

PRESS RELEASE

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Fraunhofer LBF at the Compounding World Expo 2018

Smart connections: Intelligent sensors monitor and optimize industrial processes 4.0

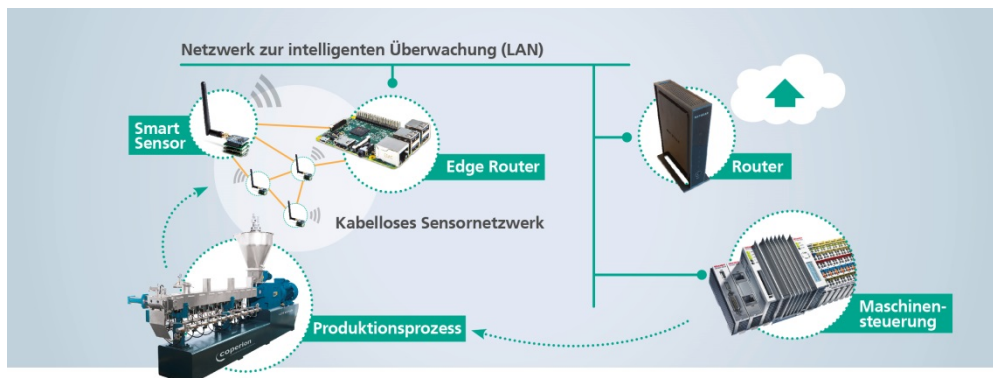
Already today modern production systems can communicate with their surroundings and manage themselves. Industry 4.0 is on the rise and cyber-physical systems (CPS) are the essential components of this development. Intelligent sensors for monitoring and controlling production processes ensure that connected work processes can run reliably. Scientists at Fraunhofer LBF have used these technologies as part of the "ImProcess4.0" project and developed an intelligent sensor node-based monitoring and optimization system for production lines using twin-screw extruders. With this sensor system unfavorable operating conditions or fluctuations in material properties can be detected, thus minimizing the occurrence of faulty batches or machine failures. It opens chances for predicted maintenance in production processes and thus stand still times will be reduced.

"Cyber-physical systems connect and coordinate. This creates completely new opportunities for applications, but it also represents new challenges for developers, who will have to find a way to work with this increased complexity and heterogeneity", explains Dr. Christian Beinert, head of Polymer Processing and Component Design at Fraunhofer LBF. Based on the monitoring system developed at LBF, support can be offered to the companies in the field of condition monitoring or predicted maintenance. In collaboration with the machine manufacturers and operators of the machines and manufacturing plants the experts of Fraunhofer LBF can configure this flexible modular and customizable system to match the customers' specific needs. "By combining existing data from the machine control system with selected, additionally recorded sensor data, we can detect unfavorable operating conditions or material fluctuations, and thus minimize faulty batches or machine failures", explains Dr. Beinert.

The Darmstadt researchers furthermore are implementing signal pre-processing, which means that data measurements can be reduced already within sensor nodes. Through the use of a multifunctional gateway, the pre-evaluated sensor data will be collected, processed and the information will be made available in a data pool. The data for identification of damages on the other hand will be compared with established data collectives.

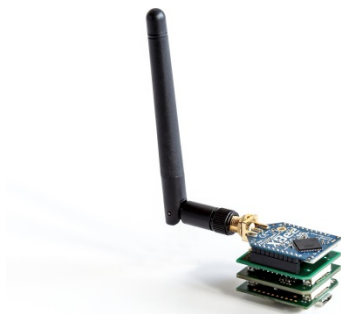
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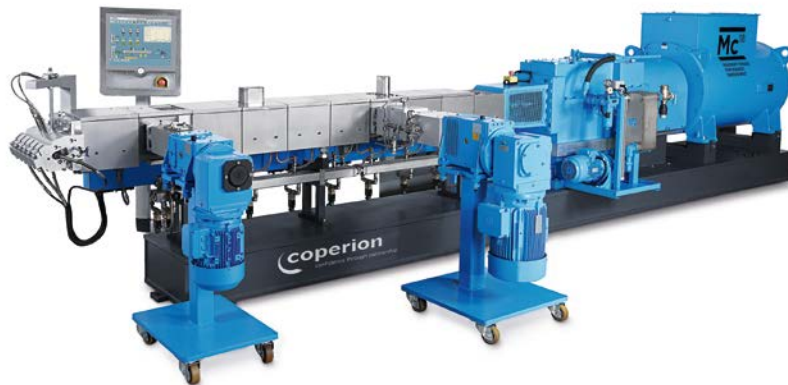
The twin-screw extruder-based monitoring and optimization system, developed by scientists at the Fraunhofer LBF, consists of intelligent sensors with integrated sensor pre-processing, as well as a multifunctional gateway for data processing and retroactive effects.

Graphics: Fraunhofer LBF



Intelligent sensors for condition monitoring.
Photo: Fraunhofer LBF

FRAUNHOFER INSTITUTE FOR STRUCTURAL DURABILITY AND SYSTEM RELIABILITY LBF



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The intelligent sensor node-based monitoring and optimization system, for instance, improves combined systems on twin-screw extruders.
Photo: Coperion

Fraunhofer LBF in Darmstadt has stood for the **safety and reliability of lightweight structures** for 80 years. Today, with its expertise in the areas of structural durability, system reliability, vibration technology and polymer technology, the Institute provides solutions for three of the most important cross-cutting issues of the future: lightweight design, functional integration and cyberphysical mechanical engineering systems. The focus here is on solutions to social challenges such as resource efficiency and emission reduction as well as future mobility, like e-mobility and autonomous, networked driving. Comprehensive skills ranging from data acquisition in real operational field use to data analysis and data interpretation, in addition to deriving specific measures to design and improve material, component and system properties form the basis for this. Customers come from automotive and commercial vehicle construction, railway transport engineering, shipbuilding, aviation, machine and plant construction, power engineering, electrical engineering, medical engineering and the chemical industry. They benefit from the proven expertise of over 400 employees and cutting-edge technology accommodated in more than 11,560 square meters of laboratory and experimental space.

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