NEW DEVELOPMENTS FOR THE INTELLIGIN SYSTEM

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Abstract

In 1996 Zellweger Uster acquired the rights from the USDA for gin process control. Beta site testing began in the Mid South during 1997. The first commercial installations were in the Southeast and began in 1998. During the 1999 season a system was installed in a Texas stripper gin application. This year the application of the IntelliGin process control was extended to the California region. There are currently 33 IntelliGin sites located throughout the cotton belt. The number of bales processed using the IntelliGin process has steadily grown from 110,000 bales in 1997 to over 1,000,000 bales in 2000/2001.

IntelliGin process control uses several new technologies that have been integrated into the system. A patented xenon flash is used on the color and trash module. The moisture is measured using a patented sensor for the seed and lint cotton. The paddle design was improved for better sampling. Software algorithms were improved to more accurately predict the effect of the processing machines on the cotton color and trash grades. New feedback loops were designed so that there were immediate adjustments made during processing decisions.

During the 2000/2001 season several new developments were introduced to the gin process control system.

- Bale moisture
- Categories for warehousing
- Trash classification
- Improved color and trash grades
- Roller gin application
- Control for adjustable grid bars

Test Results

Bale Moisture

The patented resistance moisture sensor was used in several locations to obtain accurate final bale moisture.

- Tramper door
- Tramper
- Bale mover
- Pressure sensors at bale press ram

The final objective is to use the bale moisture to control the moisture restoration system. Sensors were installed at 3 Beta sites and monitored standard ginning conditions. Changes in the moisture restoration system were verified using the moisture sensor and final bale moisture was determined using the standard oven test. The results showed that the sensor located on the bale mover provided the best results. Sensors located on the tramper door and tramper ram proved highly variable. Moisture in the cotton as it is feed into the press box is not uniform and the ambient temperature also had a negative affect on the results. Increasing the water temperature of the moisture restoration system had very little affect on the final bale moisture. Future plans are to:

- Expand bale mover applications
- Directly control the moisture regain system with PLC
- Expand application to additional equipment

Warehouse Categories

The goals of this development are as follows:

- Reduce multiple bale handling
- Improve shipping response time
- Prove feasibility of using category system
- Use low cost portable instruments
- Produce bale tags with category numbers

Categories or groups were assigned for these fiber properties.

- Micronaire
- Color
- Length

The past classing office summaries were analyzed with the goal of making the groups as large as possible. The focus was to identify and control the exception bales. We also wanted to optimize the layout of the warehouse. The recap summary identified that approximately 15-20% of the total bales ginned were exception bales. Individual bale identity was necessary because of POP payments, separate merchant contracts and changes in categories as the crop is being harvested. A matrix was designed to assign 5 categories for controlling micronaire (3) and color (2). Categories were designed using the groups and ranges provided by Staplcotn. The length trail was done using a 730 Fibrograph and testing every other bale to obtain a module average. The bales were grouped into 2 categories shorter and longer than 1.06".

Trash Classification

Samples of images were collected from the IntelliGin system that was processing cottons with bark and grass. Classing office results were collected and stored in a database. Image analysis algorithms are being improved to match the result of the cotton classer.

Color and Trash Grades

Special software was developed so that results from the local USDA classing office can easily be analyzed. Once this analysis is complete the results from the IntelliGin grades are fine tuned to match the regional classing office.

Roller Gin Application

An IntelliGin system was installed in a roller gin to analyze the pre cleaning and ginning speeds. The system color and trash measurements were adjusted to match the Pima grades.

Controlling Adjustable Grid Bars

A patent for adjustable grid bars for lint cleaners was licensed to control the amount of cleaning and lint removal of mechanical lint cleaners. The IntelliGin monitoring system was used to make decisions on how many grid bars were necessary to optimize turnout and reduce fiber damage. Results showed that decreasing the number of grid bars can improve turnout and significantly improve the fiber properties.

Conclusions

Gin process control using the IntelliGin system is now distributed throughout the cotton belt. The features of the system are being expanded to include additional process control parameters. New developments are focused on areas that maximize the value of the cotton for the producer. Continuous improvements to IntelliGin will give producers and ginners the tools necessary to maintain profitability as market conditions change.

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