Mineral-plant-fibre composite coating as a cellular wood protector against fire

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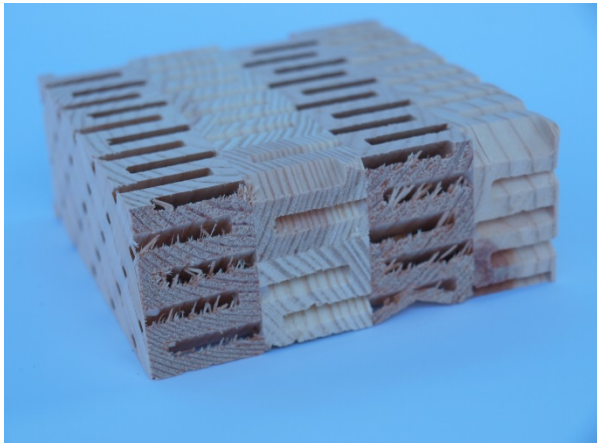
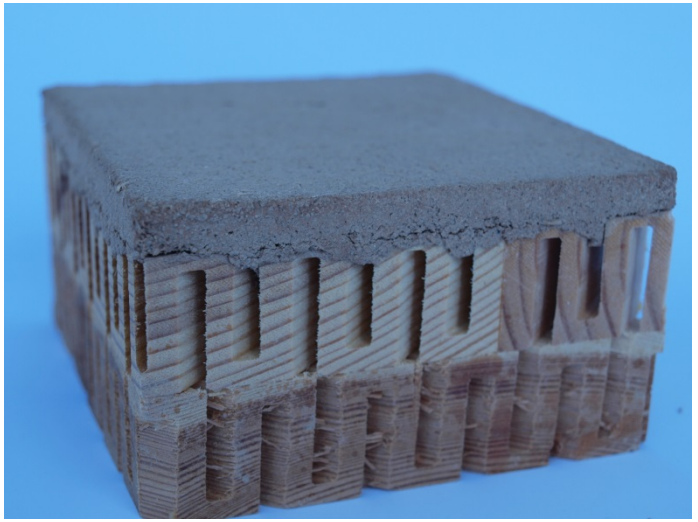
What is cellular wood (CW) material?

- The CW to talk about is known with trade mark „Dendrolite”. It was produced by company “Dendrolite Latvia” SIA with an annual manufacturing capacity of 65,000 m^3. http://dendrolight.lv/en/products/core-material/ .
- CW has good dimensional stability in the changing humidity.
- It is by 40% lighter than the same solid wood.
- It is readily ignitable, and burns easily once ignited with excessive heat-release rate.
- CW has very wide open surface formed by and multitude of small opened cells with thin walls.



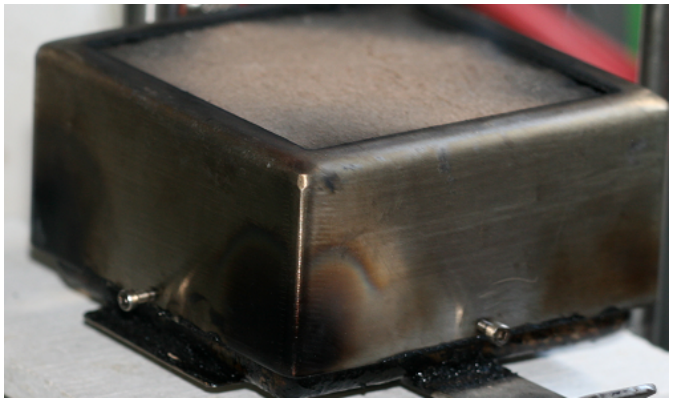
Objective

- The objective of the presented study is to evaluate protected with mineral-plant-fiber composite (MPFC) coating CW reaction to fire.



Cone calorimeter tests (ISO 5660) for MPFC composition experimental design

- Results of heat produced by burning specimen:
  - time to piloted ignition (if take place) and time to flame out; total heat release;
  - fuel load;
  - mass loss, and its average specific rate;
  - maximal averaged heat release estimation;
  - heat release rate;
  - deeps of char layer of CW substrate



- Smoke and gasses production parameters:
  - total smoke production, and its specific release;
  - specific extinction area;
  - carbon dioxide yield.

SBI tests of MPFC (EN 13238+A1:2015)

- The optimal composition of MPFC was evaluated with large scale specimen 2.25 m^2 in SBI tests to the reaction to fire by:
- *fire growth rate index* (FIGRA) with thresholds HRR > 3 kW and total heat release (THR) > 0.2 MJ or > 0.4 MJ within 300 s < t < 1500 s, and *total heat release* (THR_{600s}) were used for heat release classification and
- *smoke growth index* (SMOGRA) and *total smoke prod*uction (TSP) were used for smoke classification.
- The MPFC coating with thickness 10 mm on CW ensures fire classification *class A2/B* with no or very limited contribution to fire, as like bricks or gypsum boards, and has smoke *class s1*.

Thank you for attention!