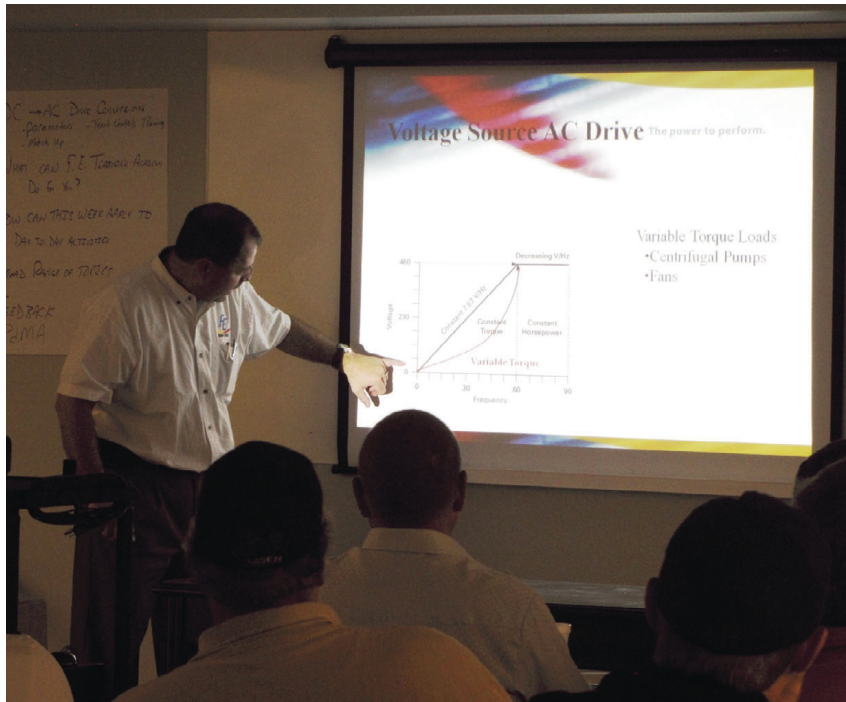


FLANDERS ELECTRIC GOES HEAD-TO-HEAD WITH ELECTRICAL ENGINEERS

BY JED E. JENSEN



Course instructors and participants share time during a lab session in looking at the excavator drives designed by the Flanders Electric engineering group.

Many mining companies face the problem of obtaining quality technical training for their employees. The challenge in mining today may be described as a knowledge gap, information transfer and technical training. Many companies are searching for ways to transfer technical knowledge from experienced employees to less-seasoned technicians.

In September 2010, Flanders Electric addressed this challenge head-on with the Flanders Electric Electrical Engineers Technical Conference. This inaugural edition is expected to be an annual event, bringing together electrical supervisors, planners and engineers from many mining companies to the Flanders Electric world headquarters in Evansville, Ind. There, they will have access to a variety of world-class technical sessions led by Flanders Electric experts. The Flanders Electric Training Academy organized this event with the specific purpose of provid-

ing high-quality instruction in topics relevant to the attendants.

Topics covered included Ward Leonard loop control and protection, power quality, AC and DC drives, substation design, and Babbitt and thrust bearings. Sessions also incorporated synchronous motor control and protection and motor design and repair considerations.

In the Classroom

The instruction consisted of classroom lecture and discussion, along with shop tours, demonstrations and hands-on lab sessions. The Flanders Electric Training Academy's mission is to provide high-quality training experiences within the Flanders organization and externally to customers worldwide.

The goal was met as participants gathered Monday through Friday. Those who attended were able to bring problems and concerns for discussions with instructors

who taught from within their field of expertise. Participants were afforded time to develop relationships and network with fellow participants, instructors and others within the Flanders organization.

The conference focused on high-level technical training for management-level electrical staff working in heavy industry, especially mining. It was successful in meeting those needs as one participant left the following comment: "I feel this week-long course was well structured for mine electrical maintenance managers, planners and electricians."

In the technical training seminar, the topics focused on the practical aspects of electrical work.

The power quality considerations segment discussed the differences between power quality and power quantity, explained why power quality is important in industry, and described the economic impacts of power quality. Power transients and distortion were examined at length, and various computer modeling tools were presented. Industry standards were outlined and application issues specific to the mining industry were presented.

In the Lab

The synchronous motor control and protection presentation included two lab exercises to help solidify presentation discussions. This training session featured discussions on the theory and components of induction motors and the differences exhibited in the operation of synchronous motors. The application and use of synchronous motors, the purpose of synchronous motors and the advantages offered to the synchronous motor user were all part of the seminar.

Flanders Electric is known for quality motor design and manufacture; and for high-quality repair of used and damaged motors. The conference also afforded participants the opportunity to discover all considerations that are part of the design of new motors and to examine the process-

es involved with the repair of existing equipment.

Participants also were given a series of lab tests and exercises to learn testing procedures involved in the manufacture and repair of electrical motors. The time spent in these labs proved to be invaluable to class participants. One of the participants remarked that the best thing about the course was, "The labs in the shop." This hands-on experience served to solidify the theory described in the classroom.

Nearly all of the participants are familiar with Babbitt and thrust bearings, so the session focused on hydrodynamic bearings. During this session, hydrodynamic bearings in all forms were a key source of classroom energy. The construction and use of the bearings were presented. Care of the bearings was discussed and performance indicators, causes of bearing failure, and bearing inspection techniques were presented. This session involved a great deal of discussion from all participants that focused on methods to improve the use of hydrodynamic bearings in practical application.

The group spent time discussing Ward Leonard loop control systems and the application of those control systems. During these discussions and lab exercises, the course participants learned the principles, development and control of Ward Leonard loops. The labs for this section featured electrical acceptance and maintenance tests, and provided a motor and generator load test.

When the topic of discussion moved to variable-speed drives, the course work began with a review of the parts and theory of various types of drives. Drive components and drive topology began the discussion and practical aspects of dealing with power difficulties caused by drives were a major part of the drives discussion. This portion of the conference featured a lab where participants were able to see a live demonstration of Flanders Electric-designed AC drives controlling the Flanders Electric MAC 1024 motor as it was directly coupled to two GE 824 motors. This demonstration showcased the ability of the MAC 1024 to drive the 824s in a loaded condition.

Substation Design

The session about substation design, protection and grounding provided each participant with a generic specification for a

portable mine duty substation and a discussion of each of the component parts of those substations. The participants gained a better understanding of the requirements of substations and the manner in which the parts of substations work together to provide a functional power supply system.

This week-long technical conference was highly successful as evidenced by the

comments received. One of the participants commented that all of the instructors are passionate about their fields of expertise, and said the sharing of knowledge and willingness to have all understand, confirms the passion for their specific field.

Jed E. Jensen is the director of the Training Academy at Flanders Electric.

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