CASE STUDY

Customer
J.C. Steele & Sons, Inc., NC

Equipment
Delta-Phase® Shakeout, Mold Dump Conveyor, Scalping Conveyor

Application
J.C. Steele & Sons is the corporate parent of The Steele Group and the global leader in stiff extrusion machinery and solutions for customers in heavy clay, iron & steel, ferro alloys, and gypsum/wallboard. J.C. Steele manufactures feeding, sizing, mixing, and extrusion machinery; as well as dies and bridges, tools, upgrades, and auxiliary equipment. The company serves its global customers with engineering, technical support, strategic warehousing, and deep inventories of spare and wearing parts.

Carrier History

Founded in 1950, Carrier Vibrating Equipment has been engineering and building machinery for the foundry industry longer than any other vibrating equipment manufacturer, bringing decades of innovation and knowledge to each custom project. Carrier's research and development team is focused on continuous improvement of foundry equipment and operational processes. Carrier holds more than 150 patents for equipment designs.

Carrier® Vibrating Equipment, Inc.

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Overview/Challenge

Too Much Damage, Too Much Sand

J.C. Steele was updating their molding process from jolt/squeeze to an automatic mold machine which would produce harder sand and more compact molds. Their current equipment, built by another manufacturer, was designed to scalp sand but did not create enough force to break up the harder sand.

The force on the castings conveyed by their current equipment was damaging the castings and allowing sand to flow downstream into the cleaning room.

Workflow Disruptions & Downtime

Workers at J.C. Steele were forced to spend a considerable amount of time and labor manually picking off castings to prevent damage. They also found themselves continuously making repairs to the units.

Later, the stroke of the scalping conveyor was modified, which led to a slight efficiency gain, but it was still causing unnecessary damage to the castings.

Solution

Step 1

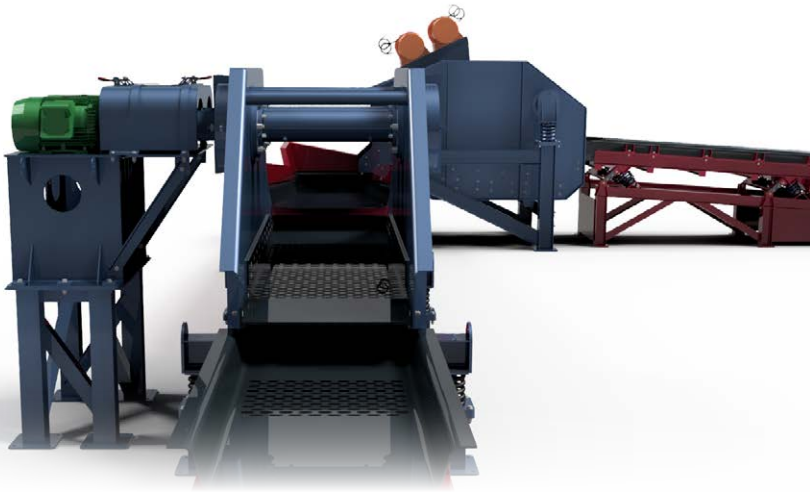
To solve these issues, Carrier recommended installing a vibrating mold dump conveyor feeding directly to a blank deck shakeout at the start of the line. The blank deck shakeout was a non-scalping, “mold-buster” style unit delivering more than 2.5 times the vertical force of their current scalping conveyor. The sole purpose was to perform an initial lump breakdown without damaging castings, it was able to better break apart the problematic sand lumps.

Step 2

The next step to address the quality of the castings and minimize sand from flowing downstream consisted of adding another conveyor along with Carrier’s patented Delta-Phase® shakeout immediately following the “mold-buster” shakeout. This second conveyor would gently move the castings to the shakeout and perform scalping to remove final nuisance carry over sand to a lower counterflow pan. The lower counterflow pan is integrated full length under the conveyor/shakeout assembly to

bring the sand back to the takeaway belt. To help reduce maintenance costs, Carrier provided replaceable pan sections for the upper conveyor trough.

With its custom perforated scalping deck pattern, the Delta-Phase® shakeout receives the sand and castings from the conveyor and continues to break down any remaining sand lumps. The Delta-Phase® shakeout is equipped with the ability to adjust angles and speed resulting in complete control. This allowed J.C. Steele workers to adjust from aggressive vibration to gentle vibration to break down the sand while ensuring quality castings. The sand discharges through the bottom and into the counterflow sand conveyor underneath the scalping conveyor. At this point the castings continue over the edge and into a collection bin.



The new molding line had been in production for 2 years when the new Delta-Phase® was installed.

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Results

With Carrier's expertise in the foundry industry, a practical solution for J.C. Steele's old equipment issues was recommended. The J.C. Steele foundry operation is now more efficient with their new mold dump and Delta-Phase® shakeout line. The issues from the switch to a harder mold sand have been resolved. Castings no longer need to be pulled from the line to prevent damage or to finish removing sand lumps. With their new Delta-Phase® Shakeout, the cleaning issues were addressed with two different preset settings. The two-stage system was designed and installed over time, with special attention paid to fitting the current layout. This led to J.C. Steele's, "easiest install they have done yet."

"This was the easiest install we have done," says Ricky M. Tucker, J.C. Steele Maintenance Manager.

For more information on J.C. Steele, visit their site at jcsteele.com.

> We are very pleased with no production downtime. The Delta phase really gives us the versatility to run smaller castings (more sand to move through the system) and larger castings (less sand through system) at the same time with no overloads on the shakeout to stop up and run over the sides or fault the system to shut down. We have very little sand to make it into our catch bins which really helps to keep our shotblast maintenance to a minimum.
>
> — Ricky M. Tucker,
> Maintenance Manager

Learn more about:
Foundry Equipment Solutions

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