

## Case note

# Waste handling crane uses anti-sway control program to improve productivity



The crane's trolley and long travel movements use the ABB anti-sway control program to prevent the load swinging.

Renova AB is Western Sweden's leading waste and recycling company. Its largest facility, in Gothenburg, is a waste-to-energy plant, which takes in 460,000 metric tons of combustible waste a year from households and industries and uses it to produce around 220,000 megawatt hours (MWh) of electricity a year, as well as district heating.

Following pre-processing, incoming waste is stored in a bunker that can hold 22,000 m<sup>3</sup> of waste. Grabs on two electrical overhead travelling (EOT) cranes transport the waste to the feeder shaft that then feeds the plant's three furnaces. The grabs can carry approximately five metric tons of waste in one lift.

### Improving process uptime

The low voltage AC drives used on the cranes were coming to the end of their life cycle and needed upgrading. The major requirement was to optimize the waste handling process. With the plant operating 24 hours, seven days a week, a highly reliable, accurate and stable crane control system was needed in order to maximize process uptime.

The solution involved swapping the existing AC drives with regenerative ABB industrial drives to control hoist, trolley and long travel motions of the two EOT cranes. The cranes each use two 15 kilowatt (kW) motors on the long travel movement, while the trolleys are powered by one 7.5 kW motor. Both motions are used in open loop direct torque control (DTC) mode. The hoist uses one 200 kW motor in closed loop DTC mode, using an incremental pulse encoder to generate speed feedback.

### Stable crane handling

Key to the system's success is the ABB anti-sway and crane control programs installed in the drives to give accurate and stable load control. The anti-sway control program is installed in the trolley and long travel drives, enabling them to control the load sway without additional hardware such as anti-sway sensors. The drives are connected to each other through an optical link to share feedback information on the hook position. The ABB crane control program is installed in the hoist drive.

The anti-sway control program gives the crane operator better control of the crane, cutting the time to feed waste to the furnace and thus maximizing the amount of waste handled in a day.

### Easy to use anti-sway function

Mihkel Albo, electrical manager of Renova AB says: "The anti-sway function is easy to use, which is especially crucial when a crane driver does not have a lot of experience. Reliability of the crane is the key to shortening the waste handling time in the bunker and avoiding downtime to achieve an optimized process.

"Compared to the previous drives, the installed AC drives feature DTC, which improves the process control, enabling fast start and stop of motors." Using regenerative drives also aids quicker acceleration and deceleration time of the motor, thus shortening the cycle time.

The upgrade of the drives was done in close cooperation with ABB's service business unit in Sweden. "We are very satisfied with our collaboration with ABB," says Frederik Roseñ, electrical engineer at Renova. "It allowed the fastest possible upgrade, and got the process up and running reliably. During the project we learned a lot from each other. If we need some assistance, for instance when needing to change parameters in drives, we get an immediate response."

### Challenge

- Upgrade existing AC drives to optimize continuous waste handling process

### Solution

- Regenerative ABB industrial drives for two cranes in hoist, trolley and long travel movements
- Anti-sway control program in trolley and long travel movements to prevent swinging of the load
- Crane control program in hoist movement for precise lifting and lowering of load

### Benefits

- Easy to use anti-sway function when driving the crane
- Load sway prevented by using anti-sway function, leading to shortened waste handling time and optimized process
- Cost-effective anti-sway solution, as no additional sensors or devices are needed
- Reliable and precise hoist operation



ABB's multidrives with regenerative supply section.

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