Vol. 9, Issue 1, 2024

MELTING POINT

http://meltingpoint.squarespace.com

THE INDUSTRY OF HAPPY FUTURES

READ ABOUT THREE YOUNG ADULTS WHO LOVE THEIR CAREERS (AND THEIR SALARIES) IN METALCASTING!

Inside This Issue

Why Metalcasting?... Metalcasting produces engineered metal components for use in all facets of our world, including what you drive, where you live, what you eat, and how you work. The metalcasting industry maintains its traditions while embracing advanced manufacturing techniques. But the key to metalcasting is what is illustrated in ***Melting Point*** magazine—the diverse ways metalcasting helps propel society forward. If you are interested in joining this forward-thinking industry, look to the sections of the magazine dedicated to Metalcasting Universities & Scholarships and Career Opportunities on pages 20-23.

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DEPARTMENTS

LIGHTS. CAMERA. CASTING.

Metalcasting is: Making stuff that is used everywhere. Applying science, technology, and automation. Fire and melted metal. Look how amazing it is to make castings.

Visit **meltingpoint.squarespace.com** or point your phone camera to the QR codes below.

Picture yourself here in an amazing career that's never boring and pays well. Look at the possibilities.

Night of Fire: These guys poured 2,000 pounds of iron melted in a 15-foot tall outdoor furnace! Watch it happen.

Waupaca Foundry shows how castings are made— and good incomes too.

THE INDUSTRY OF HAPPY FUTURES

THE BUSINESS OF 'MAKING STUFF THAT MATTERS' ALSO CREATES THOUSANDS OF HAPPY HUMANS WHO FIND FULFILLING WORK, KNOWLEDGE, AND PROFESSIONAL FRIENDSHIPS IN A SEA OF CAREER OPPORTUNITIES.

Millions of kids are "wired" with interests in science and technology, computers, training others, or designing and building things.

There are LOTS of job opportunities in metalcasting, and if you want a job you won't get tired of, metalcasting may be the right place for you!

What kind of young women and men choose to work in metalcasting? Well, all

ILLUSTRATION: VISUALMARKT / ADOBE STOCK

kinds—each with different goals, talents, and backgrounds.

MEET AUDRIE: 'I Would Never Do Anything Else.'

Audrie Corral is a 25-year-old metallurgist at AFS Corporate Member Charlotte Pipe. A graduate from Virginia Tech University, she never heard of metalcasting till she learned about the metalcasting student organization called VT Fire during an engineering department open house before making her school selection.

"I knew I wanted to go into an engineering field, but once I saw that first pour, I knew that was what I wanted to study," she said. It was a perfect fit for me. I decided to go with it and never looked back.

Born in the Philippines, Audrie grew up in Richmond, Virginia. She did an internship with Charlotte Pipe the summer of 2018 while still in school and was hired on fulltime after graduation in July 2021.

What does a typical day in the life of Audrie look like? "There is no typical day," she laughed.

"I'm involved in quality issues and process improvements," continued. I usually have samples running on the floor to either help with the quality issues or trying something new internally; finding a way to make something better. Some days I might lose, but other days it's a complete win. It can be a roller coaster. Sometimes I work with the sales people, and some days I'm at my computer digging into data and researching things. Other days. I'm out on the floor all day long, picking up castings and looking at things. There's a lot to what I do."

Happy in her work is an understatement according to Audrie.

"I can't even imagine working a different job," she said. "It's a great fit for my personality, too. I mean, I get to wear a uniform every day—I don't even have to think about what to wear. If you knew me personally, you would know how ideal that is. I would never do anything else."

MEET BRAD: 'It Makes You Feel Good When You Solve a Problem.'

Brad Cook is quality engineer at Linamar, where he supervises three spectrometry lab technicians. He oversees the metallurgical side of the foundry, supporting his team and assisting in several other departments.

He also gets involved in data analysis and reporting, which helps his company perform more efficiently with less "scrap" (castings that have to be rejected). Brad also gets to serve on the information systems team and makes recommendations for improvements and updating training.

"One of my favorite things is our scrap production team meetings—we review scrap trends and someone will point out how we could make a process more consistent for producing good castings at a good rate. So, we go out and work on it, and when we come back for the next meeting, and we see the trend line going down, and it makes you feel good—we found something wrong and we did a good job of implementing the solution, and now we see results.

Brad's dad and uncle both work in foundries—but even growing up surrounded by the foundry business, he wasn't convinced the industry was for him till he attended a fun, hands-on summer camp led by Dr. Sam Ramrattan at Western Michigan University.

He says he's always loved math, science, physics, and even statistics. Brad attended Muskegon Community College and earned an associates in manufacturing, engineering and technologies with extra course work in chemistry, CAD, and materials.

He says he was drawn to casting because of the great variety of processes and metals involved. And he knows there's room for him to advance.

For anyone considering the industry he says, "There's tons of different departments no matter what you want to do."

MEET ALEX: 'There's Always Something Different.'

Alex Basaj (pronounced ba-sigh), who knew Brad at Muskegon Community College (MCC), is also a foundry family guy. With both parents in the industry and a third-generation metalcaster on his mom's side, he says his first tour inside a foundry occurred when he was about a month old!

Although he fought the idea of entering metalcasting for years, he, like Brad, was strongly influenced by "Dr. Sam." His proverbial destiny was finally sealed during a foundry elective class at MCC, where he experienced foundry work through fresh eyes as a young adult.

Alex became process engineer at the Ardmore, Oklahoma, location of a foundry called EJ in 2022. He brought experience from Mobex (now Linamar), and a bachelor's in material science from Michigan Tech, where he served as the technical assistant for the school's foundry class his last three years. He also did three foundry internships during college years, including a large lost wax foundry serving the aerospace industry.

"I liked the uniqueness of the foundry," he said. "I grew up hearing about EJ but didn't really know what they made. Once I got here I realized how many different things we make. There are a handful of things that run every day, but pretty much everything else is new custom work.

"We're making probably 60 to 70 different types of castings in a day, all with different designs. And our stuff goes all over the world."

Alex wishes more high schoolers knew about the industry while their decision-making is already in progress.

"And we need to get to them before the end of their sophomore year in college," he said. "After that, changing your major puts you behind and a lot of kids can't afford to do that." **MP**

CASTINGS FOR *COMMUTERS*

DO YOU KNOW SOMEONE WHO RIDES A TRAIN TO WORK EVERY DAY? LIKE CITY TRAINS ALL OVER AMERICA, CHICAGO'S METRA RAIL TAKES THOUSANDS OF PEOPLE A DAY TO WORK IN BIG CITIES FROM THE SUBURBS AND BACK AGAIN ... AND THEY COULDN'T DO IT WITHOUT THESE GIANT METAL CASTINGS ...
PLUS MANY, MANY OTHER CAST METAL COMPONENTS.

KIRKIKIS - STOCK.ADOBE.COM

It was plain to see the main source of income from making castings for freight rail components was not going to be profitable much longer for Amsted Rail, a foundry in Granite City, Illinois.

For 100 years, they've been making metal castings for those long, long freight trains that carry important products all over the country ... things that feed people, heat homes, and make our lives full of abundant, convenient goods. But there aren't as many freight trains as there used to be.

Then a great opportunity stood squarely in front of this Chicago-based global maker of undercarriage and railcar components: They had a chance to cross over into making parts for passenger trains!

They bought another foundry that was going out of business ... and they did a multi-million-dollar overhaul to their facility ... then decided to jump in when a huge job from the Chicago Metra commuter rail system was up for bid.

"Our investment was basically intended to open the doors to provide future business for Granite City ––anything that would fit inside the flask size that we're capable of now," said Kerby Vulgamott, director of

Assembly is a key value-add to the contract—Amsted Rail delivers a complete bogie to their customer.

COURTESY AMSTED RAIL

COURTESY AMSTED RAIL

The foundry introduced the nobake molding process for the new transit program.

transit at Amsted Rail.

Their customer was a train manufacturing company called Alstom. And the project at hand was a GSI transit truck set—the main job was two giant metal castings weighing 3,150 and 2,200 lbs. with dimensions of 56-in. wide x 145 in. long x 26 in deep and 31 in. wide x 117 in. long x 23 in. deep respectively.

Once these monster-sized castings were completed, Amsted received recognition in major casting competition sponsored by the American Foundry Association, the leading promoter of metal casting manufacturing throughout North America.

More Than the Customer Expected

Amsted Rail far exceeded their customer's requirements by providing not only the castings but the entire assembled structure that supports the body of a train and provides stability, traction, and braking! ***That structure is called a "bogie."***

People who work at foundries like Amsted—from the metallurgists and engineers, to the amazing, hands-on team that make the molds and pour liquid metal—are incredible manufacturing heroes who keep our country moving, producing, growing, and providing thousands and thousands of jobs for people in every state.

"For our freight offerings, we offer a fully assembled bogie to our customers, said Vulgamott. "And that's our strategic advantage."

He explained that by putting together all the casting components for their customer, Amsted Rail really simplifies life for the customer.

Instead of having to order 300 different parts, they can just order ONE assembled bogie ... and boom, everything is DONE.

Bringing the Work Onboard

Amsted was awarded the job in 2019 and provided first parts this year, at a rate of about one assembled bogie per week. The foundry will be at full production in 2025 and knocking these massive parts out at a full, rapid pace during 2026, too.

Have You Heard About 3D Printing?

For the super-large "truck sets," Amsted decided to 3D print the middle sections of the castings, which are called "cores," which reduced the number of pieces to about 40 as

opposed to 160 if they had gone the traditional sand coremaking route.

Amsted's GSI trucks are cast in a nickel steel "recipe" that makes them easily weldable in the field if they become damaged. The way Amsted makes the parts, they have an incredible service life durability of 40 years!

Yeah, the customer really likes that.

And the "alloy" (combination of metals melted together) has the added benefit of resisting corrosion, and it improves low-temperature impact strength—that means that Chicago's brutal winter temperatures won't mess with these hardcore, super-strong castings.

Changing Their Entire Manufacturing Plant!

While still building parts for the freight train market, Amsted embarked on widespread changes to adapt for the incoming transit, commuter train work. We're talking many millions of dollars so they could make the castings needed for the Metra trains! They literally bent over backwards to show they were the best foundry for the job!

In-House Horsepower

Amsted employees successfully made the journey into making commuter train parts. The Granite City workforce is comprised of four unions—pattern makers, electricians, machinists, and steel workers—and from the beginning, Amsted management communicated with union teams about the tremendous opportunity to bring in a new steady stream of work.

WHAT IS A SAND CASTING?
Sand Casting is when a metal part—such as a component in a car, tractor, refrigerator, or a train—is made by pouring liquid metal into a shaped mold made out of sand.

WHAT IS "TRANSIT?"
Transit rail is a system of passenger trains operating on fixed tracks within an urban area—used for public transportation.

WARUT / ADOBE STOCK

The foundry made sure everyone had tons of training to get them ready for the new work they would be doing. That's what foundries do: They make sure their employees have the training they need to do their jobs and have opportunities to grow and make more money.

Acing the Test

Just like you have to score well on tests at school, foundries have to pass inspections and meet their customers' very high standards.

"They came to check out our capabilities, and they were very impressed with how modern our foundry was," said Richard Brosch, the company's director of metallurgy. "The fact that we had over 100 years of experience manufacturing steel castings—that was a big appeal."

Yep, you guessed it—they aced the test. **MP**

ARE YOU A TECHIE TYPE?

Foundries Need 'Smart Technology' & AI Pros

This year, a giant metalcasting company crossed a major milestone in its five-year journey to become AI driven and monitored throughout their sand , metal-melting, and finishing departments at all nine of its foundry locations.

Grede (pronounced Grady) spent a lot of money to install a "smart" manufacturing system that will ultimately help newer employees with knowledge they need to solve technical problems. The technology will also help

PHOTO: SODAPEAW/ ADOBE STOCK

the company reduce costs, improve casting quality, and enable them to trace the entire manufacturing process for every part they make through barcoding.

Industry 4.0 (I4.0) also known as the Internet of Things (IoT) is where machines are inter-connected and data is used to help managers make informed decisions—it's a new and growing reality among metal casting companies, also called foundries.

More and more, foundries are going to need IT-trained professionals to help run,

SURVEY SAYS ...

In a survey of foundry owners and management, 89% said they want to use I4.0 to increase the amount of castings they can make with better efficiency. Over 72% want to reduce casting defects and increase quality. Over 50% want to use I4.0 to reduce downtime and automate reporting. By automating risky or repetitive tasks, I4.0 technology can reduce the risk of workplace accidents.

Over the next three years, foundries want to use Industry 4.0 technology to monitor equipment and to check the quality of sand used for making casting molds. ***The majority of foundries in the survey said they definitely want to invest in robotics and automation of manufacturing processes.***

And guess what the No. 1 reason is when a foundry doesn't yet have I4.0 implemented. Over half of these foundries said it's because they don't have enough qualified employees to manage the technology.

Clue phone: Foundries are looking for trained IT and automation professionals. Keep it in mind as you continue to think about what kind of job you'd like to have in the future.

With the implementation of Monitizer at several Grede locations already, team members on the plant floor can view real-time sand operations.

monitor, troubleshoot, and repair the many facets of smart technology throughout their organizations.

Today, a major reason smart manufacturing is being adopted in foundries is the enormous number of experienced employees who are retiring. The loss of all the "Baby Boomers" is creating a knowledge gap that's hitting this industry hard.

"When someone with 20+ years of experience leaves, you lose more than a worker—you lose the know-how, said Chief Information Office Susan Bear." "So, we needed to find a way to quickly compensate in order to remain a top supplier to the industry and to continue to grow. By replacing know-how with data, we are enabling newer employees to be as effective as industry veterans."

"A lot of other companies don't feel that AI will actually ever have a role in the foundry as

THE TOOLS OF INDUSTRY 4.0

Foundries are rapidly becoming work places where Industry 4.0 will play an important role in the future. That means, right around the time you're ready to pick your career or choose a college, there will be many good-paying jobs waiting for you.

Industry 4.0 utilizes a range of tools and technologies that support industrial processes.

Some of the key tools for I4.0 include:

Robots provide companies with the ability to automate processes and improve efficiency. They also provide an opportunity to remove people from hazardous workspaces and duties.

Simulation is a quick way to predict a variety of results such as stress testing, fatigue points, filling of a casting, solidification, and defect areas without the trouble of running time and labor-consuming trials.

Vertical and Horizontal system integration combines the steps of the manufacturing process for a product and Horizontal integration expands across multiple product lines.

Internet of Things (IoT) connects machines and other devices which enables them to communicate with each other and share data. IoT can be used to monitor processes, gather data, and control equipment.

Cybersecurity—With all the ways to connect equipment, monitor work areas, and analyze data, it opens a potential for cyber-attacks. Companies improve their cybersecurity with the aid of firewalls, intrusion detection and prevention systems, encryption, and authentication methods.

The Cloud provides data management and storage capabilities for the immense amount of data being collected from the ever-growing number of sensors and IoT-connected machines. This allows for facile data access and communication.

Additive Manufacturing like 3D printing has risen as a popular process for prototyping and constructing complex internal geometries. It can be cost and time effective and with every day, more materials are being perfected with comparable dimensional accuracy to many traditional manufacturing methods.

Augmented Reality (AR) provides companies with the ability to visualize and interact with data in real time, making it easier to identify problems, optimize processes, and train employees.

Big Data—I4.0 generates vast amounts of data that can be used to inform decision-making, improve performance, and create new business models.

it does in other industries, but I beg to differ there," Susan continued. "At Grede, we think it has a huge role in taking us from the art to the science, in terms of operational knowledge. This AI step is going to be critical in the future."

A key benefit of their AI system is the ability to predict machine breakdowns BEFORE they happen.

"Maintenance is extremely important to us for two reasons: (1) Foundry equipment is really hard on itself so maintenance and uptime is critical," Bear continued. "But (2), maintenance also happens to be where a lot of the human know-how is, which means there's a potential to lose it."

And as Grede continues to complete and perfect its use of AI, data collection, and automation, they and many others like them will be hiring young, tech-savvy people. Maybe you'll be one of them. **MP**

HOW TO BECOME A GOOD LEADER

THIS INDUSTRY WANTS YOU! AND WITH SO MANY OPPORTUNITIES TO GROW IN YOUR METALCASTING CAREER, IT'S NEVER TOO SOON TO PREPARE YOURSELF WITH STRONG LEADERSHIP SKILLS.

Being a leader isn't always going to be easy. Even young men and women with successful careers face road bumps along the way.

We talked to a few young leaders who said they are dedicated to being humble, kind, open-minded leaders who are always ready to listen and learn.

One of them, Lizeth Medina Balliet, says growing into leadership takes perseverance, and she has worked her way up to senior manager of continuous improvement, automated production and advanced data science at her company.

"What I have learned is, leadership is not about being right. It's about just being fair," she said.

ILLUSTRATION: FROGELLA.STOCK / ADOBE STOCK

Continuous Improvement Mindset

Jay Morrison got his first taste of professional leadership at the age of 30 when he was given oversight of a foundry maintenance department—almost everyone else was older, and very experienced. He said a lot of people looked at him with a lot of skepticism.

Later he in charge of a bunch of salespeople who were all 10–15 years older than him. It was hard, but things got a lot better as soon as he proved he could help them do better and make more money.

Left to right: A day in the life of Lizeth, Kiley, and Jay at work in the metalcasting industry.

Jay says he hates micromanaging and has a continuous improvement mindset. "I think if you stop improving, then you should pretty much retire. I want to be the best. I can learn from my mistakes, and I'm going to probably make mistakes—but that's at least how I know I'm trying."

Working for the 'Kid'

From the time she was 10, Kiley Eck told her family she was someday going to run the foundry her great grandfather founded, AFS Corporate Member Eck Industries.

She started working in the business straight out of college and worked her way up the company ladder. Her childhood prediction came true in 2016 when she was appointed president.

"I was one of the youngest here for a long time," she said. "Once I became president, there were employees in management who remembered working for my father or grandfather, and it was hard for a lot of them to swallow working for this 'kid' now."

She built her own team and even though she's a young executive who's also a female in a male-dominated industry, she knows she's being watched–but she doesn't give in to self-doubt.

Today, Kiley says she trusts her instincts, has a good understanding of people, and maintains an open mind. Above all, she says she's fair but firm.

"Leadership isn't rocket science—I just like to treat people the way I would want to be treated," she said. "People want to be heard, and they want to feel valued." **MP**

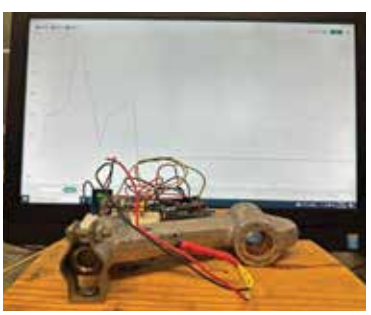
COMPETITIONS JACK UP STUDENT SKILLS

THE FOUNDRY EDUCATION FOUNDATION'S certified and affiliated colleges and universities occasionally host casting contests. They not only provide fun competition, they are also a hands-on way for students to translate their book-learning into real-world skills, expand their creativity, and experience the important concepts of leadership and teamwork.

At the Wisconsin Regional contest, the Western Michigan University team took first place for their casting. The team said, "Our goal was to develop a process for making cast components smart by integrating circuitry. It has potential to serve in a variety of applications such as automotive, rail transit, consumer electronics, medical industries, and aviation. actual.

Teams from Georgia Southern took first and second place at the AFS Southeast Regional casting competition. One team-mate said, "All the industry people I have met are so helpful in sharing knowledge and experience because they all know what it's like to be where I am!"

The Pittsburg State Graduate Gorillas team won the grand prize for the SFSA Cast in Steel Competition. One member of the team said, "I learned a lot about the casting process as a whole, including the considerations that go into the process as well as the design of making a functional tool or part." "It was a great way for me to take on the role of every person at a foundry. "There are so many cool projects and possibilities in the industry." MP



Left: The Western Michigan University team took first place at the Wisconsin Regional. Center: Teams from Georgia Southern took first and second place at the AFS Southeast Regional casting competition.

WILD ABOUT CASTINGS

A GIANT OCTOPUS carrying numerous wildlife companions invaded New York City this summer. The bronze casting sculpture by Australian artists Gillie and Marc was part of a free, open-air exhibit titled "Wildlife Wonders" that featured three interactive bronze works, according to articles on TimeOut.com and MyModernMet.com. They are arranged outside the One World Trade Center until July 2025, and the spotlight was on the 36-foot-tall octopus weighing about seven tons. Sculptures of numerous endangered species are held in its tentacles.

The artists embrace ancient techniques as well as new technologies in the creation of their works. According to gillieandmarc.com, they convert their 2D design into a 3D file from which a 3D foam model is printed.

PHOTOS: EUGENE KRASNAOK, GILLIE AND MARC

A thin layer of clay is added by hand, then a cast is made from clay. This is the final step before it is sent to the bronze foundry.

"The intricate production process involves casting the sculptures in a suitable foundry, utilizing the skilled craftsmanship and expertise of local artisans, and finishing them with meticulous attention to detail," the website states. **MP**

BACKGROUND PHOTO: ANDRIY STEFANYSHYN / ADOBE STOCK

Find a College to Study Metalcasting

Ready to launch your metalcasting career? Want to know where to get started? These colleges are optimal institutions to consider if you are interested in metalcasting as a career.

Arizona State University
Tempe, AZ

California Polytechnic State University
Pomona, CA

California State Polytechnic University
San Luis Obispo, CA

Central Washington University
Ellensburg, WA

Eastern Michigan University
Ypsilanti, MI

Georgia Southern University
Statesboro, GA

Instituto Tecnologico De Saltillo
Saltillo, Coah, Mexico

Kent State University
Kent, OH

Michigan Technological University
Houghton, MI

Milwaukee School of Engineering
Milwaukee, WI

Missouri University of Science & Tech
Rolla, MO

Mohawk College
Hamilton, ON, Canada

Penn State Erie—The Behrend College
Erie, PA

Pennsylvania State University
University Park, PA

Pittsburg State University
Pittsburg, KS

Purdue University
West Lafayette, IN

Saginaw Valley State University
University Center, MI

Tennessee Tech University
Cookeville, TN

Texas State University—San Marcos
San Marcos, TX

The Ohio State University
Columbus, OH

Toronto Metropolitan University
Toronto, ON, Canada

Trine University
Angola, IN

University of Alabama—Birmingham
Birmingham, AL

University of Alabama—Tuscaloosa
Tuscaloosa, AL

University of Michigan
Ann Arbor, MI

University of Northern Iowa
Cedar Falls, IA

University of Wisconsin—Madison
Madison, WI

College Scholarships Available...

YES!

Visit American Foundry Society Chapters at:
www.afsinc.org/chapters

Visit the Foundry Educational Foundation at:
www.fefinc.org

University of Wisconsin—Milwaukee
Milwaukee, WI

University of Wisconsin—Platteville
Platteville, WI

University of Wisconsin—Stout
Menomonie, WI

Virginia Tech
Blacksburg, VA

Wentworth Institute of Technology
Boston

Western Michigan University
Kalamazoo, MI

Youngstown State
Youngstown, OH

CAREER OPPORTUNITIES

Do You Like:

- Science?
- Building things?
- Designing things?
- Being creative?
- Working with people?
- Solving problems?

Consider Metalcasting. We Need:

- Business Managers
- Chemical Engineers
- Computer Engineers
- Electrical Engineers
- HR Professionals
- Safety Managers
- Accountants
- Quality Control Technicians
- Marketing & Salespeople
- Mechanical Engineers
- Metallurgists
- Skilled Tradespeople

Careers: Post High School

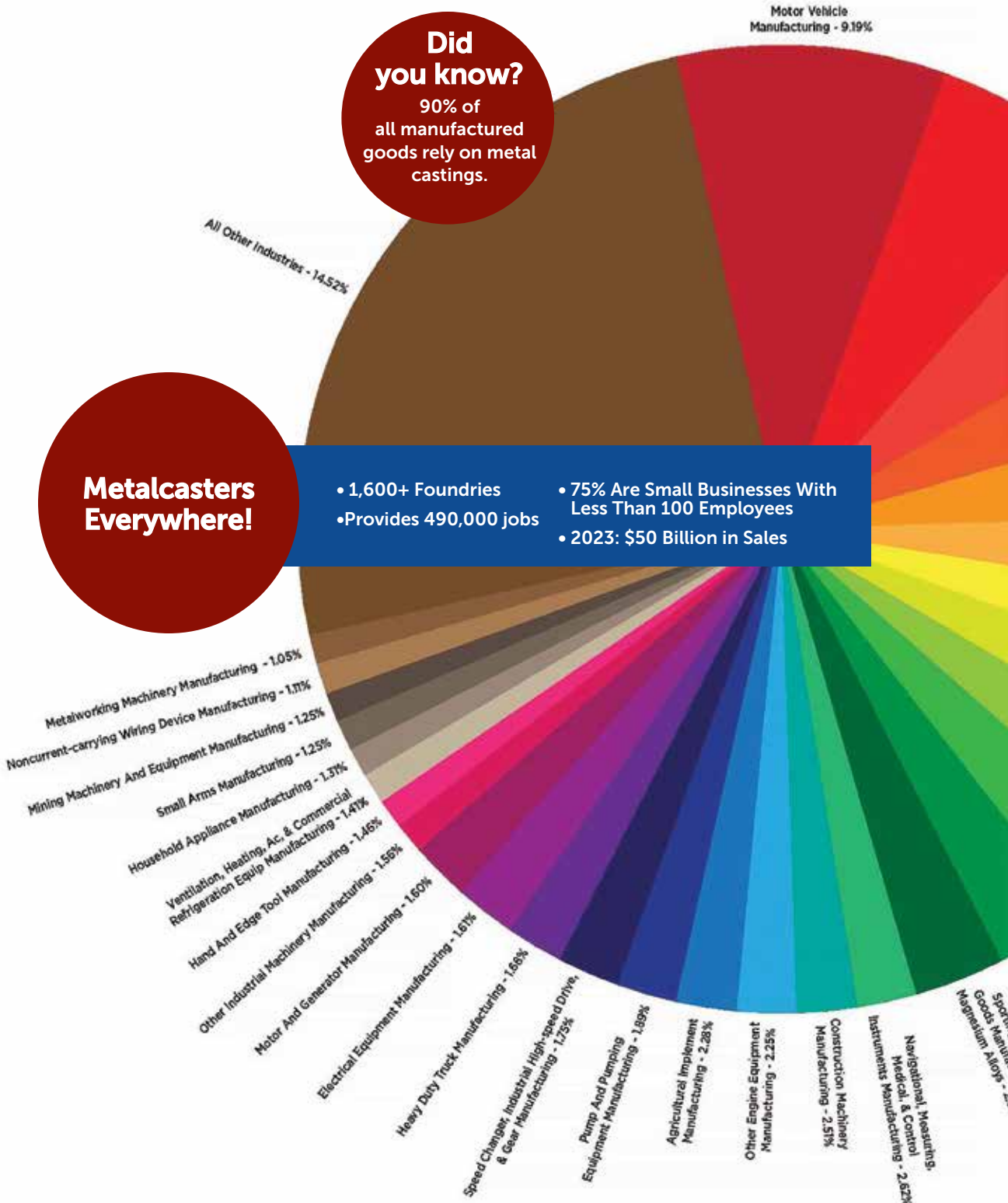
- Molder, Machine Operator, Pourer, Crane Operator
- Lab Technician, Quality Assurance, Welder, Furnace Operator
- Patternmaker, Maintenance Mechanic
- Electrician

Careers: Post College

- Metallurgist, Quality Assurance Manager, Facilities Manager
- Engineering Manager, Plant Manager, HR Manager, Controller, Computer Programmer, IT Manager
- Sales Manager, Technical Director
- VP, President

WHERE DO CASTINGS GO?

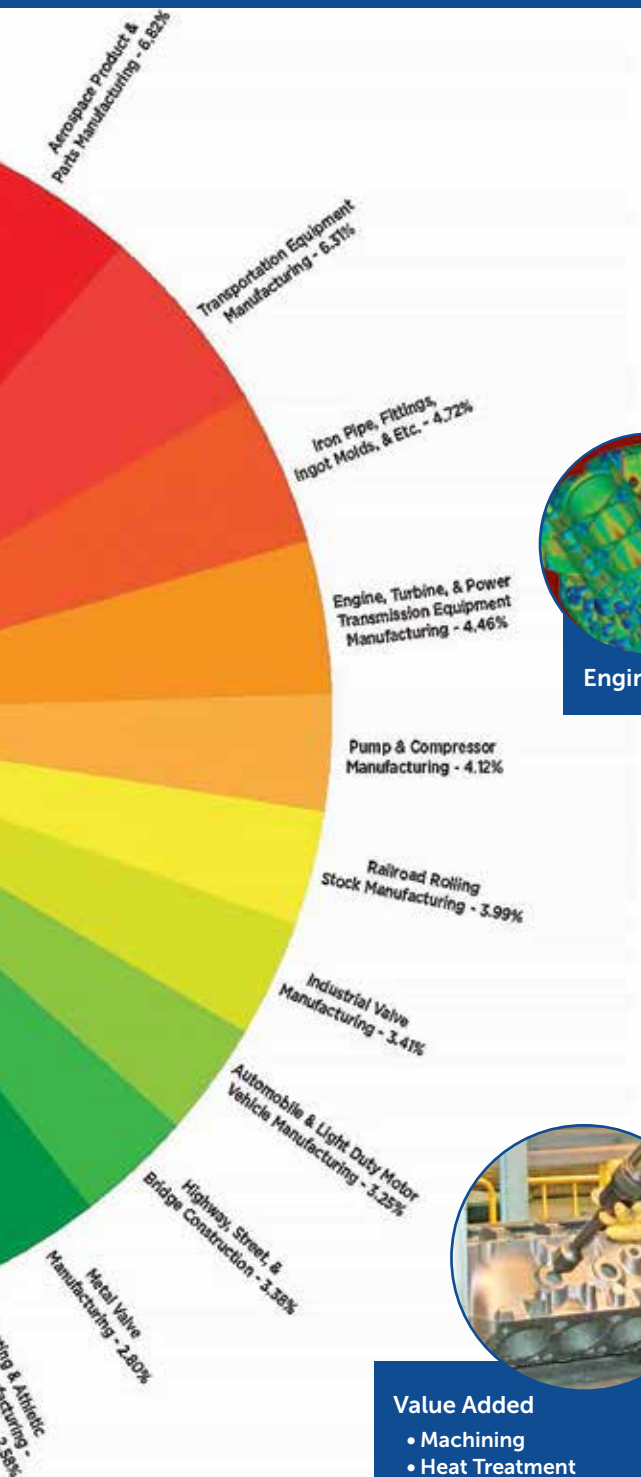
Did you know?
90% of all manufactured goods rely on metal castings.



Metalcasters Everywhere!

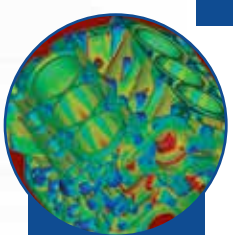
- 1,600+ Foundries
- Provides 490,000 jobs
- 75% Are Small Businesses With Less Than 100 Employees
- 2023: $50 Billion in Sales

METAL CASTING SUPPLY CHAIN



Pattern & Tooling

Raw Materials & Equipment



Engineering

Metalcasting Facility

Value Added

- Machining
- Heat Treatment
- Parts Assembly

End Users of Castings

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