

# Practical Engineering in TV's Impractical Engineering Shows: *Monster Garage* and *Junkyard Mega-Wars*



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Figure 1. *Monster Garage* star Jesse James.

**Editor's Note:** A hypertext-enhanced version of this article is available on-line at [www.tms.org/pubs/journals/JOM/0310/Byko-0310.html](http://www.tms.org/pubs/journals/JOM/0310/Byko-0310.html).

## INTRODUCTION

In the office he's William Yerazunis, PhD. On the *Junkyard Mega-Wars* set, he's Crash, team captain and self-proclaimed nerd. Yerazunis, who works as a research scientist at Mitsubishi Electric Research Laboratories, is a regular on the The Learning Channel (TLC)'s *Junkyard Mega-Wars*, a program in which two teams compete to build a vehicle from discarded materials. This show and others like it have become a trend in cable: reality TV with sparks flying, machinery whining, and, on most days, creativity flourishing.

Television audiences are fickle, so the trend may soon go the way of the battling robots that were a cable phenomenon a few years ago. For now, though, viewers can choose from several

programs that feature craftsmanship and competition. Along the way, they might learn a bit about science—Yerazunis said his program offers “stealth science”—pick up an idea or two for a new tattoo, and perhaps come to appreciate the skill that goes into creating projects as ordinary as motorcycles or as odd as scrap-metal submarines.

## A MONSTER HIT

At the annual meeting of the American Welding Society (AWS) in April, the star was not the laser welding equipment or flashy robotic products. Instead, men in suits and hardhats, young and old, lined up at the ESAB Welding and Cutting Products booth to meet Jesse James, star of the Discovery Channel's *Monster Garage* and hero of the welding world. Some brought welding gloves to be signed, others carried their meeting programs. No one seemed bothered by

the tattoos covering James' forearms, the knit cap pulled down over his eyebrows, or the seemingly gruff demeanor.

“For the most part, people put aside whatever prejudices they might have had,” said Rusty Franklin of the American Welding Society. “They were looking at the skill and the accomplishment. It didn't matter if he had a zillion tattoos, a whole bunch of earrings, and body piercings; from the perspective of welding and joining metals he does relate to the youth of today.”

Jesse James (distantly related to the wild-west outlaw of the same name) was already legendary among motorcycle enthusiasts when he was discovered by Thom Beers, executive producer of *Monster Garage*. In 2001, Beers wanted to create a special program about custom motorcycle builders and was looking for a star with the right mix of personality and craftsmanship. When

he met James, he stopped looking.

Beers created *Motorcycle Mania* starring James at work in his California shop, West Coast Choppers, where he shapes metal into one-of-a-kind bikes for a client list that includes athletes and celebrities. The program was an instant success. "The numbers were just huge," Beers said. "In the first one (which was soon followed by *Motorcycle Mania 2*) Jesse hand-built a tank from scratch. When that film aired everyone couldn't stop talking about it. That's what told me people are fascinated with real craftsmen." Beers decided to tap that audience with the *Monster Garage* series (Figure 1). Each week, a group of mechanically inclined people joined James in a garage to convert a conventional vehicle into something new and odd: a sport utility vehicle became a garbage truck; a racecar was changed into a street sweeper (Figure 2). There was a time limit, a budget, and numerous shots of James applying power tools and imagination to the challenge of the week.

The teams were carefully assembled to combine particular abilities. "We usually look for skills associated with each of the builds," Beers said. "Everybody's got to have welding skills, everybody's got to have fabricating skills." Although college degrees are not necessary for success, problem-solving skills are essential. "Some of the engineering feats are extraordinary," Beers said.

Again, Beers found a formula with an eager audience and the series in September launched its second season.

"Every week we get three million homes that tune in," he said. "That's great for cable." And, it turns out, great for the welding profession.

### BUILDING A BETTER IMAGE

The creative shows on cable, especially *Monster Garage* and *Junkyard Mega-Wars*, have attracted the kind of attention of which the AWS's Image of Welding Committee could only have dreamed. The committee was formed several years ago, said Chairman Rusty Franklin, after a media report that welding ranked as one of the ten worst jobs in America.

"There is a perception that welding



Figure 2. An old NASCAR racecar is transformed into a speedy street sweeper on *Monster Garage*.

Figure 3. A school bus that was transformed into a pontoon boat floats on *Monster Garage*.



Figure 4. A *Junkyard Wars* team prepares to compete.

jobs are not good-paying jobs, they're not necessarily skilled jobs, they're dirty," Franklin said. The committee created television commercials reminding viewers of the value of welding in everyday life, but when cable television programs began to showcase metal crafting, the profession received a publicity boost that was like a gift to the committee. "Those shows portray a very positive image," Franklin said. "Both those shows demonstrate that even non-welders are fascinated by the skill set of those people and how creative they can be in producing whatever their task is."

The appeal of shows such as *Monster Garage*, Franklin believes, comes not with the final product, but with the process of creating it, although, as shown in Figure 3, the end results are eye-catching.

As for James himself, "the guy is

an incredibly skilled welder," Franklin said. "He's driven by his creativity and skill."

During his appearance at the American Welding Society show, James took time to visit some highly impressed trade-school students who were participating in a welding competition. "He's an awesome designer and an amazing fabricator," said Miles Tilley of Ann Arbor, Michigan. Both James and Franklin believe that schools need to place more emphasis on the kinds of skills James was taught in high school shop classes. Both think his popularity could help lure students back into such classes. "I get a lot of e-mails from shop teachers," James said. The teachers tell him their classes were half full before *Monster Garage* went on the air. "Now, their classes are full," he said.

Beers said a nonprofit organization is being planned to benefit high school

## JESSE JAMES BRINGS MANUFACTURING TO THE MAINSTREAM

He's been featured in *Fortune* magazine. He's been named one of *People* magazine's sexiest men. But Jesse James reached a professional pinnacle in April when he was presented the American Welding Society's Golden Helmet Award. The award, he said, meant more to him than being named one of 2002's favorite sexy guys. Those honors fade quickly, he said. "Welding is forever."

Before finding fame on television, James was well known among motorcycle fanatics for his custom-built bikes, which sold for prices starting at \$55,000 and reaching into six figures. "I didn't plan for it," James said of his following. "I was just trying to make a cool bike for myself."

Thom Beers, executive director of *Monster Garage*, was impressed by James' skills in the garage and believed the viewing public would be, too. When Beers developed the idea for *Monster Garage*, he taped four episodes with James leading a construction crew through oddball projects that showcased imagination and mechanical ability. "I didn't know if anyone was going to like it," James said of the pilot. Viewers did like it, and the Discovery Channel, which earned its place as a cable television ratings leader more on programming about wildlife than metal working, found a new niche with males who appreciated James' talents and females who appreciated his looks (Figure A). "Men want to be him," Beers said, "and women want to be with him"

James is modest about his success—"I've always been a better welder than a businessman," he said. But his high school history tells a different story. James, now 33, started welding at 12, and within a few years was marketing his skills in shop class.

"I used to take everybody's welding test for \$10 apiece," James said.

Over the years, he's learned all kinds of welding—tungsten inert gas, steam-injected gas turbine, metal inert gas, and even underwater. The most challenging work he's done is seamless welding of copper. He now has that technique mastered and is building a bike made entirely of polished copper.

His most difficult job, James said, was when he worked in a Seattle shipyard, welding an aluminum bulkhead, standing outside, "knee-deep in ice water," sparks all around him as he tried to maneuver in tight quarters. Those days appear to be over. Now, in the comfort of his newly expanded shop, he's building a concept bike for Honda, starring on a weekly television show, and has built bikes for basketball's Shaquille O'Neal, rock star Kid Rock, and Atlanta Falcons wide receiver Shawn Jefferson.

After his time in the spotlight is over, when bike-loving celebrities forget his name, James will always have his skills and experience to fall back on.

"I've always had it in the back of my mind that if I lose my job, I can always be a \$25 an hour welder," he said.



Figure A. Jesse James, motorcycle builder, *Monster Garage* star, sex symbol.

shop classes, which face budget cuts in many school districts. Tentatively called the Jesse James Fund for Industrial Arts, the organization will auction, on-line, items such as *Monster Garage* vehicle parts and autographed tools.

### MAKING A SUCCESS OUT OF JUNK

When *Monster Garage* debuted in 2002, *Junkyard Wars* already had a solid following dating back to its debut on U.S. television in 1999. The show evolved from a British program called *Scrapheap Challenge*, in which two teams built an assigned project using materials scavenged from a junkyard.

The current *Junkyard Mega-Wars* program debuted in August. Throughout the program's evolution, the engineering challenges have been consistently daunting—teams have recycled materials into creations that have flown, hovered, and floated, all under a ten-hour construction deadline (Figure 4). Bill Yerazunis, who started on the show as a competitor and this year is a regular as a team captain, said he is always impressed with the unusual solutions people find to their problems. "Everybody has a spark of genius in them," he said.

To win a spot on the show, Yerazunis and several mechanically minded

acquaintances created a video, as required by TLC, demonstrating their engineering know-how and creativity. In their tape, they assembled a crude super-sized sewing machine from garage odds and ends. Each of the team members powered a component of the machine. They gave themselves a clever name—the New England Rubbish Deconstruction Society, or Nerds—and won a spot in *Junkyard Wars*. The team had a successful run, winning their challenge and subsequent semi-final rounds, but losing in the final challenge. Among the projects the team constructed were a mini-submarine, a steam-powered car, and a dragster.

For the fall 2003 season, Yerazunis was invited back as one of two captains who, in a change from *Junkyard* traditions, each week choose a team from selected candidates and compete in a challenge. Yerazunis is promoted as the brainy team leader versus a more brawny opponent, Richard Munsen, known as Bowser. The captains are given a construction assignment, such as a snowmobile or rock-crawling vehicle. The captains decide what to build and what types of parts they will need, and then each meets with Greg Bryant, the show's technical advisor. Bryant, who is an engineer, helps fine-tune the designs. Next, the captains select a team and begin construction.

To build his team, Yerazunis looked for specific skills depending on the project. Someone who has built things before was always an asset. All the team members needed to have construction experience—the set was equipped with plasma cutters, oxy-acetylene torches, and metal inert gas and tungsten inert gas welding equipment, along with common hand tools, and everyone was needed to join in and build with them. Someone with knowledge of auto mechanics on a wide variety of vehicles was a bonus, along with a capable welder, but not necessarily of the type who builds buildings or cars. "Almost half of our ace welders are not structural welders, they're industrial artists who spend 18 to 20 hours in the studio making something that's beautiful that's going to last for 50 years," Yerazunis said (Figure 5).

Ivan McLean, a member of the Big Shots team from an earlier season, was



just such an artist. McLean, who works as a metal sculptor, was drawn to the competition and creativity of *Junkyard Wars*. “I think we all have a common love, this feel for metals,” he said of the show’s participants.

### CULTIVATING NEW CRAFTSMEN

Greg Bryant has experience in making learning palatable, even fun. The technical expert on *Junkyard Mega-Wars*, who is an engineer, started his career as a junior-college physics teacher. His students were less than enthusiastic about the subject, and Bryant was determined to relate physics to the world those students knew.

“Keeping them interested and motivated was the biggest challenge, trying to make physics something real for them in everyday life,” he said. “Like for the young men, trying to explain to them about the latent heat of fusion of ice and relate that to how much ice you bought to cool down a case of beer. If you can get them hooked slightly like that and translate these technical concepts into things they see and use every day, then it becomes much more realistic to them. Even though sometimes it doesn’t seem like they’re learning they actually are understanding the phenomena around them on a daily basis.” Bryant looks at *Junkyard Mega-Wars* the same way. “Certainly it’s about entertaining people, but just by watching it you will understand more about technical matters than you did had you not watched it, but you won’t even realize it.” He points to an episode in which the teams had to build a hovercraft out of junkyard materials. “People that watched the hovercraft show . . . may not have known you can drive vehicles around on a cushion of air or how a hovercraft worked. It was a very entertaining show but people came away with a clearer understanding of what was required to make a hovercraft work.”

Bryant compares the lessons taught on *Junkyard Mega-Wars* to those taught in the old *Mr. Wizard* science program.

“Mr. Wizard would do these fascinating experiments that were almost magic—*Junkyard Wars* is an evolution



Figure 5. *Junkyard Mega-Wars* captain Bill “Crash” Yerazunis shares his expertise.



Figure 6. Paul Teutul, Jr. demonstrates his skills on *American Chopper*, a Discovery Channel program about custom-motorcycle-building.

of that,” he said. “But it also has people trying to make decisions based on things they have, and sometimes, most importantly, things that they don’t and they have to use an ingenious solution to work around the problem.”

Bryant qualifies as a *Junkyard Mega-Wars* expert based on his experience and education—he was formerly employed for Walt Disney’s “Imagineering” team, which performed engineering for the Walt Disney Company. He still works as a ride compliance engineer for Universal Studios.

Although the TV junkyard is mostly stocked with items collected from area scrap yards, Bryant makes sure that specific items can be salvaged from materials in the junkyard. Even when those items are supplied, though, there’s no guarantee they will end up with the intended team. “Sometimes the other team will get it and they’ll have to come up with a substitute,” Bryant said. “That’s when the show gets really creative.” For example, when taping an episode for the current season, one of teams needed to make a winch to crank up a rope, and there was a certain type that had been stocked for them in the junkyard. Their opponents found it, though, and the team members then

took the differential out of a car and built their own winch. “It was an ingenious, extremely effective design,” Bryant said. “Arguably more effective than the one they actually wanted to use, and that happens quite often on the show.”

Yerazunis believes *Junkyard Wars* offers a positive message for both adults and children. “When you get right down to it it’s stealth science education,” he said. “It motivates self learning, and that’s the best way to learn; there’s no penalty if you fail but the win is tremendous, if you learn it for yourself because you chose to.”

Yerazunis does not see the same benefit in *Monster Garage*. “They built a donut fryer in the back of a police car,” he said. “Someone’s going to watch them and they’re going to be amused, but they’re not going to be motivated.” He has more appreciation for other fabricating shows proliferating on cable now, such as Discovery’s *American Chopper*, in which a father and son build motorcycles, piece by piece (Figure 6).

“These guys are doing art with metals,” he said.

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