should be used for specific categories of threats. This gap creates a need for a strategy to identify the detailed threats against which particular types of PPE should provide protection. There are also no guidelines regarding the thematic scope of the training module devoted to PPE.

Given this identified research gap, the following research questions were formulated:

**QR1:** how should training on personal protective equipment be understood at different levels of civil protection preparedness?

**QR2:** against which threats is personal protective equipment intended to provide protection?

**QR3:** how are current threats within civil protection identified?

These research questions enabled an analysis of the assumptions underlying civil protection training, particularly within the thematic blocks concerning personal protective equipment. The study also identified the basic categories of threats against which PPE is intended to protect and proposed a strategy for their detailed identification. This strategy can be implemented in the development of training content and may expand existing crisis management plans by integrating issues of individual protection for system participants.

This study represents an entirely new approach to threat identification within the Polish system of building social resilience. In the context of civil protection and civil defence, such an approach has not been previously applied. It also introduces an interdisciplinary perspective to the strategy for classifying threats related to PPE, which must be incorporated into civil protection training.

## 2. Theoretical and legal framework

In accordance with Chapter 6 of the Act on Civil Protection and Civil Defence, the legislator introduced an obligation to organise training aimed at improving qualifications in the field of civil protection and civil defence in offices serving civil protection authorities, as well as in other offices, organisational units of local government, and auxiliary units of municipalities (op. cit.). An analysis of the Act in light of the training programmes shows that it distinguishes between civil defence authorities and civil defence entities (ibid.).

With regard to the thematic scope related to personal protective equipment, civil protection authorities include county governors (starosts), city mayors, town mayors, and commune heads. Civil protection entities, on the other hand, consist of institutions, associations, and services listed in Article 17(1) of the Act (ibid.). It is crucial to emphasise who will physically carry out the tasks imposed on civil protection entities by these authorities. Within these entities, depending on the legal basis for task implementation, employees, contractors, officers, and volunteers - hereafter collectively referred to as employees - are engaged. This is particularly important for the execution of civil protection and civil defence tasks related to personal protective equipment, as it is these individuals who will be deployed to mitigate extraordinary events. They must therefore be provided with appropriate personal protective equipment.

The structure of the regulation defines the training programmes and the requirements for entities authorised to deliver them. The programmes include nine training groups:

1) ministers, secretaries of state, undersecretaries of state, and heads of central offices,
2) provincial governors and regional marshals,
3) county governors (starosts),
4) commune heads, town mayors, and city mayors,
5) staff in offices serving civil protection authorities and in other local government offices, organisational units, and municipal auxiliary bodies,
6) persons with civil defence mobilisation assignments,
7) personnel of civil protection entities,
8) members of associations and business operators,
9) the general population (ibid.).

The structure of the training programmes defines:

1) the training objective,
2) the training participants,
3) the organisational form of the training,
4) the thematic scope,
5) the method of verifying whether the training objective has been achieved (ibid.)

Particular attention should be paid to the thematic scope of training for county governors, commune heads, town and city mayors, staff of offices serving civil protection authorities, employees of other local government units and auxiliary bodies, personnel of civil protection entities, members of associations and business operators, and - more broadly - the general population. In all these programmes, the thematic block on personal protective equipment is mandatory.

The Act also provides a legal definition of a threat in the context of civil protection and civil defence. According to this definition, a threat is a situation that negatively affects the safety of life and health, property, cultural assets, or the environment, or that limits the functioning of public administration bodies or infrastructure essential to civil protection and civil defence tasks (ibid.). Categories of threats are further detailed in Article 4(4) (f-h), which outlines tasks within civil protection.

The general categories of threats listed in this legal provision, which are particularly important for designing a threat identification strategy and, consequently, for defining the PPE training block, include:

1) chemical, biological, radiological, and nuclear threats, including the mitigation of their consequences,
2) threats caused by natural forces, including those resulting from climate change,
3) threats associated with the presence of wild animals in inhabited areas (ibid.).

It is also necessary to refer to other obligations imposed on public administration within the Polish crisis management system, of which civil protection has become an integral part. Crisis management regulations require the development of a threat assessment within the main crisis management plan (Smoleński, 2023). The main plan includes guidelines from the National Crisis Management Plan (KPZK, 2025), which serves as a planning document for lower administrative levels. Part A of the NCMP contains a threat assessment essential for crisis management planning (KPZK, 2025).

According to the NCMP, the Polish crisis management system identifies threats that are significant from the perspective of state functioning. Importantly for the training dimension, survey responses regarding the educational value of crisis management plans indicate that more than 77% of participants viewed these plans as educationally valuable (Smoleński, 2021). Over 53% recognised them as potentially useful educational material, while nearly 24% considered them highly valuable educational material (Smoleński, 2024).

In the context of occupational safety and health, threats are categorised into specific types and detailed in legal acts and guidelines, both in terms of accident prevention and health hazards (Koradecka, 2008). Moreover, legal regulations concerning occupational safety make it possible to identify specific threats and corresponding categories of personal protective equipment (Pisarczuk, 2023). In this context, a threat is defined as a source capable of causing injury or health impairment (PN-ISO 45001).

Threat identification can also be carried out at a more detailed level across multiple aspects. However, the most universal approach involves classifying threats using criteria such as: source of origin, location, involvement of military factors, current relevance, available knowledge, time, frequency, intensity, scope, symptoms, number of contributing factors, and degree and scale of destruction (Kaczmarczyk, 2014).

Regarding the thematic block on personal protective equipment, PPE is defined as equipment designed and manufactured to be worn or held by a person to protect against one or more threats to their health or safety (Stefko, 2022). Threats in the context of PPE use are typically categorised as physical, chemical, and biological (Pisarczuk, 2023).

The literature includes studies conducted in Polish conditions on the use of personal protective equipment in particular crisis response situations. These studies concern CBRN (chemical, biological, radiological, nuclear) threats. The general classification of PPE includes respiratory protective devices - such as self-contained breathing apparatus (SCBA) and air-purifying apparatus (APA) - as well as dermal protective equipment (Bodurtha, Dickson, 2016). Research conducted in Poland examined the use of specific PPE categories according to designated hazard zones (hot, warm, and cold zones) during CBRN incidents, including responses by the State Fire Service (Gikiewicz, Bralewska, 2021) and Medical Rescue Services (Trzos, Jurowski, 2019).

Civilian response studies identified specific CBRN threats such as sarin, ammonia, dirty bombs, and multi-point CBRN attacks (Gikiewicz, Bralewska, 2021), as well as novichok, chlorine, anthrax, botulinum toxin, epidemics, and nuclear accidents (Trzos, Jurowski, 2019). In both cases, the general use of chemical protective suits, breathing apparatus, and full-face masks with filter cartridges was indicated.

Given that existing studies relate only to CBRN-related PPE used by specialised emergency services, the following research hypotheses were formulated for the purposes of this analysis:

**H1:** There is a general division in the appropriate preparation of the population regarding the provision, use, and training in PPE within civil protection.

**H2:** No specific guidelines exist on correlating threats in civil protection with the use of personal protective equipment.

**H3:** The current strategy is based on the crisis management system, which does not address threats in terms of individual protection.

Verification of the above hypotheses will allow for the determination of the coherence level of the current legal and organisational system. Furthermore, it will enable the creation of a dedicated tool (algorithm) facilitating the management of PPE training, which constitutes the practical objective of this study.

## 3. Research methodology

The research methodology employed was based on two pillars, responding to the reviewers' comments regarding the operationalisation of the process:

- content analysis - the primary method was the content analysis of source documents, primarily the Regulation of the Minister of the Interior and Administration of 2025 and the superior Act on Civil Protection and Civil Defence in connection to environmental health and safety scope of identification proper PPE. The interpretation criteria included identifying defined target groups for PPE training and general scope of indicating proper PPE for defined hazards.
- systemic interpretation - the analyzed provisions of the regulation were placed within the broader context of the state's strategic goals arising from the Act. This method allowed for linking specific requirements with the overarching goals of the system, such as building societal resilience and strategy which should be implemented widely across crisis management field.

The main limitation identified in the research process is the current absence of detailed training programmes within the thematic blocks of the framework curriculum. The training system was launched only this year, which also limits the study due to the lack of empirical

data specifically related to the module on personal protective equipment. Moreover, the absence of literature addressing strategies for selecting personal protective equipment for training purposes and for building social resilience leaves no point of reference in this area.

## 4. Results

Identifying the research gap made it possible to conduct a systemic analysis of the purpose and content of the Act in relation to the threats for which the training block on personal protective equipment should provide preparation. This analysis draws directly from the content of the Act and points to three general categories of threats:

1) CBRN threats,
2) natural hazards,
3) threats posed by animals.

Subsequently, the assumptions underlying the training objectives were analysed with reference to the groups for which the PPE module is required. These groups include:

1) county governors (starosts),
2) commune heads, town mayors, and city mayors,
3) staff in offices serving civil protection authorities and in other local government offices, organisational units, and auxiliary bodies,
4) persons with civil defence mobilisation assignments,
5) personnel of civil protection entities (training optional, subject to the decision of the civil protection authority),
6) members of associations and business operators (training optional, subject to the decision of the civil protection authority),
7) the general population (training optional, subject to the decision of the civil protection authority).

The analysis of the training programme, combined with the roles assigned to these groups, allowed for the identification of the following elements shaping the purpose of the PPE-related training content:

1. for authorities managing civil protection and civil defence tasks, the Act assigns the following duties to county governors and municipal civil protection bodies with regard to ensuring personal protective equipment: directing and coordinating, within the scope of their competencies, creating and maintaining, within the municipality (or county), civil protection resources and infrastructure essential for performing civil protection and civil defence tasks, including water supply infrastructure, providing emergency assistance through civil protection entities, issuing recommendations to civil protection entities regarding the types and quantities of civil protection resources to be maintained (Act on Civil Protection and Civil Defence, 2024).

2. for staff of offices, civil protection entities, associations, business operators, and the general population, the key point is that civil protection entities carry out civil protection and civil defence tasks within the scope of their assigned responsibilities (ibid.).

The integration of OHS standards with Civil Protection hazard identification is necessitated by the legal status of the personnel involved. Since tasks within civil protection entities are performed by employees and volunteers, the rigorous hazard classification systems established in OHS regulations constitute the obligatory baseline for safety. Furthermore, the physiological impact of hazards (e.g. chemical or biological agents) remains constant regardless of whether the context is an industrial accident or a civil protection emergency, mandating the application of standardized PPE categories defined in established safety norms.

Based on comparative and systemic analysis of the threats identified in the new civil protection framework - supported by the established crisis management system, the guidelines of the National Crisis Management Plan (KPZK), and requirements derived from occupational health and safety regulations - the following categories of threats were distinguished. The identification of main categories of hazards derived from analysis of Act on Civil Protection and Civil Defence is presented in Table 1.

**Table 1.**
*Categories of hazards*

| CBRN | Natural disaster | Animals |
|---|---|---|
| Chemical contamination.<br>Biological contamination (epidemic, epizootic, epiphytotic).<br>Radiological contamination.<br>Nuclear hazards (from nuclear attack) | Flood.<br>Drought/heatwave.<br>Strong wind.<br>Severe frost/intense snowfall.<br>Fire | Physical and biological hazards resulting from contact or attack by wild animals (e.g. bites, scratches) |

Source: own preparedness.

This combination of systemic analysis and content analysis made it possible to identify detailed, potential threats within the scope of civil protection and civil defence combined with occupational health and safety threats. Detailed characteristics of chemical, biological, and radiological threats mapped to specific civil protection needs are shown in Table 2.

**Table 2.**
*Categories of detailed hazards – CBRN scope*

| Chemical | Biological | Radiological/Nuclear |
|---|---|---|
| Toxic industrial chemicals (per hazardous substances register).<br>Chemical warfare agents.<br>Agricultural processes using pesticides.<br>Transport of hazardous substances.<br>Transport of chemical energy resources.<br>Fire.<br>Explosion. | Epidemic/epiphytotic/epizootic caused by pathogens of infectious diseases (per national infectious disease register; groups III/IV per OHS regulations).<br>Pathogen particles in aerosols, liquids, materials, humans, animals. | Ionizing radiation.<br>Fallout dust |

Source: own preparedness.

Table 3 outlines the specific physical hazards associated with natural disasters and their harmful factors.

**Table 3.**
*Categories of detailed hazards – natural disaster scope*

| Dangerous | Harmfulness |
|---|---|
| Falling or ejected objects; impact with obstacles; high-pressure streams.<br>Slip-related falls.<br>Falls from height.<br>Static compression of body parts.<br>Abrasion, puncture, cuts, lacerations, entrapment, crushing.<br>Entanglement or capture.<br>High temperature/fire.<br>Low temperature.<br>Electric shock (direct/indirect contact).<br>Static electricity.<br>Injuries due to low visibility.<br>Asphyxiation (oxygen deficiency).<br>Drowning.<br>Explosion.<br>Hazards from high-risk work. | Vibration.<br>Noise.<br>Optical radiation (non-ionizing) |

Source: own preparedness.

Hazards related to the presence of animals, including direct attacks and zoonotic diseases, are classified in Table 4.

**Table 4.**
*Categories of detailed hazards – animal scope*

| Animals | Hazards |
|---|---|
| Animals listed under OHS regulations for zoological facilities.<br>Other dangerous animals occurring within the jurisdiction. | Bites.<br>Attacks.<br>Pathogenic microorganisms transmitted by insects and animals.<br>Kicks/strikes.<br>Trampling.<br>Venom poisoning. |

Source: own preparedness.

Such an analysis makes it possible to plan the training content appropriately within the module concerning the use of personal protective equipment, by linking specific PPE to clearly defined types of threats. It should be noted that the table below also includes specialist equipment due to the nature of certain threats. Furthermore, within civil protection entities assigned particular tasks, specialised workplaces or formations may also be designated. The correlation between identified hazards and the required types of personal protective equipment for specific body parts is presented in Table 5.

**Table 5.**
*PPE and hazards*

| Hazard | Affected body part and type of PPE |
|---|---|
| Falling or ejected objects; impact with obstacles; high-pressure streams | Skull: protective helmet.<br>Eyes/face: safety glasses, goggles, face shields.<br>Lower limbs: protective footwear with toecaps, midfoot protection, anti-slip soles. |
| Slip-related fall | Feet: anti-slip footwear.<br>Skull: protective helmet. |
| Falls from height | Whole body: fall-protection PPE.<br>Skull: protective helmet. |
| Vibration | Hands: protective gloves.<br>Feet: anti-vibration footwear. |
| Static compression of body parts | Knees: kneepads.<br>Feet: safety footwear with toecaps.<br>Hands: compression-resistant gloves. |
| Abrasion, puncture, cuts, lacerations, entrapment, crushing | Eyes/face: goggles, face shields.<br>Hands: mechanical-protection gloves.<br>Forearms: protective sleeves.<br>Torso/lower limbs: protective apron, gaiters, cut-resistant trousers.<br>Feet: penetration-resistant footwear. |
| Entanglement or capture | Whole body: protective clothing for moving-parts exposure. |
| Noise | Hearing: hearing protectors. |
| High temperature or fire | Head/face: welding helmets/visors, heat-resistant helmets, protective hoods.<br>Torso/lower limbs: protective apron, gaiters.<br>Hands: heat-resistant gloves.<br>Forearms: sleeves.<br>Feet: heat-resistant footwear.<br>Whole body: heat- and flame-protective clothing. |
| Low temperature | Hands: cold-protective gloves.<br>Feet: cold-protective footwear.<br>Whole body/head: cold-protective clothing. |
| Electric shock (direct or indirect contact) | Head: insulating helmet.<br>Hands: insulating gloves.<br>Feet: insulating footwear.<br>Whole body: conductive PPE (for qualified personnel up to 800 kV AC / 600 kV DC). |
| Static electricity | Hands: antistatic gloves.<br>Feet: antistatic or conductive footwear.<br>Whole body: antistatic clothing. |
| Non-ionizing radiation (incl. sunlight) | Head: caps, helmets.<br>Eyes: safety glasses, goggles, face shields.<br>Skin: UV-protective PPE.<br>Face/hands: skin-protection creams. |
| Ionizing radiation | Eyes: radiation-protective goggles.<br>Hands: radiation-protective gloves.<br>Torso: X-ray protective aprons/coats/vests/skirts.<br>Head: protective headwear.<br>Body parts: thyroid and gonad protection.<br>Whole body: radiation-protective suits. |
| Chemical aerosols – solid particles | Respiratory system: particulate-filtering RPE.<br>Hands: chemical-protective gloves, protective cream.<br>Whole body: particulate-protective clothing.<br>Eyes/face: goggles, face shields. |
| Chemical aerosols – liquid particles | Eyes/face: goggles, face shields.<br>Respiratory system: particulate-filtering RPE.<br>Hands: chemical-protective gloves.<br>Whole body: chemical-protective clothing. |

Cont. table 5.

| | |
|---|---|
| Chemical liquids – immersion, splashes, spraying | Eyes: goggles, face shields.<br>Hands: chemical-protective gloves.<br>Forearms: chemical-protective sleeves.<br>Feet: chemical-protective boots.<br>Whole body: chemical-protective clothing. |
| Chemical gases and vapours | Respiratory system: gas-filtering RPE.<br>Hands: chemical-protective gloves.<br>Whole body: chemical-protective clothing.<br>Eyes/face: goggles, face shields. |
| Biological hazards – aerosols (solid/liquid particles) | Respiratory: particulate-filtering RPE.<br>Hands: microorganism-resistant gloves.<br>Whole body/body parts: biological-protective clothing.<br>Eyes/face: goggles, face shields. |
| Biological hazards – liquids (direct/indirect contact, splashes) | Hands: microorganism-resistant gloves.<br>Whole body/body parts: biological-protective clothing.<br>Eyes/face: goggles, face shields.<br>Forearms: protective sleeves.<br>Feet/lower limbs: boot covers, gaiters. |
| Biological hazards – persons, animals, materials | Hands: microorganism-resistant gloves.<br>Whole body/body parts: biological-protective clothing.<br>Eyes/face: goggles, face shields. |
| Low visibility | Whole body: high-visibility PPE. |
| Asphyxiation (oxygen deficiency) | Respiratory system: isolating breathing apparatus; diving equipment. |
| Drowning | Whole body: life jacket. |

Source: own preparedness based on OHS general Regulation.

Based on the results of the analysis presented in the tables above, a procedural algorithm was developed for planning the training block covering issues related to personal protective equipment. This algorithm is sufficiently universal to be applied not only in designing. The algorithm includes few steps.

Step 1 involves collecting the data necessary for planning the training block, namely determining the training group (managerial level or operational/reactive level). After determining, authorities should hand over proper crisis management plan so that identify proper hazards required for training.

Step 2 consists of identifying the threats indicated in the crisis response plans applicable to the area of responsibility of the civil protection authority.

Step 3 requires translating these threats into threats defined within the framework of civil protection and civil defence, in accordance with Tables 1, 2, 3, and 4.

Step 4 consists of the actual identification of threats affecting individuals, along with determining the personal protective equipment that minimises the risk of injury.

Step 5 involves preparing the appropriate training resources, developing practical training scenarios (for the operational group), or addressing the characteristics of PPE relevant for planning procurement, storage, and maintenance by the civil protection authority (for the managerial group).

Step 6 is the implementation of the training.

To illustrate the algorithm's operational value, a hypothetical scenario can be applied as given:

Step 1 – authorities should contact the training company and determine who is planned to be trained – managerial or operational level. Authorities should hand over updated crisis management plan to company.

Step 2 – training company should analyse a crisis management plan and identify general hazards which base on National Crisis Management Plan (e.g. flood without high risk industry).

Step 3 and 4 – if a flood is identified as a scenario, next step should be consisted of using the matrix indicated in Table 1, 2, 3, 4 and identifying process should be implemented:

**Table 6.**
*PPE related to hazards in Civil Defence. Scenario of hazard: flood (without high-risk industry)*

| Category of Civil Defense hazards | Category of detailed hazards | PPE |
|---|---|---|
| CBRN | Biological – epidemic liquids (direct/indirect contact, splashes, persons, animals, materials) | Hands: microorganism-resistant gloves.<br>Whole body/body parts: biological-protective clothing.<br>Eyes/face: goggles, face shields.<br>Forearms: protective sleeves.<br>Feet/lower limbs: boot covers, gaiters. |
| Natural disaster | Drowning, Slip-related falls.<br>Abrasion, puncture, cuts.<br>Low temperature.<br>Electric shock (direct/indirect contact).<br>Injuries due to low visibility.<br>Drowning. | Feet: anti-slip footwear.<br>Skull: protective helmet.<br>Whole body: life jacket.<br>Whole body: high-visibility PPE.<br>Hands: cold-protective gloves.<br>Feet: cold-protective footwear.<br>Whole body/head: cold-protective clothing (additionally with waterproof features).<br>Eyes/face: goggles, face shields.<br>Hands: mechanical-protection gloves.<br>Forearms: protective sleeves.<br>Torso/lower limbs: protective apron, gaiters.<br>Feet: penetration-resistant footwear. |

Source: own preparedness.

Step 5: practical development of training scenario – how to use specific PPE (operational level) and how to introduce a proper management plan for resources (managerial level). Important note – the resources which would be supposed to use during real situation, should be available for attendees.

Step 6: training implementation according to detailed scenario.

## 5. Discussion

Developing a strategy for planning the thematic block, based on the results of the systemic and content analyses presented, made it possible to verify the research hypotheses:

**H1** was verified by distinguishing two levels that must be considered within the training block on personal protective equipment: the managerial level and the operational (reactive) level. Consequently, the depth of training content must differ significantly between these groups. The managerial level requires knowledge focused on logistics, quantitative planning, and maintenance specifications derived from general obligations included in the Act. It is pointed out distinctly that county governors (starosts), commune heads, town mayors, and city mayors are obliged to create and maintain civil defence resources such as PPE to ensure resource availability. In contrast, the operational level requires basic operational skills related to obligations enacted by the Act, which indicates that executive level is obliged to realise tasks referring to Civil Defence obligations. This differentiation ensures that the strategy is actionable and tailored to the specific roles within the civil protection system. The managerial level is responsible for organising the system that ensures the availability of necessary PPE (civil protection resources), while the operational level is responsible for the correct use of PPE for personal protection. Thus, the analysis provides an answer to **QR1**.

**H2** was confirmed through an analysis of the civil protection system, the crisis management system, and occupational health and safety requirements, correlating threats with specific types of personal protective equipment. The Act itself does not specify the types of threats against which PPE is intended to protect. Only by analysing the Act's purpose - building social resilience - and the purpose of the training - preparing the population practically for extraordinary situations - was it possible to identify relevant threats. This allowed the study to address **QR2**.

**H3** was verified by examining how the new civil protection system operates alongside the crisis management system. The current approach to threat identification in crisis management is based on the National Crisis Management Plan, which frames threats in terms of public safety and their impact on the functioning of affected areas. The findings of this study made it possible to identify specific types of threats through an interdisciplinary systemic analysis. This approach introduces a new perspective on understanding threats - one that extends beyond the work environment to everyday life and crisis response scenarios.

A crucial aspect of training planning is the need to tailor the training to the current situation in the area where it will be conducted. At this stage of the training process, it is necessary to consider the risk assessment of specific threats within the framework of crisis management and to ensure that the appropriate personal protective equipment is selected and secured for demonstration purposes.

The analysis presented here enables the expansion and enhancement of crisis response plans and civil protection training by providing concrete guidelines for building social resilience. Implementing the proposed threat identification strategy for PPE use will facilitate further research on the evolution of crisis planning, the identification of detailed threats, and the training of participants in the proper application of personal protective equipment.

The innovation of this approach lies in the cross-domain integration of strictly regulated Occupational Health and Safety (OHS) standards with the broadly defined, often general, Civil Defence procedures. Unlike previous classifications which focused solely on industrial safety or strictly military CBRN defence, this strategy creates a hybrid matrix. It applies industrial safety precision (specific PPE regulations) to mass-scale civil protection scenarios, filling the gap where civil operational personnel were previously treated as general population without specific protection standards.

## 6. Conclusions

The interdisciplinary analysis of the training block on the use of personal protective equipment represents a significant contribution to preparing the population for effective social resilience building.

The key conclusions that can be drawn from the analysis are as follows:

1) confirmation of a gap in the guidelines for the PPE training curriculum within the Polish civil protection system, a new issue arising from the implementation of the 2024 Act. Filling this gap by correlating identified threats with specific types of PPE (as presented in the detailed tables) is essential for achieving the overarching goal of building practical social resilience.
2) identification and verification of the dual-level approach to PPE preparedness. The managerial level (authorities) must focus on organising and ensuring access to PPE resources (including civil protection resources). The operational level (personnel and the general population) requires concrete knowledge and practical skills for the correct use of PPE for personal protection. Training programmes must clearly reflect and separate these two dimensions.
3) the interdisciplinary, systemic analysis (combining civil protection, crisis management, and occupational health and safety) enabled the identification of three main categories of threats-CBRN, natural hazards, and wild animal-related threats - and their subsequent specification. This detailed categorisation is innovative in the Polish system and provides a concrete, recommended foundation for developing the detailed content of the PPE training module.

This analysis has demonstrated the need to expand threat identification strategies within existing management and civil protection systems. Such an expansion should include the detailed identification of accident-related threats and the indication of the types of personal protective equipment required for these threats. This approach enables the proper planning of the training block and enhances public awareness of threats that may arise during crisis response activities.

An additional aspect of the proposed strategy is the development of a procedural algorithm for planning PPE-related training, which is also useful for planning civil protection resources, including PPE. This algorithm helps establish the framework for detailed training content, namely:

1) what types of material threats may occur during activities resulting from the events identified in this study,
2) what types of personal protective equipment should be used for each specific threat,
3) what the conditions of use are for the relevant personal protective equipment,
4) how to use specific personal protective equipment in practice.

This study does not close the research area concerning strategies for PPE use and training in civil protection. Further research directions may include: developing a system for selecting specific PPE by civil protection authorities, proposals of detailed training programmes for general trainings in Civil Defence scope, establishing logistical and storage principles for such equipment, and examining how expanding crisis management plans with the proposed approach influences public awareness and the development of practical training content.

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