



Analyses of Tailings 1993/1994 - Final Report

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1. Summary

The AWV-Liezen (AWV - Abfallwirtschaftsverband - Waste Management Association), which was founded in 1978, has operated a waste treatment plant with an annexed landfill for tailings since 1981.

The Waste Management Association Liezen intends to meet the specifications of the Waste Management Act and the Landfill Regulation and to ensure the further operation of the existing plant by optimising the operations at the site of the Waste Treatment Plant Liezen.

For these reasons, a project has been commissioned by the Waste Management Association Liezen and the Styrian Provincial Government, Specialised Division 1c. This project has the following working title

Mechanisch-biologische Behandlung der Feinfraktion als Maßnahme eines Optimierungskonzeptes in Bezug auf vorhandene Abfallbehandlungs-anlagen am Beispiel der MBA (Müllbehandlungsanlage) Liezen

Mechanical-biological treatment of the fine fraction as an action that is part of the optimising concept relating to existing waste treatment plants by taking the Waste Treatment Plant Liezen as an example

In the course of one year, so-called "mass balances" are made in two months' intervals. In this context, appr. 80 tons of tailings from the total catchment area of the Waste Management Association Liezen can be processed.

The fed tailings are subdivided into:

- fine fraction - screen passage
- coarse fraction - screen overflow
- fine metal - metal in the screen passage
- coarse metal - metal in the screen overflow
- interfering materials - large materials interfering with the operation of the hammer mill

47 % of tailings go to fine fraction and then to composting. The share of coarse fraction amounts to 50 %. During the mechanical processing of waste, samples are continuously taken on four points ("input", "after the mill", "coarse fraction" and "fine fraction") and sorted. 40 % of the input belong to the category "other tailings". The share of paper, plastics and organic matter varies between 12 and 16 %. Referring to the basic conditions specified by the legislator, one sample was taken "after the mill" and at "coarse fraction" resp. in order to analyse these samples for the water content, the net calorific value and the ignition loss. The mean calorific value amounts to 15,118 kJ/kg for the sample "after the mill" and to 16,233 kJ/kg for the sample at "coarse fraction". The samples of "fine fraction" were converted to a mixed sample. The mean gross calorific value amounted to 9,777 kJ/kg. The fine fraction was composted in a rotting box for two weeks, then on the platelike pile for four weeks and subsequently on the triangular pile for 16 weeks. The gross calorific value of all the rotting material is below that specified by law, i. e. 6,000 kJ/kg. In addition to the analysis of the calorific value of the fine fraction, the initial and final samples of composting are subjected to an eluate study. In this context, no washing out of the heavy metals can be detected. On the other hand, the COD is reduced by 80 % and the ammonium content by 90 %. At the fermentation tests, it was found out that the biological activity according to the fermentation test equalled zero from the middle of the platelike pile.



2. Starting Position

A prerequisite for planning action relating to waste management is the knowledge of the waste fractions contained

in the household waste or in the tailings. In September 1993, random samples of tailings were taken in seven Waste Management Associations that were interested in cooperating in this pilot project, two analyses being made in each area.

Due to the gained data, which yielded important findings for the further planning in terms of waste management, the "Fachabteilung 1c" ("Specialised Department 1c") decided to continue the analyses and extend them to all the Waste Management Associations in Styria.



3. Goals

The results of the analyses are to serve as a basis for continuing treatment of tailings in Styria and for checking the readiness of the population to separate waste.

The evaluation of the analyses at the site shows the weight and volume of the sampled waste. In parallel the communes participating in the study are to acquire basic data of waste management, such as the amount of tailings per inhabitant, quantities of waste materials collected per inhabitant, collecting degree of the bin for bio-waste and the volume of containers for tailings. By considering all the data acquired and calculated, the following aspects are to be studied:

- composition of the tailings in the areas where the samples were taken
- possible differences in the individual regions that are due to socio-economic factors or basic conditions for waste management
- estimating the recycling potential still there
- estimating the prevention potential still there
- comparing the amounts of tailings in dependence of the provided container volume
- estimating the calorific value



4. Procedure

In September 1993, samples of tailings were made in seven Waste Management Associations that were interested in cooperating in this pilot project, two analyses being made in each area.

The analyses in the remaining Waste Management Associations, which were necessary to complete the 1st series of analyses, were made in February and March 1994. In May, June and July 1994, the analyses were repeated in a second series in all the 17 Waste Management Associations.

In October and November 1994, there was a third series of analyses in all 17 Waste Management Associations so that the seasonal influences on the composition of tailings could be taken into account.

The sorting analyses were made in the following steps:

1. Selecting suitable sampling areas (by the individual Waste Management Associations)
2. Sorting at the site and experiments in the laboratory
3. Evaluating the results

As only small fractions of the produced amounts of waste can usually be studied, the extent of sampling had to be selected as to make sure that a composition of waste that was representative for the studied area could be determined. For each Waste Management Association, one sorting day was available and two analyses were made.

After the areas to be studied had been selected, some contents of collecting vehicles were taken to the place of analysis. In this context, attempts were made to make sure there wouldn't be any press compaction or blending by not fully filling the vehicles. This corresponds to contents of 10 m³ in a loose state.

For collecting the waste to be sampled, vehicles with press plates were to be used, if possible. For at vehicles with rotary drums, an intensified blending and a higher transition of humidity will falsify the values of the analysis. The contents were emptied at the place of analysis and a representative part (appr. 2-3 m³) was sorted and studied in detail.

The analysis of the samples itself was made by manual sorting, mobile mechanical equipment, which consisted of a screening drum and a conveyor, being available for support.

The contents of the samples were first screened with a perforation of 40 mm and the upper grain was manually separated into the single fractions on the conveyor.

The sorted partial fractions were weighed, the bulk volume was determined and then the gained data were evaluated by means of EDP.

Furthermore, the single fractions were subjected to a visual check in order to get additional information, (e. g. share of packaging material, allocation of the compound materials).

The analyses were made under the supervision and leadership of a person having much experience in sorting waste.



5. Result / Benefits

The absolute amounts of tailings are considerably higher in the municipal area than in rural communes. This circumstance can partly be traced back to the high share of commercial waste in the cities. However, what also must be supposed is that the low amounts of tailings in the rural area can partly be explained by a disposal in the own oven.

The prevention and recycling potentials still available in tailings are generally largest in the municipal area.

The share of waste paper in tailings hint at recycling potential that still need to be exploited. In some municipal areas, in particular, the share of waste paper in tailings are above the average.

The amounts of waste glass in tailings are low in all the areas, which shows a high efficiency in the collection of waste glass. An increase of the amounts of waste glass collected is hardly possible any more. As for the low amounts of waste glass in tailings, there are no relevant differences between municipal and rural communes.

The efficiency of the collection of packaging materials provided by the ARA System cannot be definitely assessed yet because of the lack of quantity data in many areas.

The share of waste metal in tailings is low as well. The separate collection of waste metals by means of delivery systems or own waste transporting systems leads to a very low share of waste metals in tailings.

Diapers currently from the largest share of the non-recyclable fractions in tailings.

The organic shares in the rural areas are very low, apart from few exceptions. In many communes, the introduction of a bin for bio-waste won't be necessary. In the communes where bio-waste is collected in bins for bio-waste, there is a direct correlation between the number of people participating and the exploited quantity of bio-waste.

As for fine fraction, the share is below 40 mm for appr. one third of all the tailings. The seasonal variations of the share of fine fraction are lower than generally assumed. In fine fraction, there are still considerable shares of organic matter.

There is a correlation between the amount of tailings and the provided volume of containers for tailings.

The net calorific values of the analysed waste are between 6,000 and 18,000 kJ/kg. In the most communes, the values are between 8,000 and 12,000 kJ /kg.

The shares of problematic materials generally are not alarmingly high. However, single results show shares of problematic materials that are above the average.

