



Tata Steel has developed the first device in the world to measure the permeability of a sinter bed, thus solving a problem that steel-makers across the globe have been trying to redress for the last 65 years.

THE CONTEXT

Iron ore sinter, which is used in blast furnaces in steel plants, is an agglomerate produced from ore fines, fluxes and plant reverts or scrap. However, the use of inferior grade ores and a high proportion of reverts reduces the permeability of the sinter bed in sinter machines, which, in turn, results in lower production and poor quality. Sinter plants across the globe have been looking for a direct measure of the permeability of a sinter bed as it is a key factor in determining the performance and productivity of the sintering process.



THE INNOVATION

Steel plants and instrument manufacturers and designers have been unable to solve the problem of measuring the permeability of a sinter bed in a sintering plant. Tata Steel's Jamshedpur plant has resolved this problem for the first time by inventing a device that provides the on-line measurements and control of sinter bed permeability necessary for running a sinter machine. This measurement has been available to the Jamshedpur plant's control room on a real-time basis since November 2018.



KEY CHALLENGES

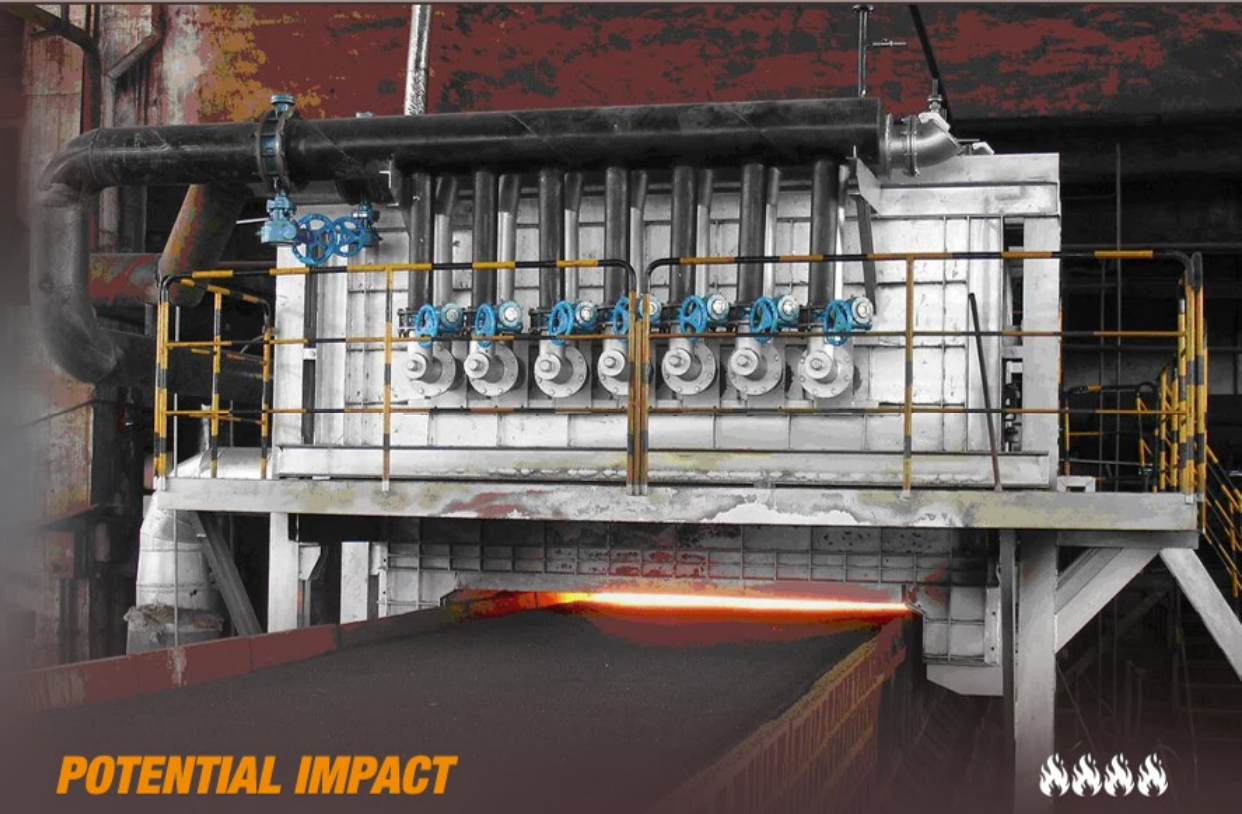
TO CONTINUOUSLY MEASURE AIR FLOW IN THE MULTI-PHASE, TURBULENT CONDITIONS THAT EXIST IN A SINTER PLANT

The team solved this by choosing the correlation-based infra-red sensing methodology to measure air flow accurately and continuously in a dusty environment at high temperature (up to 120 degrees centigrade) and under negative pressure (1,000 mm water column).



POSITIONING THE INSTRUMENT AT THE RIGHT LOCATION IN THE PILOT PLANT

The team decided to locate the instrument in Machine#1 at Sinter Plant 1, Jamshedpur, where it generates reliable and accurate data on permeability for the operators to take action.



POTENTIAL IMPACT

Tata Steel has successfully piloted a new device that resolves a problem that sinter makers all over the world have been trying to address for 65 years. The new device has been running trouble-free at the Jamshedpur plant since November 2018. Tata Steel has filed a patent for the device. Tata Steel also intends to market it as a new process control device to other sinter plants across the globe.

