

ABSTRACT

Third Intercontinental Landfill Research Symposium

Intended session: **Utilization of ashes in landfill constructions**

Maturation processes in ash covers

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At present, and as described in a separate presentation, covering is in progress of a test area of 4 hectares of old municipal waste. The design and materials selection is based on previous work on characterisation of aged ash as well as on bentonite. Thus, the objective is to achieve designs that are robust with regard to mechanical and chemical influences, including the development over time. Moreover, the aim is to use recycled materials as far as possible.

For mixtures between ash and bentonite it was concluded that the fraction of bentonite added must be sufficiently high to fill the interparticle space so that the sealing material becomes sufficiently impervious to water. On the other hand, since the overburden pressure is relatively low, the fraction of bentonite added must not be too high so that the slope stability might be jeopardized.

Even when applied in thick (e.g. 0,3 m) constructions, bentonite might be susceptible to chemical change. E.g. it might be preferable that the pH be kept below around 10. Considerably higher values have been determined in pore waters of fresh ashes. However, in aged ashes, even without carbonatisation, pH is for the most part significantly lower than this value.

Generally, the incoming ash from combustion of wood-based fuels (from Söderenergi AB) has very favourable properties for seal formation. The fresh fly ash cures to a moderately deformable and watertight material. So does also aged ash provided that some waste material from steel-making is added. Actually the curing processes can be modified by suitable combination of parameters to allow appropriate management of the material during the installation.

The most crucial aspect is probably the development over time. Available data and information indicate that the sealing improves with time. This is due to:

Hydratisation	≈ / > Day
Dissolution and precipitation of Al- and Si-containing oxides	≈ / > Month
Formation of clay minerals	≈ / > Year
Reduction of sulphate	≈ / > Decade

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