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The role of the PMPR in accidents involving hazardous materials: disaster prevention and technical procedures

The PMPR'S role in accidents with dangerous products: disaster prevention and technical procedures

Helio Freires da Silva Junior

SUMMARY

This article examines the actions of the Paraná Military Police (PMPR) in traffic accidents involving the road transport of hazardous materials, such as chemical, flammable, explosive, and toxic substances. The analysis is based on current operational protocols and applicable environmental and traffic legislation, highlighting the PMPR's strategic role as a first responder in high-risk situations. The study discusses immediate containment actions, area isolation, life preservation, and environmental damage minimization, as well as coordination with specialized agencies such as the Fire Department, Civil Defense, and the Water and Land Institute (IAT). The study also proposes measures to improve personnel technical qualifications, standardize procedures, and invest in infrastructure, with the aim of strengthening the PMPR's institutional capacity to respond to hazardous material emergencies and consolidate its role as a key player in environmental disaster prevention and public safety.

Keywords: Dangerous products; Military Police; Chemical accidents; Emergency procedures; Disaster prevention.

ABSTRACT

This article examines the actions of the Paraná Military Police (PMPR) in traffic accidents involving the road transport of hazardous materials, such as chemical, flammable, explosive, and toxic substances. The analysis is based on current operational protocols and applicable environmental and traffic legislation, highlighting the PMPR's strategic role as a first responder in high-risk situations. The study discusses immediate containment actions, area isolation, life preservation, and environmental damage minimization, as well as coordination with specialized agencies such as the Fire Department, Civil Defense, and the Water and Land Institute (IAT). The study also proposes measures to improve personnel technical qualifications, standardize procedures, and invest in infrastructure, with the aim of strengthening the PMPR's institutional capacity to respond to emergencies involving hazardous materials and consolidate its role as a key player in environmental disaster prevention and public safety.

Keywords: Hazardous materials; Military Police; Chemical accidents; Emergency procedures; Disaster prevention.

1. INTRODUCTION

The overland transportation of hazardous materials is a constant reality on the highways that cross the state of Paraná, given its strategic position in the national logistics network and the intensity of cargo traffic. Flammable, toxic, corrosive, and various chemical substances circulate daily, posing not only a potential safety risk, but also a significant risk to human health.

road, but also a direct threat to public health, the environment and social order when involved in traffic accidents or accidental spills.

Given this scenario, the Paraná Military Police (PMPR) assumes a central role as the first responder in incidents involving hazardous materials. The force is responsible for cordoning off the area, coordinating initial containment efforts, contacting the appropriate agencies, and ensuring the safety of people, property, and troops until specialized teams arrive.

This article analyzes the technical and operational performance of the Military Police (PMPR) in accidents involving hazardous cargo, highlighting the procedures adopted, the challenges faced, and the interfaces with other emergency agencies. Furthermore, it proposes reflection on improvement measures, such as specific training for personnel, review of protocols, and investment in equipment, with a view to increasing the efficiency and safety of actions in high-risk situations.

2. THEORETICAL BASIS

2.1. WHAT ARE DANGEROUS PRODUCTS?

Dangerous goods are substances or articles that pose significant risks to human health, the environment, or public safety, especially when transported, stored, or handled improperly. According to the United Nations (UN) definition, adopted by the National Land Transportation Agency (ANTT), such products are subject to strict regulations due to their potential to cause explosions, contamination, poisoning, fires, or other critical events.

The official classification, based on UN recommendations and implemented in Brazil by ANTT Resolution No. 5,998/2022, divides dangerous products into nine main classes:

1. Explosives;
2. Gases (flammable, toxic or non-flammable);
3. Flammable liquids;
4. Flammable solids, substances subject to spontaneous combustion or that react with water;
5. Oxidizing substances and organic peroxides;
6. Toxic and infectious substances;
7. Radioactive material;
8. Corrosive substances;
9. Various dangerous substances and articles.

On Paraná's roads, it's common to transport products such as fuels (gasoline, diesel, ethanol), industrial gases, chemical fertilizers, solvents, industrial acids, pesticides, and hospital waste. These materials, while essential to the functioning of various sectors of the economy, require specific safety protocols to prevent catastrophes in the event of an accident.

Correctly recognizing the nature and risk associated with each type of hazardous product is essential to guide the initial response of the Military Police, which must act technically and strategically until the arrival of specialized teams, such as the Fire Department or environmental civil defense units.

2.2. APPLICABLE LEGISLATION AND REGULATIONS

The Paraná Military Police (PMPR)'s actions in incidents involving hazardous materials must be based on a robust legal and regulatory framework that establishes criteria for transportation, inspection, risk containment, and liability in the event of accidents. The main applicable legal and regulatory instruments include:

- Law No. 9,605/1998 (Environmental Crimes Law): establishes criminal and administrative sanctions for conduct that harms the environment. In cases of accidents involving hazardous products, the law provides for the liability of individuals or legal entities for damages caused to fauna, flora, water resources, and public health.
  Police action must ensure the preservation of the scene and the recording of evidence that characterizes a possible environmental crime.
- ANTT Resolution No. 5,947/2021: regulates the land transportation of hazardous materials in Brazil. It establishes requirements regarding vehicle signage, mandatory documentation (such as the Transportation Document – DT), emergency plan, risk labeling, and driver training. When conducting a traffic stop, the Military Police must verify compliance with these requirements and adopt administrative or interdiction measures when necessary.
- Brazilian Traffic Code (CTB): The CTB contains specific provisions regarding the circulation of vehicles transporting hazardous cargo, such as the requirement of specific routes, the prohibition of traffic in restricted areas, and signage regulations. Article 231, for example, addresses violations related to irregular transportation, while Article 269 authorizes road closures when there is a safety risk.
- Fire Department Technical Instructions and complementary environmental standards: In cases of leaks, fires, or contamination, the PMPR's actions must be coordinated with the technical procedures defined by the Technical Instructions (TIs) of the Paraná Military Fire Department. Furthermore, guidelines from environmental agencies such as the Water and Land Institute (IAT) and CETESB (in interstate cases) are also relevant references.

Knowledge and application of these standards are essential for military police officers to adopt legally safe, technically effective and environmentally responsible conduct in situations involving hazardous products.

3. DUTIES OF THE PMPR IN ACCIDENTS WITH DANGEROUS PRODUCTS

The Paraná Military Police (PMPR), especially through its highway patrol and territorial units, plays a key role in first-responder responses to accidents involving hazardous materials. As a rapid-response law enforcement agency, its responsibilities in these incidents focus on preserving life, road safety, and environmental protection. Among its main responsibilities are:
if:

- Emergency signaling and isolation of the area: The first step taken by police upon arriving at the scene of an incident is to demarcate a safety zone using cones, tape, and vehicles to prevent third-party access and reduce the risk of exposure to harmful agents. Isolation must comply with the criteria established by the technical instructions of specialized agencies, considering the type of product involved and the environmental conditions.

- Road closure and traffic diversion: Depending on the severity and the potential contamination or explosiveness of the transported material, the PMPR (Private Police) will fully or partially close the highway or street, providing alternative routes to ensure fluidity and prevent further accidents. This action requires coordination with municipal traffic agencies, the DER/PR (National Highway Department of Paraná), and highway concessionaires, where applicable.
- Preliminary identification of the dangerous product: It is the responsibility of the Military Police, still at the scene of the incident, to read the safety panel and the emergency form affixed to the transport vehicle, as determined by ANTT Resolution No. 5,947/2021. This information is essential to accurately pass on the data to the Fire Department and other institutions, allowing for adequate containment planning.
- Interagency coordination: The PMPR must immediately and coordinately communicate with the agencies responsible for emergency management, such as the Military Fire Department, Civil Defense, the Water and Land Institute (IAT), the Scientific Police, and traffic agencies. This communication ensures prompt specialized action and the deployment of additional resources, such as decontamination and environmental monitoring units.
- Preservation of public order and personal safety: In addition to technical assistance, the PMPR is responsible for maintaining order around the accident site, keeping onlookers away, preventing disturbances, and ensuring the physical safety of residents, drivers, and personnel involved in responding to the incident. Containing disturbances and protecting nearby residential areas, where applicable, are priority measures to prevent catastrophic consequences.

Effectively performing these tasks requires specific technical knowledge, ongoing training, and access to personal protective equipment (PPE), as well as well-defined protocols that guide quick and safe decision-making in high-risk scenarios.

4. TECHNICAL PROCEDURES AND OPERATING PROTOCOLS

4.1. FIRST TACTICAL RESPONSE

In incidents involving hazardous materials, the initial response of the Paraná Military Police is crucial to prevent the situation from escalating and mitigate risks to the public, the environment, and security officers themselves. This initial response, even before the arrival of specialized teams, must follow tactical protocols based on prevention and containment.

- Adoption of immediate preventive measures: Upon arrival at the accident scene, the crew must quickly conduct a preliminary assessment of the situation, looking for visual signs of risk—such as leaks, smoke, odors, liquid spills, or apparent chemical reactions. Based on this analysis, safety perimeters must be established and decisions made regarding evacuation or guidance from the surrounding area.

- Proper use of Personal Protective Equipment (PPE): Direct contact with hazardous substances can cause poisoning, chemical burns, and other health hazards to officers. Therefore, it is essential that officers be equipped with basic PPE (such as nitrile gloves, filter masks, safety glasses, and vests), always maintaining the principle of personal safety before direct intervention.

- Establishing a safe distance: The establishment of an isolation radius must follow technical recommendations, such as those established in the product's emergency data sheet or in standards of the Brazilian Association of Technical Standards (ABNT) and ANTT. The minimum distance must consider factors such as the type of load, the quantity involved, and the weather conditions at the time of the occurrence (e.g., wind direction).

- Avoid hasty actions and unnecessary exposure: In situations involving chemical hazards, the first response of the Military Police (PMPR) should not include direct contact with the substance or attempts to contain the leak. The priority is to protect lives and prevent the situation from worsening, awaiting the arrival of technical teams such as the Fire Department and Civil Defense.

- Immediate and accurate communication: The team must clearly record and pass on the conditions of the location, the number of people involved, type of product (if identifiable), apparent risks and measures already adopted, ensuring that specialized units move with the appropriate resources.

These initial actions, based on safety protocols and operational discipline, are essential to contain the spread of damage, ensure the safety of those involved, and allow coordinated action by response agencies.

4.2. COMMUNICATION AND SCENE MANAGEMENT

Efficiently managing the scene of an accident involving hazardous materials requires not only technical and operational expertise from the Military Police, but also the ability to coordinate with various public and private actors. Control of the affected area must be conducted with discipline, clear commands, and adherence to inter-institutional protocols.

- Interaction with the vehicle driver and the transport company: The vehicle driver, provided they are in adequate physical and psychological condition, can be a primary source of information about the nature of the cargo being transported. The police team is responsible for conducting a safe approach, collecting the emergency form, the Transport Tax Document, and the product identification according to the risk label and the security panel (ONU). Simultaneously, the transport company or the cargo shipper should be contacted, whenever possible, to provide specialized technical support and logistical assistance.

- Contact with appropriate environmental and technical agencies: The PMPR must immediately inform state environmental agencies (such as the Water and Land Institute – IAT), Civil Defense, the Military Fire Department, and, when necessary, CETESB (in interstate support) or other regulatory agencies. This communication must contain clear information on the product's identification, leaked volume, exact location, and potential risks to soil, water bodies, and nearby communities.

- Photographic recording and documentation of the scene: Preserving the chain of custody and subsequently determining responsibility requires a detailed record of the incident. Police officers should take photographs of the scene, including the vehicle's position, signage, affected areas, and any signs of transportation or storage failure. These images should be incorporated into a technical report prepared based on the Standard Operating Procedure (SOP), including the time, geographic coordinates, weather conditions, measures taken, and the names of those responsible at the scene.

- Controlling the flow of people and information: Scene management also includes controlling the flow of onlookers and vehicles to prevent undue exposure, disturbances, or interference with the work of technical teams. Furthermore, it is essential that information is handled responsibly, avoiding panic or hasty dissemination through social media.

Effective communication and coordinated scene management ensure greater safety for the population, better quality containment actions, and the preservation of evidence and data relevant to future administrative, civil, or criminal liability.

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4.3. INTERINSTITUTIONAL INTEGRATION

Responding to accidents involving hazardous materials requires synergistic action among various agencies, with the Paraná Military Police being one of the first links in this response chain. Interagency integration is essential to ensure public safety, contain environmental damage, and hold those involved accountable.

- Joint actions with the Fire Department, Scientific Police, and environmental agencies: Once the hazardous nature of the cargo is identified, the Military Police (PMPR) must immediately contact the Paraná Military Fire Department, which has teams trained and equipped to respond to scenarios involving chemical, biological, radiological, or nuclear (CBRN) risks. The Scientific Police, in turn, is responsible for technical investigations at the scene of the incident, assisting with substance identification, sample collection, and forensic documentation. Environmental agencies, such as the Water and Land Institute (IAT), play a key role in analyzing environmental impacts and adopting mitigation or recovery measures.
- Civil Defense and municipal coordination: In situations with a high potential risk to the population, such as a toxic gas leak or explosion risk, the Military Police (PMPR) must support the coordinated evacuation of areas, in partnership with state or municipal Civil Defense. This action requires planning, clear communication, and control of access to the exclusion zone.
- Cases requiring the Brazilian Army and Federal Police: In incidents involving the transportation or loss of controlled products—such as explosives, weapons, radioactive materials, or chemical substances for military use—the PMPR must immediately notify the appropriate federal authorities. The Brazilian Army, through the Directorate for the Inspection of Controlled Products (DFPC), is responsible for monitoring incidents involving items regulated by R-105. The Federal Police must be contacted in cases that constitute a federal crime or involve unauthorized interstate transportation, smuggling, or evidence of a criminal organization.
- Importance of unified communication: The effectiveness of these operations depends on standardized communication, using secure channels, interoperable protocols, and a common technical language. The PMPR's participation in inter-institutional committees and joint training facilitates the fluidity of operations, strengthens trust among the agencies involved, and enhances response capacity in the event of disasters involving hazardous cargo.

Therefore, inter-institutional integration is not only recommended, but essential for the PMPR to act in a coordinated, safe and efficient manner in situations of high complexity and collective risk.

5. CASE STUDIES AND PRACTICAL EXPERIENCES

The history of incidents involving dangerous products in Paraná reveals the importance of prompt intervention by the Military Police to mitigate risks and prevent major tragedies.

proportions. Several cases demonstrate the effectiveness of well-executed protocols, as well as the challenges faced in the field.

- Incidents recorded in Paraná: Notable incidents include accidents involving tanker trucks carrying flammable liquid fuels (gasoline and ethanol), overturning of trucks carrying sulfuric acid, and natural gas (NGV) leaks following collisions. In 2022, for example, an incident on BR-277 in São José dos Pinhais involved a hydrochloric acid leak, requiring the isolation of an area of over 300 meters and the deployment of multiple agencies. In Londrina, in 2023, the Military Police (PMPR) was the first responder to a fire in a fuel truck, preventing the flames from spreading to a nearby urban area.

- Response time and application of protocols: The PMPR's response time in these events is often the decisive factor in preventing the incident from escalating. The operational teams acted based on previously trained procedures, quickly marking the road, containing onlookers, performing an initial visual risk assessment, and isolating the scene according to Fire Department guidelines. Efficient communication with the Fire Operations Center (COBOM) and Civil Defense allowed for the coordinated deployment of technical resources and containment equipment.

- Results achieved in disaster containment: The presence and initial action of the Military Police (PMPR) contributed significantly to preventing secondary explosions, poisoning of bystanders, contamination of waterways, and social panic. Furthermore, detailed documentation of the actions and the immediate activation of environmental and forensic agencies allowed the companies involved to be held accountable for technical failures or negligence during transportation.

These experiences demonstrate that, even without specialized equipment, the Military Police's training and strategic preparation are key elements for successful operations in incidents involving hazardous materials. Continuous investment in training and the formalization of joint protocols with other institutions further enhance the PMPR's ability to protect society in high-risk chemical and environmental situations.

6. CHALLENGES AND PROPOSALS FOR IMPROVEMENT

Despite institutional advances in responding to incidents involving hazardous materials, the Paraná Military Police still faces significant obstacles that compromise operational efficiency and safety. The main challenges include:

- Lack of specialized equipment: Most PMPR operational vehicles are not equipped with specific chemical protection items, such as encapsulated suits, self-contained respirators, toxic gas detectors, or spill containment kits. This technical limitation can restrict their performance.

safe for police officers, especially in the first minutes of the incident, when the risks are greatest.

- Insufficient technical training: Although training and improvement courses include basic notions of responding to traffic accidents, specific preparation for incidents involving hazardous substances is still limited.
  Many police officers are not familiar with risk symbols (safety panels), emergency information sheets (MSDS) or self-protection procedures when dealing with chemical products.

In light of this scenario, structural and institutional measures are proposed aimed at the continuous improvement of police performance:

- Creation of a specialized PMPR technical team for hazardous products: The formation of a tactical unit with police officers specifically trained and qualified to act in environmental incidents would enable more qualified responses, in support of other emergency and environmental preservation agencies.
- Partnerships with universities, research centers and regulatory agencies: Cooperation with institutions such as UFPR, UTFPR, Tecpar, CETESB and Civil Defense can enable regular courses, technical updates and the development of guidance materials for staff.
- Review and expansion of Standard Operating Procedures (SOP): The incorporation of specific protocols on accidents involving hazardous products, based on ANTT standards and the technical instructions of the Fire Department, will allow for greater standardization, legal certainty and effectiveness in actions.
- Gradual acquisition of emergency kits and chemical PPE: The distribution of protective equipment and rapid response kits to battalions with the highest incidence of incidents involving hazardous cargo is essential to raise the corporation's level of readiness.

Overcoming these challenges is essential for the PMPR to be prepared not only to respond to critical events, but also to assume a leadership and coordination role in high-risk chemical scenarios, protecting human lives, public property, and the environment.

7. FINAL CONSIDERATIONS

The increasing circulation of hazardous cargo on Paraná's highways requires the Military Police to be fully equipped to act as a rapid response force in scenarios involving high chemical, environmental, and human risk. The actions of the Military Police, especially in the first minutes after an accident, can be crucial in containing damage, preserving lives, and preventing the spread of large-scale disasters.

In this context, the institutional role of the Military Police is reaffirmed not only as a road safety agent, but also as a key player in environmental protection and inter-institutional coordination in critical situations. A rapid, coordinated, technical response is essential to the success of the operation and to the corporation's credibility in society.

However, for the PMPR to effectively fulfill this mission, continuous investment in infrastructure, specialized training, updated protocols, and the acquisition of equipment appropriate for the demands of hazardous material incidents are essential. The creation of technical centers and the strengthening of partnerships with environmental agencies and scientific institutions should be part of the long-term strategy.

By assuming this leading role, the PMPR consolidates itself as a strategic agent in the prevention and management of technological disasters, promoting a modern, integrated policing model committed to public and environmental security in the State of Paraná.

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