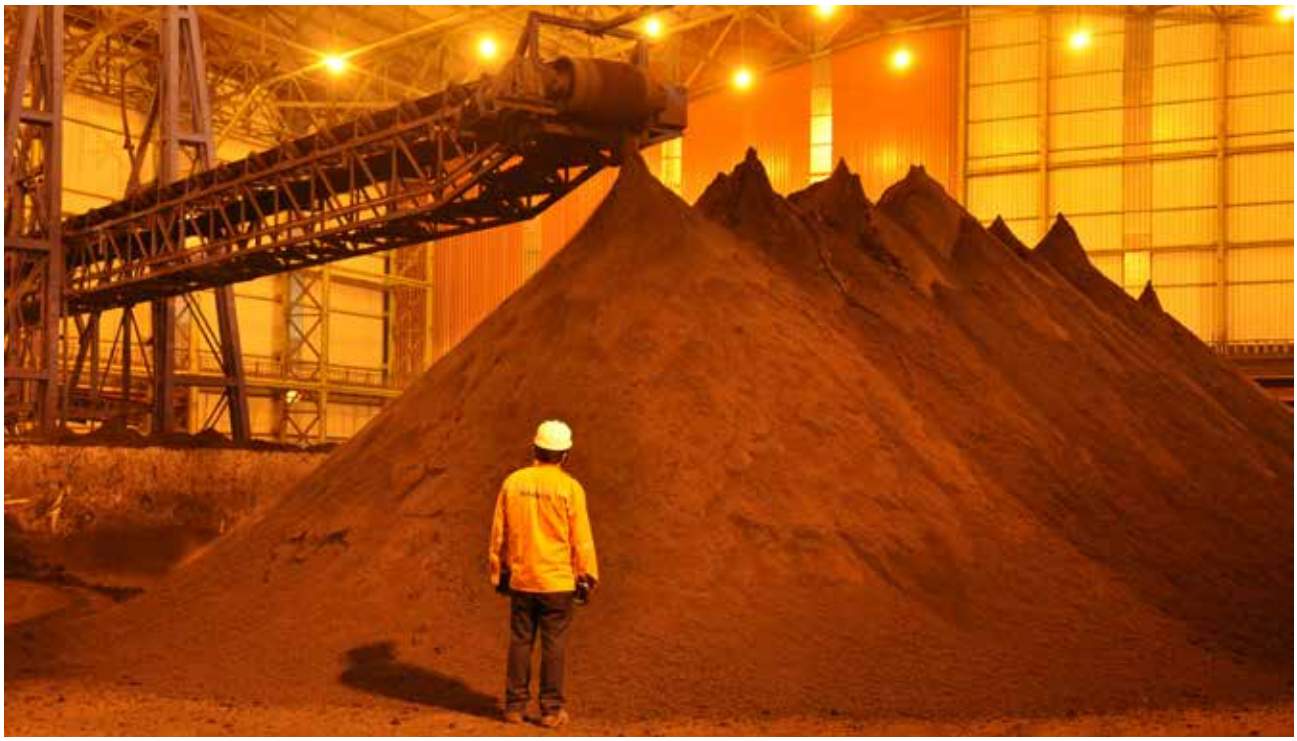
REUSE

CASE STUDY

HARSCO ENVIRONMENTAL

MICRO PELLETIZING

LEVERAGING MICRO-PELLETIZING AND BRIQUETTING TO RECOVER VALUE



New techniques enable a steel plant in India to recover hundreds of thousands of tonnes of steel making materials that would have otherwise been headed to the landfill.

> **"700,000 tonnes per year of previously wasted material could thereby be reused."**

BACKGROUND

Steel plants generate numerous finely-sized waste streams that contain value, yet cannot be recycled back into the steel making process in their current form.

This pointed to the need to develop specialized handling and agglomeration process techniques to generate larger, uniform product sizes and chemistries so the carbon, iron and mineral values contained could be recovered.

Several hundred thousand tonnes per year of previously wasted material could thereby be reused once in an acceptable form

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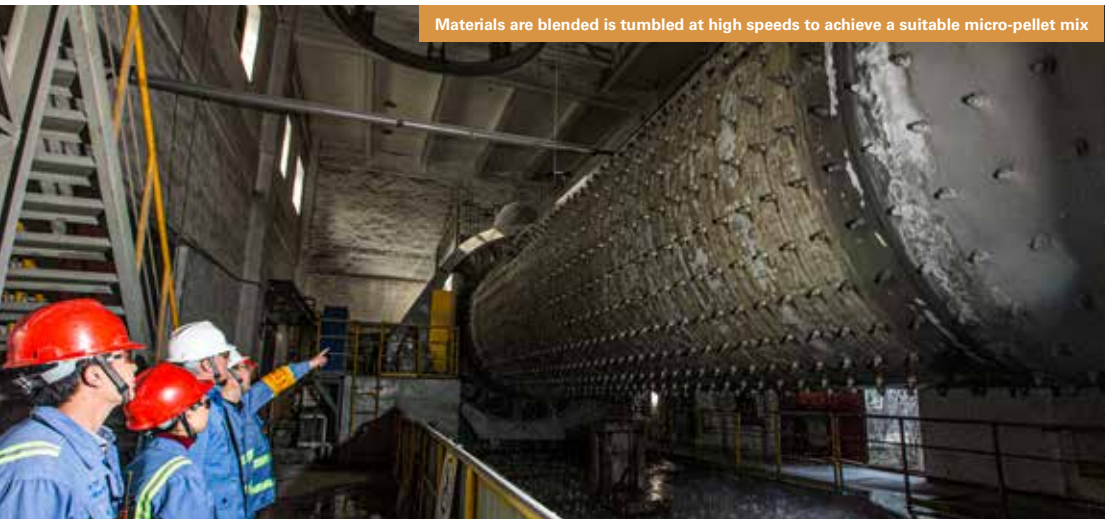

Materials are blended is tumbled at high speeds to achieve a suitable micro-pellet mix

THE SOLUTION

Harsco developed effective methods of blending these wastes with proprietary binders in custom-designed micro-pelletizing and briquetting processes to agglomerate them into forms which are acceptable for reuse back into the steel making process. The initial trials for briquetting the Indian materials were pilot tested in Sarver, Pennsylvania during the 3rd quarter of 2011.

The micro-pelletizing process begins by selecting several by-product streams for recycling. Materials high in lead, zinc and sulphur are minimized while materials high in carbon, iron, lime and magnesite are prioritized. Consideration is given to moisture content and size as the materials range from ultra-fine, dry dusts to wet sludges. Once the required balance of chemical and physical characteristics is achieved, the material blend is tumbled at high speeds with specialty binders. The resulting micro-pellets have uniform chemistry and optimum sizing for sintering at high temperatures into fused agglomerates which are then fed into a blast furnace. The carbon, iron and mineral units contained are then used to make liquid iron for subsequent use in the steel making process. Waste is thereby minimized and the ironmaking process efficiency is increased.

Briquetting begins with a similar selection process as micro-pelletizing, but focuses more on materials that are high in iron and/or carbon depending on the area of briquette application. Steel making briquettes are higher in iron for use in the steel making converter where liquid steel is produced directly, thereby avoiding the need to process these by-products in the sinter plant or blast furnace. Overall steel making costs are thereby minimized. Iron making briquettes usually include higher carbon levels which are beneficial in the blast furnace process. Specialized binders ensure both cold and hot strength in the briquette for recovery of the iron and/or carbon units in the furnace.

OUTCOME

Micro-pelletizing and briquetting processes have helped customers recover value from previously dismissed waste and generate new materials that have bolstered steelmaking capacities.

For more information on the costs and implementation of this solution, please contact us at **hem@harsco.com**

STATUS

The 12M tonne per year (TPY) steel plant at JSW Bellary, India is

now consuming more than 200,000 TPY of Harsco briquettes

back into the steel making converter for recovery of metallic and iron oxide units that were previously landfilled without any value recovered.

Additionally,

more than 800,000 TPY of carbon, iron oxide and mineral dusts and sludges are now micro-pelletized,

facilitating their use in the sinter plant to generate a raw material suitable as blast furnace feed.

This customer is now increasing their steelmaking capacity to 18M TPY and has

requested that Harsco increase its recycling production capacity

to keep pace with their increased production rate.

MAKING A WORLD OF DIFFERENCE™

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