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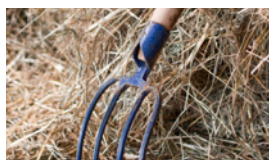
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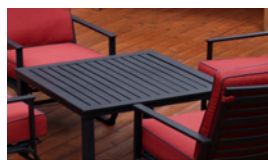
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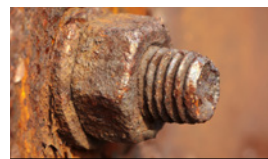
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LETTERS TO THE EDITOR

DEAR EDITOR:

I wish to complement the ARC Magazine staff and writer Jeff Herrington on a well written and well photographed article on Jim Bollinger (Winter 2021). I met Jim at the annual aviation convention at Oshkosh, Wisconsin, where we both conduct seminars. He instructs in the welding area, under the auspices of Lincoln Electric. We have chatted on occasion, and as an instructor myself, I have sat in some of his classes to observe his instruction methods. He is great! He takes a complex training program and simplifies it to the layman's level of understanding. I picked up a few tips from him.

— Archie Frangoudis
Merrimack, New Hampshire

► Thanks for the kind words, Archie. We couldn't agree more. Jim Bollinger has been an inspiration to the entire welding and fabrication industry – not just because of his common-sense, practical approach to the trade itself, but also because of his unwavering commitment to the well-being of his family, his community, and just about anybody he comes in contact with. For Jim, “DoRite” is more than just a clever name he attached to his fabrication business. It's a way of life.



“[Jim Bollinger] is great! He takes a complex training program and simplifies it to the layman's level of understanding.”

ARC ONLINE:

TEMPORARILY CLOSED FOR REPAIRS

► A number of readers have expressed some concerns (and even some understandable frustration) in recent months about an inability to access the ARC website. After seven years of publishing, some bugs had worked their way into the system and created a number of navigational challenges. Rather than attempting patchwork repairs, we chose to shut the site down for a comprehensive overhaul that's currently under way. We look forward to having the site online as soon as possible, and we're confident that an even better experience of the magazine is waiting on the other side. In the meantime, we appreciate your patience.

As always, the communication channel is always open at ARC Magazine, and we welcome your feedback about what you see or what you'd like to see on these pages. Contact us at editor@arcmagazine.pub or publisher@arcmagazine.pub.

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Glitter

&





Grit



For welder Chloe Hudson, things are not always what they appear to be, but her commitment to the work and her passion to be the best have never wavered.



By Kate Nicolosi



He



There are many sides to Chloe Hudson. She's sporty and feminine; competitive and resilient; ambitious and unapologetic. Above all, she's here to get a job done. So please get on board or step aside.

In her job at Joe Gibbs Aerospace in Huntersville, North Carolina, Hudson's projects span aerospace, aviation and government sectors. She builds everything from experimental aircraft to stock car parts for NASCAR. She is the only woman building parts for the cars in her division.

"It's crazy when you get your dream job."

Landing that dream job was the result of hustle and hard work. Hudson learned from an early age that anything was possible if you put in the effort.

Born in Atlanta, her family moved to South Carolina in search of a simpler life. Hudson, who grew up with two brothers and a sister, was always up for an adventure. Her small town of Salem (population: 200) was a stark contrast to downtown Atlanta. She spent her days exploring the outdoors, visiting national parks and playing baseball with her brothers.

"I kind of dipped my toe into a little bit of everything," she says. "From art and ballet to jazz class to karate and basketball. There was nothing my parents told me I couldn't do."

Hudson originally aspired to be a plastic surgeon after witnessing the poor results of her grandmother's melanoma surgery. But welding turned out to be a practical and gratifying profession – as well as a form of personal expression.

Her interest was piqued during her senior year of high school, in a county where the trades have been popular career choices because of the various jobs available at nearby manufacturing facilities and nuclear power plants. She wanted to upgrade her 1998 Jeep Cherokee at the time, but after-market parts were just too pricey, so she needed to find a way to make them herself. The mechanics class was full, so she chose welding.

But she chose to do it on her own terms. On the first day of the welding class, she arrived in a tank top and shorts. She describes her younger years as the "tomboy" period, but she ended up "trading the basketball shorts for a skirt" in high school. To this day, she is a fan of makeup and glitter.

"It's a creative outlet for me," she says. "I still wear glitter eye shadow. I can express that femininity in a way that I love."

The oft-mentioned adage about the relationship between surface appearance and inner value clearly applies, says Hudson. "Don't judge a book by its cover," she says. "Women have depth beyond appearance. The number one criticism I get is from my appearance – not my work."



"It's crazy when you get your dream job"



Hudson was a quick study when it came to welding. Her high school instructor took notice and “was the first person to foster this idea that it was possible to make money at welding,” she says. And perhaps most importantly she enjoyed it. “I immediately wanted to be good at it. I am fiercely competitive. I am one of those people who sets her mind to something, and nothing else matters until I accomplish that task.”

After graduation, with healthcare still on her mind, Hudson enrolled in a nursing program. Her hands-on clinicals at a veteran’s hospital proved that healthcare wasn’t for her. She pivoted to welding and enrolled in a local technical college.

“It was very difficult,” she recalls. “There was a lot of push-back, especially from instructors. Welding is a trade of talent. If you come into it and you’re not confident in your ability, a lot of people just write you off. I didn’t have the confidence to push back.”

Hudson left school after the first semester and went to work. “I have always been a workhorse,” she says. She took a job in maintenance in the nuclear sector. She wanted to earn money while learning new trades and often worked weekends and night shifts doing nuclear power plant shut-downs and refurbishments, pipe fitting, hydraulic roll grooving and fire washing.

“I did some really crappy jobs,” she laughs, including scraping paint off a nuclear reactor turbine engine in a 110-degree building. Another tough job required working long shifts while carrying a 60-pound lead shield blanket. “I was the only one in the line of twenty-five guys who could hold their own and be in there for 12-hour shifts,” she says. “I was always the only girl, and it’s never bothered me.”

The work – and the life experience that came with it – built her confidence and taught her the value of resilience. Hudson soon realized that she missed welding. She wanted to specialize in a craft and increase her earning potential.



“At 18, I didn’t have the tenacity to say, ‘I’m going to do this.’” A little older and wiser, Hudson decided to ignore the naysayers and re-enroll in welding school.

She had to dig deep and work hard to make a name for herself, since she had previously withdrawn from college with failing grades. With help from skilled labor scholarships established by Mike Rowe - host of the long-running *Dirty Jobs* series on the Discovery Channel - Hudson was able to graduate on time and with honors.



In her last year of school, she showed off her skills in a welding competition. Hudson went all the way in a “schedule 40 stainless steel pipe” contest and won her category at the state level. Not only was she the only person from her school to win in this category, but also the first female in her school and state history.

Hudson reflects proudly on that win and the wise advice from her father, who was a college athlete and her biggest supporter: “He told me, ‘It doesn’t matter what you do, just be the best at it.’ It was never: ‘You’re going to be a girl doing this.’ It was: ‘You’re just going to be the best.’”



Hudson wants her work to speak for itself. She also wants to accomplish her goals on her own terms: "Hilariously enough, I was on stage and I accepted that state trophy, and here comes my mom with a tiara," she giggles. "I still have both to this day."

In the years since the high school trophy, she still reserves the right to be "feminine and have my pink sparkle nail polish. If you don't like it, it's your problem," she says.

After college, Hudson landed a job with Fleet Reactor Services, located in Oak Island, North Carolina. In the interview, "I could see in their faces that they weren't going to give me a shot. I said, 'Give me an opportunity. If I fail, I fail. And if I don't, then you've got a welder.'"

She passed the tests and proudly took a job as a certified welder. She continued to hone her craft and set her sights higher.



In 2019, Hudson took a job out of state at a hydroelectric plant. She worked overtime, and spent her limited free time practicing TIG welding and sharing those projects on her Instagram page (@arcweldingangel). "TIG is the cleanest form of welding because it doesn't involve flux," she says. Plus, "it's the pretty welding. You've got a chance to make it into art - from something functional to a piece of art."

In fact, when Hudson attended a trade show in Atlanta and wanted to buy a cup that would "help make for a better, cleaner weld," she was turned away. "Someone said I didn't need it because I wasn't a welder," she says.

Frustrated, Hudson messaged the owner; manufacturer, Michael Furick, and asked if she could purchase the cup directly. "He said, 'Of course, don't worry about it,'" she recalls. "He sent me a whole care package of them. I've never paid for a Furick Cup. That's how much he believed in me. I'll forever be grateful."

Hudson also loves aviation, enough to take pilot lessons in her teens. So when Joe Gibbs was starting a new machining and aerospace division, she was ready for the call. Shane Love, lead welder at Joe Gibbs, saw Hudson's Instagram feed and asked her to test for the job.

“Chloe flew in for the eight-hour welding test and did an awesome job,” says Love. “She had a great attitude, was willing to learn, listened well, and continues to produce great parts.”

Most of her work at Gibbs is confidential, but it’s making a difference in the industry. The company is supporting “landmark achievements that will change history as far as flight goes,” says Hudson. “So to be a part of it is incredible.”

Hudson also spends time building car parts for NASCAR teams – including cars sponsored by the likes of FedEx and DeWalt, and those driven by well-known racecar drivers including Denny Hamlin and Kyle Busch.

She takes pride in “someone picking up a part and knowing it’s mine” due to the consistency and cleanliness of the weld. That’s where her competitive spirit kicks in. But in the end, her primary competitor is the person staring back at her from the mirror.

“At the end of the day, I don’t really worry about anyone else,” she says. “It’s about perfecting what I do and honing my skills and how I can make it better. It’s the art of it. To make sure that it’s the lasting impression of what you get when you bring me something to be done.”

How does building parts for NASCAR compare to tinkering on her 1998 Jeep?

“Night and day!” she insists. “It’s funny. I still haven’t fixed [the Jeep]. The thing I learned to weld for, I still have not fixed to this day!”

The 28-year-old skilled welder – who has now spent about a decade in the trade – is also a spokesperson for the merits of welding as a career choice, with little to no college debt and high earning potential.

“Chloe has a big following,” says Love. “She is someone for little girls to look up to. She has the ambition.”

Hudson gains fulfillment from her work. It’s a bonus that girls are taking notice and seeing welding as a career choice, especially since women make up only about 5 percent of the welding workforce today. Above all, Hudson believes it’s important to stand tall and be confident in your work, no matter the scenario.

“It doesn’t matter what I look like, where I came from, what struggle I have been through,” she says. “I’m here, and I’m here to do a job. That’s something that I definitely pride myself on. I’m not going to wilt or become a wallflower just to make somebody’s ego more comfortable.”

Hudson is a perpetual student. She loves history and World War II spitfire planes, and her long-term plans include additional aviation classes and eventually a pilot’s license. In the short term, she’s partnering with the American Welding Society to pursue her Certified Welding Instruction as well as promote the importance of CWIs for welders.

There will always be more to do – and maybe even more to prove – but for now, Hudson is content with all she has accomplished in her career.

“I love my job. I love where I work,” Hudson says. “I’m very lucky.” **ARC**





“I love my job.
I love where I work,”
Hudson says.
“I’m very lucky.”



QUESTION MARK



ARC taps into the vast experience of veteran tradesman, educator and author Mark Prosser (CWI/CWE). In addition to many years as a welder for the automotive and motorsports industries, Mark has also spent the last 15 years teaching welding at the college level, where he fields challenging questions from his students every day. He shares some of those questions – and his answers – with ARC in every issue.

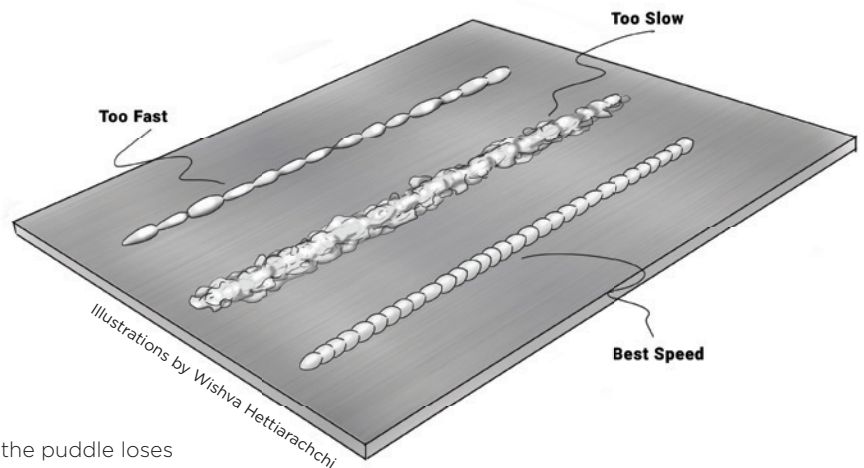
How do I know if my travel speed is correct?

► There are several different indicators for determining travel speeds when welding. The size of the electrode, the amperage being used and even the type of materials are all important factors to consider. The common component in all welding processes is the puddle. A puddle of molten metal works very similarly in each process. Reading the puddle is the most important aspect of developing your skill as a welder.

Assuming you're set up correctly – using the correct voltage/amperage relationship and maintaining correct arc length – the puddle tells the whole story. When traveling too slow, the puddle becomes wider and much harder to control. It starts to pile up instead of penetrating into the metal. When traveling too fast, the puddle loses its roundness and becomes oval-shaped with a more pointed tail. Traveling too fast also prevents the molten metal from fusing properly, and can result in undercut on the toes of the weld. The arc digs into the metal, but traveling too fast will move you away before the puddle can fill the areas where the arc has dug in.

Travel speeds increase with more amperage because more amperage is used with larger fillers and creates a larger puddle to carry. This is why welding with high amperages requires more skill and control. Once you've developed some welding experience, you'll begin to anticipate how the puddle will behave and your welds become better.

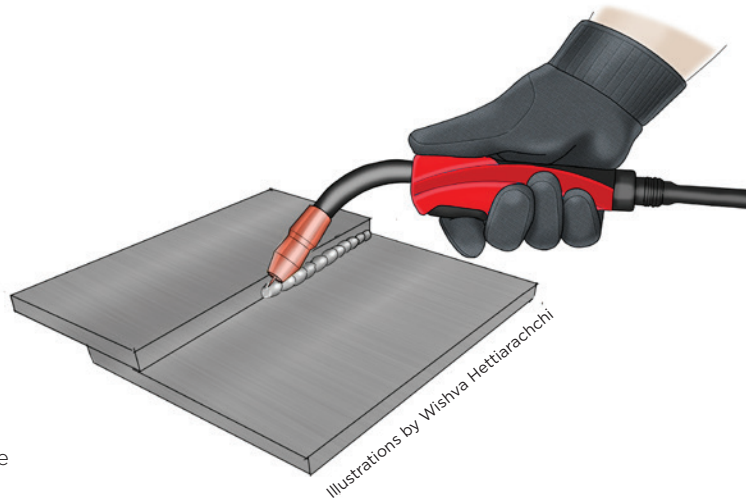
Your welding teachers no doubt told you to “watch the puddle,” but that's easier said than done. It's a skill that results from proper training and hood time. If you concentrate on the puddle and how it reacts to your movement, your weld speed – and your welds – will continue to improve.



What does the phrase “read the puddle” mean?

▶ Reading the puddle is a technique that every welder will understand and develop at some point in their welding career. If we think about welding according to the simplest definition, a puddle of molten metal is moved across some type of weld joint to fuse the two base materials together. The molten puddle changes in shape, width, height and consistency with the movement of the welder controlling the electrode. “Reading the puddle” simply means that as you are welding, your eyes are constantly monitoring the puddle in shape, size and appearance. Each welding process is different, of course, but the commonality is that the puddle will change with changes in travel speeds, arc lengths, electrode angles. Being able to see those changes as you are welding will elevate your ability to make consistent welds.

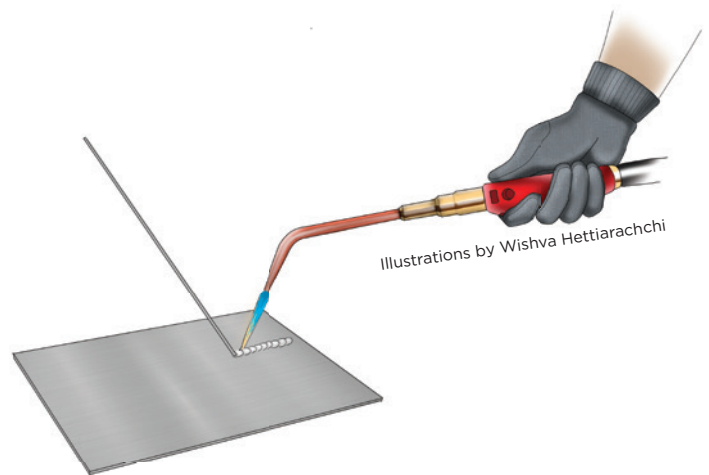
A number of things are happening simultaneously as you read the puddle: your eyes see changes in the puddle, the information returns to your brain and then the brain sends a signal to your hands to speed up, slow down, etc., to get the puddle back into the shape and consistency you need. Good welders not only develop this skill but also learn how to anticipate the puddle’s behavior and make changes accordingly. Reading the puddle is an instantaneous process. It’s not a matter of focusing on it and nothing else. You’ll need your peripheral vision to monitor arc length, travel speed, angles, the edges of the weld joint and the puddle all at the same time. After a lot of practice, making the necessary adjustments to maintain a consistent puddle will become automatic.



Can I gas weld aluminum if I don’t have a welder?

▶ Yes, you can weld aluminum with an oxy-acetylene torch. This is a common practice still preferred by some old-school sheet metal fabricators. Gas welding aluminum sheet metal requires a good deal of skill, a special flux, a different type of shade lens from TIG welding, understanding the process – and of course, some practice. Gas welds on aluminum look attractive when done correctly, and the heat input to the base metal is different, which results in a softer weld for shaping and finishing the material after the welding is finished.

As with any new welding technique you might want to learn, you have to understand the process in order to develop the skill. With gas welding aluminum, this can take some time. You have much less control over the puddle in comparison to TIG welding aluminum. Gas welding aluminum requires understanding the puddle, fast reaction times and fast travel speeds. It’s very easy to lose control of the weld if you can’t react quickly to the puddle. This also holds true for stick welding aluminum. Many people are unaware that there are special stick welding electrodes for welding aluminum. These are used mostly for aluminum repairs in the field. I personally wouldn’t recommend either of these processes as a first choice, but if it’s your only option, it can be done successfully. Gas welding aluminum is the same as every other welding process: do the research, understand the process, develop the skill and let the puddle tell you the story.





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BY PETER CHAKERIAN

THE WAY TO WENDY'S WAY

A parks commissioner in Cleveland realizes a decades-long dream for the city's lakefront. The journey is a story of long-term vision, personal tragedy, unwavering perseverance and ultimate triumph.

Bridges represent a union between counterparts—two distinct entities that span a chasm or threshold and come together in an intricate network of concrete, steel, welding joints and connecting points.

They are a symbol for travel, to be sure, taking us from one place to another. But bridges also symbolize the meeting of two worlds: time and space, heaven and earth, separate but somehow inseparable realities. They are a representation of connection, stability, hope and the potential to live as one in community and harmony.

As for Wendy's Way, a \$6 million cycle/pedestrian bridge linking Cleveland's Centennial Lake Link Trail, the 101-mile Ohio and Erie Canal Towpath Trail system and the heart of Ohio's north coast? Ask anyone involved in the decades-long project and they'll say it's all those things.... and Moore.

Wendy's Way is the passion project of businessman/entrepreneur and Cleveland Metroparks Commissioner Dan T. Moore III and his family. Moore has a rather complex, 30-plus-year history with the bridge and the adjoining land—Wendy Park on Whiskey Island.

TROUBLED PATH

The short version: for a time, the 22-acre park that runs along both the Cuyahoga River, Lake Erie and the Historic Coast Guard Station resembled equal parts untamed wildlife sanctuary and post-industrial badlands. Moore purchased said land from Great Lakes Dredge & Dock to keep it from landing in the hands of the Greater Cleveland Port Authority.

From there, it bounced around a complex chain of suitors—Conrail, Cuyahoga County and the Cleveland Metroparks—while under custodianship to Moore and his family. There were fraught discussions, overdue taxes, government intrigue, high tensions. Everything a proper local drama requires.



But as a “stubborn advocate” for access to Lake Erie, Moore was determined to bring the parkland and 8-acre marina into modern times. He had a vision and stuck to his hope to make Wendy Park on Whiskey Island a shining example of urban renewal, of equity in public access, and a symbol of love, grief and stick-to-itiveness.

Moore was driven to bring this rocky socket of feral lakeside property into the 21st century following the tragic death of his 29-year-old daughter, Wendy Moore. The revered artist/photographer and first daughter of the Moore family loved the Whiskey Island habitat and frequently made it a subject of her work.

She passed from a traumatic brain injury in a 1997 skiing accident, never to see the park again. It’s not a stretch to say Moore himself was trauma-bonded to the park after Wendy’s untimely passing.

“It was one of the most complicated real estate deals in the history of real estate deals,” Moore says tearfully. “A truly complicated thing, but the good



part was, I was along for the ride for all of it.”

Today, Wendy Park is revered by locals and known across the country as a “must-see” location for visitors to Northeast Ohio.. A variety of wildlife, hikers, bikers, boaters, kayakers, anglers, volleyball leagues, bird watchers and train watchers call Wendy Park on Whiskey Island a home away from home.

Wendy Park’s green space and the artful, newly christened Wendy’s Way stands out among the legacy of warehouses, spires, smokestacks and the Port of Cleveland’s bulk terminal that punctuate Cleveland’s skyline and history. It’s finally arrived at the place where the Moore family always hoped it would.





BRIDGING PAST AND FUTURE

Part of a larger \$16.45-million (hyphenate) “Re-Connecting Cleveland Federal Transportation Investment Generating Economic Recovery (TIGER) Trails” project, the seed for Wendy’s Way bridge was decades-long in the planting and germination process, according to Heather Moore, one of Dan and wife Marge’s daughters.

“I remember looking at designs dating all the way back to 1999,” she says. “It feels like yesterday and a long time ago all at the same time. A lot of proverbial ground was covered.”

What’s more, with all the labor and logistics involved—from surveying and 3-D laser scanning services, to obtaining railroad right-of-entry—the plan required as much fancy footwork as it did handicraft.

It takes a village with vision to get such a project to bloom. With said village and funding finally in place, the bridge took just under two years to complete. Construction began in December 2019 and culminated with a dedication and ribbon-cutting ceremony in the summer of 2021.

“I can say it was all very emotional and still is,” Dan says through tears and a cracking voice.

“But also, very satisfying. The Port Authority wanted that land through eminent domain, and back then they could have been able to

get it. We lost a fortune on the project, but our commitment was totally worth it. We wanted this to be organic to community and environment, and that’s exactly what it is today.”

What would the Port Authority have done with the land?

“Lots of asphalt,” Marge laughs as her husband gathers himself. “That’s about it. Asphalt.”

Under the guidance of Cleveland Metroparks chief planning and design officer Sean McDermott, the team walked a tightrope between artists and engineers. McDermott landed on KS Associates, Inc., of Elyria, Ohio, for the Pratt Truss bridge design. Great Lakes Construction Company and Contech Engineered Solutions – both headquartered in Cleveland – manufactured off-site and executed structural assembly on-site.

“Before we landed on the right combination, there was a lot of push-pull between artists and engineers,” says Moore. “You can have an attractive, artful style and design, but it also needs to be manufacturable. Form follows function. Get too separated from that concept? You get into trouble.”

To that end, Wendy’s Way “ticks all the boxes.” Its clean lines are artful, but it also links the Centennial Trail at the northwest corner of the Willow Avenue Vertical Lift Bridge over

the Cuyahoga River. It carries pedestrians and bicyclists over industrial properties and Norfolk Southern Railroad tracks, then terminates at Wendy Park on the south end of Whiskey Island.

Some 400 feet of Mechanically Stabilized Earth (MSE) retaining walls at the south approach ramp were needed. Bridge alignment, abutments, at-grade bridge approaches and vandal-protection fencing were also required—not to mention hand-railings, a concrete barrier drainage system for both approaches, lighting and relocating a portion of Whiskey Island Drive to accommodate the design.

And as if that wasn't enough, construction also required scheduling "timed assembly" around Norfolk Southern Railroad traffic, so as to not impede the company's daily routes.

"I remember endless meetings, marshalling stakeholders and having the Metroparks as the owner of the park being necessary to push this concept to fruition," says Halley, the Moores' other daughter.

She said that fundraising was incredibly important, but that "galvanizing all parties in the community around economic development and equity along a transportation corridor" through the TIGER grant made the project a game changer—for fellow investors the Cleveland Foundation and the Gund Foundation and for the park and city as well.

"We are a manufacturing family, but this is of fundamental value—an opportunity to keep pushing forward reimagining how we connect cities together and increase park access," says Halley. "There were all kinds of benefits that were realized in this process and everyone in the region stands to benefit."

The resulting 500-foot prefabricated three-span truss bridge with tied-arch main and 12-foot-wide deck fits in with its surroundings perfectly. The bridge itself is a both unique and an exceptional homage to everything surrounding it.

Yet the gateway sculpture pylons that would reflect the personality of its namesake were still to come.



YUSKO AND MANKA: THE GUARDIANS OF WENDY'S WAY

In early spring of 2021, the Cleveland Metroparks contacted artists Stephen Manka and Stephen Yusko about a commission for the Wendy Park Bridge. The highly lauded duo was known separately for their acclaimed public art metal sculptures. Bringing the two of them together to create artistic "endcap" pylons for the bridge only stood to double the impact of Wendy's Way's visual appeal. Which it did.

Manka is one of Cleveland's most successful public artists. His Manka Design Studio opened nearly 20 years ago, with its focus trained on public sculpture for Cleveland's neighborhoods. His work graces Playhouse Square Center, one of the nation's largest theater districts. Yusko, an Ohio Arts Council Individual Excellence Award winner, has worked as a studio metalworker for just as long.

Manka says on his website of his installations, "public art can be a form of urban acupuncture, carefully pinned to amplify aspirations and provocatively tie people to a place and to each other."

To that end, three design concepts were fleshed out immediately: one tied to the city's fabled Hulett ore unloaders, one informed by the Coast Guard station, and a third inspired by the Hope

Memorial Bridge acolytes, the Guardians of Traffic, who have watched over the city and its automotive bustle since 1932.

The latter won out. Wendy's Way's pylon sculptures would tell a story all their (and her) own.

"Once we were funded, it was go-go-go," says Manka. "We had 90-day timeframe for fabricating and precision-welding stainless-steel pylons, laser-cutting artwork, and cycles of forging, angle grinding and fitting."

"My design process typically begins with outlining factors I would like to relate to," he explains, outlining the "intersection of public art, sculpture, urban planning and industrial design" they tapped into. "Our collaboration yielded my favorite project yet, his sculptural moments really making this project sing."

"We used a variety of blacksmithing and metal fabricating techniques in the design, which embody clean lines and purpose," adds Yusko, who spent several weeks



drawing up the three unique concepts before the team settled on the design.

The duo then teamed with Precision Welding in Valley View, which served as chief fabricator for the 1600-pound towers. Constructed from 316 stainless steel, they stand more than 13 feet high. Alro Steel and Penn Stainless also assisted, particularly with laser cutting the imaginative myriad of detail work.

Yusko then TIG welded all the smaller components—doors, cutout boxes, lighting fixtures—and then sorted glass installation, and getting all the pieces in shadowboxes to fit together.

“Our sessions together were chaotic and

stressful but always fun,” Yusko recalls. “His computer adeptness, my ability for precise fitting and forming and forging—all the grinding, fitting, tweaking—we learned a ton and had a great working relationship.”

Finally, installation included programmable, color-changing LED lighting on the tower-tops and lighted boxes that contain bird and floral sculptures. The results make for a striking, incandescent memorial at dusk, dawn and all points in between.

“We were absolutely thrilled to be asked to do this,” says Manka. “It’s a defining moment, for sure.”

“It’s just so whimsical, which is classic Wendy,” says Marge. “And Wendy was a connector. It’s perfect.”



FROM INSPIRATION TO AWE-INSPIRING

In talking with the family, Yusko and Manka “were able to incorporate design elements that shed light into Wendy Moore as a person,” landing on an “amazing, labor-intensive collaboration,” says Yusko. Poppies and other flowers, migratory birds, and clover (honoring Wendy Moore’s birthday, St. Patrick’s Day 1967) were all gentle remembrances laser-cut into the endcaps.

“We were also figuring out a readapting of drawings on old signage at Wendy Park before the Metroparks took it over,” says Heather Moore, who along with Halley took on assisting art direction.

“We wanted to incorporate clover and shamrock, and when we brought in (Manka and Yusko) who had art and architecture in their background, the ideas started rolling and expanding. They wanted to incorporate migratory birds and poppies as a reflection of grief and healing... It was an amazing end-moment for the project,” she added.

Yusko’s memory of watching birds at Wendy Park factored heavily into the design aesthetics as well.

“I’ve seen many raptors there, including bald eagles, osprey, cooper’s hawks, red-tailed hawks, kestrels and peregrine falcons,” he says. “Wendy Park is also a stop-over for many different birds during their spring and fall migrations, so Steve and I wanted to include this aspect of the park in our sculptures.”

“And the lighting adds a beautiful additional level of abstract beauty

▲ Dan T. Moore III: “If you have enough passion and energy, you can land on what you want to see and do in the world...”

and a little bit of a light show,” adds Heather, whose background includes glassblowing and studies at the Pilchuck Glass School in Seattle.

“Cleveland is such an industrial town,” she says, “and in that sense, this incredible story about my Dad driven by the loss of his first daughter is incredibly sad, but it’s also incredibly moving.”

She adds: “His resilience resembles that steel. I’m glad Dad had this to channel his grief into and make something positive for the community in Wendy’s name. What an honor it is for him to have a legacy for her.”

And what a legacy it is. In addition to completing this enormous project, Moore and his family have established a protective headgear company called Team Wendy, which provides life protecting supplies for military,

police, search-and-rescue and more.

“They make the best helmets in the world,” says Marge. (You can learn more about the venture at www.teamwendy.com).

“I think the takeaway from all this is that if you have enough passion and energy, you can land on what you want to see and do in the world while combating against those things that you don’t,” says Dan.

“That was always Wendy’s way.”

ARC

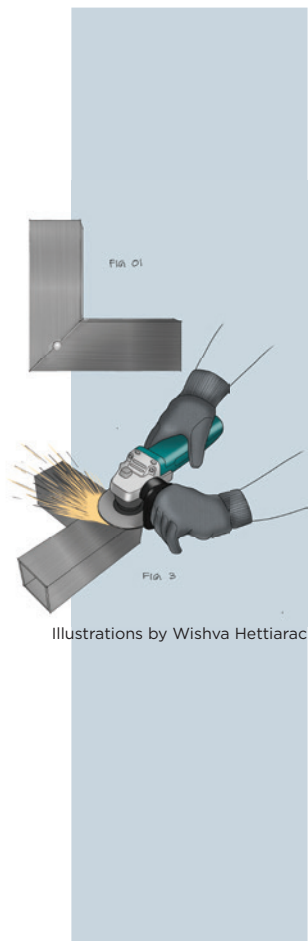


SHOP TRICKS AND TOOLS

ARC brings you time-saving, money-saving ideas to improve the quality of your projects and the process by which you complete them.

TACK AND WELD SEQUENCING ON SQUARE TUBE

► Proper squaring when building an object with square tubing can be a challenge for beginning fabricators, but understanding proper tacking and welding sequencing techniques will help you get it right. Figuring out the direction of pull of a weld can take practice. Beginning welders usually concentrate on making nice-looking welds – which is important, but sometimes it can be tricky to understand how the sequence and direction in which we weld can greatly influence distortion. A square tube square is helpful in explaining a little bit about the sequencing process. If you follow the steps and practice tack and weld sequencing, you can significantly distort in your fab projects.



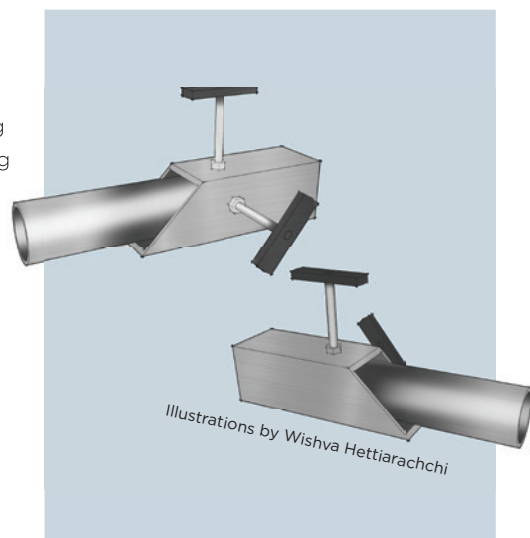
Illustrations by Wishva Hettiarachchi

The process of building starts with good tacks, which serve two basic purposes: 1) to hold the materials in position and still be able to move them for fitment, and 2) to hold the materials so they cannot move or break during welding. When constructing a square corner, place the first tack in the center of the tube to allow the tube to move for alignment (Fig.1). Once the square is true, place the second tack on the outside corners of the square, and the last tacks on the inner side of the square (Fig.2). Once everything is square and tacked, the weld sequencing can begin. Place the first weld on the outer corner of the square to help with the distortion in one direction. Quick grind the outer sharp edges to create a better weld joint (Fig. 3). When all the outer corners are welded, do the flat butt welds from the outside corner inward to the other corner. The welds pull in the direction of travel, but the strength of the frame itself counteracts the pull. Weld the flat butt joints, then flip the part immediately and weld the other side if possible (Fig.4). Move around from corner to corner, side to side, saving the inner fillet welds for last. Learning how welded metal behaves and counteracting the effects by proper tacking and weld sequencing can greatly reduce distortion in your projects.

SIMPLE TUBE CUTTING JIG

► If you fabricate with tubing, you know that many things change when you work with round materials. The bend radius needs to be considered, the cutting process is much more challenging on round tube, and the technique for welding around tube is very different from welding flat plate. Most small hobby shops don't have coping equipment or a mill end – or even a good saw for cutting tube. But the simple tube jig presented here will allow you to make accurate cuts in tube, and the angle of the cut can be modified to fit your needs. This tool is especially helpful if your project calls for repeated cuts.

The tube jig consists of some square tube slightly larger than the round tube you want to cut. Figuring out the size to use can be tricky, but a couple adjusting screws can hold the tube tightly in place, even if the fit isn't exact. The square tube is much easier to cut than the round tube, and will serve two



purposes: it will establish a clear guideline where to cut the round tube, and it will also hold the tube while cutting it.

Start with a square tube and cut the round tube at the desired degree at one end. Next, drill two holes on the sides of the tube for bolts, then weld nuts onto the tube. (Be careful to not damage the threads of the nuts during welding.) You can use regular bolts, or you can weld a T handle onto the top of the bolt to make adjusting easier. These bolts will hold the tube in place while cutting. Slide the round tube into the square tube and use the adjusting bolts to secure the tube in place. Begin cutting the round tube using the edges of the square tube as the guide. (A grinder with a cutoff wheel is ideal for these cuts.) If you get off track, you'll know pretty quickly because you'll start cutting the jig.

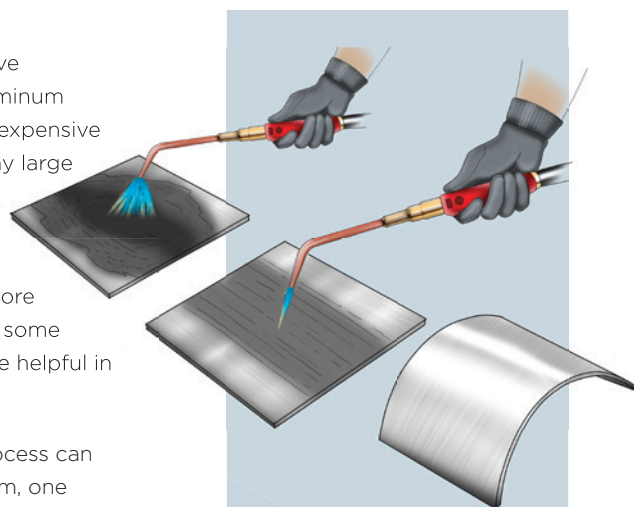
If you need angles cut on round tube – especially several cuts – this jig can help you maintain cut consistency. The time it takes to build this handy tool will be saved in cut quality and consistency when cutting your round tube.

ANNEALING ALUMINUM

▶ If you fabricate with aluminum, especially aluminum sheet, you've encountered some different characteristics than that of steel. Aluminum has several desirable qualities, and was once the most exotic and expensive metal known. Now, however, it's a commonly used material in many large and small manufacturing processes. Shaping aluminum requires shrinking it in some places and stretching it in others. Even simple bends in aluminum can be made much easier by the annealing process, which softens the material and allows it to move much more easily. Fabricating aluminum also causes the material to harden in some areas, to the point where it's no longer workable. Annealing can be helpful in this instance as well.

There are several different types of aluminum, and the heating process can effect each of them differently. When working with sheet aluminum, one common material is the 3003 series, which responds well to forming and shaping. The annealing process softens it, but subsequently working it makes it harder and stronger. Aluminum in the 3003 series can also be annealed more than once if necessary, so you can soften and harden as needed.

The annealing process requires heating the aluminum to approximately 800 degrees F (aluminum has a melting temperature of approximately 1200 degrees). Monitoring the material temperature can be done with a digital temp gun or maybe temp grease sticks, but a very simple heat indicator is the soot generated by an oxy-fuel torch setup. Light the torch with only acetylene, bring it to the panel, and wait for the soot to appear. Next, adjust the torch to a regular neutral flame and move it back and forth across the panel until the soot burns clean off the panel. Always keep the torch moving because the soot burns off at about 800 degrees. Once you're up to 1200 or 1400 degrees, the material melts and drips on the floor. Once the soot is burned clean, the panel can be quenched in water or allowed to cool naturally. The results will be an annealed panel, and the difference will surprise you. It's a simple but effective way to make your aluminum move and shape much more easily when you're fabricating.



Illustrations by
Wishva Hettiarachchi

WYATT SWAIM

REQUIEM FOR A TIG WELDER

By John C. Bruening

Wyatt Swaim was considered an icon by many, but he was also a friend to everyone he met.

A welding engineering consultant for high-tech industries since the 1980s, and affectionately known throughout the industry as “Mr. TIG,” Swaim was an ambassador for the welding trade. He promoted TIG welding – and TIG welding education – to anyone interested in learning it, from technicians on the aerospace manufacturing line to pit crew members at NASCAR and the Indy 500 to weekend hobbyists taking their first tentative steps into the more technically advanced dimensions of welding.

His was a familiar face to just about any welder anywhere, thanks in large part to the hundreds of instructional videos he posted on his Youtube channel. He was considered one of the world’s foremost experts in TIG welding.

Swaim passed away in March 2022 from health complications following an automobile accident. He was only 68 at the time of his death, but he leaves behind an enormous legacy.

Dennis Klingman, who was manager of technical training at Lincoln Electric before his retirement in 2008, recalls the friendship that developed when Swaim became an aerospace and motorsports TIG welding consultant for Lincoln Electric in the late 1980s. Words like “personable” and “knowledgeable” come up often when Klingman describes Swaim.

“Number one, he was an excellent welder,” says Klingman. “Number two, he was great with people. He was

super friendly and super polite. He never talked down to people. If anyone at any level of experience asked him a question about welding, he was never condescending at all.”

A native of San Diego, Swaim founded Hi-Tech Welding Services in 1986, when he was 33 years old. The heart of the company was a complete production facility that provided the highest level of welding, R&D, welding engineering, and metallurgy to high-technology industries. Activities at the facility included TIG, plasma and electron beam welding, as well as non-destructive testing, X-ray and penetrant inspection.

Swaim wrote several articles on high-technology welding and dedicated much of his energy and talent to TIG welding training. He conducted advanced training seminars for the Experimental Aircraft Association and various motorsports teams, and was part of the trackside welding team at the Indy 500. He did IRL and CART race welding throughout the United States and Brazil, and regularly demonstrated TIG Welding at the AWS Show, the Essen Welding Show in Germany, the Canadian Welding Show and other international conventions.

“Wyatt was an icon,” says Klingman, but he was an icon whose feet were planted firmly on the ground in service to those around him, whether they were racing stars like Al Unser or Johnny Rutherford, high-profile automotive and motorcycle enthusiasts like Jay Leno, or just young high school students looking for guidance to improve and expand their welding skills.

“There are a lot of aerospace welding engineers, but there was only one who enjoyed teaching,” says Klingman. “There was only one who enjoyed doing instructional videos on Youtube. There was only one who worked with a major manufacturer to help them develop their machines and their products. That was Wyatt.” **ARC**

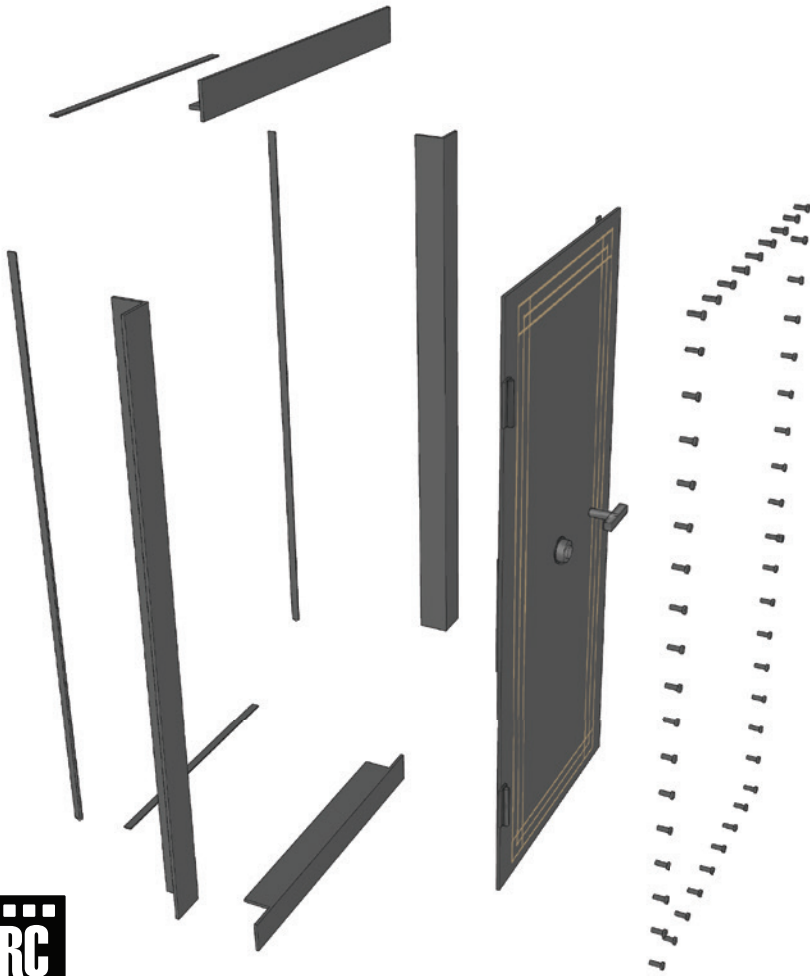
“THERE ARE A LOT OF AEROSPACE WELDING ENGINEERS, BUT THERE WAS ONLY ONE WHO ENJOYED TEACHING.”



Project Spotlight

TURNING A VINTAGE SAFE DOOR INTO A DECORATIVE ENTRANCE FOR YOUR SHOP

By Jimmy DiResta



Illustrations by Wishva Hettiarachchi



Watch exclusive footage at arcmagazine.pub

Sometimes a door is nothing more than a hinged panel of wood or steel separating one space in your shop from another. But with a little imagination and ingenuity, something functional can become something fascinating. In this issue of ARC, Jimmy DiResta gives his workspace a little

character by modifying a 3/8-inch steel door from a vintage safe (circa 1900) and creating an access point that's more than just a generic slab of wood or steel.



STOP SAFETY FIRST

Before you start any project involving welding, make sure you have the right Personal Protective Equipment (PPE), which includes, at least, an ANSI-approved welding helmet, safety glasses, appropriate welding gloves for the process you're using, and a flame-resistant shirt, jacket, or sleeves to protect from UV rays and burns. You should also keep a fire extinguisher close at hand. Use adequate ventilation when welding. Use an approved respirator if exposure to welding fume cannot be controlled, or if welding outside and natural air movement is not sufficient to keep welding fume out of your breathing zone.

MATERIALS

18 feet of ¼-inch thick 4x4-inch angle iron
12 feet of 1x ¼-inch flat steel
12 feet of 1½-inch solid round
2 square feet of ½-inch scrap plate
100 ⅜-inch bolts

WELDING/CUTTING EQUIPMENT AND TOOLS

Lincoln Electric Ranger 330MPX stick welder
Lincoln Electric Power MIG 140MP MIG welder
Band saw
Lathe
Belt sander
Belt grinder
File
Stone mason chipping hammer



Step 1:

Create the doorjamb by cutting and positioning the angle iron. Use chalk to mark the location of the rectangular opening for the latch, then drill around the inside of the chalk line to start the cutting process. Use a chipping hammer to pop out the cutaway piece. Use a belt grinder and a file to square up the inside edge of the opening.

Step 2:

Use the same drilling-and-filing method to cut openings in the opposite side of the doorjamb to accommodate the locking mechanisms on the hinge side of the door (opposite the latch side). Stick weld the doorjamb panels together and cut the tongues off each corner. Grind the resulting edges to create a smooth surface at each corner of the jamb.

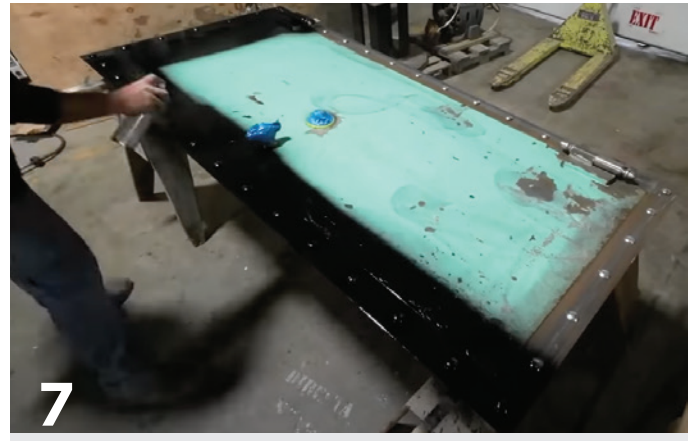
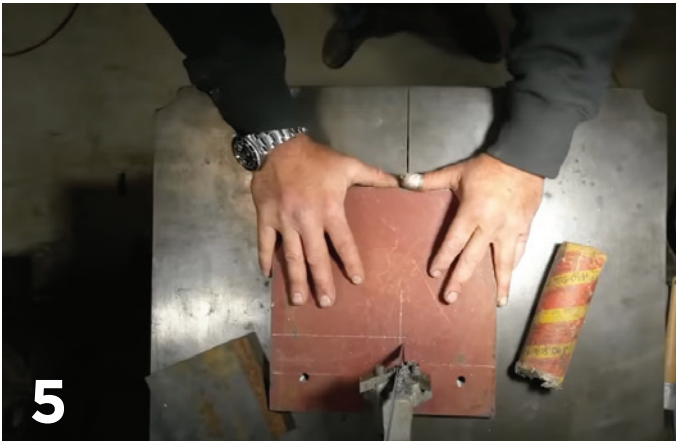
Step 3:

Cut the 1x1/4-inch flat steel strips and weld them to the interior perimeter of the doorjamb to create a stop for the door.

Step 4:

Flip the door and frame assembly and MIG weld the cracks in the seams between the front of the door and the jamb. Cut the 1/2-inch solid round to make the hinge barrels, then use the lathe to cut the 3/4-inch pins at one end of each barrel and shape the finial at the other end. Use the lathe to cut identical finials for the opposite ends of the hinges.

▶ A detailed drawing and cut list for this project can be downloaded at arcmagazine.pub.



Step 5:

Use the band saw to cut the ½-inch plate to create the doorjamb sections that will attach to the hinge barrels. Weld the barrels to the plates, and then weld the plates to the frame.

Step 6:

Drill holes around the entire perimeter of the door frame, then insert the 3-inch carriage-head bolts.

Step 7:

Sand the front surface of the door and paint with two or three heavy coats of black gloss paint. Add pinstripes and other decorative flourishes as desired.

Step 8:

Cut away all wall materials – panels, frame and insulation – to create the opening for the door. Fit the door to the opening and use the protruding ends of the carriage head bolts to mount the door onto the wood and/or steel framework.

COLLABORATIVE COEXISTENCE

By John C. Bruening

The sculptors of Woman and Machine, a grassroots welding and training initiative based in Massachusetts, are celebrating the shared creative space where opposites intersect and find common ground.

Their recently completed but yet-unnamed metal sculpture took shape in the months running up to International Women's day on April 8. Artists Joanie Butler, Karen Sullivan and Michelle Davis were still finishing the piece when IWD arrived, but the race to finish didn't hinder the inspiration. They used found metal to shape a semi-abstract figure – seemingly of the animal kingdom, but up on hind legs – that captures the coexistence of male and female qualities.

“The exoskeleton is very masculine,” Butler explains. “That represents the male aspect. And the internal pieces of this sculpture are all the femininity that oozes out from within. From the inside out, it's emitting an energy, and we're trying to show what that relationship is through a piece of sculpture. We've been able to do that using various components – everything from your kitchen fork to your connecting rods to your quarter-inch round stock. And then we have copper and all these other aspects as well.”

“I'm not a newbie to welding or fabrication work, but I hadn't dabbled in metal art very much until a few years ago,” says Sullivan, who founded Woman and Machine in 2017 in Plympton,

Massachusetts (about 30 minutes south of Boston), to teach welding skills and techniques with an emphasis on automotive work. She got more familiar with the artistic dimension of welding after she met Butler and made her a part of WAM's instructional team.

Based in San Diego at the time – and still there now – Butler brought twenty years of experience in automotive and motorsports welding to WAM. In that same amount of time, she has immersed herself in metal sculpting. Davis, meanwhile, was a WAM student from Belgrade, Montana, whom Sullivan and Butler brought in to assist with the sculpture project.

Perhaps the biggest challenge to the three-person collaboration was the often remote-control nature of the project. Given the artists' far-flung locales, individual sections of the piece were often created separately and then shipped to a designated location for assembly.

“It's a challenge,” Butler admits, “but it also part of the wonder and the beauty of this. We have put every ounce of our heart and soul into this project, and we want to do something like this every year. It's a way of showing that it's possible to collaborate and work with people who are in different places – not just geographically but mentally and even philosophically – as long as you have a clear shared vision and good communication. That's what we want to show. That's why we do what we do.” **ARC**

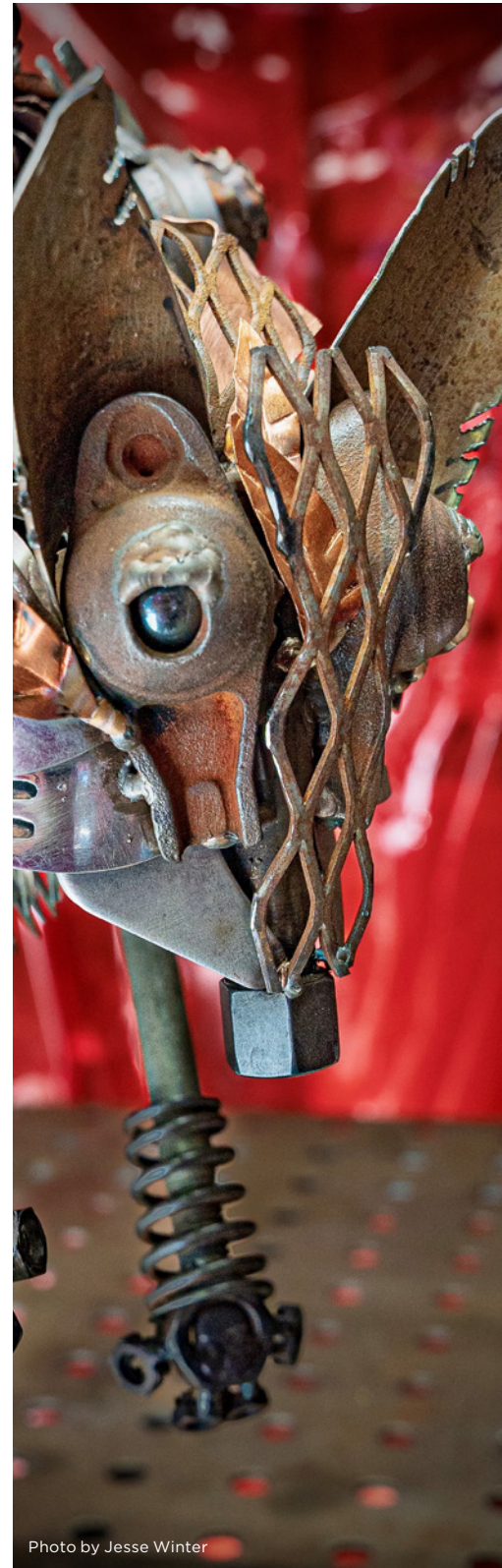
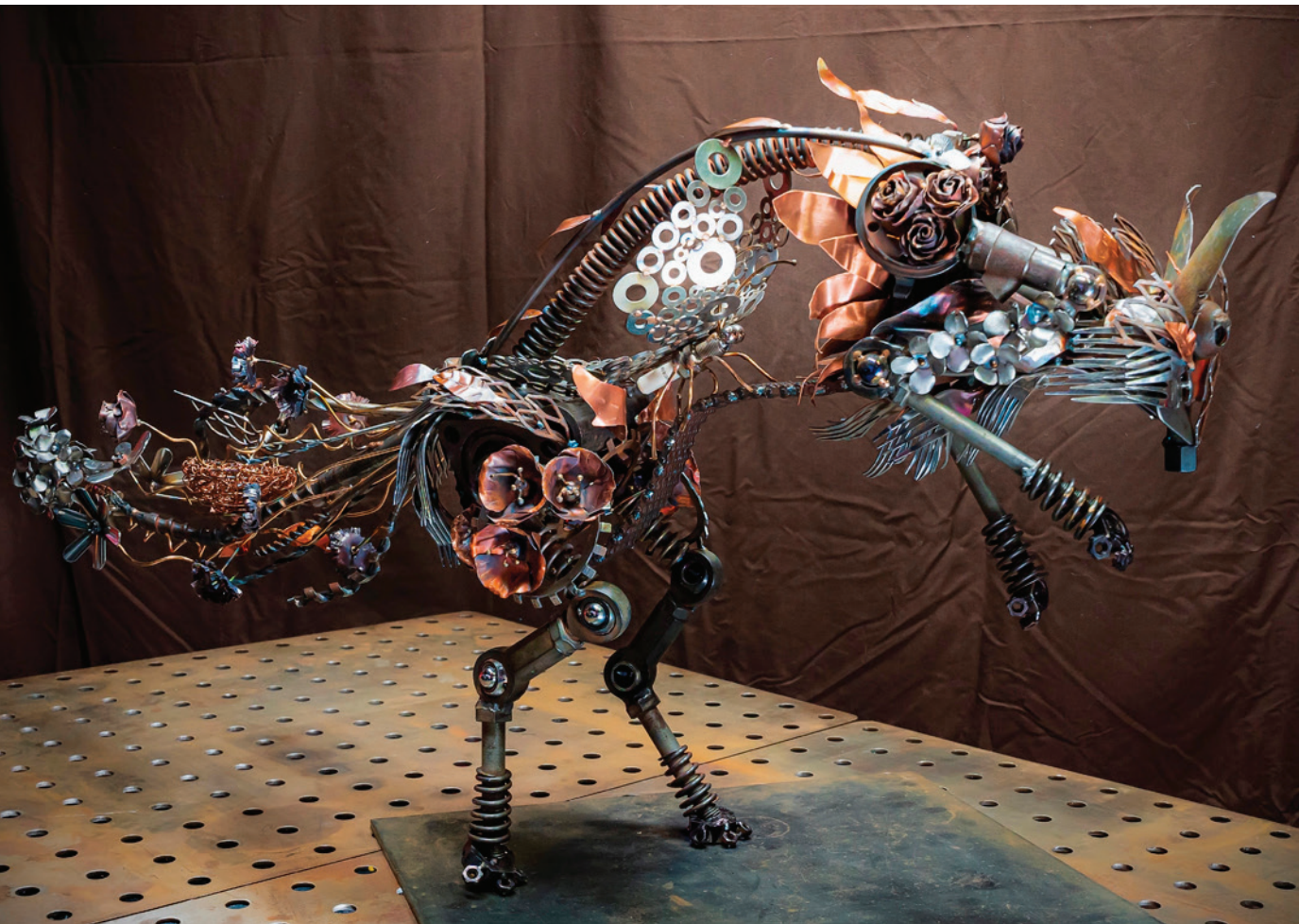


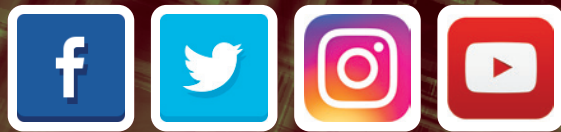
Photo by Jesse Winter



The artists (from left): Michelle Davis, Karen Sullivan, Joanie Butler.

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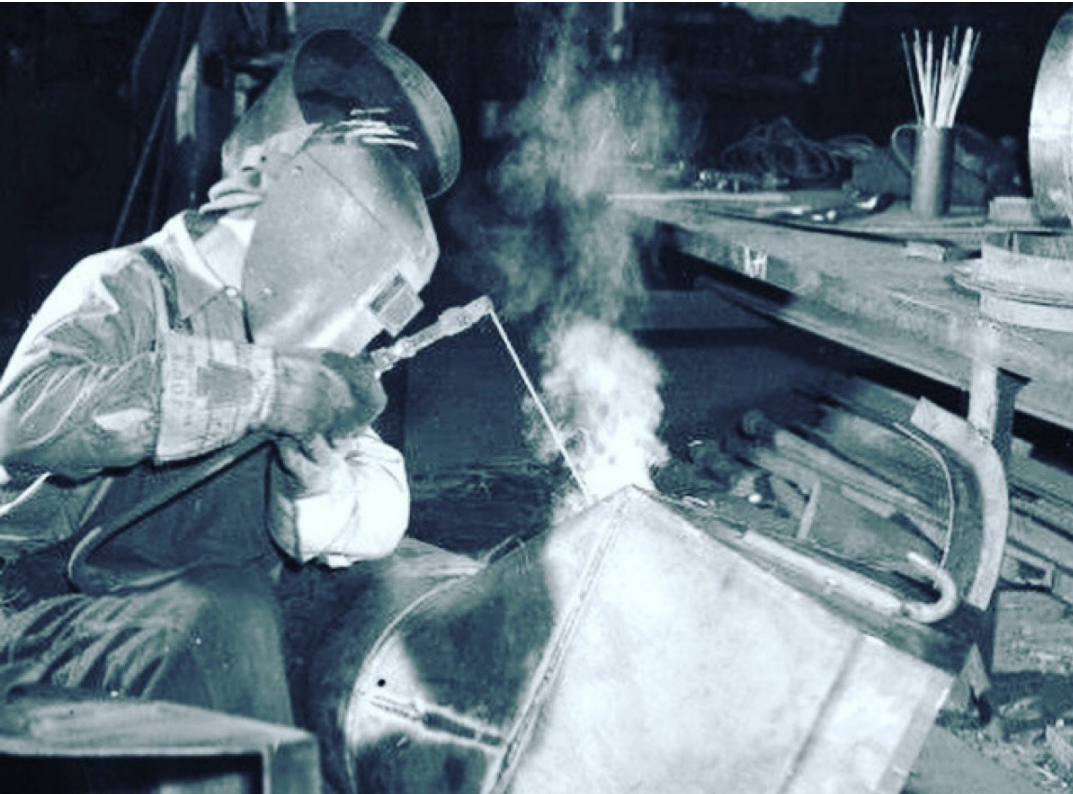


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Chutes and Scores



June 1940

A maintenance worker at Koerdel Brothers Sheet Metal Contractors in Jeannette, Pennsylvania, fabricates coal chutes using 10-gauge iron. The chutes, designed for a gas producer, are 15.5 feet long with a 15-inch diameter. The welder shown here – a Shield-Arc Junior made by Lincoln Electric, and a popular machine among fabricators from the 1930s to the 1950s – had been in service for four years with minimal maintenance and no repairs when the photo was taken. **ARC**

Have any vintage (pre-1975) photos you'd like to share? Email them in jpeg format to editor@arcmagazine.pub with a date the photo was taken (actual or approximate), a brief description (three or four sentences), and an email address where we can reach you for additional information.



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