Report on the IWWG Workshop “Landfill aeration: achievements and challenges after two decades of experience”; organized by the IWWG Task Group on Landfill Aeration (TGLA)

The IWWG Task Group on Landfill Aeration organized a workshop in the framework of the 16th International Waste Management and Landfill Symposium in Sardinia, Italy. The aim of the workshop was to identify both the potential of the methodology and further research needs.

The main topics which have been discussed in the framework of the workshop were:

- What are the potentials and limitations of semi-aerobic approaches (Japanese case study) towards emission and emission potential reduction?
- What are the most critical aspects which may prevent the aeration project from being successful?
- Description of the stabilization performance on the basis of experiences made at German and Austrian projects.

On Wednesday morning, 4 October 2017, approximately 30 participants attended the workshop and contributed towards a lively and constructive discussion.
Following a short introduction on the background, aims, objectives and important outcomes of the Task Group so far (e.g. the IWWG Monograph Series volume “Landfill Aeration”, edited by Rainer Stegmann and Marco Ritzkowski), a first introductory presentation by the Task Group Leader (Marco Ritzkowski, Hamburg University of Technology, Germany) provided an overview on full scale aeration projects in Europe. He highlighted the great potential of the methodology towards climate protection (avoidance of the uncontrolled release of greenhouse gases), which was also acknowledged by the German Ministry of the Environment (National Climate Protection Initiative) and the UNFCCC (CDM project methodology AM0083). However, despite these very positive aspects the experience gained from multiple projects over the past years show a couple of challenges which needs to be addressed in the future: Beside others, these are limitations in hydraulic permeability with increasing landfill height, risks and undesired bio-chemical effects due to increasing temperatures as well as problems associated with high water tables inside the landfilled waste mass. Therefore, three short presentations have been arranged in order to stimulate the discussion about these (and other) specific aspects.

Hideki Yoshida (Muroran Institute of Technology, Hokkaido, Japan) presented a Japanese case study of the application of the semi aerobic landfill concept. According to the results of a comprehensive monitoring program which has been conducted for more than 6 years, passive aeration was capable to significantly enhance the bio-degradation, associated with a considerable increase in landfill temperatures, moderate methane emissions and improvements in leachate quality. However, the presented data also show that seasonal variations (particularly higher and lower temperatures) have a strong impact on the performance of passive aeration and, probably most important, clogging of individual gas vents may lead to a significant shortage of the stabilization performance.
Thomas Wohlhuter (ARCADIS, France) presented an insight into the performance of a full scale project, based on the aeration concept of low pressure aeration using vertical wells with simultaneous air injection and off gas extraction, which has been implemented on an old part of a French MSW landfill.

Beside very promising results achieved during the initial stages of the project, it became clear that high water levels inside the landfill present a real challenge to the performance of the aeration. Currently different measures are applied in order to overcome these challenges and to ensure an accelerated bio-stabilization in the further course of the project.

With the last presentation of the workshop program, Marlies Hrad from the University of Natural Resources and Life Sciences, Vienna, Austria presented performance data of an Austrian aeration project compared to another scientifically documented aeration project in Germany. The comparison was mainly based on waste and leachate quality, carbon discharges as well as landfill temperatures and settlements. Stability indicators referenced in the literature for solid waste and leachate characteristics have been used to evaluate the data from the different aeration studies. It became obvious that process performance control and a reliable protocol to determine the “success” of in-situ aeration projects are crucial for further strengthening of this technology and its acceptance.
In conclusion, the workshop led to the identification of several aspects which are essential for successful landfill aeration projects. Water (moisture) seems to be one of the major factors since it may diminish air distribution on the one hand, but stimulate decomposition on the other hand. The adjustment of suitable water content and the avoidance of leachate accumulation are contributors towards effective bio-stabilization.

The dynamics of the discussion during the workshop underlined the remarkable interest in landfill aeration. The possibility of bio-stabilizing closed MSW landfills has already been implemented into the German and Austrian legislation. Its contribution towards climate protection is recognized by the German Federal Ministry of the Environment which provides financial support, both for pre-investigations and investment costs in connection with landfill in-situ aeration.

For more information about the Task Group and indications on how to become a task group member, please refer to [http://www.tuhh.de/iue/iwwg/task-groups/landfill-aeration.html](http://www.tuhh.de/iue/iwwg/task-groups/landfill-aeration.html).

The next Task Group meeting and workshop will take place during the XII Intercontinental Landfill Research Symposium (ICLRS) 2018, which will be held in Sunderbyn (Sweden) 26-28 June, 2018.

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