

AEROBISATION OF LANDFILLS (II)

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Background:

A major problem in connection with landfills is the long lasting emissions, so that aftercare periods over many decades or even longer have to be envisaged.

In order to reduce the emission potential from landfills as early as possible the landfill should be operated as a bioreactor with enhanced degradation and elution processes during the operation and post-operation phase. Once the anaerobic processes have nearly come to an end, aerobic processes may be introduced in order to further degrade components that are not or not easy to degrade under anaerobic conditions. This can be done by a controlled artificial aeration. Another method – mainly from Japan- is the installation of a semi-aerobic landfill from the beginning of landfill operation. This concept includes natural aeration of a landfill by making use of the “chimney effect”.

Objective:

The subject of this workshop is the discussion of the possibilities and limitations of an aerobisation of landfills. The realisation (design) and results from full scale applications will be presented and discussed. In addition to the biological processes and their effects on the reduction of the emissions also questions like explosion control, air distribution and heat transfer in the landfill body will be raised. Another issue is the emission control of the air that leaves the landfill.

In particular, the following questions respecting landfill aerobisation arise:

- How is the full scale application affecting the specific conditions respecting different mechanisms for the N- and C-removal?
- How and to what extend do preferential pathways for the injected air influence the aerobisation process and how could the resulting problems be enhanced?
- Are temperatures inside the landfill body predictable before starting in situ aeration measures and are there instruments to control the temperature regime in the course of aeration?

- In situ aeration measures: An adequate tool for the prediction of long term settlements of anaerobic landfills?
- Operation time perspective?
- How to define (biological) landfill stability? Are general parameters helpful or do we have to evaluate individual cases? Does the end of the aeration measure also define the end of landfill aftercare?
- Which scenarios can be proposed for alternating the different operational phases (anaerobic degradation, aerobic stabilisation, watering (elution)) and time duration of them.

The session will be introduced by Prof. Cossu and Prof. Stegmann, giving a short overview on the session outline and stressing the open questions to be discussed in the course of the session.

Short statements (individual duration approx. 15 min.) will be given. According to the different subjects two or maximal three statements will be discussed, giving the presenters the possibility to clarify or, if need be, to deepen specific aspects of their work.

The expected results are:

- Possibilities for an effective operation (ecological and economical)
- Possibilities for an effective temperature and moisture control during the aeration process
- Indicators describing the degree of aerobic stabilisation measures
- Future strategies for in situ aeration measures

The session chair is going to summarise the findings of the specific and general discussions to be published on the conference web page.

As it already became apparent during the last SARDINIA-Symposium, the joint presentation and discussion (also and especially at levels below publications) is essential for a target orientated further research on and application of Landfill aerobisation. Therefore it is planned to establish a working group mainly consisting of the sessions presenters, but open for external input.

PROGRAM for the Session AEROBISATION OF LANDFILLS (II)

0:00 – 0:10 Introduction

R. Cossu / R. Stegmann (Chair)

0:10 – 1:00 Semi Aerobic Landfills

Statement (15 min.)

Y. Matsufuji (Fukuoka University, Japan)

Experiences with semi aerobic Landfills in Japan and Malaysia

Complementary short Statement (5 min.)

R. Stegmann, J. Heerenklage (Hamburg University of Science and Technology, Germany)

In-situ Landfill Aeration by means of air-venting through the landfill

DISCUSSION (30 min.)

1:00 – 2:30 Aerobic Landfills

Statements (15 min. each)

R. Stegmann (Hamburg University of Science and Technology, Germany)

Full Scale Application of the Low Pressure In Situ Aeration in Germany: Case Study Old Kuhstedt Landfill

R. Cossu (University of Padova, Italy)

Full Scale Application of the In Situ Aerobic Stabilisation in Italy: Case Study Modena Landfill

R. Prantl, P. Lechner (University of Natural Resources and Applied Life Sciences, Vienna, Austria)

In situ Aeration and Monitoring of an Austrian Old Landfill: Evaluation of Assessment Criteria for biological Landfill Stabilisation

GENERAL DISCUSSION (45 min.)

2:30 – 2:40 Wrap up /Conclusions

Chair: R. Cossu / R. Stegmann

Additional contributions respecting “Landfill Temperatures in the course of Biodegradation” and “Air Permeability of a Bioreactor Landfill” will given by Hideki Yoshida and Jon Powell