



ACCCI MESH Quality Subcommittee

APRIL 2018

Quality Update

- ▶ ABC Coke Quality Project – Coal Bulk Density Belt Scanner
- ▶ ASTM D05 Coal and Coke Update

ABC Coke Quality Project

COAL BLEND BULK DENSITY BELT
SCANNER

Project Goal

- ▶ Continuous on-line bulk density analysis of coal blend.
- ▶ Monitor and control bulk density using various techniques on a continuous basis.
- ▶ Eliminate analyst bias that is exists by using **ASTM D291 – Standard Test Method for Cubic Foot Weight of Crushed Bituminous Coal**

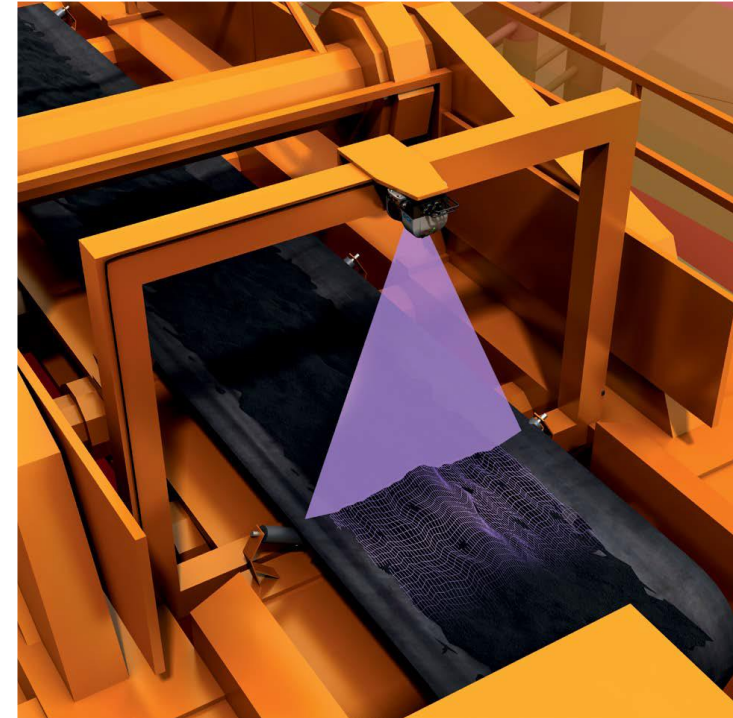
ABC Coke Quality Project

- ▶ Coal Blend Bulk Density Belt Scanner
- ▶ Manufacturer: SICK (www.sick.com)
- ▶ Model: Bulksan ® LMS511
 - ▶ Non-contact and maintenance-free sensor for measuring volume flow.



Coal Blend Bulk Density Scanner

- ▶ Scanner measures area profile of material on the belt
- ▶ Scanner data combined with belt speed yields volume; and volume combined with a belt scale yields density
- ▶ Density = Mass/Volume
- ▶ Compared **SICK Scanner** to **ASTM D291 – Standard Test Method for Cubic Foot Weight of Crushed Bituminous Coal**
- ▶ Scanner on loan for 30 days from manufacturer



Coal Blend Bulk Density Scanner

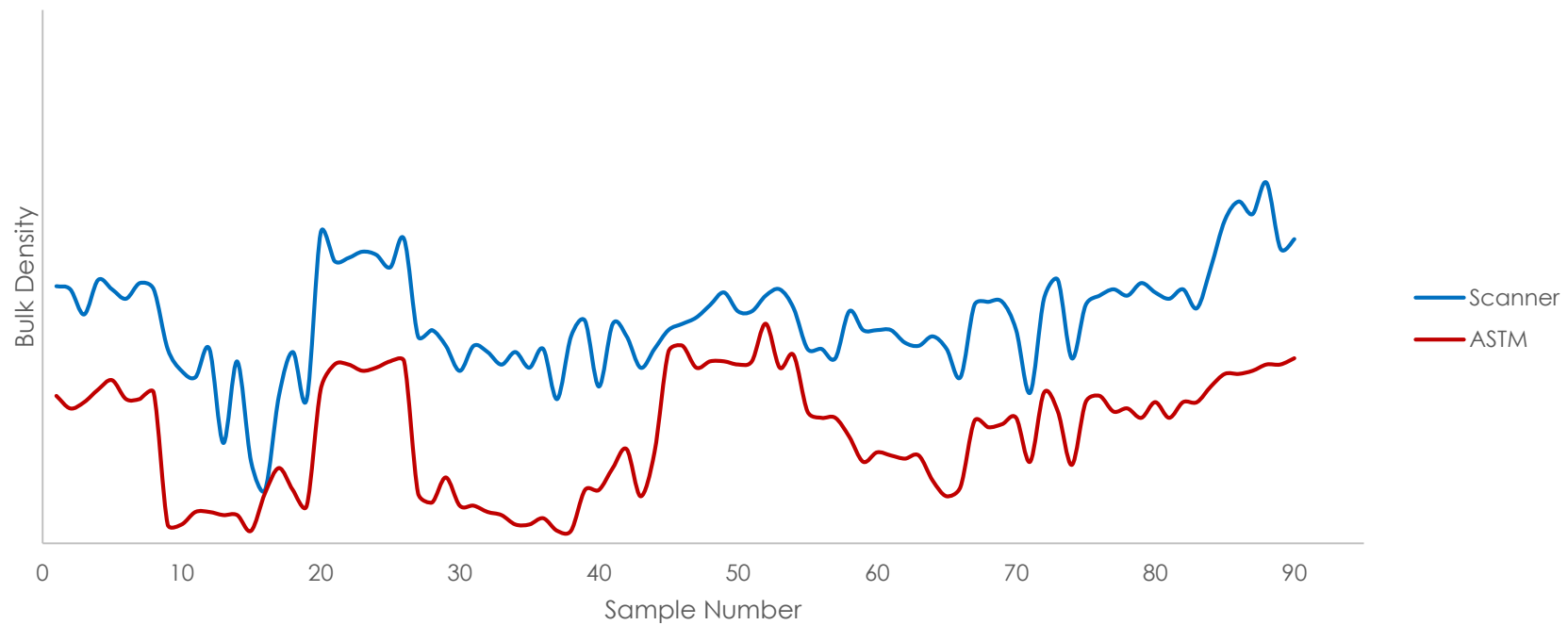
- ▶ First Round of Testing
- ▶ 18 Days of Comparative Tests for a total of 90 samples
- ▶ Scanner Data Recorded from **Display**
 - ▶ One minute of data points averaged together
 - ▶ Belt stopped and sample pulled
- ▶ ASTM D291 performed by same technician to reduce human to human variability – Sampling and analytical testing supervised by management

Expectations

- ▶ Anticipated a bias between the scanner and the ASTM method
- ▶ Hoped the bias would remain relatively parallel between the two tests
- ▶ ASTM Method could potentially be phased out or reduced to spot checking in favor of the on-line analyzer

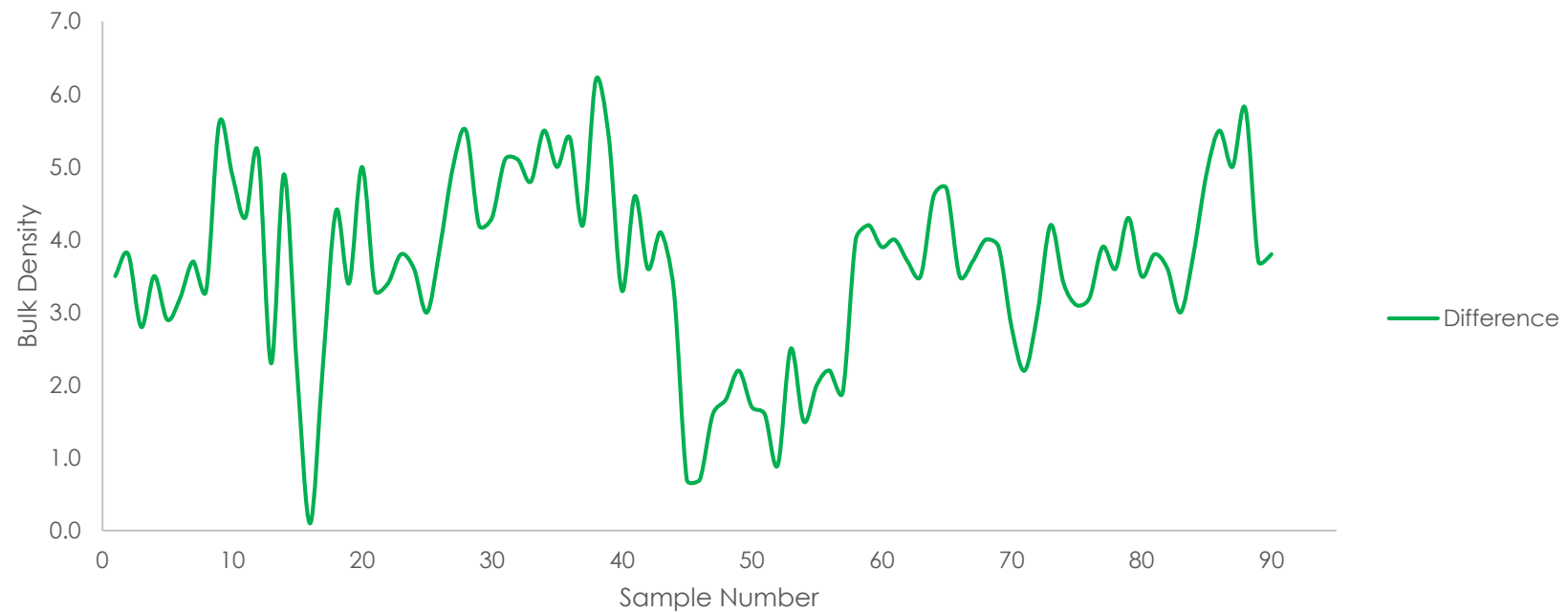
Coal Blend Bulk Density Scanner

Bulk Density (Scanner vs. Lab)
ASTM and Scanner show some correlation but is it reliable?



Coal Blend Bulk Density Scanner

Bulk Density (Scanner vs. ASTM)
Bias between ASTM and Scanner is not stable

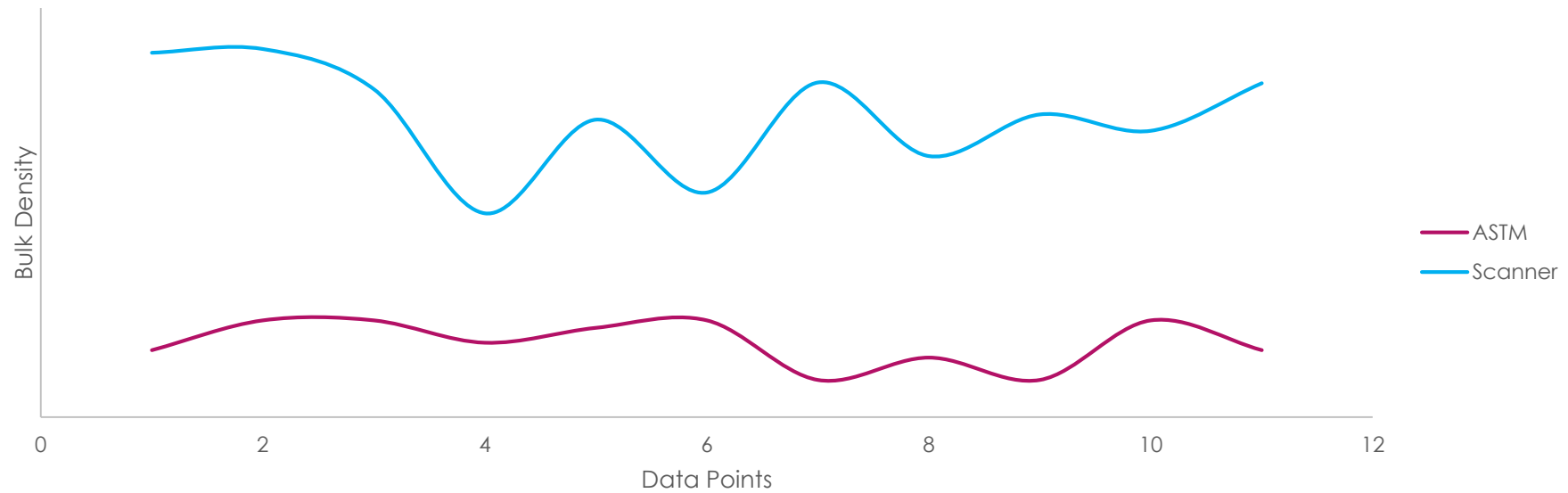


Coal Blend Bulk Density Scanner

- ▶ Second Round of Testing
- ▶ Two Days of Comparative Tests for a total of 11 samples
- ▶ Scanner Raw Data Pulled from **Laptop**
 - ▶ Belt stopped and sample pulled – time noted.
 - ▶ Previous minute of raw data averaged together at time sample was pulled
- ▶ ASTM D291 performed by same technician to reduce human to human variability – Sampling and analytical testing supervised by management

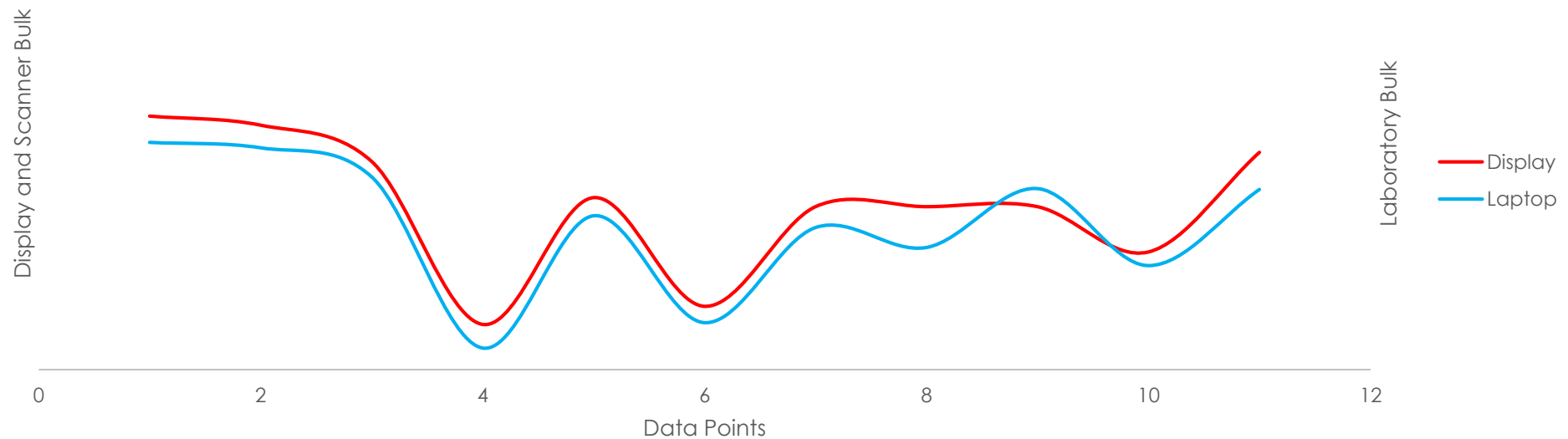
Coal Blend Bulk Density Scanner

September 21st & 22nd (2017)
Scanner and ASTM bias is still not stable



Coal Blend Bulk Density Scanner

Display vs Laptop
(Shows BD Data from Test 1 and Test 2 are Comparable)





Any Questions?

ACCCI QUALITY UPDATE

FALL 2017 MESH MEETING

ASTM D05 – Coal and Coke Subcommittees

- ▶ D05.07 Physical Characteristics of Coal
- ▶ D05.15 Metallurgical Properties of Coal and Coke
- ▶ D05.18 Classification of Coals
- ▶ D05.21 Methods of Analysis
- ▶ D05.23 Sampling
- ▶ D05.24 Statistics
- ▶ D05.28 Petrographic Analysis of Coal and Coke
- ▶ D05.29 Major Elements in Ash and Trace Elements of Coal