

Reliable WLAN in a red-hot environment

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A robust wireless technology from Siemens is being used to help manufacture massive steel components. In one of the most modern open-die forges in the world, a facility owned by Saarschmiede GmbH, turbine and generator shafts are being manufactured for power plants. During the production process, it is important to ensure precise interaction between the 12,000-metric-ton forging press and the two gantry cranes that hold the workpiece. Siemens accomplished this by installing an industrial-standard WLAN connection between the cranes and the forging press control system. The solution shows that reliable wireless communication can be realized even under extreme conditions

of the sort that prevail during the forging of hundreds of tons of hot steel.

Open-die forges produce steel workpieces not through casting but through forming, which allows them to achieve the highest material qualities. A gripper holds the hot piece of steel in the giant press and turns it to make sure it is worked from all sides. Large gantry cranes transport the over-one-hundred-ton workpiece to the gripper and hold it while the grip on the piece is changed. The forging process gradually gives rise to a shaft several meters in length, the free end of which is held in position with respect to the press by the gantry cranes. Their movements are an integral part of the forging process and must be linked to the control system. An emergency-off feature must ensure that the press is immediately switched off if the forces exceed their load-bearing capacity of the cranes.

Wireless connections are a suitable means of providing [communication](#) between moving parts. One challenge is the requirement of uninterrupted and fast communication between cranes and press, to guarantee the emergency-off function. This challenge was overcome with a WLAN system adapted to industrial applications - an IWLAN which was designed by Siemens specifically to cope with the harsh environments.

The cranes transmit their signals via IWLAN to access points that in turn communicate with the control system via Profinet - an industrial version of Ethernet. With update intervals of 16 milliseconds the Profinet coupling allows very rapid reactions. The access points are positioned so that their omnidirectional antennas pick up the wireless signals of the cranes without interruption. The devices also have a rapid roaming feature, which enables extremely rapid cell switching without signal loss in the area.

The production hall was likewise a challenge for the installation of the

IWLAN. Radio waves are reflected by the massive steel structure. If reflected and direct radio waves become superimposed, the result can be interference and scattered cancellation or attenuation of the signal. To reduce these effects, all communication end-points pick up signals from multiple directions using two omnidirectional antennas.

Provided by Siemens

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