



Session: Bulk Materials Handling
Tuesday, Sept. 23
8-10am
Room N255, Las Vegas Convention Center, Upper Concourse

Title: Achieving Greater Energy Efficiency and Increased Productivity
Through the Implementation of an Electric Drive System on a 19-
Kilometer Conveyor Belt System in a Texas Open-Cast Mine

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Abstract:

Energy efficiency and improved productivity of long single belt conveyor systems continue to become increasingly important to operators of such systems. Modern single belt conveyors can move materials many miles and the implementation of sophisticated electric drive and control systems to operate them are often the best choice.

Production operations require a constant supply of bulk material to maintain around-the-clock production. The source location of the bulk material and conveyor routing may dictate using an exceptionally long conveyor belt system that may pass over hilly terrain with significant height differentials and include multiple horizontal curves. Further, the production plant demand for bulk material may vary frequently during normal hour by hour operations.

On one recent project the designers considered a mechanical solution using hydraulic motors with flow control. However, Siemens demonstrated that an electrical drive system can provide a more flexible, reliable, and efficient solution. The solution consisted of five 750 HP variable frequency drives strategically positioned to provide measured and appropriate responses to changes in belt tension and other dynamic behaviors especially during start up and shut down. One drive is installed at the tail station (loading point), two drives at a mid point followed by two at the head station (uploading point). Fiber optic cables connecting the drive stations permit precise coordination of motor forces applied at each of the drive locations. Using actual condition data such as speed references and belt tension measurements taken at strategic positions along the

length of the belt, the individual drives are able to properly control belt stresses and speed. A key control function is the prevention of oscillation during starting and stopping.

Not only is this the best solution for uphill / downhill operations and curved conveyors, it also provides improved energy efficiency through the demand - dependent regulation of the belt speed. This solution offers increased availability of the conveyor by controlling the stresses that contribute to premature wear and tear on the belt and other mechanical components.