By Bruce W. Smith

SMOOTH SAILING

A simple yet well-engineered suspension upgrade from Source Engineering takes the rock-and-roll out of Freightliner XC-based motorhomes with I-beam front suspensions, improving handling and reducing driver fatigue

SOURCE OF STABILITY

A few Source Engineering suspension modifications on motorhomes sitting atop the popular Freightliner XC chassis make a dramatic difference in handling and ride.

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[1] Source teamed up with Bilstein engineers to custom tune/build these exclusive Platinum Series high-pressure-gas shocks. REK-206 kit provides a pair of 60mm front shocks and 46mm rear shocks to replace the smaller, 40mm factory Sachs hydraulic shocks. [2] Source Platinum Series Bilstein shocks (left) utilize a much larger piston inside the shock tube than the factory hydraulic shocks on the Freightliner XC chassis. The Bilsteins also provide far more suspension compression and rebound damping control under all driving conditions. [3] About the size of a pack of gum, this Ride Control Valve regulates airflow in and out of each air spring to smooth out the chassis rocking and rolling. The proprietary metering design lets air out quickly, but slows it down returning into the air bag. [4] Removing the OEM Sachs rear shocks on the Discovery only required dexterity and an air impact with a 1⅛-inch socket.

We seldom equate driver fatigue with the way a vehicle motors down the highway. But ride and handling have a direct impact on how we feel after spending four, five or six hours piloting a motorhome toward our next destination. That fatigue is both mental and physical.

Even though we aren't breaking a sweat or trying to openly solve brainteasers while we drive, our body is hard at work multitasking. Each time the motorhome is rocked by a gust of wind from a passing semi, pitches slightly fore or aft from the undulating road or shudders as it rolls over uneven surfaces, muscles all over our body automatically react to keep us stable in our seat. Flexing muscles in response to these movements is taxing, although we may not realize it.

At the same time, the driver's brain is making thousands of tiny calculations every minute to counteract the motorhome's movements so it stays in control, telling arms and hands instantly how much input is needed in the steering wheel to keep between the lines. That subliminal thought processing is just as taxing on the body as flexing muscles.

We don't realize how much work the brain and body are doing until driver fatigue starts creeping into the picture. At what point during the road trip that level of tiredness and lack of concentration happens, and to what degree, is totally dependent on how the motorhome rides and handles.

Stabilizing the Ride

The owners of Source Engineering Inc., located in the heart of


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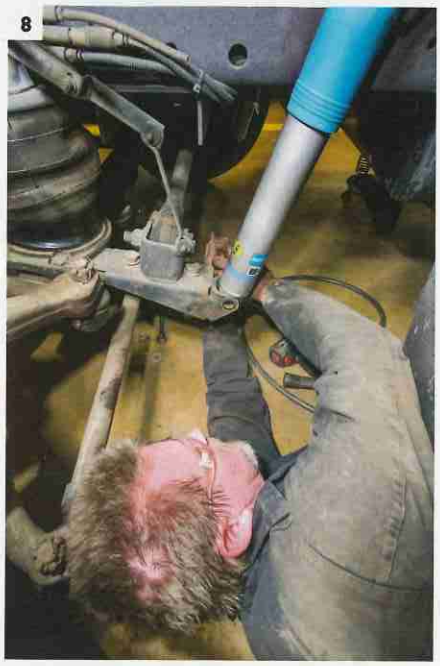
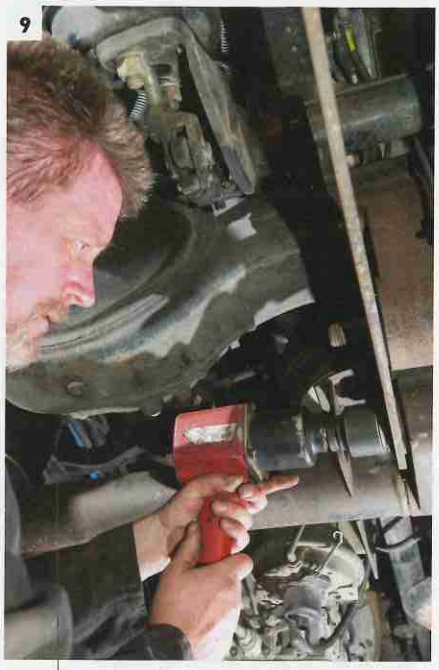
[5] Master technician Todd Hill showed us how Source's Platinum Series shock (left) compares to the factory Sachs rear shock. The two look similar in size. But the Sachs shock (right) is a twin-tube, while the Bilstein is a high-pressure-gas single tube, so the piston and valving, which control the suspension, is about 50 percent larger on the Bilstein. [6] Hill leaves the retaining band on the high-pressure gas-charged Bilsteins during installation. This eases the install. The thin plastic band breaks as soon as the motorhome suspension flexes.

Photos: Bruce W. Smith





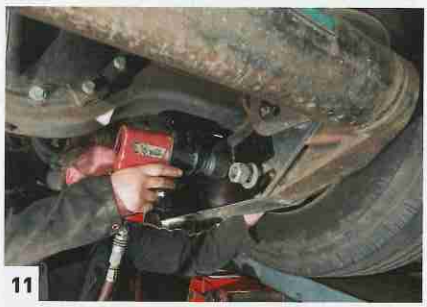
[7] After the new shocks are installed, a Comfort Ride Control Valve is placed on each feed line to the rear air springs. The air lines were cut and the ends then inserted into the valves to lock them in place. Valves are directional, so they must face the proper direction (indicated by the arrows) for correct airflow. [8] Swapping out the front factory Sachs shocks for the bigger 60mm Source Platinum Series Bilsteins requires using a ¾-inch socket up top and a 1⅛-incher for the bottom mount. Hill installed the Comfort Ride air spring control valves after the new shocks were mounted on each side. [9] Installation of Source Engineering's Freightliner XC rear sway bar only requires removing the four 43mm nuts from the trailing-arm bolts. A special wobbly socket is used to handle this task.

Oregon's RV manufacturing hub of the Willamette Valley, capitalized on 50 years of combined experience in chassis development, drivetrain packaging and maintenance of Class A motorhomes before starting their own company.

The company now focuses on the development, manufacturing and installation of suspension components that improve the ride and handling of certain diesel pushers. Its newest offering, the REK-206 suspension kit, is designed to smooth out and stabilize the ride of motorhomes built on the Freightliner XC chassis with the I-beam front axle. The kit, which retails for $1,825, consists of custom-calibrated Bilstein shocks, Source-proprietary air-spring valves and Source's rear anti-sway bar.

Installation time is about four hours, as we saw firsthand when Source's master RV technician Todd Hill turned the roly-poly, porposing ride of a 39-foot 2004 Fleetwood Discovery 39L, with only 23,000 miles on the odometer, into a smooth-sailing machine. Hill was the chassis supervisor with Monaco for some 22 years.

How can just changing shocks, adding valves to the air bags and installing a rear sway bar make such a big difference? It's basic Suspension 101: The air springs take the initial impact, pushing air out to help soften the change in the direction the tires are heading; meanwhile, the shocks help control the up/down motion of the air springs, and the sway bar fights against body lean.



[10] Source Engineering's REK-206 sway bar assembly is lifted up and over the exposed trailing arm bolts, where it will stay positioned by itself until the bolts are reinstalled. The design is simple, yet efficient in reducing body roll on big motorhomes. [11] After the sway-bar assembly is in place, the trailing-arm nuts are replaced and torqued to spec. Installing the sway bar takes less time than replacing one of the rear shocks. [12] Source Engineering's Freightliner XC rear sway bar contributes a significant amount to the overall ride improvement. The side plates are ⅝-inch steel and the torsion tube is a hefty 1¾-inch diameter.

All three components are intertwined, and all three need to be tuned to work in harmony to maximize ride quality and vehicle handling. If one or more components are not functioning adequately, improperly tuned, or are missing all together, ride suffers.

Custom Chassis Tuning

In the case of the 39-foot Fleetwood we used as a test platform, there isn't a rear anti-sway bar, and the factory Sach's twin-tube hydraulic shocks seemed barely adequate in controlling the six air springs. The resulting handling during our city/highway test loop showed a significant amount of porposing when the brakes were applied, a very boatlike side-to-side oscillation as the motorhome entered main thoroughfares from parking lots, and a significant amount of buffeting from crosswinds and passing big rigs on the interstate. And that's driving in a very docile manner.

The ill-handling antics kept the driver busy sawing the steering wheel, and both driver and passengers adjusting to the multitude of motions, not to mention what was going on with items stored in the coach's cabinets. It's the typical ride and handling of this particular Freightliner XC chassis, according to the company, and the reason it came up with the components in the REK-206 kit.

The shocks in the REK-206 kit have been custom-tuned by Bilstein engineers who spent a lot of seat time with Source Engineering's design team so the internal valving of the high-pressure, gas-charged, single-tube performance shocks worked in concert with the addition of the rear sway bar and the special Source valves plumbed into lines feeding the factory air springs.

The pistons in the Source/Bilstien shocks are much larger in diameter than those found in the factory Freightliner XC's twin-tube hydraulic shocks, have a far greater range of fluid control on both compression and rebound, and the single-tube, high-pressure gas Bilsteins maintain their damping under the harshest road/driving conditions because the fluid doesn't overheat or foam up, according to the manufacturer.

Controlling Roll

Body roll is brought under control with Source Engineering's patented Comfort Ride Control valves, which allow full outflow of air from the springs under compression, but meter incoming air as the bag tries to rebound. This improves the overall ride, and significantly reduces the residual side-to-side rocking that's common to the stock XC chassis.

The last element to controlling the XC chassis' ride and handling is the addition of Source's rear anti-sway bar that bolts to the trailing arms on the rear-axle housings. It's a stout piece of fabrication, consisting of ⅝-inch steel side plates with a 1¾-inch 3140 steel tube in between. When the sway bar is bolted in place, which is a very simple task, excessive body roll is all but eliminated.

These three components make a significant suspension change that greatly improves the ride of any motorhome built on the Freightliner XC I-beam chassis, reduces driver fatigue and results in a very pleasant ride for passengers. (The sea-sickness medicine can now be left at home.)

The photos in this article show how the above was accomplished when RV Sales of Oregon brought in a 2004 Discovery 39L to get its suspension upgraded. The install is an easy, straightforward job, requiring nothing more than an air gun and the sockets/wrenches any motorhome tech would have within easy reach. Hill says it usually takes him less than four hours to install the kit on customers who bring in their coaches (by appointment only) to have Source do the upgrade. It's time and money well-spent. M

Sources

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