The value of hemp/lime concrete in an environmentally-sound construction

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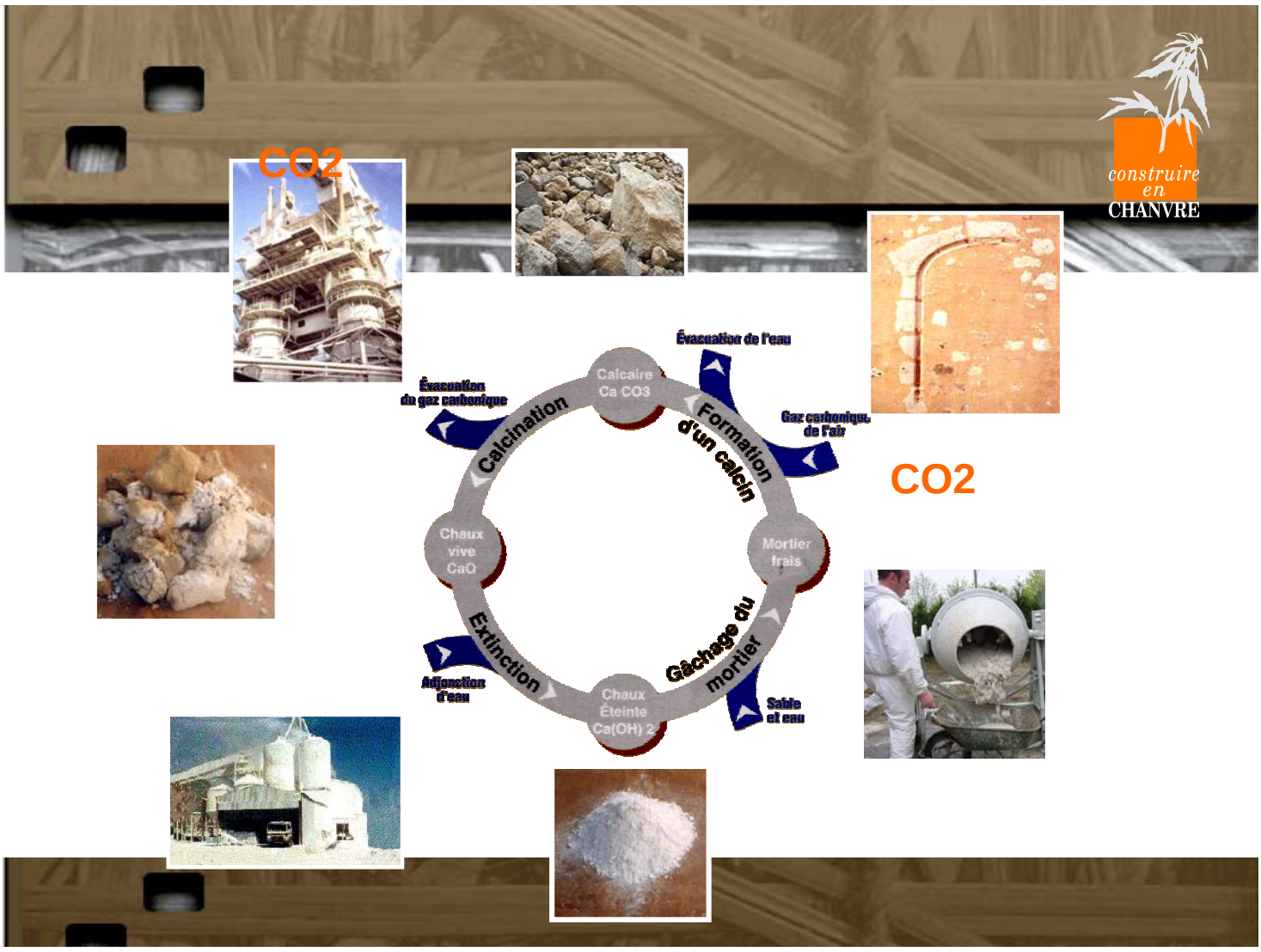
The value of hemp/lime concrete in an environmentally-sound construction

- Hemp construction in France,
  especially about Hemp/Lime concrete
- Hemp LCA
- Hemp concrete LCA

Hemp construction

About Hemp/Lime concrete

- Environmental quality
  - Hemp/Lime concrete adds environmental qualities of hemp and lime, especially to fix CO2



Hemp LCA

– The partners :

- French Agriculture Ministry
- Hemp producers and manufacturers
- Lime producer
- Construire en Chanvre

Hemp LCA

- The 3 topics :
  1. Environmental impacts of agriculture production and first transformation (since the sowing to the end of the first transformation)

  These impacts are distributed on fibres and on shives

  The LCA studies 2 ways of distribution :

  ➡ depending of weight proportion between fibres and shives (40/60)

  ➡ depending of economical value of fibres and shives (68/32)

Hemp LCA

- The 3 topics :
  1. Environmental impact of agriculture production and first transformation (since the sowing to the end of the first transformation)
  2. Environmental impact of 1Kg and of 1M3 of compounds included 30% of hemp fibres

     and comparison with 1M3 of polypropylene compounds and with 1M3 of compounds included glass fibres

Hemp LCA

- The 3 topics :
  1. Environmental impact of agriculture production and first transformation (since the sowing to the end of the first transformation)
  2. Environmental impact of 1Kg and for 1 M3 of compounds included 30% of hemp fibres and comparison with polypropylene compounds and with compound included glass fibres
  3. Environmental impact of 1M2 of a hemp concrete wall with wooden structure
     - and comparison with 1M2 of a wall composed of concrete blocks and polystyrene/plasterboard
     - with the same thermal resistance

Hemp LCA

- The analysis uses French Norm NF P01-010
  - organizes the environmental evaluation for construction product
  - since the production of raw materials to the destruction of the building, included all the environmental impacts during the life of the building
  - final form was published in 2004

Hemp LCA

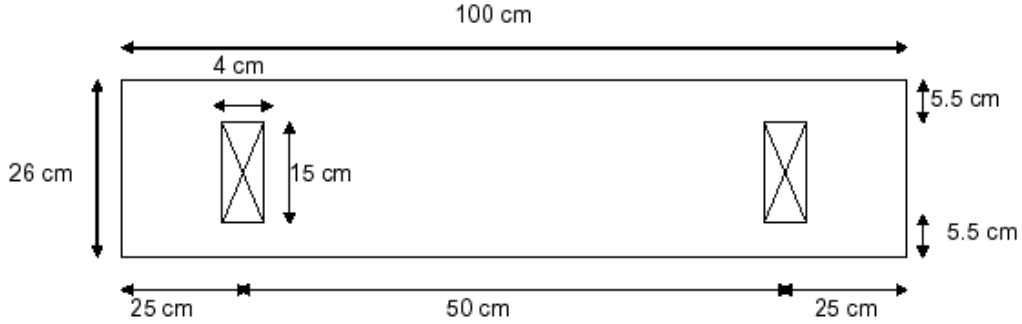
- The schedule
  - Starting : beginning of 2004
  - End : middle of 2005
  - Today : the analysis is finished but the comparisons with the other materials are in progress to be validated by a “Critical Review” made by an expert

=> The results are not yet publishable

Hemp concrete LCA

- The parameters of the analysis
  - UF (Unité Fonctionnelle)

Figure 1 : Coupe transversale de l'unité fonctionnelle



Source : BCB-Lhoist

Hemp concrete LCA

- The parameters of the analysis
  - DVT (Durée de vie typique) “Life duration”

Tableau 1 : Flux de référence

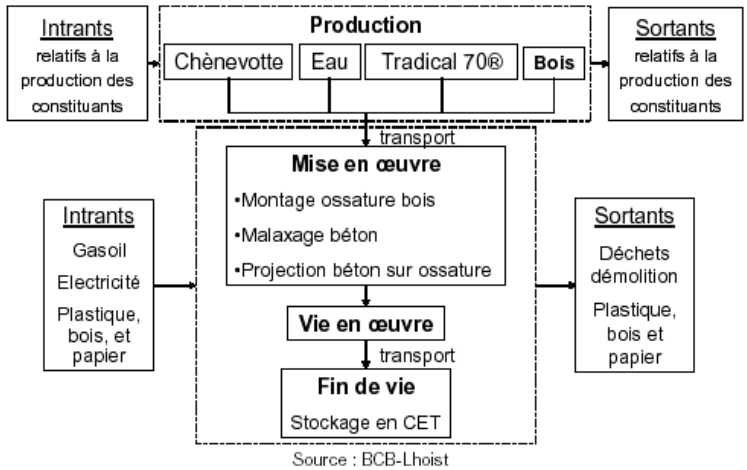
Constituant	Quantité nécessaire (kg/m² de mur)	DVT (an)	Flux de référence (kg/UF)
Tradical 70®	54,5	100	0,545
Chènevotte	24,8	100	0,248
Eau	37,2	100	0,372
Bois	5,5	100	0,055

Source : BCB-Lhoist

Hemp concrete LCA

- The parameters of the analysis
  - Organization of the life cycle

Figure 2 : Arbre de cycle de vie simplifié du mur en béton chanvre banché sur ossature bois

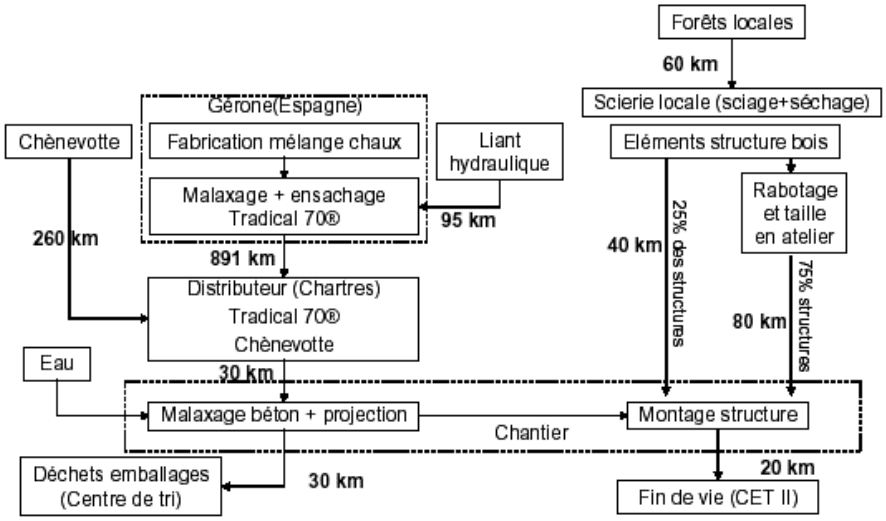


Source : BCB-Lhoist

Hemp concrete LCA

- The parameters of the analysis
  - Scenario de reference

Figure 3 : Scénario de référence



Source : BCB-Lhoist, Construire en chanvre

Hemp concrete LCA

- The analysed topics :
  - Using of no renewable resources *(Epuisement des ressources).*
  - Atmospheric acidification *(Acidification atmosphérique)*
  - Greenhouse effect to 100 years / CO2 fixing *(Effet de serre à 100 ans)*
  - Ozone layer destruction *(Destruction de la couche d'ozone)*
  - Photochemical ozone production *(Formation d'ozone photochimique)*
  - Energy consumption *(Coût énergétique)*
  - Waste production *(Production de déchets)*

Hemp concrete LCA

- The results :
  - the LCA confirms that on almost all the topics, hemp has low environmental impacts
  - Especially, hemp/lime concrete, about CO2 fixing and greenhouse effect

Other environmental interest about Hemp/Lime Concrete

- Observation : a Hemp/Lime concrete house gives the same thermal comfort with a lower temperature (Hygro-thermal behaviour)

=> the Hemp/Lime concrete house has a low energy consumption


construire
en
CHANVRE


Thank you for your attention