



# Robotic Bundle Tagging project at Nucor Steel Seattle Washington



# Finishing End - Bundling



# Shipping

Product is shipped by either rail or truck





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The background is a black and white photograph of an industrial setting. In the foreground, several large, dark, circular coils of material, likely steel, are stacked. Each coil has a white alphanumeric code stamped on its outer edge. The codes visible include '091100571L', '091100581L', '091100553L', '091100552L', '091100532L', '091100551L', and '091100541L'. In the background, a complex network of metal scaffolding and structural beams is visible, with bright light streaming in from the upper right, creating a high-contrast, dramatic effect. A solid red trapezoidal shape is overlaid on the left side of the image, containing the company logo and name.

# ZS TEBULO

INDUSTRIAL ROBOTICS



The background image is a grayscale industrial scene. It features a multi-level metal structure with safety railings. An orange robotic arm, with 'TEBULO' written on its side, is positioned on one of the levels. In the foreground, there are large, shiny rolls of metal, likely steel coils. The overall atmosphere is industrial and modern.

History:

Tebulo has been operating in Europe since 1974

North American office opened in 2009

Tebulo has a complete worldwide presence

Over 200 installs in steel mills worldwide

# Standard Equipment



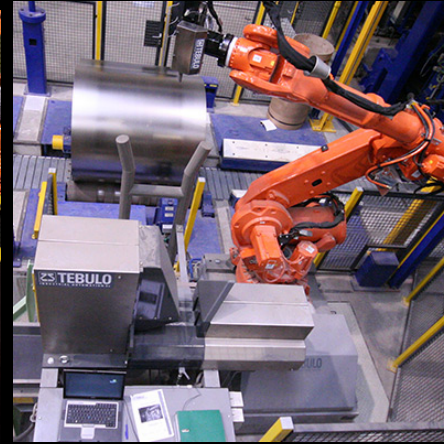
Slabs, Billets,  
Ingots Marking  
& Labeling  
Tagging



Hot Coil  
Marking &  
Labeling



Cold Coil  
Marking &  
Labeling



De-strapping  
Solutions



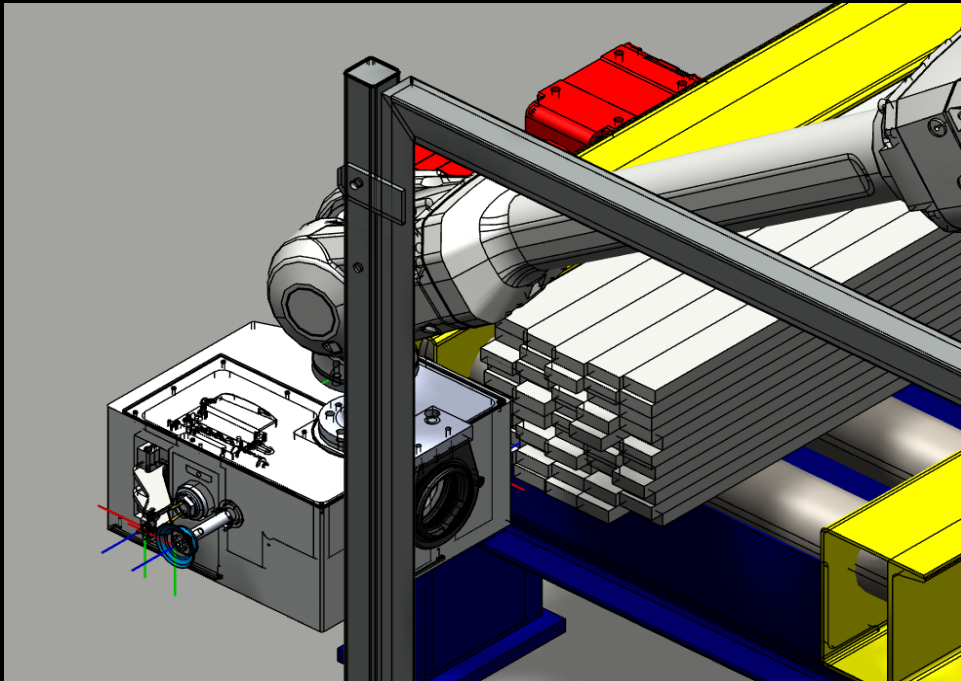
Bundle  
Tagging and  
Piece Count



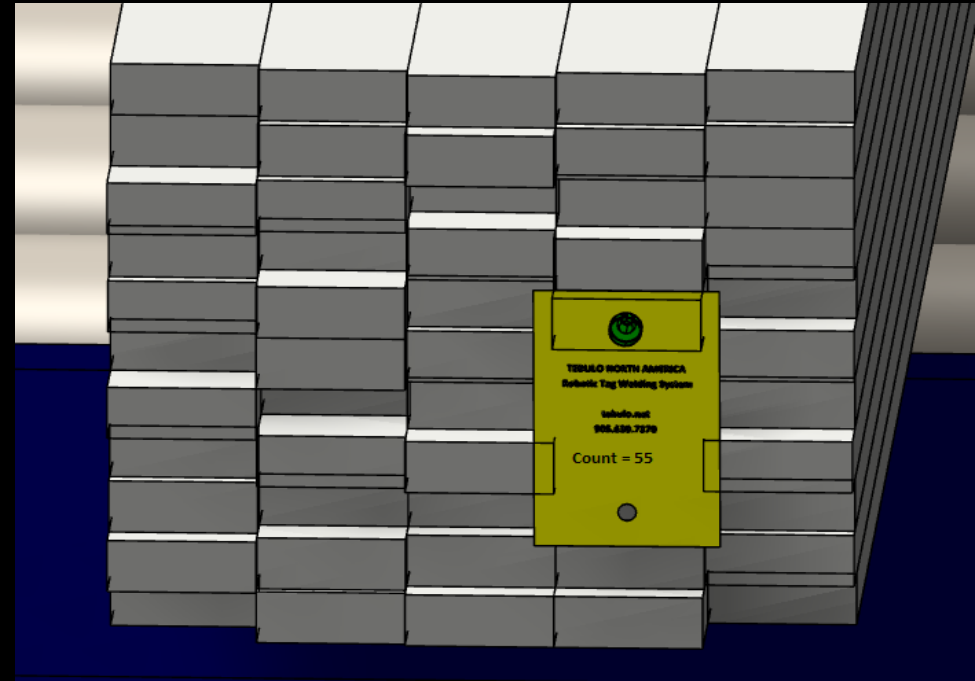
Custom Robotic  
Solutions

# Main Objectives

Scan End of Bundle Determine  
Location of All Pieces





Weld Tag Onto Piece Sticking Out  
Farthest








# Secondary Objective

 Open


 Save

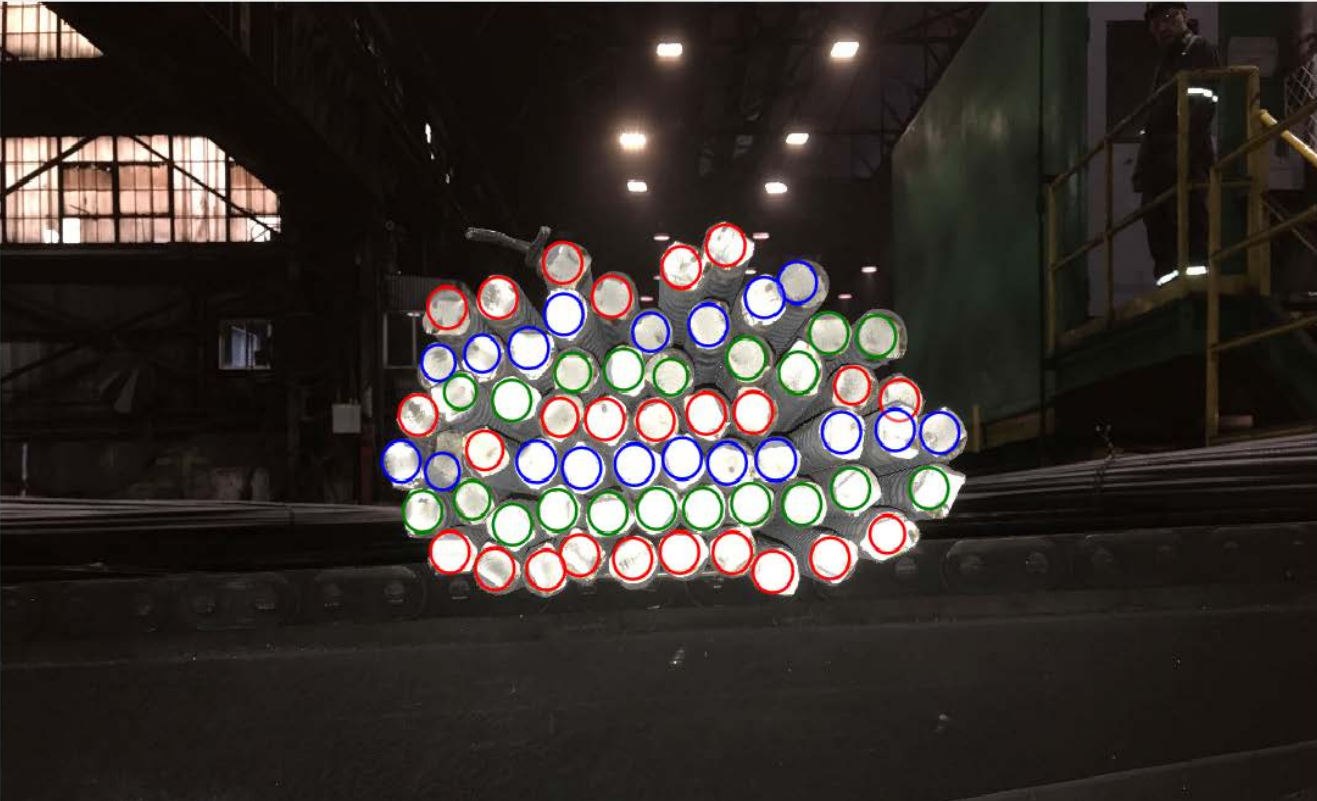
 Next

 Save & Next

 Count

64

 Settings





# Required Shapes

Rounds and Re-bar



Angles





Chanel



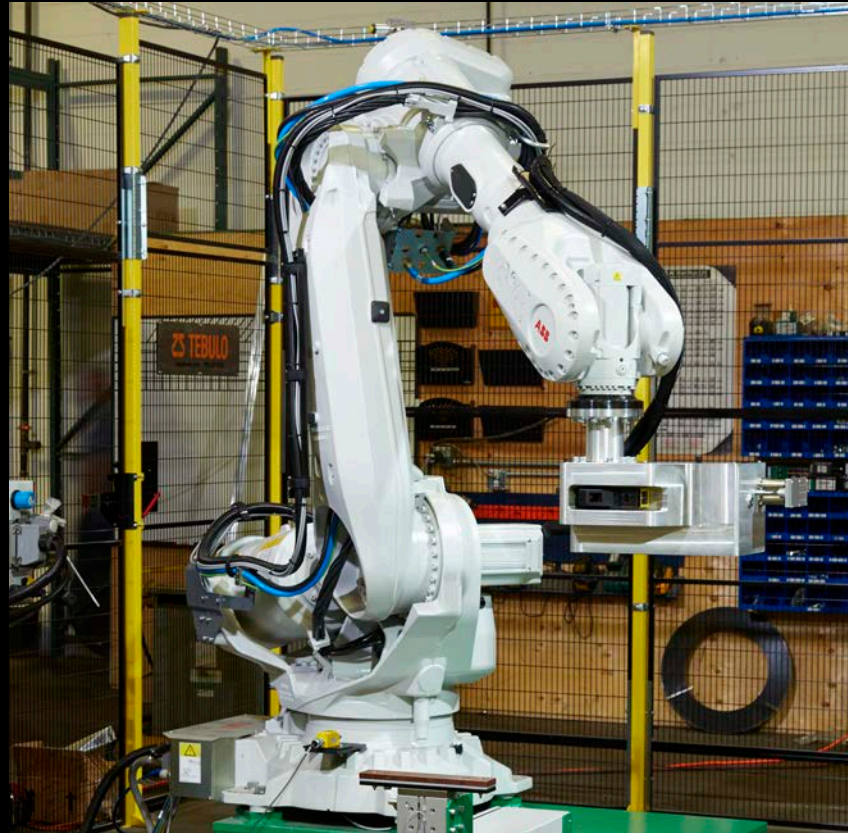
Flats





# Components

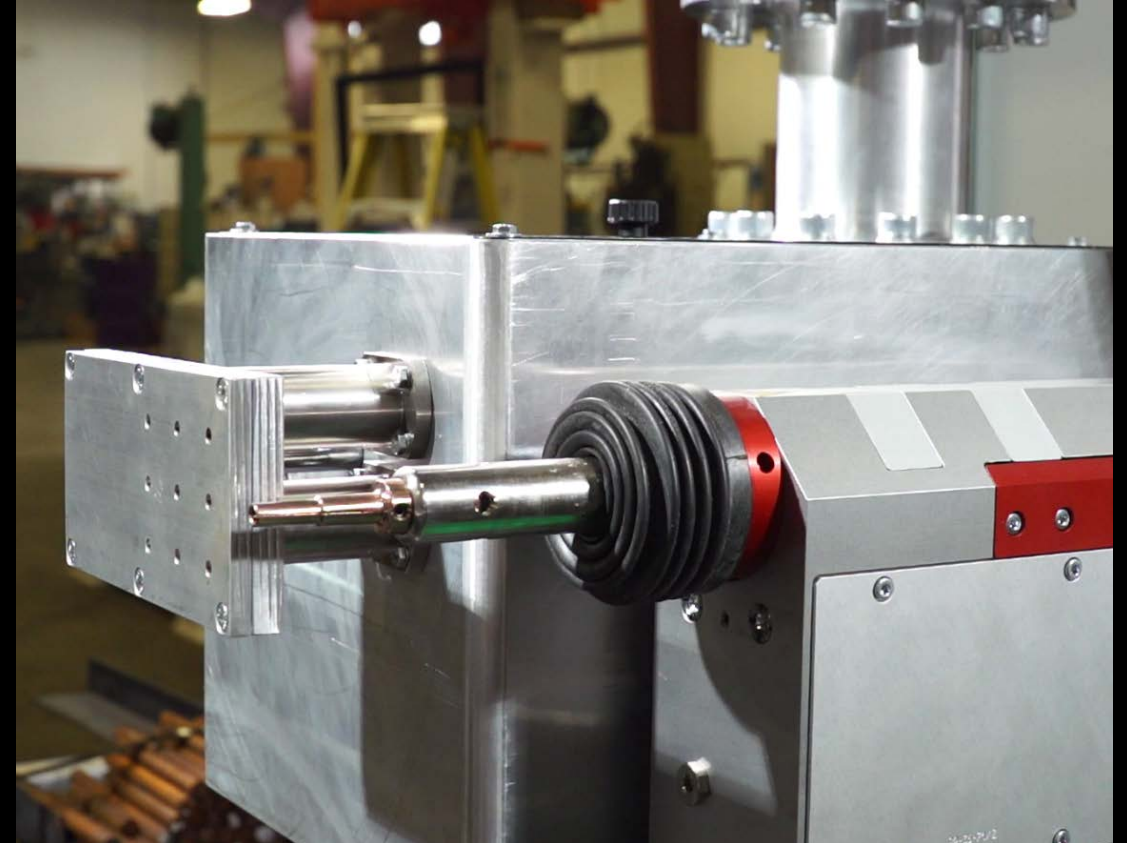
## 6-Axis Robot



## Stud Feeder System



## Welder and Vacuum Pad





## Printers



## Lock Out Key Capture



# Factory Acceptance Test

Tebulo Office, Hamilton ON

- Bundle Tagger Oct 10<sup>th</sup>
- Billet Marker Oct 30<sup>th</sup>







# Install





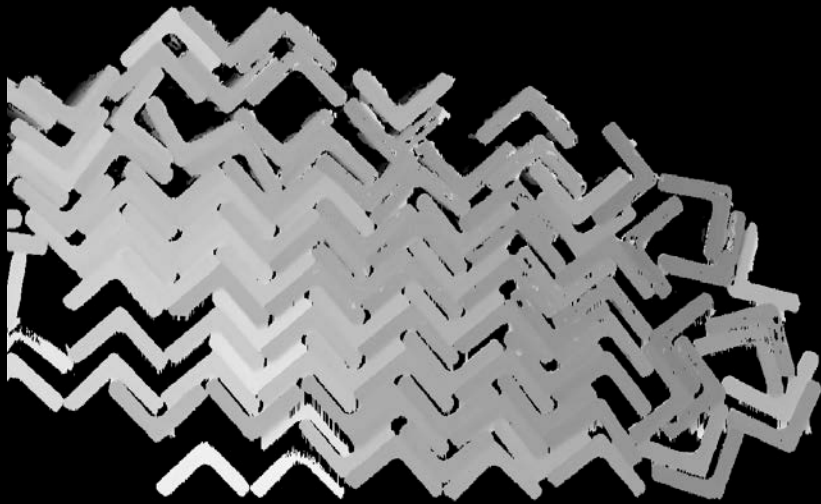
Start up



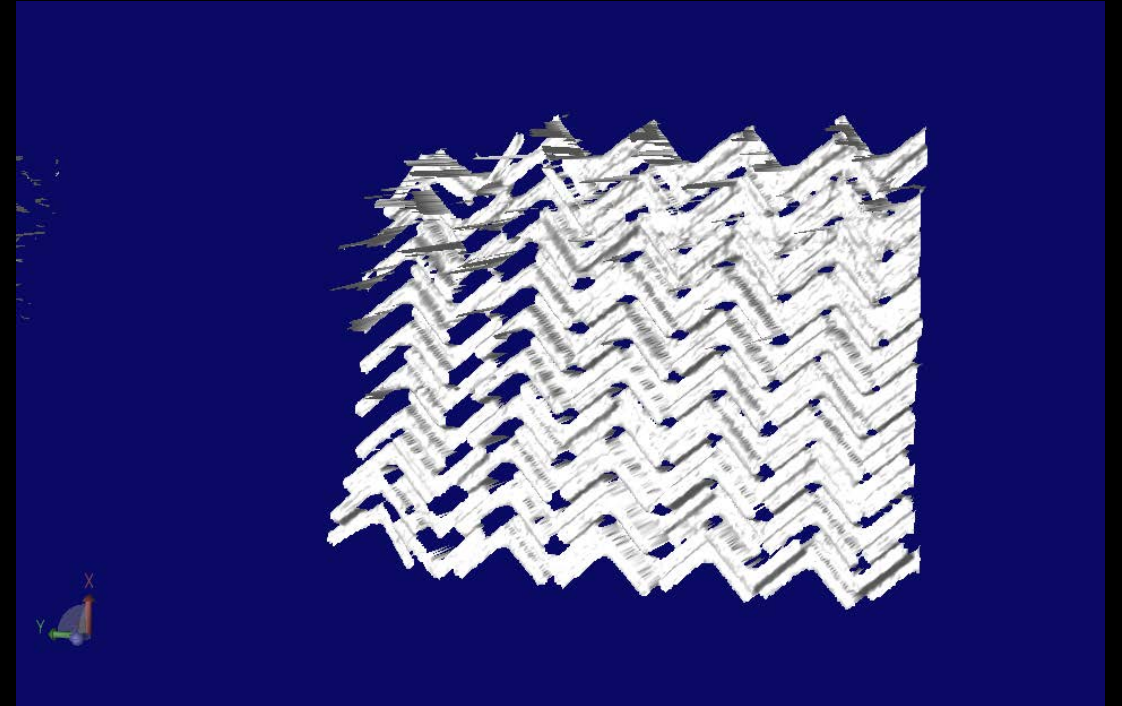
NUCOR

**TEBULO**  
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Angle

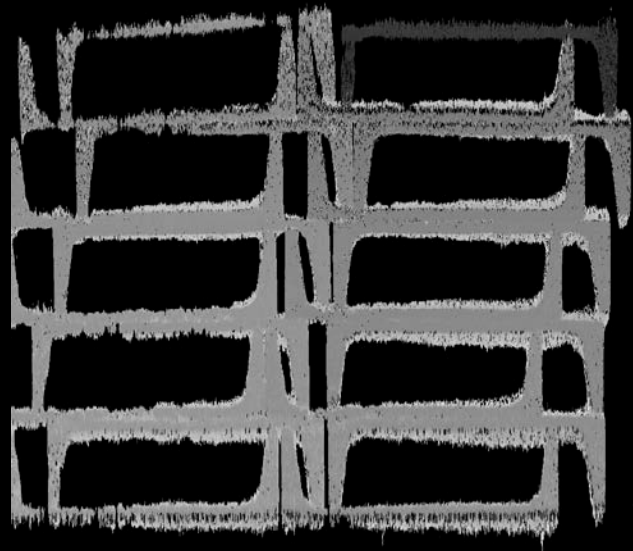


3D

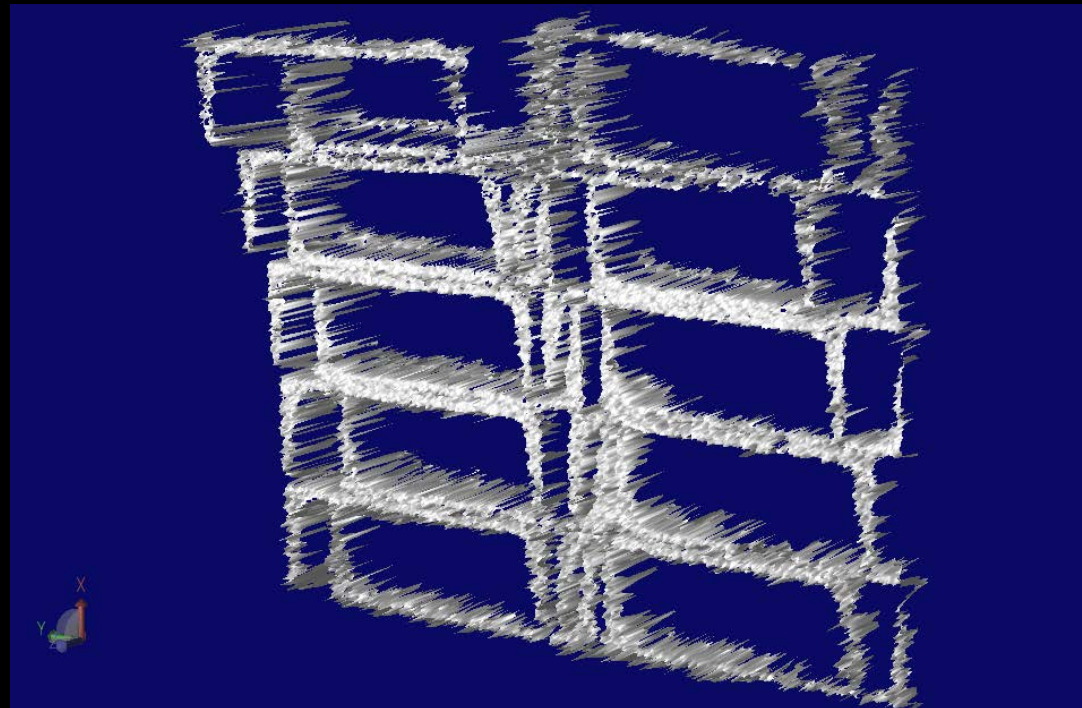




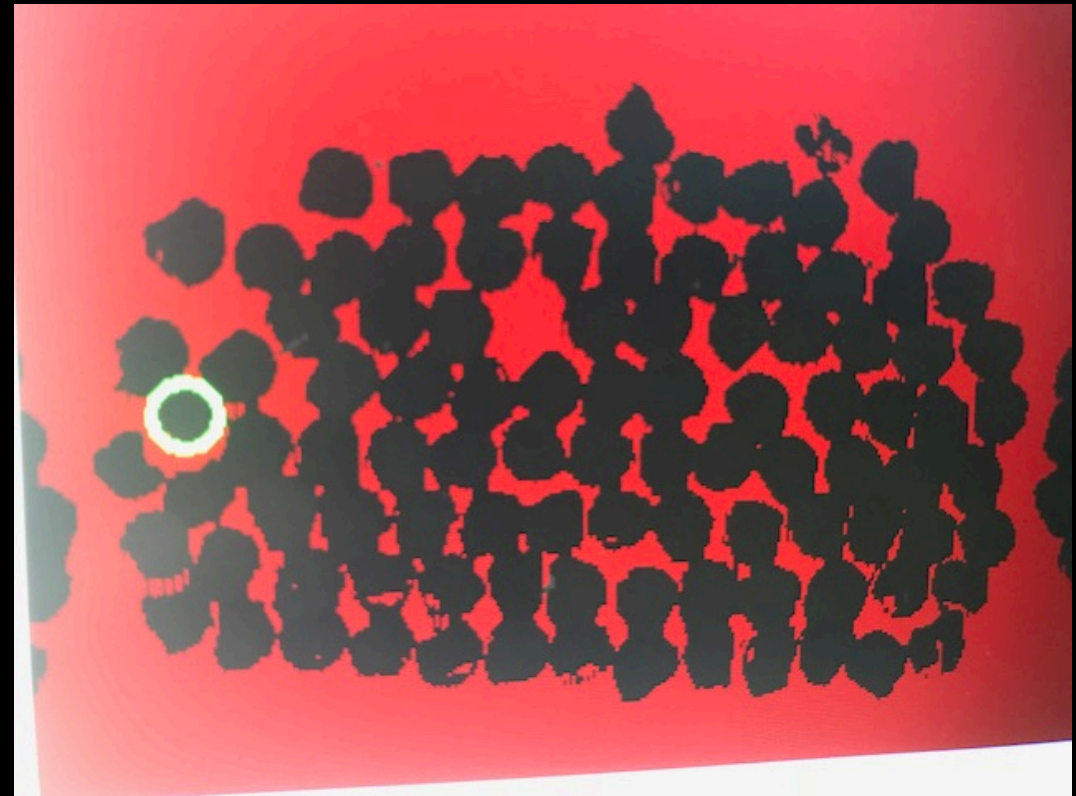
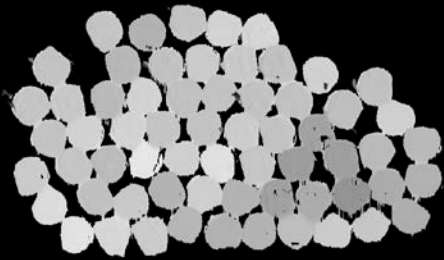
Chanel



3D



# Images





# Billet Marking

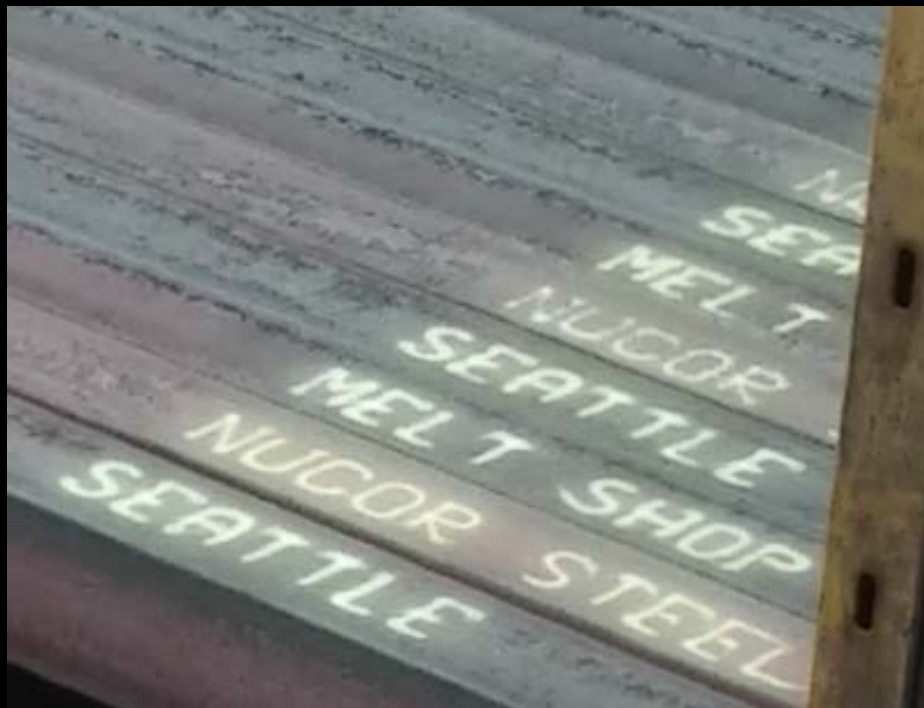
Laser Etching



Single Nozzle Marker



## Water Based Paint

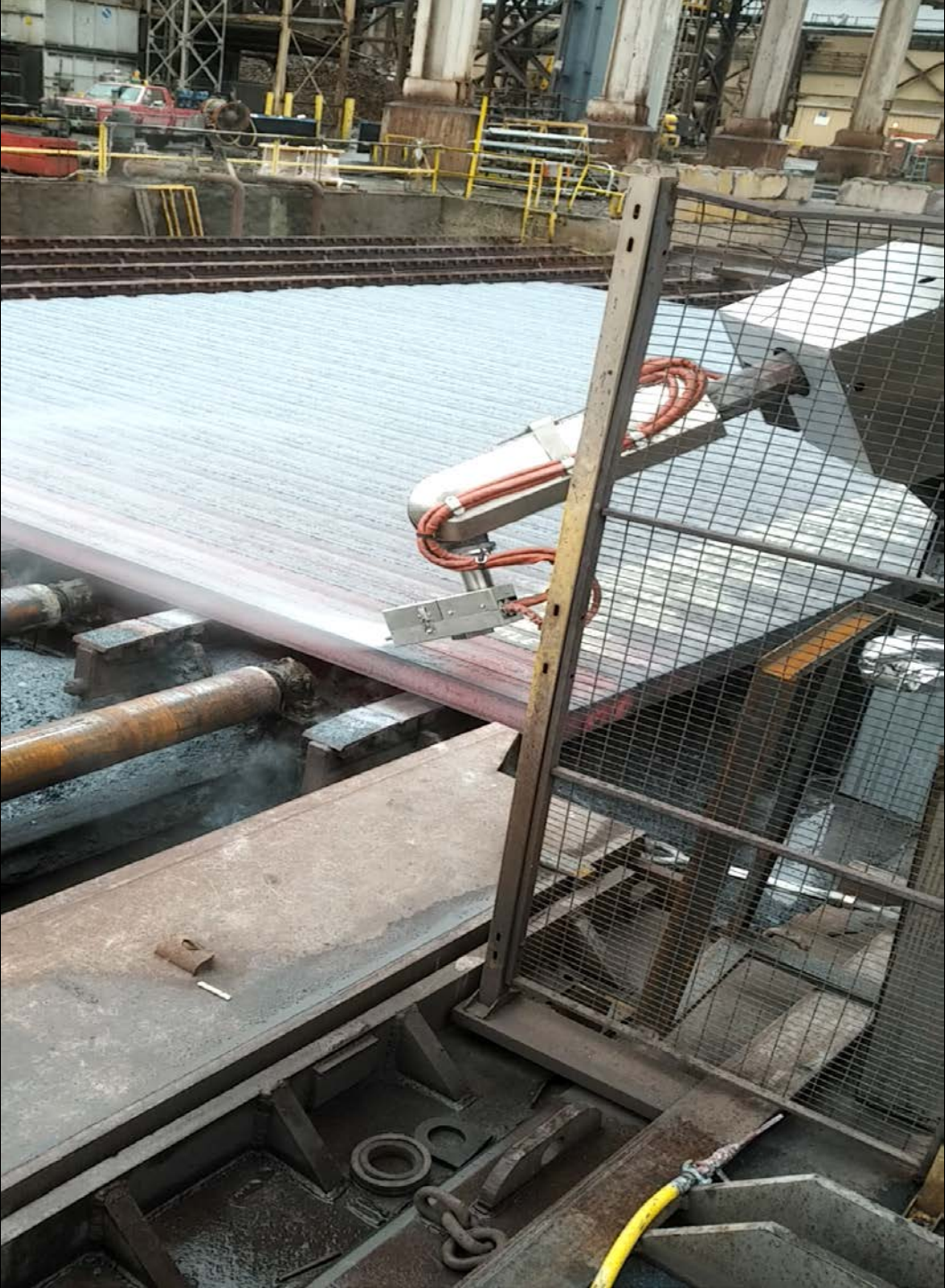


## Rhomboid Detection





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# Open Issues

## Bundle Tagger

- Insure Tag is placed in body of bundle
- Use Actual Area Size for Piece Count Calculation
- Work on Communications With Level 2
- Continue Working through all Shapes and Sizes

## Billet Marker

- Speed up Movements to Insure All Billets Are Etched and 1<sup>st</sup> and Last Billet Marked
- Possibly Add Fan Nozzle for Painting Ends
- Better Protect Laser and Camera Cable From Radiant Heat



# Any Questions