

Drive & Motion **Solutions**

*More Drive & Motion **Solutions** by Industry/Application*

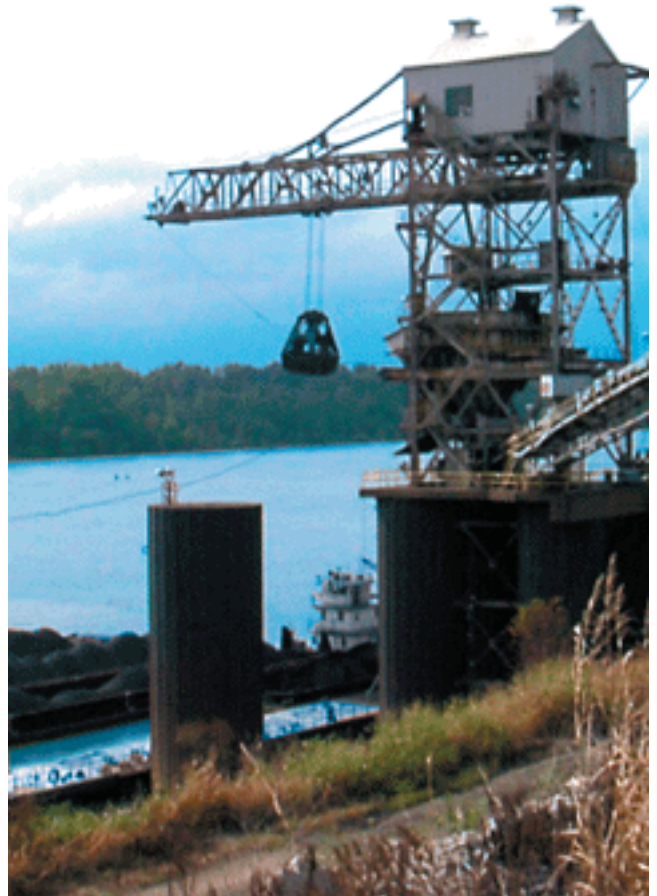
Industry: Natural Resources and Energy

Application: Bulk Material Handling

New Grab Bucket Controls Improve Performance and Reduce Downtime

Cinergy burns over a million-and-a-half tons of coal a year at its Gallagher Station in New Albany, Indiana. The 600-megawatt electric generating plant is across the Ohio River from Louisville, Kentucky and serves homes and businesses in southern Indiana. The coal is delivered by barge. Since the power plant's inception in 1958, the coal has been unloaded by a Heyl & Patterson grab bucket, which is now controlled and driven with Control Techniques drives.

Three Mentor II digital DC drives are driving the same rugged, mill duty motors originally installed when the power plant was built. The drives on the larger Hold and Close motors load share when the bucket is lifting. The third drive operates the Trolley motor, which moves the loaded bucket over the hopper and the emptied bucket back over the barge. (See Single Line on following page.)



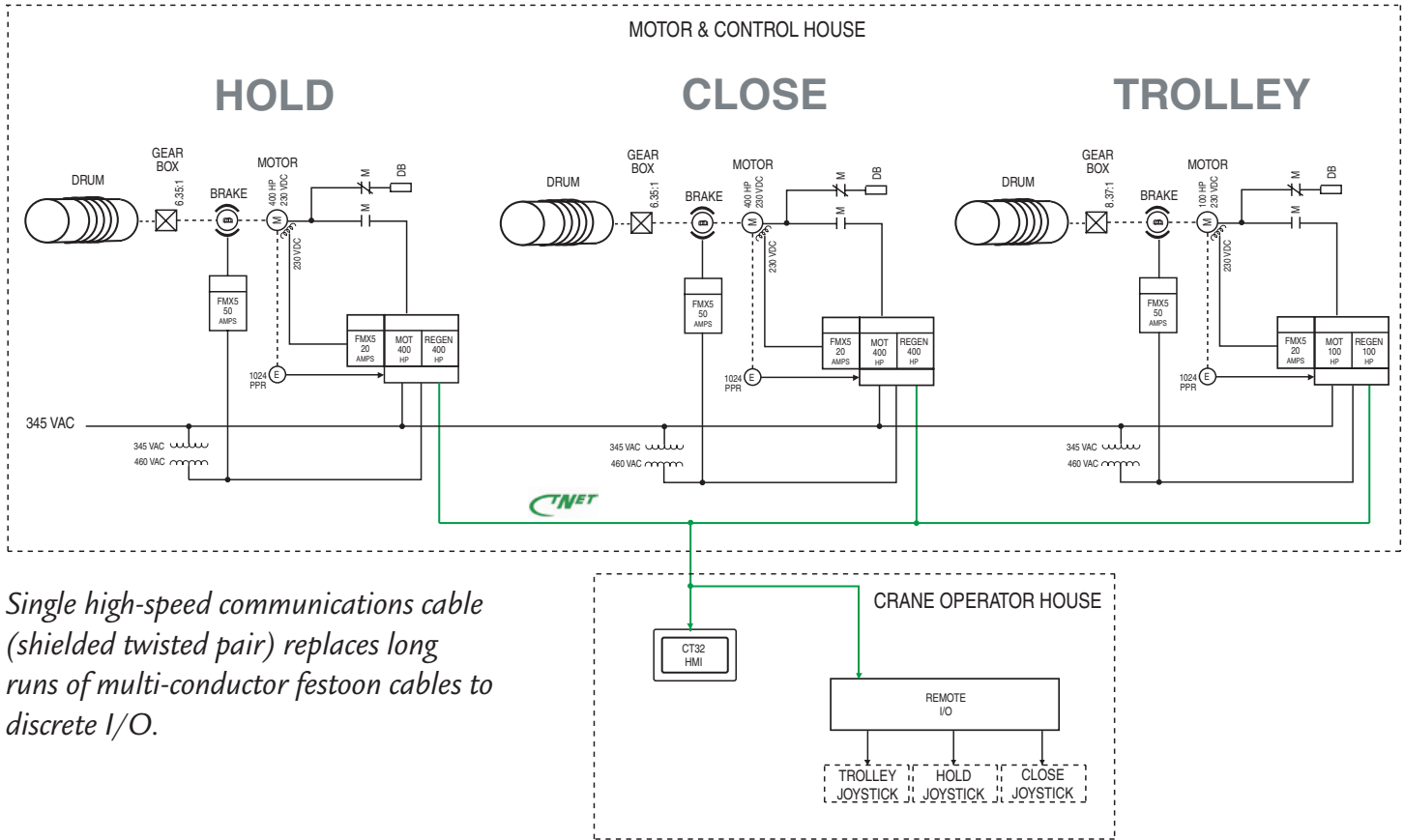
The Mentor II drives replaced analog DC drives, which replaced the original M-G sets in the 1980's. The analog system used relay logic for control. This required dozens of long runs of interconnecting wire from the Operator's Cab located under the trolley and above and beside the hopper, up to the Machine Room, or Motor and Controls House located atop the stationary barge unloader.

According to Jon Reid, project engineer for Cinergy Energy Services, Inc., the primary reason for the retrofit was to alleviate downtime and maintenance of the analog drive system. "The analog controls required constant tuning due to changes in heat and cold," Reid said. He also said Cinergy was seeking to obtain much more control over the bucket's operation to reduce maintenance on the mechanical components.

Frank Maverich, Senior Electrical Engineer at Heyl & Patterson said, "We chose the Control Techniques solution for retrofitting our grab buckets on the basis of capabilities and cost. The Mentor II DC drives possess all the features required for this application, and many were implemented to achieve Cinergy's objectives," he said. "The drives are very stable and reliable, and can handle a wide range of environmental conditions. The new system gives the operator greater control of the bucket, with five speeds in either direction."

Drive & Motion **Solutions** (continued)

Single Line for Cineroy Grab Bucket



Single high-speed communications cable (shielded twisted pair) replaces long runs of multi-conductor festoon cables to discrete I/O.



“We also took advantage of the drive’s feedback and programming capability to program automatic speed changes based on position. This enabled us to eliminate the need to use mechanical braking during most of the unloading process,” Maverich said, “reducing stress on major mechanical components.”

Now, with greater speed control and efficient regenerative braking, the integral brakes are used when the bucket is being held in position for a prolonged period of time, and as “fail-safe brakes,” operated by a coil that releases the spring-loaded brakes when there’s a loss of power.

For better monitoring and control, a CT32 color HMI screen was added in the cab, giving the operator immediate feedback on the bucket’s operation. The operator also can easily maintain and troubleshoot the system without leaving the cab. (See HMI screens.)

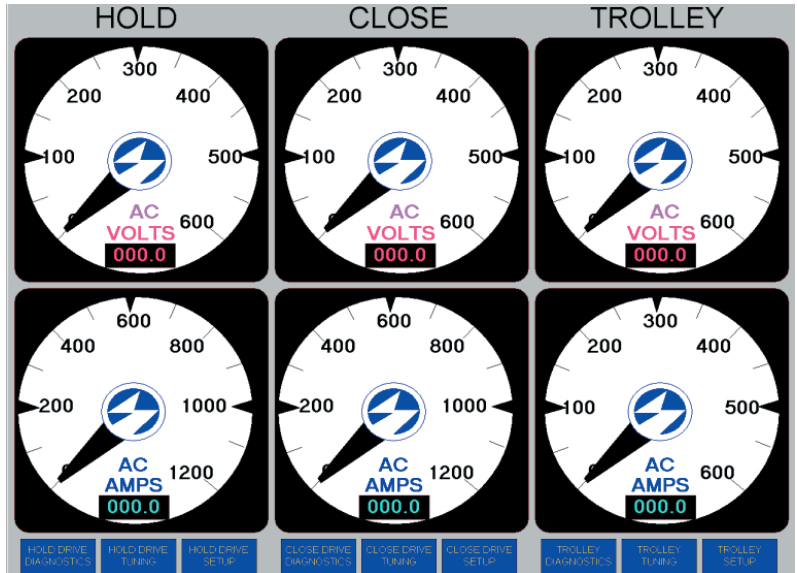
Other Control Techniques solutions implemented by Heyl & Patterson included the addition of a hand-held pendant control in the Machine Room to make reeving the drums a simpler and quicker task. To meet OSHA safety requirements, the trolley, hold, and close drums are reeved with new cable after unloading a specified amount of tonnage. In the past, a worker in the machine room where the drums are located would have to be in radio contact with the operator to accomplish the task. The Gallagher Station reeves its drums almost weekly after unloading between three and four barges a day, each carrying an average of 1,500 tons of coal.

As part of the retrofit, H&P also replaced the 12-ton bucket, and dozens of cable sheaves. Except for a couple of switches, the relay wiring between the cab and the machine room (over 40 I/O) was replaced with a single CTNet cable.

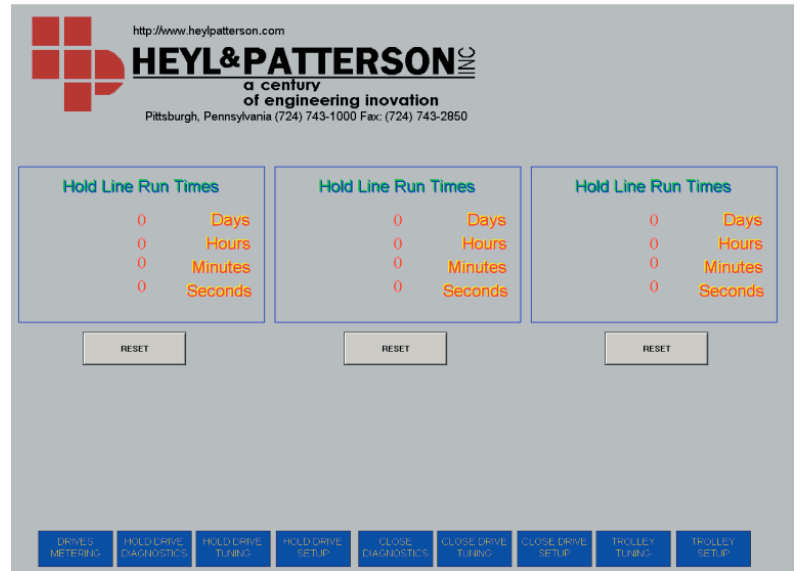
Maverich said the retrofit took two weeks, but that the start up of the Control Techniques drive and control system took only eight hours. He said, “Four hours one day, four the next, and the grab bucket was unloading coal.” ■



CT32 HMI Screens



HMI Screen: DC Drive Metering Window



HMI Screen: Resettable Elapsed Time Meters For Keeping Track of Scheduled Maintenance.

Additional HMI Screens developed by Heyl & Patterson to assist Bucket Operators:

- Setup of Preset Speeds and Position Limits;
- Diagnostics and Monitoring for all Drives, and;
- Diagnostics and Monitoring of System Remote I/O