MPM
NEWSLETTER

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GREEN SAND ADVISORY

WHEN LESSER IS BETTER

USING ADDITIVES AS ESSENTIAL CONTAMINANTS

"Quality and additive engineering technology, co-related to cost economics,should drive the decision making on use of additives in molding sand, notjust one of the two in isolation. If in doubt, or if the advantages oftechnology over cost economics or vice versa, is not clear; the recommendation would be to choose technology over cost economics for casting quality performance that is customer-centric."

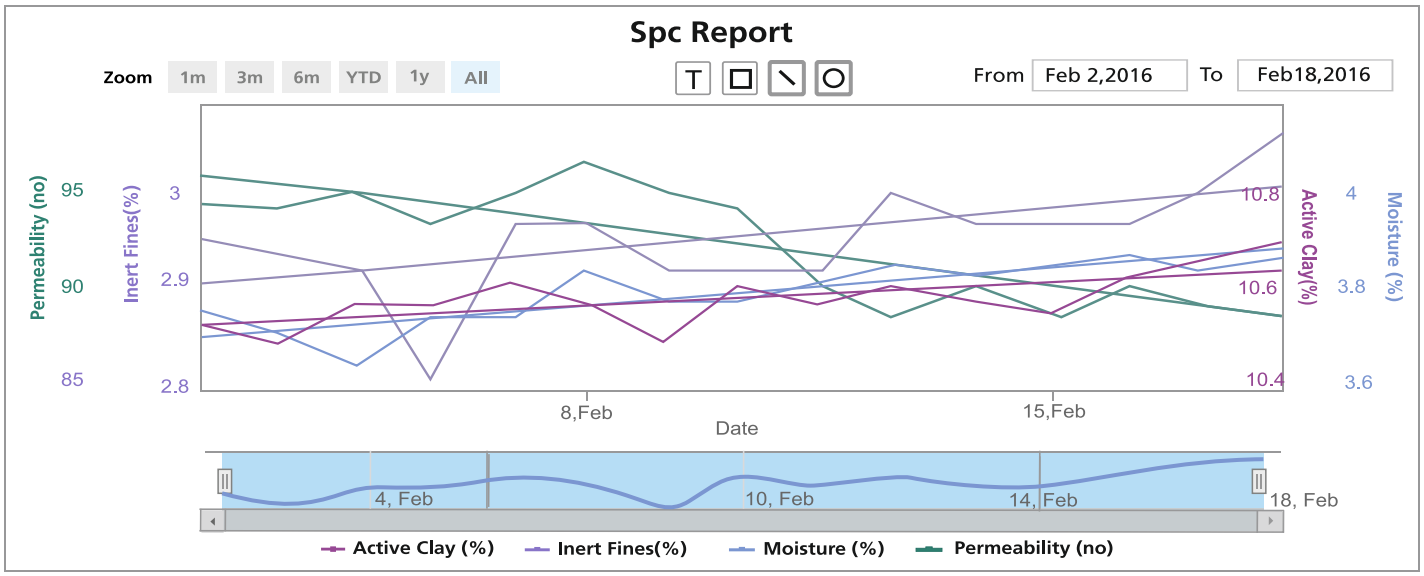
- Deepak Chowdhary
- Founder Owner of MPM PVT.LTD. Nagpur India
- Inventor Of 'SANDMAN' data analytics driven molding sand control-for reduced rejections

Most times, when choosing an additive for the moulding sand, the cost considerations of the additive overreaches it's technical performance metrics in actual use. The disconnect thus created between commercial and technical considerations obscures the real cost of the additive in shop-floor operational application.

One example of the above is: The level of addition of additives which is often either a single dose setting batch after batch; or is often overlooked during pattern change-over. This can have far reaching, often negative,consequences: on rejections and also on sand carry over (sand sticking). Theeffects are more pronounced when the additive is used in higher than optimaldoses in the molding sand.

For example: a 5% ash low cost Coal Dust while appearing cheaper, butwithout the essential coking and Lustrous Carbon donating capabilities, willnormally demand higher levels of addition to maintain

Trend chart showing co-realtion between increase in various parameters with active clay, for example.



Courtesy: SANDMAN - Predictive data analytics decision support software for optimisation of green sand parameters in foundries.

target LOI values. Itscontribution to good parting of sand from metal and surface finish is questionable if one understands the principles of a good lustrous carbon former (refer: http://www.foundryinfo india.org/tech_section/pdf/24_OP.pdf).

Let us consider a 5% Ash content (by weight) of 1 ton Coal dust addition/consumption to achieve a specific LOI = 50 kgs of Ash.

A "quality" Lustrous Carbon Additive may be required at conservative 0.800ton addition/consumption for the same LOI: 5% ash = 40 kgs of Ash.

Lets us extend the same argument to Bentonite. Consider a burnout of 0.2% after pouring. Assume a total bentonite addition/consumption of 1 ton = 20 kgs ash

Consider now that the bentonite consumption is reduced to 0.850 tons by a better quality (Mb Value/Gelling and swelling) bentonite. The ash generation =17 kgs

Each foundry can do the math and calculate their ash/inert fines build up in any manner they are comfortable with: per liquid metal ton (LMT) or per 100 tons castings produced or simply on "thumb-rule" calculations like done in the above example. The build up will increase with every increase in production in the total sand loop. The effects of the perspective so gained can be veryprofound.

Did you know? A single additive increase in addition impacts almost 8 major parameters of the molding sand simultaneously, creating a 'noise' in the process.

Effects and Impacts *

1. **Increases the total surface area of the molding sand**
2. **Increases consequent demand for related additives**
3. **Increase moisture demand/ temper water**
4. **Lower flowability of the sand.**
5. **Reduces permeability Index of the prepared sand even if marginally.**
6. **lowers the fusion point of the molding sand/reduced sand refractoriness**
   - **6.1. Increased sand sticking to the castings/ sand fusion**
7. **Sometimes, It can also result in Uneven compaction of the mold**
8. **Increase in Inert Fines**

'Noise' is what creates rejections. Can you afford this 'noise' in your system sand?

(*excerpt from author's technical paper: Perspective on Use of green sand additives as essential contaminants.(can be requested at: deepak@mpmindia.com)".

Disclaimer: The above list is not exhaustive, nor 'cast-in- stone'. Sometimes some effects and related impacts are marginal and not evidently seen or recorded. This sharing of experience is just to make the reader aware of the logic of the use of additives in a judicious, diligent and aware manner so that the process can remain stable, reliable and repeatable with the ultimate view of keep sand related rejects at minimum.

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