



Rhino in the fast lane

Hollywood's favorite car customizer relies on 3D modeler to speed completion of Disney's real "Cars"

Sawing into high-priced sports cars right off the showroom floor might make mortal car-builders squeamish, but Eddie Paul proceeds with a surgeon's confidence. "We've got this brand new Porsche here, and we're going to cut it in half and put it back together ..." he says.

And everything Paul does is fast. This applies to what he makes — the automobiles in movies that are so unique that they take on a leading role, ranging from the American classics in *Grease*, to the high-flying General Lee in the *Dukes of Hazzard*, or to the modern-day racers in *The Fast and the Furious*. Fast also applies to how he does it: "Studios give us impossible jobs and very little time to do them," says Paul, president of Customs By Eddie Paul, a division of El Segundo-based E.P. Industries, Inc.

The southern California inventor and auto-customization wizard had another tight timeline for his latest challenge, transforming a real Trans Am and Porsche to resemble the automotive characters *Lightning McQueen* and *Sally Carrera* from the summer Pixar animated release, "Cars." Paul and his talented crew of fabricators produced the two stars, along with a sidekick tow truck called *Mater*, each within a month's time. The show cars were displayed at various automotive events across the country to promote the movie's summer debut and were exhibited at the 2006 World Wheels trade show.

To convert cartoons of cars into real-world hot rod mods, Paul and his staff adopted a new 3D tool, Rhinoceros software. One of Rhino's biggest strengths is NURBS surfacing, which is popular among a wide variety of product designers because of its ease in sculpting accurate, complex curves.

"Pixar wanted us to take two-dimensional cartoon cars and make them into three-dimensional full-size cars. That's how we found out about Rhino," explains Paul.



Real cars become real "Cars," thanks to the skills of Eddie Paul's team using, among other things, Rhinoceros software for 3D modeling.



Because the cars were originally designed as animations that expressed themselves in body tilts and sways, Paul had to rework the renderings into 3D models that were a closer match to real-world sports cars. “We started with the rendered files of the cartoons. The characters were tilted and were not level. We had to spin them, balance them out, and separate the features into individual sections of actual car parts, like bumpers, fenders, things like that.”

In addition to complete automotive capabilities, E.P. Industries’ 25,000 square-foot facility includes 15 CNC work stations, two CNC routers, CNC plasma-cutting, 3D digitizing, and a metal fabrication, welding, plastics, and woodworking shop.

Once the car’s modified contours were defined in the Rhinoceros modeler, the individual part designs were sent through E.P. Industries’ new 3-axis CNC router, which the company still had to learn how to use. The software immediately converted the designs into machine language, so Paul’s staff could quickly cut the curved parts exactly to the specifications of his Rhino design model.

“For what we’re doing, Rhino is perfect. It’s amazing. We do a lot of stuff with this program now, because whatever we draw, we get,” says Paul. “We do stuff pretty fast around here. We’ll be making drawings in the morning and be putting parts on the car that evening. We will often go from concept to completion in less than eight hours.”

Paul’s mechanics attach the fabricated cut bumpers, fenders, and other additions to the outer shell of the Porsche. “We take the whole body off the car. We attach a hundred different pieces, then we use a special adhesive made by Sem to glue the plastic together like we’re building a small model car,” says Paul. “When we’re all done, we put the Evercoat filler on, sand it, prime it, and paint it.”

Paul faced some unusual design problems in making cartoon characters come to life. In the place of a windshield, there are eyes. In Paul’s windshield design, the driver can manually move around the pupils from inside the car. The windshield part was a non-standard shape, but was drawn and fabricated in a single working day. “You have to make the car drivable, so you have to color the windshield with enough transparency so the driver could look out.”

Adding facial features to the body affected the performance of the car. “Another thing people don’t realize is they removed all the grills off the car. Instead, we have the mouth there,” says Paul. “Without that ventilation, the car had a tendency to overheat, so we had to find an alternative way to get airflow into the engine.” Paul’s team installed intake fans to collect air in from under the car and from the cars’ interior.

A third challenge involved the transport of the vehicles. The Mater tow truck was eight feet high, but the opening to the trailer lacked the headroom. “We had to redesign *Mater* so that the top comes off,” Paul explains. “Rhino helped out a lot with that, because we could scale the models so easily.”

Learning a new 3D product design application did not slow the pace of Eddie Paul’s fast-paced garage. The learning curve for Rhinoceros software was as fast as anything else at E.P. Industries. Paul had used 3D animations programs, like 3D Studio Max, to some degree in the past, but only started using Rhino shortly before the start of the “Cars” job. “I got Rhino a month before, and I played with it a little bit. From the time I actually installed it, I



was making parts that day. I was making more complicated parts the next day. Within a week, we could do the whole car," Paul says. "Rhino is the easiest program I've ever learned how to use. I was impressed. I haven't had any glitches yet. All in all, it's been pretty flawless. It's a great program."

As for *Sally*, *McQueen*, and *Mater*, Paul and crew are currently building a second set of full-size "Cars" characters, slated to appear at the Specialty Equipment Market Association convention in Las Vegas, followed by the Championship Auto Show circuit. At the same time, the original set of three will be back at Eddie Paul's garage for touch-ups after their promotional tour and then be placed on display in the Pixar Studios front lobby, coinciding with the anticipated DVD release of "Cars."



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