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Research area: Process aims

Process measuring and control technology

Key words:

quality monitoring, defect detection, web inspection

TITLE:**"Web Defect Inspection (WeDefIn)" - 100%-Inspection of material web using TeraHertz-radiation****Background/Problem area**

Production of functional materials, of compound materials and multilayers is increasing. For these products with its special functional properties and its complex structure the monitoring of the properties becomes more and more important. Measuring methods based on a statistic inspection by random samples or by measuring on only some spots are not enough. 100% inspection is forced.

Another aspect is the production of high level materials based on recycled raw materials. The recycling process includes the danger of unwanted particles and components in the stock. Those particles can decrease product quality further more disturb or destroy expensive production equipment.

Objectives/Research results

Aim of the research project is the development of an innovative, ready for industrial use measuring system for 100% inspection of web-formed materials like paper or paperboard. Defects like inclusions, voids, bubbles, pipings or delaminations can be found in a web material.

A new kind of TeraHertz-antenna (THz) will be designed. It is the base for a multi-channel measurement initiated from one radiation source. A fs-Laser pulse generator with high performance will enable THz-signals at a high repetition rate across the web. An appropriate data acquisition unit accumulates the signal information. Special algorithms extract the material information from the signal data. Deviation from the normal signal is a sign for web defects.

The procedure is able to inspect complete material web in cross direction (100% inspection). Materials impervious for visible light are in the focus.

The use of electro-magnetic radiation in the THz-range offers an alternative solution to x-ray-scanners and measuring devices working with visible light.

Application/Economic benefits

The project result can be used as safety equipment in production lines. The preventive monitoring of stock or raw materials can reduce destruction or disturbance of expensive equipment. And so it can reduce downtime and increase machine availability.

The new inspection device helps to ensure product quality of paper and paperboard production, of special papers production, of multilayer material or compound materials.

Period of time: 01.08.2014 – 31.12.2016

Remarks

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