How To

Install a Ladder-Bar Suspension

Factory Frames Make Installation a Breeze

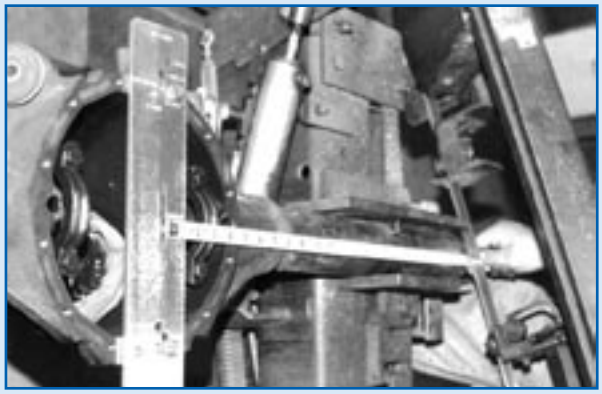
Working with a full-frame car makes the installation of a new rear suspension somewhat easier than when dealing with a unibody car, as the frame rails provide solid, ready-made mounting points for the required crossmembers. With this in mind, a 1966 Chevelle was chosen to illustrate the steps involved in adding a Chassisworks ladder-bar system to a typical framed car.

Neither a black-belt rating as a welder nor exotic, hard-to-find tools are required for the home builder to complete a project such as the one shown on these pages; the most essential items are simply common jackstands, levels, squares, tape measures and patience. Of course, a flat place to work is also highly desirable.

The main key is getting the rearend assembly back in its proper place after a new rear suspension is installed, and this is assured by measuring and recording the stock placement of the axle housing, in relation to fixed points, before anything is dismantled. A protractor or inclinometer can be used to determine the existing pinion angle, while factory holes in the frame rails can be used as natural reference points for the front-to-back location of the axle tubes. The frame rails themselves are convenient for both the ride-height and housing-centering chores.

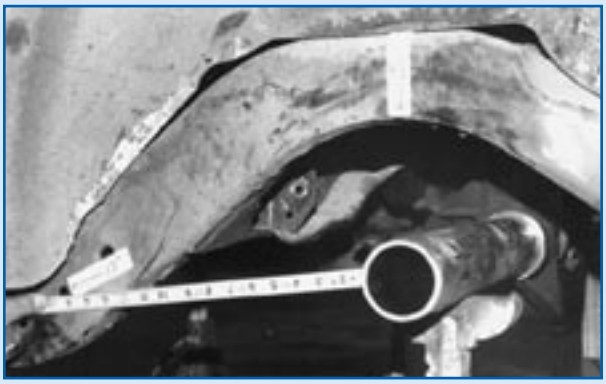
One should also be aware that the housing will be going in and out of position numerous times before the car gets back out on the street. The use of a floor jack is highly recommended to assist in this area ■

To begin at the end, this is our 1966 Chevelle project car as it looks following the installation of a Chassisworks ladder-bar rear suspension. The ride height can be quickly and easily changed with the adjustable lower shock mounts.



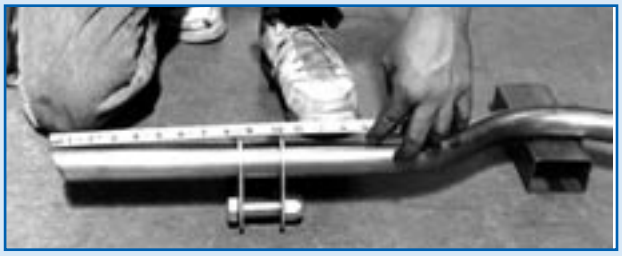
After recording all the necessary measurements of the stock location of the rear housing, pull the housing out from under the car, strip the axle tubes of everything except the brake-line brackets, and cut them to accommodate the desired wheel/tire size. Shown bolted to the housing is the exclusive Chassisworks pinion-centering gauge; used on any popular rearend and in conjunction with the provided worksheet, it allows any competent home builder to achieve professional results.

The narrowed rear is put back under the car and set up in its original location. Pre-existing holes in the frame were used as reference points for the initial front-to-back measurements, taken from the front of the axle tubes.



After the correct height of the housing is set, using the recorded measurement from the bottom of the frame to the top of the tubes, it is necessary to center the housing from side-to-side. A level is used to assure perfect numbers when checking the distance from the sides of the frame rails to the ends of the tubes.

A protractor or an inclinometer set across the front of the yoke will reveal the initial pinion angle, and an adjustable jack stand comes in handy for returning the now-free-floating housing to its stock attitude.



After cutting the crossmember to size, the front ladder-bar brackets are set in their proper, as-wide-as-possible locations and tacked in place. (The minimum clearance from the brackets to the frame is 1-1/2 inches.) The steel sleeves that ride in the middle of the urethane bushings are used to establish the correct spacing for the brackets.

To determine the location of the front crossmember, measure the prescribed distance forward from the housing and make a mark on the frame rails. Next, measure the distance between the rails at this point, noting the exact location of the drive-shaft centerline.

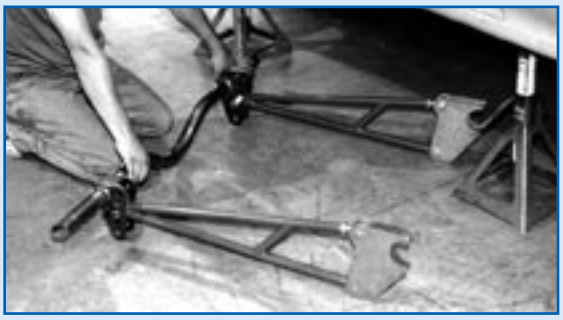
Using material provided in the kit, gusset straps are fabricated and welded to the back of the brackets for added strength.

This is how the Chevelle's fully welded front cross-member looked just prior to its final installation. Note the contour on the end of the tubing.

These measurements are then transferred to the dropped-loop crossmember, which is marked for cutting. Labeling the driver and passenger sides of the crossmember will help in maintaining its proper orientation, keeping the loop centered under the driveshaft. Be sure to cut the ends of the tubing to follow the contour of the rails, if any.

With their assignments as spacers for the brackets completed, the steel sleeves are returned to their intended homes in the middle of the urethane bushings.

Don't be reluctant to sneak up on the perfect crossmember length by making a series of small cuts on the tubing. A snug fit is helpful for the final alignment.

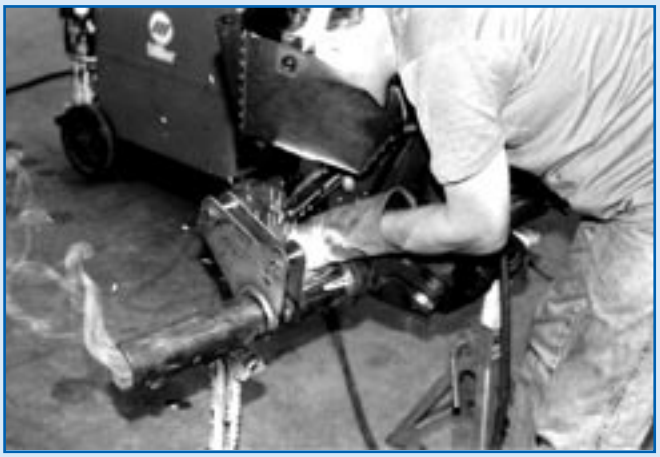


This is the last time the crossmember will be seen in the daylight. With the ladder bars assembled and mounted to the crossmember, the entire unit slides under the car and is lifted into place, with the rear brackets snug to the axle tubes. This is where a tight fit for the crossmember will come in handy, to help hold itself in position.

Bumping the brackets into the housing will undoubtedly jostle it around; all measurements must be rechecked before firing up the welder.

The housing is brought back out from under the car and the ladder bars are removed from the brackets. The ears at the top of the housing, used for mounting the stock link bars, will be removed to provide clearance for the panhard bar.

With clamps holding the front crossmember in place, the rear brackets are checked for plumb and tacked to the housing.



Again, the steel sleeves from the urethane bushings are used as spacers, and the brackets are welded to the axle tubes. Chassisworks recommends also welding the tubes to the housing for added strength.

Constant use of a tape measure is critical to ensure the success of any chassis or suspension installation. Here, the distance between the brackets is verified after they are tacked to the housing.

With the brackets welded to the tubes and gusset straps added, the housing and ladder bars are remounted under the car. The shock is then assembled in the center position of the adjustable lower shock-mounting plate, which is held in its desired location and marked for cutting.

With the rear brackets tacked in place, and after making sure everything is straight and square, the front crossmember is tacked to the frame. The ladder bars are then removed from the front brackets, and the crossmember is welded to the frame.

The universal lower-shock mounting plate is then cut along the line to fit on the back of the rear ladder-bar bracket.

After tacking the plate to the ladder-bar bracket, make sure it is straight and plumb before final welding.

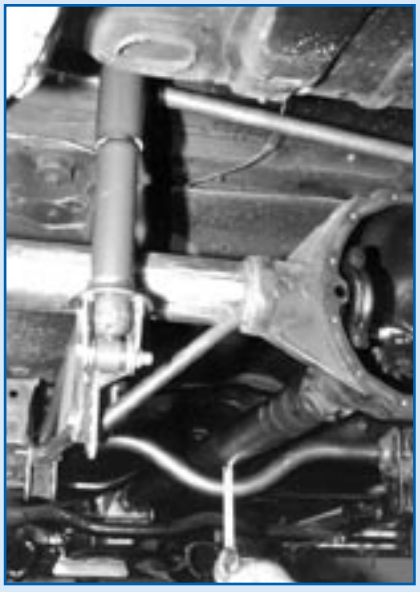
The tubing for the upper shock-mount crossmember is cut to fit between the frame rails and positioned with the use of levels and shock simulators, with the adjustable shock mounts set at their highest level. Once again steel sleeves, fabricated from tubing for the upper shock mounts, are used to establish the proper bracket spacing.

These are the pieces included in the Chassisworks panhard-bar kit. One end of the bar and one of the rod ends are threaded for adjustment; the other rod end is welded in place. The bracket at the lower left is attached to the axle tube.

The non-threaded end of the panhard bar is marked for cutting to the desired length. The housing must be properly centered when determining the correct bar length.

Seen here are the installed upper shock-mount crossmember and the panhard bar, which spans the distance from the frame on the left side to the axle housing on the right. Make certain that the panhard-bar bracket on the housing clears the frame rails.

This is the fully fabricated upper shock-mount crossmember, prior to installation. The tabs on the ends of the tube were added to allow the crossmember to sit as high as possible between the frame rails, while still providing a sufficient amount of surface for welding.

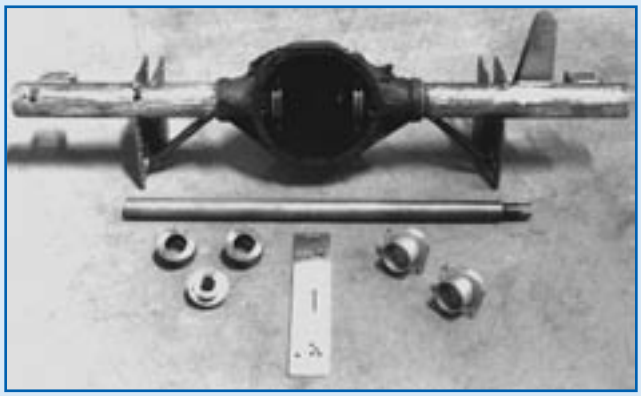


The shocks are installed without the springs, and all clearances are checked at both full compression and full extension to make sure nothing binds up. Clearly visible is the extra brace welded between the lower shock-mounting plate and the housing.

Don't forget to remount the pads for the rubber axle snubbers onto both sides of the housing, directly below the frame rails, to keep the shocks from bottoming out and beating themselves up.

With clamps holding everything in place, the stock housing end is welded back onto the axle tube.

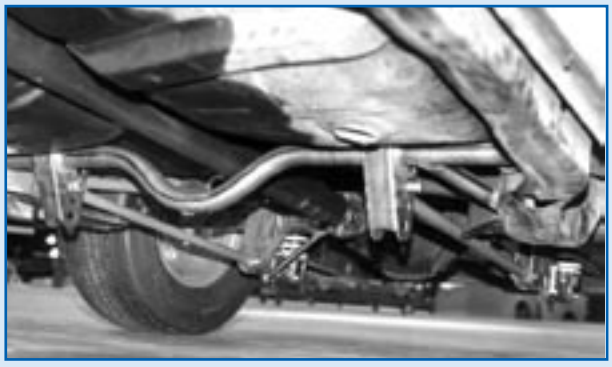
The housing ends are fully welded, and the entire assembly is back in place. Visible are the notches that had to be cut into the stock crossmember to allow full ladder-bar travel, and the lower shock-mount gussets.



With all necessary brackets attached to the housing, it's time to complete the narrowing procedure; Chassisworks carries the parts needed for the home builder to do the job. The pinion centerline gauge, foreground, is machined to work with all types of housings, while the alignment bar, carrier adapters (left), and housing-end adapter provide absolute precision when welding the ends in place.

Lacking only the brake backing plates and a bit of paint, the ladder-bar installation is virtually complete, with the panhard-bar bracket clearly visible. The bearing-mounting areas of the stock housing ends have been cut off to allow the use of the Strange safety hubs, which are bolted to the housing-end flange from the inboard side and contain their own bearings, eliminating the potentially hazardous C-clip method of holding the axles in place.

The alignment bar slides into the housing and through the carrier-bearing adapters, which are installed in place of the carrier bearings. The housing-end adapter fits snugly into the bearing area of the stock housing end (which was cut off a couple of inches from the backing-plate mounting flange), holding the end perfectly square to the pinion.



L60-15 tires on 15x8-inch rims put a full 22 inches of rubber on the ground as the Chevelle returned to earth. Visible on the right side of the photo is one of the additional gussets (formed from the cut-off ends of the front crossmember) that runs from the crossmember to the frame.