INLINE

An innovative design of a flexible, scalable, high quality production line for PEMFC manufacturing

Project start: 2017-02-01

Project end: 2020-01-31

The project aims at the development of a design of a flexible, scalable, high quality production line (process steps) for the manufacturing of PEMFC's (Proton Exchange Membrane Fuel Cells). The spectrum of automation in fuel cell manufacturing tasks investigated in the project includes tasks that require:

- The design of a flexible production process that allows a scale-up to 50.000 parts per year.
- The definition of automatic quality control strategies and processes to ensure quality for high-volume production, including the organization of necessary re-work.
- The development of flexible assembly stations that allow a gradual transition from manual operation to fully automatic processes.
- Data collection, documentation and tracking methods that fulfill traceability requirements.

The design of the production line that will be considered in the project includes the manufacturing of parts of smaller quantity as well as very large quantities of PEMFC's.

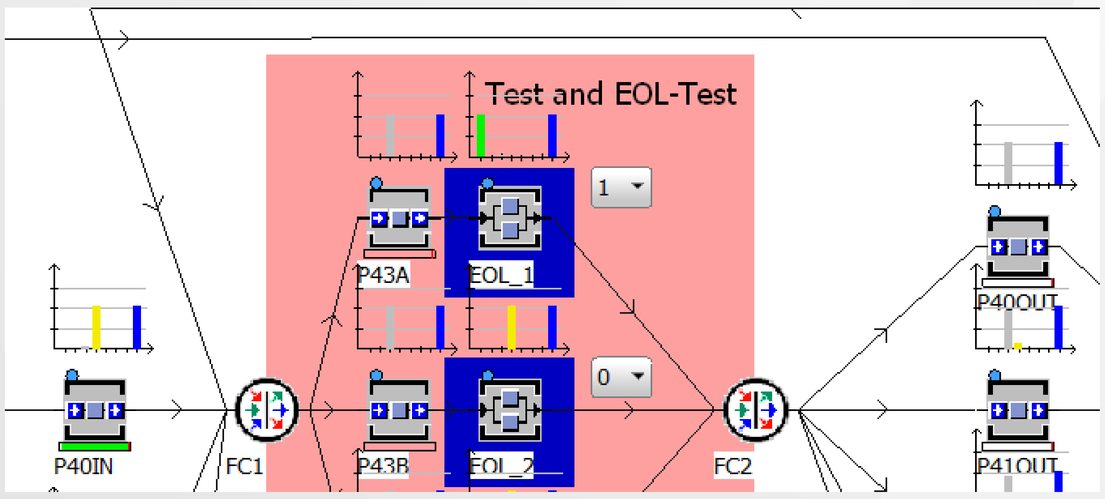

Figure: Simulation model of Fronius production process

Objective (A): Redesign of the media supply unit as part of the end plate assembly to decrease cycle time and manufacturing costs. The media supply unit requires manual steps that are currently difficult to automate.

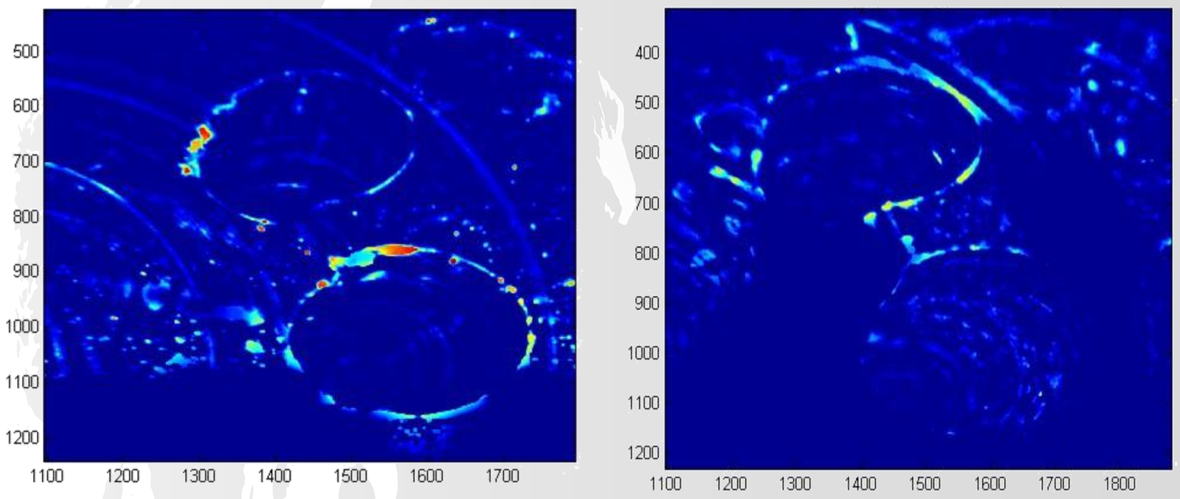

Figure: Sample images of drill holes in the tank valve of OMB. Left: burrs highlighted in red, right: without burrs.

Objective (B): Development of **automated quality inspection methods** to improve the end of line test and to ensure **traceability of critical components**. A reduction of the need for making time-consuming measurements will take place by using predictive models and data acquired through inline quality control along the supply chain.

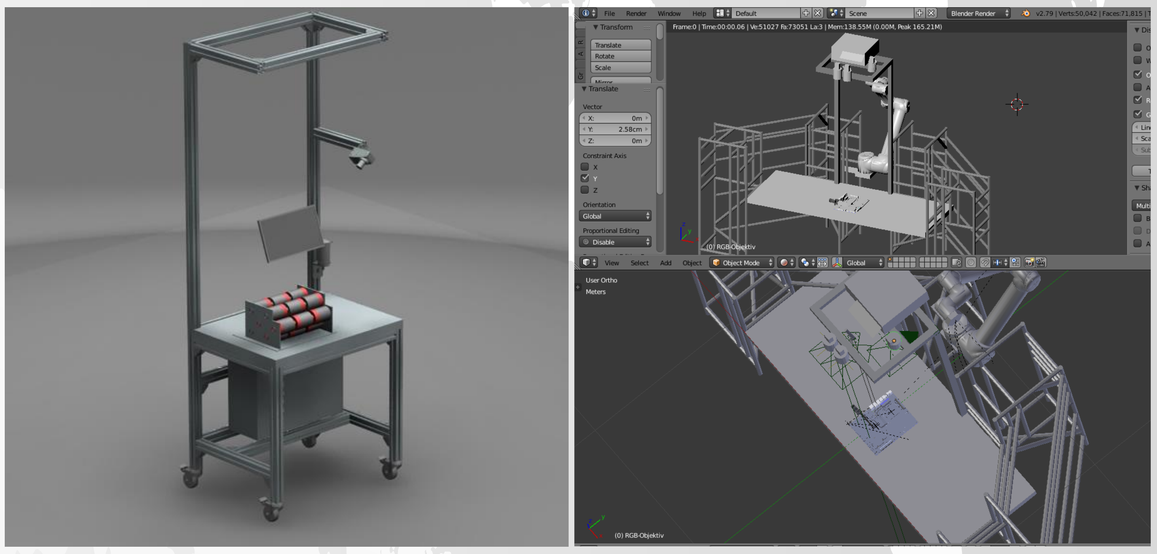

Figure: left: inline control concept for the assembly of the battery pack. Right: concept of the assisted assembly station.

Objective (C): Scalability of the manufacturing process. A proper integration of automatic and manual process steps through assistance systems will ensure that the production process can be scaled up to a level of 50.000 pcs/year. A specific manufacturing process of the **350 bar H_2 tank valve** will be developed to produce large quantities with high quality and safety requirements.

The project leading to this application has received funding from the Fuel Cells and Hydrogen 2 Joint Undertaking under grant agreement No 735367. This Joint Undertaking receives support from the European Union's Horizon 2020 research and innovation program and Hydrogen Europe and N.ERGHY.