Geomechanical properties and landfilling of mechanically and biologically pretreated (MBP) municipal waste

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Waste management in Germany

- Separate collection of:
  - Paper (to be recycled)
  - Glas (to be recycled)
  - ”Bio-waste” (fruits, vegetables, plants and garden products...) composted and used in agriculture
  - Packing material (plastic boxes, plastic bottles, cans, ...) to be recycled or used for high calorific incineration
  - ”The rest” (residual waste)

Treatment of the residual waste

- Incineration
- Mechanical-biological-treatment (MBA)
- Direct disposal on landfills (limited until 2005)

MBP why?

- Landfilling of untreated residual waste will be prohibited in Germany after May 2005.
- Aims of MBP:
  - Reducing landfill gas production (greenhouse gas)
  - Reducing leachate contamination
  - Reducing the volume of material to be landfilled
  - Producing a (more) homogenious landfill content
  - Gaining high energy combustible material
  - Extraction of recyclable material (Fe-metal)

Actual situation in Germany

MBP 02/2002 in Germany	amount	capacity (Mil. Mg/a)
MBP in operation	35	2.15
MBP under construction	1	0.16
MBP close to realisation	19	1.37
Sum	**55**	**3.68**
MBP considered	14	0.5

- MBP operation and stabilisation of the output is well investigated.
- Only little research and experience about landfilling of MBP output.

Basic elements of MBP before landfilling

- Extraction of material with high energy content (calorific value) by sieving (diameter >80-150mm / ~3-6´´)
- Magnetic metal (Fe) separation
- Far-reaching degradation of biodegradable organic matter by aerobic or combined aerobic-anaerobic treatment
- If necessary, separation of another high calorific fraction by sieving (>40-60mm / ~1.6-2.4´´)

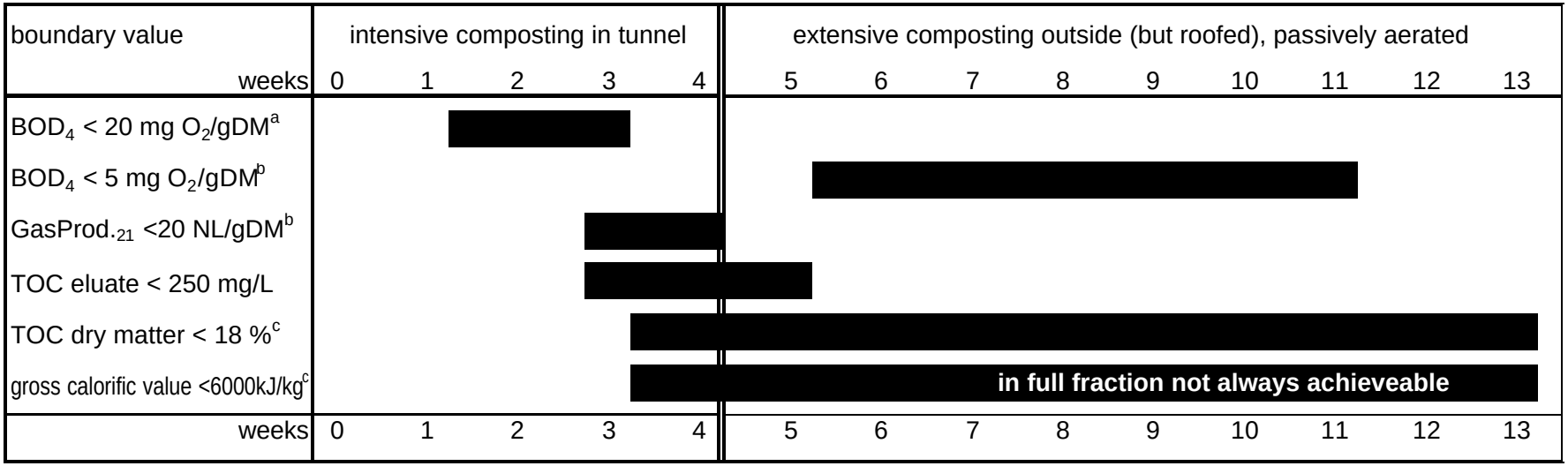
Example for material streams out of a simple MBP plant

- 3 % Fe-metal
- 30 % >100mm, calorific value >17.000 kJ/kg
- 12 % >40mm after biological treatment, calorific value about 10.000 - 15.000 kJ/kg
- 37 % for landfilling

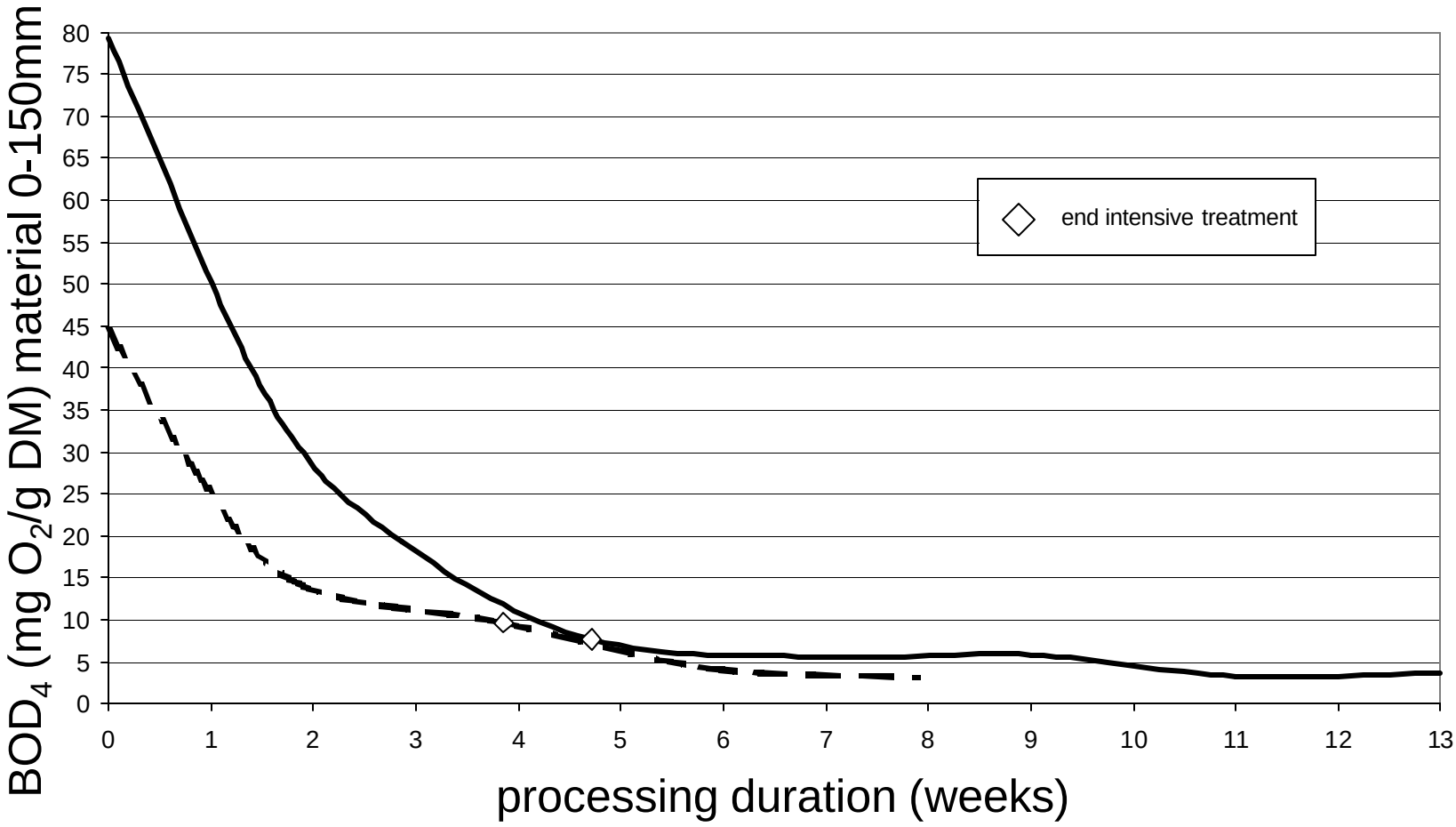
- 18 % loss by biodegrdation (mainly H_2O and CO_2)

(mass-%)

Legal boundary values for landfilling of MBP output and e.g. for treatment duration in a well operated composting tunnel



Examples for BOD_4 (respiration activity) reduction



Example of different sieve fractions of aerobic treated residual waste

0 - 20 mm (0.8´´)

0 - 40 mm (1.6´´)

0 - 60 mm (2.4´´)