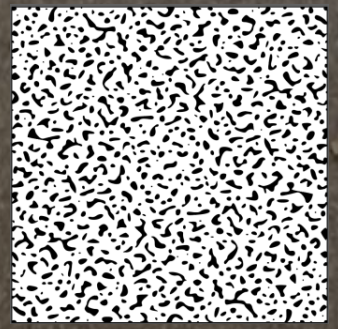
COSMODOT

END-TO-END TRACEABILITY OF SAND-CASTING PRODUCTION WITH CDOT CODE MARKED ON SAND MOLD AND TRACK THROUGHOUT WHOLE PROCESSES

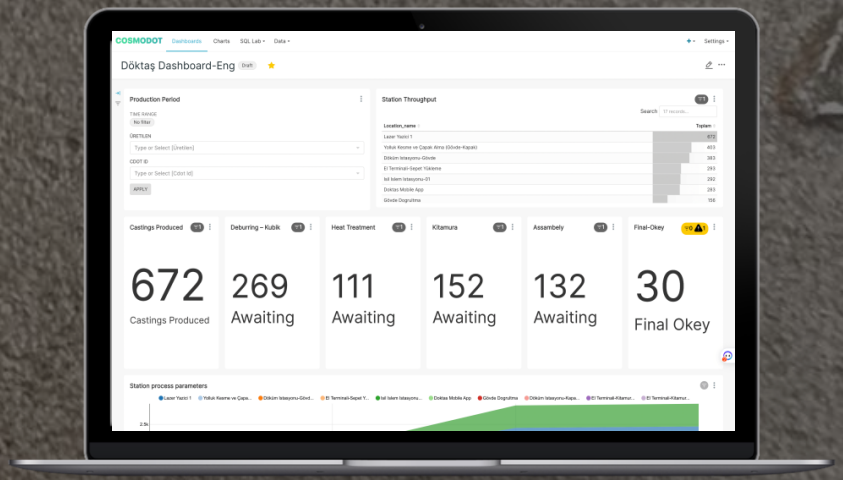
Tunç Acarkan
Head of Technology Transfer & Sales

About Cosmodot

- Industrial deep tech start-up established in 2020
- Present in United States & Türkiye
- Inventors of the CDOT code



CDOT Code



CTRACE real-time traceability platform

100% Good Read Results	Applicable to 30+ Materials	For 20+ Heavy Processes & Conditions	AI-Compatible Code

Traceability in Sand Casting

Industry 4.0 can Unlock Significant Value in Production

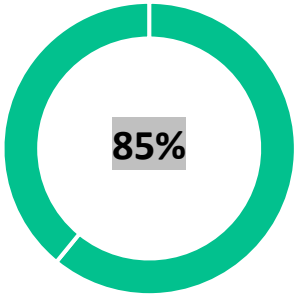
Reduction in Cost of Stock

Increase in Workforce Efficiency

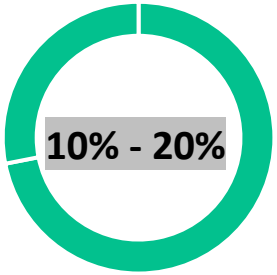
Reduction in Machine Downtime

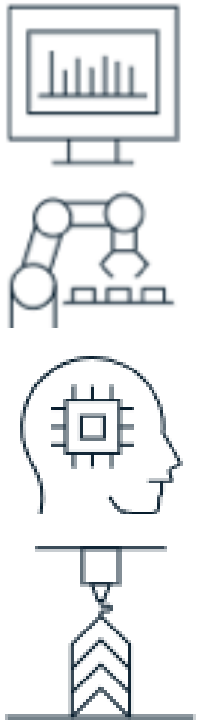
Increase in Production Capacity

Increase in Production Forecast



Reduction in Cost of quality





McKinsey & Company

Resource: https://www.mckinsey.com/capabilities/operations/our-insights/capturing-the-true-value-of-industry-four-point-zero

CDOT addresses <Bad Data Quality from Things> and creates a new opportunity space for Industrial AI to achieve industrial value transformation

"Visible problems are often caused by accumulations of invisible factors, such as the decline of equipment leading to shut down, the lack of accuracy leading to product quality deviation, and so on. Like an iceberg, the visible problem is only part of the entire issue, while the hidden problems are larger but unseen. The function of big data and AI technology is to predict the invisible problems in production to obtain the means to avoid and solve the invisible problems. This will create carefree manufacturing."

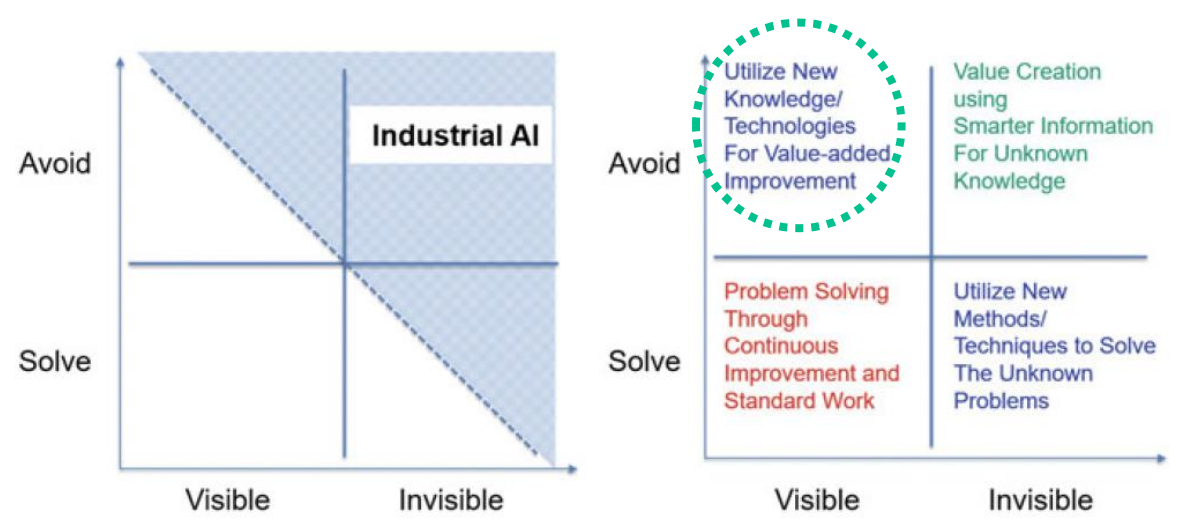
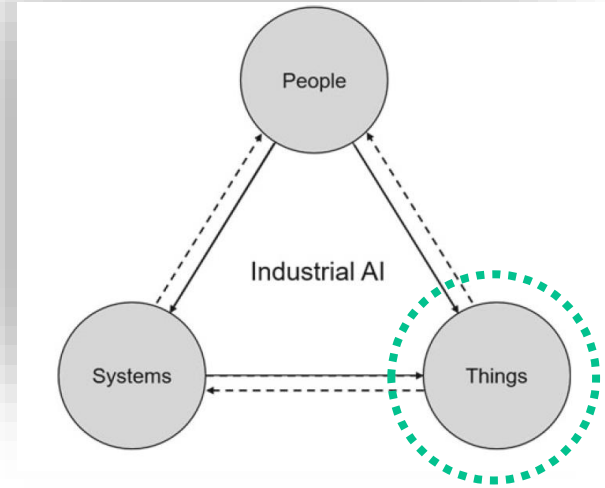


Fig. 2.9 The four quadrants of Industrial AI opportunity space (left); industrial big data in industry (right)

Source: "Industrial AI Application with Sustainable Performance" by Dr. Jay Lee



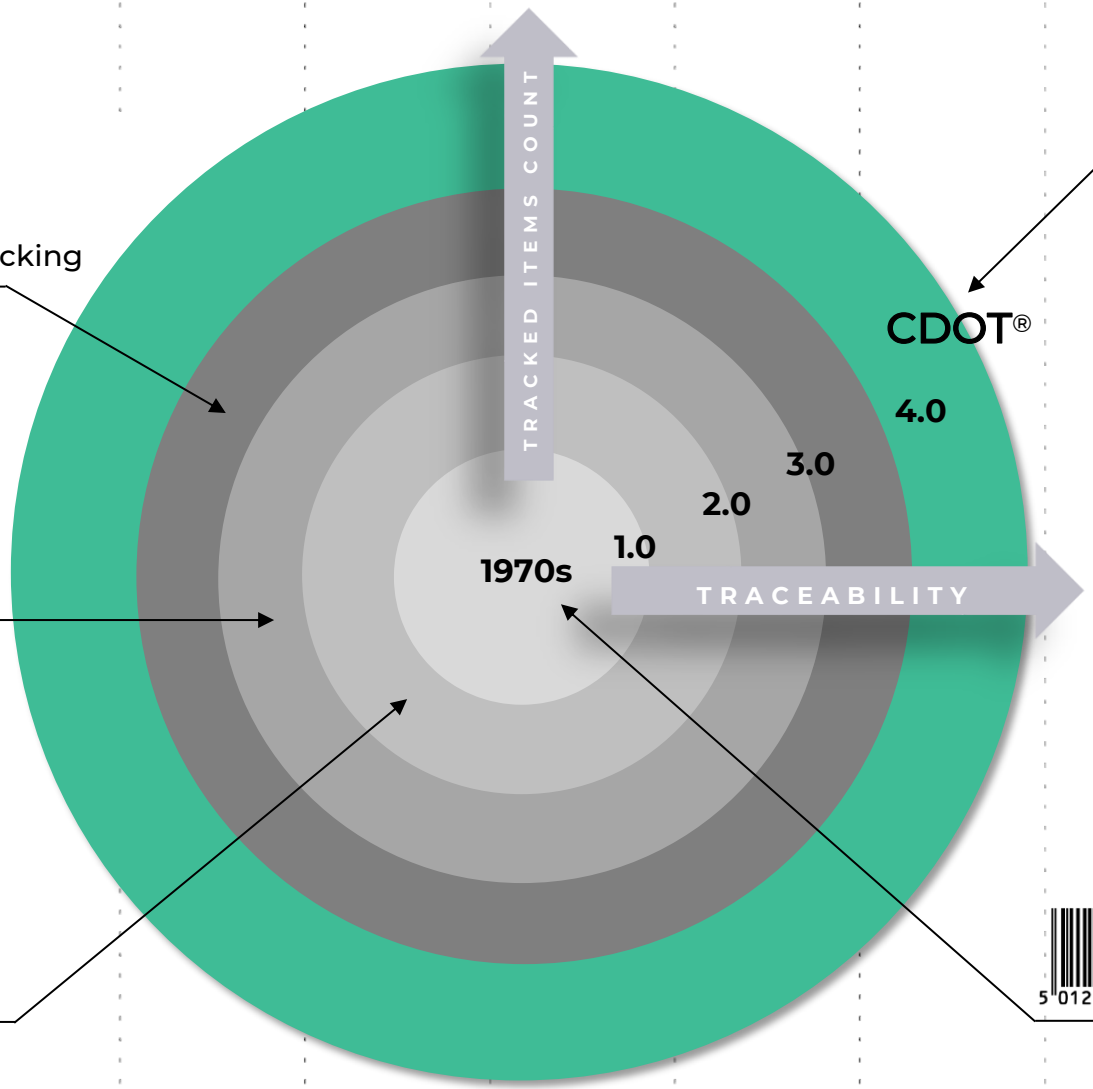
"Bad Data Quality: In industrial big data, data quality has constantly been an issue for many enterprises. This is mainly limited by the means of data acquisition in the industrial environment, including sensors, communication protocols, configuration software, and other technical constraints. The management technology of data quality is hard work for any enterprise."

Industrial AI needs more Computable Things Data to promote its cyber space which in return will guide the physical space using the knowledge from cyber space.

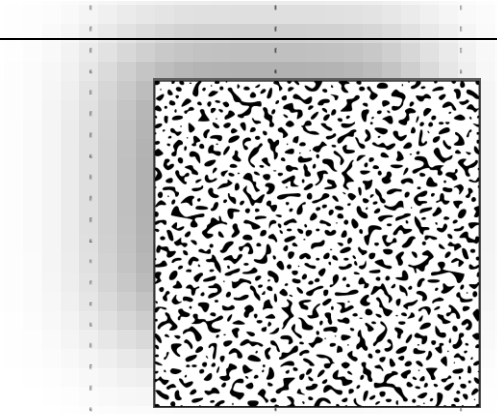
CDOT opportunity space

Introducing CDOT® code

Tracking Trillions of parts and product data with AI-compatible CDOT code



2022
Tracks & Reveals Trillions of parts and products data
❑ Industrial Process Visibility



1998
Tracks Billions
of parts and products.
❑ Serialized Line-Item Tracking

1994
Tracks Billions
of parts and products.
❑ User Engagement

1990
Tracks Billions
of parts and products.
❑ Supply Chain Visibility

1970
Tracks Billions
of parts and products.
❑ Product Labelling

What is the problem of <Bad Data Quality from Things> today?

Incumbent Pyhsical ID codes cannot produce Digital IDs in 70% of the manufacturing cases.

Over $1 trillion worth of parts left uncoded annually

Negatively Affected Industries

Aerospace
Aluminum Industry
Appliances Manufacturing
Automotive
Copper Industry
Carbon Fiber Industry
Casting & Forging Industry
Construction
Electronics
Energy Industry
Forest Industry
Glass Industry
Iron & Steel Industry
Machinery & Equipment
Oil & Gas
Precision Parts
Semiconductors
Wood Industry

Untraceable Cases

Cataphoresis
Die Casting
Drawing & Forming
Dusting & Rusting
Enameling
Firing
Galvanization
Glazing & Varnishing
Heat-Treatment
Low Light & Low Reading Angle
Metalized Coating
Painting
Paper Label Damages
Pickling (Acid Dissolution)
Sandblasting
Sand Casting
Scaling (Oxidation)

All current Physical ID codes cannot maintain their digital integrity in these cases, thus trillions of manufactured parts have bad data issues

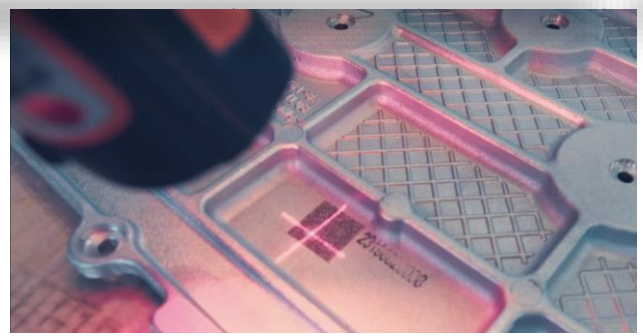
1. Painting (up to 700µm)

2. Metallized Coating (up to 700µm)

3. Sand Casting

4. Die Casting (700°C hot part)

5. Die Casting (rough & shiny surface)

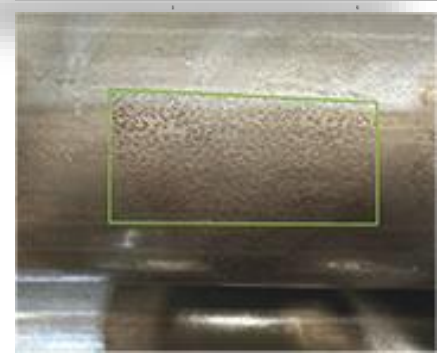


6. Small & Curved Surface

6. Heat Treatment

8. Galvanization

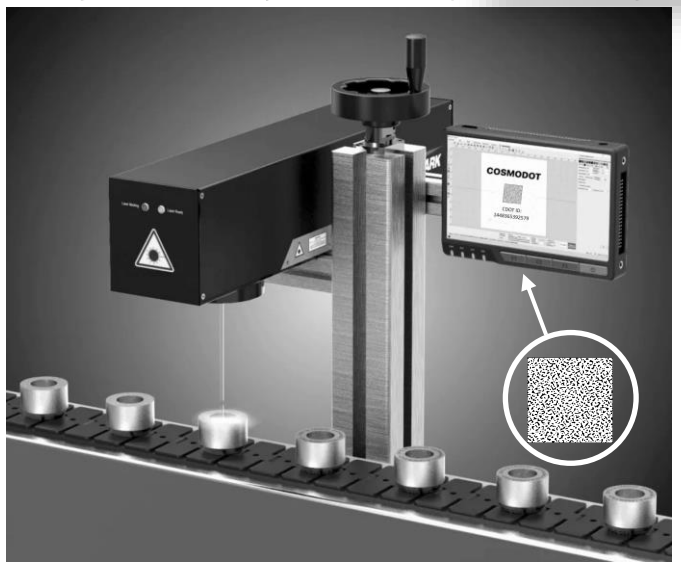
9. Pipe Drawing



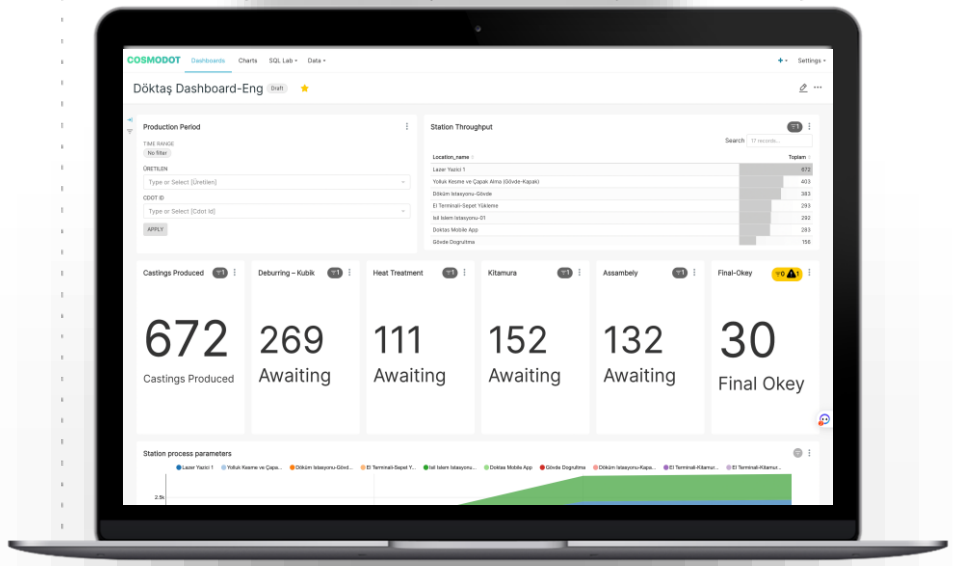
Smooth implementation: no change to regular operations

CDOT Encoding, Decoding and CTRACE Tracking

CDOT CODE



CTRACE PLATFORM



1. Coding

- ❑ Customers can leverage serialized unique CDOT codes using laser marking machines which marks CDOT codes directly onto parts.

Compatible with All Printer / Marker Models for Writing

2. Decoding

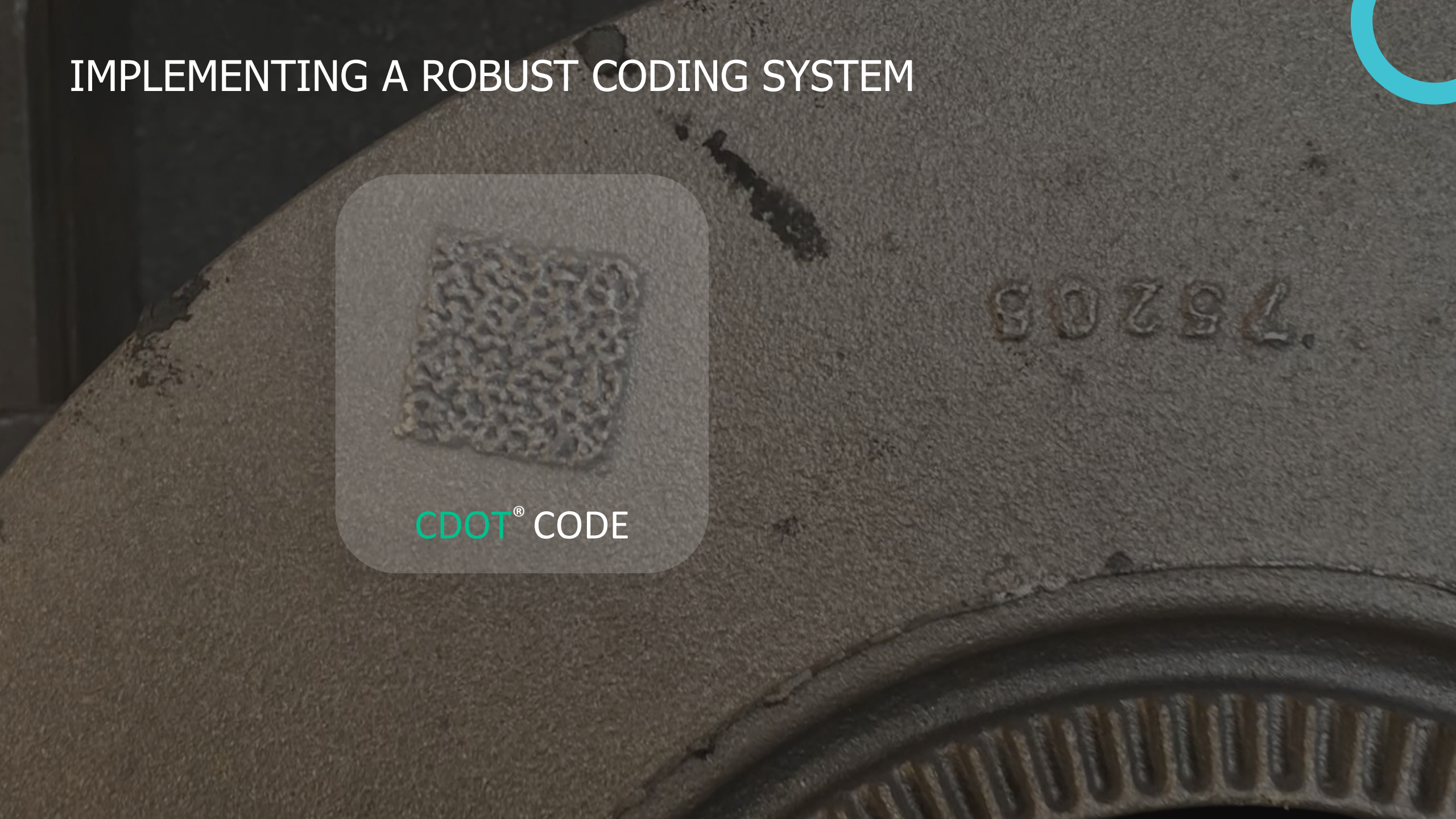
- ❑ Customers decode CDOT codes on direct parts. Decoding can take place via options; (a) Customer Cloud, (b) Customer Local PC, (c) EDGE Device.

Compatible with All Camera / 2D Readers for Reading

3. Tracking (CTRACE)

- ❑ Real-time visibility, tracking and control from raw materials to the final product and beyond.
- ❑ Real-Time bi-directional data transfer between individual parts and products with PLCs and Third-Party software.

IMPLEMENTING A ROBUST CODING SYSTEM

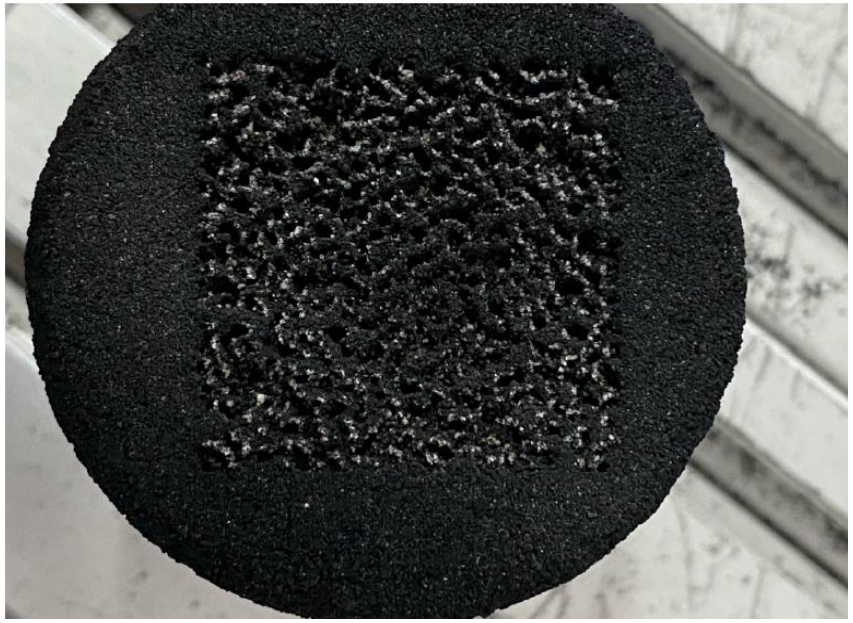


CDOT® CODE

Sand Casting Production Harsh Environment

Extreme Heat Up to 1400ºC/2550F	Shot/Sand Blasting	Heat Treatment Up to 540ºC/1000F for +3 hours	Exposure to Dust – Rust - Acid

Initial testing and Preperation



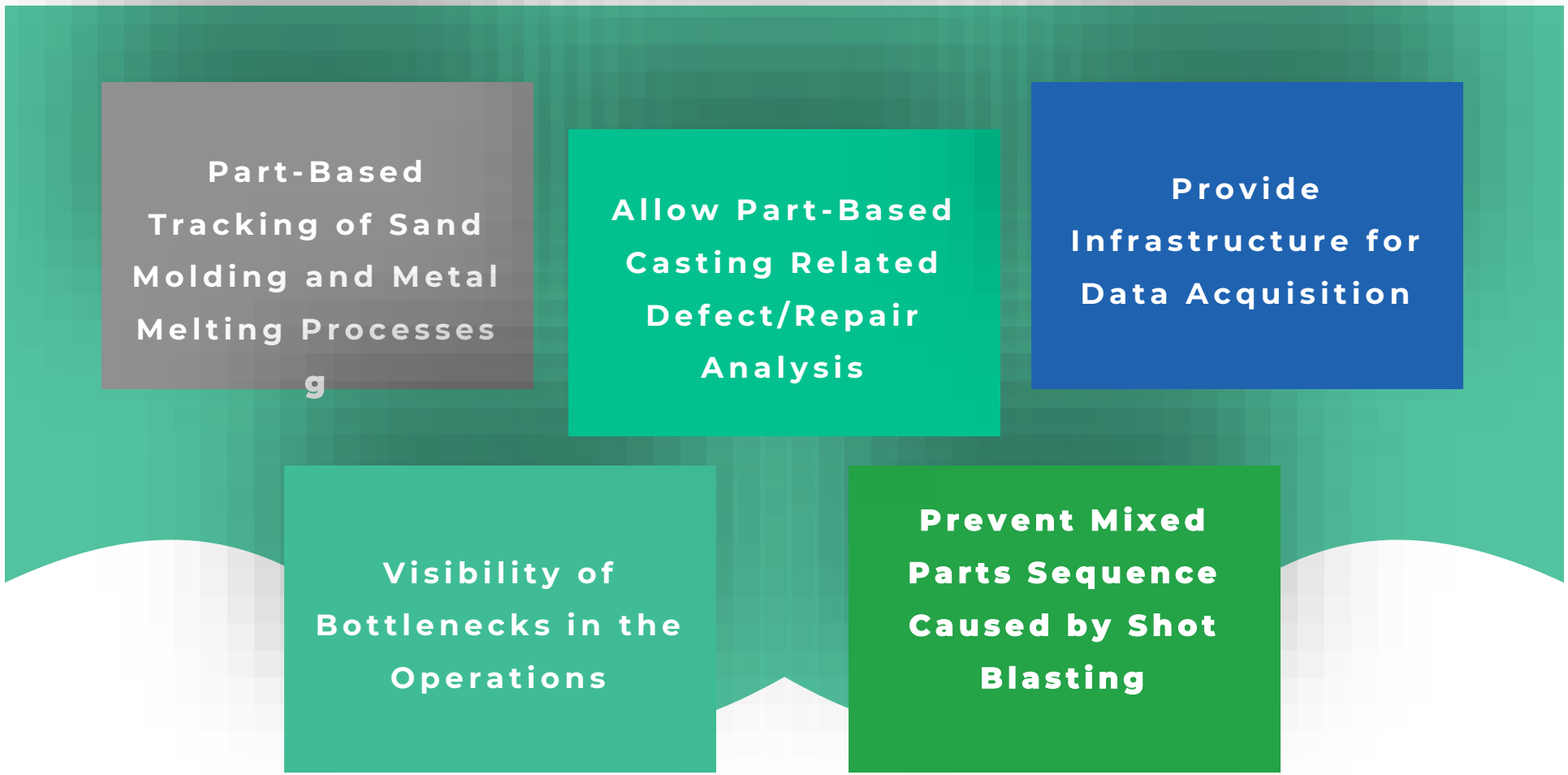
CDOT Code on Sand Sample

CDOT code first trial with
50 Watt laser with 300mm lens

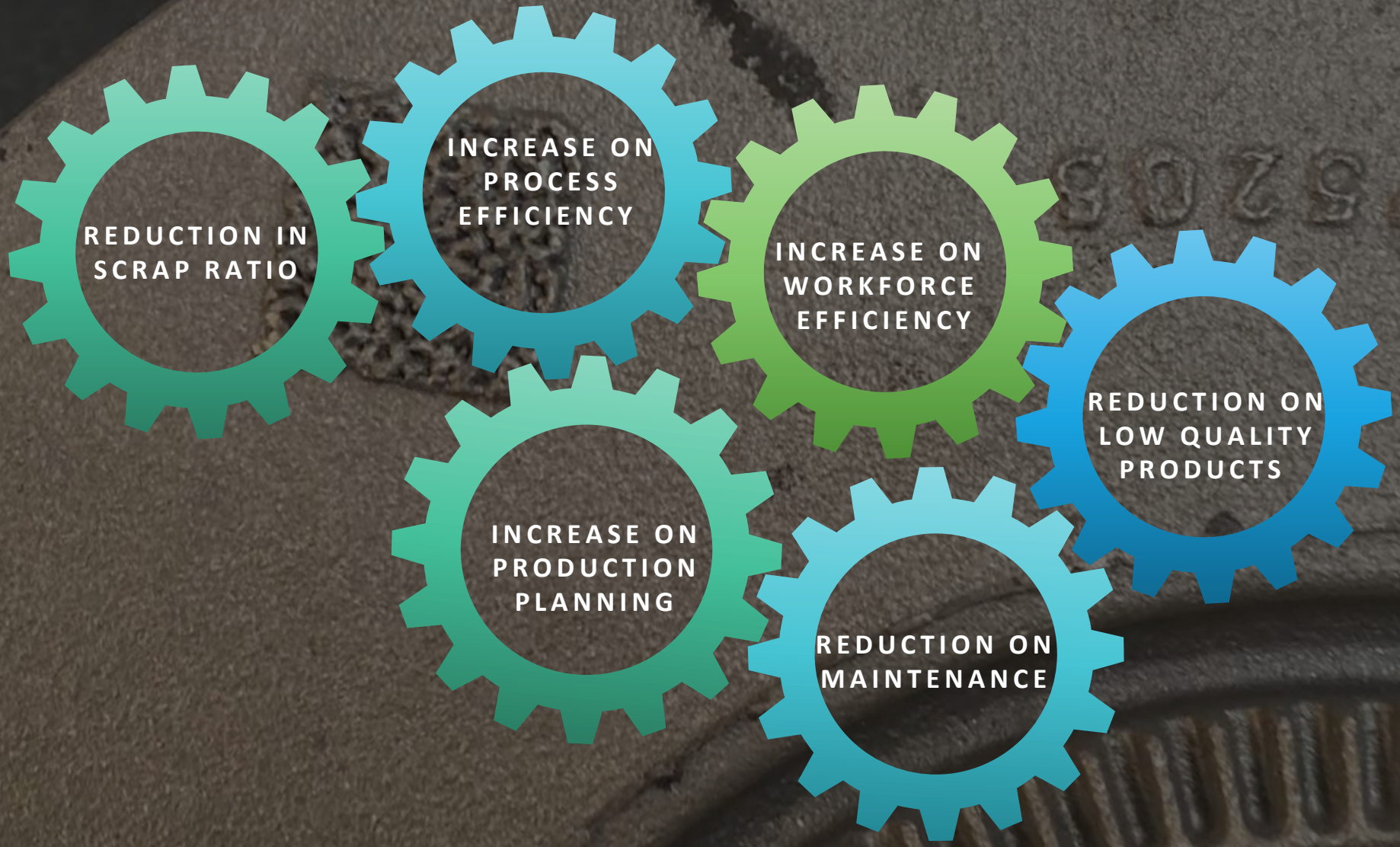
%100 Readable CDOT Code
60 Watt Laser and 100mm Lens

Data 03
00
01
02
03
04
19.8%
10.1%
TOTAL

PROJECT OUTCOME



LONG TERM EXPECTATIONS



COSMODOT

THANK YOU

Tunc Acarkan – Head of Sales
+44 746 789 6635
+90 532 320 4540
tunc.acarkan@thecosmodot.com

COSMODOT