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Robust Castable Behaviour How it can be Achieved?

A refractory castable with respect to its flow behaviour, wet mixing, setting behaviour and strength development will necessarily depend on the composition of the mix as well as certain external environmental conditions such as ambient temperature, water quality, intensity of mixing etc etc. The entire installation can be challenged with the variation of the castable behaviour with respect to the above mentioned properties. Some counter measures on the site is possible but may at times these countermeasures are detrimental to the performance of the castable. Raw material purity and ambient conditions will thus be mainly responsible for the robustness of the castables. Among the available binding system Calcium Aluminate cement is the most significant hydraulic agent though in some specific cases hydratable alumina is used and phosphates and colloidal silica are also very sparingly used as binders. The main reason of CAC's preference over others is that its addition results in more robust castable with lower sensitivity to temperature, faster and more reliable demolding coupled with ability to dry out with less risks. Since typically the matrix of a castable is the weakest part with respect to penetration and corrosion, it



needs to be made stronger. In that respect a binder containing calcium magnesium aluminate has proven to be more resistant to penetration and corrosion. Calcium magnesium aluminate is a new generation of binder that provides highly reactive spinel and develop unique micro structure and gives rise to superior corrosion resistance. This binder at the same time displays a unique placing property and make the castable a robust one.

The idea of using calcium magnesium aluminate originate from the concept of spinel being more resistant to slag attack and also the fineness of spinel increases the corrosion resistance property also improves. Since calcium

magnesium aluminate cement gives rise to a specific matrix microstructure which is integrated into the castable and make the castable robust. In the castable where calcium magnesium aluminate is used as the binder magnesium aluminate grains are smaller and very homogeneously distributed and that improves the corrosion resistance. In conclusion to make a robust castable when we use Calcium Magnesium Aluminate cement as the binder it gives us the following advantages.

- 1) It provides a double function, that of a hydraulic binder as well as provide corrosion resistance to molten metals to slags.
- 2) It is flexible with other additive systems used in castable formulation.
- 3) Finer spinel phase gives rise to unique microstructure that helps to improve corrosion resistance.

