



arvi

Material Value Chains

Refining of municipal solid waste incineration bottom ash fine fractions

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Starting point

Bottom ash is the largest solid residue from municipal solid waste incineration (MSWI) in grate furnaces. The amount of bottom ash generated is around 15-20 % of the incinerated waste. In Europe between 15 and 20 million tons of MSWI bottom ash is generated annually.

MSWI bottom ash is a heterogeneous mix of unburnt and molten material retained on the grate as well as smaller particles that have through grate openings. The composition of MSWI bottom ash could be generally described as follows:

- 10 % ferrous metals
- 2,5-3,0 % non ferrous metals (aluminum, copper, brass)
- 80-85 % slag and unburnt inorganic materials (glass, ceramics, soil)
- 1-3 % unburnt material

The particle size distribution of MSWI bottom ash (Figure 1) is reminiscent of gravel.

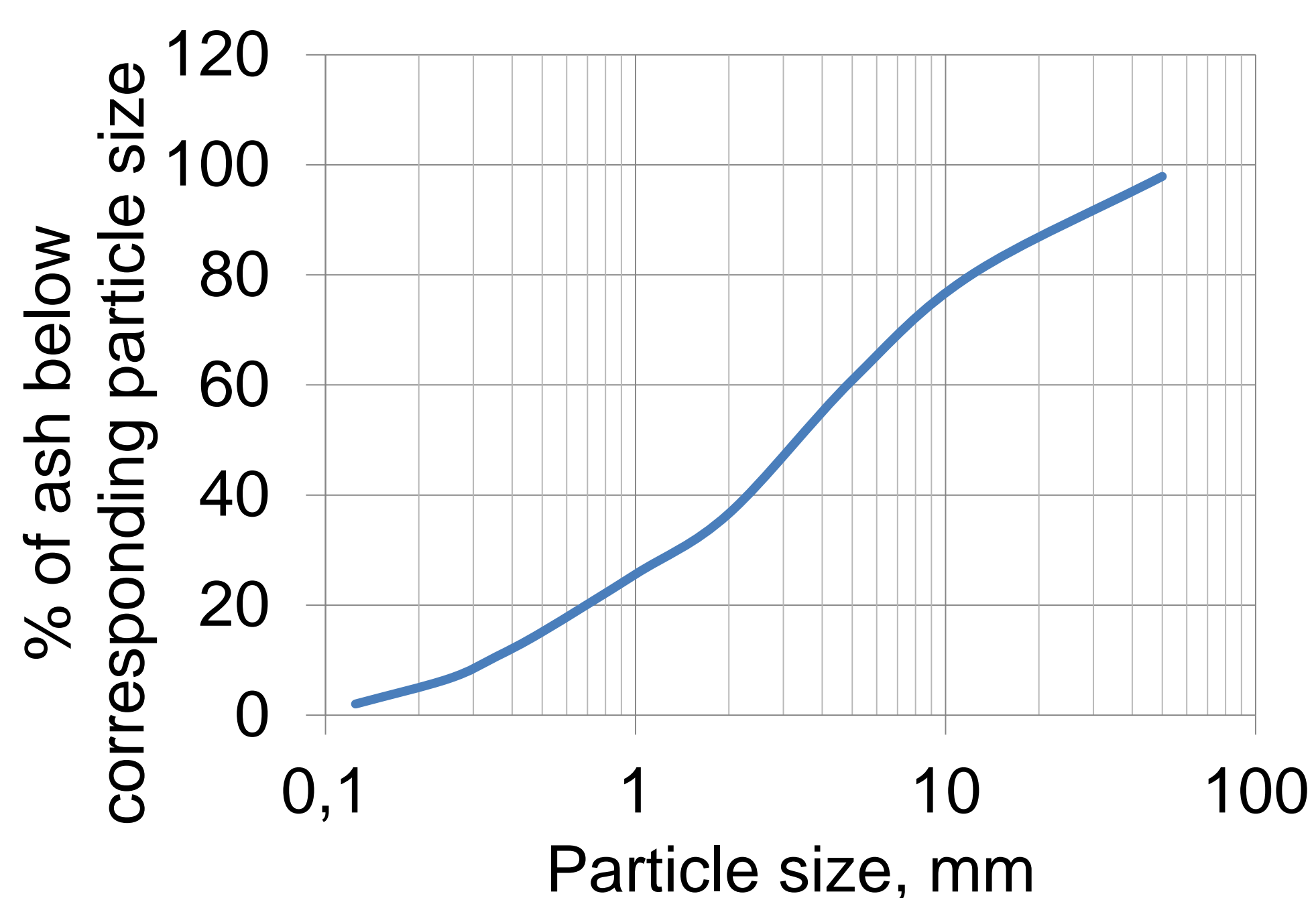


Figure 1. MSWI bottom ash particle size distribution

Today, valuable ferrous and non ferrous metals are recovered quite effectively from the coarsest fractions of MSWI bottom ash mainly by means of magnetic and eddy current separators. However, there are currently no cost-effective ways to separate these metals from the fine bottom ash fractions (e.g. <2 mm or 4 mm), which represent 40-50 % of the bottom ash. Main challenges in recovery of metals from finer fractions are deteriorating of the separation efficiency of dry mechanical separation techniques towards finer particle sizes and the impurity of the separated fractions.

Achievements

The studies focused on fine MSWI bottom ash fraction 0-2 mm from the ADR (Advanced Dry Recovery) process operated by Suomen Erityisjäte Oy. Through proper characterisation of the material and a series of laboratory scale recovery experiments a process concept for refining of the fine grained MSWI bottom ash was created (Figure 2).

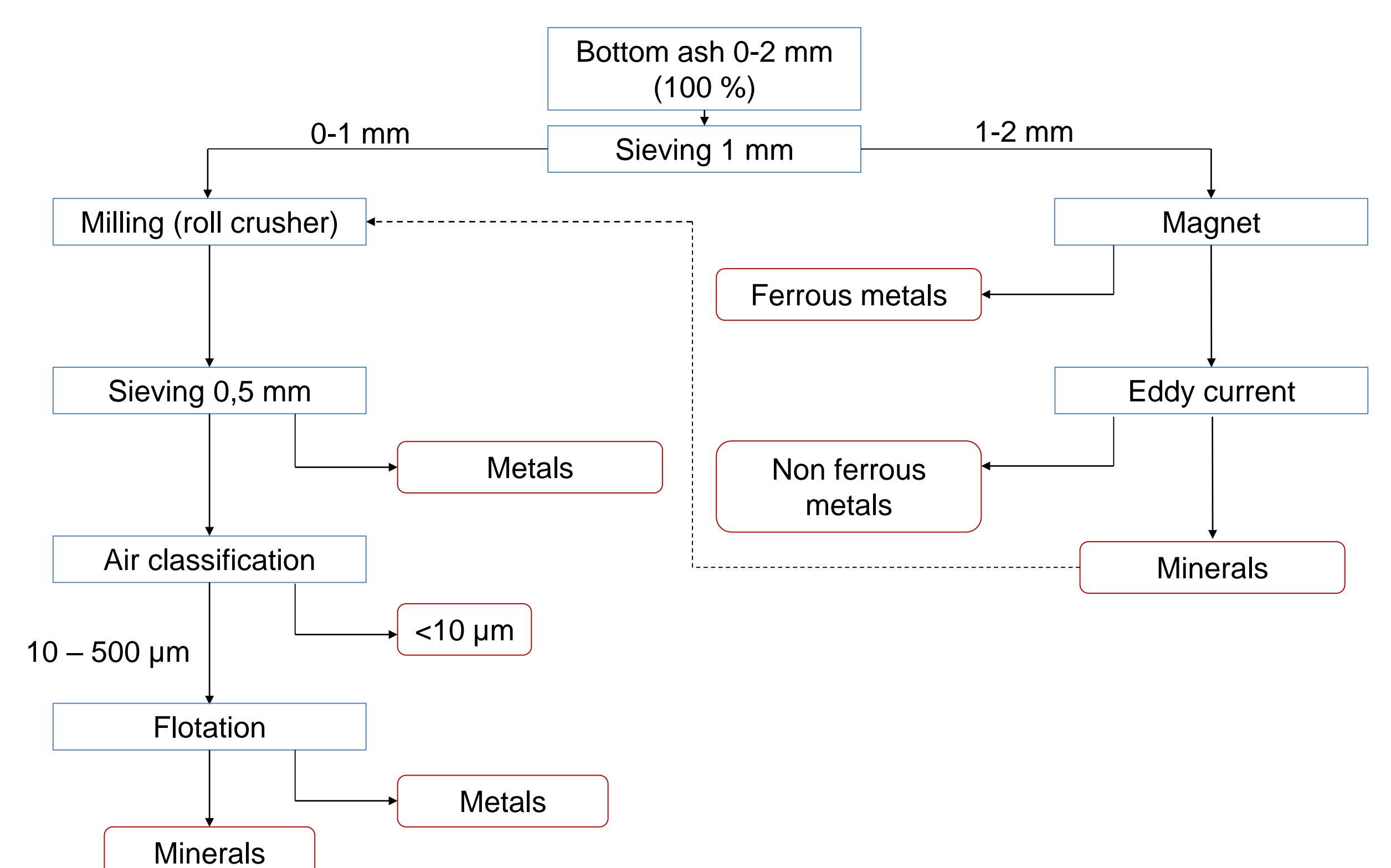


Figure 2. Process concept for refining fine grained MSWI bottom ash

The proposed processing concept is based on advances in separation efficiency of the conventional mechanical separation techniques combined with techniques applied in metal ore processing. It has to be noted however, that the metals recovered by magnetic and eddy current separators from the fine bottom ash fractions still need further purification before creating value from them.

