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MAGAZINE

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## ALSO INSIDE:

**CGI vs. Car Guy**  
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**Master Class**  
Back Purging Stainless Steel

A man with dark hair and a slight stubble, wearing a black leather jacket over a dark t-shirt, stands in a workshop. He is looking directly at the camera with a neutral expression. The background is filled with various tools, equipment, and parts of motorcycles, creating a dimly lit, industrial atmosphere. The lighting is dramatic, highlighting the man's face and the texture of his jacket.

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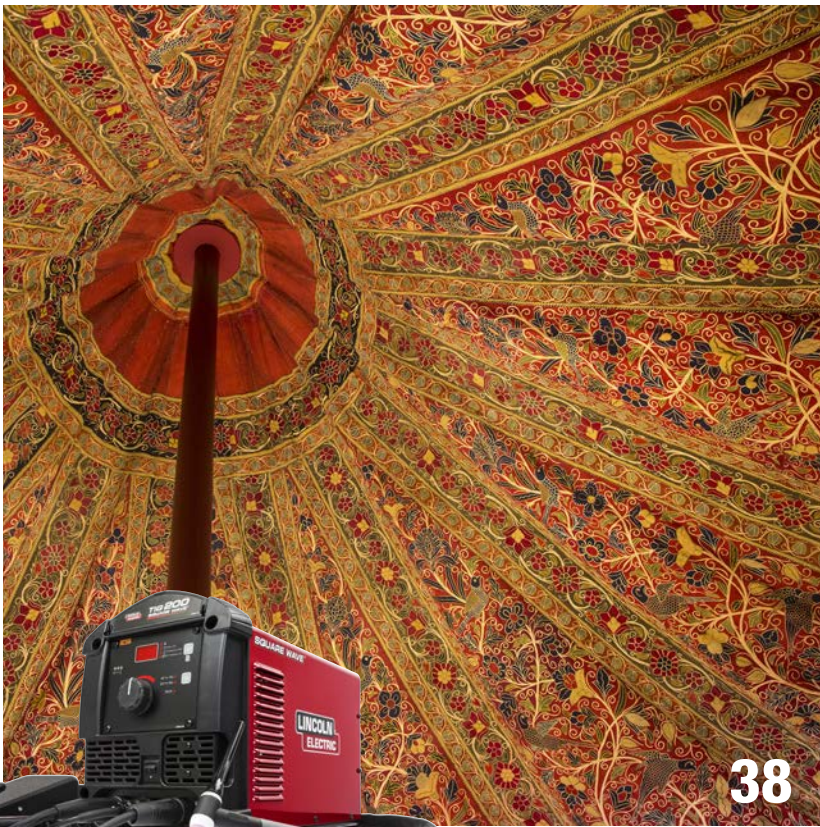
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## CONTRIBUTORS



Jeff Herrington  
**Writer**

A Dallas-based writer, Jeff Herrington has traveled to more than 40 countries on five continents. His interview subjects include a prime minister of New Zealand, a top heart surgeon in France and the CEO of Argentina's state oil company, as well as hurricane-ravaged business owners and Nazi-occupation survivors. Along the way, he's climbed Sri Lankan ruins and reported on a Japanese ice festival in below-zero weather. His first mystery novel, *Murder in Manhattan*, debuted in December and the second in the series, *Murder Becomes Miami*, will be published this fall.



David Murray  
**Writer**

David Murray writes on a wide range of subjects—politics, motorcycling, murder, golf, ballet, sailing, professional poker and speechwriting—for media outlets like *The New York Times*, *The Atlantic Monthly*, *Chicago Magazine*, *Advertising Age* and *Road Racing World*. With a young Army officer dying of cancer, he co-wrote the *New York Times* best-selling memoir titled *Tell My Sons*, and he has just published a memoir about his ad exec parents, *Raised By Mad Men*. He lives with his wife and daughter in Chicago.



Scott Skrjanc  
**Instructor**

Scott Skrjanc is a former welding instructor for Lincoln Electric (from 1994 to 2001), where he taught many aspects of the welding school curriculum. He has also trained welders and instructors at multiple welding schools and national union training programs across the country. His current role at Lincoln Electric is Group Leader for trade shows and events that include celebrity management and product integration for television and movies.



Jesse Srpan  
**Welder & Fabricator**

Jesse Srpan is owner and operator of Raw Iron Choppers, a motorcycle design and fabrication shop in Chardon, Ohio. Since his first projects at age 13, he's maintained a passion for welding and fabricating some of the most unique motorcycles in the country. His work has been recognized nationwide for its ingenuity and radical design concepts. Most days, he can be found in his shop, where he designs and fabricates full-size, one-of-a-kind custom motorcycles and parts.

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**DEAR EDITOR:** Anyone complaining about the cover image of the Spring issue is too young to remember pictures of Rosie the Riveter. Putting Jessi the Welder on the cover says it's OK for women to get their hands dirty. Since the economic meltdown of 2006, we've seen a return to valuing real workers. Your timing is excellent.

*Peter C. King, Signal Mountain, TN*

**DEAR EDITOR:** From what I see, some people have very arrested ideas about what the welding trade is today and judge the book by its cover. Jessi Combs is, from my point of view, the perfect representation of the modernity of the trade...Women are of great value in welding – even more so in TIG high-precision welding. The trade needs women like her. She is the perfect first-issue cover. I really enjoyed reading Jessi's reply (and yours) to the unhappy reader. Right on target. I am so happy I discovered your publication. Keep up the good work.

By the way, my two daughters know how to use power tools. And they are also beautiful.

*Alain Tanguay, address withheld*

Peter, Alain, your feedback is appreciated. Response to the Jessi Combs story and cover image has been overwhelmingly positive.

– John C. Bruening, Editor

**DEAR EDITOR:** I'm a full-time mechanic at a John Deere dealer, and in my off-hours I work as a freelance writer for several magazines. I'm a tech writer and columnist for *Farm Journal*, I write tech and feature stories for *Speedway Illustrated*, and I fill gaps in my time writing for *In-Fisherman* and other outdoor magazines.

That's why I'm impressed with *ARC Magazine* on multiple levels. As a mechanic, I like the practical, useful information it provides, without being a heavy-handed advertising tool for its sponsor. As a writer, I'm very impressed with the quality of writing and photography. As a long-time advocate for print journalism, I'm very pleased to see an effort made to expend the money and effort to produce a quality print publication in a time when it's so easy to slap together an electronic "magazine" and brag about how many "hits" it produces.

In short, great job. I look forward to future issues.

*Dan Anderson, Bouton, IA*

Thanks for the kind words, Dan. We're still strong proponents of print, although we do publish web and tablet versions of the magazine. Both offer access to videos and enhanced content not found in the print edition. And to be honest (no bragging here), we do experience heavy traffic in both spaces. You can access the website at [www.arcmagazine.pub](http://www.arcmagazine.pub), and subscribe to the tablet version from there. In the meantime, your request for a subscription to the print edition has been forwarded to the appropriate parties, and your question for the Ask the Experts column appears in this issue.

“ I'm impressed with *ARC Magazine* on multiple levels. As a mechanic, I like the practical, useful information it provides, without being a heavy-handed advertising tool for its sponsor. ”

**DEAR EDITOR:** Thank you very much for publishing this fantastic magazine. I have really enjoyed both issues. I hope you continue. Thank you so much.

*Bertan Kizilduman, Antalya, Turkey*

Thanks, Bertan. Great to get feedback all the way from Turkey. Don't hesitate to keep us posted about issues that are relevant to welding and the welding-related trades in your country and region.

**DEAR EDITOR:** I just received my first issue of *ARC* and really enjoyed it. The Gas Monkey Garage cover story, the *FIFI* B-29 Superfortress feature story, Ask the Experts and Beginner

Tips & Tricks (because I always feel like a beginner) were read with relish.

“Welding at War” on the Flashback page was mostly accurate. However, the plane shown in the photo is a Martin B-26 Marauder Medium Bomber, not a Douglas A-20 Havoc Light Bomber. The B-26 used Pratt & Whitney R-2800 engines, which were larger and more powerful than the A-20’s R-2600s. The two planes do look similar, except to a World War II plane nut. The Marauder was developed about four years after the Havoc, and in a world going to war, four years is a quantum leap in aircraft engineering and technology.

Keep up the good work.

*Thomas Lux, San Leandro, CA*

Glad you’re enjoying the magazine, Thomas. You weren’t the only person to bring the A-20 Havoc/B-26 Marauder error to our attention. There are very few people left with a comprehensive first-hand knowledge of World War II aircraft. The grainy, black-and-white photographs from the era occasionally require some detective work – and even a little guesswork. Thanks for the clarification.



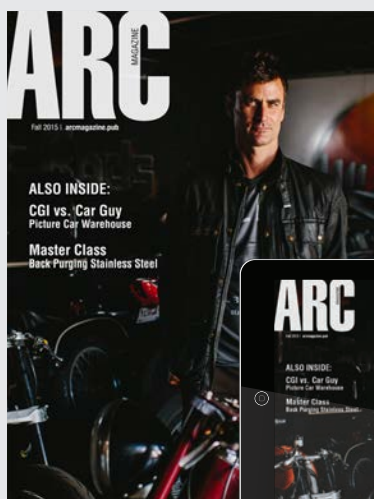
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# ASK THE EXPERTS

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](mailto:questions@arcmagazine.pub)



**What's the best way to fabricate a box for a back purge? I'm currently welding stainless, and the back side of the work piece always looks sloppy because I don't have a back purge.**

*John Mucha, Chicago, IL*

There are a couple different options. As long as you're getting gas on the back side of the weld, you're fine.

Before you can do anything, you'll need two lines to purge. So you'll have a Y connection – one that connects to the torch and the other for the purge. Once you have the Y connection, you can hook the torch up to a back-purge trail cup. Or if you don't have a trail cup, you can cover the joint with aluminum foil and then tape the hose to the joint to enable a steady gas flow along the back of the weld. Make sure to poke exit holes at the opposite end of the gas purge hose (you can use your tungsten to do this) so you have continuous flow of gas on the back side. Make sure the gas hose is taped tightly to one end and there's sufficient room to allow the gas to push the air out of the opposite end.

You can also use a simple cardboard box as a purge box. Be sure to cut away the side of the box that will be resting on the table. Sit the cardboard box over the table, which enables you to maintain your ground, and then mount your hose at the lower end of the box so the argon gas – which is heavier than air – can push the air upward and away from your work. While the TIG welding arc is very focused, use care to avoid igniting any of the surrounding cardboard panels. (See a more detailed Master Class on stainless steel purging on page 40 of this issue.)

**I have the Lincoln Electric POWER MIG® 210 MP. I like using the TIG process with the foot pedal. Are there any good lift arc or scratch techniques that will help me reduce contamination of my tungsten and sticking during the start?**

*J.S. Fletcher, Old Pueblo, AZ*

If you're using the foot pedal, in order to make the arc start, you need to put the tungsten down with no power, push the pedal down with the tungsten touching the material, and then lift the tungsten. If you do it any other way, the tungsten is going to be hot, and it's either going to scratch or it's going to stick.

**When TIG welding aluminum, what causes pin holes to keep appearing?**

*Will Barnett II, Sarepta, LA*

Pin holes can result from either the presence of hydrogen or insufficient gas protection.

Any buildup of lubricants, grease, oil, paint, primer or other contaminants can be a source of hydrogen, so the aluminum needs to be extremely clean before welding. When cleaning the weld surface, use a de-chlorinated brake cleaner. Do not use alcohol. Alcohol will smear grease around without actually removing it. A de-chlorinated brake cleaner will ensure that you don't get phosgene gas when you strike the arc. You can get it in any auto store. It's the best option because it evaporates very quickly.

If everything is clean and hydrogen free, the other possibility is insufficient gas protection. This can be the result of a number of different factors. First, check to make sure your flow rate setting on the gas bottle is correct. Also, avoid welding in conditions where winds or even mild drafts can

affect your shielding gas setup. Finally, check your tungsten to make sure your stickout isn't too far.

**I run an older generator welder with a high-frequency converter. I only have scratch start. Any tips on not contaminating the tungsten?**

*John McCarty, Toutle, WA*

The answer is as simple as a piece of copper.

If you're scratch-starting, you should have a TIG torch with a valve on it so you can manually control the gas. This is where a two-line TIG torch usually comes in handy – one line connects to the bottle and the other connects to the machine. Turn the valve on and scratch off a piece of copper.

Wherever you're going to weld, place the copper nearby, pop it quickly, and you're ready to go.

**I have a 19-year-old Lincoln SP 100 115-volt welder set up for flux-cored welding because I weld outside a lot. It makes great welds, but it welds "ugly" compared to a conventional MIG welder. Is that just the nature of the beast, or is there a way to make flux-cored welds look better?**

*Dan Anderson, Bouton, IA*

The SP 100 is an older machine, but there's no reason why you can't produce good looking welds with it, as long as you set it up properly and recognize its limitations in relation to heavier gauge material. First, make sure the flux-cored wire is on the correct polarity. MIG runs positive. Flux-cored wire runs negative. So the torch end should be on the negative terminal.

You could be running too heavy of a material for the SP 100 output. The SP 100 is considered a light-duty machine, and you're not going to get much power with 110 volts. Figure on a limit of 1/8 inch to no more than 3/16 inch for flux-cored. If you try welding anything heavier than that, you won't have enough heat. It's going to roll and bead up. But you can really put down some nice beads if you use 1/8-inch, 10-gauge material. **ARC**

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# BOY MEETS WELD

BRYAN FULLER PASSES THE TORCH TO A 12-YEAR-OLD WELDING WUNDERKIND

By Jeff Herrington

Photography by Andrew Thomas Lee



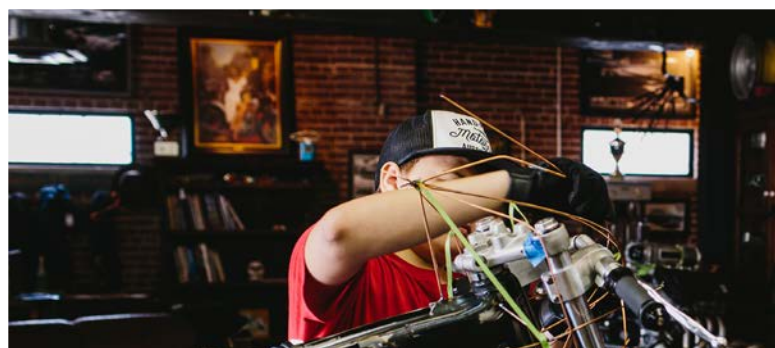
**BRYAN**  
Fuller

**ZEKE**  
DeZeeuw

**W**hen we think of teaching, we usually think of school buildings, classrooms packed with dozens of students and 50-minute lessons punctuated by a long-awaited bell. But some of the most famous teachers in history have passed along knowledge in a much more personal way, one protégé at a time. Socrates guided Plato on his exploration of what it meant to lead a virtuous life. Annie Sullivan showed Helen Keller how Braille could help her read and write. And University of North Carolina basketball coach Dean Smith counseled John Thompson, Jr., his counterpart at Georgetown University, on the fine art of winning a national championship.

Bryan Fuller, the force behind Fuller Moto in Atlanta and the host of *Naked Speed* on the Velocity Channel, has taken the same approach with 12-year-old Zeke DeZeeuw. Since their first meeting at a motorsports festival two years ago, the master builder of custom cars and motorcycles has become the unofficial mentor of the young Texas boy who's gaining recognition as a whiz kid with a welding torch.

"It's really gratifying to show someone how to do a weld right," Fuller says, "and then hear them say, 'Wow, I did that! I didn't know I could do that, but I can!'"





It's a muggy, sultry, summer day in Atlanta. Fuller, Zeke DeZeeuw and his father, Patrick DeZeeuw, are huddling over a worktable inside the Fuller Moto shop just east of downtown. The Eagles are singing "Peaceful Easy Feeling" on a radio somewhere, and nearby, someone is hammering on a piece of metal non-stop. Zeke has finished marking some measurements on a piece of cardboard that's meant to be the template for the aluminum that will cover the fuel tank of a motorcycle they're building. Fuller picks up the cardboard, wags it at Zeke and asks, "Now that you've traced the outline for the template, what do you do next?" Zeke looks to one side in search of the right answer.

"Attach it to the wire frame of the tank?" he responds.

The master builder drops his head and shakes it, wearing a look that is part grin and part smirk. "No! You double-check your measurements," he answers. "We *always* double-check our measurements before we move to the next step." Patrick DeZeeuw steps forward and nods in solemn agreement with their host. "You know what they say, Zeke: measure once, cut twice," his father intones, intentionally skewing the famous adage to make an important point with his son.

The half-built motorcycle resting on the stand behind them represents a gentlemen's agreement of sorts that the trio struck some time back. Two years ago, when Fuller and the DeZeeuws met at the Barber Vintage Festival in Alabama, Fuller became smitten with a Honda CB200 that Zeke and his father had rebuilt back in Texas. But Zeke refused to give up Lucky (the name he bestowed upon the bike), despite the fact that the celebrity had just given him an awesome TIG welding lesson. So Fuller invited the DeZeeuws to





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spend a week in Atlanta to tap into his tricked-out studio and extensive expertise and build a bike from the ground up. Fuller's payoff? At the end of the week, he could keep whatever motorcycle got built.

What would prompt the 44-year-old television star and Kid Rock fanboy to offer the learning opportunity of a lifetime to an unknown youngster living four states away? Is it because Fuller himself apprenticed for three years in his early thirties in the shop of industry legend Chip Foose of Southern California, and he sees this as a chance to pay the debt forward? Is it because Fuller is now the father of a five-year-old, so he's more concerned about equipping the next generation with the perspective and values they'll need to succeed?

Or maybe it's because the author, designer and master builder rarely stumbles upon a prodigy with the innate talent and attitude of Zeke DeZeeuw.

"Most of the people I meet at welding festivals are older, stuck in their ways and not terribly interested in broadening their knowledge," Fuller says. "Zeke doesn't have any preconceived notions about how to do things, and he shows an extraordinary level of focus and commitment to building bikes for someone his age. He really stands out."

Truth is, Zeke DeZeeuw has always stood out. When he was six, he took his first solo ride on a motorcycle, a Suzuki DS80 equipped with a two-stroke engine. He mounted the bike, zoomed off and drove full-speed into a neighbor's fence. Only two years later, he announced he was ready to build a motorcycle. Just five months later – and with the help of his father and several amazed adults on some online motorcycle forums – Zeke had finished

Lucky and was tooling around his neighborhood on it.

"Zeke is a tactile person," says his father. "No, let me rephrase that. He's a destroyer. One day when he was little, I walked into our house to find he had completely taken apart our family computer."

Turns out, Zeke can be a resourceful parts curator as well as a destroyer. When he was building his second bike (named Victoria) for Fuller's *Naked Speed* program, he wanted to equip it with premium Öhlins shocks. But his father nixed them as too expensive. So Zeke hunted down the name of the company's president, called him, somehow got past the president's gatekeepers and pled his case for a set of shocks. Sure enough, a set arrived a few days later. So, too, did a set from one of Öhlins biggest competitors, whose president Zeke had ALSO telephoned on the sly.

That was one of the first times Fuller decided to exert his role as Zeke's mentor.

"You can't do that," he chided Zeke. "If you want to be taken seriously in this business, you have to protect your integrity at all costs." Fuller urged Zeke to call the competitor, apologize and promise them that a check for their shocks was on its way.

"And that was when I knew I could definitely trust Bryan with my son," his father says.

But for every time the 12-year-old pulls a Dennis the Menace act, there are ten instances of him being amazingly considerate, or behaving like Zeke the Geek. As he prepares to pound on a piece of sheet metal, he suggests to a bystander he might want to don some earplugs. When his father says he wants to ask one of Fuller's employees for help with the fuel tank template he's working on, Zeke shakes his head and says, "Leave it there, Dad. I'll do it."

And then there's the geeky way he came up with the name for the bike they're all building that week at Fuller Moto.

"I had this dream about trapezoids," Zeke says, "so I thought it would be cool if we included them in the design of the brake drum. Then the tires came in, and the spokes formed trapezoid shapes as well. That's when I knew I wanted to name the motorcycle ZOÖID."

Which pleases his father to no end. "ZOÖID" is Greek for an organized body that has independent movement within a bigger living organism," says Patrick. "I think that perfectly describes our relationship with Fuller Moto this week."

An explanation of Greek etymology may not be what you'd expect from a suburban landscaper, but it's par for the course for Patrick DeZeeuw. Although he's a true-blue Texan who craves good TexMex and travels the nation's backroads to find the country's most bodacious barbecue, he's also the quintessential Renaissance man who cites the poetry of Michelangelo one moment, the lyrics of Wilco the next. The family name, DeZeeuw, means "of the sea" in Dutch, so his daughter's name is, of course, Ariel (as in the title character of the popular Disney film *The Little Mermaid*). Then there's the family motto, which appears on each bike Zeke builds and on the door of the claustrophobic workshop situated behind their home outside Dallas.

"Our motto is, 'Luctor et Emergo.' 'I struggle and I emerge'," Patrick says. "It's the motto of the state of Zeeland in the Netherlands, but it's also the philosophy I want my kids to carry with them throughout life."

Having worked 33 years for one of the premier landscapers in the Dallas area, Patrick says he understands better than most how valuable a good mentor can be to someone just learning the ropes.

"You know, Fuller is such a paradox," he says. "He comes off all cool and low-key, but in fact he's a much better communicator than I am. Usually, he explains the 'why' of something to Zeke before Zeke feels a need to ask 'why'."



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Zeke agrees that Fuller possesses several traits that make him a terrific person to learn from.

“Normally, you have to be quiet and dialed in to whatever a teacher is saying,” he says. “But Bryan makes learning really fun. Like, he sometimes makes these loud noises when he is grinding something. And he doesn’t solve a problem for you – he teases you into solving it. For example, he told me all I needed to calculate the center line of the fuel tank was its front width, rear width and length. But then he made me figure out the rest of it.

“Working here this week has helped me develop my mental toughness and integrity. I’ve definitely learned that you have to work really late sometimes to get a project out on time. We’ve probably used 100 times the skills building ZOÖID here than we used to build Lucky.”

At the end of the marathon week, the trio has finished ZOÖID and Zeke has hit upon an idea for yet another project he might undertake when he’s Fuller’s age.

“Who knows if I’ll be building motorcycles then?” Zeke wonders. “I may be building computers, or even airplanes. However, I know now I’d love to have a shop where people of all ages – but especially younger people – pay a subscription to learn from me and use my tools to build whatever they want. I’d give them the down-and-dirty, hands-on building experience they couldn’t get anywhere else.”

Meanwhile, Fuller has a gleaming new custom motorcycle to call his own. And a byproduct of that process is the gratification of knowing he has helped instill some important lessons about life and work in someone who could succeed him not that long from now.

“I see so many parallels between the building world and real life,” Fuller says. “I hope I showed Zeke not just the importance of doing a weld right but that patience, technique, teamwork, paying attention to detail and sticking to a budget all are important to our success.

“And, that we always have some master to please, no matter what.” **ARC**



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# *CGI vs. Car Guy*

By David Murray



*How Hollywood's old-school stunt- and prop-car provider Ted Moser outthinks, outworks and usually outperforms the most sophisticated computer-generated imagery.*

Computers have made it possible for filmmakers to do the impossible: take audiences into the past, make us eyewitnesses to fantastical events, put us in the middle of situations that we have no business seeing.

No one disputes that – not even Ted Moser, who makes his living providing real cars for live-action stunts and props for movies, TV productions and commercials. Moser, after all, provided vehicles for *Into the Storm*, the 2014 thriller about storm chasers. It never rained once during the filming. All the weather was provided by computer-generated imagery.

But as for the cars themselves, Moser prefers real wheels – and all the wrenching, welding, painting and repainting they require. Though he happily provided cars for the 2003 CGI-enhanced street racing action film, *2Fast 2Furious*, Moser believes the best car movie ever made was *Bullitt*, filmed in 1968. “No CGI, all raw cameras hanging out of cars, everything’s on the edge,” he says. (How much does he like *Bullitt*? He named his dog Steve McQueen.)

Moser knows, and his work shows, that there are things that computers aren’t nearly inventive, efficient, culturally literate, passionate – or car-crazy – enough to do.



© Adrienne Battistella Photography

## REINVENTING THE WHEELS

On location in New Orleans shooting *Quarry*, the upcoming Cinemax/HBO TV series, Moser uses his fingernails to peel a stubborn decal off a late-1960s taxicab as he describes to ARC the scope and nature of his strange line of work.

Moser provides “picture cars” in whatever numbers, at whatever price, in whatever condition and with whatever modifications a show’s producers require whether they know what they need or not.

He owns 700 cars in a dizzying variety of makes and models, and either brings them to productions he’s working on or rents them out to others via his company, Picture Car Warehouse. You’ve seen many of these cars yourself, in TV shows (like *Mad Men*), commercials (like the celebrated Autotrader *Dukes of Hazzard* reunion spot) and films, like *All the Pretty Horses*, *The Town* and *Little Miss Sunshine*.

Moser and his crew of expert mechanics, body people, painters, upholsterers, fabricators, graphic designers, transportation and logistics people and number crunchers work minor miracles, to order.

Remember that scene at the end of the film *Argo*, where the plane carrying the hostages was trying to escape Iran, and being chased down the runway by police cars and an army truck? Here’s the story...

The truck, a 1962 Mercedes Unimog (see photo, bottom right), topped out at 45 miles an hour, a rate of speed that Moser, who provided the vehicle for the production – because who doesn’t have a 1962 Mercedes Unimog truck at his elbow? – had been assured would be fast enough for the scene. A week before the scene was to be shot, director Ben Affleck told Moser the truck needed to go 70. After furiously considering and discarding options involving a new engine and new gearing, Moser put the truck’s body on a Ram Charger chassis, completing the job only minutes before the cameras rolled.



© Cinemax / Michele Short



© Adrienne Battistella Photography



© Adrienne Battistella Photography



© Adrienne Battistella Photography





What if Moser had blown it, and held up the production?

“Well,” Moser says, “you don’t blow it.”

That’s one of a thousand stories Moser can tell about reinventing sets of wheels on the fly to make cars go the right speed, fit through tight spaces and perform the required stunts.

But Moser’s most singular contribution starts long before the lights, camera or action. It starts when he reads the script and begins to imagine the world that his cars will help bring to life, and mentally races through 700 cars of every conceivable type, in infinitely varying and changeable conditions. He needs “hero cars,” which the lead characters will drive, and “nondescript cars,” or “NDs,” to serve as realistic traffic or parked props.

The *Quarry* script originally specified the makes, models and colors of the cars in the scenes. Moser asked a

production manager whether those orders were literal, or was there room for his own creative interpretation. The response: *Do as you’re told*. Finally, he got a meeting with the two young co-writers/producers, and asked them the same question. “Please!” they said, begging him to use his judgment and make the cars fit the place and the time they were trying to create – in this case Memphis, in 1972. “We weren’t alive in 1972,” one of the writers told *ARC*. “We need Ted’s sensibility, because cars are such a part of creating that world.”

And what judgment, what a sensibility Moser has. Among the 75 cars he had brought from L.A. to the *Quarry* filming location in New Orleans were some vehicles that didn’t seem to belong. A 1949 Chrysler Royal, for instance. In 1972? “Well, some of the scenes will be shot in a poor neighborhood,” Moser points out, “where lots of the cars would be older.”

Lots of movies get these details wrong. The atmospheric integrity of the recent 2011 movie *The Help*, Moser believes, was partly spoiled by illogically shiny, brightly-painted cars in a world of dusty gravel roads.

Not that Moser is a historical purist. Not only is he not above choosing or repainting a car to pleasingly match a house it is parked in front of, he considers himself responsible for doing that, too.

### HOW TO BECOME A HOLLYWOOD PICTURE-CAR PROVIDER WHEN YOU GROW UP

It dawns on you early on that, more than most people, Moser is precisely where he belongs in life. And it’s interesting to consider the combination of destiny and luck that led him to this place.



## CAR GUY vs. CGI:

If you can't beat 'em, join 'em!

Computer-generated imagery can do just about anything, as long as you have enough money, and a willingness to forego the kind of visceral grit that can only be communicated by real rubber—or real metal—meeting the road.

But these days, CGI and real action work together to achieve effects that neither could separately.

ARC interviewed stunt coordinator Richard Burden on the set of the TV show Moser was working on. Burden is an old-school stunt man. “Like, I really wanna roll that van right there.”

He describes how CGI and real action synergize. He'll get instructions to “roll the car to the edge of the bridge,” and CGI will take it over the edge, making the stunt safer and the logistics simpler.

“If you want to roll the car three or four times, I have to get it up to 70 miles an hour,” Burden explains. “If you want to roll it 10 times, I gotta go 100.” So the special effects director will say, “I need to see it roll once, and then I can make it roll 10 times” with CGI.



WDFG-TV  
MEMPHIS

4

**No matter what,  
what I did was  
always about cars.**

– Ted Moser

The son of a gas station owner in Littleton, Colorado, Moser was a born automobile savant. “My mom says that by the time I was three years old, I could name the make and model of every car on the road,” he says.

He played drums in high school and majored in music in college until he got bored during a course about 18th century music theory. He thought he wanted to be an accountant. He worked for a lawyer, and considered becoming one. He skied fanatically and rode horses competitively. But “no matter what, what I did was always about cars.”

Eventually, he found himself owning and operating an auto repair shop near Denver.

He got his first taste of the movie business when the crew of *Die Hard II* came to Colorado in 1990 to shoot some airport scenes at the old Stapleton Field. Hired as a mechanic for the picture cars, Moser performed well, at one point saving the production from a delay by a small but smart act of civil disobedience.

He’d bought \$6,000 worth of parts to fix cars in case they broke down, but the film’s transportation coordinator told him they were unneeded and he should return them. “Then the hero police car takes a crap right in the middle of the set,” he recalls, and as the crews, the actors and 400 extras sat idle, the producer was getting ready to fire the transportation coordinator on the spot. But Moser hadn’t returned the car parts, and he used them to fix the vehicle. The grateful transportation coordinator took him to other locations around the country.

He loved the experience. He joined the Teamsters, sold his shop and began rising up the pecking order from picture car mechanic to transportation coordinator. He moved to Los Angeles in 1999.

## ONE-MAN TRAFFIC JAM

Even living in the cradle of Hollywood production, Moser had to scramble to find and rent historically appropriate and mechanically sound cars for props

and stunts. Meanwhile, he had begun acquiring cars for fun and for pleasure, and when he bought a mess of 25, his wife insisted he find a way to make his hobby pay. So he started Picture Car Warehouse in 2003. Between supplying cars for the productions Moser works on and renting them to other projects, PCW has grown into a 45-employee, \$4-million business.

Which comes with serious complications.

On the *Quarry* set in New Orleans, Moser finds himself fighting the usual battles unique to his business: “I’ve gotta find a bulldozer to crash a car into!”

He’s trying to describe to the executive producer his plan to save some budget money by installing a Lincoln Continental interior into an old Pontiac he had on-hand. The producer is having a hard time getting his mind around that.

In between, Moser is texting and talking – and not always peacefully – with his son and others who are trying to manage the Picture Car Warehouse back in L.A. without his omniscient grasp of the business.

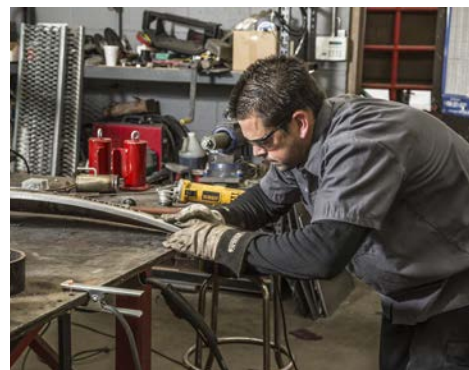
And in the middle of the afternoon, his first grandson is born to his daughter in Texas.

And as if the 61-year-old Moser isn’t spread thin enough, he’s telling a reporter about various business schemes, from sponsorship and promotion ideas to reality TV shows. He has bought the rights to a movie about a legendary 1960s African-American drag racer he got to know in recent years, and he’s looking for a producer. “The movie isn’t about racing,” Moser says. “It’s about race relations.”

Moser struggles to balance his big plans with his bumper-to-bumper schedule. He wants to cut his car collection, which once numbered at 800, down to 400.

“I’ve been trying to get away from cars my whole life,” he says.

Fortunately for movie lovers and car buffs everywhere, he’s not doing a very good job. **ARC**



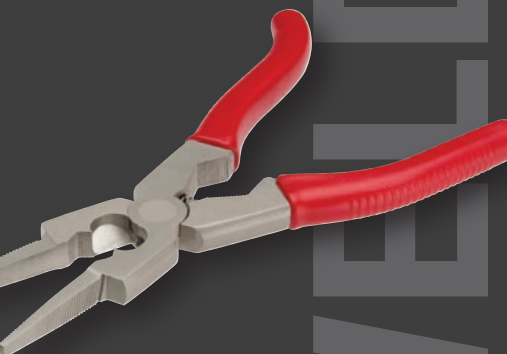
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## MAXIMIZING GAS COVERAGE, MINIMIZING STRESS AND OTHER TIPS

### LENS ENHANCES TIG WELD QUALITY

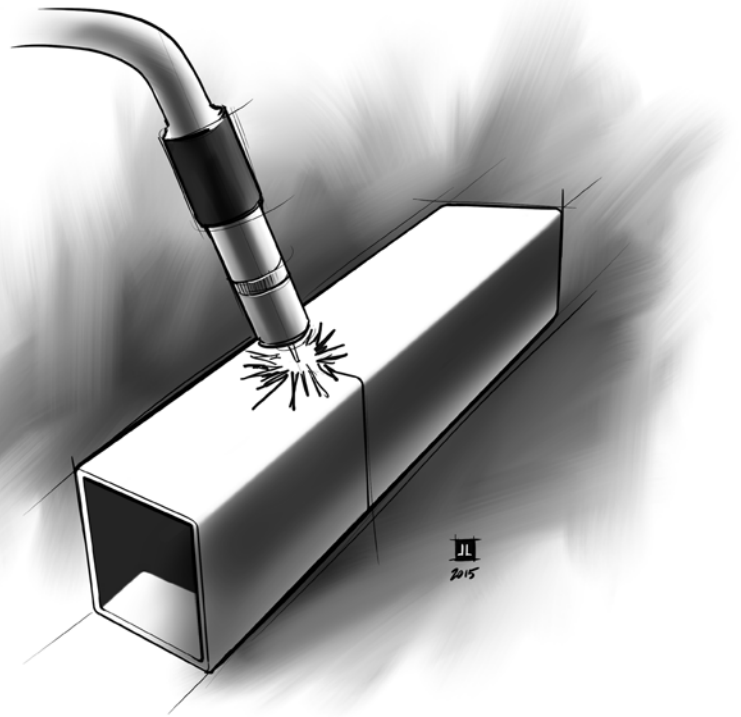
Consider using a gas lens instead of a standard collet body when TIG welding stainless steel. The gas lens provides better weld gas coverage that is more consistent and smooth. This will help with aesthetics and the overall weld bead quality and consistency.

– Submitted by Ryan Walker, Niagara Falls, NY

### MINIMIZE WELD STRESS

When welding brackets, square tubing or a plate that will be under stress – such as on farm or construction equipment – begin the weld between the corners, rather than at the corners. Never tie in a weld at the corner. This refers to fillet welds or corner welds. Make sure the weld is continuous around the corner. If the weld is subject to stress and is started or ended at the corner, it may tear from that point.

– Submitted by Brian Maddy, Sandy Springs, GA



### THICK HAS YOUR BACK

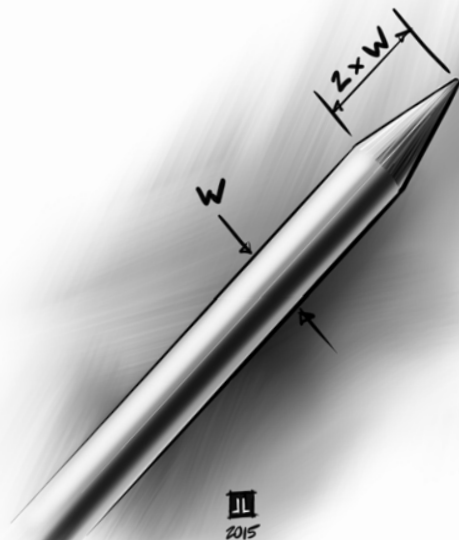
When welding thin-gauge stainless steel, tack it in several places and use a thicker metal (one that is a better thermal conductor, such as copper or aluminum) as backing to absorb the heat. This cuts down on distortion.

– Submitted by Christopher Taylor, Charlotte, NC

## A TIP ABOUT TIPS

I grind the tip of my tungsten 2 to 2½ times the width (diameter) of the rod. For example, a 1/8-inch rod should be sharpened ¼-inch from the tip. This will help the focal point of the arc. Also, be sure that the grind marks are parallel to the electrode, which allows for better arc stability.

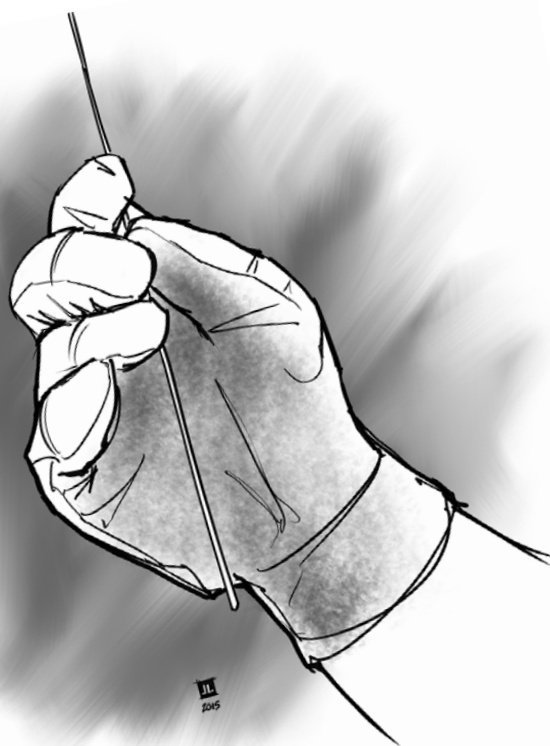
– Submitted by John Cortez, Chandler, AZ



## GIVE YOURSELF A HEAD START

There's a lot to learn about TIG welding. But you can give your feed hand a head start by putting on a TIG glove and feeding a TIG wire up and down your hand while watching TV or doing other non-welding activities. This will help your fingers get used to feeding the TIG rod.

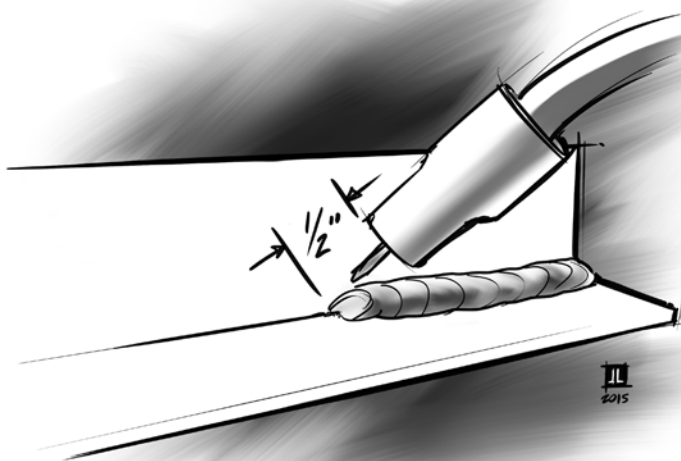
– Submitted by Chris Secor, Mount Laurel, NJ



## SUFFICIENT STICK-OUT

When running flux-cored arc welding larger wire (no gas), the wire stick-out should be about ½ to ¾-inch away from the puddle. Any less and there will be constant burn back and the need to replace the tips.

– Submitted by Danny Anderson, Brea CA



# PROJECT SPOTLIGHT

## MATERIALS

- Unused steel fuel tank
- 16-gauge steel plate for tank bottom
- Exhaust tube for tunnel

## WELDING/CUTTING

### EQUIPMENT

- Lincoln Electric Precision TIG® 275 Welder
- Lincoln® ER70S-6 TIG filler, .045 inch
- Argon gas
- 1/16 inch or 3/32 inch thoriated tungsten
- #7 cup with gas lens on a #20 water-cooled torch

## ADDITIONAL TOOLS

- Hammers
- Aviation snips
- Professional-grade scribes
- Marker pen
- Compass
- 12- and 15-inch scales
- Pneumatic angle grinder
- Masking tape
- Clamps
- Magnets
- Vice grips
- Cut-off wheel
- Flathead screwdrivers
- Beverly shears
- Non-chlorinated brake cleaner

## PERSONAL PROTECTIVE EQUIPMENT

- ANSI-approved welding helmet
- Fire-retardant jacket
- Safety glasses
- Hearing protection
- Gloves
- Steel-toe boots

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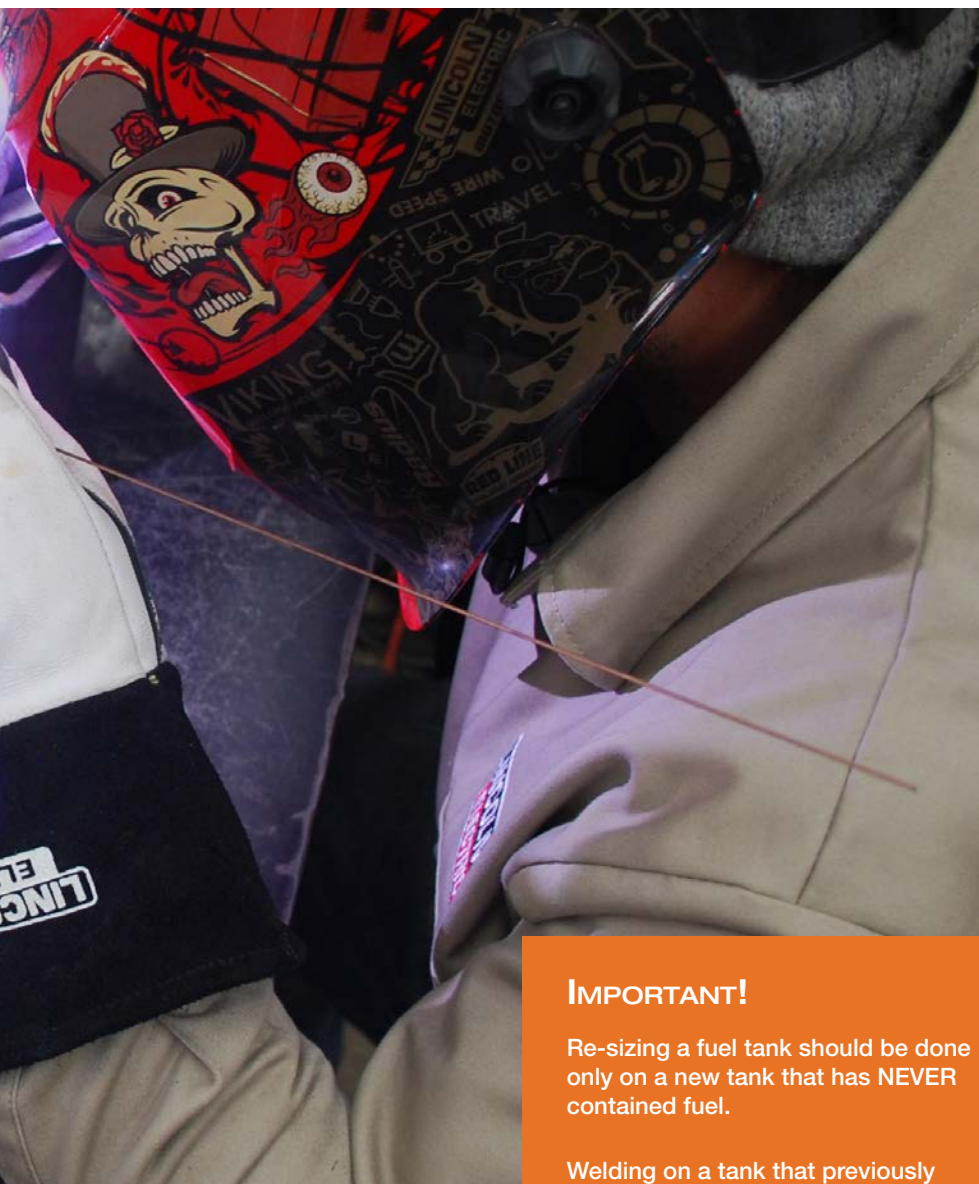
## HOW TO RE-SIZE A **MOTORCYCLE GAS TANK**

By Jesse Srpan, Raw Iron Choppers, Chardon, Ohio

Anybody can modify a motorcycle gas tank. With a minimum of tools and equipment, and some careful planning and measuring, you can accomplish the job.

There are a couple different reasons to re-size a gas tank. A bike enthusiast might want a narrower tank to create a more sleek and streamlined appearance. Or a tank might need to be altered to create room for the rider or other components on the bike frame.

*ARC Magazine* joined Jesse Srpan, owner and principal fabricator of Raw Iron Choppers, as he takes us through the steps of modifying a tank for a recent build.



### IMPORTANT!

Re-sizing a fuel tank should be done only on a new tank that has NEVER contained fuel.

Welding on a tank that previously contained fuel – even if it is currently empty – is extremely dangerous. It may cause a fire or explosion and result in injury or death. Special procedures must be used that are beyond the scope of this article.

After the re-sizing project is finished, the tank should be tested to ensure that there are no leaks.

grinder to cut three inches out of the tank from the center line (1½ inches on each side). Try to stay about three inches away from the gas cap bung so there is no interference when you weld. Remove the vent line inside the tank as well. File the tank to smooth out rough patches.

**Step 2:** Bring both halves of the tank together to make sure they fit up before starting the tack welds. You might need to do some hammering before and during your tack welds to ensure the fit is true.

For this project, I started with .045 thick filler (ER70S-6). I like thinner material for this application, because I can add more without pushing through the filler rod. While I used 3/32 tungsten with gas lens, 1/16 tungsten can be used. The choice depends on your type of tungsten.

Using the calculation of 1 amp for every 1/1000 thickness, I weld at 55 amps, but you can set your amperage to 65 or 75.

Avoid rocking the tank while you tack weld. Doing so might cause a hole to burn through the tank.

Tap the tank while it's hot to ensure a good fit. The fit-up is crucial. It has to be tight as your weld will pull both halves together. It's important to remember to not directly hit the tack welds. This could potentially create dimples and low spots.

Make sure there's good fusion on the tacks on the inside of the tank. You should be able to see the tacks go through the metal. You don't want to weld the tank on top cold, nor do you want to see burn-through in a big area.

After grinding down the tack welds, you can weld from tack to tack, alternating from side to side to control distortion. When a tank feels like it is too hot, it will start to buckle, especially in the flat areas with no concave shape. That's why the heat should be spread around.

**Step 1:** When preparing to modify a tank, cut out the mounts, bungs and vents. You'll want the gas tank to be as flat as possible to get an accurate measurement of its full width.

I'm narrowing this tank, so I find its center line and mark it with a marker or pencil and masking tape. Use a



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**Step 3:** After fully welding the tank, you can create the template for the bottom panel. You can create a paper template, or apply masking tape in a layered fashion across the width of the tank. Cut the tape in the shape along the edge of the tank's bottom area, and then transfer it to poster board. Mark which side is the bottom to make sure there are no problems when you transfer the template back to the tank. Then cut the template out of the poster board.

**Step 4:** When you're comfortable with the fit-up of the template on the tank, transfer it to a steel plate. For mounting reasons, consider using a slightly thicker gauge of steel for the bottom, as compared with the tank. Using magnets to keep the paper template in place, outline the template onto the plate with a marker.

**Step 5:** Before tack welding the bottom, it's time to determine the tunnel layout and where you plan to place the fuel cap and petcock. The petcock is important because it holds reserve fuel that you might need, especially because you're narrowing an already small tank. Because the tank will be narrow, be careful where you mount the petcock to avoid conflicting with the line of the tunnel. Once you determine the placement of the tunnel, you can turn your attention to the petcock. Doing the opposite (petcock first, tunnel second) might force you to cut your petcock and lose your reserve. Remember, narrowing a gas tank means lowering your fuel capacity.

**Step 6:** To give yourself room to work when eventually placing the bottom, cut a square out around the perimeter of the template on the plate. Use Beverly shears, which cut on an angle, to make the template (make sure you cut outside the marked lines) and aviation snips to clean the edges.

Line the bottom up with the tank, remembering to mark which side is the top and bottom. Each side is different, and if you place the wrong side on the bottom and begin to tack weld without checking, there will be a gap on one side and overhang on the other.

**Step 7:** Fold the original paperboard bottom template in half and scribe a center line. This will help when you place your tunnel. Eventually, you will transfer that center line onto the bottom plate.



**Step 8:** After grinding the edge of the bottom, begin tack welding at the front. A screwdriver can help push in or pull apart the corners to square them up. Again, make sure the tank stays as still as possible and doesn't rock. Rocking could cause the arc to pop while you're welding. Complete the tack welding, followed by the full weld using your desired amperage. Make sure to have a nice bead and good lap over where you stop and start.

**Step 9:** It's time to work on the tunnel, which can be fashioned by using bendable exhaust tubing. You can show as much – or as little – of the tunnel as you want. How much you want to show determines the length of the cut. In my tank, I want to show a lot of the tunnel, so I'm going to use half the tubing, cutting lengthwise. Take the piece of tubing and place it on the bottom of the tank to measure and mark the length. This will also allow us to measure and place our radiuses. Cut out the area that will hold the tunnel, as well as the front and back radiuses. Mount rubber on the tank's frame so the tunnel doesn't rest directly on it. Place the tunnel in the cut-out area and tack weld, followed by a bead on each side to bring everything together.

**Step 10:** The tank is ready for the gas cap and petcock. While it's your choice as to where to put the gas cap, remember that the placement will affect fuel capacity. Placing the cap too far back on the tank might mean the bike gets less fuel.

The petcock's screen can be removed, and it can be cut at an angle. All you need is the inner diameter to fit into the tank. The measurement can be taken on the inside or outside of the petcock. Again, the petcock can be inset anywhere in the tank as long as it does not interfere with the tunnel.

Narrowing a gas tank requires patience more than anything else. You can't rush through and expect the tank to survive. It's about measuring, symmetry, layout and, of course, welding. Laying down a quality weld is the most important step because you don't want your tank to eventually crack, especially after applying an expensive paint job.

But narrowing a tank can be a fun project, one that will help you enjoy your custom bike for years to come. **ARC**





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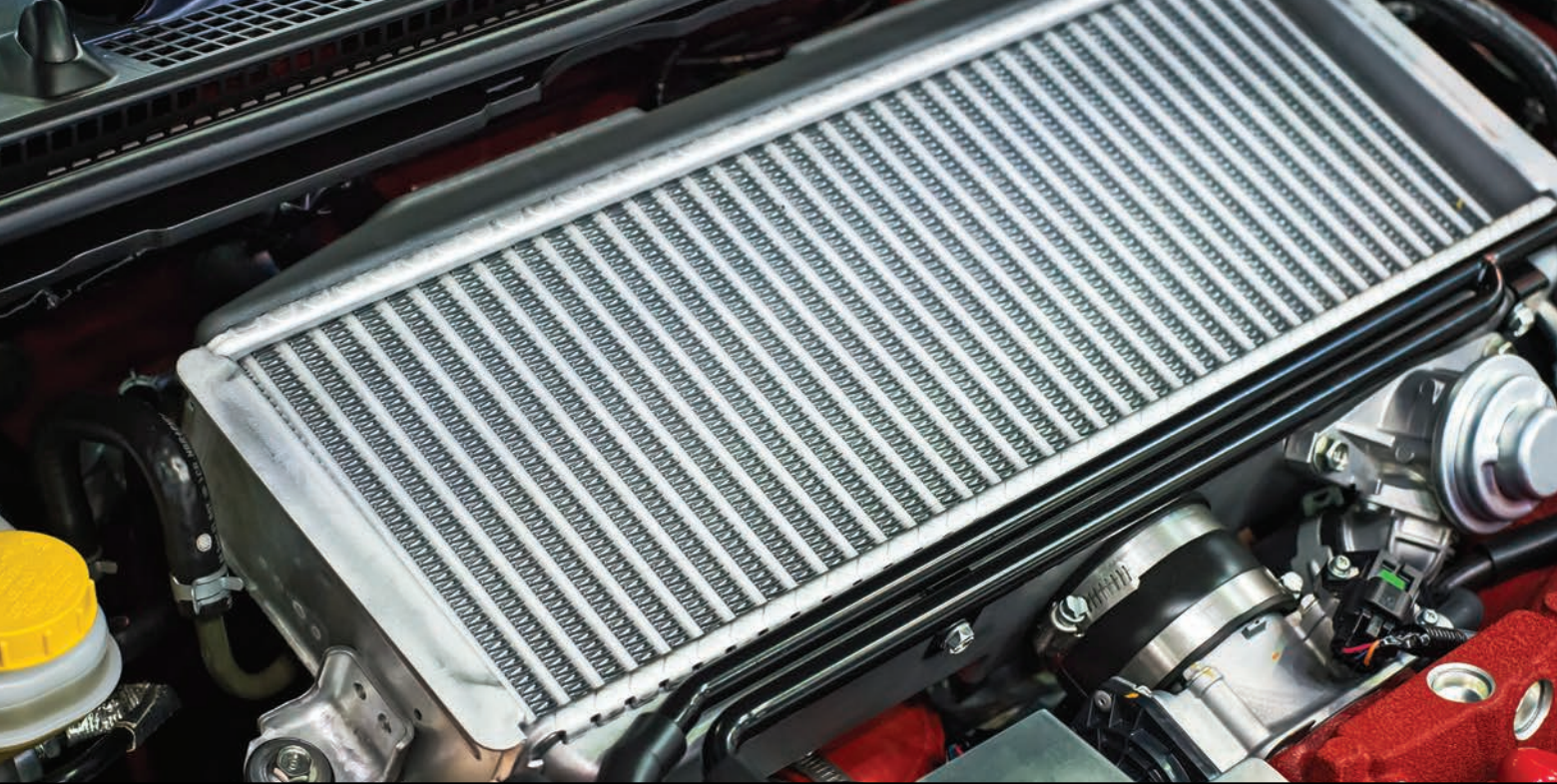


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# Turn to the Pros



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## Art Unseen: The Role of the Mount Maker

By Ken Krizner

Question: What does welding have to do with a 19th century Persian tent?  
Answer: Nothing you'll notice, if Philip Brutz does his job well.

In the basement of The Cleveland Museum of Art, well out of public view, Brutz recalls the challenge of building a mount to display one of the museum's latest exhibits, measuring 14 feet wide by 14 feet tall, in such a way that it won't interfere with a patron's ability to walk underneath the display and also remain invisible to the public eye.

For Brutz, however, it's just another day at the office. As one of two full-time mount makers for The Cleveland Museum of Art, his primary responsibility is to build mounts that provide inconspicuous physical support to display conspicuous objects d'art.

"It becomes routine, but you never take it for granted," Brutz says. "These are very precious objects, though you can't be intimidated by their value."

These professionals must be meticulous and demonstrate technical skills that rival any craftsman in any trade. Imagination is a plus and patience a virtue. Multitasking is unacceptable.

"Mount makers must focus on the task in front of them and nothing else," Brutz emphasizes.

Brutz came to The Cleveland Museum of Art after working at two other museums and spending more than 20 years as a maintenance supervisor, where he gained valuable experience. As a mount maker, he is an artist in his own right, albeit one that prefers his artistry to remain in the background, as is the case with the royal tent of Mohammad Shah Qajar, King of Persia (1834 to 1848).

Working with the museum's textile conservator, designer, cabinet maker and lighting specialist, Brutz provided overhead support for the tent by welding the cantilevered rim in a rectangular tube (chromoly to mild steel) measuring 1 inch by 1/2 inch with a wall thickness of 35 thousandths of an inch. He then covered the welds with the Persian textile. A center pole and wood cabinets lend support as well.

The fact that no one notices his work pleases Brutz. Even though he takes great pride in his craft and is proud of this particular mount, he knows all eyes must remain on the art. Of mount makers he says, "We are successful if we're not noticed." **ARC**





Informational text on a small display case to the left of the tent.

To get a behind-the-scenes look at the build and see additional projects completed by Philip Brutz, download the tablet edition of *ARC Magazine™*.  
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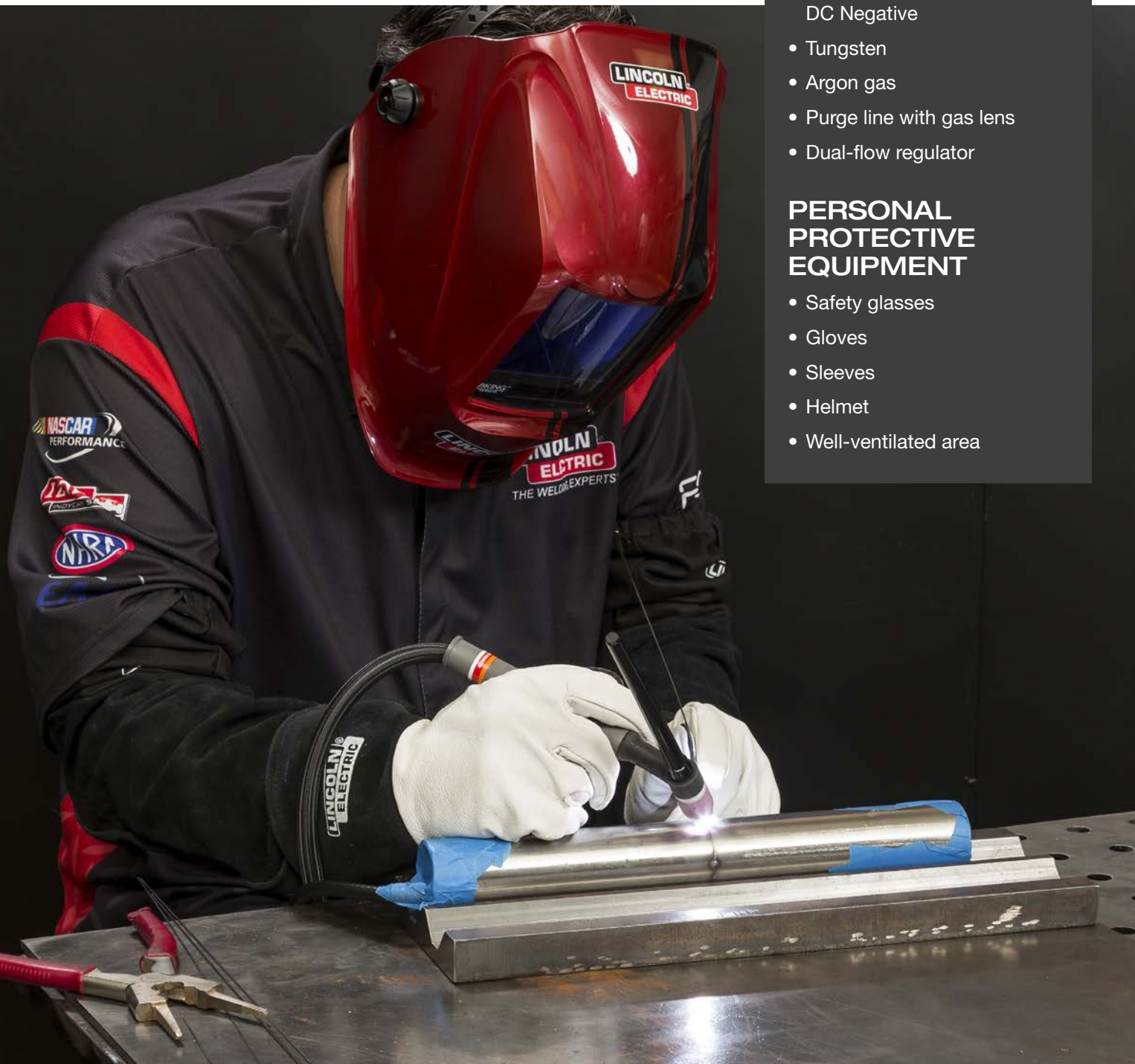




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## Back Purging Stainless Steel

By Scott Skrjanc, former Lincoln Electric welding instructor and current group leader



### TOOLS

- 304L tubing
- Lincoln® ER308/308L filler rod
- Lincoln Electric Precision TIG® 225 Welder, DC Negative
- Tungsten
- Argon gas
- Purge line with gas lens
- Dual-flow regulator

### PERSONAL PROTECTIVE EQUIPMENT

- Safety glasses
- Gloves
- Sleeves
- Helmet
- Well-ventilated area

Stainless steel is the preferred material in many applications because of its resistance to corrosion.

When preparing to weld a stainless steel pipe, purging is an important step to ensure that the weld is successful and that it remains intact for the long term.

While our demonstration involves a vehicle exhaust tube, purging stainless steel is important when welding pipe for food storage and other applications where impurities must be avoided. For example, failure to purge a pipe that transports food or beverage materials could lead to particles becoming trapped in hard-to-clean grooves, resulting in contamination.

On the outside, a weld on purged and non-purged stainless steel pipe looks identical. On the inside, however, is where the important difference occurs.

A purged weld is flat and tied in on the inside where the weld metal comes together. There are no valleys that could potentially threaten the integrity of the weld. Both portions of the tube look exactly alike.

A non-purged tube displays a “sugaring effect” resulting from the presence of chromium oxide. The presence of oxygen in the weld seam results in oxidation. A noticeable line forms where the weld metal comes together because it doesn’t fuse well. Non-purged stainless steel could crack, especially in high-vibration conditions. Caustic materials could become wedged in the line and eat away at the weld.

Purging removes oxygen and nitrogen and replaces those gases with a 100% argon gas atmosphere.

So to ensure the integrity of the weld, purging is an important part of the process when connecting (or repairing) stainless steel pipe.

The process starts with an examination of the pipe you intend to weld. It can be partially or completely separated.

There may be one or multiple cracks. If it is partially separated, it’s good to leave it that way (as opposed to breaking it into two pieces) because the fit will be much better.

A good cleaning of the tube is always recommended. Remember, TIG does not like dirty material. Make sure you clean the inside of the pipe if you have access to it. At the very least, clean the outside.

Safety is always a primary concern when welding. Make sure you’re welding in a well-ventilated area and wearing personal protective equipment. Once the work area is prepared, you can set up and begin the purge.

After cleaning, tape off one end completely with masking or other adhesive tape, then punch several holes in the tape to allow the oxygen and nitrogen inside to escape (we used a TIG rod for this; see Figure A). Place the purge hose with gas lens (to help with the gas flow) into the other end of the tube and tape off that side completely as well (see Figure B). This prevents the reintroduction of oxygen and nitrogen into the pipe.

Set the regulator (dual flow or separate tanks) to run 15 to 20 CFH of argon to initiate the purge. You’ll know the purge process is happening when you feel the gas escaping the perforated end of the pipe. You also want the argon on the outside of the tube.

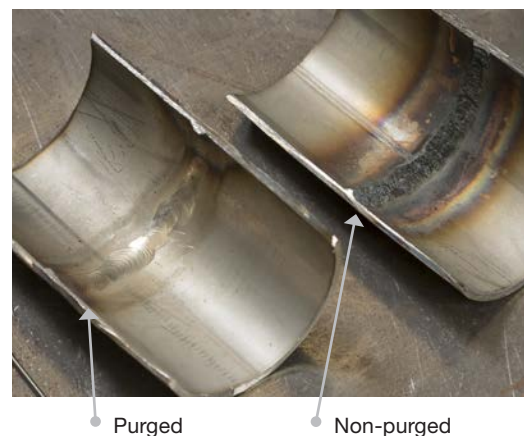
The length of time to purge prior to beginning to weld is based on the pipe’s diameter. Make sure the argon continues to flow during the entire welding process.

When you’re ready, place several tack welds around the pipe.

When it’s time for the final weld, the amperage should be based on the thickness of the tube. A general rule is 1 amp per thousandths of an inch. For example, a tube 0.035 thick requires 35 amps. Stainless steel is welded on DC negative.

Once the weld is complete, let it cool naturally.

Welding stainless steel is not difficult, but it does take practice—and so does purging. Weld on purged and non-purged materials to see the difference for yourself. Purging creates the best possible weld environment and ensures that the metal joins properly and stays together. **ARC**



# WELDING STACKS, **CUTTING COSTS**



Have any vintage (pre-1975) photos you'd like to share? Email them in jpeg format to [editor@arcmagazine.pub](mailto: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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