

# Improving the Properties and Performance of Anode's Cast Iron

Location: China



## The Project

The rodding room had a problem with their control of cast iron (CI) production, resulting in inconsistency of the cast iron composition. In addition the CI composition was rich in phosphorous which caused the following problems:

- Contamination of the bath with phosphorous leading to reduced current efficiency.
- The cast iron went through a phase change in late rota anodes causing vertical cracks in the anodes and cracks that cause loss of the whole butt corner, leading to high carbon dust and spikes.
- Sticking of cast iron to the rods which caused difficulties to strip the thimbles from stubs.

The project aim was to introduce standard work procedure that will result in producing grey cast iron with consistent composition.

## LMRC's Role

LMRC engineers introduced a new cast iron recipe (grey cast iron) which was low in phosphorous content. The procedure of cast iron preparation was standardised with measures that guarantee production with consistent composition in every batch.

As the new working standard was a complete change to the working procedure that the staff were accustomed to, LMRC engineers had to train the staff on the new procedure. The new procedure contained more measurements such as temperature, and accurate weighing of the components that made the final recipe of the cast iron.

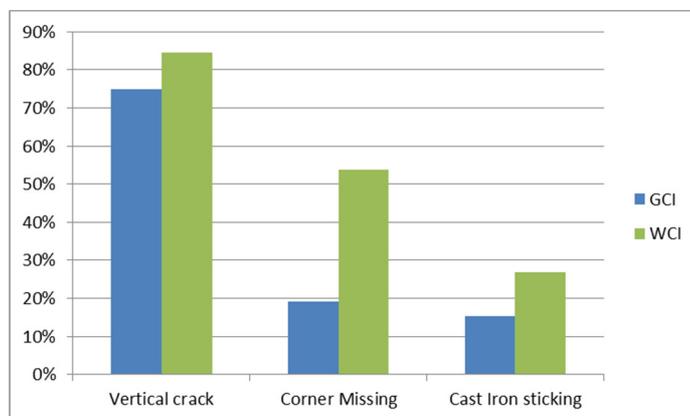
## The Results

The new work standard was implemented successfully and the cast iron consistency was improved – the composition of each batch was similar and within the required specification.

The new grey cast iron (GCI) composition had a positive effect on the flowability compared with the previous recipe (WCI) enabling the casting of more than 5 extra anodes per ladle at lower casting temperatures.

The use of grey cast iron reduced the number of vertical cracks on the anode butts and reduced missing corners on anode butts by 34.62%.

The new CI recipe (GCI) improved the thimble stripping process by reducing CI sticking to the anode stubs by 11.54%, which is almost half that for the previous recipe (WCI).



**Figure 1:** Effect of new cast iron recipe (GCI) on vertical cracks in anodes, corner missing in anodes and cast iron sticking to stubs, compared to the previous recipe (WCI)

An additional benefit was 5~10mV reduction on stub-to-carbon voltage between the GCI anodes and the WCI anodes.

Working according to the new standard has opened the way for more precision work and new culture of continues improvement in the rodding room. The operators are more aware of the cast iron specification needed and the resulting effects to anodes and pots operation when the specification is not met.

LMRC initiated discussions between the rodding room and potroom engineers to form client –supplier relationship to ensure the rodding room will receive feedback from the potroom about the quality of anode production, in order to maintain the quality of anode produced.