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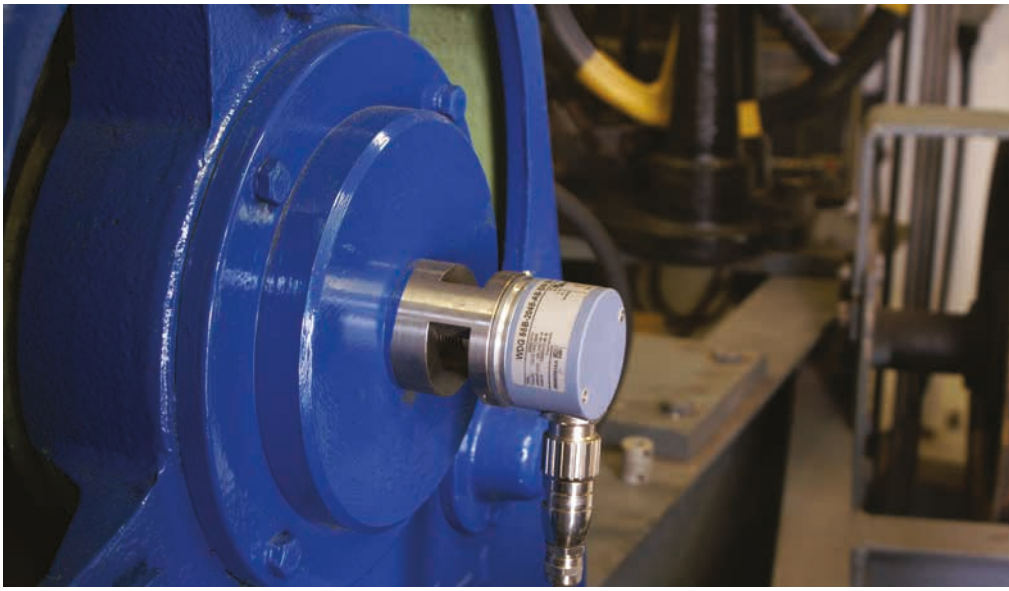

Challenge at a lofty height

Control unit and motor at a distance of over 220 metres

It can be seen from far away: the emblem of the City of Duisburg, the chimney of the municipal utilities' power stations 1 and 2, built in 1967 by the harbour to generate power and heat for district heating from anthracite.

The shared chimney of the two coal power stations consists of three flues located in close proximity, with a further tube between them. In that tube, an elevator travels at a speed of 3 m/s, carrying visitors and employees to the vertiginous height of over 180 metres. From the visitors' platform, a steep spiral staircase leads even further up into the engine room, propped like a gigantic mushroom between the chimney stacks.

The elevator is the only way to get to the visitors' platform, as there is no staircase from the ground. For safety reasons, there is therefore a second evacuation elevator that can rescue individuals from the elevator cabin and bring them back down – a very elaborate process, which makes it all the more important that the elevator operates reliably. For this reason, the installation was modernised earlier this year and upgraded to meet the latest state of the art.

However, this was not easy. The old control unit dated back to the 1980s, and it had become difficult to find spare parts for it. Circuit boards had to be replicated by hand, which was rather time-consuming. Those in charge at the municipal utilities company therefore decided to change over to a new control unit. However, they wanted to retain the elevator itself and the associated DC motor. This course of action is not unusual – but matters were complicated by the great height of the engine room above the visitors' platform, while the control unit is located in the cellar of the power plant at the foot of the elevator shaft.

At the time the elevator layout was designed, there were good reasons for this separation. For one, it meant that malfunctions could be detected straightaway and that maintenance and any required repair work could be carried out, because there are no stairs leading to the top of the tower.

Secondly, the engine room and the shaft are exposed to wind and weather at their lofty height, which means that the control electronics would have been subjected to unnecessary stresses. As well, it would have been hard to fit an additional control cabinet into the small engine room.

The only problem was that this setup involved extremely long cable lengths. All in all, the distance between motor and control unit is 220 m – a technical problem that also spoke in favour of retaining the DC motor. The municipal utilities company awarded the contract to Otis, which commissioned Emotron to design and commission the new control equipment for the existing Otis elevator.

The greatest difficulty lay in transmitting the 1Vss encoder signals to the bottom with no losses. For this reason, the specialists from Emotron chose a sine-wave encoder from Wachendorff Automation to accurately determine the cabin speed in the elevator shaft. For the standard version, cable lengths of up to 150 metres had already undergone extensive testing and were being used successfully in the field. Working closely with the control specialists, the Wachendorff Automation specialists succeeded in transmitting the signal reliably over 220 metres as well, in spite of considerable interference factors.

"We adapted our encoder precisely to the conditions prevalent in Duisburg," explains Kai Nagel, who acts as an

Application Advisor in the Technical Support Department at Wachendorff Automation. “Instead of the usual supply voltage of 5 V, the encoder operates with 15 V in this instance, and it has been terminated with special resistors,” adds Götz Benczek from Emotron.

Custom solutions such as this are not unique for Wachendorff Automation. That they can be realised speedily and cost-effectively is mainly due to the fact that at Wachendorff the majority of the employees operate under one roof at the Geisenheim site, from manufacturing to technical support and product management. Only the sales operation is decentralised, partly in order to ensure nearness to customers. Short paths and effective communication between the different operating departments and with the customers thus make for extremely quick response and realisation times.

The other catalogue versions of the Wachendorff WDG encoders, which are all designed to industry standards, are, however, also extremely resilient and robust. They provide the ideal combination of precision mechanics and a compact optical path with electronics that are not only highly effective but robust as well.

In continuous operation, the service life of the LED is approx. 11 years.

Added to this are a high protection rating of up to IP67 and the capability of coping with extremely high bearing loads. This makes Wachendorff encoders some of the most reliable and robust devices on the market – characteristics that are indispensable particularly when it comes to safety-relevant applications. Wachendorff Automation underpins its claim to quality by offering a five-year guarantee.

Image 1 and 2:
Spiral staircase/Towers: A steep staircase leads from the visitors’ platform up to the engine room.

Image 3 and 4:
Platform/From above - Duisburg/From above - Ruhrort: The view from the visitors’ platform is breath-taking. Employees and groups visiting the power plant can enjoy the view.

Image 5
Emblem: The tower has been seen as Duisburg's emblem since 1967. The three flues and the elevator tube in the middle represent an impressive eye-catcher when lit up by green floodlights at night.

Image 6
Control system: The new control cabinet with the DC power supply and the elevator control unit.

Image 7 and 8
WDG/From above - engine room: The Wachendorff Automation encoder at its operating site high over the roofs of the city.

Image 9
Team: Employees from von Otis, Emotron, Wachendorff Automation and the municipal utilities company have jointly brought the unusual project to a successful conclusion.

Any Questions? Just call us at +49 (0) 67 22 / 99 65 414, send us an E-Mail to support-wa@wachendorff.de or call your local distributor: **www.wachendorff-automation.com/distri**

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