Appendix: The Troldtekt production process

This case has been prepared by the Interdisciplinary Centre for Digital Business Development (DBD), Aarhus University. The case is based on the DIATOMIC project 'Industry 4.0 Living Lab for Acoustic Panel Production' led by Tom Collins. Case authors are Emilie Mathilde Jakobsen and Anita Krogsøe Skou at DBD.

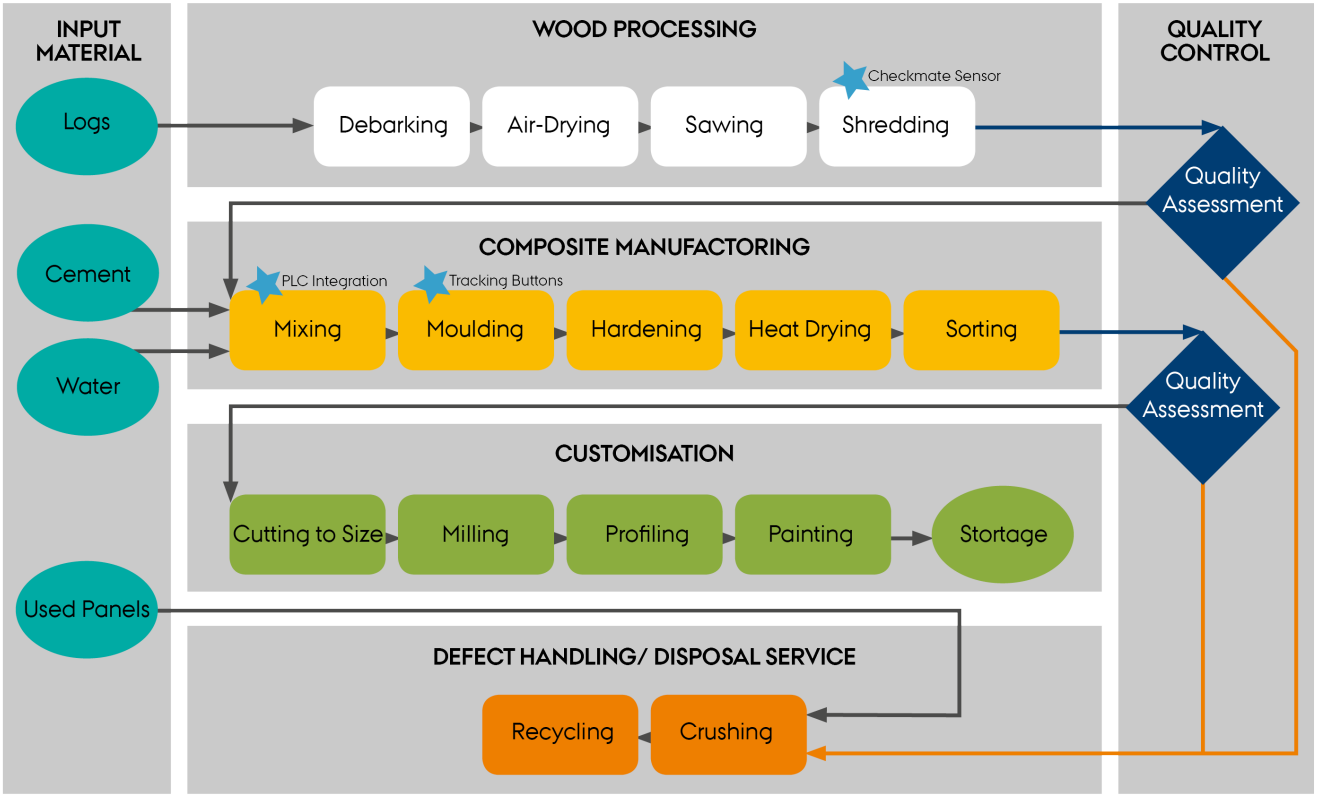

*Figure 1: Troldtekt's production process. * indicates where the IIoT project though its lifetime applied new technology.*

The manufacturing process starts by collecting the two natural materials for the acoustic panels: Norway spruce and Portland cement.

The spruce logs are debarked and air-dried for six months before further processing.

When the wood has reached the optimum moisture level, it is sawed and shredded to create wood wool with various fibre sizes characterising the different structures of the finished acoustic panels.

The shredded wood wool is mixed with cement and water to protect the wood fibres. The mixture of wood wool, cement and water is distributed evenly in moulds to achieve a uniform appearance.

Next, a hardening process takes place for three to four weeks, and subsequently, the panels are moved to Troldtekt's high-efficiency drying oven.

Department of Business Development and Technology
Aarhus University
Birk Centerpark 15, 7400 Herning
Tel: +45 87164700 - Email: btech@au.dk

After drying, the panels are cut to a specific size, and the milling, profiling and painting ordered by the customers take place.

[See a video of the Troldtekt production process by clicking on this link].

Throughout the manufacturing process, sustainability efforts have been operationalised:

- Electricity comes from renewable energy sources only.
- No waste is created as residuals are returned to nature's biological cycle.
- No untreated wastewater is discharged.
- Waste heat from the drying process is recovered and channeled back.
- Paint wastage is reduced (currently by more than 70%).
- Defective panels that fail to meet the quality standards are crushed and recycled (e.g. for soil improvement materials and compost).

The sustainability initiatives have helped Troldtekt reduce its energy consumption per produced square meter by 50%.