Special Emphasis: Welding Education

Entertainment’s Take on Welding

- A Look at European Qualification
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PUBLISHED BY THE AMERICAN WELDING SOCIETY TO ADVANCE THE SCIENCE, TECHNOLOGY, AND APPLICATION OF WELDING AND ALLIED JOINING AND CUTTING PROCESSES WORLDWIDE, INCLUDING BRAZING, SOLDERING, AND THERMAL SPRAYING
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On the cover: A custom trophy fabricated at the Warner Bros. Studios Metal
Shop in Burbank, Calif.
The Thrill of Competition and Collaboration

During the recent WEMCO Annual Meeting, we watched and chatted about the Sochi Winter Olympics while having a drink in the evening. Everyone was commenting on how important the interplay is between rooting for our native countries, the love of our favorite sports, our personal interest in seeing the athletes we recognize do well, and the thrill of watching close times and scores between contestants. It was just great to feel the excitement of the games, and the passion of the outstanding athletes. It was fun to allow ourselves to get caught up in the physical exertion of such highly trained men and women. At times, you felt your heart rate increase, and your fist clench at those successful moments; the incredible times, and you could almost feel the unfortunate slips and falls on the slopes and ice. Really, if you allowed yourself to get caught up in the moment, it was enthralling. The Olympics are an incredible and exuberant mixture of youth, excellence, struggle, failure, and triumph.

Now you might think it a bit of a reach, but, in fact, WEMCO has many of these same characteristics and opportunities. If you’re unfamiliar with WEMCO, it is an association of welding manufacturers and standing committee of the American Welding Society. For more than 15 years, I have been coming to WEMCO Annual Meetings, and in that time, I have seen interest in different welding technologies wax, wane, then rise yet again. What is noticeable, though, has been the impressive people I have met from these companies. And all the while, various products and processes have changed and evolved. Those who have attended the WEMCO meetings over those years have seen individuals bravely leading small companies, new leaders take over the helm of larger companies, and, at the same time, made new friends and affirmed old acquaintances. Frankly, there is nothing better than to sit down with colleagues to share memories and make plans for the future.

Who is your typical WEMCO member? Companies, like individuals, are all different; with aspects we are both familiar and unfamiliar with, and possessing characteristics we like and dislike. Some participate; some are quiet observers. All have different motives for attending. What is noticeable, though, has been the impressive people I have met from these companies. Over the years, I have met not only outstanding teachers, and other great guys and gals, enjoyed good times and listened to impressive speakers, but I have also had the opportunity to learn from the best about the best technologies and processes. WEMCO’s technologies traverse the full range of welding, from the fully automatic to the most manual processes, fascinating our members. Where else can you get this exposure? Where else could you find this knowledge?

Perhaps best of all have been the speakers WEMCO draws in. At the Annual Meeting this past February, we had excellent presentations on where distribution is headed and how to respond to rising challenges and demands from sources such as end users. We were offered potential solutions on how to respond and who will be there to deliver to them. The fact is, membership in WEMCO allows you to experience the passion, ambition, and the interest in excelling with the best in the welding industry. As a member of WEMCO, you can gauge for yourself where the industry is headed, and plan accordingly.

And just like as at the Olympics, you have the camaraderie and good times of the contestants and the spectators. You can exert yourself or relax among kindred spirits with the same interests, or just watch the proceedings in calmness and quietude. What WEMCO really offers is the best window you can get to the welding and cutting industry. Missing the Annual Meeting is like missing your favorite sport and all of the Olympics. Make sure you are a member. Welding, after all, is that unique world with innumerable products, limited only by our imaginations. Come join the leaders!

Nigel Scotchmer
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Lights, Camera...Welding

Skilled fabrication crews creatively hold production together in Hollywood and beyond

Welding and fabricating will not likely win a “Best Supporting Actor” Oscar for on-screen performances, and close-up equipment shots, in such films as The Green Hornet, Drive, and the Iron Man franchise. But, the combined efforts of these crafts still have a commanding role in many aspects of behind-the-scenes production and give welders and fabricators a challenging, high-profile outlet in which to practice their creative, and in-demand, skills.

Welding and fabrication are key technical components of many Hollywood productions even though they aren’t as highly visible as cinematography, costume, and makeup design, or explosive, in-your-face special effects. Nevertheless, welding and fabricating help things take shape and stay together on film, quietly making sets, customized props (Fig. 1), special effects, and auto crashes a reality.

When you consider the role props play in a film, it’s clear that prop development, from the small knife wielded in a bar fight to a tricked-out sedan used in a high-speed chase, play integral roles in a film project, on-screen, and off.

While the cost of simple props obviously varies from project to project, depending on whether it is a Hollywood summer blockbuster or a minor independent (indie) film, the average props budget will range from 1 to 10% of the total budget, according to budget-planning information provided by various filmmaking industry educational resources. Add in the cost for cars required for street scenes or high-speed chases, and the budget climbs from the bottom of this range to the top, or even higher.

For example, an indie film with a budget of $100,000 would be safe to allocate a mere $1500 for props, according to a budget tutorial at 4filmmaking.com, while fabricators at Picture Car Warehouse in Northridge, Calif., a long-time supplier of cars to the Hollywood film industry, spent roughly $7 million on just creating custom vehicles for the $76 million-budget blockbuster 2 Fast, 2 Furious in 2003.

A Need to Know It All

As long-time entertainment-industry prop fabricator Paul Pearson sees it, in order to create Hollywood-caliber props, fabricators need to have a “mass of skills,” including not only welding, but also sheet-metal fabrication, model and miniature building (Fig. 2), electronics and electrical know-how, and even mold making — creating everything from customized autos to small hand weapons such as pistols and knives.

A rough knowledge of hydraulics and pneumatics also comes in handy, as does an understanding of basic machine- and wood-shop operations. And while it’s not necessary in every situation to perform a certified weld, those in the industry still must do it not only well but as unobtrusively as possible.

“If we do our job correctly,” said Pearson, who got his start in custom auto fabrication and now owns Custom Props, Inc., in Van Nuys, Calif., bringing nearly 40 years of prop fabrication experience to the table, “you should never know that we were there.”

From Hot Rods to Stunt Cars

Automobiles, motorcycles, and other means of on-screen transportation are prominent areas where welding quietly performs in television programs, feature films, music videos, and commercials.

“The cars you see on TV or the big screen aren’t just normal, generic cars. They’re modified for certain needs, and doing so requires welding, much of it hidden,” explained Los Angeles fabricator Paul Clarke. Moving from fabricating work in the motorsports industry to the entertainment industry, Clarke, over the past 20 years, has designed and/or worked on vehicles for such films as Looper, Saving Mr. Banks, Drive, Need for...
Different Cars for Completely different.”

adapting prebuilt cars into something structurally sound as possible, often
“And we need to do this as simply and no jumps or sustain a crash,” Clarke said.
neath, changes designed to help them do
fabricating, these cars are dismantled, stretched (Fig. 3), strengthened, and re-
built to accommodate filming angles and even safety requirements.
“We hide structural changes under-
changes designed to help them do jumps or sustain a crash,” Clarke said.
“And we need to do this as simply and structurally sound as possible, often adapting prebuilt cars into something completely different.”

Different Cars for Different Takes

What’s more, for every one car that the audience sees on screen, many more identical vehicles are employed for dif-
f erent takes and uses during filming, noted Ted Moser, Picture Car Warehouse’s founder and owner, who entered the film production industry more than 20 years ago and has become a go-to source for vehicles used in films, television, and advertising.
“People don’t realize that we have built four or five different cars for each one they see on screen,” Moser said, noting that during the production of the film, The Town, starring Ben Affleck and Jon Hamm, the company custom-fabricated four different Dodge Caravans that the bank robbers used as a getaway vehicle.

In fact, in most productions involving automobiles, three different kinds of cars are used to serve as the single vehicle the audience sees on screen — the hero car, the process car, and the stunt car.

The hero car is the eye-catching looker on the screen, used for both interi-
or and exterior shots. To see a prime ex-
ample of a hero car, Moser said to check out 2 Fast, 2 Furious, starring the late Paul Walker and Tyrese Gibson. The Dodge Challenger created by Picture Car Warehouse for the film epitomizes a hero car, according to Moser.

“That hero car was visibly perfect, from the interior to the exterior to the engine,” Moser said. “We spent $7 million on cars and fabrications for this film, building roll cages, removing air bags, and automatic braking systems, and performing other tasks, ultimately constructing 200 different cars within a 6-week time frame.”

Process cars have a perfect interior for filming actors inside the car, but the exterior likely has been modified in a va-

riety of ways to accommodate cameras at different angles.

“In Saving Mr. Banks, a series of limousines, each a different version of the same car, was modified in order to locate cameras for a shot,” Clarke explained.

“This happens in most movies that involve cars. You might need to fabricate a removable roof or be able to easily pop a door on or off. Or if you need to see an actor’s feet changing gears, you might have a hole in the floor that allows cam-
ers to be positioned tightly down there. We even have cut a Mercedes in half for filming purposes. Those kinds of modific-
ations are things viewers don’t think about or don’t even notice, but the cam-
era crew couldn’t get the shot it wants without those changes.”

The stunt cars, with pristine exteriors, include modifications such as welded roll cages, five-point harnesses, a third brake, a lower rear end, and other safety features. Some films can have 20 identical cars, each designed to do specific stunts — jump bridges, roll over, explode, and more.

“You have to make sure the roll cage can’t be seen from any shooting angle,” Pearson pointed out. “If you suspect that you have seen a stunt car, then I didn’t do my job correctly.”

Not Much Formal Planning

All of these modifications require more than a bit of automotive alchemy. Hollywood fabricators often work from a verbal description, or at best an artist’s rendering, of the vehicle in mind. And, often, it becomes a process of trial and error, on a stringent time frame.

“We usually don’t work with a formed set of plans,” Moser said. “It’s not like building a chassis that already has preset measurements. We just have to get cre-
ative and do it.”

For example, Moser’s team completely rebuilt one of the Caravans used in a chase scene in The Town. Crews retrofitted a Chevy 350 engine into the van and removed the entire original dri-
vetrain. Modifications also included welding in a sub-frame and a 9-foot Ford rear end. The vehicle ultimately was re-
worked to make it rear-wheel drive instead of the standard, front-wheel drive, which assisted with speed and handling for the chase scenes.

In another project, the Picture Car Warehouse team customized a Mercedes Benz Unimog for a chase scene in Argo, winner of the 2013 Academy Award for Best Picture.

“In a planning meeting before the beginning of shooting, I explained that a Unimog would only reach about 37 miles per hour, so the film initially scripted with
that in mind,” Moser recalled. “However, a week before they were ready to shoot, the filmmakers decided that they wanted it to go 75 miles per hour. We took the Unimog body off of its chassis and fabricated it onto a 1985 Dodge Ramcharger chassis. We had to stretch the chassis to make this happen — and it worked.”

**Time Is Short**

On top of the obvious challenges of creatively designing and combining aspects of different vehicles into one to make them function as needed for filming, Moser, Clarke, and Pearson face an even tougher hurdle — tight time constraints.

“We sometimes have less than a week to build a fleet of cars that need to be done perfectly, on time and on budget,” Moser said. “Sometimes we have to do it overnight. There are times when our welding machines run 24 hours a day to meet production schedule demands.”

For the film *Looper*, on which both Moser and Clarke were involved, fabrication teams had five days to create unique hover motorcycles (Fig. 4), a process that involved from-scratch design and a lot of cutting, welding, and fabrication.

Clarke and Moser said they turned to Lincoln Electric equipment for this job, as well as other work that required intensive, constant welding on such substrates as aluminum. They relied on Lincoln Electric’s Precision TIG® 375 gas tungsten arc welding (GTAW) machine for this high-visibility, fast-turnaround project.

“We need equipment that is reliable. We can’t have something breaking with the kind of turnaround times we face,” Moser said. “In this industry, there isn’t something called ‘downtime.’”

**Setting the Stage**

Welding and fabrication’s importance in the entertainment industry reaches well beyond stunt cars. At Custom Props, Inc., Pearson and his team also fabricate a variety of custom props, ranging from weapons, such as knives and guns, to special doors, sculptures, and more.

Prop fabrication is an area where GTAW skills are a must, thanks to the widespread use of aluminum. They relied on Lincoln Electric’s Precision TIG® 185 machine to get the job done.

“We use TIG welding a great deal when we manufacture weapons such as guns, knives, and custom swords,” he said, noting that he frequently relies on his own Lincoln Electric Precision TIG® 185 machine to get the job done.

“TIG is essential because of the quality welds it produces on aluminum. You shouldn’t be able to tell the weapon is a prop. It needs to look like a real weapon.”

As with cars, weapons also fall into hero and stunt categories. Directors will shoot the “hero shot” with a real knife, but when the knife-wielding villain starts to chase his victim, he’ll really be carrying an aluminum stunt knife. And in the stabbing scene, the aluminum blade is actually retractable. Weapons even can be outfitted with blood tubes or molded rubber components, depending on shooting requirements, Pearson said.

Aluminum welding goes beyond on-screen weapons and props and moves onto the actual set of films, television pro-
grams, commercials, and music videos. In the movie *Heat*, starring Robert DeNiro and Val Kilmer, a series of what appear to be heavy steel bank-vault doors actually are aluminum — Fig. 5.

“We brushed the doors and hinges to look like steel,” Pearson explained. “Aluminum really is like a stunt actor in Hollywood, too. It fills in for stainless, chrome, and a lot of other materials.”

For a sculpture designed to hold helium balloons in a Dunlop tires advertisement, Pearson’s team welded a 35 × 35-ft structure of polished aluminum in the shop, then dismantled it to move and rebuild it in the shooting location — the New Mexico desert outside of Santa Fe.

“We supply a set crew for shoots, to ensure that we can perform repairs quickly and keep production running,” Pearson said.

When it comes to prop welding, one thing is certain from film to film: It only has to last as long as it takes to get the shot.

“That’s why you don’t find a lot of certified welders in the business,” Pearson said. “What we’re welding doesn’t have to last 20 years. We’re done with it after the director calls cut for the final time.”

However, it’s a different story off-screen literally behind the camera on cranes and rigs.

“That’s where certified-welding comes into play,” Pearson said. “The crane business is where the real precision welders make their money.”

As Pearson noted, there is an entire business market devoted to camera crane

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**Bringing Toy Legends to Life**

One of the big advantages of fabricating for the entertainment industry is the variety of projects that come your way. In Los Angeles fabricator Paul Clarke’s case, he was given the opportunity to help bring the dream cars of many a little boy to life, creating fully functional, life-sized versions of popular Mattel Hot Wheels cars.

Mattel uses these cars for a variety of promotional purposes, including meet-and-greets at auto shows and other live events and in videos on its Hot Wheels website.

Clarke has worked on at least five different Hot Wheels projects under contract with PCW Brands, a sister company to Northridge, Calif.-based Picture Car Warehouse.

One of those closest to his heart is the Bone Shaker (Fig. 1) — a replica created from the ground up.

“These toy cars only have exterior features, none of which is appropriately sized for a real automobile,” Clarke said. “You can’t just scale your design off of the toy. So you have to start asking yourself questions, like, ‘How big would it be in real life?’ and ‘What kind of interior would it have?’”

“We built it from scratch,” Clarke said, noting that his team created the car’s entire interior, based on its skeletal theme — Fig. 2. “We thought this looked like a car from hell on the outside, so we wanted to be sure it looked like that on the inside.”

“We built it as though it was a living, breathing entity,” Clarke said. “This one is special.”

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![Fig. 1 — Built entirely from the ground up, the Bone Shaker® is a fully functioning car.](image1)

![Fig. 2 — The fully custom interior includes a number of features that extend the skull-related theme of the car.](image2)
construction and maintenance.

“You have camera rigs and Louma cranes (versatile, modular, remote camera cranes) that require constant welding adjustments. All of these different things have to work on set and on location day in and day out, and many of them have to hold a $350,000 camera. You don’t want that camera to fail off the end of a 50-foot crane and smash, or hit someone on the set.”

**Beyond Hollywood**

While Hollywood remains the heart of the U.S. entertainment industry, changes in the economic environment increasingly have pushed film production into states other than California, thanks to tax breaks and other financial incentives. This means some of the work goes to shops in other states, making businesses such as Pearson’s find other ways to land contracts and keep up with their craft.

“We no longer survive off of movies, television commercials, and rock videos,” Pearson said, noting that his company has branched out to creating sets and trusses for live rock tours, specialty features for retail dressing, and even trade show booths, among other areas. “It became necessary to expand as more and more film work goes outside of Los Angeles.”

Recently, Pearson and his team worked with Lincoln Electric to create a futuristic, custom motorcycle featured in the company’s “This Future Made Possible With Lincoln Electric” video that provides a look toward the fabricating future. The video can be viewed at Lincoln Electric’s “Made Possible With” campaign website.

“We used a lot of steel in that project,” Pearson said. “We hand-formed the panels and used fiberglass and foam shaping. In that one motorcycle, there’s probably one form of everything I learned over the past 40 years. It really was a great creative fabrication project for us to tackle. It’s a pretty interesting piece.”

**A Satisfying Welding Career**

Whether they’re working on something related to the big screen, television, or even on-stage at a live event, welders and fabricators have found that a career in the entertainment industry poses unique challenges and rewarding results.

“In some ways, it’s always different,” Moser mused, “but in other ways, it’s no different than any other welding or fabrication job. We have to get it done on time and stay within budget.”

Clarke agreed, noting that his initial experience in motorsports paid off with his transition to fabricating for the entertainment industry. It taught him to work quickly, efficiently, and creatively — and to expect the unexpected.

“I usually never know what I’m going to encounter in a particular day,” he said. “I don’t normally get blueprints and often work only from some general information on what the exterior is going to look like and what the safety structure might be. I then have to use that little bit of information to create the steps and design needed to achieve the end result. I love being able to get creative with welding and fabrication and figure out what we want to do and how to make it happen. And to do this, you really need to know how to master your welding machine.”

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