

FULL SCALE APPLICATION OF IN SITU AEROBIC STABILIZATION OF OLD LANDFILLS

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The landfill of Modena, in Central Italy, will be crossed by the new high velocity railway line, between Milan and Bologna. Waste will be completely removed from a part of the landfill and a trench for the train line will be built. During excavation works in the landfill body several problems may arise, mainly caused by biogas emissions and by the presence of a 4 m thick layer of leachate saturated waste at the bottom of the landfill. In order to facilitate excavation works and further disposal of the material extracted, suitable measures were defined. Among others, the aerobic in situ stabilisation of the area will take place before the start of the excavation works. This will ensure an increased biological stabilisation of deposited waste and safer conditions during excavation, as the formation of biogas will be prevented.

The full scale in-situ aeration plant has been built and comprises 12 air injection wells, 16 gas extraction wells and 13 monitoring wells as shown in Figure 1, as well as two biofilters for biogas treatment and a leachate extraction system. Leachate recirculation is possible in an area of the installation and tests will be performed for the evaluation of the influence of aerobic condition on the variation of leachate characteristics. Two control units enable the continuous monitoring of flow rates and of extracted gas composition. All data are displayed and recorded by means of proper software and the control is possible from remote station at the University of Padua. Novel safety features have been implemented in order to avoid explosion risks as a consequence of the concurrent presence of methane and oxygen in the extracted gas. The monitoring of gas composition will be carried out in the extraction as well as in the monitoring wells. Samples of leachate will be periodically extracted and analysed. Waste samples will be drilled after the first months of aeration and analysed for the determination of the main stability indexes (respiration index, biogas production in fermentation test, BOD₅/COD ratio in leaching test eluates, black index) and the results will be evaluated in combination with the ones obtained for waste samples collected before the start of the aeration.

The detailed description of the plant will be given, as well as the results of the first months of plant operation.

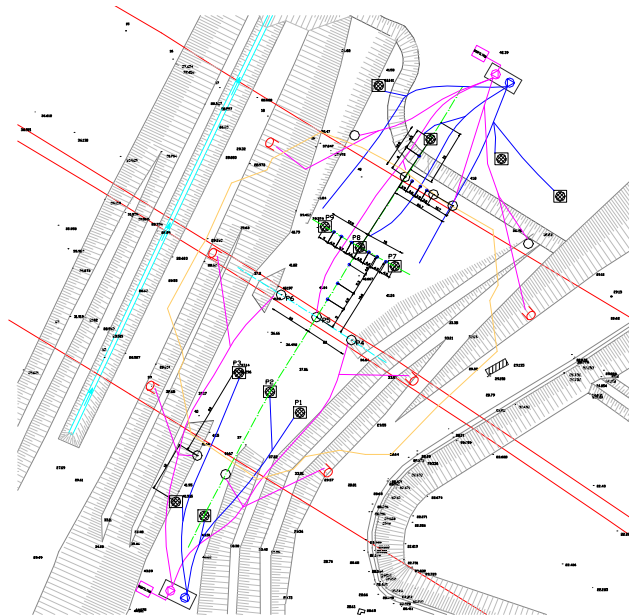


Figure 1. In situ aerobic stabilization of the Landfill of Modena. Lay-out of air injection and biogas extraction wells