

Eliminating Weak Areas Helps Make This Chassis . . .





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ACERS SELDOM REALIZE that often they are not competing against each other, but with the laws of physics. They desire to maintain the speed that they build up

on the straightaways while attempting to turn left. However, unseen forces come into play which scrub off the speed and can put the vehicle out of control.

In the 17th Century, Isaac Newton developed a set of laws which describe the actions of objects in the universe. His second law states that forces exerted on an object have a direction and a value equal to the object's mass (weight) times its accleration (F = ma). Overly simplified and applying it to the case at hand, what this means is that a race car builds up a force as it accelerates down a straightaway. As it turns into a corner, this force will be applied laterally across the chassis. Consequently, bending and flexing will take place anywhere the parts are weak or not sufficiently braced.

Montrose, Pennsylvania's Cal Smales is well-acquainted with the stresses exerted on a race car. The Modifieds he owned were driven to major wins by George Kent and Greg Sacks, before escalating costs drove Smales out of the sport in the early Eighties. He returned to active involvement when his son Brad 80 OCTOBER 1986



Above: The Smales' construction techniques have significantly reduced lean and roll during cornering.

The firewall shows the results of the removal of excess metal. The front corners are braced with more tubina.

began his driving career in the Street Stock/Late Model class.

When the father-and-son team decided to build a new car for the Upstate New York wars, they concentrated on ways to reduce the flexing that occurs in the car. Their efforts focused on two areas: eliminating excess weight and making the chassis more rigid.

When the Chevelle body and frame were first being stripped, a long hard look was given at what contributed to

excess weight. Some areas, such as the firewall, were found to contain up to three layers of metal. These were stripped away to a single layer, and all other excess metal was either cut off or ground away. They estimate this eliminated 200 pounds throughout the car.

All parts of the frame which were not critical support braces were drilled to further reduce weight. The laminated ribs in the floor were removed and replaced with a single sheet of metal. Com-



pared to other Late Models, Cal describes the car as "super-light," weighing in at 2900 pounds. To bring the car up to minimum weight specifications, about 150 pounds of lead were boxed into compartments (for safety) along the left side of the frame.

Once work on tidying up the chassis was completed, a basic Stock Car Products roll cage was installed. The left front corner was braced and stiffened with tubing which runs through the firewall and onto the right side of the roll cage. This keeps the left front wheel on the ground without having to use so much wedge. Similar bracing is also found on the right front.

Rigidity is also needed at the back of

frame itself.

Additional chassis work included boxing the frame and adding a crossmember under the car, as Chevelle frames are wide and have no connectors. Nylon bushings have been used in all hinge points, such as A-frame members, rear stabilizer bars, and radius rods. A larger sway bar (1¹/₈ inches) was used, and the team went a little softer in the front springs to let the bar hold the angle of the frame in the corners. The pitman arm was lengthened for quicker steering.

The length of a race determines where the fuel cell is placed. On the short races, the cell is mounted on the left side to increase the weight percentage. On longer races, it is moved to the right. Smales feels that as fuel burns off and lightens the right rear, the weight bias shifts to the left, giving the car more bite.

Safety was a major concern, as Brad



The roll cage has been braced differently to protect the driver in the event of a roll. The wing bar (*arrow*) gives additional protection from objects entering the cockpit.

the chassis. The roll cage was brought all the way back to the tail and braced there. The top of the frame is supported by a transitional brace that runs to the rear hump. On the rear radius rod pockets, a bar bolts into the transmission crossmember and is welded to the frame.

Smales also made modifications to the rear shock locations. The right shock was mounted as far out as it would go on the axle housing so that roll wasn't created. The left shock was moved inboard and angled forward to let the rearend work its normal action up and down without affecting shock stiffness. There were no shock adjustments made on the had already rolled a car once in his career. The crossbar on the roof of the roll cage has been positioned to provide more support for the left corner. This arrangement gives the driver increased headroom and prevents that corner from caving in on him. The top right of the cage is supported by a bar which connects into the frame behind the driver.

The Lisle seat has been redesigned so that the sides rest outside of the shoulders instead of under the arms. Besides giving more support and freedom of movement, the design also reduces the chances of cracked ribs from hard hits. The seat is mounted tipped back instead



of upright. Allowing more curvature, the sloped seat helps take the load off of the spine. Unlike the experience with the previous cars he has driven, Brad now has no back problems when he climbs out of the car.

Finishing the interior, the sheetmetal forming the rear deck has been built into the shape of a stepped shelf and sits on the stock crossmembers. When track rules permit running without a full windshield, the design should act as a spoiler and create additional downforce.

So far their ideas seemed to have worked. Brad described the car's response as very neutral, and the amount the car leans in the corners has been reduced considerably. The car made its debut at the Pocono Race of Champions in September of 1984, where it finished 12th after starting deep in the pack for the 40-lap event. Brad easily won his next race, the Late Model portion of the Southern Tier 200 at Shangri-La Speedway (Owego, New York), clinching the track title in the process. After numerous qualifying and feature wins throughout New York, the car was sold in mid-season. The new owner, Rick Holden, took the Chevelle to two feature wins at Spencer Speedway in Williamson, New York.

The successes that they had in the Street Stock/Late Model class have proved to Brad and Cal that their ideas do indeed work. These same construction techniques will be incorporated in their next project, as the Smales operation now sets its sights on the NASCAR North Tour.

All of the bars join behind the driver, tying the front and back together and making the chassis more rigid. Note how the sheetmetal forms an internal spoiler (arrows).

This bar (arrow) runs from the roll cage to the tail. Note the holes which have been drilled throughout the chassis to help reduce weight.