UPACMIC (LIFE12 ENV/FI/000592)

UTILISATION OF BY-PRODUCTS AND ALTERNATIVE CONSTRUCTION MATERIALS IN NEW MINE CONSTRUCTION

LIFE12 ENV/FI/000592

Ympäristöministeriö
Miljöministeriet
Ministry of the Environment

RAMBØLL

MAASTORAKENTAJAT
member of ANDAMENT GROUP

fortum

UPACMIC (LIFE12 ENV/FI/000592)

Utilisation of by-products and alternative construction materials in new mine construction

- Started in July 2012 and the project will end in August 2020
- Co-ordinated by Ramboll Finland, other partners are Fortum Environmental Construction and Suomen Maastorakentajat
- Area: secondary materials in mining sector
- Funded by the EU LIFE financial instrument, Ministry of the Environment of Finland and Yara Finland

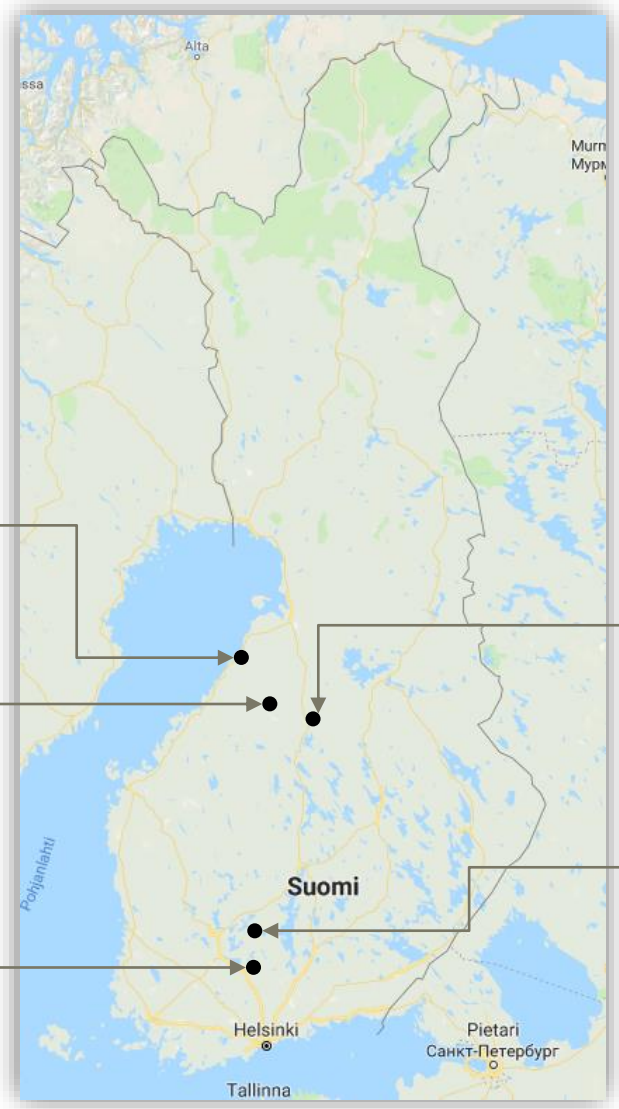
- Implementation
  - Development of material mixtures suitable for the pilot applications: cover structure, bottom structure and reactive wall/barrier
- Monitoring of the impact of the project actions
  - Studying the project impact on the main target audience and on the environmental problem targeted
- Communication and dissemination actions
- Management actions

UPACMIC LOCATIONS

Suomen Maastorakentajat,
Pyhäjoki

Hitura Mine, Nivala

Fortum, Riihimäki

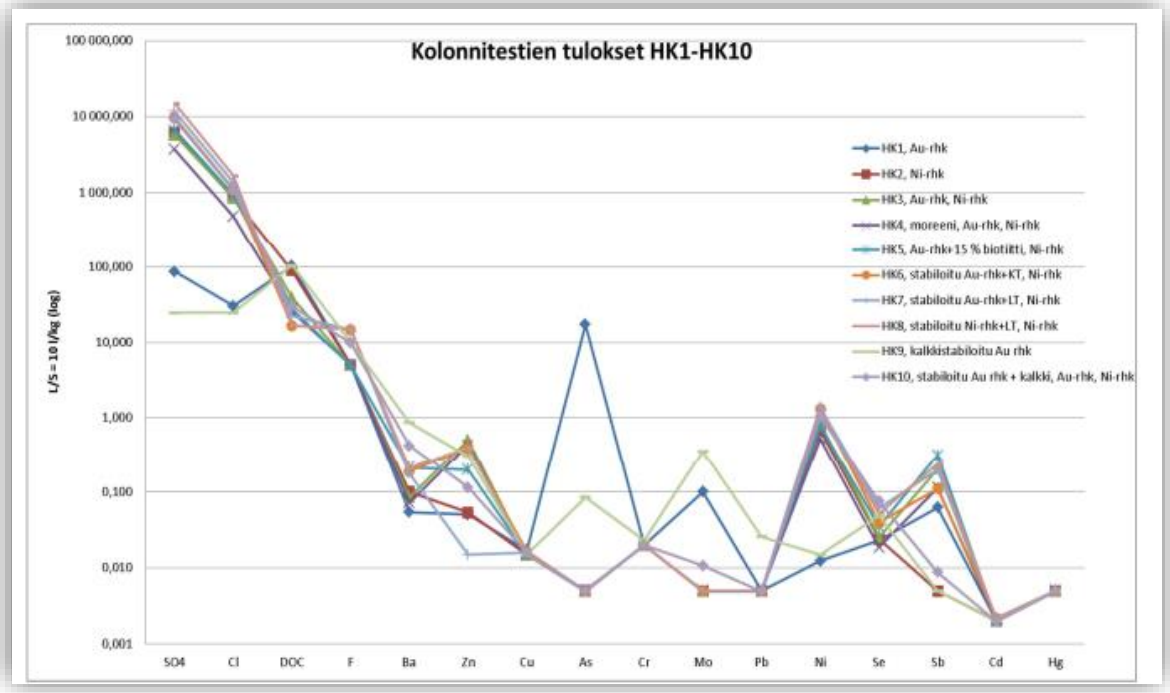


Pyhäsalmi Mine, Pyhäsalmi

Ramboll R&D, Luopioinen

RAMBOLL

LABORATORY TESTS



Column tests according to the standard CEN/TS 14405

Column ID	Materials
HK1	Gold enrichment sand
HK2	Nickel enrichment sand
HK3	Gold enrichment sand, nickel enrichment sand
HK4	Moraine, gold enrichment sand, nickel enrichment sand
HK5	Gold enrichment sand + 15 % biotite, nickel enrichment sand
HK6	Stabilised gold enrichment sand + piled fly ash, nickel enrichment sand
HK7	Stabilised gold enrichment sand + fly ash, nickel enrichment sand
HK8	Stabilised nickel enrichment sand + fly ash, nickel enrichment sand
HK9	Lime stabilised gold enrichment sand
HK10	Stabilised gold enrichment sand + lime, gold enrichment sand, nickel enrichment sand

FIELD TESTS IN PYHÄSALMI MINE, 2016

Gypsum + moraine

Lysimeters

Mixing of enrichment sand + ash

PILOTING CONSTRUCTION IN HITURA MINE, 2018

Levelled enrichment sand waiting to be covered

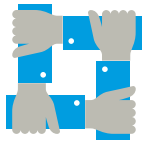
Fibre clay (OPA) from Oulu

Covered fibre clay

UPACMIC

Structures made of alternative materials can impact on the quality and amount of the seeping water (-> pH, solubility of metallic elements, water permeability)

Studies are yet unfinished and will further continue



Piloting site possibilities are yet searched – do you know a site where bottom structures or reactive barriers could be needed?

http://projektit.ramboll.fi/life/upacmic/index_eng.htm

Twitter @UPACMIC

THANK YOU!

pentti.lahtinen@ramboll.fi, +358 400 939 082

harri.jyrava@ramboll.fi, +358 400 732 593

tarja.niemelin@ramboll.fi, +358 40 6877 809

LIFE12 ENV/FI/000592