

Innovations in USDA Cotton Classification

Bremen International Cotton Conference

Darryl W. Earnest
Deputy Administrator
USDA, AMS, Cotton and Tobacco Program
Memphis, TN

Main Topics to Cover

- ◆ High Volume Instrument Improvements
- ◆ Automation of Sample Movement Process
- ◆ Image Analysis for Color, Trash, and Extraneous Matter
- ◆ Business Intelligence Analytics
- ◆ Quality Management Program
- ◆ Future Considerations

Mission

Facilitate the efficient marketing of U.S. cotton and tobacco to both domestic and international markets through providing accurate, timely, efficient, and unbiased services that assist the industries in conducting fair and competitive trade practices and promoting the commodities worldwide for the benefit of all segments of the U.S. industries and end consumers.

Vision

To pursue innovation; embrace efficiency; reject complacency; deliver the highest level of customer service; personify professionalism, integrity, and respect; accept social responsibility; and strive for excellence.

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High Volume Instrument Improvements

High Volume Instrument Improvements

Automated
Micronaire



High Volume Instrument Improvements

De-Coupled Instrument Components



Traditional Coupled



De-Coupled



Individual Operation
=
Increased Flexibility &
Optimization

Automation of Sample Movement Process

Automation of Sample Movement Process



Abilene, TX Classing Office

Automation of Sample Movement Process



Abilene, TX Classing Office

Results of Automation in Abilene

- ◇ Reduced the number of HVIs from 14 to 8
- ◇ Increased the number of samples classed per hour from 108.3 to 114.9 (net) and testing output close to 120 s/h
- ◇ More improvements expected for 2016 season
- ◇ Better optimized personnel and instruments which correlated into increased efficiency

Automation of Sample Movement Process



Memphis, TN Classing Office

Automation of Sample Movement Process



Memphis, TN Classing Office

Results of Automation in Memphis

- ◆ Four instrument system
- ◆ Passed qualifications and contract criteria over past couple of weeks
- ◆ Qualifications resulted in 125+ samples per hour instrument-tested. This compared to average of 93.4 samples per hour in MCO in 2015-16 using traditional methods
- ◆ More testing and qualifications to follow in 2016 with full utilization planned for 2016 classing season

Image Analysis of Color, Trash, and Extraneous Matter

Image Analysis for Color, Trash, and Extraneous Matter

- ◆ USDA secured contracts with three companies for imaging prototype technology
- ◆ USDA desired to seek new potential lighting and imaging technology to enhance measurement ability for color and trash and also to pursue potential of electronic detection of extraneous matter
- ◆ Each of the three companies used different state-of-the-art approach

Image Analysis for Color, Trash, and Extraneous Matter



1

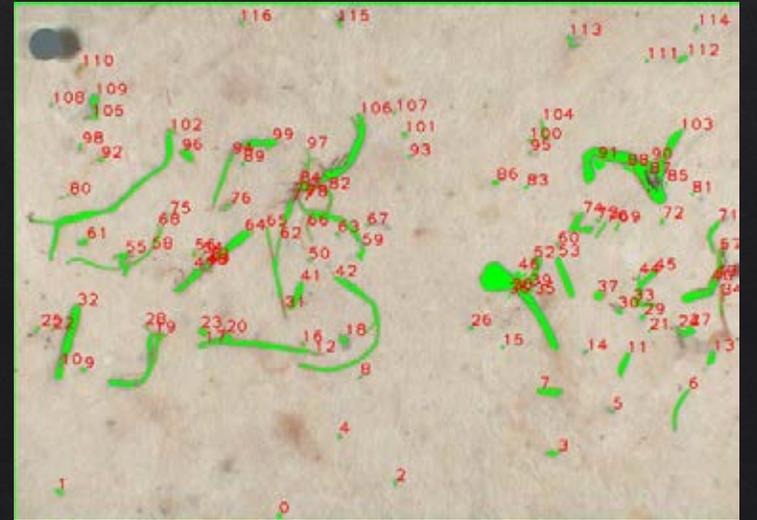
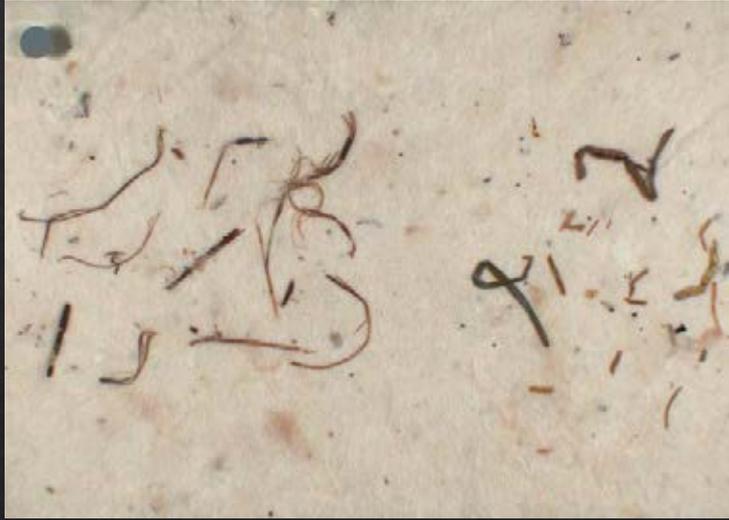


2



3

Image Analysis for Color, Trash, and Extraneous Matter



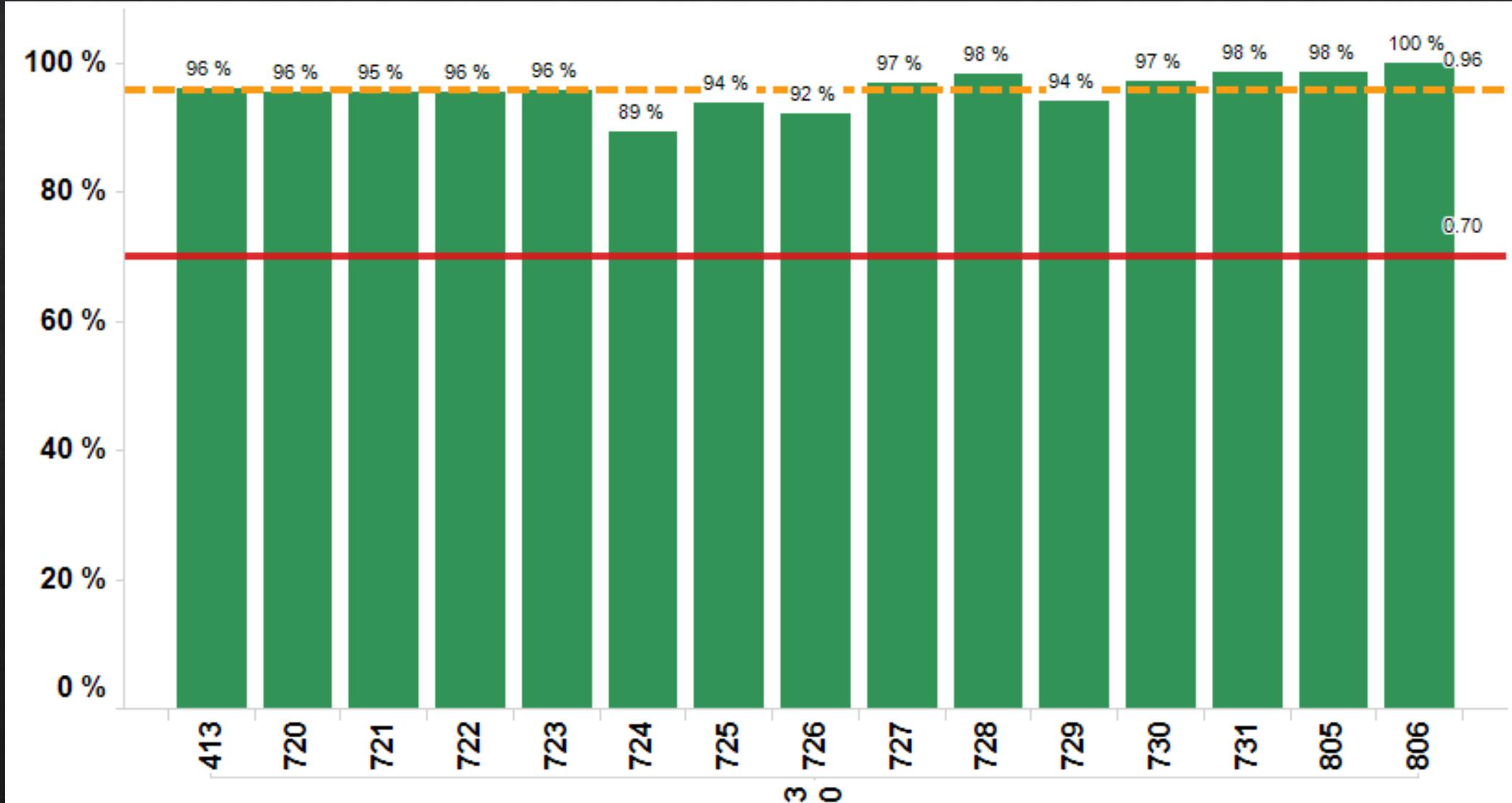
Business Intelligence Analytics

Business Intelligence Analytics

- ◆ Utilization of real-time analytics for immediate graphic and data feedback on a variety of operations to make critical decisions
- ◆ For cotton classification, use data from known-value in-house cotton along with live measurements to provide immediate feedback for monitor of performance and to make any adjustments
- ◆ Business intelligence analytics can be used for all facets of operations that use or generates data (which is virtually everything)

Business Intelligence Analytics – In-House Known Value Check

In-house Tolerance - Micronaire

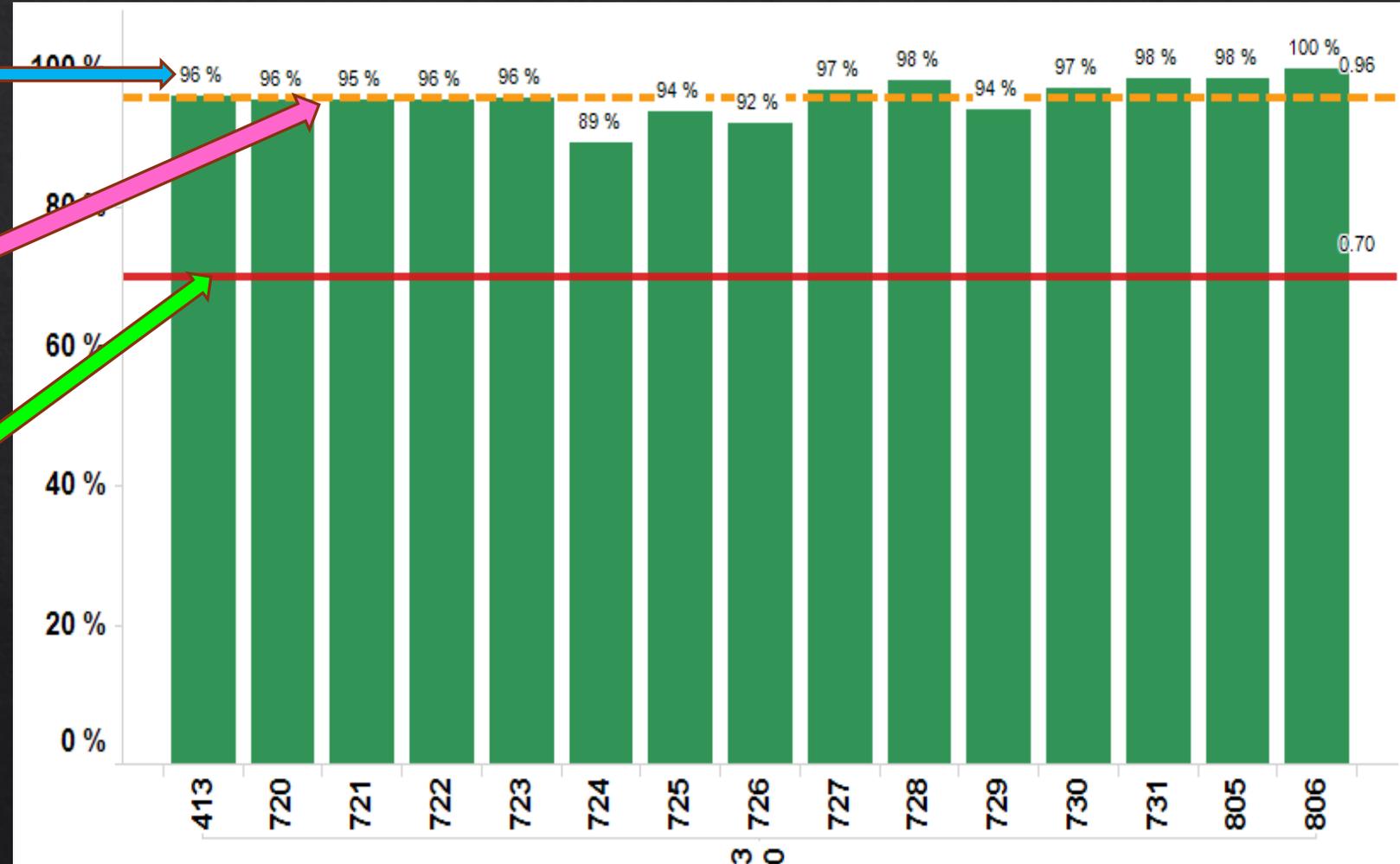


Business Intelligence Analytics – In-House Known Value Check

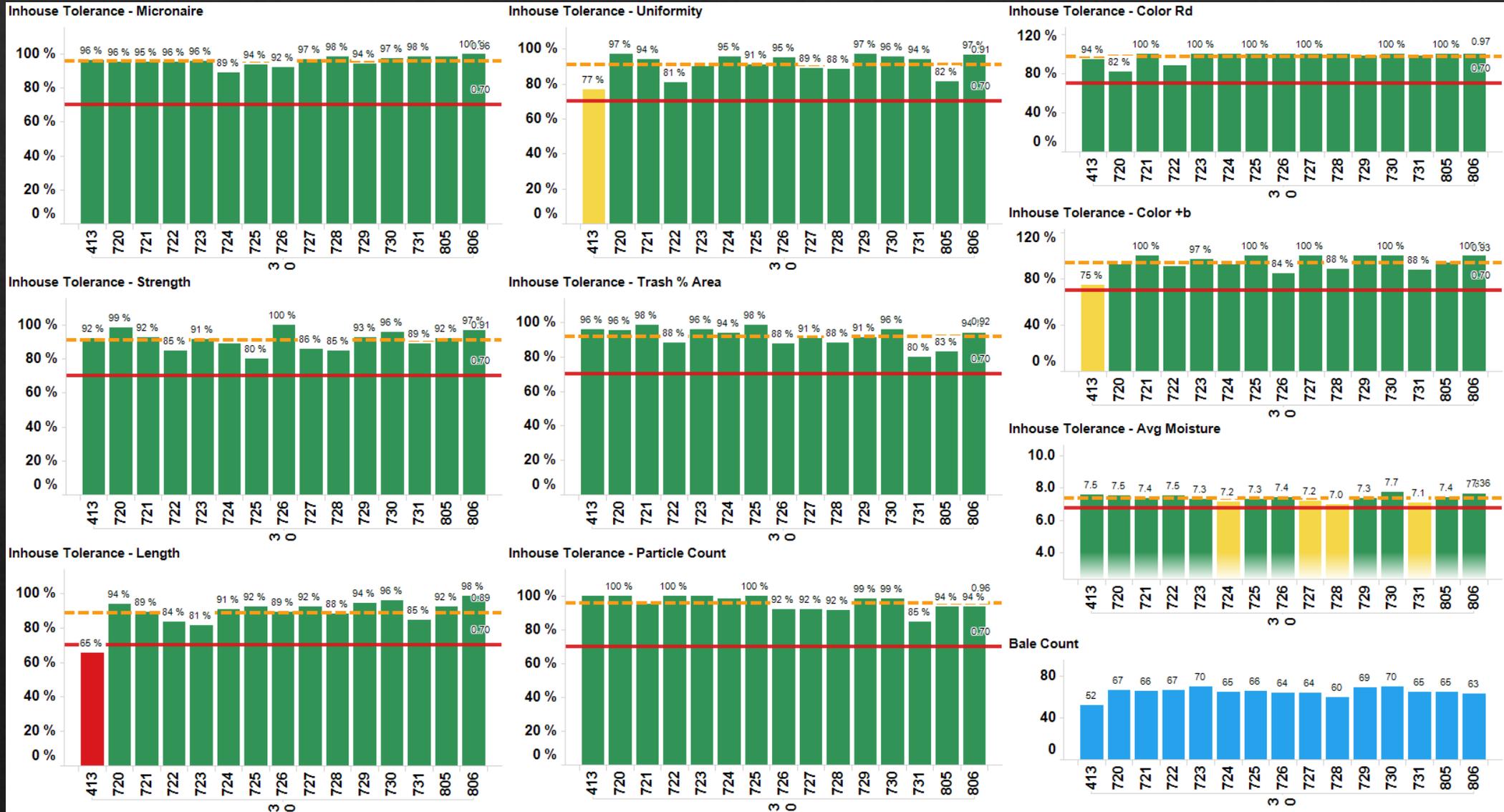
Performance –
Repeatability of testing

Calculated Trend Lines
and Statistics

Adjustable Target Line
for Minimum
Performance



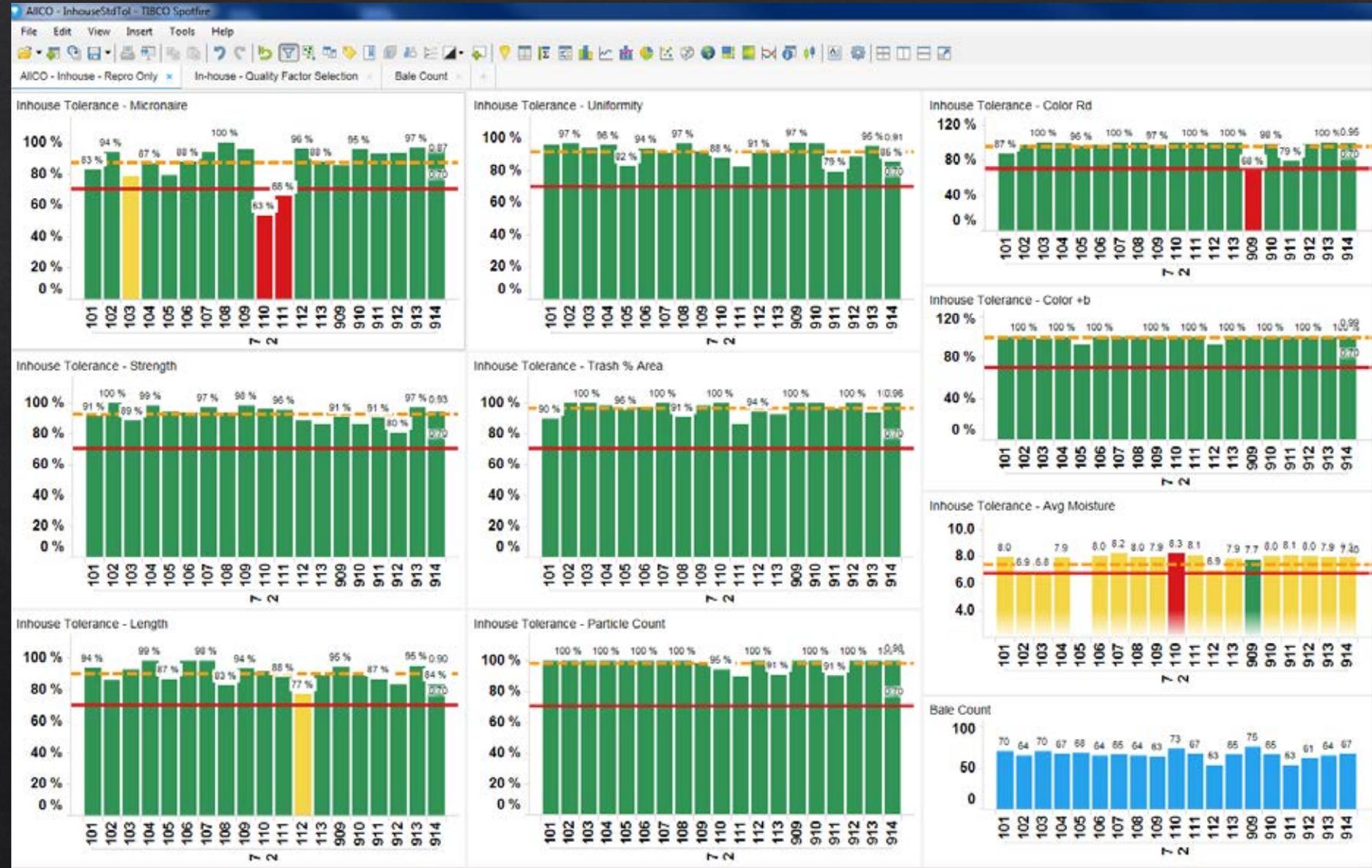
Business Intelligence Analytics – Large Amount of Data



Business Intelligence Analytics – Color Coded Graphics

Immediate graphical recognition of problems or potential problems

Regardless of number of instruments, can immediately hone in on **RED** lines to address issues and **YELLOW** lines that may be approaching **RED**



Business Intelligence Analytics

Immediate Real-Time Performance Data



Business Intelligence Analytics

Big Screen Monitors in Plain View of all Lab Operations to assess performance throughout the entire shift



Business Intelligence Analytics

- ◆ Powerful tool to analyze large amounts of data in short amounts of time
- ◆ Immediate feedback for quick decisions
- ◆ We can also look at many different analyses with the entire crop in real time

Quality Management Process

Quality Management Program

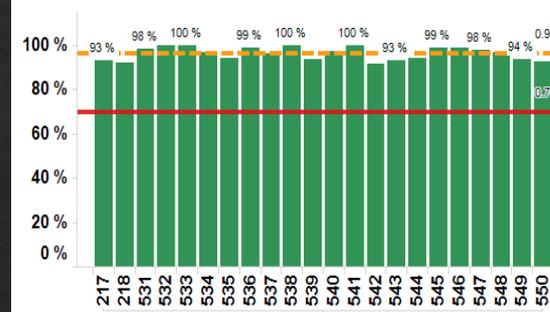
- ◆ Use known-value cottons and materials and the current methods of in-house verification checks throughout each shift to manage accuracy and precision in each office
- ◆ Couple the known-value checks with business analytics software to give immediate real-time feedback
- ◆ Allows for frequent ongoing checks instead of sending cotton to Memphis overnight for retesting (current check-lot system)

Quality Management Program

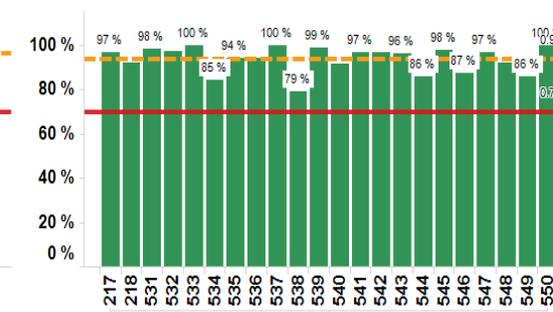
Can use Analytics in QMP to measure performance of testing instruments, classers, supervisors, shifts, offices, divisions, etc.

Can analyze thousands of data points in seconds and millions in minutes

Inhouse Tolerance - Micronaire



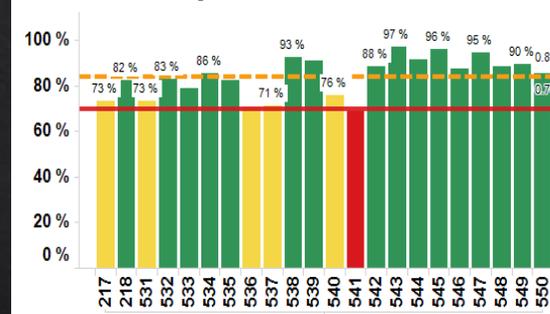
Inhouse Tolerance - Uniformity



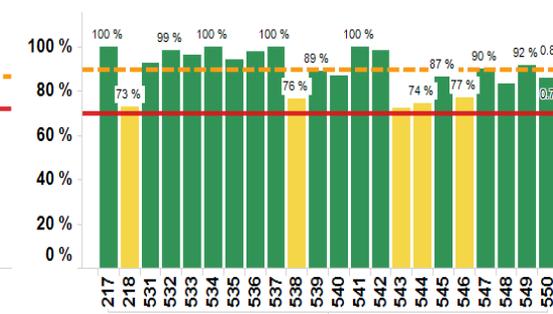
Inhouse Tolerance - Color Rd



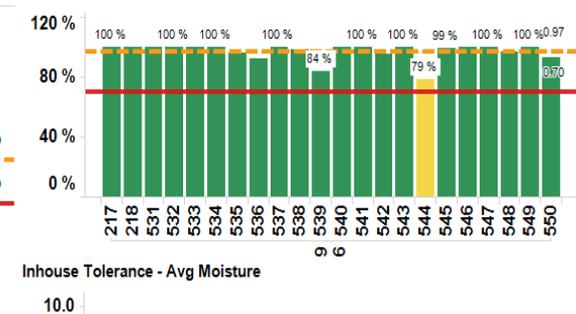
Inhouse Tolerance - Strength



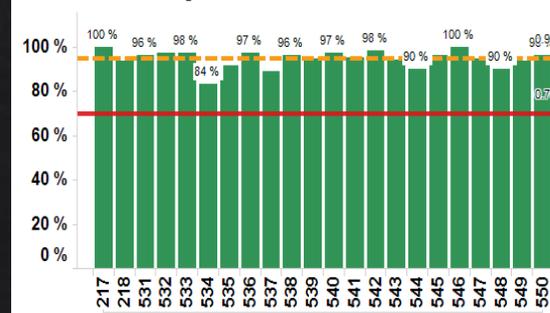
Inhouse Tolerance - Trash % Area



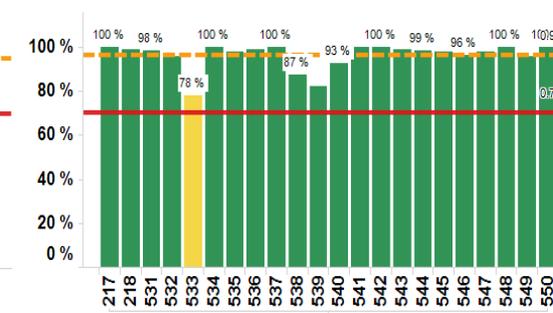
Inhouse Tolerance - Color +b



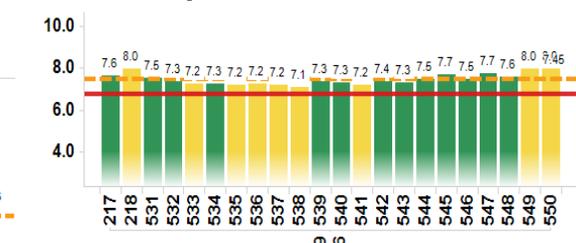
Inhouse Tolerance - Length



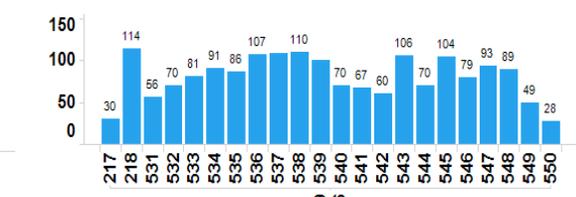
Inhouse Tolerance - Particle Count



Inhouse Tolerance - Avg Moisture



Bale Count



Quality Management Program

- ◆ C&T pilot-tested the QMP in 4 classing offices in 2015 crop (one pilot office in each region) with very promising results that proved the principles that were expected
- ◆ Full implementation of the QMP in all 10 classing locations will take place in 2016

Future Considerations

Future Considerations

- ◆ Continue to work with instrument manufacturer to improve HVI equipment
- ◆ Evaluate Beta models for three imaging prototypes
- ◆ Continue to evaluate automation (both types) and plan for future procurement and implementation in other locations
- ◆ Advance toward full automated cotton classification
- ◆ Plan future classing office modifications and new offices around automation and business analytics
- ◆ Leverage technology and analytics to identify areas for efficiency improvements in all facets of operations

Conclusion

Keep the Mission and Vision in Mind

To pursue innovation; embrace efficiency; reject complacency; deliver the highest level of customer service; personify professionalism, integrity, and respect; accept social responsibility; and strive for excellence.

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THANK YOU!!!