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

Aubin Roy ([avniR] by cd2e), Sylvie Groslandert (ULiège)
- Context
- VALDEM project
- Life Cycle Management
Context:

- Building and construction sector:
  - more than 1/3 of global resource consumption
  - considerable generation of solid waste
  - 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:

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

Co-founders:

http://valdem-interreg.eu
VALDEM project: partnership

Coordination & legislative survey

Mineral Processing applied to C&DW

Valorization in materials with technical, economical, environmental validation

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 Assessment (MT3 – A4)
Life Cycle Management: general scope

- Dismanteling/demolishing
- Recycled material
- Recyling process
- Transport of waste
- Sorting process
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
- Sorting
- Mixed waste, depending on sources (>80%)

Downstream
- Flow
- Issue
- Concrete + brick
  - Mixing
  - Concrete + plaster
  - Plaster
  - Concrete fines + brick
  - Fines + mixing
  - Concrete fines + brick + soil
  - Fines + mixing + soil
  - ...

Civil engineering/Demolishing
Road/Demolishing
Scope of the project
Required traceability

Interreg
France-Wallonie-Vlaanderen
VALDEM
Union Européenne
Liège université
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

**Lack of a consensual methodology for allocation in recycling**

- 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: 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
Life Cycle Management: outputs

**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**
Acknowledgment:
This work is part of the research project VALDEM (Convention n° 1.1.57 of Interreg France – Wallonie - Vlaanderen 2014-2020) partly financed by the European Regional Development Funds, and Wallonia.

VALDEM’s Team

http://valdem-interreg.eu

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