



Wood Chip Burning Facility Relies on Passive Radar Positioning

The challenge

Biopellet Magdeburg GmbH & Co. KG operates a biomass heating plant that burns natural wood chips among other materials. The heat produced by the plant is also used to provide energy to the adjacent wood pellet mill. To transport the material from the wood chip storage yard, the facility relies on a fully automated crane system. Precise crane positioning proved to be a major challenge because the yard is often full of steam that renders the use of conventional optical sensors impossible.

The solution

To address this issue, the company equipped the crane bridge with two passive radar sensors from Symeo GmbH for centimeter-precise positioning. The maintenance-free sensors transmit signals in the 61 GHz range, which are reflected by simple metal reflectors. The radar-based distance measurements are reliable and extremely accurate even when there is considerable dirt and steam on the grounds of the plant, a not all too uncommon situation.

The project's success

With the passive radar solution, the automated wood chip handling system now operates more efficiently. The crane positions itself on the border of the individual storage areas with centimeter-accuracy, directly in front of the perimeter wall. This permits optimal access to and use of the storage yard and at the same time eliminates any possibility of the crane gripper colliding with the wall.

Steam hampered reliable crane positioning

The CO²-neutral heating plant operated by Biopellet Magdeburg GmbH & Co. KG is fired with various materials, including wood chips. The facility, which took about one year to build, boasts a boiler capacity of around 12 MW and an electrical output of roughly 2 MW. The heat produced by the plant is also used to provide energy to the adjacent wood pellet mill. In the wood chip storage yard, a fully automated crane system from Schmiedl Metall- und Fördertechnik GmbH is used to transport the material, which is stored according to different stages of quality. The steam from the plant excluded the use of optical sensors for positioning the crane.

The solution: passive radar sensor

For this application, Symeo GmbH has just the right radar sensor in its product portfolio. The sensor is passive, which means it can operate without an active target at the other end. It can also be deployed in harsh environments where steam, vibrations or dirt are common. The passive measurement only requires two components: a passive radar sensor and a metal mirror that serves as a clearly visible radar target.

Two passive sensors were installed on the crane bridge, sending signals in the 61 GHz range, which are then reflected by two metal mirrors. One mirror is mounted on the crane trolley, the other on the far end of the building. The measurements can also be carried out without a

metal mirror provided that a level, reflective surface is available. Because the sensor features a beam angle of +/- 2° and does not require precise alignment with the reflector, installation is extremely quick and easy.

„We searched a long time for a solution that would allow us to position the crane under difficult conditions such as those found in the wood chip storage area. With the passive radar system from Symeo GmbH, we can reliably detect the position of the crane down to the centimeter using only two components, despite the extensive amount of steam that surrounds the storage yard. Decreased boiler output caused by inhomogeneous fuel input and collisions between the crane gripper and perimeter walls are meanwhile a thing of the past,“ says Dirk Zober, plant manager at Biopellet Magdeburg GmbH & Co. KG.

Robust, maintenance-free, no wear and tear

Both the passive radar sensor and the stainless steel mirror feature a robust design with no moving parts, which means they require no maintenance and are free of wear and tear. Depending on the environment, the system has a range of up to 100 meters. Symeo offers additional products for longer distances.

The Symeo passive radar system has been in operation at the biomass heating plant in Magdeburg for more than one year without experiencing any outages.

Biopellet Magdeburg GmbH & Co. KG
Biopellet Magdeburg GmbH & Co. KG operates a biomass heating plant in Rothensee on the outskirts of Magdeburg. The heart of the system is an innovative boiler that burns natural wood chips in several stages. Apart from serving as a sustainable source of energy, the downstream ORC system also extracts heat for the state-of-the-art mill that produces industrial-scale and DIN pellets from wood chips.
www.biopellet-magdeburg.de

Symeo GmbH

Symeo GmbH develops and markets systems for precise, contact-free and maintenance-free distance measurement, position detection and collision avoidance for cranes, industrial vehicles and other transport methods. Furthermore, the company develops customer-specific, certified telemetry and smart metering solutions.

Symeo products are robustly designed and well-suited for applications in harsh industrial environments indoors and outdoors. Symeo's patented LPR® offers a wireless and real-time system for precise positioning and distance measurement that is ideally suited for industrial applications. Symeo also provides industrial GNSS (Global Navigation Satellite Systems GPS, Galileo and Glonass) receivers that can be combined with LPR® and other motion and inertial sensor systems. This combination enables highly-available and precise positioning even under the most adverse conditions and in areas with limited satellite availability.

The company delivers standardized products and complete solutions to system integrators, original equipment manufacturers (OEMs) and end customers worldwide.

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- Contactless positioning using radio-based technology
- Passive radar sensor in a robust housing
- Maintenance-free, no wear and tear
- Impervious to dust, dirt and vibrations
- Operates even in harsh environments and weather conditions
- Simple data integration into the crane control system via TCP/IP or a Profibus interface