

MODERN CASTING

MODERNCASTING.COM

A PUBLICATION OF THE AMERICAN FOUNDRY SOCIETY | MARCH 2026

A BOLD FORAY INTO FOUNDRY 4.0

FERROLOY'S JOURNEY
INTO TRANSFORMATIONAL
PROCESS EFFICIENCY

MARK SOUCIE, OWNER

PLUS

SAFETY
INNOVATIONS **p. 26**

METALCASTING
CONGRESS
PREVIEW **p. 50**

INNOVATIONS IN SAFETY

Learn from three foundries whose work to improve safety, health, and ergonomics in their operations recently earned AFS accolades.

JOANNE COSTIN

Foundries are making progress on the safety front. New Bureau of Labor Statistics data on nonfatal illnesses and injuries show foundries have reduced incidents in the workplace over the last five years by 20%. Yet they continue to have a higher-than-average incident rate at 5.1 cases per 100 full-time workers.

Continuing to reduce incident rates will require not only the diligence of each and every worker, but also the creativity of foundry managers and suppliers to identify new solutions. Last October at the AFS Environmental Health & Safety Conference, AFS presented the



Operators can safely remove slag from a furnace at Ironcast de Frontera in Ciudad, Mexico, using a remote-controlled arm with a clamp attachment. Credited for the AFS award: Reynol Espinosa Quintanilla, maintenance and new equipment installation manager; Luis Mejia Soriano, safety & environmental manager; and Gerardo Barajas Corona, operations manager.

2025 Safety and Health Innovation & Insight Awards to three foundries that developed simple, effective solutions to make their plants safer, healthier, and more ergonomically friendly. These are their stories.

REMOTE SLAG REMOVAL KEEPS WORKERS OUT OF THE DANGER ZONE

At AFS Corporate Member Ironcast de Frontera in Ciudad, Mexico, workers primarily produce engine blocks and cylinder heads for heavy-duty trucks and equipment. To remove slag formed on the surface of molten iron during the casting process, workers previously needed to stand on the edge of the furnace and use a shovel attached to a 3-meter-long metal tube. This required unergonomic movements and exposed them to risks from sparks, high temperatures, and combustion gases.

After hearing about accidents at other foundries involving workers tripping or falling into furnaces, the Ironcast de Frontera team sought an alternative.

An internet search for a manufacturer of a semi-robotic arm with a clamp attachment led to a solution from Polish crane manufacturer HAK. The arm is remote-controlled, allowing the operator to stand several meters from the heat source. The clamp collects the slag and deposits it in a container. Ironcast de Frontera made several changes to adapt the arm to their specific application.

“We had to change the hydraulic pump for one with a motor that would support severe working conditions,” said IRONCAST plant director Armando Garza Arizpe. Other components required protection with a heat shield.

“I thought the equipment could do the job easily, without complications,” said Arizpe. “All the electronics are well isolated from the furnace.”

When initially installed, slag built up on the clamp, but applying a refractory coating on a weekly basis solved the issue. According to Arizpe, operators



The steel stand used to stabilize ladles during relining at Grede in New Castle, Indiana is designed to be easily moved in and out of position with a forklift. Credited for the AFS award: Ryan Sorrell, melt manager, and Kevin Crandall, maintenance manager.

became proficient after about four weeks. “Operators feel safer and more comfortable,” he said. A task that previously had the highest risk level in the plant (Level 16) is now at the lowest (Level 1).

Ironcast de Frontera has since installed the arm at four other furnaces in the plant, with two more installations planned. Not every installation uses the same configuration. In some cases, the arm’s position had to be changed to avoid interfering with other activities in the foundry.

The cost of each semi-robotic arm was \$45,000, plus installation. The first installation, completed in 2024, took approximately four months.

A SIMPLE LADLE STAND REDUCES THE RISK OF ACCIDENTS DURING RELINING

A worker was hit in the arm with a 2,500-lb. ladle during the relining process, a painful accident but one that Grede’s New Castle, Indiana, foundry used as a catalyst to design a solution that made the operation much safer. The New Castle foundry produces ductile iron castings ranging from 10 lbs. up to 300 lbs.

Ryan Sorrell, melt manager for the foundry, explained what happened during the routine procedure, a task the company had previously believed to be low-risk.

“A precast ladle shape was lowered

into the empty ladle. The employee hit the button the wrong way, and the precast shape hit the bail (steel shell) of the ladle, knocking it over,” said Sorrell. “It hit an employee’s arm on the way down.”

The employee sustained significant bruising and was placed on restricted duty.

Grede takes every accident and near miss seriously. After analyzing the incident, the Grede team realized that because the bail had to be moved to a 45-degree angle for the relining process, the ladle was less stable than previously assumed. Their solution was to fabricate a steel stand that provides a wide, stable base for the ladle during relining, eliminating the risk of it being knocked over.

Working with an in-house fabricator who had previously worked in the area where the accident occurred, the company designed and fabricated the steel stand within two weeks at a total cost of \$7,500, including labor and materials. Additional perimeter features were added later to eliminate the use of a ladder. Previously, a ladder was used to reach inside the ladle to properly center the precast shape.

Sorrell stressed the importance of sharing safety best practices. “We regularly share best-practice safety solutions across all Grede plants so they can evaluate and implement improvements where similar processes exist,” he said.

NEW MATERIAL TRANSFER BELT REDUCES EXPOSURE TO NOISE AND SILICA DUST

At AFS Corporate Member Waupaca Foundry’s Plant 1 in Waupaca, Wisconsin, workers use sand casting to produce a variety of gray iron parts in lower quantities. A 90-ft., flat-stroke vibratory conveyor was previously used to transfer and sort “dirty castings” to tumble blast

We regularly share best-practice safety solutions across all Grede plants so they can evaluate and implement improvements where similar processes exist.

Heraeus

ELECTRO-NITE



Skip the dip

With molten metal dip temperature measurements, you may not always get enough information to ensure cast quality. But with continuous temperature measurement tools from Heraeus Electro Nite, you get the real-time reading needed to optimize plant safety and quality, casting after casting.



**Ready to measure temperature continuously?
Learn more at www.heraeus-electro-nite.com.**

U.S.A. and CANADA 800-558-9008 • MEXICO +(52) 844-866-9090 • BRASIL +(55) 11 3579 9300 • EUROPE +(32) 11 600 211

cleaning machines. The vibratory system used springs to lift the castings slightly as they moved, causing fine dust to be released into the air and creating a loud banging as metal hit metal.

According to Engineering Manager Michael Barden, the setup resulted in excessive noise and high levels of silica dust, making it a challenge to create a safe and comfortable space for workers who stood adjacent to the belt and pushed castings to one side or the other into the proper holding area. With sound levels routinely above 100 dB, two forms of hearing protection (plugs and muffs) were required, as well as respirators, due to average silica readings around 75 $\mu\text{g}/\text{m}^3$. Barden noted that few workers wanted to work in those conditions.

“We tried dust collection, noise barriers, and sound-dampening devices,” said Barden. “Nothing worked the way we needed it to.”

The decision was made to replace the conveyor with a Superbelt conveyor from AFS Corporate Member Magaldi Technologies, which runs without vibrations. According to Barden, the new conveyor eliminates the steel-on-steel banging of the castings. While his primary objective was noise reduction, tests showed the solution was even more effective at reducing silica.

“With the new equipment installed and additional industrial hygiene testing, we were able to demonstrate an average reduction in silica exposure by 98%, reclassifying the area to no longer require respirators,” said Environmental Engineer Shianna Wheeler. “The system also reduced noise levels from 105 dB to 92 dB, eliminating the need for double



By installing a new conveyor system, Waupaca Foundry Plant 1 was able to reduce silica exposure by 98% and reduced noise levels from 105 dB to 92 dB, eliminating the need for respirators and double hearing protection in that area. Credited for the AFS award: Michael Barden, engineering manager.

hearing protection.”

Waupaca has two similar conveyor systems in its plant, and Barden had also seen them at trade shows. However, they had never been used in an area where

operators were adjacent to the conveyor. The Waupaca engineering team worked with Magaldi to customize the design of a diverter system for the conveyor. A padded mat to stand on and pads on the outside framework that workers lean against improved operator comfort.

From start to finish, the project took almost a year. The investment was \$900,000 for the machine and installation. Some of these costs were offset by savings on respirators and double hearing protection, as well as energy savings and longer belt life. **MC**

With the new equipment installed and additional industrial hygiene testing, we were able to demonstrate an average reduction in silica exposure by 98%.



INCIDENCE RATES OF NON-FATAL ILLNESS AND INJURIES BY INDUSTRY 2024*	
All Industries	2.6
Manufacturing	2.7
Foundries	5.1
Ferrous Metal Foundries	5.6
Iron Foundries	5.5
Steel Investment Foundries	4.0
Steel Foundries (except Investment)	7.7
Nonferrous Metal Foundries	4.5
Nonferrous Metal Die-casting Foundries	3.5
Aluminum Foundries (Except Die-casting)	5.2
Other Nonferrous Metal Foundries (Except Die-casting)	5.2

INCIDENCE RATES OF NON-FATAL ILLNESSES AND INJURIES*		
2020 - 2024		
	Foundries	All Industries
2020	6.4	2.9
2021	6.5	2.9
2022	5.8	3.0
2023	5.3	2.7
2024	5.1	2.6

Incidence rates of non-fatal illnesses and injuries in foundries have fallen 20% since 2020, compared to 10% for all industries.

SOURCE U.S. BUREAU OF LABOR STATISTICS. *THE INCIDENCE RATES REPRESENT THE NUMBER OF INJURIES AND ILLNESSES PER 100 FULL-TIME WORKERS AND WERE CALCULATED AS: (N/EH) X 200,000, WHERE N = NUMBER OF INJURIES AND ILLNESSES EH = TOTAL HOURS WORKED BY ALL EMPLOYEES DURING THE CALENDAR YEAR 200,000 = BASE FOR 100 EQUIVALENT FULL-TIME WORKERS (WORKING 40 HOURS PER WEEK, 50 WEEKS PER YEAR)

Foundries have some of the highest rates of non-fatal illness and accident among all industries. The incident rate in foundries is 89% greater than the overall manufacturing rate.

SOURCE: U.S. BUREAU OF LABOR STATISTICS. *THE INCIDENCE RATES REPRESENT THE NUMBER OF INJURIES AND ILLNESSES PER 100 FULL-TIME WORKERS AND WERE CALCULATED AS: (N/EH) X 200,000, WHERE N = NUMBER OF INJURIES AND ILLNESSES EH = TOTAL HOURS WORKED BY ALL EMPLOYEES DURING THE CALENDAR YEAR 200,000 = BASE FOR 100 EQUIVALENT FULL-TIME WORKERS (WORKING 40 HOURS PER WEEK, 50 WEEKS PER YEAR)