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LETTERS TO THE EDITOR



DEAR EDITOR:

I've been enjoying your magazine, especially the cover story about Nic Ashby [Summer 2017]. As a veteran myself [Vietnam], I agree with his belief that we should all give something back. I'm also glad to know he's home safe after 400 combat missions in Iraq and doing important work with Rockstar and the National Guard. Keep up the great work, Nic!

I also enjoyed reading about Boys Town. As a veteran welder, I encourage all those boys who are learning the trade to keep at it. Every new welder starts out by making a mess, with cracks and stuck rods and burn holes. But you always get better with practice.

— *Stephen Wilson, Rogersville, Missouri*

Nice to hear from you, Stephen, and thanks for your military service and the sacrifices that came with it.

Glad you're enjoying the magazine. We thought Nic Ashby's back story – including his self-professed “attitude problem” during his youth, his subsequent military service, etc. – could be an inspiration to many young men and women in similar situations.

The Boys Town story was equally uplifting, and for similar reasons. Most of the kids who enter the famed residential village in Omaha, Nebraska, come from highly adverse circumstances, and their chances for a stable, balanced adulthood are usually stacked against them. Training in welding, fabrication and related trades can help them get on the right path.

We all deal with adversity at one time or another. Anytime someone turns adversity into advantage, it's usually a story that will inspire others.

— *John C. Bruening, Editor*

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ASK THE EXPERTS

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

Looking for guidance with technical issues? Contact us at questions@arcmagazine.pub

What is the easiest way to determine proper cup size and tungsten stick-out when welding either groove or fillet welds?

- *Jeremy Massolin, Welland, Ontario*

► You always want to use the largest cup possible to ensure adequate gas coverage. Manufacturers make smaller cup sizes to fit in smaller welding spaces, but you generally want to use the largest cup size that you can fit in the space. For example, I wouldn't try a fillet weld with a small number 4 cup if I can fit a 7 or 8 in the space. People tend to think the cup size determines the quality of a groove or fillet weld, but it doesn't. In the end, it's determined more by a combination of your tungsten size and your travel speed.

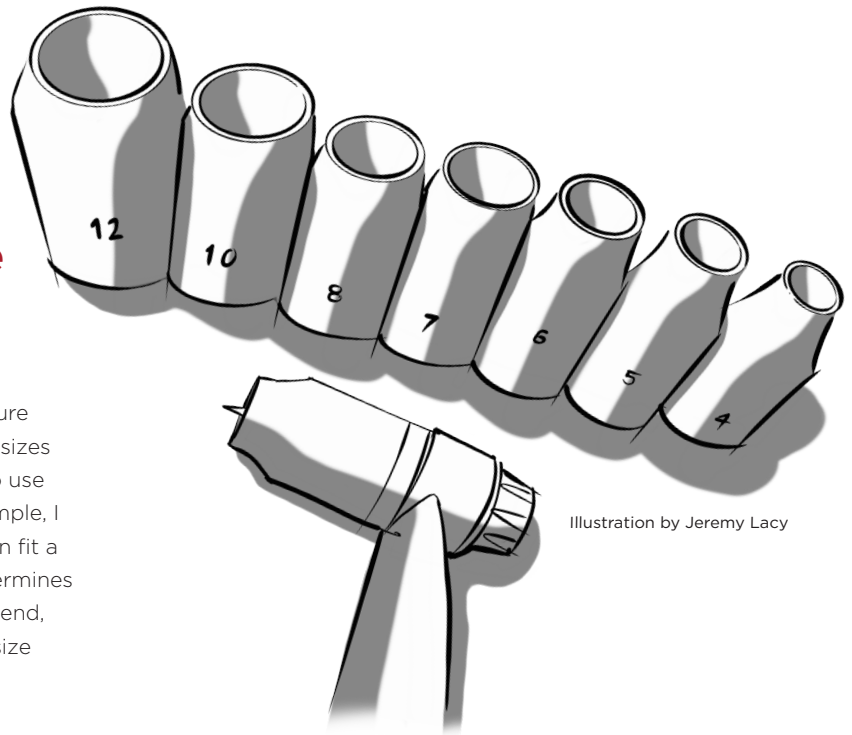


Illustration by Jeremy Lacy



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What is happening when the arc changes color if you touch your filler base or metal? What is the oxidizing point of your tungsten?

- Jared Satuch, Fort Erie, Canada

▶ If your tungsten is sticking out of the cup and the tip is turning purple, that means your post-flow of gas is insufficient. The tungsten is still too hot at the end of the weld, the argon gas quits, and oxide forms on the tungsten. So you want to add a few extra seconds of post-flow gas after you've finished welding to allow the tungsten to cool. This also prevents the oxidation. Consider purple a warning sign. The ideal color should be silver, or yellowish to silver. Any dark blue or purple means the tungsten is not getting enough gas to protect it, and it's oxidizing too much.

What is the best way to clean oil-soaked aluminum castings before welding?

- John First, Gallatin, Missouri

▶ Your best bet is to clean them in a mild alkaline – ideally in a dip tank, but a spray would also work. Other options include a solvent wipe with acetone, toluene, methyl ethyl ketone (MEK), trichlorobenzene (TCB) or chlorothane. Using a dechlorinated brake cleaner is another option. However, the mild alkaline is the most effective option if it's available.

Here in Costa Rica, and generally in Latin America, MIG welders tend to use 100% CO₂ with ER70S-6 wire, basically because it is cheaper. What are the advantages of using a CO₂/argon mix?

- Enrique Calderón Ramírez, Paraiso, Cartago, Costa Rica

▶ Changing gas in MIG welding is like knocking the flux off a stick electrode and putting a different flux on it. It changes the characteristics completely, depending on voltage, amperage and gas. You're correct: 100% CO₂ is cheaper than a CO₂/argon mix, but 100% CO₂ will give you a very volatile arc. It's very choppy,

and it creates a lot of spatter. You can get good penetration with it, but if you mix 75% argon and 25% CO₂ – the standard short-arc mix – the argon calms the arc down and you get much less spatter, and a better bead appearance and better mechanical properties. And with a little bit of adjustment, you can get the same amount of penetration with the mixed gas. All you have to do is turn your wire feed speed up.

Can you explain what causes magnetism in the base material when welding, and how it can be prevented? When the arc starts to flutter and trail behind your direction of travel, it can really mess up the weld.

- Will Painter, Raphine, Virginia

▶ We'll assume you're referring to the magnetism that's created by the arc during stick welding. The phenomenon is called arc blow. It won't go away, but there are a few things you can do to make it more manageable:

- The best way to minimize it is to switch to AC polarity, although that isn't always an option.
- Arc blow is generally not an issue when you're welding at the middle of the plate, but when you're at the end, the magnetism naturally bounces behind the electrode. However, if you attach a run-off tab – an extra piece of metal at the end of the plate – the magnetism will shift to the tab rather than bounce back.
- The longer your arc, the more your voltage increases, and the more the magnetism will increase with it. When possible, try to weld in deep V groves to maintain a shorter arc length.
- If you're welding with a high amperage, your tendency toward magnetism is already higher, but changing your rod angle or torch angle should be helpful.
- If you're doing corner welds, start at the corner and weld outward. Welding toward the corner will just spit the magnetism outward and result in a sloppy weld.
- Sometimes the position of your ground can affect the magnetism. Move your ground lead to another location – preferably the direction in which the magnetism is likely to jump, based on the direction of your weld.

You'll never get rid of arc blow entirely. It's a naturally occurring phenomenon. But if you can do some combination of these things, you'll be able to manage it more easily.



BUILDING A LIFE

INTERVIEW BY KEVIN DUNWORTH

Paul Teutul, Jr., has been riding a rollercoaster for the better part of 15 years. He was one of the stars of *American Chopper* (Discovery) from 2003 to 2010, and the subsequent spin-off, *American Chopper: Senior vs. Junior* (TLC) from 2010 to 2012. The now 43-year-old Paul Jr. is married with a young son of his own, whom he considers his greatest creation. His well-documented ups and downs have given him some perspective about fatherhood, career and more – all of which he explores in an upcoming book, *The Build: Designing My Life of Choppers, Family & Faith*.



Paul Jr. Designs



WE THOUGHT IT MIGHT BE INTERESTING TO ENLIST KEVIN DUNWORTH, OWNER OF DELAWARE-BASED LOADED GUN CUSTOMS, TO INTERVIEW PAUL JR. AND JUST SEE WHERE THE CONVERSATION WENT. DESPITE HIS PRECONCEPTIONS, DUNWORTH ADMITTED TO DEVELOPING A LEVEL OF ADMIRATION AND RESPECT — EVEN FRIENDSHIP — BY THE END OF THEIR TIME TOGETHER, AND THAT THEY HAD MORE IN COMMON THAN NOT.



KEVIN DUNWORTH: Tell me about the years before the show. Were you thinking early on about being a designer/fabricator?

Paul Teutul Jr.: I grew up making railings, working in the steel business. I started sweeping floors and painting railings. Then I learned to weld. So I came up through the years doing that kind of fabrication, which really opened the door for me to build bikes later on. For the first two years of building motorcycles, it was a big learning curve. Then as time went on, we just got more and more experience, learned more fabrication and went from there.

KD: You went to a vocational high school...

PT Jr.: I went for welding. I think I had more experience than the teacher, just because I had started at 12 and by the time I was 18 I was pretty proficient, and I had more life experience than the teacher did. That's nothing against him, he was a great guy, but it was really simple for me. It was just an easy way to get credit for school. Then in my senior year, I was able to go to work. I just always worked.

An employer wants experience, and there's only one way to get it, and that's to be employed. You learn a lot more after you finish school. I think school will give you the 101, the basics, but in one year of work, you can probably learn more than you can in five years of school if you're in a shop that's actually producing.

KD: You were well into your 20s and into the first couple years of *Orange County Choppers* when *American Chopper* got under way. Tell me how that came about.

PT Jr.: We were building bikes for a few years, and it was up and down. We'd buy and sell, and we were just trying to make a name for ourselves in the first two years. We got a call from Pilgrim Films and Television, and they said, 'Hey, are you interested in doing a show?' Long story short, six weeks later we were done with the first episode. *American Chopper* aired the same night as *Biker Build-Off*. Jesse James had already had his *Motorcycle Mania* documentary a couple years earlier and was making waves. I think people were realizing there was some value there.

So we watched the first episode, and we were disappointed. We thought no one would ever take us seriously, but by the end of the next day, we had received something like 1,000

emails about the show. Now, this was back in 2002, when you just didn't get 1,000 emails about anything, you know? Then later that night we got a look at the television ratings. We knew nothing about ratings, but apparently they were the best numbers out of everything that aired that night. It resonated with people, and it was the beginning of our 10-year flight with *American Chopper*. It was insane. We literally became a phenomenon, and I don't use the term lightly. It was really that.

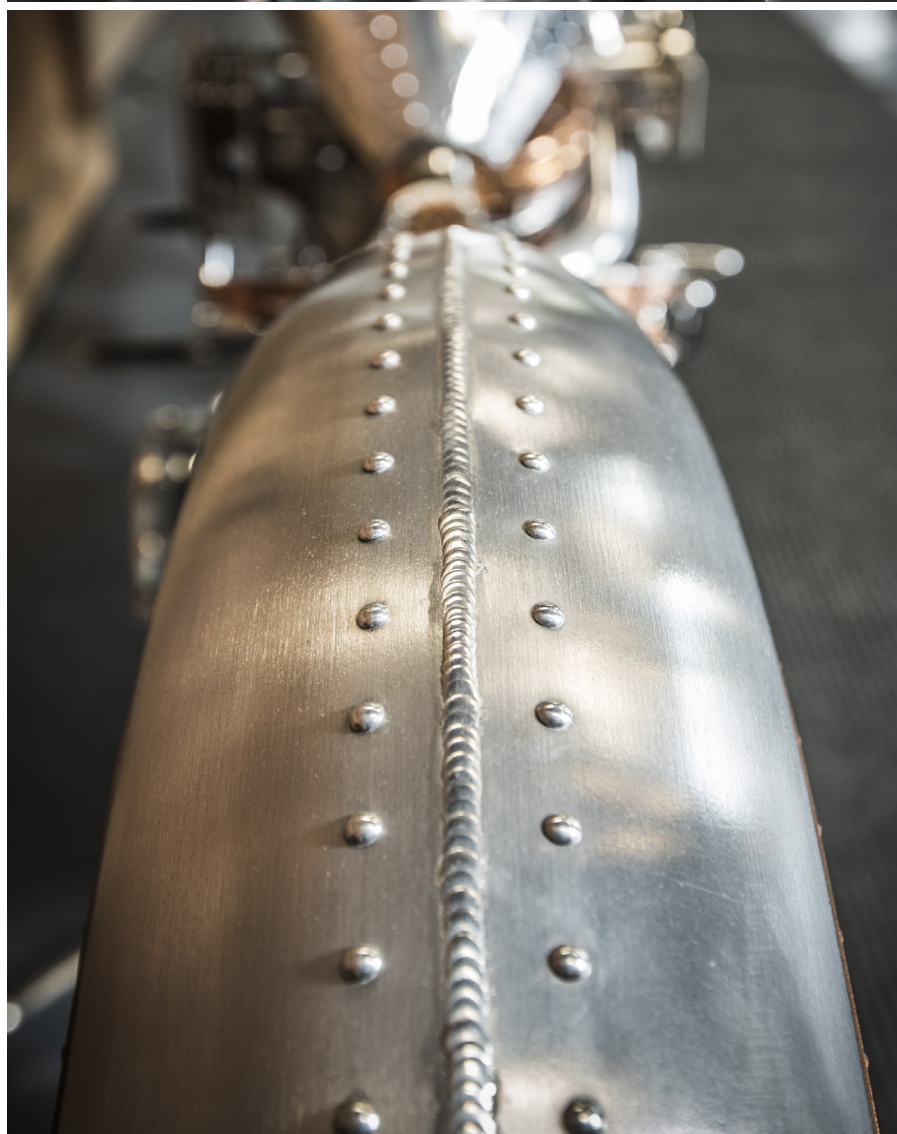
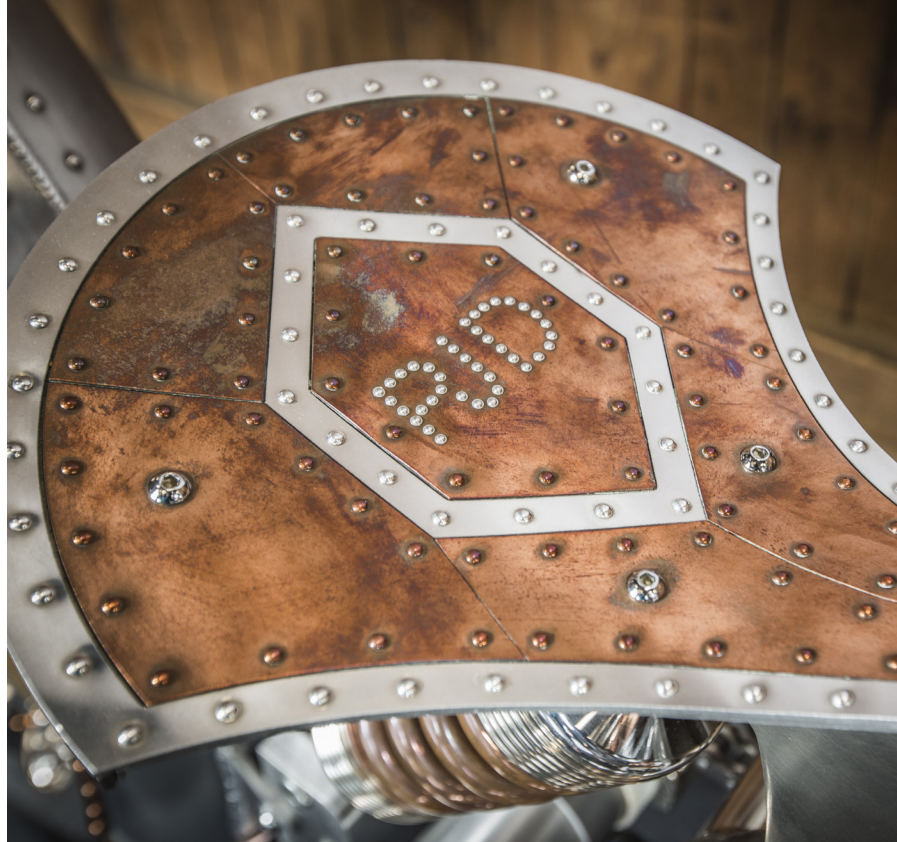
We were building motorcycles on TV at a time when they were really starting to become popular again. It was like a resurgence of the '70s, during the height of the chopper scene. We got our start by building Pro Streets. That was hot when we first started building bikes in 1999. And then it seemed like the choppers started to creep in, and then for a while they were really hot. We always kept it balanced, but the focus was on choppers for all those years of the show. We were always building those stretched-out bikes. I think it was the right time for that.

Motorcycles alone could not have kept us on the air for a decade. But the family dynamic and the creative process were what brought us a global audience. The show was relatable. It didn't matter who the viewer was or where he was from. It just resonated. That's what gave us staying power for a decade. It's really hard to be a successful television show for a decade.

KD: That all came to an end five years ago. What's the new focal point of your life?

PT Jr: My son is the best thing ever. You talk about creations. I know my part in all of it was the easy part, but he's my boy, and he's been the best experience. And Rachael is just the best wife. I've been very blessed to have such a great situation. Everybody knows about the dynamic between my father and me, and now the dynamic has changed because I have a son of my own. I think in some way I can relate more to my father, and in other ways I can't. I have my own son, which makes it even more curious for me as to why things went so horribly wrong between my dad and me, and why he needed to be so competitive with me instead of being the guy championing me to move forward. He really had a problem with that.

I just don't understand that. I look at my own son and I think, 'Man, he's better than me. I want everything better for him.' What a game changer







he's been. I love that kid so much, and he's such a great kid. He's only about two and a half right now, but man, the whole thing is unreal sometimes.

KD: Where did you come up with the name Hudson for him?

PT Jr: I didn't want to name him Paul. It's a family name, but he needs to be his own guy at whatever he does. We worked hard on a name. I'm a particular guy. You've seen how I am about the things I create. I like uniqueness. I like things that are one of a kind. We had about a hundred girl's names that we liked, but we couldn't come up with one boy's name. But it came to me toward the end of Rachael's pregnancy. I had Hudson cars at one time. I went through this phase where I was buying and selling these mid-30s super-rare Hudsons. It was just a name that was out there, but it never really dawned on me. Then one day we were just talking, and I said, 'Man, I like the name Hudson,' and that was it. It's a name that has every good value. It has strength, it has sensitivity, it's just very unique.

"MAN, HE'S BETTER THAN ME. I WANT EVERYTHING BETTER FOR HIM."



KD: You mentioned earlier that you're "blessed." You frequently refer to faith and The Bible, and it's even in the title of your new book. What does all that mean to you?

PT Jr: I'm a Christian, so it means everything to me. It's who I am. I've always said this to anyone's who's asked, as far as my abilities that I have, I really do believe it's divine intervention. I feel like there's really no reason why I should have all these ideas and feel like it's a gift that God has given me. So anytime anyone talks to me about my creativity or the bikes themselves, I give glory to God for it because I know where it comes from. And that comes from growing up in a house where my mother really gave us a lot of guidance when I was young. That really has stayed with us. She instilled these values in us. As I got older, I went my own way and did my own crazy things, but I always knew in the back of my head which direction to go. That's a daily practice, and I love The Bible. It's the thing that I read, and I do my best to adhere to its values. It's been my life guide, so to speak.

KD: Do you feel as though those early lessons in welding and fabrication when you were a kid opened a lot of doors for you?

PT Jr: It was everything. Learning how to weld was the first step toward learning how to make things – substantial things. Early on, I was able to be creative. We had a welder, a torch and a cutting wheel, and we made crazy things with just that. Amazing things. When we built the Black Widow, the entire bike came together with something like three tools. You can do a lot with very little. That's the way we started.

KD: But that was a generation ago. Are learning experiences like that still possible with kids at a high school or technical college? You've talked about the importance of the trades, and the idea that not everyone has to be – or can be – a doctor or lawyer.

PT Jr: Absolutely, especially in this day and age. I feel like kids go to college, and they get all these student loans and they come out and maybe they can't find jobs. That's a really tough place to be, because you have to start paying those loans back, and you're not finding work. But there are always trades that



are looking for skilled workers. At some point in time, it really has been a matter of convincing the parents to let the kids learn a trade, because I think "trade" has become a bad word as far as parents are concerned. If you learn an actual trade, something that enables you to make things, it's something you can always go back to. You could be doctors and lawyers – we need all kinds of people – but I think some people are more cut out for being tradesmen.



A background in the trades is everything. It can translate to other things. It's broader than just motorcycles. If you learn to weld, you can do a multitude of different things, whether it's just a hobby or a career option to fall back on. But when I say weld, you know, you have to learn to read a tape measure first. You'd be surprised how many people can't. Any opportunities to learn any type of trade where you're working with your hands is going to make you a better and more well-rounded person.

KD: Your new shop is an awesome place that you just reopened to the public...

PT Jr: After all those years with the show, once my father and I split, I didn't have any place to display my bikes. They just sat in the dark corner of the shop getting metal and dust on them, which isn't good for the paint and nobody got to see them.

So I made the move out of my old location to this new place, which is a little bit of a smaller space but not by much. It looks smaller from outside, but it's still 5,000 square feet. And then I have a 2,000-square-foot showroom and 3,000 square feet in the back. So it's all new. We'll see what happens, you know? What's nice is that I'm open to the public, so they can come in and look around and check things out. There's much more accessibility. I kind of wish I would have done it a long time ago, to be honest with you.

KD: Regardless of what visitors might see, is there a sense of satisfaction or pride that you yourself get when you see so much of your work displayed so artistically in one place?

PT Jr: When I see all those bikes, I well up inside because I feel like they are a piece of me. Each one is an extension of me. They're my form of self-expression. That to me is an

emotional thing. I think anything that I've built like this, there's so much emotion in it, that it translates into the design. It's so much a part of me that comes from such a deep place. Honestly, I miss that right now, because in the absence of television, I don't have as much opportunity to do big projects because they require a lot of resources and television drives the bigger clients.

KD: After 10 years of television and five years away from it – and everything that's come and gone in those years – have you reached a point where you're comfortable where you are?

PT Jr: I tried very hard all those years to avoid having my identity tied up in the show and being a celebrity. It's not easy to do, but I don't feel like I ever abused it or made celebrity a big part of myself. But it does become a part of who you are, and it's interesting when you start to pull back from that. It starts to expose some things. Suddenly, you're like, 'Man, why am I feeling this way?' I think fame – that high level of exposure – really creates an interesting dynamic. For people who are not really equipped to handle it, I can see how some people go off the deep end. That's why a lot of people get into drugs, and you see all these really bad cases of celebrities dying young because they just can't handle it. It's too much for some people.

I'm comfortable being me. I am. I'm just where I am. But I do struggle sometimes, like anybody, with the question of where I'm supposed to be headed. In the end, you just have to keep moving forward. **ARC**

(Paul Teutul Jr.'s new book, The Build: Designing My Life of Choppers, Family & Faith will be available in November from WaterBrook Press, an imprint of Penguin Random House.)

"WE HAD A WELDER,
A TORCH AND A CUTTING
WHEEL, AND WE MADE
CRAZY THINGS WITH
JUST THAT."



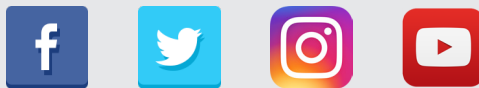
Opposite page: Paul Jr. (and his right-hand man) doing business in the new office space. Above: Showing off the winner of the 2011 Chopper Live Build-Off, inspired by the classic World War II P-51 Mustang fighter plane.

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Brandon Rumbaugh, a U.S. Marine veteran and a motivational speaker for It's About The Warrior. Rumbaugh is also a beneficiary of IATW's efforts to help vets readjust after coming home.

A photograph of a workshop or garage. In the foreground, a wooden workbench is cluttered with various tools and materials. On the floor to the left, there are several items with an American flag pattern, including what looks like a bag or a piece of fabric. The background shows more wooden structures and tools, suggesting a space for construction or repair work. The lighting is somewhat dim, creating a focused and intimate atmosphere.

A Pittsburgh foundation
helps returning veterans
rebuild their lives

COMING HOME

By Peter Chakerian

Veterans make great sacrifices for our country every day. Outside of lengthy, intense deployments and the risk of life to combat experience, the impacts to the service members in our armed forces are many and far-reaching.

Often, there's a war being waged inside the service members during active duty. There's the uncertainty of not only their day-to-day experience, but what's to come.

There's also a war being waged at home while they're away—a battle where spouses and children try to navigate a “new normal” that can last years in both regular and combat deployments.

And there's a war in the complex issues vets face after they transition out of military service. Not just the physical, psychological and emotional scars that may have resulted from their military experiences, but also the sense of direction, purpose and self-worth that vets seek as they move back into civilian life.



Executive Director Monteleone wears his commitment to IATW literally on his sleeve.

Watch exclusive footage at arcmagazine.pub or in the *ARC Magazine™* tablet edition (download it for free).



On the Homefront

A regional nonprofit organization called It's About the Warrior (IATW) has been actively battling on behalf of those vets. On a mission "to assist and empower all post-9/11 veterans and their families," IATW serves a tri-state, 22-county footprint that includes Pennsylvania, eastern Ohio and northern West Virginia.

Led by U.S. Air Force veteran, founder and executive director Steve Monteleone, IATW first took shape in 2012, born from involvement in fundraising for the Wounded Warrior Project.

The organization aids vets with "multi-tiered assistance that includes financial aid, grant assistance, home improvement, therapeutic and outreach programs," Monteleone told *ARC Magazine*. "It's more than simply getting veterans back on their feet; it's about empowerment."

Monteleone's idea for IATW started as a golf outing in Elwood City, Pennsylvania, with the goal of assisting the Wounded Warrior Project, he explained.

"But as it happened," he says, "this event rallied my golf

buddies and raised a lot of money, and I got to thinking, 'Why send money out of the area when we could keep it here and help people in our own backyard?'"

A schoolteacher and football coach after active duty, Monteleone found himself at a crossroads when

and kinship. But I never expected it to be as big as it is now."

Monteleone quickly realized his aims, as he and a hearty group of volunteers effectively helped hundreds of veterans early on. With a full-fledged board of directors, IATW is poised to step beyond its

concentration of post-9/11 veterans in the country—somewhere between 27,000 and 28,000, with Tampa Bay, Florida, and Phoenix, Arizona, rounding out the top three—we have a lot of work to do."

"The next couple years are going to be really important for the organization and the vets as we continue to grow," he says. "We help ANY post-9/11 veteran, not just wounded or combat vets, which makes us very unique—because, let's face it, just because you haven't seen combat doesn't mean you don't need assistance.

He adds: "We are actively working toward opening up scholarship programs for dependents of vets. Helping their kids off to college or vocational school is a priority for us. Our transitional program is another big thing, where our team takes an active role in assisting vets with their long-term goals."

Helping veterans identify (and train for) new career paths and vocations is also at the forefront of the agenda for Monteleone and IATW.

And as it turns out, the "family, friendship and kinship" he mentioned earlier is at the

"I NEVER EXPECTED [IATW] TO BE AS BIG AS IT IS NOW."

his education job was eliminated in 2013.

He decided to "take a chance with my severance package from being an educator and really work to make IATW grow. We really wanted it to be very different from what everyone else is doing, anchored in family, friendship

programs, forging ahead in some inspiring ways. To hear him tell it, there are no signs of slowing down.

"The scary thing is, we haven't even scratched the surface," Monteleone says, adding that he has only recently started drawing a salary. "Because this area has the largest

root of a budding association that has a slight “journeyman-apprenticeship” feel, even though both men whom Monteleone brought together see the relationship as “helping one another.”

Forged by Fire, Friendship and Football

Pittsburgh-born John “The Builder” Malecki played for the University of Pittsburgh, where he was named to the Big East All-Academic Football Team. From 2009 to 2013, he bounced around the NFL, with gridiron stints for the Tennessee Titans, Cleveland Browns, and his hometown Pittsburgh Steelers.

When his career ended (“not by choice,” he said, referring to being cut in training camp after some leadership changes with his hometown Steelers), Malecki found that the skills and dexterity gathered during his downtime in another skill set: furniture building.

It would become a saving grace. In the years following his football career, he parlayed his hobby into a full-time business as a custom furniture builder who often tackles other wood and metal projects. That spirit and drive from his athletic career, combined with a Rust Belt ethos that refuses to surrender or waver, came to fore during his reinvention and second act.

Not only has Malecki found new inspiration in his trades, he has taken to the internet via training videos and more to help others learn what he has delved into. “It is a new mission to inspire a new

generation of makers and craftsman,” says Malecki. “And it has moved in some very fulfilling new directions.”



His enthusiasm is palpable. Although focused primarily on building and making, Malecki’s business has also included (to a lesser degree) informally partnering with IATW and, through the magic of friendship and football, fundraising and connecting relationships with veterans through the foundation.

“I coached high school football in western PA with a friend, Rich Johns at Penn Hills High School,” Monteleone recalls.

“He coached John at Franklin Regional. Our introduction came through football and watching him play over time, and it led to all of us becoming

pretty good friends—and John became a big advocate and active part of our organization.

“He really reinvented himself and, with John being a great guy and big advocate and such a talent at what he does, he extended some opportunities to our vet groups on woodworking and sheet metal,” Monteleone adds. “We’ve had many of our vets reach out to him about that.”

Malecki recalled that “learning to weld, working a MIG welder, and putting things together was something that helped move me into a new career. Learning to build and weld, I believe, is important for veterans too, especially those with PTSD. It helps them cope and focus on the beauty of creation and the fulfillment in building things,” he says.

“Athletes and veterans have a common mindset, especially when it comes to teamwork,” Malecki adds. “And when people with a similar mindset in life come together, there’s a passionate path that can be forged. I have always been as much of a patriot as possible, helping and doing what I can to support the individuals who have afforded me a lifestyle and freedom for their sacrifices.”

Building Beyond Friendships

One such student of sorts that Malecki has helped—and has worked very closely with over the past several months—is 28-year-old Brandon Rumbaugh, a Marine who was deployed to Iraq as a mortar gunner in early 2009 for a seven-month tour after his 2007 enlistment.

After a short return to the United States, Rumbaugh was deployed again—this time to Afghanistan—near the end of that same year. It was there that he lost both of his legs in an IED explosion in November 2010, while attempting to aid a fellow Marine who was also wounded by an IED.

After his injuries, Rumbaugh spent two years at Walter

WE ARE
BROTHERS,

WE



SHARE
THE SAME
CAUSE.

Future foretold? This phrase was scrawled on the locker room wall at Franklin Regional High School, Malecki's alma mater.



Reed National Military Medical Center in Washington, DC. He eventually retired and moved back home to Pennsylvania in 2013.

"[Monteleone] approached me [when I came home] and said, 'We're here for everything that you need,' and over time, he really inspired me to start speaking and telling my story," says Rumbaugh. "He felt it was something people needed to hear."

"Through the foundation, he has exposed me to a new career," Rumbaugh adds. "I was asked to be on the board [of directors], handling new member registration and grants. I go over applications and vets' finances, and make decisions as to how we can help them."

"Steve connected me with Brandon," Malecki also recalls. "After hearing what happened to him, I began following him. He has a passion for public speaking and a growing audience. His whole story is incredibly moving and meaningful. Seeing what he has given up, and how positively he approaches his day-to-day, when he could just as easily see things negatively, made a huge impact on me."

"We were introduced over lunch," Rumbaugh adds. "John was an easy guy to get along with, and all three of us clicked from the beginning. There were things we knew we could do together—things that we could do through all of our platforms together to be effective even down to a personal level so that it would change peoples' lives while doing it."

"He is forging a path in the world for others too, and he's doing it with no legs," Malecki adds, offering that found new motivation in their connection and that, "as in the NFL, it brought a lot of happiness to my life and helped me evaluate how I could give back."

The friendship and knowledge sharing is one example of many where military veterans in need could gain a new sense of direction and purpose in the aftermath of debilitating physical injuries and/or psychological trauma. The partnership between Malecki and IATW is putting a

helps me impress upon people how important that support can be ... that two young men can help one another find new ways to grow and support one another."

He's not sure whether he's ready to launch an apprenticeship program, "but creating a more tangible opportunity for men and women who are suffering is important," he says. "Helping Brandon bring that message to the veterans is important as well."

He adds: "Trades are a big deal to help people make stuff happen, and I'm excited to help other vets in the region see that. I think they're mentoring me as much as I am mentoring them, but even that sounds more formal than it is. It is mega-casual for now, but it has legs to be something more."

But it's real, Malecki emphasizes. "These are real-world issues that the media [doesn't always cover]. Not just something fabricated for a feel-good story. [Steve and Brandon] are changing the world, and I'm glad that I can be a part of that. I taught myself to make furniture, and now I can help others learn the same thing? With two really great partners? How can you not be inspired?" **ARC**

See more about Brandon Rumbaugh, his partnership with John Malecki and the important work of IATW, at arcmagazine.pub.

"I'M EXCITED TO HELP OTHER VETS IN THE REGION... I THINK THEY'RE MENTORING ME AS MUCH AS I'M MENTORING THEM."

To that end, Rumbaugh and Malecki have made some inroads beyond their friendship through informal training in welding, metal fabrication and other building-related skills. They have collaborated on a couple of projects together, but in the larger sense, the bond they share is helping both of them belong to something that is both worthwhile and bigger than themselves.

And it may just be a direction forward with IATW, as all three shared with **ARC**.

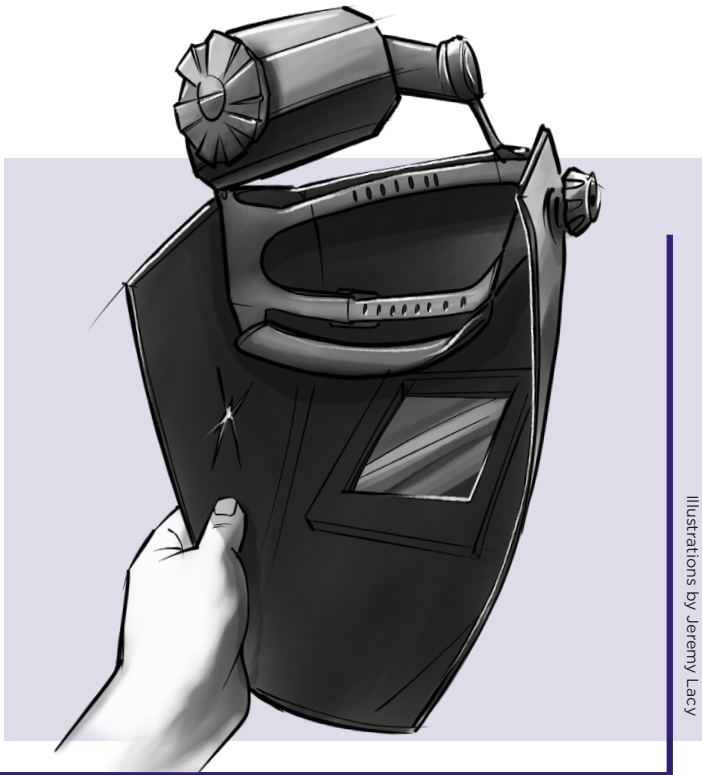
spotlight on how trades can be a new avenue for them, with Malecki serving as a mentor to Rumbaugh.

Malecki says he's interested in working with more vets like Rumbaugh in this way, adding that "this is much less mentoring and more about friendship," and that they're "sporadic up to this point, still in the early stages, but with huge possibilities,"

Malecki said. "Brandon and I are friends. The whole concept of a workshop build series just

BEGINNER TIPS & TRICKS

Make It Easier to Weld Your Workpiece.



Illustrations by Jeremy Lacey

CHECK YOUR HOOD

- JOHN SCHECHTMAN, EARLVILLE, IOWA

► Hold your welding helmet toward the sun or a light occasionally to inspect the shell for cracks or pin holes. If light comes through the helmet, replace it. The smallest pin hole can result in quite a bit of sunburn on your face and neck.

EFFECT OF WELDING CURRENT

- LARRY SORENSON, ALTOONA, PENNSYLVANIA

► One welding variable that has a big impact on the degree of weld penetration is current. As welding current increases (i.e., amperage is higher), weld penetration increases. Conversely, as welding current decreases (i.e., amperage is lower), weld penetration decreases.

PREP FOR SUCCESS

- JARED STAUCH, FORT ERIE, ONTARIO

► Prepping your metal is the first step to success. This can help prevent any headaches as you get into the weld. Rust, paint, water and other contaminants affect your weld bead and penetration. Keeping the metal and the work area clean will help get the proper penetration and weld profile you need.

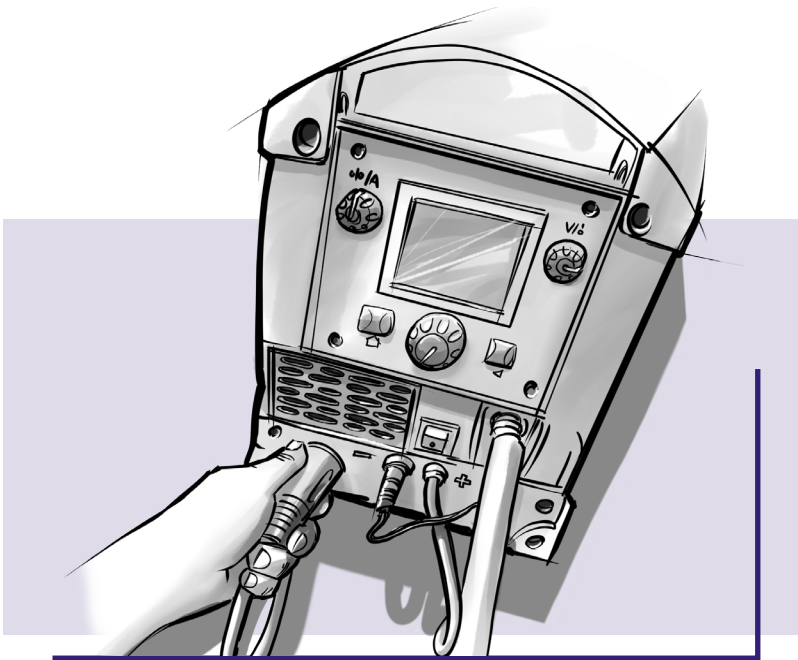
HAVE A TIP OR A TRICK YOU'D LIKE TO SHARE WITH BEGINNERS? LET US KNOW!

Send your tip or trick to questions@arcmagazine.pub 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 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 Welding Gear Ready-Pak*.





CHECK THE POLARITY

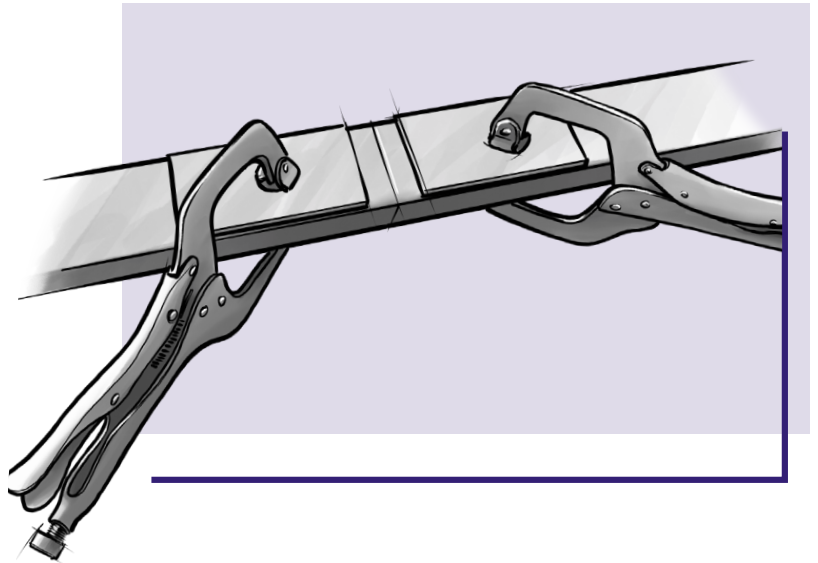
– NEITAN PEREZ FIGUEROA, ADJUNTAS, PUERTO RICO

- ▶ To achieve a better quality weld, make sure to switch polarity between MIG solid wire (direct current electrode positive, DCEP) and inner shield flux cored self-shielded wire (direct current electrode negative, DCEN).

AVOID DISTORTION AND DISCOLORATION

– DIEGO ESPINOZA, YUMA, ARIZONA

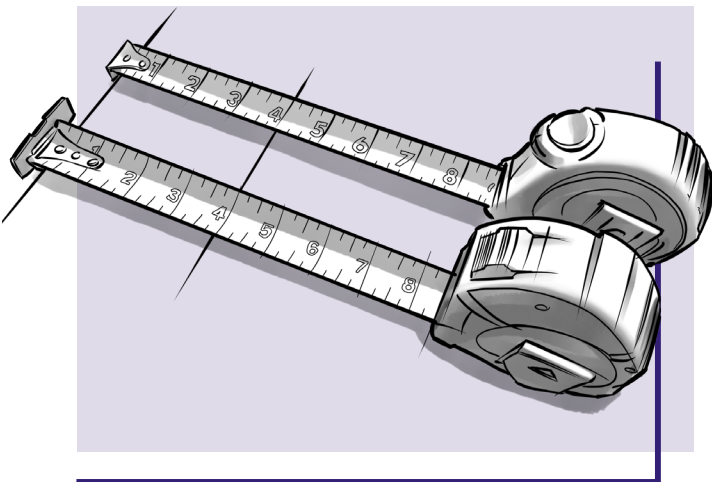
- ▶ If you need to weld stainless steel, it's a good habit to clamp blocks of aluminum behind and around the weld joint. The aluminum blocks serve to draw heat out of the material, since aluminum has a higher thermal conductivity than stainless. Using chill blocks can reduce distortion and discoloration on the welds. Also, it may prevent sugaring on the backside of the weld, especially on thin material when back purging is not used.



SMALL DIFFERENCES, BIG DISCREPANCIES

– ERIC PESCIETTA, LUDLOW, MASSACHUSETTS

- ▶ Sometimes it's easy to overlook the small things when you're in a big shop. While working with a partner, it's always a good idea to compare tape measures. Oftentimes, two tools can be off by a 1/32nd or even 1/16th of an inch. It may not seem like a lot in the context of an inch or two, but those inconsistent fractional hash marks add up to some big discrepancies over the course of 50 feet. You might even suggest that everyone in the shop use the same model of tape measure from the same manufacturer – and maybe even replace them at certain intervals as the hash marks fade or become unclear.



EDUCATOR SPOTLIGHT

KIM ROSENBAUM

THE MORE YOU KNOW...

By John C. Bruening

For some people, teaching is a career. For Kim Rosenbaum, it's a way of life.

Since 2014, she has taught welding to sophomores, juniors and seniors at Twin Lakes High School in Monticello, Indiana. It's the latest chapter on a journey that turned a single mom with limited options in the late 1980s into a formidable tradeswoman and educator almost 30 years later.

But the teaching doesn't stop when the teenagers go home at the end of the school day. Two afternoons a week, Rosenbaum runs a Women in Welding workshop for female teachers, administrators and staff at the high school.

"I can't think of a better way to get more female high school students into my class than to have female teachers say, 'I took Ms. R's class, and you should try it.'" she says. "I went to certain teachers whom I knew, and I said, 'Will you do this with me?' And they all said yes. I had a culinary teacher, a Spanish teacher, an English teacher, one of the secretaries, a fine arts teacher - people from just about every discipline."

Whether she's teaching a shop full of kids during the day or adults after hours, she gets her greatest sense of satisfaction from helping students get a leg up.

"I feel like I've accomplished something when I teach a student a trade, and that student goes out into the workforce," she says. "A lot of my students come back and say, 'Ms. R, I just completed my fifth year in the pipefitters apprenticeship program, and I'm making \$42.50 an hour.' Or they come back and they say, 'I bought my first house,' or 'I bought my first car.' That, right there, is what it's all about. I've taught these kids a set of skills that can provide them with a good living."

Self-empowerment is a concept that Rosenbaum understands first-hand. Originally from Gary, Indiana, she first started welding in 1989, out of necessity more than any personal passion. As a single parent of two young boys at the time, she needed to make a living. She spent 15 years as a welder in a machine shop, and at the same time taught evening classes at the Valparaiso campus at Ivy Tech, a community college with 32 campuses throughout the state. In 2010, she took a teaching position at the AK Smith Career Center in Michigan City. After four years at AK Smith, she joined the Twin Lakes faculty at the start of the 2014-15 school year.

Jacob Murray, a 2016 alumnus of Twin Lakes, is currently a first-year apprentice with the Lafayette division of the Plumbers and Steamfitters Local 157. Murray took an introductory welding class in 10th grade, but his interest in the trade was only marginal until Rosenbaum joined the faculty the following year. By the time Murray graduated, Rosenbaum had helped him parlay his welding skills into his apprenticeship with the union.

"The most important advice she ever gave me was, 'The more you know, the more you're worth,'" says Murray. "I was all gung-ho about being a welder, and then as soon as I got in, I realized there's so much more to what I do in the apprenticeship than there is just welding."

Rosenbaum "gives 110 percent to everything she does," says Murray. "She doesn't do anything halfway. She takes her time, she explains things, and she truly does love teaching. I think she's just born to be a teacher. I'm very thankful that she chose that path." **ARC**





**"SHE GIVES 110 PERCENT
TO EVERYTHING SHE
DOES. SHE DOESN'T DO
ANYTHING HALFWAY."**

▶ CONNECT WITH KIM



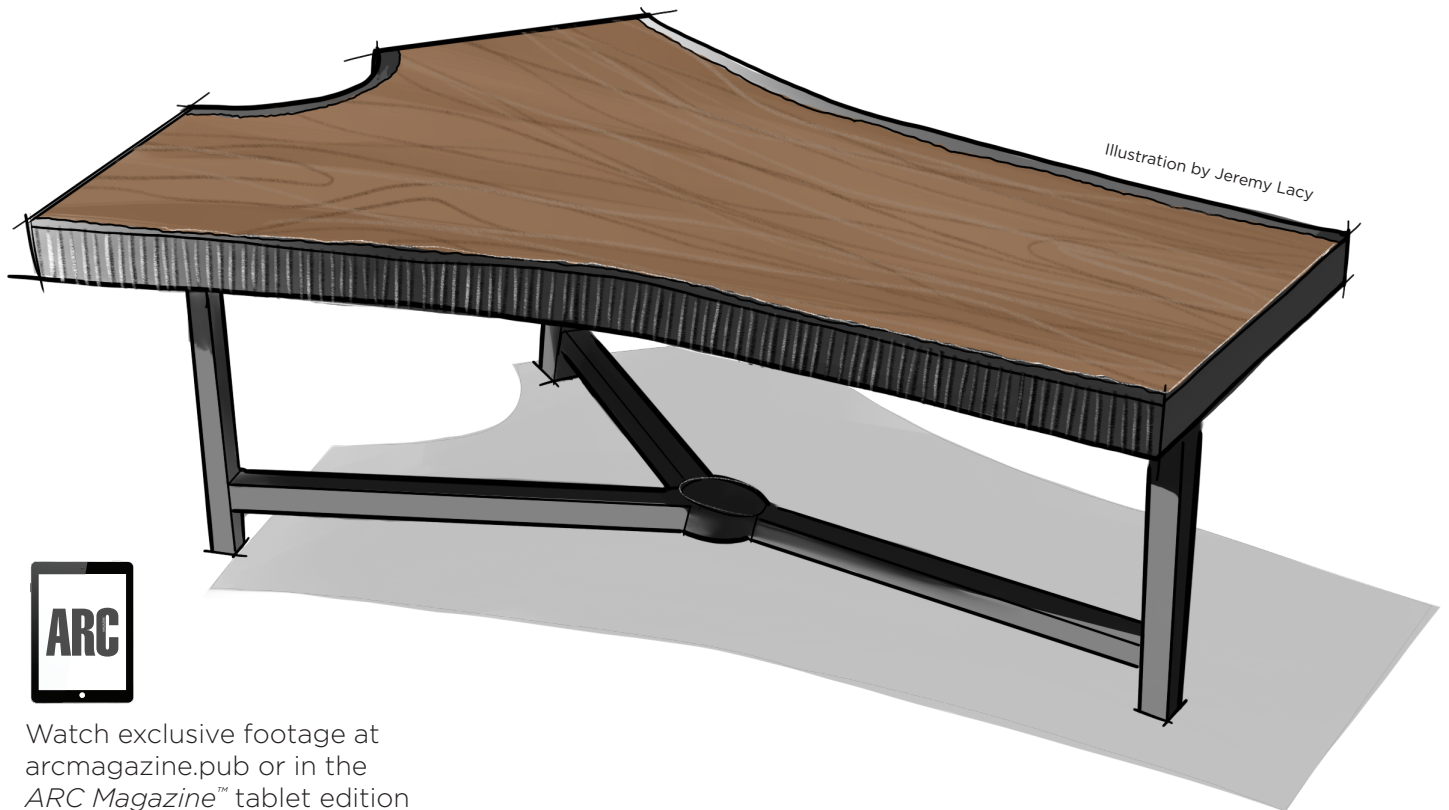
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Project Spotlight

A TABLE CREATED FROM WALNUT AND STEEL

By Jimmy DiResta



Watch exclusive footage at arcmagazine.pub or in the *ARC Magazine™* tablet edition (download it for free).

Sometimes it's great to experiment. You never know what you might come up with. Sometimes you hit on a novel idea that turns into a one-of-a-kind piece of furniture.

That's the case with a table I created using steel and a walnut slab. By being unafraid to test the limits of fabrication, I built a rugged-looking piece that can accentuate any room and, of course, serve every practical purpose that any preassembled store-bought table could.

Home hobbyists don't have to be confined to using steel and walnut for such a project. You can fabricate a distinctive table using any combination of materials. Whatever you choose, don't be afraid to push the limits of your building skills. The result can be something spectacular.

All of the design files and specs can be found at arcmagazine.pub.



© Jimmy DiResta

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. A properly approved respirator should be used whenever fumes may enter your breathing zone and general area.

MATERIALS

- 16-gauge sheet metal
- 3/4 x 3/4 stock rods
- Natural walnut slab
- Sheet metal screws
- Polyurethane
- Blackener
- Wax

WELDING/CUTTING EQUIPMENT AND TOOLS

- Lincoln Electric POWER MIG® 210 MP
- Belt Sander
- Palm Sander
- Horizontal Bandsaw
- Grinder
- Scrub Plane
- Cordless Drill
- 36-grit sanding disks
- 6-inch cutoff wheels

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Step 1: Plenty of Steel Rods

Start by cutting 3/4-inch x 3/4-inch steel stock rods that will eventually connect to the perimeter of the walnut slab. This project requires about 130 rods. The intention is to mimic steel flowing around the natural shape of the walnut.

Step 2: Cutting the Slab

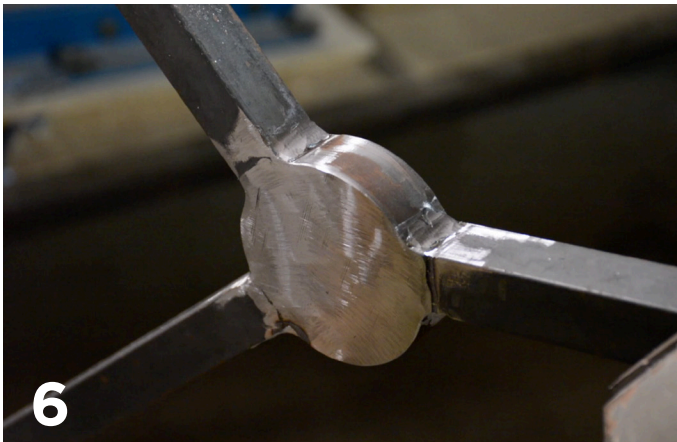
We need to cut the slab. The unusual part of this project is that I cut out the natural bevel of the slab. But the wood needs to be prepared for later on, when the steel rods are placed. After cutting, use a scrub plane to clean off the top of the slab and a palm sander to smooth out the surface.

Step 3: Piecing the Build Together

It's time to place the steel rods around the slab. Tack weld the rods to each other. On the cut sides of the slab, tack weld 1/8-inch steel plates to mimic natural bark. Drill into the steel and slab and connect with screws. The screws are embedded below the surface and filled with weld. Grind the welds down so the steel surface is flush with the slab surface. The weld bead actually burns into the wood, establishing a blending of the burned edge of the walnut with the organically shaped metal. This is followed by the final welds on the sides and on top of the steel rods, followed by grinding. The individual pieces of steel become one full piece that surrounds the slab.

Step 4: Smoothing the Surface

We're about ready to lay a finish on the slab. First, however, prepare the wood with a belt sander, followed by a palm sander, to smooth the surface. Finally, use a grinder to clean up the welds.



Step 5: Putting Down a Finish

Use antique black gel for a finish on the steel sides and polyurethane for a finish on the walnut and exposed steel on the top. A light sanding and wax job will complete the finish.

Step 6: Connect the Base

A table is of no use if it sits on the floor, so legs and a base are needed. While there are several options, I used a Y-shaped, three-legged base for this project. First, the base is built, using 1-inch-thick steel connected to a steel disk. Tack weld the base together, followed by the final weld and grinding. A dye grinder can help make a seamless transition from the round of the oval disk to the flat of the base.

Step 7: Fasten the Legs

Weld the legs to the base. The legs are cut to 17 inches. Use the antique black gel to finish the base and legs, followed by steel wool.

Step 8: Final Step

Place the slab on top of the legs. There is no need for a physical connection between the legs and slab, because its weight keeps it in place. And there's your table, a useful piece of furniture and an interesting addition that adds character to the room.

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

ARTISTRY OF A DIFFERENT NATURE

Rich Baker has been an artist for his entire life. Early on, his creativity manifested itself in music and songwriting. These days, he expresses himself through fabrication and MIG welding.

Earlier this year, Baker merged his past and present forms of expression by designing a Baby Grand piano out of heavy wall metal tubing, hand-bent in some parts and machine-bent in others, and finishing all of it with a high-gloss black powder coating. The piano (below) sits at the historic Heintzman House in Markham, Ontario. The 200-year-old mansion is the site of weddings and other milestone events. He hopes the flower-filled piano will become an iconic spot where pictures are taken, important occasions are celebrated and memories are made.

The piano was an out-of-the-ordinary project for Baker. For several years, he's created hollow-formed sculptures with a focus on wildlife as the subject matter. He is currently designing a blue whale (right). Along the way, he continues to hone his craft, just as he did with music earlier in his life. The only difference is the medium. "Fabrication is a natural movement from the music world," he says. "Rather than putting ideas down on paper with a pen, I hammer and weld ideas out in metal." **ARC**





WELDERS
HOW STUFF GETS MADE
LINCOLN
ELECTRIC

Master Class

A discussion of advanced materials and techniques for the seasoned welder.

Welding dissimilar metals, such as stainless steel to carbon steel, require their own rules and procedures.

WELDING STAINLESS TO CARBON STEEL

By Karl Hoes

Many times fabricators are faced with the task of joining dissimilar metals. In situations like this, maintenance welders, auto shop technicians and home hobbyists have to decide which filler metal and welding process to use to produce a quality weld.

One such application is connecting a 304L stainless exhaust tube to a 1018 carbon steel flange.

When selecting filler wire for welding dissimilar metals, such as stainless to mild steel, fabricators must understand that the weld deposit is a mixture of three metals – the two metals being joined, as well as the filler metal that joins them.

Using typical carbon steel and stainless filler wires are not appropriate for welding the dissimilar stainless and carbon steel.

The chemistry of 304L stainless steel contains about 18% chromium and 8% nickel, which makes it a ductile material that is not hardenable by heat treatment. Two pieces of 304L stainless are typically successfully welded with 308L filler metal. But using 308L filler metal to join carbon to stainless is not a good idea, because the diluted weld deposit could also be sensitive to solidification cracking and embrittlement.

Similarly, by improperly using a carbon steel filler metal, the weld deposit chemistry would be a mixture of the carbon steel flange, the carbon steel filler wire and 304L tube. The chemistry of the weld would not be a ductile stainless steel but possibly chrome nickel steel, very hard and brittle.

There are a few considerations in choosing which stainless steel filler is

right to join 304L stainless exhaust tube to a 1018 carbon steel flange. The highly alloyed 309L, 310 and 312 have been successfully used for joining various stainless alloys to each other and to carbon and alloy steel for years. 312 stainless is popular for welding dissimilar and other problem steels, but it is not suitable for the elevated service temperatures encountered in exhaust systems. The higher levels of ferrite can lead to the development of a brittle microstructure in the weld metal and premature failure.

310 is another product that can work, but its chemistry makes a fully austenitic weld that could be susceptible to solidification cracking. Typically, 309L would give the best results and is often chosen for this application.

Process selection is another consideration. Shielded metal arc welding (stick) and flux-cored arc welding are ruled out because of the thin wall thickness of the tube and potential burn through. Gas metal arc (MIG) welding works well for welding stainless exhaust systems on a regular basis but may be cost prohibitive for occasional users, who would have to consider the cost of a wire coil and special shielding gas needed to weld stainless.

To join 304L stainless and 1018 carbon, we chose the gas tungsten arc (TIG) welding process with argon gas.

Sometimes purging stainless thin wall tubing is necessary to achieve acceptable results with some welds, especially full penetration butt welds. For fillet and lap joints, purging can sometimes be avoided. **ARC**



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Shell Game



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.



September 1940 — Workers from Pittsburgh-Des Moines Steel Co. weld the outer shell of a gas storage facility in Cleveland, Ohio. The facility consists of three alloy steel tanks, 57 feet in diameter, 70 feet tall, with a storage capacity of 50 million cubic feet. The inner and outer shells are separated by a three-foot layer of cork insulation that protects the integrity of the stainless steel inner shell during seasonal expansion and contraction.

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