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# Sandman : A Data Driven Solution For Reducing Casting Rejections In Sand Foundries

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## About the Client

Established in 1984, **MPM Private Ltd.** is one of India's leading manufacturers of foundry consumables, primarily known for their proprietary blended lustrous carbon additive, marketed and sold worldwide under the brand name LUSTRON. In addition to foundry consumables, they also provide sand testing and auditing services to foundries across the nation.

## Motivation

Management of foundry sand systems has traditionally been considered as an art rather than as a science. Though the physical infrastructure has kept pace with the times through advancements in machine automation, the operational infrastructure is still reliant on the experience of personnel on the foundry floor. This rather intangible human element in foundry sand management poses serious problems, with the experience and knowledge of the foundry sand management being tied to the personnel working at the foundry and not the foundry itself. Furthermore, the foundry sand system is not only heavily reliant on rapidly depleting resources such as silica and bentonite but also energy. With increasing pressure on business sustainability, casting rejections and their control in sand foundries assume a pivotal role in optimization of operational costs.



## Problem

A common approach in engineering practice is to describe every process operation through means of a first principles model. Such an approach quickly becomes infeasible with the realization that the underlying physics of the entire foundry sand system is ill understood.

It immediately follows that a data modeling approach is the only other feasible choice. This too has its own problems in the form of identification of the correct set of inputs to model the system, not to mention the quality of input data. Finally there is the mammoth task of providing a solution which is scalable and configurable across customers, while being easily accessible to even the most inexperienced personnel in the foundry.

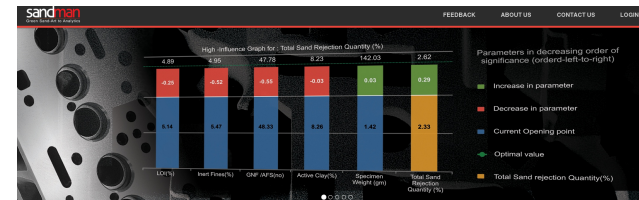
## Solution

We realized that a stand-alone desktop application would not suit the evolving needs of the end users. A decision was made that a cloud-based application would allow us to be more agile with regards to addition of new features and provide us with the computational horsepower required to implement our algorithms.

It was understood early in the development process that the reliability of the solution depended on the identification of the sand parameters which affected the casting rejections and the quality of the data. We worked closely with our client **MPM Private Ltd.** to leverage their knowledge on sand foundries. This collaborative effort resulted in development of not only a comprehensive sand characterization protocol but also a flexible yet robust data validation engine.

Once data acquisition and validation was made easy, our analytics team was able to leverage that data and gain insights. The team reduced the sand and casting rejection

data into several operational states of the foundry with each state resulting in a determinable percentage of casting rejects. This allowed us to integrate predictive capabilities into the application. Our knowledge gained through experience in process control and data visualization was also put to use, with us developing intuitive reporting engines for monitoring and control of sand parameters.



A preview of Sandman

This collaborative effort culminated in Sandman<sup>1</sup>. In its current iteration Sandman acts as a repository of the experiential knowledge of the foundry, with the ability to record, monitor and perform retrospective analyses on any process operation affecting the sand system. It also has a feature-rich set of modules providing predictive and planning capabilities to foundry personnel, allowing them to optimize their operations through our analytics, enabling them to resurrect their otherwise dead data.

Sandman is currently being deployed across foundries in India. We at **Gyan Data** believe in collaborative development and iterative refinement and continue to work with **MPM Private Ltd.** in improving Sandman, providing personalized solutions for foundries.

<sup>1</sup>SandMan is fully owned by our client MPM Private Ltd.