

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

LIFE12 ENV/FI/000592

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RAMBOLL



PROJECT PARTNERS

RAMBOLL

- **Project coordinator, environmental specialist and design solutions**

MAASTORAKENTAJAT
member of ANDAMENT GROUP

- **Environmental construction**

fortum

- **Environmental construction and waste management solutions**

- **Funding from Ministry of the Environment and EU Life+**



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INITIAL PROBLEMS

MINING WASTE AND ACIDIC MINE DRAINAGE (AMD)



Tailing pond in Hitura Mine

19 Potentially Acid Mine Drainage producing mining landfills

Various industries produces a lot of potential material for mine construction and AMD treatment

INDUSTRIAL WASTE FRACTIONS



Deinking sludge from pulp industry

In 2017 pulp and paper industry alone produced around 84 000 tons of landfilled waste annually in Finland**

PROJECT TARGETS

➤ Piloting new materials in mine construction applications:

- Cover layers
- Bottom sealing layers
- Reactive barriers

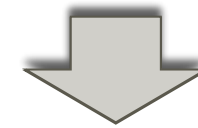
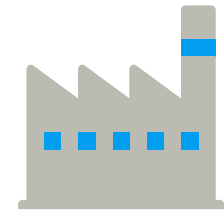
➤ Save natural resources by utilizing industrial by-products:

- Fly ash
- Gypsum
- Deinking sludge
- Foundry sand
- Lime waste

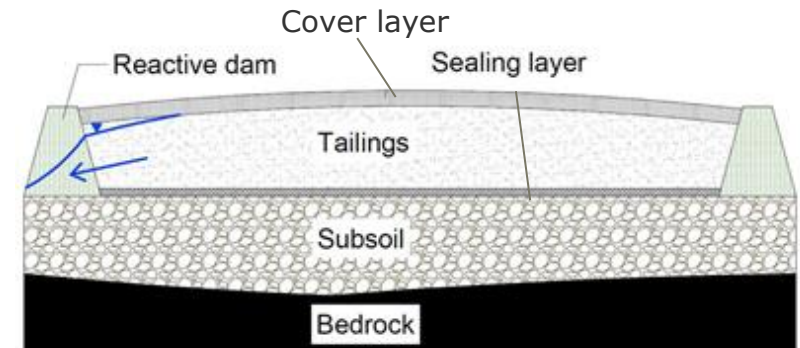
➤ Find new resource efficient solutions for mining industry

- Best practices are gathered in the guideline

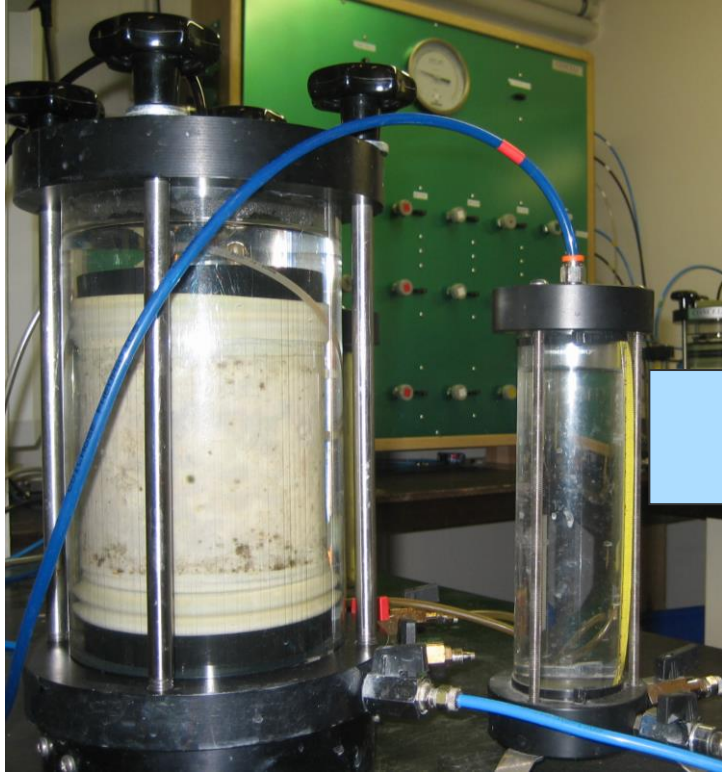
By-products from various industries



New materials for mine construction



DESIGNING PROCESS



LABORATORY TESTING AND DESIGNING



PILOT TESTING IN FIELD CONDITIONS

- PYHASALMI MINE
- HITURA MINE



PILOT CONSTRUCTION

- HITURA MINE

RESULTS

“One man's waste is another man's raw material”



- Less landfilling need for industrial wastes
- Minimisation of mine environmental impact after closure
- Lower raw material need compared to traditional methods
- **Remarkable financial saving potential!**

80 000 ton of moraine could be replaced with industrial wastes (fibre clay) in cover structures in Hitura mine during I-stage closure. Piloting of bottom structure and reactive barrier will be done in following years.

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Project website:

<http://projektit.ramboll.fi/life/upacmic/index.htm>