

Solid Waste Management

(Topics of the lectures of Prof. Peter LANG)
Academic year 2023/2024 autumn semester

Introduction, notions. EU definitions on waste and waste management. Sustainable development. **Waste management hierarchy (classical, actual). Material cycle producing waste.**

Municipal waste, quantity, and composition. Hazardous wastes.

Trends in Municipal Solid Waste Management (generation, collection, composition, treatment and disposal, CO₂ emission, costs)

Incineration/combustion of waste. **Conditions of combustions.**

Properties of the waste to be burned. Composition by proximate and ultimate analysis.

Heating value, density.

Types of incinerators: **moving grate, rotary kiln**, Westinghouse-O' Connors, combustion chambers, multi-storied kiln, **fluidised bed**, combination of multi-storied and fluidised bed kilns.

Cooling of flue gases. **Heat recovery facilities.**

Emissions. Dioxins and furans. Flue gas purification (wet, semi-dry, dry methods).

MSW incineration in Budapest, system for the purification of flue gases. Cyclone. Baghouse-filter

Combustion of wastes in high temperature industrial technologies (cement kiln).

Equipment used in waste pre-treatment. **Shredders** (rotary shear, granulator, hammermill, chain crusher). Major types of screening equipment (**trommel, disc**, vibrating screens).

Air classifiers. Air separation of municipal solid waste. **Vertical straight**, vertical zigzag, pulsed, horizontal and air knife classifiers. **Air transport and complete air classification systems. Efficiency of separation.**

Magnetic separators (magnetic belt pulley, drum magnet, magnetic head pulley). Eddy current separator. Electrostatic separator.

Ultimate disposal. Natural and technical protection system. Landfilling of municipal solid wastes, requirements. Scheme of an MSW landfill. Geotextiles. Final cover of a landfill.

The topics denoted by red are very frequent questions.