

What's New in Feed Mill Automation?

By Tom Shoen, Comco Manufacturing

The feed industry is historically conservative when it comes to adopting new automation technology. Margins for most companies are relatively low so control systems tend to be in place for many years, thus many mill managers may not be aware of what newer control systems may offer. The purpose of this document is to give a brief overview of some of the new features and technology available.

Tablets and Smart Phones

For a few years now, several feed mill control vendors have offered PDAs (personal digital assistants) as optional control system components. These systems typically are used for things like manual operation of equipment for maintenance, remote monitoring and acknowledgement of alarms, and inventory. The first generation of these systems generally ran on the Windows CE operating system.

The exploding popularity of smart phones and tablet PCs has led to the development of inexpensive and easy to use application development tools for these platforms. Custom applications can be developed very quickly and can save thousands of dollars in controls costs. As an example, iPads are being used in applications that once required remote control panels with industrial touch screen displays.

These applications can be browser-based rather than an application installed directly on the device. This means that any device with a compatible browser can run the application so there is no worry of the software becoming obsolete as new devices become available.

Industrial Wireless Technology

In addition to the applications discussed above, wireless technology is now being used in many industries for communications to control equipment and field devices. The advantage of this technology is that a mill could install a wireless device like a bearing temperature sensor on an elevator leg without the expense of wiring the sensor back to an input card on the PLC. Thus far this technology has not been widely accepted and the additional cost of the sensors may more than offset the wirings savings.

At this point there is no single standard communications protocol for these devices as there is with computer hardware so each manufacturer has its own proprietary protocol. If a standard can be agreed upon, the prices of these devices can be expected to fall significantly due to increased competition and this technology will become more attractive.

Lot Tracking

Lot number tracking has become more complex. Historically mills have only been concerned with medications, but for many feed mills this is no longer sufficient. Bio-terrorism regulations require mills to track lots forward and back. Pet food manufacturers and organic feed manufacturers face stringent documentation requirements from customers. Control systems now must have the capability to trace comingled lots, rather than just first in, first out tracking that is usually sufficient for bagged ingredients. Most systems today can incorporate bar code readers to quickly capture lot information.

Audits

Lot number tracking tells us where the ingredients that went into a batch came from and where the batch ended up. Audits tell us what happened at the mill as it was made. Control systems today keep a comprehensive audit of every operation including things like alarms and manual overrides. Every bit of data entered and every mouse click are logged with the time, date, and user login. Mill managers can easily access this information to monitor operations.

SQL Databases

The first generation of Windows-based mill automation systems were generally based on the Microsoft Access database. In the middle of the last decade, we began to see systems based on Microsoft SQL Server.

Microsoft Access is limited to a maximum of two gigabytes. That seems like a lot of data but the newest control system keep track of a tremendous amount of data and a high capacity mill can hit this limit in a matter of months. Microsoft SQL Server databases have a limit of up to 524,258 terabytes, depending on the version used, so are essentially unlimited from a practical standpoint.

Another reason for a shift to SQL Server is that it is a much more robust system. SQL databases are faster than Access databases of the same size. They handle multiple users better and they are much less prone to data corruption and have much better tools for data recovery if a problem is encountered. For these reasons, many large companies have made Microsoft SQL Server a requirement for new systems.

Analytical Tools

In addition to printed reports, most control systems now include statistical process control tools that allow the user to analyze processes on the basis of accuracy and efficiency. Run charts can be quickly generated on batch data. Data like scale readings showing the increase in weight on a scale in fractions of a second can be logged and used to troubleshoot scale and feeder issues.

Maintenance Software

Some systems now offer integrated maintenance modules. Maintenance tasks are set up based on a time interval or, since the software is integrated with the control system, they can also be set up based on actual hours of operation or equipment alarms.

We have seen significant advancements in feed mill automation over the past 20 years. We have gone from single-user systems using character-based operating systems like DOS and proprietary hardware to networkable windows-based systems using standard off-the-shelf hardware and sophisticated graphical user interfaces. It is not likely that development will continue at quite this pace but we can still expect to see a number of new innovations as new technology is adapted and refined for our industry.