

Racing to the Fixturing Line: How One **Hot Rod** Fabricator Streamlines Operations



Kevin Tully, who owns Hot Rod Chassis & Cycle, Addison, Ill., finishes gas tungsten arc welding an arm of the HRCC Interceptor independent rear suspension in the 1965 Barracuda known as "Red Tail."

The ability to adjust fixture height and clamping style provided a better estimation of project lead times as well as lowered costs

BY PAMELA FARLEY

Kevin Tully, owner of Hot Rod Chassis & Cycle (hotrodchassisandcycle.com) in Addison, Ill., has greatly increased his weld accuracy and productivity by outfitting his shop with a modular fixturing system (see lead photo). Along with his team, Tully updates and modifies hot rods, pro-touring, autocross, and road racing cars with a focus on cars built from the late 1920s to 1964.

This is how Tully describes his business: “We travel back in time” using expert fabrication techniques to restore classic cars to their original glory with ultramodern performance capabilities.

To grow his business and streamline operations, Tully made the decision to purchase a [modular fixturing system](#) consisting of a modular welding table and adjustable, universal clamps and components — Figs. 1, 2.

Modifying Cars with Modular Fixture Tables = Ideal Building Foundation

One of the challenges the shop faces in rebuilding and restoring classic cars is the nonsymmetrical chassis in the majority of cars built after 1956.

Most work involves modification to the car chassis and frame including the fabrication of frame rails, mounting brackets, front and rear suspension, roll cage, header, and exhaust. The material is typically mild steel for the chassis or chrome-molybdenum for the roll cages. Accurate measurement and placement for custom parts takes a lot of time and concentration.

“Not much on a car is parallel. There are lots of curves and dissimilar shapes, nothing is symmetrical. After 1956, drive trains were offset to give drivers more



Fig. 1 — A '65 Plymouth Barracuda is shown fixtured and getting its new frame installed.



Fig. 2 — Temporary cross members and fixturing are seen on this vehicle.

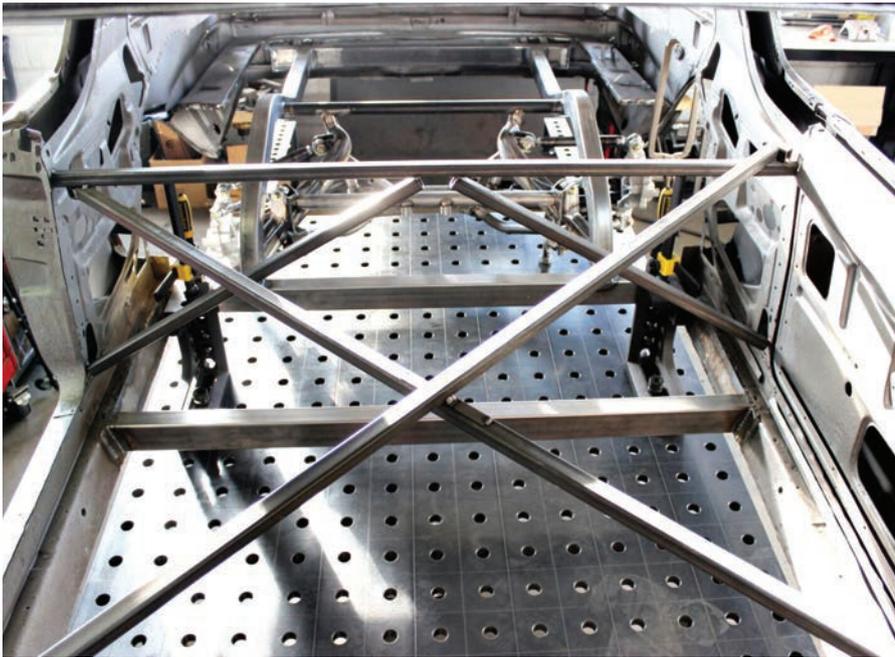


Fig. 3 — This photo looks rearward at the Interceptor IRS suspension along with new crossmembers and frame rails.

space for pedals,” Tully pointed out.

Many people overlook the use of a modular fixture table for layout and measurement. The modular aspect of the fixtures is not just due to the parts being easily reconfigurable, but also that their machined surfaces allow for the quick creation of reference points because every part has known dimensions. Some modular fixture components have built-in scales, and some table surfaces also come with grid lines etched into the surface, which further aids layout.

“We used to spend about 4–6 hours to fixture a car on a table. With our modular welding table, it’s now about 1–2 hours, tops,” Tully said.

“We use (modular) squares and stops to set the ride height (the minimum height the car body, or any part of the car, will be from the actual road surface). We use pipe clamps placed between the inner rocker panels, facing out. These are used to push the car left or right on the table, allowing for fine adjustment. Rocker panels allow an easy, convenient place to do this, as they run along each side of the car, and are a great place to measure from for centering. Once the car is centered on the table, pipe clamps can be used to secure the cross members to the stops and squares. This is a very important

function so we can square up the body,” he added.

From that point, the fabricators have a square framework as the foundation for their build.

In addition, the floor of the car and the firewall are usually cut out so the Hot Rod Chassis team can build a completely new chassis based on how the car will be driven or raced.

“We most likely will build the car

Modular Fixturing Benefits

- Adaptability and repeatability are the most important benefits of modular fixturing in welding operations.
- Modular fixturing systems enable the setup of an unlimited number of configurations.
- Reduce rework and scrap by setting up fixtures that accurately locate and position stock to ensure dimensional accuracy.
- Simplify the quotation process by reducing guesswork related to fixture costs.
- Save shop space by disassembling and reassembling modular fixtures for each new job instead of using dedicated fixtures.
- Modular fixtures are especially useful for short production runs or prototyping jobs.
- Ability to react quickly to changes in job specifications.
- Time savings on every job after a one-time investment in modular fixturing.

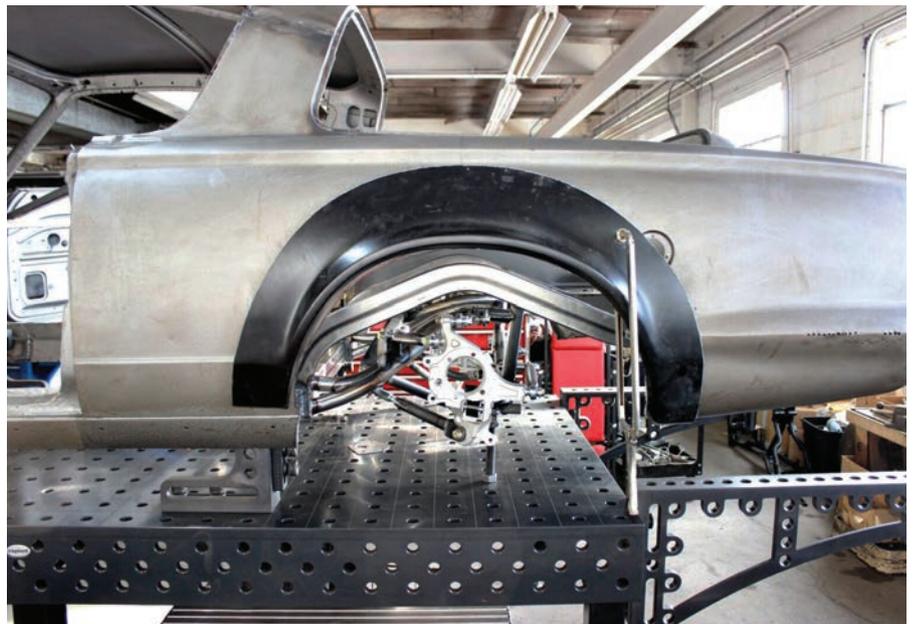


Fig. 4 — This profile shot shows a new wheel opening before grafting and frame rail over the Interceptor IRS.

with a lower center of gravity for better traction, better performance. We basically lower the body and raise the suspension.”

Mounting Hole Grid Pattern Serves as an Indexing and Locating Function

Tully’s modular fixturing system allows him to complete the full build on his modular welding table.

“Our old system consisted of a 10-ft-long modified planing mill table with T-Slots and ½-in. threaded holes on the top and sides. We had to make all the fixtures in-house, but they weren’t modular. All of the fixtures we built were dedicated fixtures because they were built to suit each unique build. We spent untold thousands of dollars in fabrication time and machining creating those dedicated fixtures. While many of our racing cars have similarities, we are building them from almost any car body, from a 1950 Hudson Super Wasp to a 1970 AAR ‘Cuda.’

“With such a wide variety of bodies to choose from, the ability to use modular fixturing is a necessity. The mounting hole grid pattern and grid lines can be used for measuring and visual alignment during fixture setup, and as an indexing and locating function during the build and welding. Over the last 100 years of car production, engineering and design of the body has varied widely. I’m not sure how we got along without a modular fixturing system.”

Handling More Jobs

The ability to adjust fixture height and clamping style to almost any configuration imaginable has given Hot Rod Chassis the opportunity to take in almost any job while being able to give a more accurate estimation of project lead time. It has also dramatically dropped the time necessary to not only begin fabrication, but also the pace at which it progresses. This cuts production time, lowering each project cost, and allowing the company to serve more customers.

“In the end, we can reach a wider customer base, and raise profits. Productivity is increased to as much as half the time, or even less, than our average time with the mill table. With reduced lead times, we are able to schedule more jobs in a shorter period of time, and we’re seeing those benefits in our bottom line. To gain, for example, an additional month for production time is significant,” Tully said.

Intuitive Highlights

Tully was especially pleased to discover that building modular fixtures on his table was very intuitive.

He proudly said, “New fixtures are created through ‘Imagineering.’ We may use computer-aided designs (CADs) (Fusion360), or we may simply draw a quick sketch and take some dimensions from the actual need, and work from there. Most hot rods are a hodge-podge of parts from different manufacturers. We make those choices based on the performance needs of each individual build.”

For shops that often use CADs in the design process, most modular fixture companies provide files for the parts so that fixture setups can be designed on the computer. Plasma or laser cut plates are often designed as custom fixtures that interface with the modular fixtures as well as 3D printed parts. With printed parts, modular fixtures help reduce cost and lead time by reducing the amount of material that needs to be printed.

Finishing First

Tully noted the ability to set up modular fixtures is vital to the success of his business.

“We’re usually building cars from a donor body. We are a Hagerty authorized repair facility for preexisting hot rods, customs, and race cars. But our primary focus is building new traditional hot rods and TransAm/LeMans inspired road race cars. We use ultra-modern underpinnings and technology while maintaining a vintage esthetic. Almost everything is one off, with exception of our new independent rear suspensions (IRS), the Pursuit and Interceptor models,” he said — Figs. 3, 4.

Tully concluded, “With our modular welding table, we’re getting excellent repeatability with each unique project, and our repetitive tasks.” **WJ**

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