

MAGNETEK ENGINEERED SYSTEMS

Olmsted Waste-to-Energy Facility Bridge Crane Project



Project — Olmsted Waste-to-Energy Facility

Application — Waste-to-Energy Bridge Crane Automation

Product Used:

- IMPULSE®•G+ Series 3 Drives
- IMPULSE®•VG+ Series 3 Drives
- Programmable Logic Controller
- Hoist Motors

CHALLENGE

- Double the capacity of waste-to-energy facility from 200 tons of refuse burned per day to 400 tons
- Provide uninterrupted operation, 365/24/7, for energy delivery
- Update semi-automated cranes for increased throughput and up-time

SOLUTION

- Magnetek provided VFD control of bridge cranes to feed an additional furnace, doubling energy production
- Updated drives, controllers and motors to ensure continuous operation
- Provided application expertise to achieve maximum performance
- Semi-automated crane control increased efficiency and reliability

Olmsted County, MN, takes going green to the next level with its waste-to-energy facility that burns non-recyclable refuse to produce energy. Since opening in 1987, the waste-to-energy plant has processed over 1 million tons of garbage into high-pressure steam and electrical energy used by nearby government buildings and sold to the power grid.

To further increase the amount of waste turned into usable energy, the facility underwent an expansion to increase its capacity from 200 tons to 400 tons of waste processed per day. The nearly \$100 million project began in October 2007 and was completed in January 2010.

The existing plant had two 100-ton-per-day boilers. A 200-ton-per-day boiler was added during this expansion to increase capacity. Each boiler has a hopper that is fed waste by two six-ton bridge cranes. With only two boilers, the manual operation did not prove to be an efficient method of moving refuse from the garbage pit to the loading hoppers. Now, with three boilers the operation needed to vastly improve its efficiency to meet the project goal of doubled throughput.

Magnetek provided automated bridge crane application expertise to the project by updating the cranes with new semi-automated controls to increase their speed, reliability, and productivity. All new variable frequency drives were installed throughout the system, as well as a PLC (programmable logic controller) interface for each crane that allows the operator to pick a load of waste out of a storage pit and place it into one of the fuel loading hoppers.

ADVANTAGES OF USING MAGNETEK'S ENGINEERED SYSTEMS GROUP

- Expertise in crane, hoist, and monorail control systems
- Experience in waste-to-energy systems
- Turnkey design, programming and field start-up
- 100 years of combined experience in the Engineered Systems Group providing automated crane, hoist, and monorail systems

Two overhead bridge cranes are located 100 feet above the pit that is 30 feet deep, and 50 feet wide, 100 feet long, and holds up to 3,000 tons of refuse. Either crane can travel from one end of the pit to the other as the grapple descends to take bites of the stored waste to transfer combustible material from the storage pit to the loading hopper. The new semi-automated control allows for hoist, bridge and trolley control to position the grapple over a specific, predefined area of the pit as requested by the crane operator. Once the load has been picked, the automated control system moves the hoist, bridge and trolley as necessary to provide the most efficient path to the hopper.

The waste, after being loaded into the hopper, slowly travels 16 feet down onto the feed rams. The feed rams force the waste into the boilers. Ultrasonic monitors track the level in the hoppers and inform the operator when another load is needed. Each of the three fuel loading hoppers is fed alternately with the crane and grapple.

From their pulpit room, 35 feet above the pit, an operator commands the semi-automated movements of the crane and grapple from an operator's chair tied to a PLC in a central control room equipped to monitor and operate the facility. Two operator's chairs exist, one for each crane. However, the system is designed to allow an operator at either chair to operate either crane on a first-come-first-served basis. Alternatively, two service stations are on either end of the runway to allow manual control of the cranes for repair and maintenance.

Magnetek's Engineered Systems Group contributed to improving the waste-to-energy facility's efficiency and throughput by providing a semi-automated bridge crane control system using IMPULSE variable frequency drives and new hoist motors. The system also incorporates PLCs programmed by Magnetek to meet the project's specific requirements. And to ensure that the systems operated per the end user's specifications, Magnetek's system engineers performed on-site start-up services and training.