

Total equipment monitoring + Less down time = \$\$\$\$

Bill Thompson for *Progressive Dairyman*

The ability to properly manage the electrical network in dairy facilities has become a very important issue as we introduce more electrical equipment to dairy operations.

Dairies are investing a great deal of money on parlor and facility equipment to improve operating efficiently. Technology is now available, based on managing the electrical network, that will enable a producer to ensure that his equipment is running at peak performance levels.

New technology will soon be introduced (January 2009) to the agricultural industry that will support an equipment monitoring system. This system will improve a dairyman's ability to maintain every piece of equipment on his dairy that is powered by electricity. Equipment will be monitored in real-time to detect any "fault" or malfunction in the equipment that will affect performance or possible future failure.

The type of malfunction, severity and location of the malfunction and an action plan on how to fix the problem will immediately be reported to the producer (or equipment dealer) via a computer monitor. In other words, a producer will know at any given time, the working performance level of virtually every piece of equipment on the dairy. If a piece of equipment is showing performance issues that may cause future failure, the producer can repair the problem before the equipment actually fails.

Here is how the system works: A new "smart" sensor with a microchip embedded in the sensor will detect any deviation in the voltage used by the piece of equipment. A "picture" of the fault will be sent to a software program that will compare the "picture" to thousands of examples of faults that are stored in its database.

The fault examples in the data base were mathematically developed using algorithms, to build an example of what a sine wave of these faults would look like. The software can tell the



Allowing the producer to evaluate the performance level and predicted future failure of parlor and facility equipment will greatly enhance the preventive maintenance program and save expensive down time. Photo by PD staff.

producer if the problem is an electrical arc, an overload, short, bad motor contacts, etc. Since each sensor is programmed with the exact location of the equipment, the producer will know what the problem is and where it is located. The exact time of the event and related data is logged and saved.

If a fault occurs that is not recognized by the software, the monitor will still report that a fault has occurred in a particular piece of equipment and the fault location. This "none recognized" fault can then be identified and the information stored in the database. The data will then be fully available for future fault detection.

Depending on the severity of the problem, the sensor can make the decision to shut down the equipment or shed power to another piece of equipment.

Other important functions:

- A sensor is placed on the power coming into the dairy that will give the producer data on power quality. Any deviation from the stated power requirements is logged in regard to the type, time and duration of the deviation. This function will be on the second generation with a release

date of late 2009.

- Temperatures inside electrical boxes and in equipment rooms are constantly monitored and an alarm is given if these temperatures rise above the norm. This function, along with knowing immediately of any arcs or shorts in the equipment, greatly reduces the fire risk in a facility.

- A current improperly flowing to the grounding network is detected and the source identified. This current has been known as "stray voltage" in our industry and can cause stress and related problems to health and productivity of the herd.

Issues related to identifying, measuring and eliminating stray voltage will no longer be controversial. The system will identify the problem and locate the source of the leakage current.

- VSDs, cooling fans, and fluorescent lights are examples of equipment that normally run above the 60 hertz (Hz) levels. Higher current levels can cause "harmonics" or "electronic noise" which may affect animal ID or other sensitive equipment. The system will identify the level of the

harmonics and locate the source of the noise.

Allowing the producer to evaluate the performance level and predicted future failure of parlor and facility equipment will greatly enhance the preventive maintenance program and save expensive down time. This level of total parlor monitoring has been the goal of producers for many years.

This technology will greatly enhance the operating efficiency and profitability of dairy operations. **PD**



Reprinted from Sept. 30, 2008

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