



# Continuous Sinter Sizing & Colour Analysis



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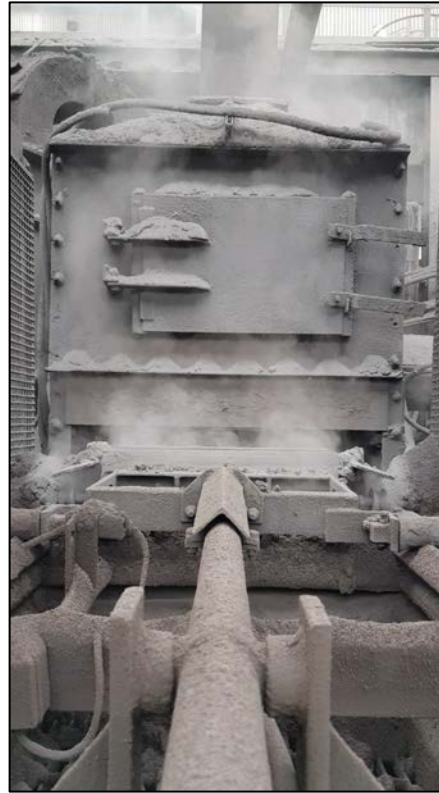
30<sup>th</sup> Oct 2023



# Sinter Sizing – 1970s Technology

## Manual Sampling/Measurement

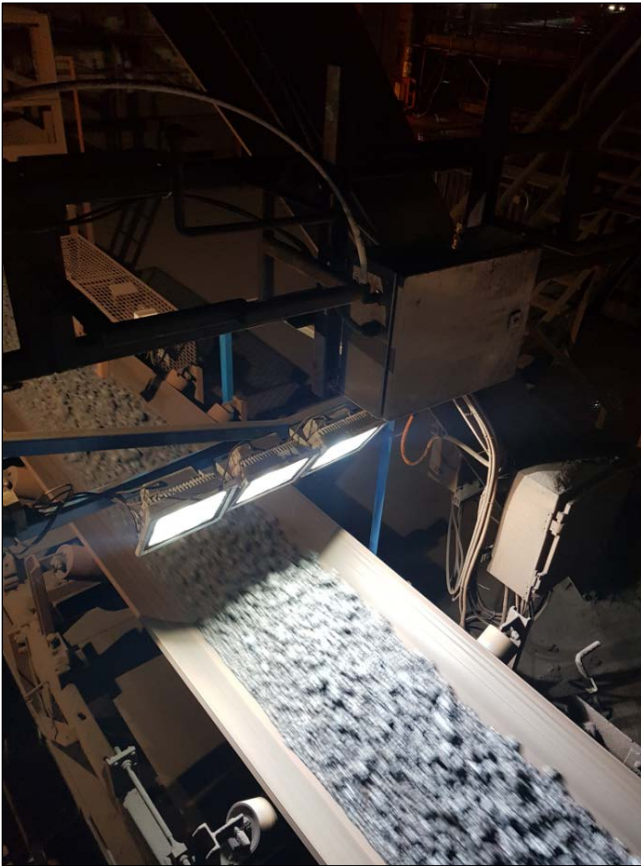
- Manual periodic sampling – cannot respond to system changes quickly
- Time consuming / labour intensive



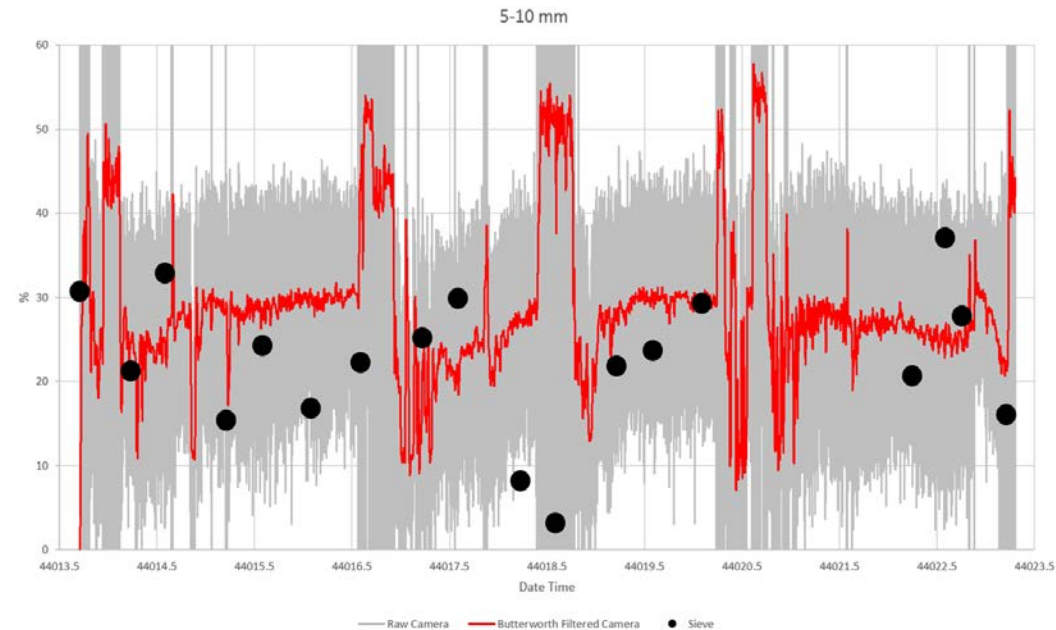
# Sinter Sizing – Current State

- Industry led challenge – improved measurement improves the process control
- In-line high speed on belt sizing
- Real-time data acquisition and trending

Camera insitu



Camera versus Manual Sampling





# Sinter Sizing – Current State

- Typical Sinter plant





# Bespoke Image Processing and Analysis Methodology



Input Image

Belt Detection

Illumination  
Correction

Background  
Detection

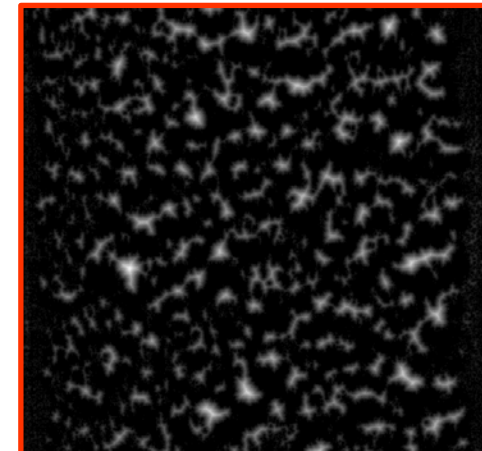
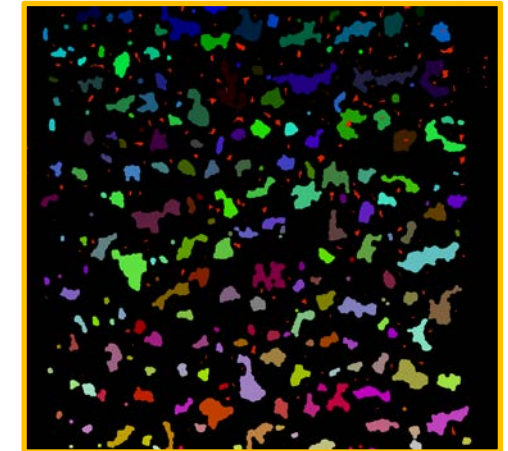
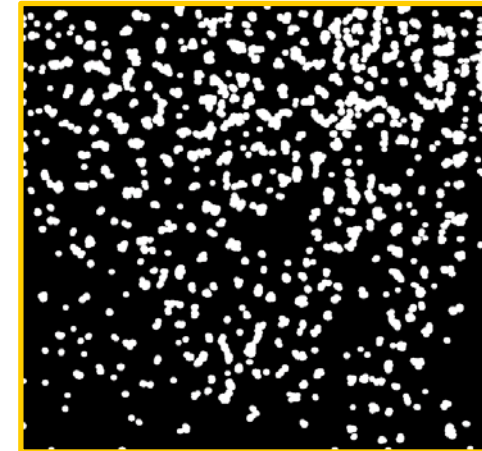
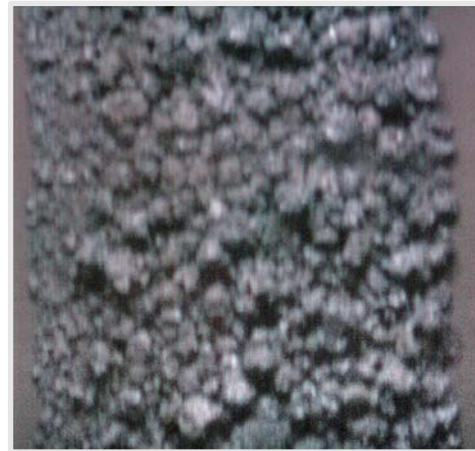
Distance  
Transform

Watershed

Count Particles  
& Colour

Weighting  
Factors

Output







# Bespoke Image Processing and Analysis Methodology



Input Image

Belt Detection

Illumination  
Correction

Background  
Detection

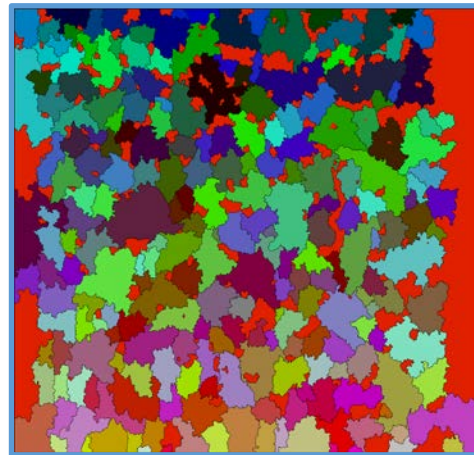
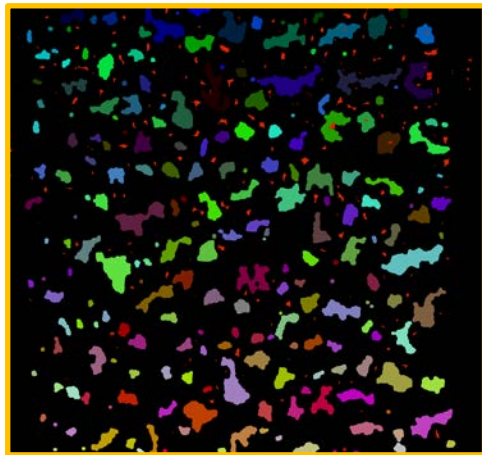
Distance  
Transform

Watershed

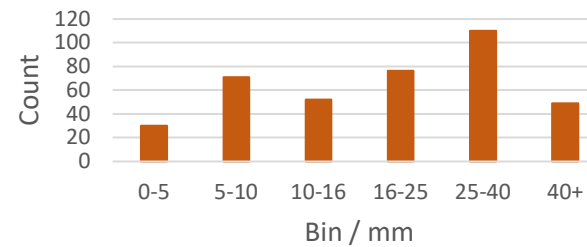
Count Particles  
& Colour

Weighting  
Factors

Output



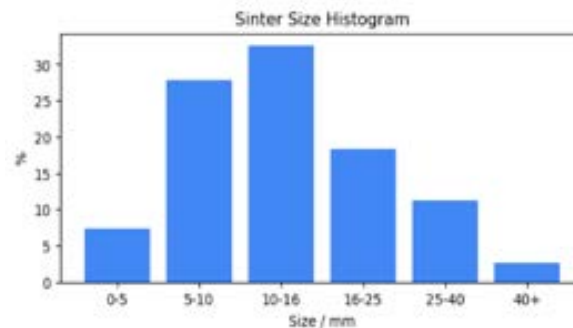
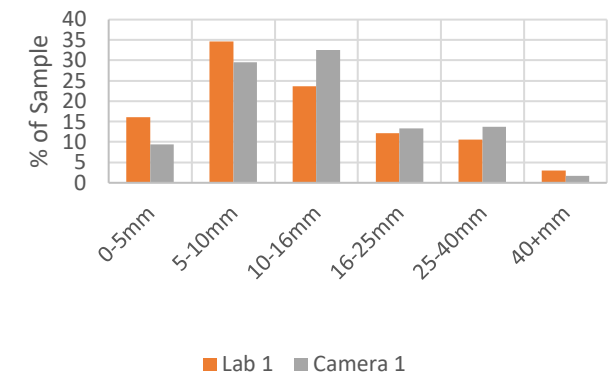
Size Count



Mean Colour (R, G, B): 32, 31, 36



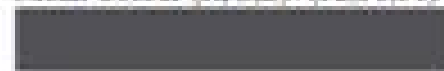
Camera vs Sieve Comparison



Mean Size / mm: 15.29

Standard Deviation / mm: 10.03

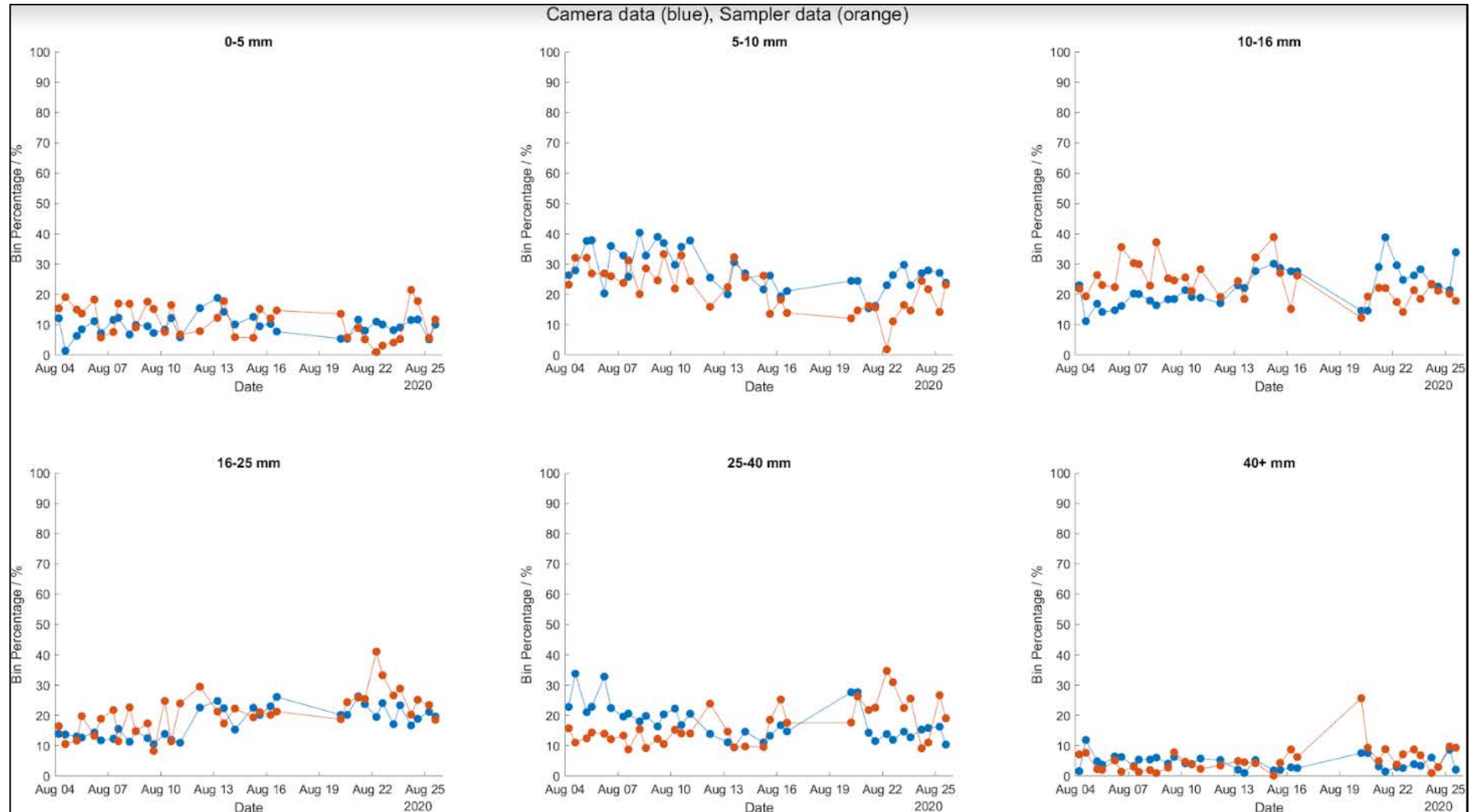
Mean Colour (R,G,B): (32,31,36)





# Sinter Sizing

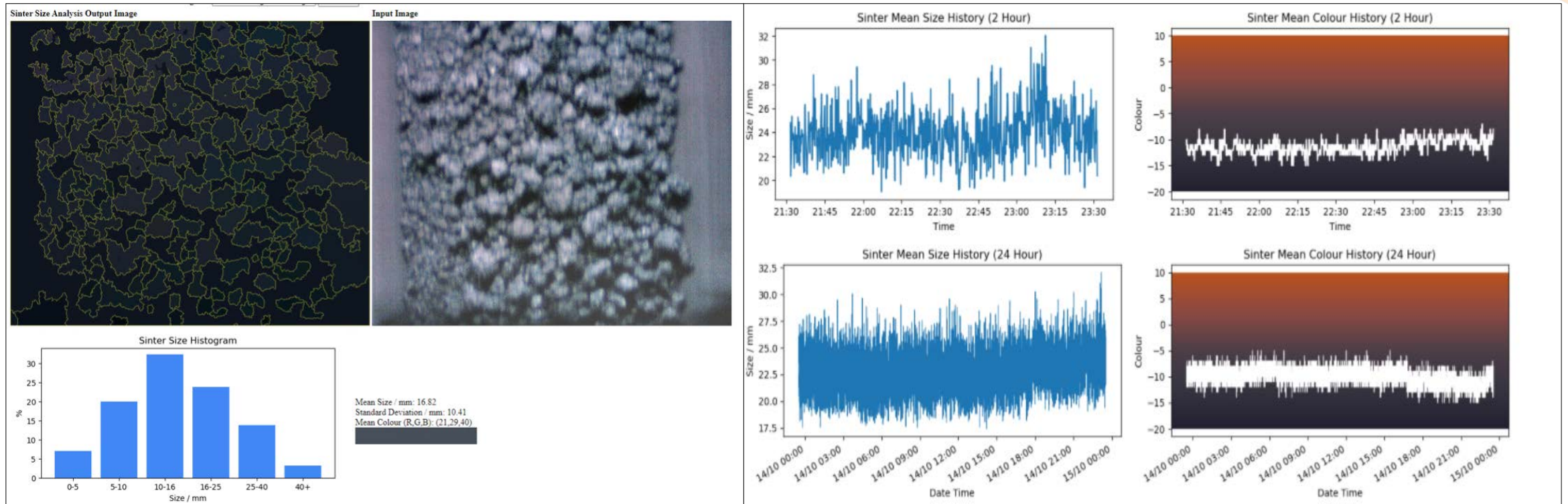
- Camera sizing analysis correlates well with routine manual samples across all six size fractions





# Sinter Sizing

- Webpage gives live video feed, live output and 2hr/24hr trending



Webpage freely accessible across the plant/at home - can be used as a lead indicator for sinter quality at Blast Furnaces, and feedback for operational steer in sintermaking.

Read the full paper @ <https://www.tandfonline.com/doi/full/10.1080/03019233.2023.2208979>  
and see all our publications at <https://pyroptik.com/mission/>





# Sinter Sizing

- Potential project benefits across the 3 Pillars of Sustainability

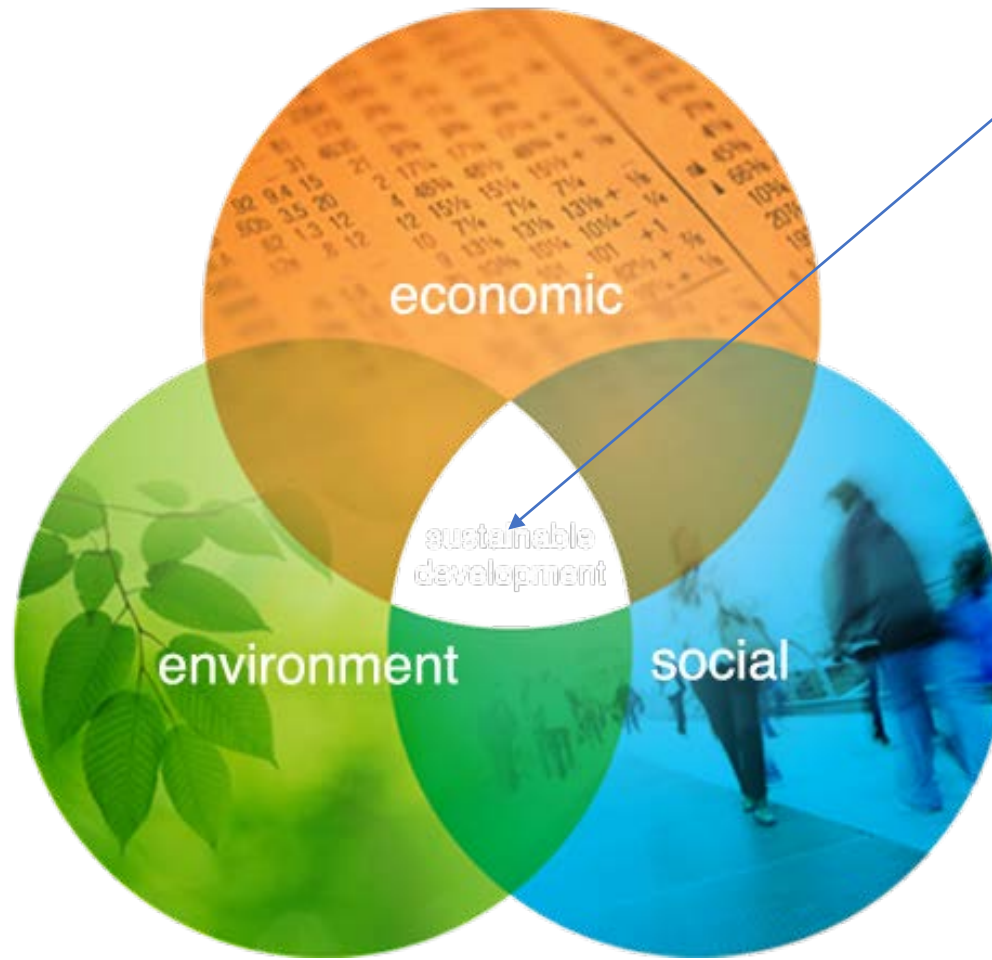
Reduced Blast  
Furnace coke rates

Reduced Emissions  
Trading Scheme Liability

Reduced  
Carbon  
emissions

Reduced  
dust  
emissions

Better working  
conditions on plant



**Low-cost enabler for  
Digital Transformation**

Improved  
Knowledge  
Transfer

Better data  
to guide  
experience

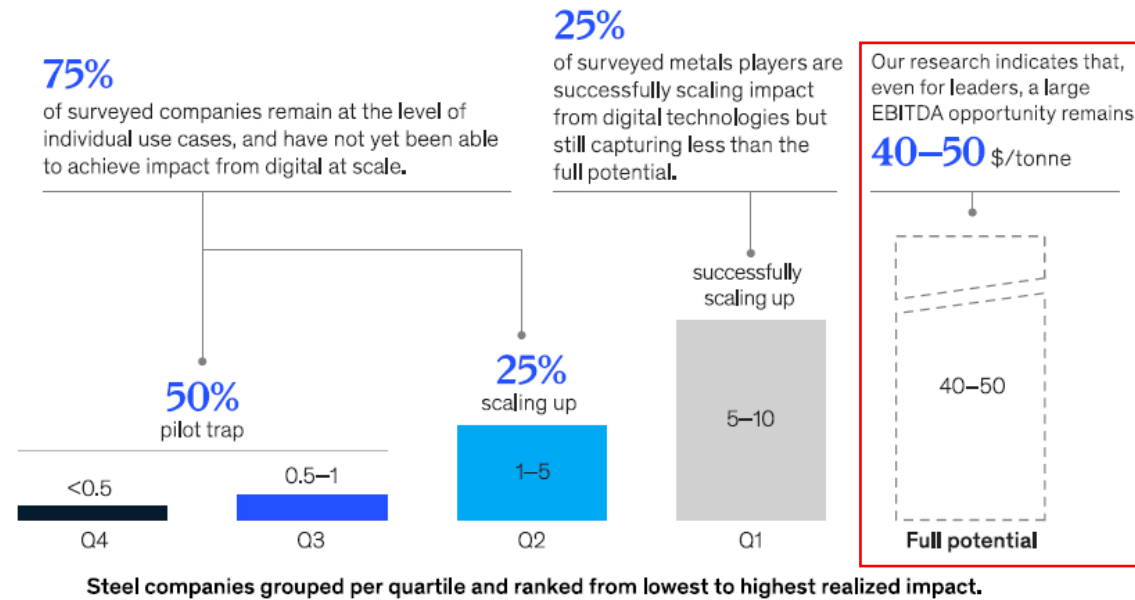
Reduced  
reliance on  
manual  
handling



# Sinter Sizing

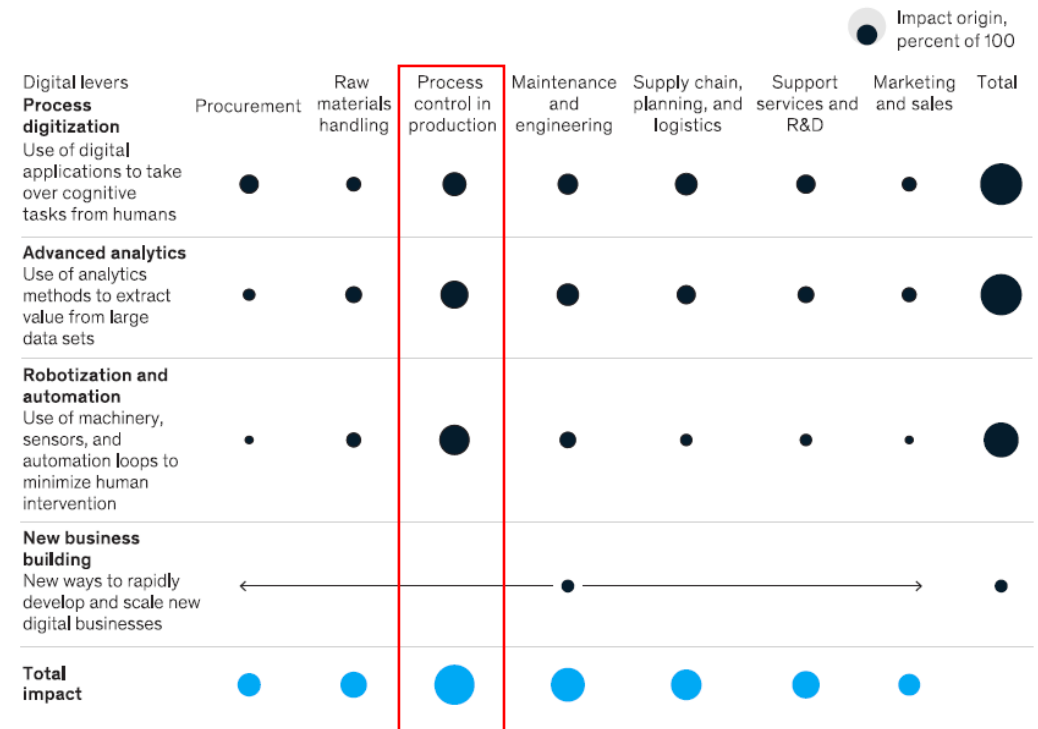
- McKinsey studies show potential 40\$/tonne EBITDA uplift from digital and analytics, led by improved process control in production

EBITDA uplift from digital and analytics, \$/tonne, steel companies only



McKinsey  
& Company

Metals players are capturing opportunities primarily across three digital levers and along the full value chain.



McKinsey  
& Company

**Source:** How digital and analytics can unlock full potential in steel, McKinsey, Jan 2021



Any Questions?  
Please contact Iain Scott  
[iain@pyroptik.com](mailto:iain@pyroptik.com)