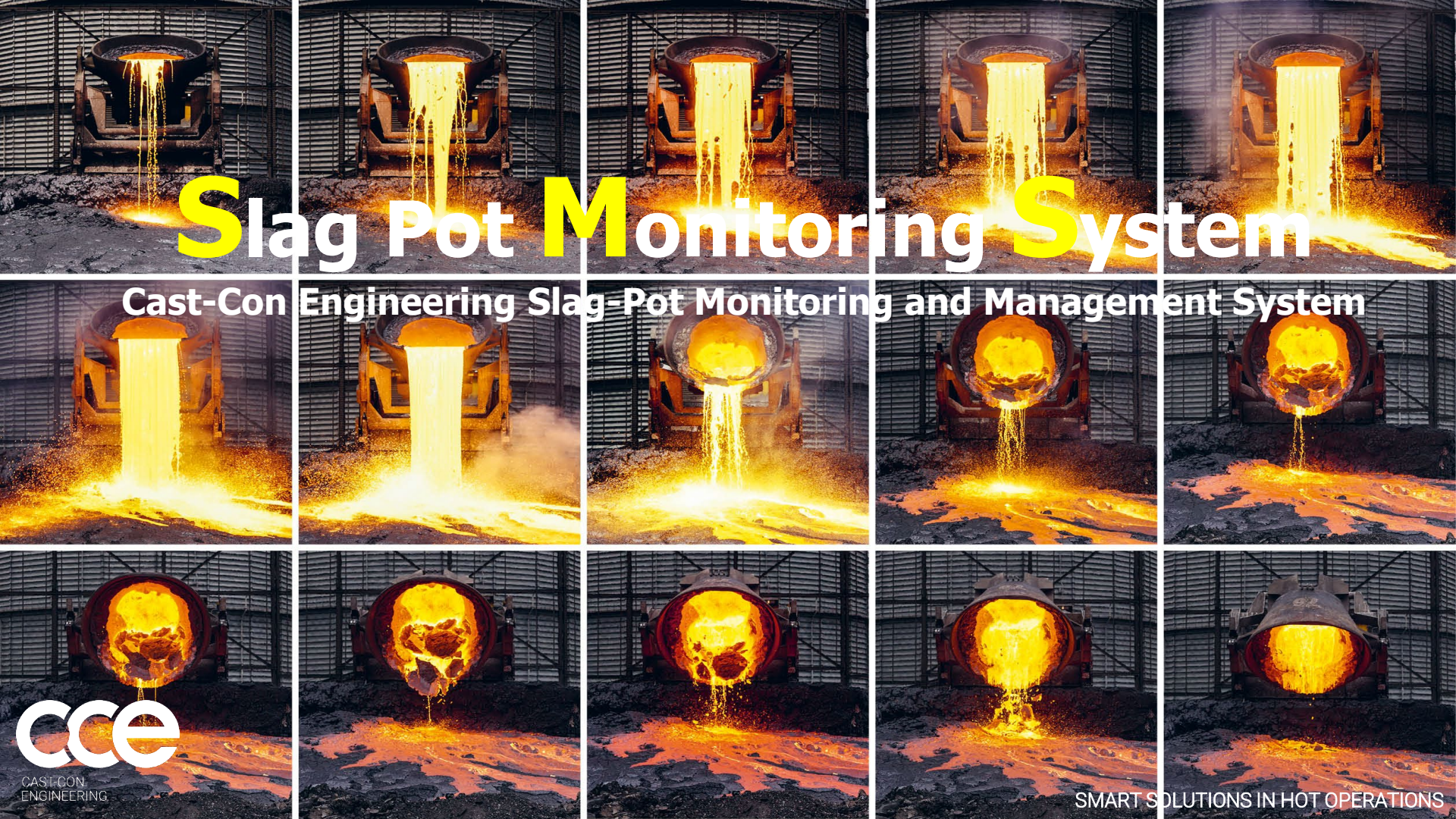


Slag Pot Monitoring System

Cast-Con Engineering Slag-Pot Monitoring and Management System

CAST-CON ENGINEERING

SMART SOLUTIONS IN HOT OPERATIONS

CAST-CON
ENGINEERING

More Safety …. But not only!

Thermal Cameras.

A solution to mitigate the risks, prevent accidents and track slag pots.

Background

Moving hot slag is probably one of the **most dangerous** jobs within the production process!

The danger of injuring people or destroying equipment by slag spilling over or, even worse, escaping from the slag pot due to a breakthrough is present EVERY time while picking up a slag pot!

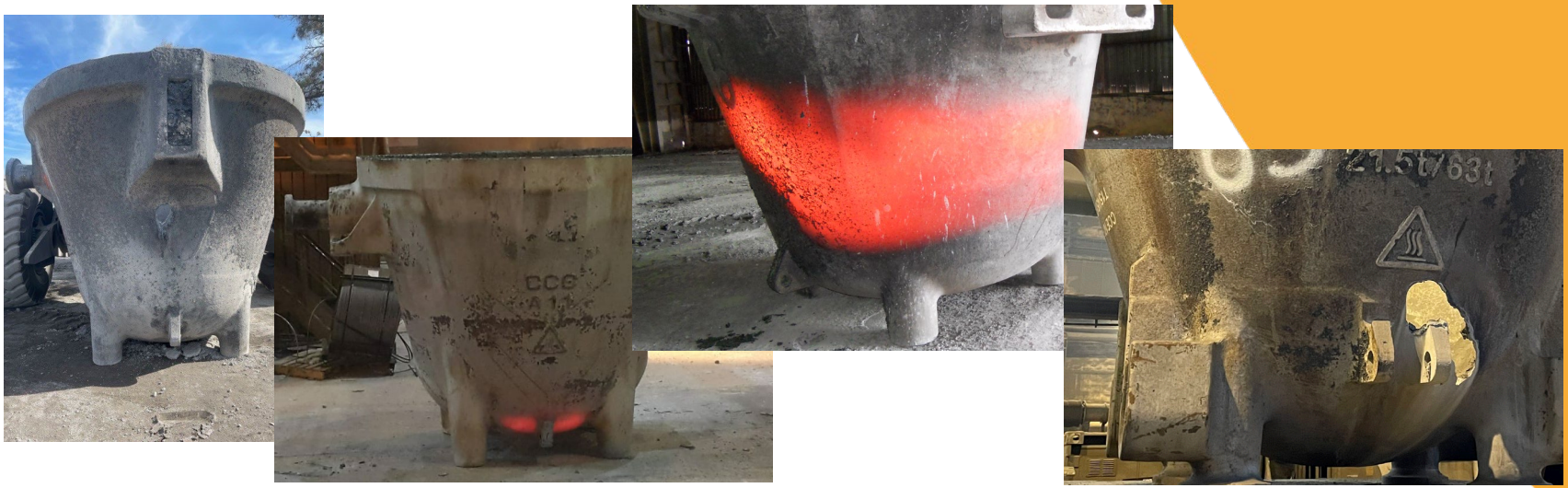
CAST-CON ENGINEERING

Background

- Transport of slag with temperatures up to 2,300 - 2,800°F and more is mostly done with slag pots in special vehicles

Background

- When filling the slag pot, it often happens that the liquid slag hits the side wall of the slag pot. Contact with hot, liquid slag/steel can lead to increased, premature wear and washouts on the side wall of the slag pot and, in the worst case, to breakthroughs.
  All the more, as in most cases, not only slag but also with running steel is filled into the slag pot!



CAST-CON ENGINEERING

Current procedure

- Before picking up the slag pot, the operator carries out a visual inspection
- Temperature measurements are carried out manually by using a heat gun
- Due to the small measuring surface, measurement is covering only small spots
- The operator decides, **based on his experience**, whether the slag pot can be picked up and transported or not
- The slag pot management and the collection of information are done on paper sheets

CAST-CON ENGINEERING

Current problems & risks

- due to an inaccurate measurement or misinterpretation of the measured values, there is danger to life and limb by picking up a slag pot BEFORE a potential breakthrough occurs
- during visual inspection, hot spots are not detected or rated as uncritical!
- utilization of too cold or too hot slag pots
- delayed maintenance or repair
- unequal distribution or use of the allocated equipment
- the leakage of hot slag can cause serious or even fatal injuries to the operation staff and damage or loss of the equipment.

CAST-CON ENGINEERING

Objectives

- Prevention of accidents resulting in personal accidents or fatal injuries!
- Improve SAFETY to the operators and the operation
- Reduce risks linked to the slag pot handling
- Avoid utilization of too hot or too cold slag pots
- Avoid utilization of worn or damaged slag pots
- Ensure that the slag pot is turned regularly
- The thermographic measurement is carried out automatically by one fingertip
- Provide information about the status of the slag pot to the operation staff
- The tracking system improves the slag pot management
- Collect and provide all data for electronic support online

CAST-CON ENGINEERING

Targets

- By means of the monitoring system the operator and the maintenance personal can evaluate the current status of the slag pot
- High temperatures leading to a critical pot can be identified
- An alarm is generated when a critical pot is identified
  - -> avoid to pick up the pot
  - -> an emergency plan is launched
- Ensure equal distribution and use of allocated slag pots

CAST-CON ENGINEERING

Targets

- Provide **in real time** all relevant information for safe and smooth operation
- avoid unnecessary work
- Optimize maintenance and repair
- Improve production and maintenance management
- Extend the overall lifetime of the equipment based on the collected data
- Reduce maintenance costs
- Reduce downtime in production

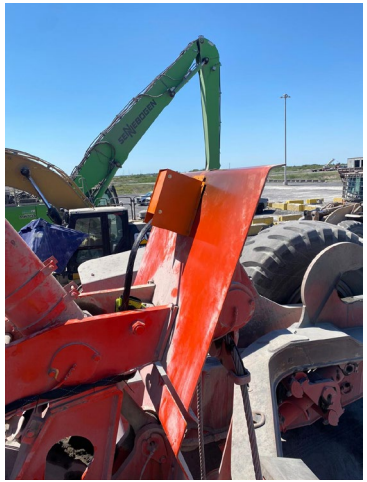
CAST-CON ENGINEERING

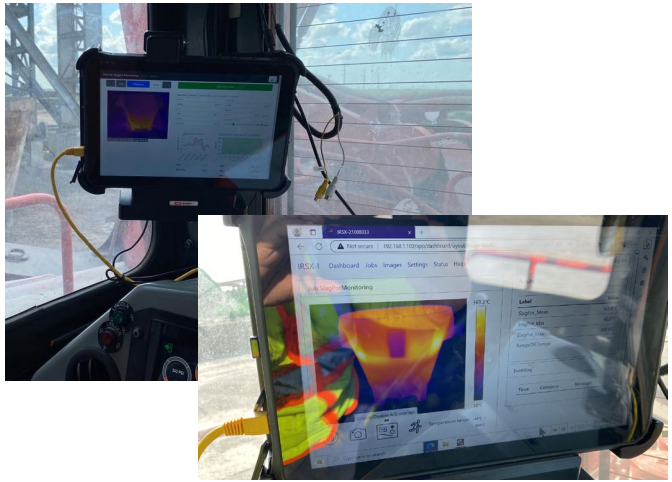
Functional description

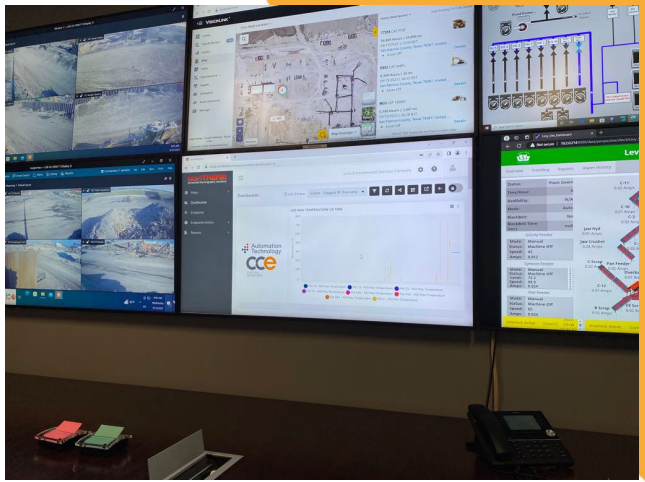
The thermal camera is mounted on the slag pot carrier.

Before pick up the slag pot the thermal camera measures the temperature over all surface.

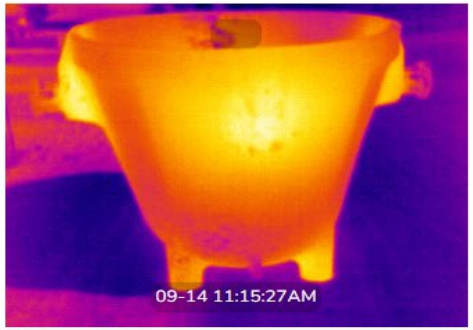
The data is evaluated by the software and visualized to the operator and control center.







Pot 343



AOI MAX TEMPERATURE

153.2 °F

MEASUREMENT COUNTS

2 Measurements

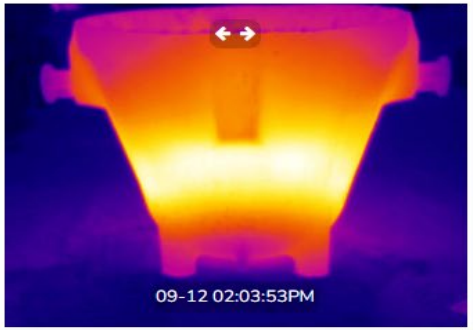
LAST RESULT

Optimal (Low)

LOCATION

Furnace

Pot 344



AOI MAX TEMPERATURE

490.9 °F

MEASUREMENT COUNTS

10 Measurements

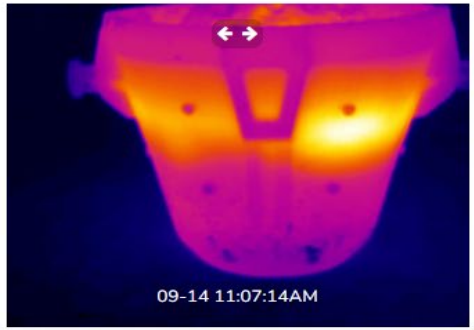
LAST RESULT

Optimal (High)

LOCATION

Storage

Pot 71



AOI MAX TEMPERATURE

1,349.6 °F

MEASUREMENT COUNTS

10 Measurements

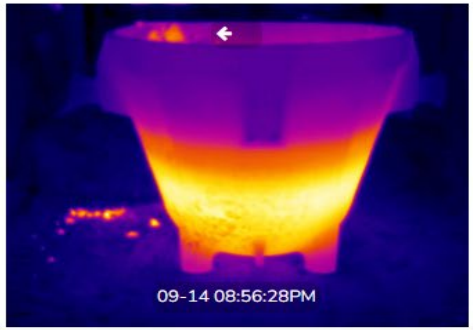
LAST RESULT

FAIL (Inspection Required)

LOCATION

Furnace

Pot 72



AOI MAX TEMPERATURE

734.2 °F

MEASUREMENT COUNTS

11 Measurements

LAST RESULT

Optimal (High)

LOCATION

Furnace

CAST-CON ENGINEERING

Functional description of temp. monitoring

Based on the results of the temp measurement,
the operator and the control center are receiving following information;

- no critical situation - **pick up the slag pot**
- critical situation - **do not pick up the slag pot – repeat measurement**
- hazardous situation - **do not pick up the slag pot – call supervisor**
- status – **inspection after critical and hazardous situation**
- status – **regular inspection**
- status – **out of service for repair**
- status – **out of service**

Individual statuses and alerts can be configured acc. to your requirements.

CAST-CON ENGINEERING

SmartProcessingApp

The SmartProcessingApp is the heart of the system

- It serves as the central interface for data acquisition, evaluation and forwarding of the acquired data to the cloud.
- The result data is calculated locally on the tablet and then automatically uploaded to the cloud, where it is available on every device with an internet connection
- Thanks to over-the-air updates, the system is always up to date and more features can be added at any time.

CAST-CON ENGINEERING

Data collection and reporting

Based on the below data, the monitoring system will be able to generate daily, weekly or monthly reports for each single slag pot;

- no. of heats
- no. of critical situation
- no. repairs/maintenance
- location – EAF / CC / slag pits / parking place / repair station…
- status – ready for service / in production / in repair / stand by / out of service…
- monitoring – pick-up / type of slag / full or empty / time and date / pit no. / knocking…
- total time of operation..
- etc…..

Hardware & Software

- Thermal camera
- I/O panel and cables for installation and power supply
- Mounting bracket for the camera and CamSafe housing
- Rugged industry tablet
- Smart Processing App