



“Gheorghe Asachi” Technical University of Iasi, Romania



GEOSPATIAL ASSESSMENT OF ENVIRONMENTAL ASBESTOS DISTRIBUTION AND DISASTER VULNERABILITY IN THE VOJVODINA REGION, SERBIA

Bojana Zoraja*, Zorica Miroslavljevic, Bojana Tot, Svjetlana Vujovic

*Department of Environmental Engineering and Occupational Safety and Health, Faculty of Technical Sciences, University of
Novi Sad, Trg Dositeja Obradovica 6, 21000 Novi Sad, Serbia*

Abstract

Asbestos, a well-known carcinogenic material, continues to pose significant environmental and public health challenges due to its widespread historical use and persistent presence in buildings and infrastructure. In Serbia, the lack of comprehensive databases on asbestos distribution and disaster-prone areas significantly limits the capacity for effective risk management, particularly in the aftermath of natural disasters. This study proposes a geospatial approach to assess environmental asbestos distribution and disaster vulnerability in the Vojvodina region, a representative area in northern Serbia with a high population density and history of asbestos use. By developing and integrating two distinct geospatial databases, one documenting estimated quantities and locations of asbestos-containing materials and another detailing disaster risk based on the national geospatial disaster registry, this work identifies municipalities at highest risk for asbestos exposure during disaster events.

The analysis employs a model for estimating historical asbestos consumption and overlays it with categorized disaster data (e.g., earthquakes, fires, floods, storms, and landslides), resulting in a series of intersection maps that highlight critical zones where asbestos release is most likely in emergency scenarios. The results demonstrate a strong spatial correlation between regions of intensive asbestos use, particularly during the 1970s and 1980s, and areas prone to high-impact natural hazards. Key municipalities, such as Novi Sad, Pančevo, and Subotica, are identified as priority zones for future emergency planning and intervention.

This research underscores the urgent need for a strategic framework for asbestos management in Serbia, which should include updated spatial inventories, targeted emergency response protocols, and public health protection measures. The integration of geospatial data in risk assessment processes enables more effective planning, resource allocation, and mitigation efforts, particularly in post-disaster scenarios where asbestos-containing debris poses significant health risks to both response personnel and the general population.

Key words: asbestos, disaster vulnerability, emergency preparedness, environmental risk, hazardous waste management, geospatial analysis, Vojvodina, Serbia

Received: February, 2024; Revised final: August, 2024; Accepted: October, 2024; Published in final edited form: April, 2025

* Author to whom all correspondence should be addressed: e-mail: bojanazoraja@uns.ac.rs; Phone: +381214852458; Fax: +38121640677