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MAGAZINE

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**Nick
Offerman**

on the Trades

SHOW US THE ONE WHO SHOWED YOU THE WAY

Chances are, you didn't learn how to weld all by yourself. Somewhere along the way, there was that one person who inspired you, showed you the ropes, set you on the path. And whether that person knew it or not, he or she probably changed your life.

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ARC Magazine is launching a new editorial section to spotlight welding educators. We'll feature a different "teacher" in each issue who are doing or have done their part to introduce the art and craft of welding to a new generation. We're counting on you to help us find them. Maybe it was someone at your high school. Maybe it was at a trade school or in a college program. Maybe it was a parent, grandparent, neighbor or friend. Whatever the case, we want to know about that man or woman who opened your eyes to the world of welding and metal fabricating.





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ARC

COVER STORY



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Nick Offerman
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and advocate for the trades.

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DEAR EDITOR: I have a great appreciation for the time and effort you're putting into a dedicated welding magazine. As a shop owner/operator, it's very enjoyable to read the tips and tricks and find more ways to skin a cat. Also, the deeper look at companies like Gas Monkey Garage makes for excellent read without plaguing the reader with sponsored ads. Something I would really like to see in a future issue would be a shop section where you show some layouts of other fab/repair shops and how they made use of their space or what they would like to have done differently. Thank you for the magazine so far, it's far exceeded my expectations.

Ryan Panuska, Maynard, IA

PS: The historical tidbits are a real hit with my shop guys. Keep up the good work!

Thanks for the feedback and the suggestions, Ryan. We're always interested in hearing what readers are interested in seeing in the magazine. Keep an eye out for some fine tuning in our editorial coverage as we move further into 2016.

— John C. Bruening, Editor

DEAR EDITOR: Thanks for the cool magazine! I got my first issue and already learned something that is a big help. I didn't know that you should push the foot pedal after you touch the tungsten to scratch start the weld. I use a Lincoln Electric POWER MIG® 210 MP and this tip helped me a lot. Great stories and pics, too! Looking forward to seeing the next issue. Thanks again.

Jason Roark, Ramseur, NC

DEAR EDITOR: I am a Welding Engineer for a large company that builds equipment for the US Navy. I received my first copy of *ARC Magazine* in October 2015. We have about 43 welding machines in our fleet (all of which are Lincoln Electric welders). About 13 of these are the old DC 600 machines that we have had in our fleet for about 20 years. We do a lot of weld wrap and weld pickups with a lift arc/scratch start TIG torch. Your Ask the Experts column in the Fall 2015 issue included a great idea for using a piece of copper to prevent tungsten contamination. Thank you so much for such a simple fix for a huge problem that we have in our fabrication shop. Keep up the great work, and thank you for sharing your ideas.

Aubrey Mapp, Saint Marys, GA

Jason, Aubrey: Thanks for checking in. Glad you both found some useful information in our Ask the Experts column. Nearly all of the content in that column is user-drive – likewise with our Beginner Tips and Tricks column — so readers shouldn't hesitate to contact us with questions or suggestions about processes, techniques, safety or any other welding-related topics.

DEAR EDITOR: Greetings! I have enjoyed reading your publications.

It was somewhat vindicating to read the Master Class article in the Winter 2015 issue regarding welding of 4130 chrome-moly tubing. Years ago, I took on a part-time job with a small high-end mountain bike manufacturer in suburban Boston that was leading the way with GTAW versus the decades-old method of torch brazing to join 4130 tubing. I did some research and testing with ER80S-D2 filler metal and convinced the boss that this was the proper filler metal to use for 4130 welds that were not going to be post-weld heat treated. He agreed after seeing our testing results and how nice the welds looked after we developed some pulsing parameters.

Not long after I began welding full-time, I had the good fortune to meet Mr. Dennis Klingman of Lincoln Electric, who worked in motorsports. He corroborated my

use of ER80S-D2 for welding 4130, and some twenty years later, I see the same information presented in your magazine article.

Thank you very much, and keep up the good work!

Scott Bengtson, Hudson, MA

Good to hear from you, Scott, and congratulations on the TIG welding successes. Dennis Klingman is the resident expert in TIG welding at Lincoln Electric, so rest assured that any information you download from him – twenty years ago or last week – is rock solid.

“ As a shop owner operator, it's very enjoyable to read the tips and tricks and find more ways to skin a cat.” ”



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ASK THE EXPERTS

Welding experts at Lincoln Electric answer your questions about equipment setup, processes, techniques, safety and more.

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Can you provide any tips on running 308/309 uphill fillet weld with SMAW?

Mike Cabot, Happy Valley-Goose Bay, Labrador, Canada

The answer depends on which coating you're using. There are three types: -15 (lime coating), -16 (titania coating) and -17 (silica-titania coating). Your best bet will be either -15 or -16. A -16 coating will be a little bit heavier, and will enable you to do flat, horizontal and uphill fillet welds. It can weld AC or DC, and can also be used out-of-position. A -15 coating, which is intended for DC use only, can handle just about any fillet weld—flat horizontal, uphill, vertical down and out-of-position. But the -17 coating is probably not a good idea. It's primarily for flat horizontal fillet welding. It generally gets too soupy for anything else. If you wanted to weld 1/8 inch or 5/32 inch with -17, you might be able to push it if you're an extremely skilled welder, but the more moderately skilled welder is better off using -15 or -16 for uphill fillet welding.

What is the main function or purpose of silicon in a solid welding wire (for example, 70S-3 or 70S-6)?

John Hindel, Chicago Ridge, Illinois

The silicon content in a consumable has an oxidizing effect on the weld that generally cleans the weld area. The -6 or -3 in the numeric designation of an electrode is an indication of the chemical composition of the consumable—generally the silicon composition—so a -3 electrode has less silicon than a -6 electrode. The greater the silicon content in the consumable, the better it can handle some rust and mill scale. The silicon also promotes wetting and makes the puddle more fluid, which enables the gases and contaminants to escape before the weld solidifies.

What would be the proper amperage and voltage to weld F22 material using GTAW and FCAW processes?

Julian Ortega, Houston, Texas

F22 material is aluminum, and you generally wouldn't weld aluminum using the flux-cored process. Either TIG or MIG would be the more appropriate processes. When you TIG weld with F22, your voltage is adjusted by your arc length. Generally, you're on a constant current machine, so you're setting amperage, not voltage. Your

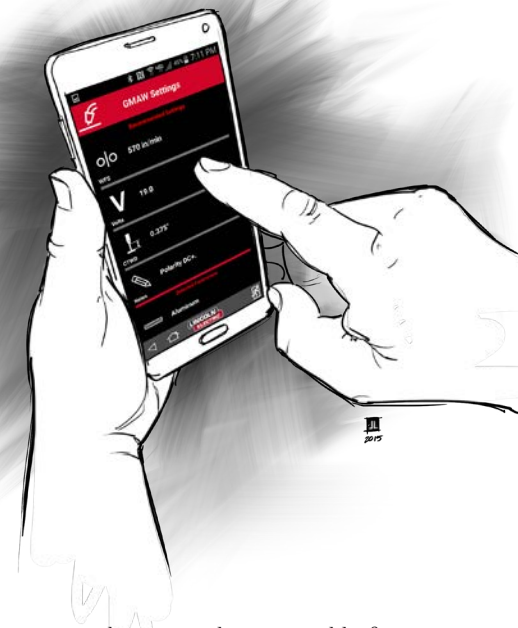
voltage is dependent on how close your tungsten is to the work. TIG welding should be anywhere from 9 to 12 volts, and you'll need to set your parameters for whatever type of material you're welding. So it would be good to know the thickness of the material.

The nice thing is, you don't have to commit these or any settings to memory; there's an App for that! You can download the Lincoln Electric Weld Parameters Guide app on your smartphone or tablet, and it will walk you through the setup process based on weld process, material and thickness, electrode type and diameter, gas mixture and will give you the proper setup based on the variables you input.

As a beginning welder, I'd like to know what is meant by the phrase "weldable primer." What is it, what is it used for and when?

Andrew M. Paradiso,
Rochester, New York

Generally, the best welds are made with clean base metal, but in some cases, there needs to be a coating on the material to prevent mild corrosion. In these instances, the welder will use a primer that can be welded over without the need to clean the primer off. The most common primer is called Bloxide®, which has an aluminum oxide base. For best results, though, you



want to clean your base metal before welding and avoid primer whenever possible, as it will degrade some of the properties of the weld. The same holds true for smaller home projects. It's best to clean the base metal as thoroughly as possible, complete your welds, then coat the material or the part afterward.

When welding with a 6011 rod, why do you have to whip and pause, and why does it stick so easily?

Michal Wilson, Portsmouth, Virginia

E6011 or E6010 electrodes can be used with a dragging or whipping technique. The whipping technique is best for controlling the arc in situations where there are gaps or poor fit-up. The sticking happens when the electrode touches the workpiece, which results in a short. If the electrode sticks to the workpiece too long, it will overheat, causing the electrode flux to start burning. To whip the electrode properly, try to hold an arc of about 1/16 to 1/8 inch away from the workpiece. Keep in mind that the E6010 electrode is for DC polarity welding only. The E6011 is an AC electrode, but can be used with DC polarity (although AC is preferred).

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Comedic actor, writer and avid woodworker Nick Offerman is best known for his portrayal of Ron Swanson on the television show *Parks & Recreation*. In his most recent book, *Gumption: Relighting the Torch of Freedom with America's Gutsiest Troublemakers*, he came to the defense of anyone who works with their hands with a provocative view on their role in keeping America great. ARC caught up with Offerman in Boston as he prepared for the opening of a stage production of *Confederacy of Dunces*.

Taking one for the trades

ARC: *In your most recent book, in the chapter dedicated to author Wendell Berry, you quoted him as saying: "...The collegiate system and the importance that's placed on it has demeaned and is doing away with the trades." You added your own thoughts, "This is a topic that has always gotten me fired up. When I was in high school in the eighties, only the underachievers and burnouts were relegated to the area vocational school. It was considered a substantial demotion in life, brought on by poor grades or attitude. 'John, I don't think you have what it takes to get through trigonometry. How about we make you a welder?'"*

What do you think can or should be done to start to get rid of the black eye that the trades have gotten as somehow being a second class vocation?

Nick Offerman: It's funny, because I was a victim of the mentality myself. I didn't notice per se. I mean, I noticed my uncles. One uncle that was a farmer was also the mechanic who fixed all the buses for the school. He was very heroic to me in his use of tool skills, and welding, and fabricating. The kids that knew how to do that were the kids that were in shop class, the Future Farmers of America. To me, that had a charisma, where I knew if some s*** went down in the parking lot, those were the guys I'd look for, or ladies, because I'd know they probably had a good socket set in their trunk. All of the rest of the kids had a really cute digital watch or the latest Nikes.

But I only really became aware of the disparity when I got into the trades myself as a scenic carpenter and then as a woodworker and I said, "Gosh, I'm kind of sorry ... I'm glad that I found this path on my own, but I'm sorry that nobody in our public education system is pushing anybody in these directions," because by the time I was in high school, it had become such a disposable society. It's something that drives me crazy, that most of our consumerist population is quite happy to just buy shoes and throw them away after a couple of years, and they do the same thing with their furniture and sometimes even their cars. They say, "Oh, I busted up the fender on my Prius. I guess I have to get a new one." That sickens me. We live in such a world of waste.

Not only are we destroying our planet by buying all of those new fenders and Nike sneakers, but we're devaluing so much of our population who perhaps aren't cut out to go to get an English degree but are just incredible with a hammer or a welder or a sewing machine or what have you.

ARC: *I think that one of the things that we end up missing is mentorship. There was a time when, if you wanted to learn something like welding, or electrical work, or carpentry, all you had to do was go out in your garage and stand next to your dad or your grandfather or somebody who knew better.*

We're losing the people who know better—who were willing to teach us—at a ridiculous pace. The welding industry is losing 60,000 welders a year just to old age and attrition. How do you make up numbers like that?

Offerman: No, you're right. I will always continue to speak to this issue because it's one of the fires that's lit under my own life. When I first had the opportunity to speak on a touring stage or to write a book I said, "Well, I'm not as funny as my friends, the comedians. I'm not as smart as my friends, the writers, but I can talk about chisels." I tried to make an entertaining way of pushing the world of making things with your hands. I agree. I grew up in a small town in Illinois called Minooka, and I think that I've lived in cities since I became a professional entertainer.

I do think that there's a vast amount of our population that is still in the proper tradition of teaching their kids...but it can certainly look that way from an urban or suburban environment. However, I do think that there's been a great dearth of this practice. That's why I'm on my soapbox about it, because not only is it important to our population just being able to hold our heads up and earn a dollar with a set of tools, but it also weakens us nationally because eventually we're going to need the craftsmen of other countries to make everything, if we keep going along this path, which is horrifying. I do think that some members of the government are aware of this deficit, so hopefully with voices like my own, and your magazine, and all of us that are trying to bring attention to this type of lifestyle, we've gotten the hipsters interested...

ARC: *We have gotten them, yes.*

Offerman: Now we have to just get them to stop being so cool and just start chopping firewood.

ARC: *What kind of advice would you give to a kid who's trying to convince his parents that he or she doesn't want to go to college, and who may have an aptitude to do something else. What kind of advice would you give to parents about accepting that path?*

Offerman: That's all the kid needs to do is say so, and it's the parents who need the advice. Wendell Berry writes really eloquently about it. He talks about how we've been sold this bill of goods that you're on this path. If you want to succeed, you've got to get good grades in high school so you can go to a good college and get an office job that's on a salary track. That sense of prosperity is a fallacy. So many people follow that path, and either they can't get a job or they get a job that makes them miserable. Maybe they make a salary and they can afford a house and a family, but they're spending 40, 60 hours a week driving themselves crazy in a cubicle, trying to watch numbers go up and down on the market.

There's something important here that I want to point out, because it's not as simple as, "I'm not good at calculus or getting grades, so I want to go build houses." Building houses, welding, machinery, fabricating anything out of steel, or farming, all of these so-called vocational trades require just as much intelligence, if not more, and just as much artistry as writing a novel or running a business. You know what I mean?

ARC: *I think the argument we come up against is it's one or the other; it's a binary question. You're either going to go to college and be successful or you're going to work at McDonald's, and there's not a whole lot in the middle.*

Offerman: It's true. I mean that's one of the tough questions. I don't encourage people to go into the trade of woodworking because that's very difficult. I also don't encourage people to go into the job of acting because that's a very painful, difficult percentage-wise, most often thankless job, but I do encourage people to get up on stage and entertain people or to make things out of wood. But if you try to make those your sole source of income, that can be incredibly arduous. Now, in specialized trades, whether it's welding or electricity or plumbing or being a contractor, landscaping, masonry, you can certainly make a wonderful living if you find the right specialized niche, but what strikes me about Wendell Berry's take on it is that you can earn a lot less money doing things with your hands, with your tools, but still have an incredibly enjoyable and prosperous life.

That's the advice I would give to those parents you asked about, is consider your quality of life. What is it that makes you the happiest? Is it how expensive your BMW SUV is? What if you had a used Suburban? Do you think you and

your family could still have a good time? If the answer is not yes, then I'd take those parents out back and give them a stern talking to. To me, it's all part of this fallacious American dream that you have to make as much money as possible to find happiness and success. What I've learned through my obstinate choices of theater and some on TV and also woodworking is that the happiness and success that I feel come a lot less from the money that I earn than from the fun that I have with my loved ones, my wife, and our home, the lives that you build for yourself. That is comprised of so much more than the paycheck you're bringing home.

Obviously, you want to afford a roof over your head and be comfortable, but beyond that, I think it's much more important to look to spending time with your loved ones and going for a walk in the woods. That's the tricky part with the kids. If I knew of a kid that was like, "Hey, I don't want to go to college. I want to become a welder," I'd say, "Let's get that kid over here. I've got some things that need welding." The scary part to me is how to attract kids to a tool belt when video games are so attractive, and all of the other distractions in modern society. That's something I find very worrisome.

ARC: *There's a lot of movement in the educational landscape in this country to focus on science, technology, engineering, and math—the STEM platform. Where do the arts fit into that?*

Offerman: I'm sorry to be a little bit of a one-trick pony, but Wendell Berry has a great book called *Life is a Miracle*, in which he takes down this other writer who wrote a book saying that eventually all of the educational disciplines will be separated, so science will be off on its own and a mass new frontier, and we eventually will be able to know everything. (Editor's note: the book that Offerman is referring to is E. O. Wilson's *Consilience*). His main theme is that everything is connected, that science and math involve a great deal of artistry as well.

When anybody starts asking me for advice, I say, "All right, the starting point for all of us is we can never know everything, in any field, in any discipline. We're human beings, so we can never know everything and we can never do anything perfectly. With that in mind, whatever we choose to spend our hopefully 89 to 102 years doing will simply be trying to become better at whatever our





All of these vocational trades require just as much intelligence, if not more, and just as much artistry as writing a novel or running a business.

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chosen discipline is. The most interesting thing in the world is a human being. We don't go see Michael Jordan play basketball because we know he's going to have a 100% perfect game, but we know in his prime, he's going to get closer than anybody, so it's the attempt that we are astonished by. With that in mind, whatever it is we choose to spend our time at, we can only continue to maintain the attitude of students. In my woodworking, for example, I am annoyed and thrilled when 17 years into my work I see, "Oh, I need three geometric theorems that I learned when I was 14," and everybody said, "When will we ever need to use this?" "Well, here, now I need those goddamn things."

I get them out and I relearn them, and I'm thrilled. It's like magic still. With that in mind, for me, that's the argument, is that we're not creating scientists and mathematicians, thank you. We're creating human beings, ostensibly. I want those human beings, if not to play a musical instrument, at least have the appreciation of it. Because if we just become incredible binary thinkers, then I believe those are known as robots. You can't have the hard sciences, if you will, without the arts as well. It's all part of our culture.

ARC: *Looking at the bios of the staff at your shop, you see a wide range of skills and experience. Can you speak a little bit to—aside from technical abilities—the qualities that you look for in an employee that might resonate with somebody who is taking on a trade?*

Offerman: When I realized that I wanted to staff up my shop, it was when I got the job on *Parks & Recreation*. I knew having gone through *Will & Grace* with my wife (actress Megan Mullaly), I knew that if this show went, if it took off, that I was going to lose a lot of my shop time for seven months of the year. Rather than close the shop up and turn the lights off, I wanted my shop to thrive, so I said, "Well, let's get some pals in here and keep dulling these saw blades." At first, Lee, who manages the shop, came to me recommended by a friend, and we sat down and had a meeting. She was heaven sent. She worked at this great museum in San Francisco called The Exploratorium, but she had also been to the College of the Redwoods woodworking program.

I pictured the perfect storm that I needed to be administrator of, and then we just gathered ... I mean it's really a ragtag

bunch of hippies. Some of them came to us through Lee. Some came through the world of comedy like, "Hey, my brother wants to learn woodworking. Can he come work at your shop?" This guy, Thomas Wilhoit, who's one of our stalwarts, just cold called us. He was in L.A. for the summer, and he was bored. We were the third place that he called, and we got to talking. He's from Kentucky. It turned out he had actually seen Wendell Berry speak, and I said, "Will you please stick around?" There's a little bit of a revolving door. If you make a living as a woodworker, you're very fortunate, but it's always going to be pretty meager.

Again, your recompense or your treasures are going to be found in other places than your pocketbook. We have a really good time, and it's a wonderful coalition of personalities. But I think some will probably end up being career woodworkers, and some will move on to other pursuits. It really comes down to if I'm around and I have the time, I like to make somebody sweep. We have them come to the shop, and we talk to them and find out their experience, and maybe they help us do some work. I like to surreptitiously ask somebody to sweep and look at how good of a job they do, because you can really tell almost everything about a worker by how they sweep a floor. Other than that, everybody works hard. Everybody has gumption, their application of their learning and their execution.

We had one guy, who is a great guy, a really wonderful artist, who had a bad temper for a while. We ended up having to ask him to move along because he was letting his temper affect the shop. We said, "Hey, we don't have bad tempers here. If you can't have a good time here, I don't know what's the matter with you, but you'd better go find someplace else to deal with people."

ARC: *I love the idea of asking to sweep the floor to find out the temperament of a person. That's sage advice. How much time do you get to spend in the shop?*

Offerman: It's very sporadic. When we were shooting *Parks & Rec*, I was spoiled because I had one or two days off every week, so I'd get to drop in. Generally, when I have one or two days, I don't get a lot of personal projects done as much as I administrate. I help out. I answer questions and help with designing our pieces. Then I'll have a few months off, so I'll get in there. Last year, that's when I made my first ukulele. I was in there a few weeks, and I just did a bunch of work for the shop. I flattened a bunch of slabs. For me, I could just rearrange the hand plane drawer, and it's such a great vacation from the fast paced world of Hollywood bulls***. It's part of the reason that my next book is going to be about woodworking.

As much as I can, I try to engineer into my projects as a writer and actor things that I want to do. I have a film that I'm developing that would involve a lot of hiking and kayaking in British Columbia. As I said, I'm going to do this book about woodworking, and then I'm going to be required

to spend a bunch of time in my shop, and I'm tricking myself into getting to do the things I love the most for pay.

ARC: *The question everyone wants us to ask you is about the Ron Swanson character (from Parks & Recreation), and how much Nick Offerman is in Ron Swanson and how much Ron Swanson is in Nick Offerman?*

Offerman: That's a good question. It's a character written for comedy. He's a very simple man, and that's what I think people respond to so powerfully in this day of infinite choices, that there's this guy that says, "Look, I have three rules, and anything outside those rules, you can go to hell." I think people crave that kind of fatherly influence like, "Oh, please just tell me I can only drink milk and I can only eat steak." I'm a human being, so I'm much more complicated. I also have a realistic digestive system. Ron loves Lagavulin Scotch, which is my favorite scotch. It has been since 1998. It was also the favorite scotch of Mike Schur, my boss who created the show.

I do have a love of meat as well as the part of my demeanor that is stentorian, and august, and un-moving. My gravitas, if you will. All of those elements, and my mustache of course, all of those parts of me will boil down to their purest essence for comedy. Ron is a distillation I suppose of some of the sides of me that they thought would be funny. I feel like I don't have a great deal of Ron Swanson in my life beyond that I do love simplicity, and I do love to not suffer fools gladly. I think I have a certain amount of common sense that I inherited from my dad and he from his dad, that involves an agricultural or blue-collar sensibility to all aspects of life. I think that's something else they played on with Ron.

It is something that's important to me, but at the same time, I'm much more bizarre, and weird, and flawed, and just human. I do love steak, and bacon, and scotch, but if I consumed as much as Ron does, I would already be dead from clogging my arteries, so I have to eat a little bit more sensibly. He's really funny, and he's also a much faster woodworker than I am. He turned out an Irish harp overnight while drunk. That thing would take me at least a week and a half.

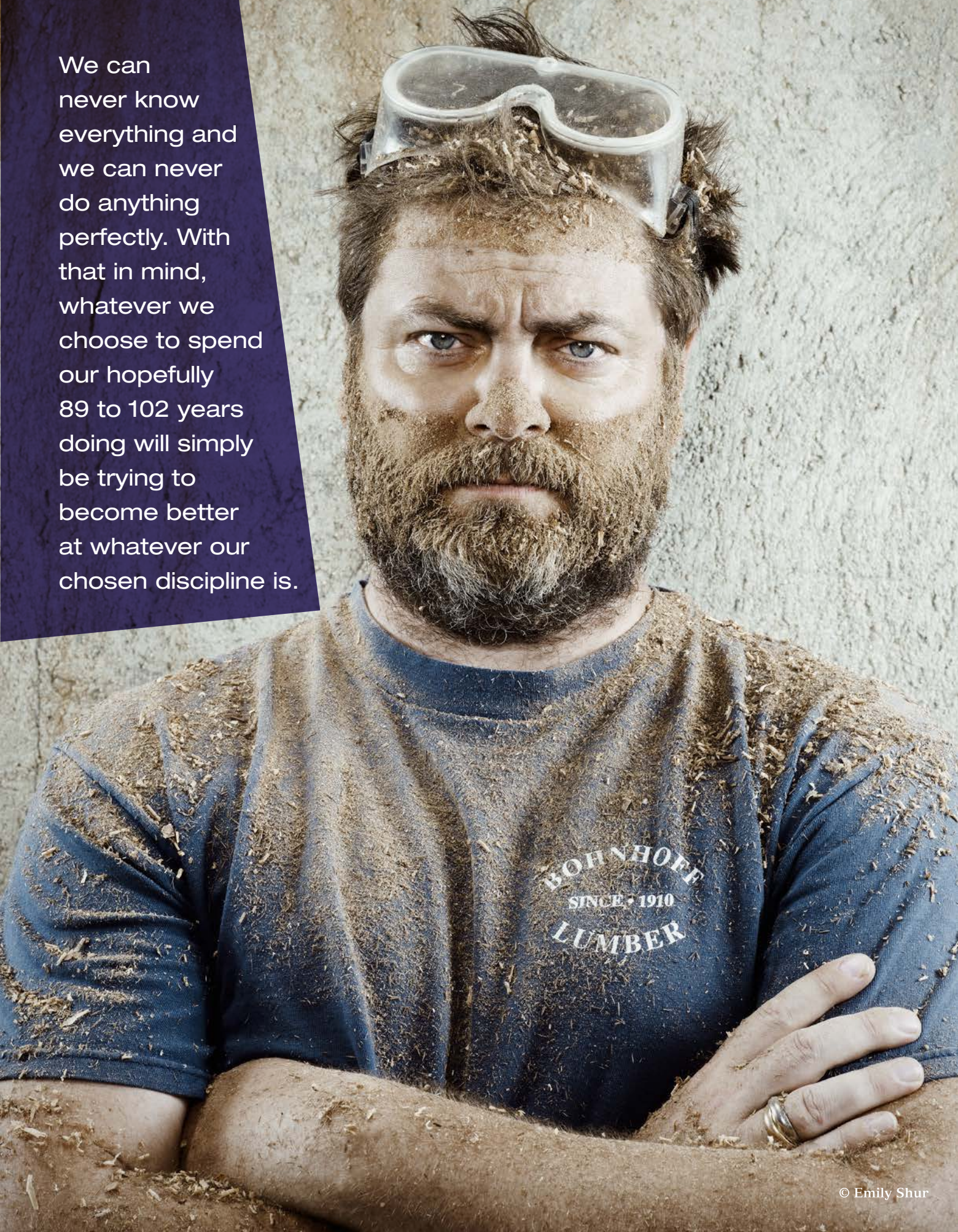
ARC: *I came across something recently, and I'm curious if you're aware of this. Apparently, Bob Dylan is a welder, and among other things, he makes decorative wrought iron fences and iron gates. Does that surprise you at all?*

Offerman: Wow, I had no idea. That's crazy.

ARC: *Could you ever see yourself welding and woodworking, maybe making some music together?*

Offerman: I'm not sure if Bob would have much patience with me, but I'd be happy to sweep his floor. **ARC**

We can never know everything and we can never do anything perfectly. With that in mind, whatever we choose to spend our hopefully 89 to 102 years doing will simply be trying to become better at whatever our chosen discipline is.



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VO

CA

vo·ca·tion \vō-'kā-shən\ *noun*

1. specified occupation, profession, or trade; 2. a special urge, inclination, or predisposition to a particular calling or career 3. work pursued for personal satisfaction first and personal gain second

T

It's easy to paint the term "welder" with a broad brush. We usually use it in reference to those professions in which the machine is synonymous with its user, such as the pipeline welder or the iron worker. But there are others for whom the welder is a vital, pivotal tool used in the pursuit of the user's passion-turned-business. These are the craftsmen, the artists, the builders, the makers – the vocations for which welding is a means to an end, but not the end itself.

The following pages celebrate a select few of these "vocational" welders. Their chosen paths are diverse, but the passion to create — with welding as part of that creative process — is the common thread that turns their vision to reality.

I

N



STRIVING ARTIST

Price Davis

Owner, Price Davis Studios

 @pricedavisart


Denver, CO

Davis is best known for his large-format installation art, crafted primarily from metal. The most recent and largest was a 28-foot-tall, three-piece, three-story steel sculpture entitled “Denver Lilly,” which is on display at Denver International Airport. Early dabbling in welding and encouragement from his shop teacher led to a full-blown career as a metal sculptor, but it didn’t come easy. He spent years as a real-estate developer, which helped him hone his skills until he could devote himself to his passion full time. This experience has given him a unique perspective and has made him determined to help like-minded artists. “We have to fight for the artist,” he says. “Artists should be paid for their work and shouldn’t be kept poor. The idea of a starving artist is no joke.”

HOLLYWOOD KNIGHT

Eric Underwood

Special Projects Manager,
Ghostlight Industries

 @GhostlightUS

Los Angeles, CA

The “need for speed” has become the cliché to describe an adrenaline addiction that can only be appeased by more miles per hour. As the guy in charge of fabricating a huge assortment of custom vehicles for movies and TV, when Underwood talks about speed, he’s referring to his daily race against the clock. Whether he’s building a vehicle designed to absorb a high-speed collision with a brick wall (and keep going) or prepping 1920s- and 1930s-era cars for a Ben Affleck movie, the only thing that’s consistent is the pace. “Someone will come to us with an idea, and we have to figure out how to design and execute that idea,” he says. “We do crazy builds in an accelerated, ridiculous time frame.”



CHAIRWOMAN

Taylor Forrest

Owner, Taylor Forrest Furniture

 taylorforrest.com

New York, NY

Taylor Forrest started out in fashion design but eventually transitioned to furniture. It was a leap that's not as drastic as people might think. She believes that furniture, like clothing, should strike the perfect balance between functionality and style. Creating pieces that capture that balance is the most exciting part for her.

"You catch an idea about a piece and you can just sense that it's super-alive, and you just have to make it, and there's no way that it shouldn't exist," says Forrest. "And then you make it, and you just think, 'Gosh, I love this so much.' I don't make anything that I don't love, or that I wouldn't want in my own home, or that I wouldn't want to see all the time. I make a piece of furniture with the intention that I want to see it twenty years from now and still be in love with it. I think that's what the concept of timelessness is all about. I want to make timeless things."





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OUTER BANKS IRON MAN

Randy Hodges

Owner, Manteo Blacksmith

 manteoblacksmith.com

Kill Devil Hills, NC

Seventeen years ago, Randy Hodges left behind two decades of civil engineering to pursue his passion for blacksmithing as his medium to create decorative metalwork.


“I traded in my vocation for my avocation,” says Hodges, whose blacksmithing skills were primarily self-taught. “Because I was living in a tourist area and a tourist-based economy, I knew I could make things to sell to tourists and create enough income to make a living.”

Hodges believes there’s still a place for skilled trades in the digital age. “My fear nowadays is that there aren’t many options for learning other than on a computer, and that’s not the same thing as learning a skill or a trade,” he says. “I believe that if a person applies himself to his craft, his education and his pursuit of that lifestyle, he could do just as well as he could do by going to college.”

NOBLE SCION

Alex Loos

Owner, Hans Noble Design

 hansnobledesign.com

Cleveland, OH

After 15 years in his father's heating and cooling company, Alex Loos bid ductwork farewell and launched his custom furniture building business, Hans Noble Design, in the fall of 2013.

"I'm a perfectionist," he says. "I try to make everything just right, because I'm trying to carry on the tradition of my family. Both sides included some very good artists. They weren't hacks. So I'm just trying to be true to that lineage."

Doing right by your ancestors may be a big responsibility, but Loos loves the work. "To see the finished product, I just get this great feeling that I've accomplished something with my life," he says. "It's so rare for someone to make a career out of doing something that they love."





LIFE CYCLER

Matt Nunn

Owner, Samsara Cycles

 samsaracycles.com

Frederick, CO

Matt Nunn has been taking things apart and rebuilding them as far back as he can remember. There were forays into construction and metal fabrication in his 20s and 30s, but he eventually returned to his first love – the bicycles of his youth. These days, he builds custom bike frames – nearly 100 a year – for a customer base that stretches from Colorado to New Zealand.

“If I had settled [for those other jobs], I might still have been somewhat happy to this day,” says. “I can tell you one thing for sure, though. I would not be as happy as I am now.”

Much of that satisfaction comes from the personal relationships with his customers: “They love the fact that they’re talking to the guy who answers the phone, writes the order, cuts and machines the material, welds the material, assembles the bike, sweeps the floor and runs the elevator. People are looking for that connection – something they don’t get when they buy from a large manufacturer.”

HANDBUILT IN 



LOCAL HERO

Dani Pajak
Owner, Disowned Customs
🐦 @disownedcustoms
Cleveland, OH

Although it took him a while to figure out what he wanted to do with his life, Pajak never forgot what his father told him: learn a trade. This simple advice led to the start of his custom motorcycle shop and a starring role on a to-be-announced fabrication competition on TV's Esquire network. When he's not filming or working on his own projects, he helps others at Cleveland's only cooperative motorcycle shop, Skidmark Garage, in the same location as his business is based. He tries to impart the benefits of vocational training by example. At the very least, he says, young people can develop a skill they can carry for the rest of their life – even if they ultimately decide on a different occupation. "You can always go to college," Pajak says. "But you want to learn an everyday skill that will help you succeed in life."



TORCHBEARER FOR THE TRADES

Jeremey Cupp

Owner, LC Fabrication

 @lcfabrications

Grottoes, VA

“A person can learn a trade and go to work at a fabricating company and make good money. And they can continue to make good money because their skills are a scarce and valuable commodity.” This bold statement speaks to the value Cupp places on his trade as a machinist. When he applies his expertise to fabricating custom motorcycles, a more paternal instinct emerges. “Some people might say it’s cheesy,” he says, “but I think the only thing comparable is watching my children being born.” Like raising a child, the “care and feeding” that goes into his builds are evident in his meticulous attention to detail and willingness to challenge conventional thinking. These traits have earned him the respect of bike builders and fabricators worldwide, as evidenced by his winning of the Builder’s Choice award in the 2015 Handbuilt Motorcycle Show.

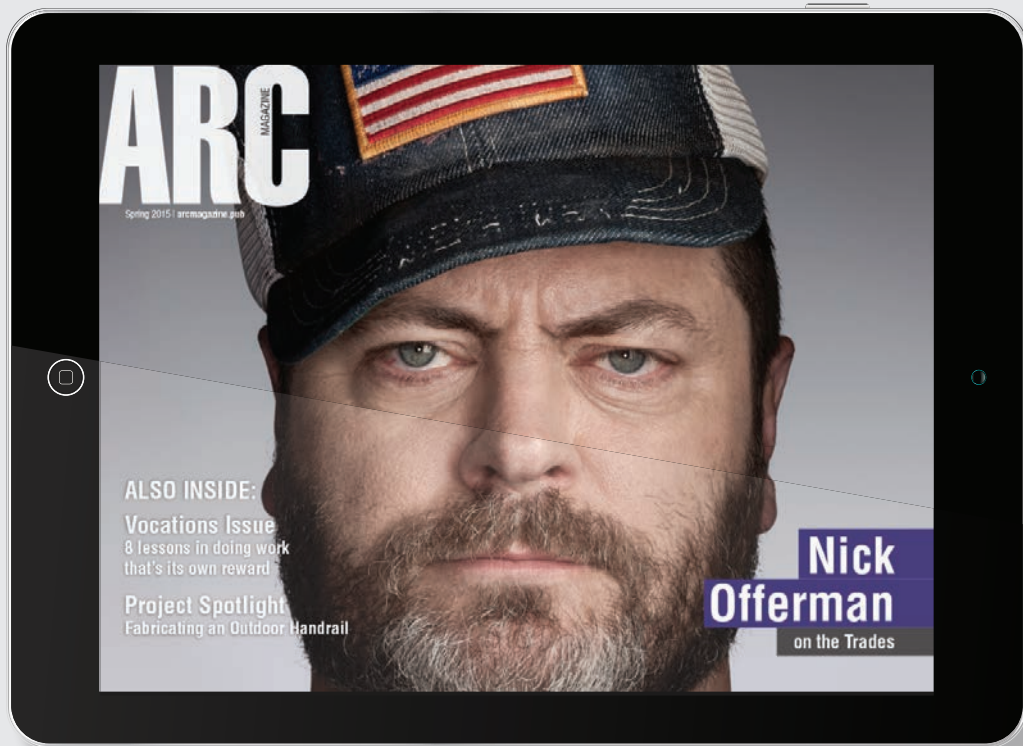
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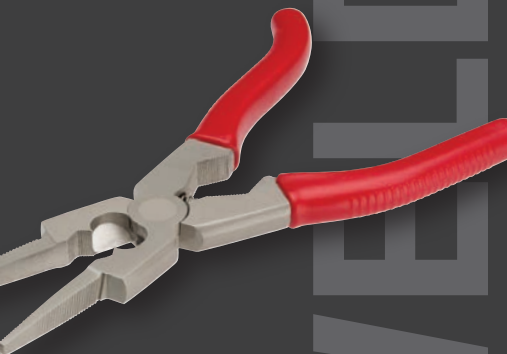
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TACKING, TESTING AND OTHER TIPS

PREP WORK IS ESSENTIAL

Clean and prepare your metal as best you can. It will make for a much neater finish.

– Submitted by Mat Simpson, Brisbane, Queensland, Australia

GRIND FIRST

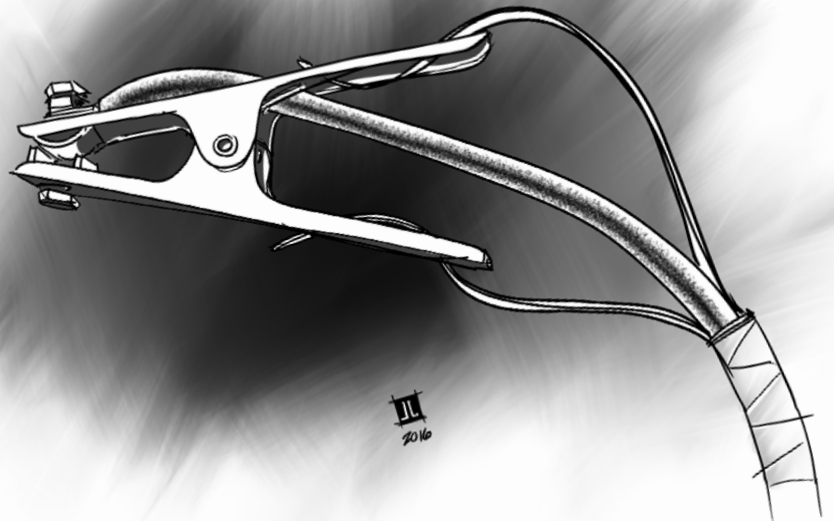
Grind before you weld, not after. It's all about taking the time to prep your work. It makes a huge difference.

– Submitted by Eugene Minchau, Viking, Alberta, Canada

KEEP CABLES FROM TANGLING

You can keep your ground clamp from snagging on other cables in your shop by threading a zip tie through the clamp. The zip tie is secured with tape.

– Submitted by Jimmy Diresta, New York, New York



MAKE SURE THERE IS NO INTERFERENCE

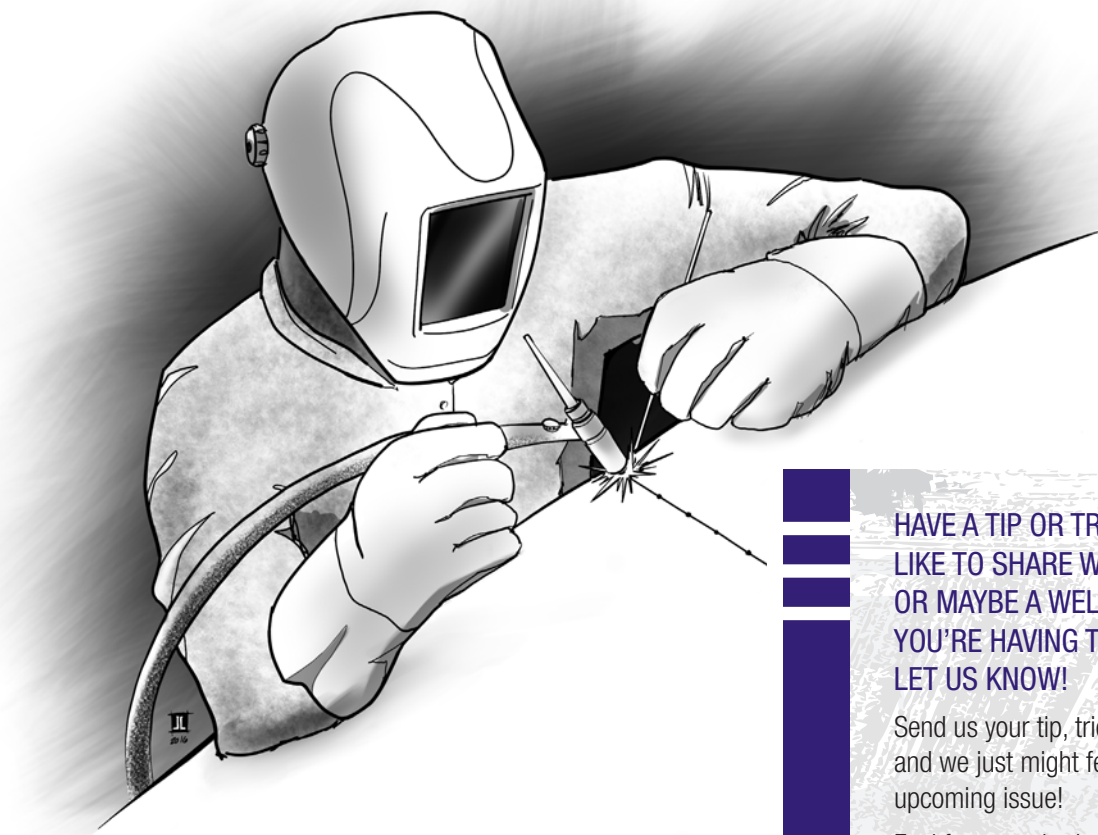
Determine the start and stop points for smaller projects. Then, before you weld, figure out the travel direction and torch/hand placement. What you're doing is simulating the motion without pulling the trigger to make sure there are no interferences with whip catching, and you are comfortable as you hold the torch.

– Submitted by Daniel Caywood, Fort Wayne, Indiana

THINNER MEANS CLOSER TACKS

When tacking a joint of sheet metal together with TIG (14 gauge and thinner), make sure to keep your tacks close together. The thinner the material, the closer the tacks.

– Submitted by Dave Trace, Reading, Pennsylvania



TEST BEFORE YOU FINISH

Weld a test piece, if possible, prior to your finish weld. This will allow you to see whether your settings are correct prior to potentially ruining an expensive piece or creating additional work. The test can be conducted using extra material.

– Submitted by Gahan Mullen, Houston, Texas



HAVE A TIP OR TRICK YOU'D LIKE TO SHARE WITH BEGINNERS? OR MAYBE A WELDING ISSUE YOU'RE HAVING TROUBLE WITH? LET US KNOW!

Send us your tip, trick or question, and we just might feature it in an upcoming issue!

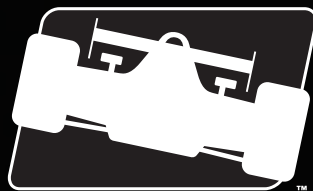
Feel free to submit more than one tip, but please be as specific and detailed as possible. The more details you can provide, the more likely we are to use your tip. Note: We reserve the right to edit responses for the sake of grammar, appropriateness and/or available space.

And ... if we do use your submission, we'll send you a FREE Lincoln Electric baseball cap or an *ARC Magazine* t-shirt, plus you'll be entered into a drawing where two lucky winners will win their choice of a POWER MIG® 210 MP or a Square Wave® TIG 200. Winners will be announced after the publication of the Winter 2016 issue.

2016



5 SCHEDULE



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MAR 13 **STREETS OF ST. PETERSBURG** ST. PETERSBURG, FL

APR 2 **PHOENIX INTERNATIONAL RACEWAY** AVONDALE, AZ

APR 17 **STREETS OF LONG BEACH** LONG BEACH, CA

APR 24 **BARBER MOTORSPORTS PARK** BIRMINGHAM, AL

MAY 14 **INDIANAPOLIS MOTOR SPEEDWAY** INDIANAPOLIS, IN

MAY 29 **INDIANAPOLIS MOTOR SPEEDWAY** INDIANAPOLIS, IN

JUN 4-5 **THE RACEWAY AT BELLE ISLE PARK** DETROIT, MI

JUN 11 **TEXAS MOTOR SPEEDWAY** FORT WORTH, TX

JUN 26 **ROAD AMERICA** ELKHART LAKE, WI

JUL 10 **IOWA SPEEDWAY** NEWTON, IA

JUL 17 **STREETS OF TORONTO** TORONTO, ON

JUL 31 **MID-OHIO SPORTS CAR COURSE** LEXINGTON, OH

AUG 21 **POCONO RACEWAY** LONG POND, PA

SEPT 4 **STREETS OF BOSTON** BOSTON, MA

SEPT 18 **SONOMA RACEWAY** SONOMA, CA

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MATERIALS

- 10-gauge mild steel square tubing
- 0.5-inch steel bar stock

WELDING / CUTTING EQUIPMENT

- Lincoln Electric POWER MIG® 210 MP Multi-Process Welder
- Lincoln Electric Miniflex® portable welding fume extractor
- Lincoln Electric SuperArc® L-56® MIG wire, 0.035-inch diameter
- Lincoln Electric Innershield® NR®-211-MP flux-cored wire
- Gas, 75/25 mix (75% Argon and 25% CO₂)
- Angle Grinder

OTHER TOOLS

- Magnetic fixtures – multi-angle and pivot angle

PERSONAL PROTECTIVE EQUIPMENT

- ANSI-approved welding helmet
- Safety glasses
- Fire-resistant jacket
- MIG welding gloves
- Lincoln Electric SteelWorker™ gloves (to fabricate the steel)
- Fire extinguisher

FABRICATING AN OUTDOOR HAND RAILING FOR A BUILDING ROOF



Watch the complete project video at www.arcmagazine.pub

By Lon Damon, Certified Welding Educator,
The Lincoln Electric Company

Fabricating an outdoor handrail is a multifaceted project that involves welding both indoors and outdoors with different techniques. The techniques shown in this project can be applied to your own project, but in this case, our railing was designed to be attached to an existing parapet to surround a rooftop deck. While aesthetics is important, the first priority of an outdoor handrail is its safety. Fabricators working on an outdoor handrail for a commercial building or public venue should always begin by checking with local codes and ordinances.

For this project, the handrail is composed of 10-gauge mild steel square tubing and 0.5-inch bar stock. A significant portion of the fabrication will be done indoors, where I have more control over working conditions. Always use a fume extraction unit when welding indoors to capture weld fume. The welder I used on this project is a Lincoln Electric POWER MIG 210® MP, set at 18.2 volts, manual CV, using Lincoln Electric SuperArc® L-56® MIG wire, 0.035-inch diameter, with a wire speed of 255 inches per minute (IPM). I welded with a gas mix of 75% argon and 25% CO₂.

Outdoors, I switched to the Lincoln Electric Innershield® NR® 211-MP flux-cored wire. The flux-cored process (FCAW) is preferred, so I didn't have to deal with wind blowing away my shielding gas.



Step 1: Prep structural members. Start by cutting all pieces of mild steel square tubing, using a grinder to clean off any mill scale. Failure to clean will make it harder to get the arc started and get good penetration. Cleaner material also makes for a cleaner weld.

Step 2: Fit and tack the structural elements. Prepare to tack weld one end of the square tubing. First, make sure the steel tubing is straight and square. Multi-angle and pivot angle magnetic fixtures will help make sure that each piece of the steel tubing remains square and

doesn't move while tack welding. The tack welds will hold the steel tubing in place, allowing us to manipulate the project and get the pieces of bar stock in place for final welding at a later stage. Once a few tack welds are placed, the fixtures can be removed and tacking can continue on the back side.

After the mild steel square tubing is tacked, move to the second (in the middle) and third (on the opposite side) pieces of tubing. Line up each piece with your marks and use the angle fixtures to keep the pieces straight and secure. Tack weld each piece.

Step 3: Prep horizontal dividers. After the mild steel is tacked together and each piece is centered, straight and true, we move to the 0.5-inch bar stock. Like the mild steel, it is important to grind the mill scale off the bar stock. The magnetic fixtures can keep the bar stock secure to make it easy to grind just like with the steel tubing. Bevel the ends of the bar stock with a grinder prior to welding to ensure better fusion.

Step 4: Fit, tack, repeat. Make a jig out of scrap metal to help you quickly locate the attachment points for each piece of bar stock. Using your jig as a guide, place all pieces of bar stock into one side of the railing. Tack weld the horizontal bar stock rails, being careful not to weld into the jig. Remove the jig and repeat the process at the other end of the railing.





Step 5: Add stand-offs. It's time to turn to the four stand-offs that will attach the railing to the building's parapet. Your tack welds may be in the way of getting a good 90° angle fit-up of the stand-offs. If so, grind them flat and remove any remaining mill scale. A pair of multi-angle magnetic fixtures can be helpful in making sure the piece does not move while welding and stays at a 90-degree angle. Tack weld each stand-off.

Step 6: Finish weld all joints. Since a handrail is a large object, it's not easy to flip over or upside down. So the fabricator will be welding in different positions on each side, including vertical down and horizontal. MIG is the ideal machine for all-position welding. There will be good penetration on the 10-gauge steel.

Step 7: Outdoor fit-up and welding. The project moves outside to the building roof to join individual railing pieces. On old buildings, corners are almost never true, which made the final fit-up for this project a challenge. In this case, the top corner fit well, so we welded that joint, then turned our attention to the bottom joint. After some cajoling, we had a gap that we could live with, but needed to use a weave weld to deposit enough metal to fill the gap and create a good joint. Knocking the slag off the joint revealed a good quality weld, given the poor fit-up. **ARC**



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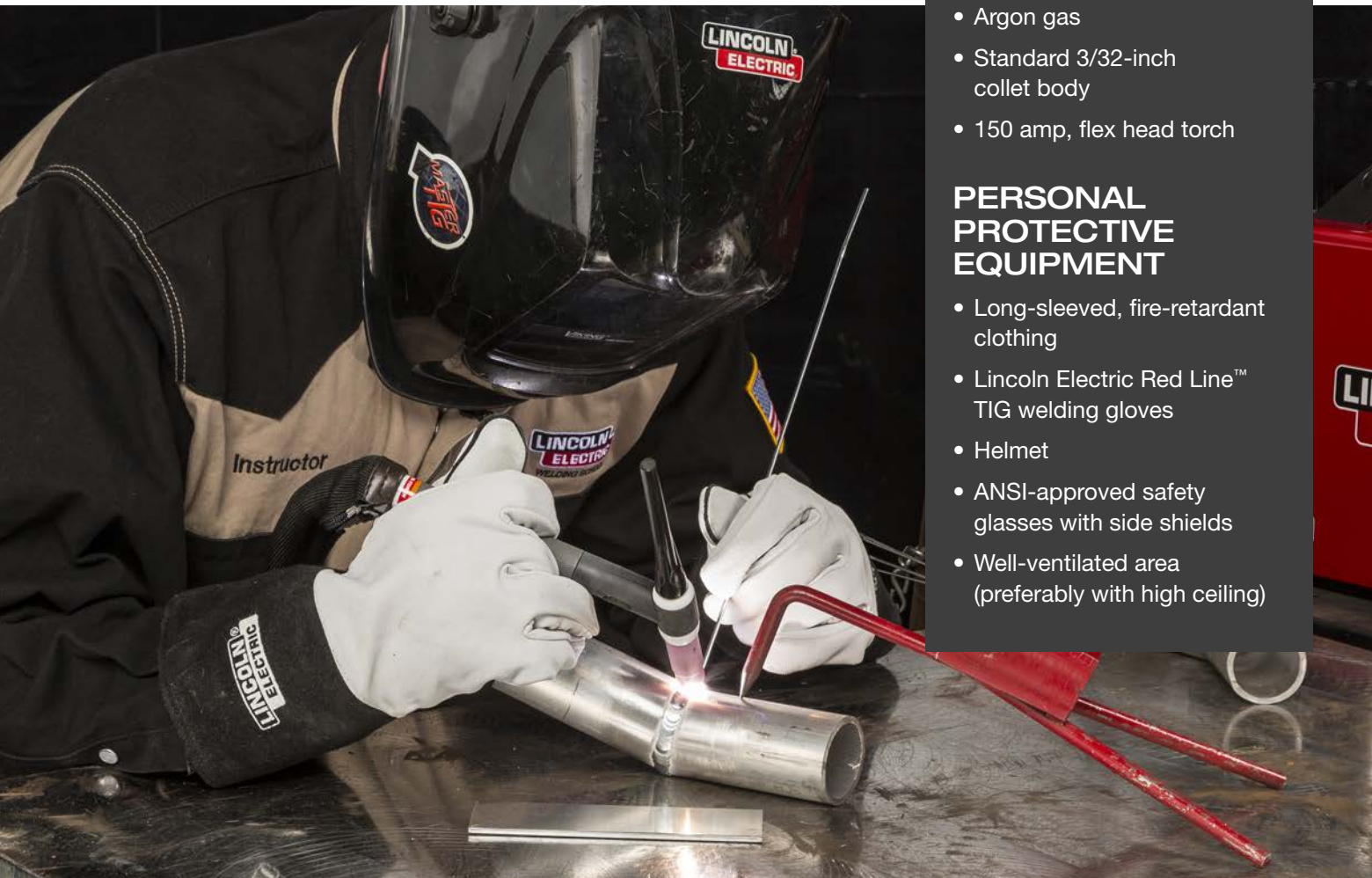




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How To Avoid Solidification Cracks in 60-Series Aluminum Alloys

By Karl Hoes, Welding School Instructor, The Lincoln Electric Company



TOOLS

- 6061-T6 aluminum tube, 0.125-inch wall thickness, approximately 60-degree included angle bevel
- Lincoln Electric Square Wave TIG® 200
- Lincoln Electric® ER4043 filler wire, 3/32-inch diameter
- Argon gas
- Standard 3/32-inch collet body
- 150 amp, flex head torch

PERSONAL PROTECTIVE EQUIPMENT

- Long-sleeved, fire-retardant clothing
- Lincoln Electric Red Line™ TIG welding gloves
- Helmet
- ANSI-approved safety glasses with side shields
- Well-ventilated area (preferably with high ceiling)

One of the most widely used families of aluminum alloys is from the wrought aluminum-magnesium-silicon class, commonly referred to as 60- or 6xxx series. The key to a successful weld of this series is to change the chemistry of the weld deposit by adding an adequate amount of filler metal of a different composition. This will make the weld less crack-sensitive.

For good reason, there is no 60-series of filler metals – all the welds would crack. While the chemistry of 60-series alloys gives them their heat treatability and strength, it also makes them sensitive to solidification cracks.

So, fabricators utilizing the 60-series should use such filler metals as those from the aluminum-silicon (40- or 4xxx) and aluminum-magnesium (50- or 5xxx) series.

The 60-series of aluminum alloys is predominantly used as extrusions, as well as for rolled sheet and plate. The alloys are versatile, heat treatable to moderately high strengths, formable and more corrosion-resistant than other families of heat-treatable alloys. Extruded products from the 60-series are a leading choice for architectural and structural applications. The most common alloy in the series, 6061, is often used to fabricate truck and marine frames.

Tee, lap, corner and edge joints can all be successfully welded without beveling, as long as adequate filler is added. The weld deposit is a mixture of the filler metal and base metal, and it should contain more filler metal than base metal. Fabricators should avoid excess dilution of the weld with the base metal on lap and corner joints.

Preparing butt joints by beveling will help ensure that adequate filler metal is added. Square full penetration butt joints should be avoided as too much base metal will be diluted into the weld causing the weld deposit to be crack-sensitive. Moreover, concave craters must be avoided at the end of the weld to prevent crater cracks.

ER 4043 and ER 5356 are the most common filler metals selected for welding 60-series aluminum. Service conditions will determine which of the two, or a different alloy, is the correct choice. It's best to consult filler metal selection charts to determine the correct application. **ARC**



Pipe Welding by Wagon



September, 1927 — Using a fairly primitive transport system (even by 1927 standards), a field worker prepares to lay the final bead on a bell and spigot joint along the Lamkin-Hodge pipeline in Louisiana. This 8-inch gas line – which stretched across 60 miles of the Bayou State between the towns of Lamkin and Hodge – was one of the first major U.S. pipelines to be constructed via arc welding.

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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