



Infrared cameras monitor planing systems - from fire protection to quality control

“Planes make shavings”, as the saying goes. At the Austrian company Binderholz GmbH, various products are machined using the latest generation of planing machines. If parts on these types of machines become too hot, in the worst case this could lead to the shavings igniting and resulting in a fire. Optris infrared cameras detect overheated parts immediately thereby removing the risk of fire effectively. But in this application, the infrared technology also provides additional benefits: Burns on the wood caused by excessive pressure are minimized.

Wood has a millennia-old tradition as a material and for building. Even today, wood production still exceeds that of steel or concrete. The possibilities for use are diverse: As well as being used as the raw material for paper production, wood is also used as a building material in civil engineering and as an interior material in buildings and for furniture construction.

High-performance planing systems

The Austrian company Binderholz GmbH (see box text) is the European market leader for solid wood products and innovative building solutions. At their site in Fügen, among other products, binderholz produces laminate sheets for glue-lam and profile boards, as well as floorboards. The rough-sawn solid wood parts are smoothed, dressed and, if necessary, profiled on a planing machine. The 12 meter long multi-side planing machine has a total of eleven spindle that can process the workpiece in

one pass from all sides. During the process, the wood moves at a speed of up to 3,4 meters per second through the planing line. So-called inlet guides and pressure shoes, which are adjusted pneumatically, press the wood parts against the spindles. “Due to the high speeds the correct adjustment of the contact force is very important”, explains the electrical operations specialist who is responsible for equipping the planing lines at binderholz. If the pressure is too high, the inlet guides overheat due to excessive friction, which can lead to a fire in the worst case.

Temperature monitoring on the planing line

In order to avert the risk of fire due to hot machine parts, binderholz relies on a temperature monitoring system in the planing line. It was not possible to implement a temperature measurement with traditional measurement sensors since the amount of cabling would have been prohibitive, due to the requirement to measure the temperature at a huge number of locations. In addition, the cables should have been protected from damage by chips, for example. The solution was provided by Optris, the manufacturer of infrared cameras. The camera models PI 400 and PI 640 are used. The PI 400 cameras have a resolution of 382 x 288 pixels; the PI 640 even has 640 x 480 pixels. For each pixel, the infrared cameras measure an individual temperature value – and at up to 125 Hertz.

Floor boards are one of the products produced by binderholz at the Fügen location with the aid of Optris infrared measurement technology.



The PIX Connect software enables the overlapping of several heat images to form a total image / Merging Mode). The advantage is that the hottest point (Hotspot) can also be detected within the overall image

image: binderholz



Technical data Optris PI 640

- Optical resolution of 640 x 480 pixels
- Spectral range from 7.5 to 13 μm
- Exchangeable lenses: 15°, 33°, 60° and 90°
- License-free analysis software Optris PIX Connect and complete SDK included
- Measures precisely from -20 to 1500 °C
- Image frequency up to 125 Hz
- Modern USB 2.0 interface (optional USB to GigE)
- Compact size 46 x 56 x 76 - 100 mm (depending on lens)
- Installation of several cameras in one network possible
- Protection class IP 67



Further information on the PI 640 can be found at <https://www.optris.global/thermal-imager-optris-pi-640>

In total, eleven infrared cameras are installed on two planing lines at binderholz. These have a view of all critical components of the planing machines which could be damaged at excessive temperatures or, in the worst case, cause a fire. In addition to the above-mentioned guides, which can overheat due to the friction at excessive pressure, this also includes parts of the drive technology, such as gearboxes, motors and drive shafts. The software of the cameras has a functionality which is particularly important for fire protection: The temperature of the hottest point within the image – the so-called hotspot – can be displayed and evaluated. In the software, it is possible to set threshold values for the temperature at which certain actions are triggered. There are two alarm stages for fire protection: At a temperature of 120° C, a pre-alarm is triggered, which is signaled by a universal alarm light. In this way the machine operator is made aware of the alarm and can check the situation. The image of the infrared camera, on which the hottest position is marked, is particularly helpful. If a temperature of 130° C is exceeded, the system triggers the main alarm and the planing machine is stopped. The temperature thresholds can be changed in the visualization from the control location of the planing line. Depending on the product and type of wood, various threshold values are necessary here. Up to now, overheating has already been detected several times with the system. If such damage is detected early, the maintenance team can exchange the corresponding parts before real damage occurs. A failure with longer production shutdowns is thus avoided, and the overall system availability increases as a result.

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Overheating events have already been detected several times.“

Infrared monitoring offers further possibilities

However, monitoring of temperatures at the planing lines offers even more possibilities which go far beyond preventive fire protection. In this way, the temperature of the wood surface can also be evaluated. Depending on the contact pressure of the stop rail, the wood surface can likewise heat up considerably. In addition to the risk of fire, if the temperatures are too high, discoloration or even scorch marks can impair the quality of the surface. There is a quality control step directly after the planing line, but by the time the discoloration is noticed there, many more boards have already been planed. In order to prevent



Monitoring the process via a large live monitor picture: binderholz

such quality defects, the infrared cameras of Optris can also be used. These monitor the surface temperature of the workpiece and thus ensure the quality of the end product. With the temperature monitoring of the wood surface by the infrared cameras directly in the machine, the scrap rate can be reduced.

Easy integration of the compact cameras into the control technology

Due to the compact design of the infrared cameras of only 46 mm x 56 mm x 76 mm, the measuring devices can also be used in confined spaces in the optimum way. For the factory electrician it was equally important that the cameras

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The very good interface of the Optris cameras was a decisive advantage for us.“

can be integrated simply into the control and operating architecture of the planing system: In the first step, upon reaching the different temperature threshold values, a signal was transmitted via the digital output to the PLC, which then reacted correspondingly. “In the meantime we read the temperature measurement value into the PLC and track the temperature profile in this way,” he continues to explain.

For the preventive fire protection, the infrared images of the cameras are presented additionally on a PC, supplied by the company Kapsch BusinessCom AG (Innsbruck branch). The license- and cost-free software PIX Connect from Optris runs on the PC. The modern software has an intuitive control interface and offers numerous functions for the analysis and documentation of the measurement data. The software can be individually adapted and enables the adjustment of

binderholz

tiptop timber

Europe's market leader for solid wood products and innovative building solutions

The name Binder stands for traditional values and reliability in the wood industry, combined with high-tech and innovation. Still a small sawmill operation more than 60 years ago, today the family company binderholz presents itself as one of the leading European companies, equipped with the latest technologies and manufacturing methods, with a corresponding reputation in the market.

binderholz has 12 locations: five Austrian - Fügen, Jenbach, St. Georgen, Hallein and Unternberg - five German - Kösching, Burgbernheim, Oberrot, Baruth and Wolfegg - and two Finnish - Lieksa and Nurmes - employing around 2,750 staff. The solid wood product range spans from sawn timber, profile wood, single- and multi-layer glued solid wood panels, board plywood to binderholz plywood BBS. The residual wood produced in the production is processed into bio-fuel, green power, multipurpose boards, molded blocks, and molded pallets. The products are exported globally.

binderholz produces sustainably and efficiently based on the No-Waste principle and uses 100% of the wood resource. The company owes its reputation to its proven customer care and customer proximity, a product range and price policy matched to the market, as well as the binderholz quality management approach.

Further information: www.binderholz.com



The Hobellinie Type Hydromat 30B have a daily throughput of about 20 m³/h of wood.

picture: binderholz

the alarms, which are triggered at different temperatures. The display of the hot spot within the recorded region is particularly important.

In the event of an alarm this allows the machine operator to recognize at a glance which part of the machine is currently too hot, so that he can initiate corresponding measures.

Further installations planned

The use of the infrared cameras from Optris at binderholz is a success story. In addition to the preventive fire protection, which protects the investments, an innovative quality assurance approach can also be integrated directly on the planing systems.

” **The systems run absolutely stable and are fail-safe.**“



Further information on non-contact temperature measurement technology in early fire detection can be found at <https://www.optris.global/fire-prevention>



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The system convinced the responsible people to such a degree that further installations have already been implemented in the company's facilities in Austria and Germany.

“The systems run absolutely stable and are very fail-safe,” the expert summarizes the positive experiences.

Author

Ing. Christian Linhart, Optris GmbH
 Sales Engineer Austria

Advantages at a glance

- Contactless temperature monitoring detects potential fire sources in real time
- Undesirable surface changes on workpieces (e.g. burns on wood) can be detected early based on thermal changes
- Industrial infrared cameras can depict processes at high speeds
- The non-contact measurement IR cameras require significantly less wiring on the system than conventional sensors
- Coupling of various infrared cameras enables the monitoring of larger systems or many critical components
- The Optris software enables the setting of different alarm levels