

CONSTRUCTION OF HOUSING WITH SOIL CEMENT COMPOSITE BLOCKS

In addition to treating and retreating utility poles, WOOD-PERFECT Company has developed a construction branch that deals with building houses with a structure made of treated round wood (columns and ring-beam), and walls made of Soil Cement Composite Blocks.

The objective of such a system of construction is to achieve strong, sustainable, accessible housing for low-income families.

The construction materials used have a low impact on environment: the round wood and soil cement composite blocks.

These 2 building materials present many advantages, among others:

- Competitiveness in the point of view of technical, economic and environmental preservation.

- Have interesting seismic characteristics.

- Specifically for wood: renewable resource, lightness, elasticity, etc.
For regions suffering from shortage of wood, adjustments are needed.

- Specifically for the earth blocks: almost universal availability, virtually unlimited resource, elasticity, good thermal mass, soundproofing, etc.

There are many challenges to solve in order to obtain the above benefits. Three recent innovations have contributed to achieving the target set.

- 1 ° Achieving good protection of earth blocks against weather, abrasion and shocks.

- 2 ° Achieving good protection of wood against biodegradation.

- 3 ° Achieving an effective assembly of large section round wood that indeed resists to stress and compression strain.

Round wood



Photo : Village imuhira

The use of round wood lead to a triple benefit:

- It is raw wood, which did not consume energy in processing.
- The absence of processing result in avoiding losses of materials due to sawdust, shavings, etc. that represent up to 65% of the raw wood.
- For a same mechanical performance, one needs a lower volume of round wood, as cutting its fibers by sawing begins significantly its mechanical properties, particularly its bending strength.

When a tree is growing, it stores CO₂ inside the wood: one ton of wood is stores about 1,5 ton of CO₂.

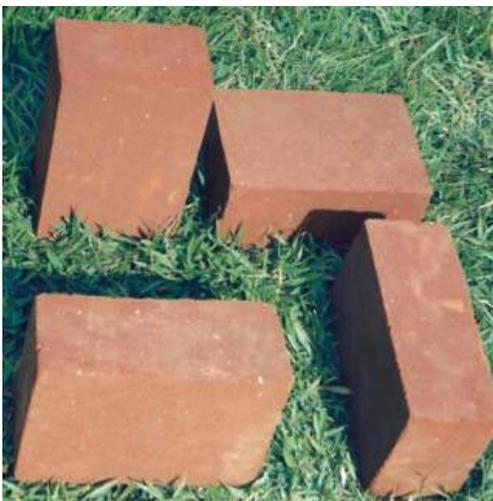
This amount of CO₂ will be released in nature when wood will be burned or decomposed by microorganisms in landfill.

It is then obvious that the balance sheet of wood as carbon sink is even better that it is valorized in long-term use. Among all uses, housing construction is one that has the highest efficiency in terms of duration of CO₂ storage: in the order of 50-100 years.

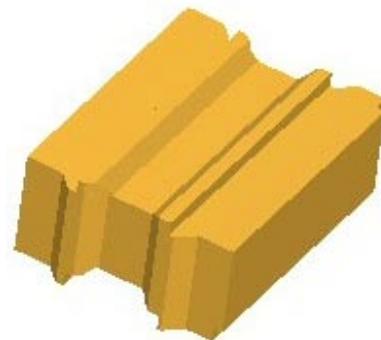
Soil Cement Composites Blocks

A Soil Cement Composite Block (SCCB), is different from any other kind of earth blocks, stabilized or not stabilized.

In usual stabilized earth blocks, we have a homogeneous mix of cement ($\pm 6\%$) and row earth ($\pm 96\%$) that is compressed mechanically. This leads to a homogeneous stabilized block. The outer layer of the block, exposed to weather, has the same composition as the inner part of the block that is not exposed to any adverse conditions.



Regular stabilized blocks



interlocking stabilized block

On the other hand, the Soil Cement Composite Block is also compressed, but it is not homogeneous in its composition.

It has two external layers made of cement mortar (0% of earth) and the inner part is made only of raw earth (0% of cement).

The use of cement is then optimized: maximum cement where it is needed, i.e. at the external layers exposed to weather, shock and abrasion, and 0% of cement inside the block where it is not useful.



A SCCB consumes less cement than a usual stabilized earth block. However, a building made with SCCB has the same appearance than the one constructed with cement blocks, even better.



Nothing is indicating that the inside is made of compressed row earth. This helps the block to resist against the weather, but also the population to accept it as a "normal" housing according to their mental standard.



Ongoing construction of housing with SCCB in Bujumbura

Round wood columns and ring beam are covered with a thin layer of cement in order to maintain the aspect of "normal" housing once again.

SCCB are not limited to low cost housing.



A two-storey housing made of SCCB with high standing finishing.