



Novel fibre value chains & ecosystem services from sustainable feedstocks

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## Processing of Wood Fibres for Wood-Concrete Applications

**Objective:** To assess the feasibility of using wood from contaminated soils (*Populus spp.*, willow, and black locust) for the production of wood-concrete blocks as an alternative to hemp.

Equipment, Materials and Methodology

- **Wood cutting:**  
Logs were processed using a chip cutter powered by a 30 kW electric motor, producing wood chips oriented along the fibre direction (3–5 cm wide and 2–3 cm high).
- **Grinding:**  
A knife grinder with interchangeable grids (5, 10, and 15 mm) sheared the chips between a blade and counter-blade, with a 3.4 mm gap.
- **Classification and sieving:**
  - *TMI Chip Class™*: sorts wood chips by size (3, 7, 8, 14, and 45 mm) using back-and-forth movement.
  - *Retsch AS200*: a vibratory sieve shaker used to determine particle size distribution.
- **Methodology:**  
The processing scheme includes cutting, grinding, classification, and selection of the most suitable particle fractions based on yield, density, and shape factor.



## Key Findings

- The **3–7 mm fraction**, obtained using a **10 mm grid**, showed the best yield (up to 70% with dry poplar).
- **Dry wood** produced more fine particles than green wood, leading to higher yields in the desired size range.
- **Apparent density:**
  - Poplar: 198 kg/m<sup>3</sup>
  - Willow: 200 kg/m<sup>3</sup>
  - Black locust: 237 kg/m<sup>3</sup>
  - Hemp (reference): 119 kg/m<sup>3</sup>
- **Shape factor** (measured with Keyence VHX-7000):
  - Hemp: 4.26
  - Poplar: 3.30
- Higher wood density may be a disadvantage for lightweight applications but could offer improved insulation.



## Conclusions

- Bark has a negligible impact on grinding, and green wood can be used for industrial processing.
- The 10 mm grinding + 3–7 mm sieving fraction will be prioritized in the next steps.
- Differences in density and shape compared to hemp require formulation adjustments for wood-concrete blocks.

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