

Screen supported analyses of Tailings in Styria 1998 Final Report

Contractor: Technical Office for Environmental Protection Ltd.
Customer: Styrian Provincial Government - Specialised Division 1c
Participants: Waste Management Associations in Styria
Date of Publication: May 1999

1. Summary

The "Screen Supported Analysis of Tailings in Styria in 1998", which was commissioned by the "Fachabteilung (FA) 1c des Amtes der Steiermärkischen Landesregierung" (Specialised Division 1c of the Styrian Provincial Government) breaks down the composition of appr. 22 t of tailings from three periods (heating period, non-heating period, pre-heating period). The executing company was the "Technische Büro für Umweltschutz" ("Technical Office of Environmental Protection"), which was charged with making an analysis of tailings all over the province.

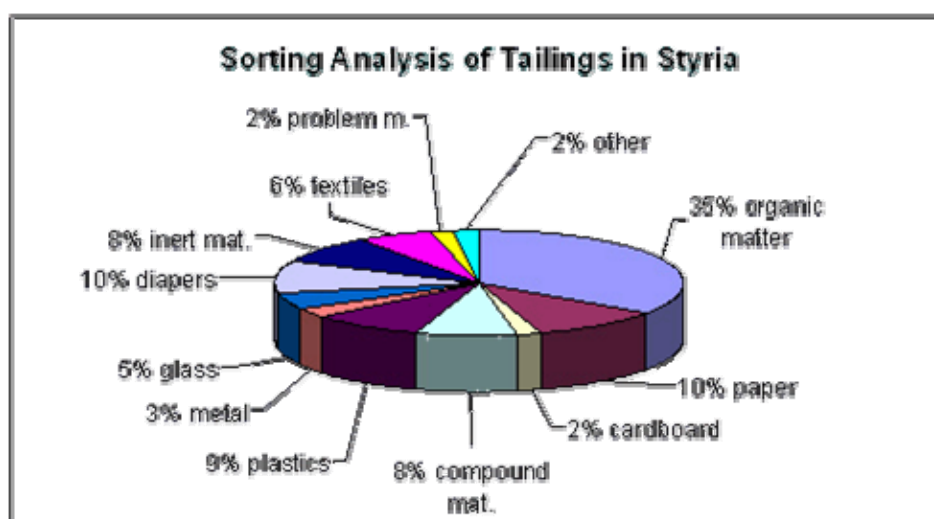


Figure: Composition of tailings

A structural comparison shows that rural communes have much a lower overall amount of tailings than municipalities (69 kg/inh.a as compared to 173 kg/inh.a). The low amount in rural communes can partly be traced back to intensive self-made composting. Furthermore, the amount of commercial waste resembling household waste may be assumed to be lower in rural communes than in municipal structures. As for communes with a low amount of tailings, however, it must be assumed that an undesired thermal use of the "fraction rich in calorific value" (incineration in the kitchen stove) is practised.

The fraction specific consideration generally shows that fewer valuable substances remain in tailings in rural communes than in municipal structures. In municipal structures, in particular, there still is a potential for reduction in terms of waste paper in tailings. Nevertheless, there also is a potential for reduction in terms of waste paper in tailings in rural communes in which the tailings contain a large share of paper. In view of the high share of packaging materials made of plastics and compound materials in tailings, it is, above all, in municipal structures that a better collection of the valuable substances should be possible.

The **share of diapers** that cannot be recycled, which is quite high (10% of all the tailings), can only be reduced by intensifying the use of recyclable diapers. Furthermore, an optimisation of the collection of waste glass and metal

in the municipal area is still possible.



2. Starting Position

In analogy to the analyses of tailings made in 1993/94, analyses of tailings were again made all over the province in 1998 in 3 stages.



3. Procedure

In coordination with the regional waste consultants, samples of tailings were collected in 80 partial areas. These samples were completely analysed in a mobile waste sorting plant. This plant, which is used by several European countries, basically consists of a conveyor belt, a polygon drum screen with exchangeable screen inserts (40 mm screen), a container for receiving the underflow of the screen, containers for receiving the individual sorting fractions, a sorting table and a drying cabinet for the required determination of the water content. The work was headed by one Supervisor and done by four skilled workers.

The underflow of the screen (sampling quantity with a grain size below 40 mm) was reduced to appr. 10 kg according to the Sample Dividing Technique according to Gavert and Kick and then sorted as well. Immediately after this the water content of the samples was determined (dried) and the samples were comminuted so that the ignition loss and the gross calorific value could be determined (in the laboratory of the "Berliner Kraft und Licht Aktiengesellschaft").

Finally the net calorific value was calculated according to DIN 51900.



4. Goals

This project was aimed at finding potentials for reducing the amount of tailings in Styria on the basis of the acquired data.



5. Result / Benefits

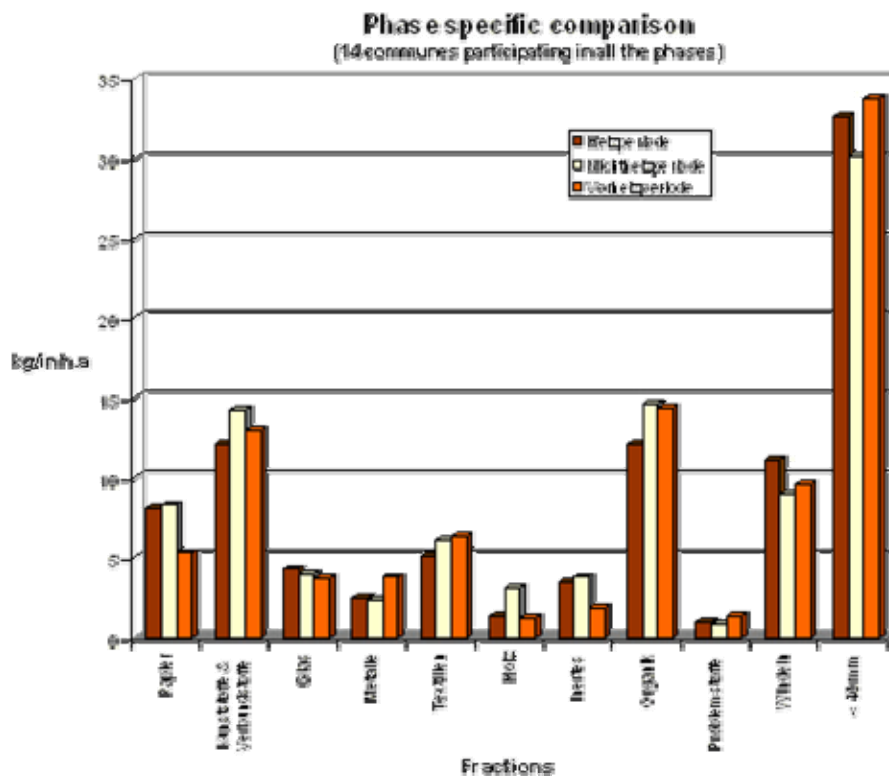
Structural comparison of tailings

In general a distinction was made between the municipal and rural area and the mixed area, in which the affiliation is not defined exactly. The structural comparison shows that rural communes have much a lower overall amount of waste (except for bulky waste) than municipalities (mean value 69 kg/inh.a as compared to 173 kg/inh.a). The low amount of tailings in rural communes can partly be traced back to intensive single composting. Furthermore, the amount of commercial waste resembling household waste may be assumed to be lower in rural communes than in municipal structures. As for communes with a low amount of tailings, however, it must be assumed that an undesired thermal use of the part of tailings that is rich in heating valuable substances (incineration in the kitchen stove) is practised.

Phase specific comparison of tailings

Three phases were compared (heating period Feb./March '98, non-heating period August '98, pre-heating period October '98). When the mean values are considered, the following differences become evident:

- The amount of paper, glass and metals in the pre-heating period is lower than that of the other phases
- The share of plastics and compound materials is highest in the non-heating period
- The share of fine fraction < 40 mm is highest in the heating period, (the share of ashes being high at the same time)
- The share of organic matter is lowest in the non-heating period
- The share of diapers and textiles is lowest in the heating period
- Inert material can be found most frequently in the non-heating period
- As for wood and problematic materials, only slight differences can be seen.



What should, however, be considered when interpreting these results is the fact that partly different areas were studied in the three phases. Therefore, the results of the 14 communes that were studied in all the phases are summarised and interpreted separately. In contrast to the overall study, the following differences were shown:

- The share of fine fraction < 40 mm is highest in the pre-heating period
- The share of organic matter is lowest in the heating period
- The share of diapers is lowest in the non-heating period
- The share of textiles is lowest in the pre-heating period

Fraction specific results

At this comparison, the quantities of valuable substances remaining in tailings were shown. The individual fractions in tailings were broken down exactly, (e. g. 8.8 kg paper /inh., a with 12 % periodicals,...) and, if necessary, compared to the quantity collected in the collection of valuable substances.

As for used materials in tailings, a distinction was made between "packaging material" and "non-packaging material".

Furthermore, the share of organic matter is shown in dependence of the bin for bio-waste (with or without a bin for bio-waste). This comparison has shown that areas without a bin for bio-waste had much a lower share of organic matter in tailings.

Calorific values, ignition loss

Representative samples of tailings of altogether 40 partial areas were subjected to an additional analysis. The gross calorific value is interesting in view of the admissible maximum value of 6,000 kJ/kg for waste to be put on the landfill, which is specified by the Landfill Regulation. The net calorific value, which is related to humidity, for its part, characterises the material whose waste is put to further use, (e. g. incineration). The ignition loss, which is determined by the fine fraction (< 40 mm), designs the share of organic carbon. The mean gross calorific value amounts to 14,794 kJ/kg, the mean net calorific value to 9,247 kJ/kg. At the share < 40 mm, the gross calorific value amounts to 8,277 kJ/kg, the net calorific value to 4,629 kJ/kg and the ignition loss to 41.6 %.

This result means that tailings must not be put on the landfill without pretreatment because their gross calorific value still is too high and therefore must be pretreated according to the Landfill Regulation.

