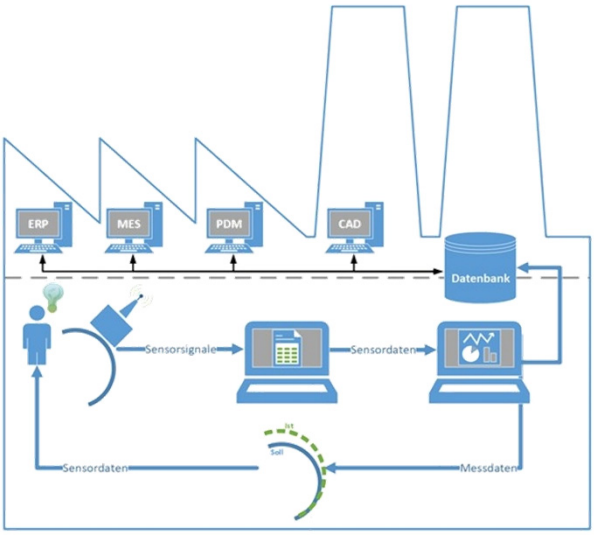
QUALITY OPTIMIZATION WITH DIGITAL TWIN

Application for the manufacturing industry -

Acquisition of bending shapes for quality assurance and process monitoring



SUMMARY

Implementation of a new flexible digital twin for component checking: requirements definition, design, development and introduction of a mobile measuring device for flexible acquisition of component geometries in production.

CURRENT SITUATION

Herkules Wetzlar GmbH are experts in the production of bending machines and the manufacture of bent parts. The bent parts offered by the company encompass a very wide range of profile shapes. This variety makes quality control very expensive, and conventional measuring methods cannot be used with large components. That is why measurements used to be taken by hand with rulers, measuring sticks or 1:1 templates.

PROJECT DESCRIPTION

The aim was to develop a digital solution to make quality assurance and data acquisition for process optimization more efficient. With no suitable measuring technology available on the market, work started on developing a new measuring system. With Herkules Wetzlar GmbH, PtU developed a new measuring concept allowing the gathered production data to be used in its entirely Alongside this, the prototype of a device for the digital measurement of bent parts was created.

PUBLICATION

Kessler, T, Huttel, D, Kilz, J. and Groche, P. "Profilbiegen 4.0 – Roadmap für die Automatisierung des Drei-Rollen-Profilbiegens" (Profile bending 4.0 – Roadmap for automation of three-roll profile bending*Umformtechnisches Kolloquium Darmstadt* (2018)

PARTNERS

PtU Darmstadt

Mittelstand 4.0 Kompetenzzentrum Darmstadt

HERKULES

SOLUTION

The system operator can use the new measuring system to compare the actual condition of the bent parts with the specified condition at a glance. The profile shape is acquired through incremental measurement of the arc length with a friction wheel, and simultaneous measurement of the change in the tangential angle with a gyroscope. Intermediate stages can be recorded with the new measuring concept, making the process much more transparent. The measuring results are made available to the system operator digitally and visualized. The data obtained in this way can then be
used to optimize production in the medium and long term. In the context of ISO 9001, for example, the data can be used for traceability and quality management.

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INDUSTRY 4.0 FEATURES

Digitization and monitoring of component properties from the productive environment forms the basis of long-term optimization of production.

STANDARDIZATION APPROACHES

The acquisition of component shapes using the mobile measuring device will be moved to the environment of internal quality control. Standardized workflows can be developed for process optimizations and for component traceability.