LCM of construction waste towards circular economy of buildings: VALDEM project

Aubin Roy ([avniR] by cd2e), Sylvie Groslambert (ULiège)
Context

VALDEM project

Life Cycle Management
Context:

- Building and construction sector:
  - more than 1/3 of global resource consumption
  - generation of solid waste: 40% of the total waste volume
  - EU: CDW = largest waste stream (1/3 of all EU waste)

- CDW (Construction & Demolition Waste): mostly not recycled

- Causes:
  - heterogeneity
  - dispersion
  - economic viability
VALDEM project: objectives

VALDEM aims to improve demolition waste treatment to reach a circular economy in North of France and Wallonia (BE):

- Identify waste flow and create new recycling sector
  - Optimize building EoL management: new deconstruction, sorting and recycling processes
  - Increase recycling
  - Generate high quality secondary materials (up-cycling)

- Validate the approach by using Life Cycle Assessment

- Demonstrate the transferability of the results to industries

- Conduct a monitoring of regulations and highlight opportunities
VALDEM project: scope

General information:
http://www.valdem-interreg.eu/

Budget: 3 557 608.84 €
Duration: 4 years
Start: 01.07.2016
Geographical area

Co-founders:

Région Hauts-de-France
ADEME
Liège université

AVEC LE SOUTIEN DU FONDS EUROPÉEN DE DÉVELOPPEMENT RÉGIONAL
MET STEUN VAN HET EUROPEES FONDS VOOR REGIONALE ONTWIKKELING
VALDEM project: partnership

Coordination & legislative survey

Mineral Processing applied to C&DW

Valorization in materials with technical, economic, environmental validation

Life Cycle Assessment (MT3 – A4)
VALDEm project: partnership

Mineral Processing applied to C&DW

Coordination & legislative survey

Life Cycle Assessment (MT3 – A4)

Charlotte COLEMAN: Gypsum residues in recycled materials: chemistry and effects on microstructural and mechanical properties of cementitious mortars

Mohamed El Karim BOUARROUDJ: Étude de la formulation et des propriétés de bétons autocompactants à base de fines de recyclage
Life Cycle Management: general scope
Life Cycle Management: activities

**Upstream**

Assess environmental burdens link to collection, sorting and treatment of construction and demolition waste

*Challenges*

Lack of consistent, specific, detailed and reliable data

*Approach*

Data collection at different scale (micro with sorting facilities, recyclers … and macro: regional and national statistics …)

**Downstream**

Assess environmental burdens link to product manufacture from CDW

*Challenges*

Lack of a consensual methodology for allocation in recycling

*Approach*

State of the art of current research regarding allocation in recycling (PEF …)

Connecting with related initiatives and projects (Recybeton, Studies from SNED, FEDEREc, KU Leuven …).
Life Cycle Management: detailed scope

Types of buildings (upstream)
- Residential buildings
  - Dismantling then demolishing
    - Demolishing quality +
    - Demolishing quality -
- Commercial and industrial buildings
  - Dismantling then demolishing
    - Demolishing quality +
    - Demolishing quality -

Demolishing/dismantling practices
- Sorting on site
- Storage platform

Sorting facilities practices
- Mixing
  - Concrete + brick
  - Concrete + plaster
  - Concrete fines + brick + soil
  - Fines + mixing + soil

Downstream
- Flow
- Issue

Civil engineering/Demolishing

Road/Demolishing

Scope of the project

Required traceability
Life Cycle Management: concrete actions

Identify hot spots and key aspects → meta-analysis

- waste inventory (recycling parks)
- potential waste flows (regional data)

Comparative LCA:

- technical informations from consortium partners
- evaluation of benefits and impacts of proposed solutions
- limit impact transfer to generate the maximum value for the stakeholders

Transfer of results to the main actors (recycling operators, building contractors, product manufacturers,...) in the 3 regions
Bring scientific and concrete elements (based on data from the ground and at macro-level) on how recycling of CDW can improve environmental impact of buildings along their life (current and future) and move forward to a circular economy in construction sector.
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VALDEM’s Team

Contact:
Dr Hervé BREQUEL
R&D Manager
herve.brequel@ctp.be
Phone: 0032.69.88.42.66

http://www.valdem-interreg.eu/