



# LIFE CYCLE ANALYSIS (LCA) IN THE ABSOILS PROJECT

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**ABSOILS - LIFE09 ENV/FI/000575**

Sustainable Methods and Processes to Convert Abandoned Low-Quality Soils  
into Construction Materials

# LIFE CYCLE ANALYSIS (LCA)



- Methodology based on the ISO 14040 standard
- Compilation and evaluation of the inputs, outputs and the potential environmental impacts of a product system throughout the product's life time or a chosen lifetime period
- An incomplete LCA (Streamlined LCA) is possible in case there is shortage of time, money, data or other necessary resources to carry out a complete one
- For ABSOILS Verification a Streamlined LCA was carried out.

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# LIFE CYCLE ANALYSIS (LCA)



The studied environmental impacts in each pilot:

- Depletion of natural resources
- Global warming potential GWP (CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O)
- Energy consumption (not an actual environmental impact but the cause of airborne emissions)

Functional unit (FU) = Quantified performance of a product system for use as a reference unit

- Arcada FU = 100 m<sup>2</sup>
- Dog Park FU = 100 m<sup>2</sup>
- Jätkäsaari FU = m<sup>3</sup>

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# LIFE CYCLE ANALYSIS (LCA)



Arcada structural alternatives:

Compaction embankment  
0,7 m

Geotextile

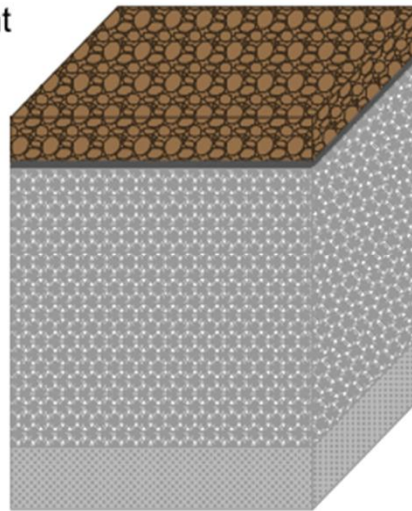
Mass stabilisation of  
abandoned clay

Binders:

Alt 1: cement

Alt 2: cement + fly ash

Natural clay deposit



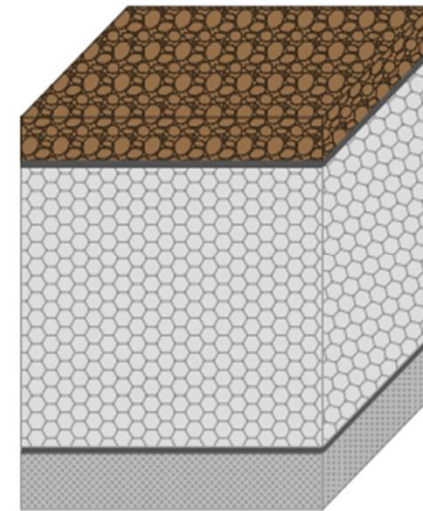
Embankment  
0,7 m

Geotextile

Light weight  
expanded clay (alt 3)

Geotextile

Natural clay deposit



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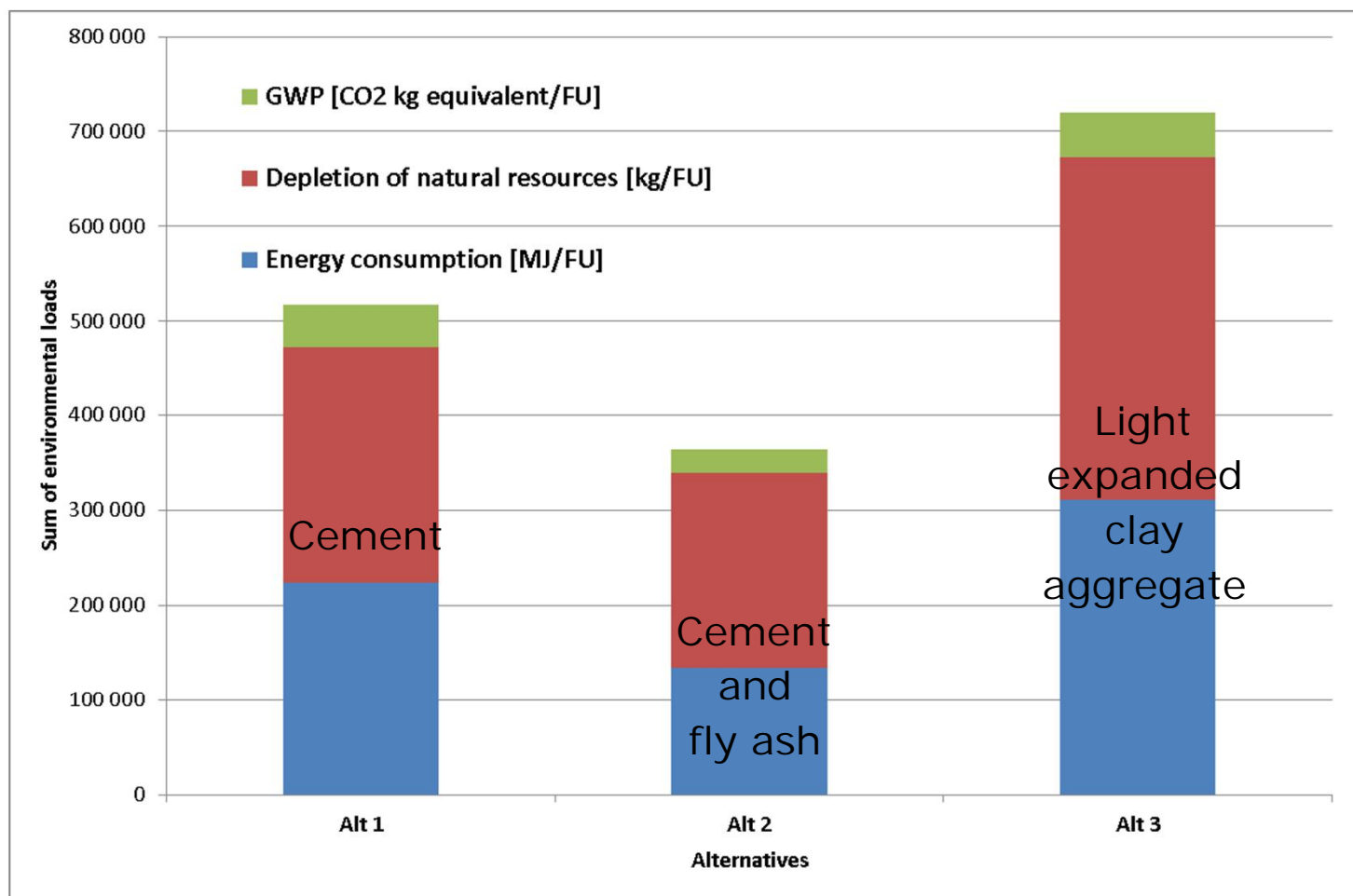
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# LIFE CYCLE ANALYSIS (LCA)



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Arcada results per functional unit (100 m<sup>2</sup>)



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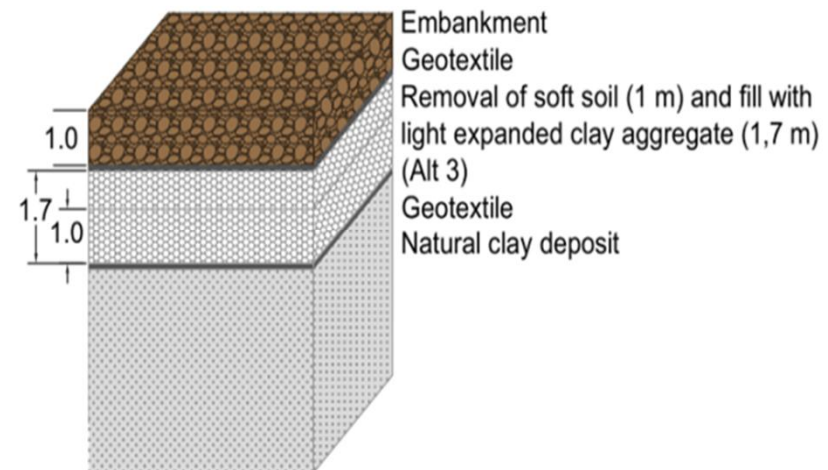
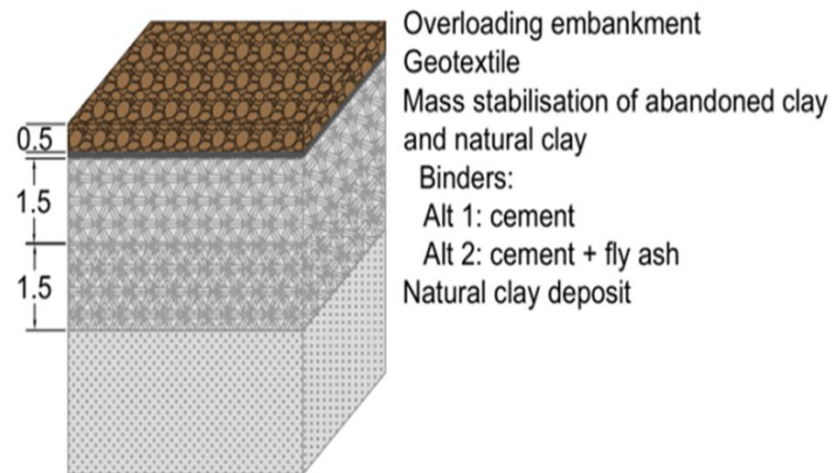
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Dog Park structural alternatives:

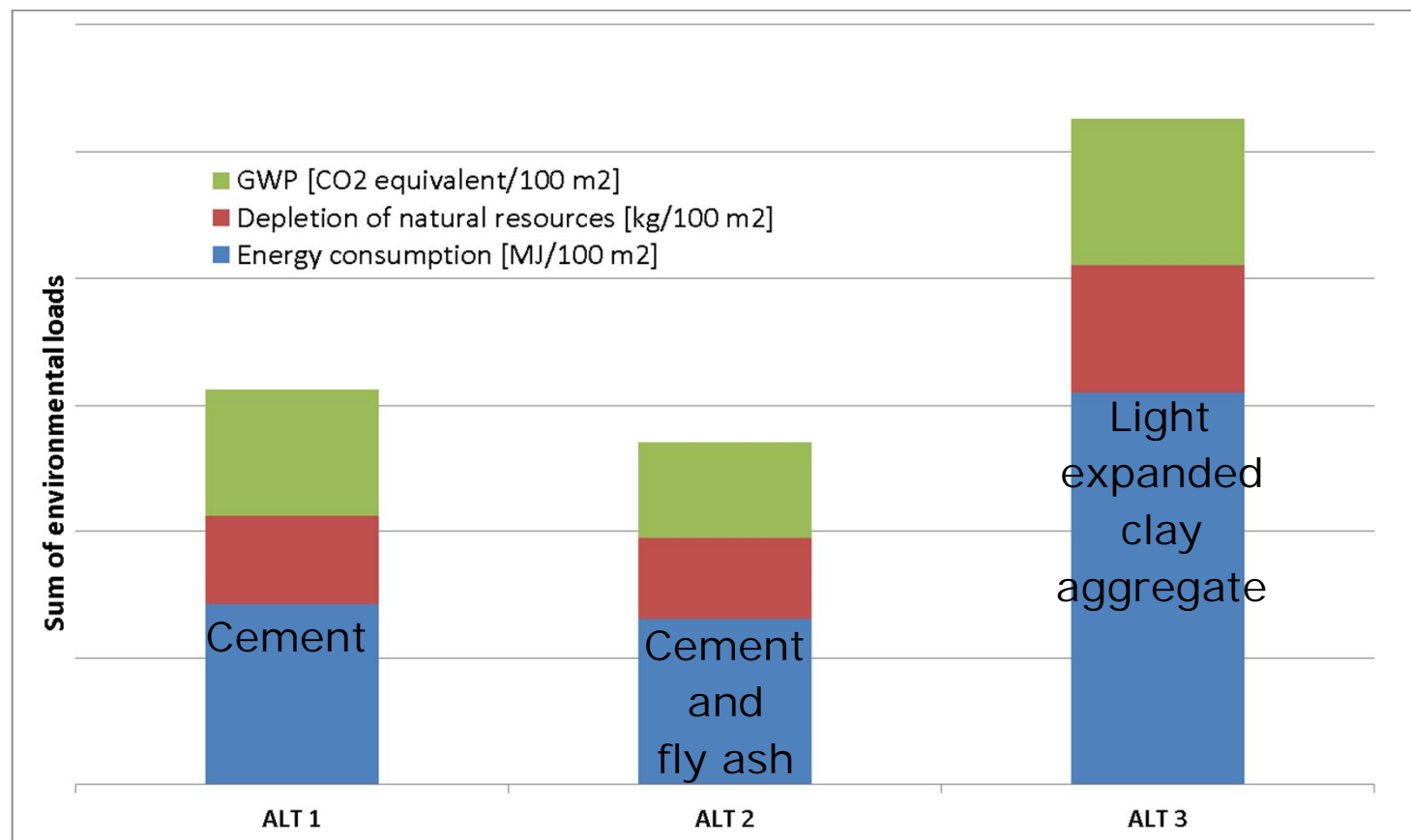


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# LIFE CYCLE ANALYSIS (LCA)

Dog Park results per functional unit (100 m<sup>2</sup>)



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Jätkäsaari structural alternatives:

- Alt 1 Mass stabilisation of the dredged sediments with cement, utilization of mass stabilised sediments in the park
- Alt 2 Mass stabilisation of the dredged sediments with cement and fly ash, utilization of mass stabilised sediments in the park
- Alt 3 The contaminated sediments are transported to the landfill (mass stabilised lightly with cement, so the transportation can be done), non-cohesive soils for park filling

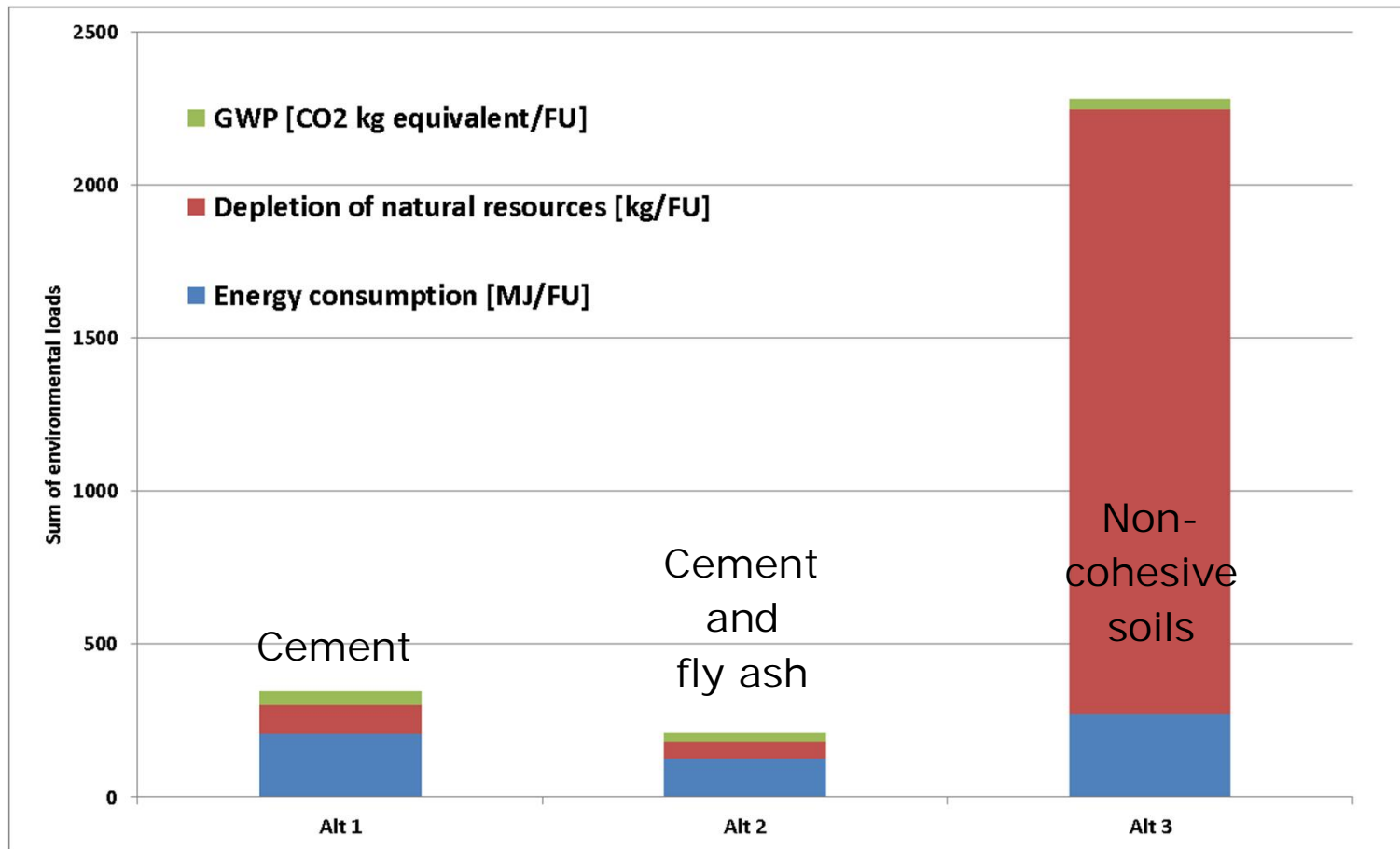
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# LIFE CYCLE ANALYSIS (LCA)

Jätkäsaari results per functional unit (m<sup>3</sup>)



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In conclusion:

- According to the studied environmental impacts the pilot structures seem to be more environmentally feasible than the conventional structures
- When interpreting the results, the functional unit (FU) must be considered and the results can be reliably compared only between the structure alternatives
- Utilisation of surplus soils and by-products is according the EU Waste Hierarchy

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