

“Utilization of ashes in landfill constructions”

3rd ICLRS at Lake Toya, Hokkaido, Japan

Session chair report

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The first part of the session “Utilization of ashes in landfill constructions” consisted of three presentations followed by a few questions specific to the presented material:

- Utilization of ashes in a landfill cover system (Gustav Tham, Anna Mellström, Sweden)
- Maturation processes in ash covers (Rolf Sjöblom, Sweden)
- Air permeability diffusion coefficient and tortuosity of incineration ash (Toshihiko Matsuto, Japan)

The ensuing overall discussion was focused on these topics:

- Long-term consolidation of ashes in (landfill) constructions – Processes and time span?
- Will there be a “final stabilization”? When?
- Further research needs?

Following some aspects of the discussion and conclusions:

- ❖ Long-term processes, long-term perspective – there are different opinions (or rather definitions?) with regard to this term depending on the background of the researcher (countries, legislative conditions, ...):
e.g. Sweden – 100 ... 1000 years ↔ Japan – 30 ... 50 years
⇒ What is the target? – How good is good enough? – How are risks perceived? – How to identify critical factors?
- ❖ How do the ashes behave with regard to mechanical, chemical and biological stability, how do they change, consolidate, leach ...?
- ❖ How do processes like carbonation and clay formation contribute to the long-term performance of the ashes as building materials?
 - Different materials will react differently, e.g. clay formation is likely to be faster in coal or wood ashes compared to volcanic ashes
 - Development of monolithic structures?
 - Are these processes relevant if one looks at a 30-year long-term perspective?

- ❖ Succession of leaching processes and mineral changes (risk of leaching prior to stabilizing conversions; however, field results give evidence for rapid conversion)
- ❖ Optimization of the incineration process may be a way of influencing the ashes towards a desired direction, e.g. immobilization of critical elements by maximization of glass phases which, moreover, will be beneficial for the clay formation.
With optimized incineration processes, the utilization of more critical materials like MSWI residues may be possible as well.
- ❖ Importance of verification of lab or pilot scale results by means of qualified field tests
- ❖ Need of tools for the prediction of the long-term behaviour and stability, e.g. models.

Summary

An interesting and promising concept for the recycling of residuals like ashes in landfill cover constructions has been presented and the participants of the session have got a deeper insight into a number of physical properties of incineration ashes on the one hand and reaction processes that are likely to occur in an ash body within short and longer time perspective on the other hand. The idea of using ashes for landfill covers is not common, so the possibility of exchanging experiences with regard to this special case were limited. However, the discussion about factors to consider was vivid and topics for further research could be identified.

Lale Andreas

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