



Editorial

Smart Factory – Future of Production: Real and Virtual

Digital twin: The production process will be fully simulated on digital plane. It generates a virtual copy which portrays the total production process. Productions planners can analyze optimize or newly organize the manufacturing process in virtual copy. The information technology is assigned a central role with the manufacture as well as with the management and control of the production plants as also with bringing together and evaluation of machine data or information on energy requirement. Data rising and preparation are always frequently the right time possible. It generates new analysis possibilities as for example for a farsighted maintenance and the consideration for the flow of energy and its use in its entirety.

The computers generate digital copies (images) of production plants and the whole of the factories a so-called digital twin with abundance of information. Out of the CAD data of the manufacturing ways and machines production data and energy flow charts a total picture is generated in the computer. This can be used for planning new processes and work flowing off but also for the virtual commissioning of plants.

The digital twin copies every production step: The real production becomes on the digital plane completely reproduced. It generates a virtual copy which not only visualizes the production plant with all the machines but also reproduces the dynamic flowing offs and the behavior of the system components in course of production at the right time. The digital twin copy the whole production process and enable any time the direct gearing in the production. The conception and construction of production plants are simplified. Therefore the production becomes not only flexible but the concepts of the virtual twin simplify simultaneously the conception

and the construction of production plants. Still before the first real piece of work is prepared. The manufacturing concerns can beforehand simulate the production at last flow find out the weak spots and can optimize. The plant is as it were before the production virtually set in motion and tested. This accelerates the planning and simplifies the commissioning of new production plants. This vision could already become a reality soon. Developers of Fraunhofer Society work at several institutes jointly with industrial partners thereon to develop the necessary technologies for the conversion of the concepts and this is in steps with the first pilot project to transform in practice. The Fraunhofer Institute for production plants and construction technique (IPK) in Berlin is engaged for example with the challenge to copy the whole production process as digital twin.

The researchers develop a comprehensive system that itself in running factory monitors, regulates and rectifies. The control through the digital twin goes so far that in future every construction part can itself determine how it is through the process chain optimal and quick managed – similar to a PKw-Navi a whose up-to-date data is computed in the quickest route The developers of the Fraunhofer Institute for production technology (IPT) in Aachen have in right such a navigation system for the production. With every production step the software monitors, how a construction part is prepared. With the information then later all further orders for the construction parts can automatically be executed.

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