

THREATS TO THE ENVIRONMENT RESULTING FROM THE RELEASE OF A HAZARDOUS SUBSTANCE IN ROAD TRANSPORT

SUMMARY

The paper presents threats caused by road transport of dangerous goods in direct reference to the natural environment. Negligence in this area usually leads to serious failures and difficult to estimate losses. Transport catastrophes involving toxic substances can cause air, water and soil contamination as well as long-term, often irreversible environmental degradation. Areas in which losses may be particularly severe are mainly forests with the status of national parks or nature reserves. These forms, created for the preservation of biological diversity, are distinguished by special natural, educational, scientific and cultural and social values. Care for the preservation and protection of the state should form the basis for sustainable development that guarantees the ability to meet the basic needs of present and future generations in the use of the natural environment. Forests are the most complex terrestrial ecosystem, shape the climate, absorb excessively emitted carbon dioxide, regulate water management and are a natural environment and a shelter for animals and plants living in them. In order to be able to reliably present all issues related to the transport of chemicals and the risks associated with it for areas of special environmental importance, the current state of knowledge in this respect has been critically analyzed. This was particularly true of the regulations governing such transport, aspects related to road infrastructure, the selection of safe routes and accident statistics covering the transport of dangerous goods.

In order to illustrate the effects of the hypothetical contamination, a transport accident scenario was developed, which resulted in the release of toxic substances in the form of liquefied chlorine and ammonia, nitric and hydrochloric acids as well as diesel oil to Diesel engines, most frequently transported by road. The number and atmospheric conditions prevailing at the time of the disaster determining the scale of contamination were also determined. The failure was located in the immediate vicinity of the example reserve "Las Dąbrowa" in Gliwice. This area is included among forests with high protection value and special natural values in the category of "water protection forests". It is one of the best-preserved forest complexes in the Silesian Province. As a result of the permits obtained, based on the criteria for establishing all the floors of the forest occurring in the analyzed area, and the relative, greatest natural resistance to pollution from anthropogenic sources, material for testing was taken from the reserve. Its composition includes black alder seeds, goutweed and aquatic

eyelashes. These plants under laboratory conditions were properly prepared and then treated with the mentioned chemical substances. Conducted experiments allowed to determine their susceptibility and ability to survive in conditions of atmospheric contamination. In the next stage of the research computer software was used, thanks to which the types and sizes of the range zones of the released cloud created from the pool of the released substance were determined and the contaminated area was visualized on the map. The modeling and analysis of the effects of the release of selected substances on the representatives of the reserve flora made it possible to implement the main research scope of the dissertation. The obtained results provided arguments allowing to formulate conclusions and recommendations, the application of which could help to improve the safety of transport of dangerous goods through protected areas, which was the purpose of the work.