Ladle gunning to improve lifetime & decrease energy consumption for heating

BACKGROUND
Customers needs

CONCEPT
Calderys solution

SUMMARY
Recap of the solution

RESULTS
Concrete benefits

LADLE GUNNING TO IMPROVE LIFETIME & DECREASE ENERGY CONSUMPTION FOR HEATING

The background situation

Typically steel ladles are taken out of service due to one area of the refractory ladle lining becoming too thin to safely continue using the vessel.

In this situation, the complete refractory lining is removed, often resulting in the disposed of material which was still in good condition and could have safely achieve additional heats.

The request from the customer

Provide a solution to:

- Balance the refractory wear rate of the ladle
- Ensure that, at the end of its life, the refractory lining has been consumed uniformly so that there is no excessive wastage of good refractory product.

The solution would need to be conducted on hot ladle linings and be fast so it does not disrupt the normal production tempo of the steel plant.

The solution should be easy to integrate into the current production flow stream and provide a reduction in the total refractory cost of the ladle.

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Analysis of the customer request

Based on the requirement of balancing the ladle refractory lining wear rate, in hot conditions, during the normal production path of the ladle, hot gunning was considered as a solution.

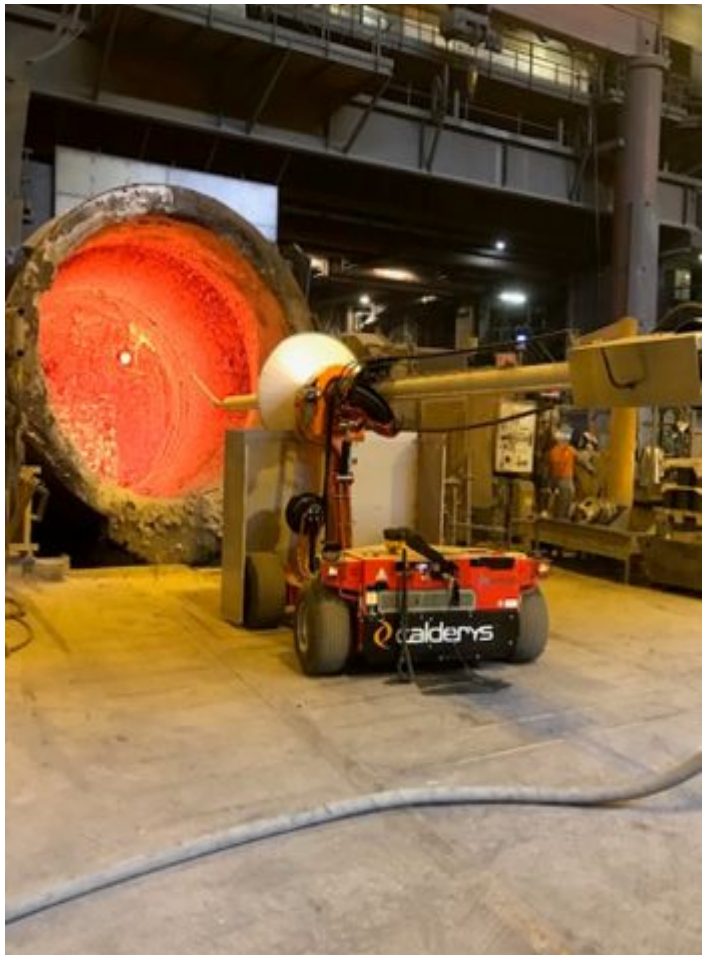
A right balance has to be found between cost of the gunning material and saved time for the production process.

Description of the solution developed by Calderys

To safely and effectively apply the gunning material in hot conditions, close to the ladle, we use a remote controlled Shooter fed by a fully automatic batch gun.

To minimize the cost of the ladle maintenance, we use a “Spot Gunning” approach, where only the high wear areas of the ladle are maintained.

This approach effectively balances the wear rate of the lining while reducing the application time and amount of material required per patch.



Benefits brought by the solution

- **54 less ladle relines per annum**, saving over 3,000 man hours per year
- **€202k saving in gas** for ladle heat up and reduced CO_2 emission (-520 tons)
- **Lower waist and disposal costs**
- Significantly improved **ladle availability**

LADLE GUNNING TO IMPROVE LIFETIME & DECREASE ENERGY CONSUMPTION FOR HEATING

Product presentation

We use a Multi-Bond MgO based gunning material, **CALDE MAG GUN P83** to maintain the slag line and upper barrel of the steel ladle. The Multi-Bond system gives good sticking and low rebond when applied to the hot ladle brick even when being applied overhead.
For maintaining the floor and blocks of the steel ladle, we use an Alumina based gunning material, **CALDE GUN M32**. This product is used to patch the high wear areas in the floor, helping us to eliminate this area of the ladle as the refractory life limiting factor.

Services – Expertise

Calderys supplies a full service to effectively and safely increase the ladle life.This service includes the supply of equipment, application labor on a 24 hour basis and specialized maintenance gunning materials for this type of application.

The Calderys ladle maintenance program is based on continuous improvement. Our team works closely with the customer on a daily basis to identify and explore additional areas to increase the ladle life further and at the same time reduce the total refractory cost.

Thank you for your attention

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