Success Story

# Control Performance Optimizer Offline Controller Design Improves Copper Rod Quality and Productivity

## Challenge

BHP Copper Metals had made various attempts to automate the pour pot level, with little success. To maintain product quality, it is essential to keep the pour pot filled with metal to a constant level. BHP Copper Metals in San Manuel, Arizona needed a solution to improve basic PID control of their continuous casting process.

## Solution

BHP Copper Metals chose Control Performance Optimizer to implement an enhanced control strategy based on accurate process models. Control Performance Optimizer allowed them to design and test control strategies offline and the controller implemented worked immediately and required no additional tuning.

Control Performance Optimizer is Powered by Matrikon, which represents vendor neutrality. This product works with third-party control systems and applications.

## Advantage

- Improved product quality
- Improved yield
- Improved operation consistency
- Reduced equipment wear

## The Challenge of Implementing New Control Strategies

BHP Copper Metals in San Manuel, Arizona, use the Southwire process to produce some 180,000 tons of copper rod annually. It needed a solution to improve basic PID control of their continuous casting process. They chose Control Performance Optimizer to design, test and implement an enhanced control strategy based on accurate process models.

During production in the rod plant, cathodes are first melted in an ASARCO shaft furnace, then continuously cast into copper bar and subsequently rolled into rod. Copper leaves the shaft furnace and is transferred to the holding furnace by means of a launder. Liquid copper continuously leaves the holding furnace, flows down a second launder and then enters the pour pot.

To maintain product quality, it is essential to keep the pour pot filled with metal to a constant level. Low pour pot levels will cause process slag on the surface of the pour pot to be entrained and enter the cast bar, thus reducing rod quality. However, if the pour pot level is too high, then liquid copper will spill out the overflow, reducing yield and increasing cost.

Additionally, implementing new control strategies online without prior testing can be dangerous and expensive, as production can be lost to poor quality or trips.

## Offline Simulation for Better Control

Over the years, various attempts had been made to automate the control of pour pot level, with little success. Using dynamic process simulation, a number of control strategies were developed, simulated and tested offline

The strategies developed were evaluated before final implementation based on a number of criteria, including:

- performance at steady state
- disturbance rejection

Thanks to the extensive preparatory simulation, the controller implemented with Control Performance Optimizer worked immediately and required no additional tuning.

## Multiple Benefits

The new controller reduced both the level deviation and the movement of holding furnace, thus improving the rod quality and reducing copper spillage while prolonging the life of the motor. Figures 1 and 2 show the before and after implementation results.

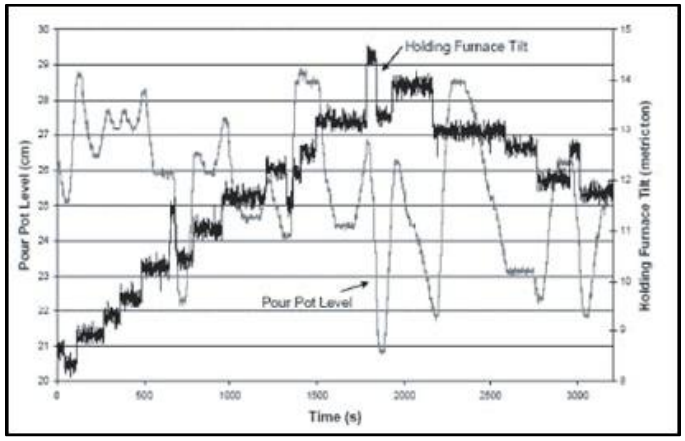


Figure 1- Level deviation before controller implementation

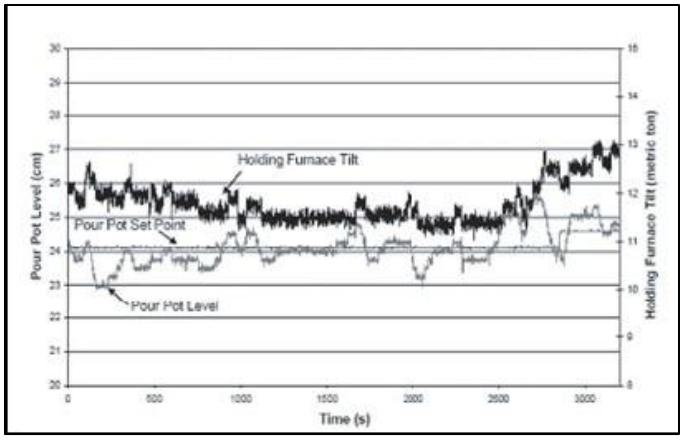


Figure 2- Level deviation after controller implementation

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'Powered by Matrikon' symbolizes that this product/solution is system and application independent.

**For more information:**
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