ProcessDesk – Digital Support for Developing a Recycled-PP Melt-Spinning Process

Bernd Seufert*[1], Christian Prescher† , and Johann Böhnewitz[1]

[1]Strucnamics Engineering GmbH – Germany

Abstract

The production of textile products can involve complex process chains with multiple interdependent steps across multiple machines. Each machine has its own set of sensors producing data in different formats, can be used in different configurations, and each small parameter change heavily impacts the product.
With over 20 years of in-house expertise in composite production for aviation and other industries, Strucnamics Engineering knows these pain points and built ProcessDesk to tackle them and support its adoption as a partner. It starts with gathering the continuous stream of data each machine produces, modeled in ProcessDesk as tools (the machines) and data sources (the sensors feeding them). The capture is parametrized, so connecting a new one stays simple. Instead of a growing pile of Excel sheets that accumulate unordered over the years, the data is now stored and visualized in an organized form. These continuous streams can be batched to visualize the data of a single process step, and the batched steps can be connected in process chains, to show the complete process from input material to output product.

Manufacturing processes do not only consist of data. In the real world, process parameters and outer factors change on-the-fly, which heavily affect the outcome and should be recorded. In ProcessDesk, batches do not only hold sensor data: images, documents, comments or tables can be added too, and each batch can hold further values, such as a numerical target height. Manual, sensor-less processes can also be documented this way. Batches, tools and data sources can be organized in lists and found via tags and filters, so the run behind a special outcome five years ago is only one search term away.

The end result is shown in visualizations: each batch, tool and data source shows its data in an interactive chart, with measuring between points, events and more. Data can be compared across batches, either in a scatterplot or by overlaying multiple batches in a multi batch view. ProcessDesk is currently being used in a research project for developing a recycled-PP melt-spinning process, where it visualizes the sensor data of a single run of a line with over 300 measured values.
The goal is an interface to support the complete digitalization of processes, process chains and their metadata in an organized, findable form. This makes it a tool for companies and universities that want to track their own processes.

*Speaker

†Corresponding author: c.prescher@strucnamics.de

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