CHARACTERISTICS AND MECHANISM OF SEMI-AEROBIC LANDFILL ON STABILIZATION OF SOLID WASTE

Takayuki Shimaoka, Yasushi Matsufuji,
and Masataka Hanashima

Department of Civil Engineering, Faculty of Engineering, Fukuoka University,
8-19-1 Nanakuma, Johnan-ku, Fukuoka, 814-0180, Japan

The details of a semi-aerobic landfill are described and compared with an aerobic landfill, particularly related to the characteristics of the solid waste stabilization and the stabilization mechanism.

Semi-aerobic landfill is an attempt to lay the leachate collection pipe, comprising the perforated main and branch pipes and gravel, at the bottom of the landfill to discharge leachate out of the landfill as quickly as possible. This prevents leachate from penetrating into the ground water by removing leachate remaining from the bottom of the landfill. Also, oxygen in air is led into the landfill through the leachate collection pipe by heat convection resulting from differences between the inner temperature and outside air temperature. The leachate collection pipe of a semi-aerobic landfill has the following effects: acceleration of leachate discharge ensures expanding aerobic atmosphere and improves activities of aerobic bacteria, decomposition of solid waste, and leachate quality.

Comparative study of the decomposition characteristics of the pollutant components in the semi-aerobic and anaerobic landfills has been conducted by using two types of large lysimeters (diameter of 1.2m and height of 9.25m). Clarified differences between landfills are as follows: decomposition of the BOD and T-N components in the seepage water in the bottom layer close to the leachate collection pipe of the semi-aerobic lysimeter was clearly evident, and elution of the pollutant components not in the vicinity of the leachate collection pipe was more remarkable than the anaerobic landfill, suggesting that decomposition of the waste itself is accelerated.