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OVERVIEW OF ASBESTOS-CONTAINING WASTE GENERATION AND REPORTING IN THE REPUBLIC OF SERBIA

Research paper

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Abstract: Asbestos-containing materials remain a waste management concern due to their continued presence in buildings and infrastructure. This study analyses reported asbestos-containing waste in Serbia using data from the Serbian Environmental Protection Agency (SEPA). Annual SEPA reports were used to examine disposed asbestos waste from 2012 to 2024, while Geographic Information System (GIS) records for 2020 were analysed to identify reported waste types, quantities, locations and management operations. The results show considerable variation in reported quantities over time, while the GIS data provide a more detailed view of their spatial distribution and management. The comparison of the two data sources also revealed differences in their coverage and level of detail. The findings highlight the need for more complete reporting and better integration of waste records to improve the assessment and management of asbestos-containing waste in Serbia.
Key words: Asbestos-containing waste, waste management, GIS, Serbia

INTRODUCTION

Asbestos refers to six naturally occurring silicate minerals with a fibrous structure, which are classified into two groups: serpentine and amphibole. Chrysotile, the main serpentine type, accounts for approximately 95% of industrial asbestos use, while the remaining types belong to the amphibole group (Pena-Castro et al., 2023). Due to its resistance to heat and fire, asbestos was widely used from the late 19th century in construction, shipbuilding, industry, and household products (Klemczak et al., 2024). However, exposure to asbestos can cause serious health effects, including asbestos-related lung diseases and cancer (Sen, 2015). In response to these health risks, Commission Directive 1999/77/EC prohibited Member States from allowing new applications of chrysotile asbestos on their territories from 1 January 2005 (European Commission, 1999). In Serbia, the production of asbestos fibres was banned in 2011, followed later by a ban on the use of asbestos-containing products (Stojšin & Ubavin, 2021). As a result, the extensive use of asbestos, particularly during the 1960s and 1970s, has led to the presence of asbestos-containing materials in many existing buildings and infrastructure. As these materials reach the end of their service life, they may become a source of asbestos-containing waste.

Under the Serbian waste classification system, asbestos-containing waste is classified according to its origin and includes several specific waste streams. These include waste containing asbestos from electrolysis (06 07 01*), waste from asbestos processing (06 13 04*), asbestos-containing waste from the production of asbestos cement (10 13 09*), metal packaging containing a hazardous porous solid matrix such as asbestos (15 01 11*), asbestos-containing brake linings (16 01 11*), discarded equipment containing free asbestos (16 02 12*), asbestos-containing insulation materials (17 06 01*) and asbestos-containing construction materials (17 06 05*). All of these waste streams are classified as hazardous waste in the Serbian Waste Catalogue (Republic of Serbia, 2010).

The management of asbestos-containing waste is additionally regulated by the Serbian Rulebook on the Management of Waste Containing Asbestos ("Official Gazette of the Republic of Serbia", No. 75/2010), which defines asbestos waste as raw asbestos, materials or products containing asbestos fibres, as well as asbestos dust generated during their processing. The Rulebook covers measures for the collection, transport, storage, treatment and final disposal of such waste, with particular emphasis on preventing the release and spread of asbestos fibres and dust into the environment. It also requires asbestos waste to be appropriately

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packaged before transport and, where applicable, treated by surface solidification, solidification or destruction of asbestos fibres before disposal (Republic of Serbia, 2010).
The aim of this study is to assess the quantities of asbestos-containing waste generated by reporting entities in Serbia. To achieve this, the research utilizes GIS records from the Serbian Environmental Protection Agency, for the year 2020. Specifically, the GIS database was queried and filtered using the waste index codes 17 06 01* (insulation materials containing asbestos) and 17 06 05* (construction materials containing asbestos). To provide a comprehensive national overview, the analysis is supplemented with data from the latest SEPA annual reports on generated waste and special waste streams.

MATERIAL AND METHODS

The methodology was based on data collected from the SEPA GIS waste management portal and SEPA reports. Reported quantities of asbestos-containing waste were analysed for the period 2012–2024 to examine changes over time. GIS records for 2020 were analysed for each reporting entity, including its location, reported waste quantity, and waste management operation (treatment or disposal). The reported quantities were then grouped by municipality to show their distribution across Serbia. The results are presented as a line graph showing the national trend, a map showing the distribution of asbestos-containing waste in Serbia, and a table with the reported quantities and management operations for each location.

RESULTS AND DISCUSSION

The available data were first examined to assess reported quantities of disposed asbestos-containing waste in Serbia between 2012 and 2024. The data show considerable variation over the observed period (Figure 1) (SEPA, 2025). The highest quantity was recorded in 2014, when 1,647 t of asbestos waste was disposed of. In the following years, the quantities decreased and remained below 1,000t. From 2018 onwards, the reported amounts were relatively similar, ranging from 201t in 2021 to 412t in 2019. In the most recent years, 253t was reported in 2022, 277t in 2023 and 278t in 2024.
The high value recorded in 2014 stands out from the quantities reported in the surrounding years. The available data do not provide an explanation for this increase which may be related to differences in demolition and reconstruction activities, the removal of asbestos-containing materials, or reporting practices. Despite the decrease compared with 2014, asbestos waste continued to be reported in Serbia in recent years, indicating that asbestos-containing materials remain present and continue to enter the waste management system.

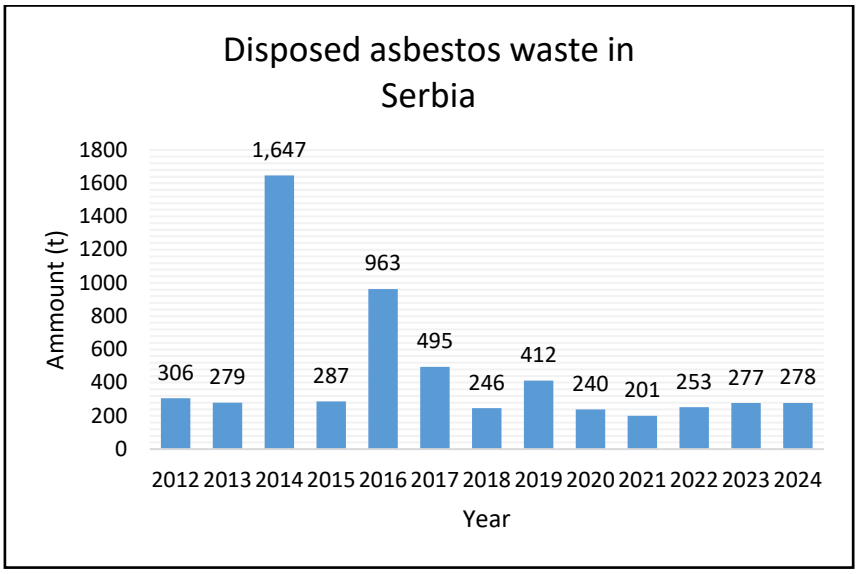


***Fig. 1.**. Reported quantities of disposed asbestos waste in Serbia, 2012–2024 (SEPA, 2025)*

To provide a more detailed view of the situation in Serbia, the available GIS data were further examined. The analysis covered the year 2020, the latest year for which data were available in the GIS database, and focused on the locations, reporting entities, waste types, and reported quantities of asbestos-containing waste. Records were available for six locations: Irig, Novi Sad, Kikinda, Kostolac, Lazarevac, and Pirot. The reported waste was classified under two waste codes, 17 06 01* and 17 06 05*. Code 17 06 01* was reported in Irig, Kikinda, and Lazarevac, while code 17 06 05* was reported in Novi Sad, Kostolac, and Pirot. The reporting entities included a waste collection and treatment company in Irig, a public utility company in Novi Sad, the Thermal Power Plant in Kostolac, a branch of the Serbian Power Utility (EPS) in Lazarevac, and an automotive tyre manufacturing company in Pirot.

A total of 21.764 t of asbestos-containing waste was reported across the six locations. The quantities varied considerably between locations, with the highest reported amount recorded in Kikinda (12.28 t), accounting for more than half of the total reported quantity. This waste was reported as sent for treatment. Lazarevac had the second-highest reported quantity, with 6.64 t, while 9.98 t was reported as sent for disposal. The remaining locations had substantially smaller reported quantities: 2.5 t in Novi Sad, 0.17 t in Pirot, 0.15 t in Kostolac, and only 0.024 t in Irig. The waste reported in Novi Sad and Pirot was sent for disposal, while the waste reported in Irig was sent for treatment. No treatment or disposal quantity was recorded for the 0.15 t reported in Kostolac.

The spatial distribution shows that the largest reported quantities were concentrated in Kikinda and Lazarevac, while substantially smaller amounts were recorded at the other four locations. These differences may reflect variations in the activities of the reporting entities and the types and quantities of asbestos-containing materials handled, rather than the overall distribution of asbestos-containing waste generated in Serbia. The spatial distribution of the reported quantities is shown in Figure 2, while the corresponding waste codes and management operations are presented in Table 2.

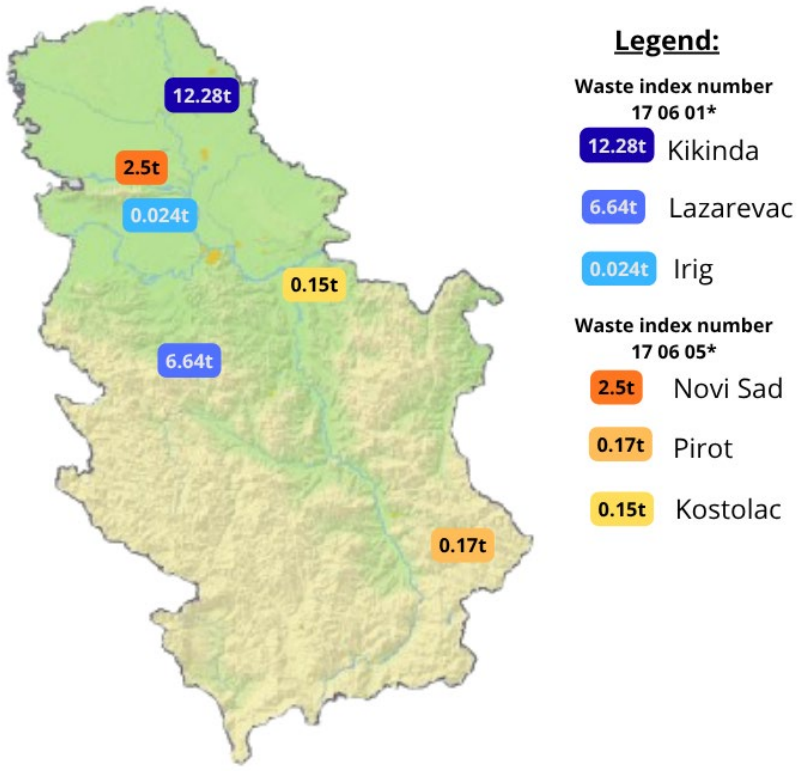


Fig. 2. *Spatial distribution of reported asbestos-containing waste in Serbia in 2020*

Table 2. *Reported quantities and management of asbestos-containing waste in Vojvodina in 2020 (SEPA, 2026)*

Location	Waste code	Waste generated in 2020 (t)	Sent for treatment (t)	Sent for disposal (t)
Irig	17 06 01*	0.024	0.024	-
Novi Sad	17 06 05*	2.5	-	2.5
Kikinda	17 06 01*	12.28	12.28	-
Kostolac	17 06 05*	0.15	-	-
Lazarevac	17 06 01*	6.64	-	9.98
Pirot	17 06 05*	0.17	-	0.17
	Total	21.764	12.304	12.65

The total quantity reported in the GIS records for 2020 was 21.764 t, compared with 240 t of asbestos-containing waste reported as disposed of in the SEPA annual report for the same year.

In comparison with EU countries, the reported quantities in Serbia are considerably lower than those reported in several European countries. Germany reported 10,860,400 t, Italy 3,650,105 t, Poland 1,647,960 t and Belgium 1,458,731 t of asbestos-containing waste for disposal. Among countries closer to Serbia, the reported quantities were 870,890 t in Austria, 98,198 t in Hungary and 68,735 t in Croatia (European Commission, 2024). Since the reporting periods are different between countries, the data are not directly comparable, but they provide an overview of the quantities of asbestos waste disposed of in Europe.

However, for Serbia, the difference between the quantities reported in the SEPA annual report and the 2020 SEPA GIS records highlights limitations in the current system of recording and integrating asbestos waste data .While the annual reports provide the total quantity disposed of, they do not indicate the quantities belonging to individual waste codes. The GIS database provides more detailed information on waste types, locations and management operations, but does not necessarily include all entities generating asbestos-containing waste and sending it for treatment or disposal. Better coordination between these data sources, together with more complete reporting and systematic integration of records, would provide a more comprehensive overview of asbestos-containing waste management in Serbia.

CONCLUSION

The analysis shows that asbestos-containing waste continues to be reported in Serbia, despite the long-standing restrictions on asbestos use. Reported quantities of disposed asbestos waste varied considerably between 2012 and 2024, with the highest quantity recorded in 2014 and relatively stable amounts in recent years. The 2020 GIS data provided more detailed information on the locations, waste types and management operations of individual reporting entities, but represented only a limited part of the total quantity reported at the national level. The comparison with SEPA annual data also revealed differences in the level of detail and coverage between the two data sources. These findings indicate a need for better coordination and integration of waste records, more complete reporting by entities generating asbestos-containing waste, and more detailed classification of reported quantities. Improving the consistency and completeness of asbestos waste data would support more reliable assessment of waste flows and provide a stronger basis for planning its safe management in Serbia.

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