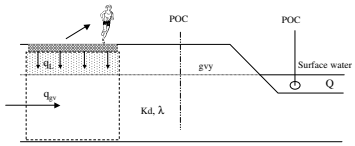
Contaminant leaching

Characterization of source : Daniel Ragnvaldsson et al
Uwe Fortkamp
Anja Enell et al.

Leaching tests in RA: Ebba Wadstein and Gabriella Fanger

Leachate treatment: Amund Gaut et al.



Leaching standards

European:
- Percolation test – TS 14405 CEN TC 292 WG6
- Granular waste compliance leaching test – EN 12457 1- 4
- pH dependence leaching test TS 14429 CEN TC 292/WG6

- Dynamic monolith leach test CEN TC 292/WG6
- Static test for Acid drainage potential TC 292/WG8 (mining waste)

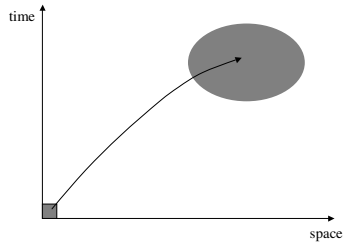
International (ISO):
Batch tests, percolation test and pH dependence test for soil and soil like materials, ISO 21268 series 1- 4
Guidance on the selection of methods for human bioaccessability/bioavailability ISO/DIS 17924

Future
Leaching test for organic contaminants

DRIVERS

The Landfill Directive
Water Framework Directive
Construction Product Directive
Mining Waste Directive
Soil Framework Directive

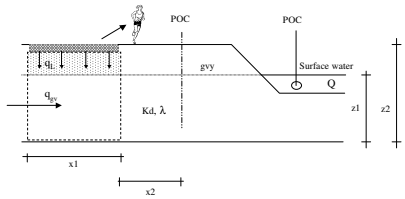
From lab test results to predictions in field scale



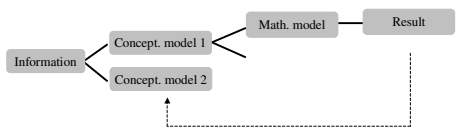
Key issues:
- Test vs field conditions
- Field scale heterogeneity
- The art of averaging- developing effective parameters
- Things change in time

Conceptual model

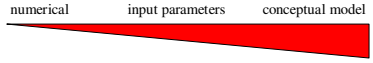
Definition of:
- Physical domains and properties
- Scenarious incl. boundary conditions
- Exposure pathways
- Processes



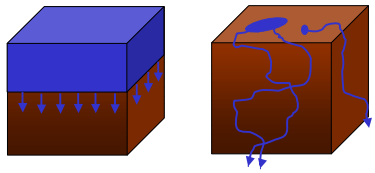
Modelling



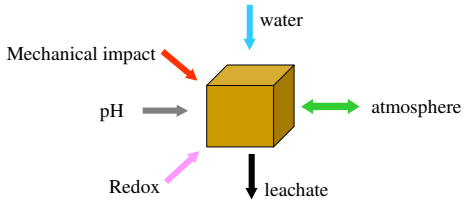
Errors:



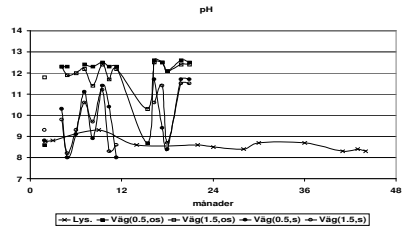
Lab vs field: flow regime



Lab versus field: Boundary conditions

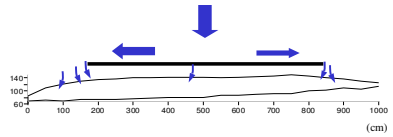


Example: pH in blast furnace slag



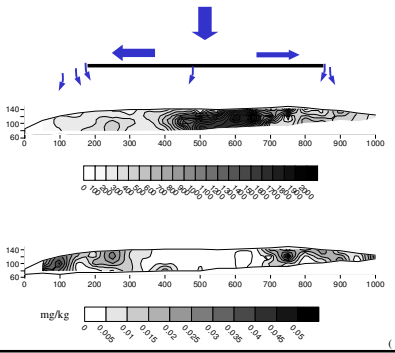
(Data from Fällman, 1997)

Boundary conditions for a bottom ash road sub-base



17 years later.....

Patterns of leachable content (LS10)



(Bendz et al, 2006)

Key aspect

Field scale predictions of leaching over time requires information of boundary conditions and how the may evolve with time due to change i land use, change in climate, etc