



Optimizing Suspension for Engine Swaps & Increased Power in a 2010 Ford Shelby GT

Client Success Story – beelinesautomotive



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Client Overview

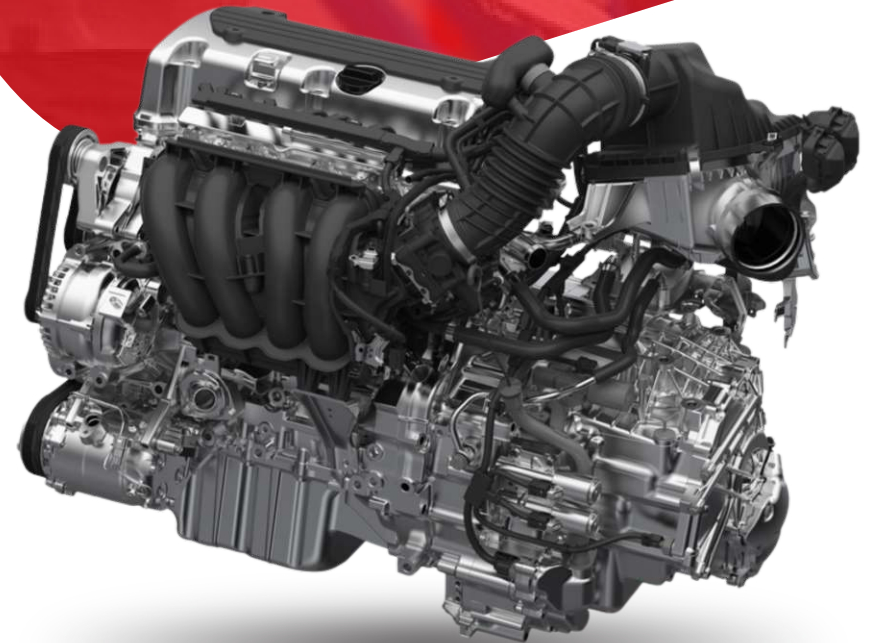
Client: Daniel Foster

Location: Lexington, Kentucky

The customer is a longtime resident in Lexington, Kentucky, who happens to be a Mustang enthusiast. He owned a 2010 Mustang GT 500 which was well maintained. He had a complete performance overhaul of engine swap and wanted a suspension up gradation. This was to match the high power output given by the engine. But this was not a simple bolt on job. There was much customization needed.

Daniel had installed a built 5.8L Trinity V8 with a larger supercharger, pushing the car's output past the 750-horsepower mark. The goal wasn't drag-only. He wanted a street-table, fast-handling car that could hold its own at occasional track days.

There were many facets to be considered here. Real world road conditions, quick maneuvers/movement & the increased torque everything was to be put in consideration.



Identifying the Core Problems

Daniel's stock setup was still running factory struts, control arms, and sway bars — all designed around the stock engine's ~540 hp. During his test drives after the swap, he noticed the following issues:

- ◆ Noticeable nose lift under throttle
- ◆ Rear-end squat that reduced traction
- ◆ Steering feel became unpredictable during cornering
- ◆ More body roll than expected at high speeds
- ◆ Excessive wheel hop on hard launches

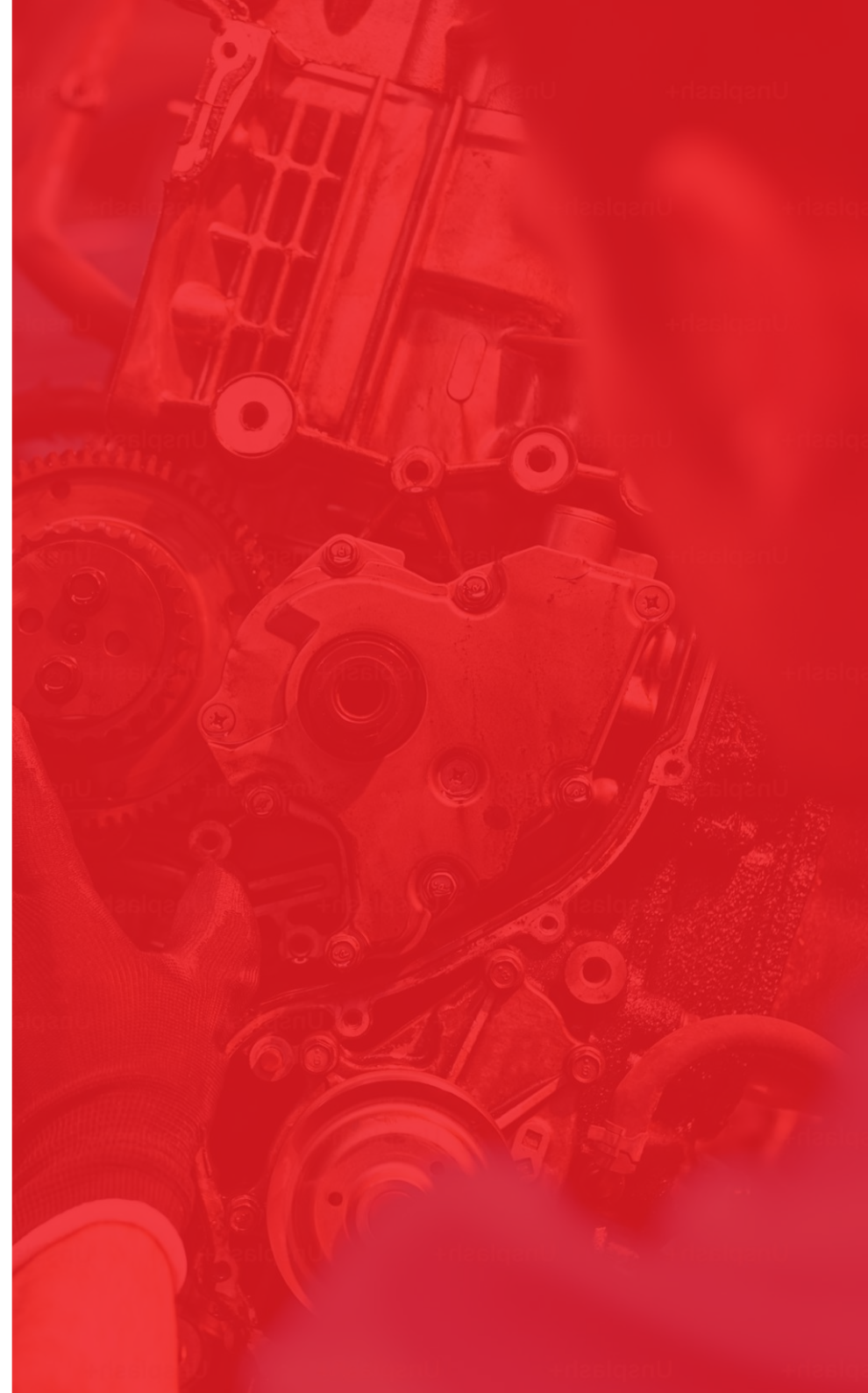
His tires were quality — Michelin Pilot Sport 4S — but they weren't connecting the way they should. The new engine's weight distribution and torque output had simply outgrown the suspension.

Step 1: Evaluating Suspension Limits

Before tearing into anything, we did a full inspection of the chassis, suspension geometry, and bushing wear. The car had 62,000 miles and while nothing was completely shot, it was clear most of the original suspension hardware was tired. The sway bar end links had play, the bushings were soft, and the factory control arms had flex. The rear axle had started showing light wheel hop — something that would only get worse as power increased.

The Trinity V8 is about 100 lbs heavier than the stock 5.4L engine. Combine that with the added torque, and the front-to-rear balance was thrown off. We also checked the ride height and found uneven drop due to the sagging original springs.

No single part was going to fix this. It had to be a complete approach.

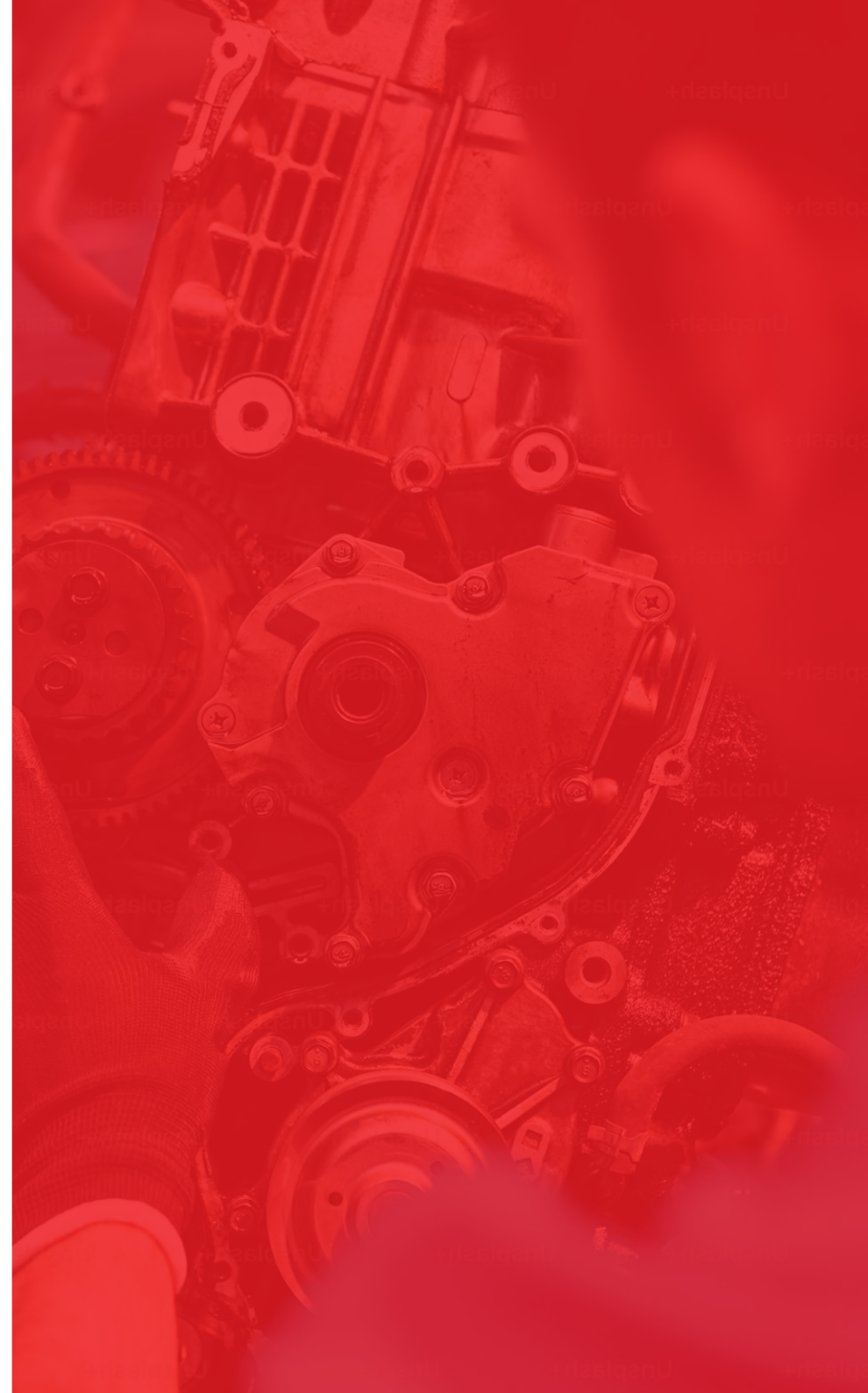


Step 2: Suspension Overhaul Plan

Based on Daniel's goals — a car that could put down 750+ hp reliably, stay planted on the street, and remain manageable on occasional road courses — we put together a full suspension revision:

Front Suspension Upgrades:

- ◆ **Adjustable Coilovers (Viking double-adjustable):** Set up for 500 lb/in front springs to better manage the added engine weight.
- ◆ **MM Caster/Camber Plates:** Allowed for correct camber setup at lowered height and improved
- ◆ **BMR Tubular K-Member:** This shed some front-end weight and provided needed clearance for long-tube headers.
Heavy-Duty Sway Bar (Whiteline): Improved roll resistance up front.
- ◆ **Polyurethane Bushings:** Reduced front-end slop under cornering loads.

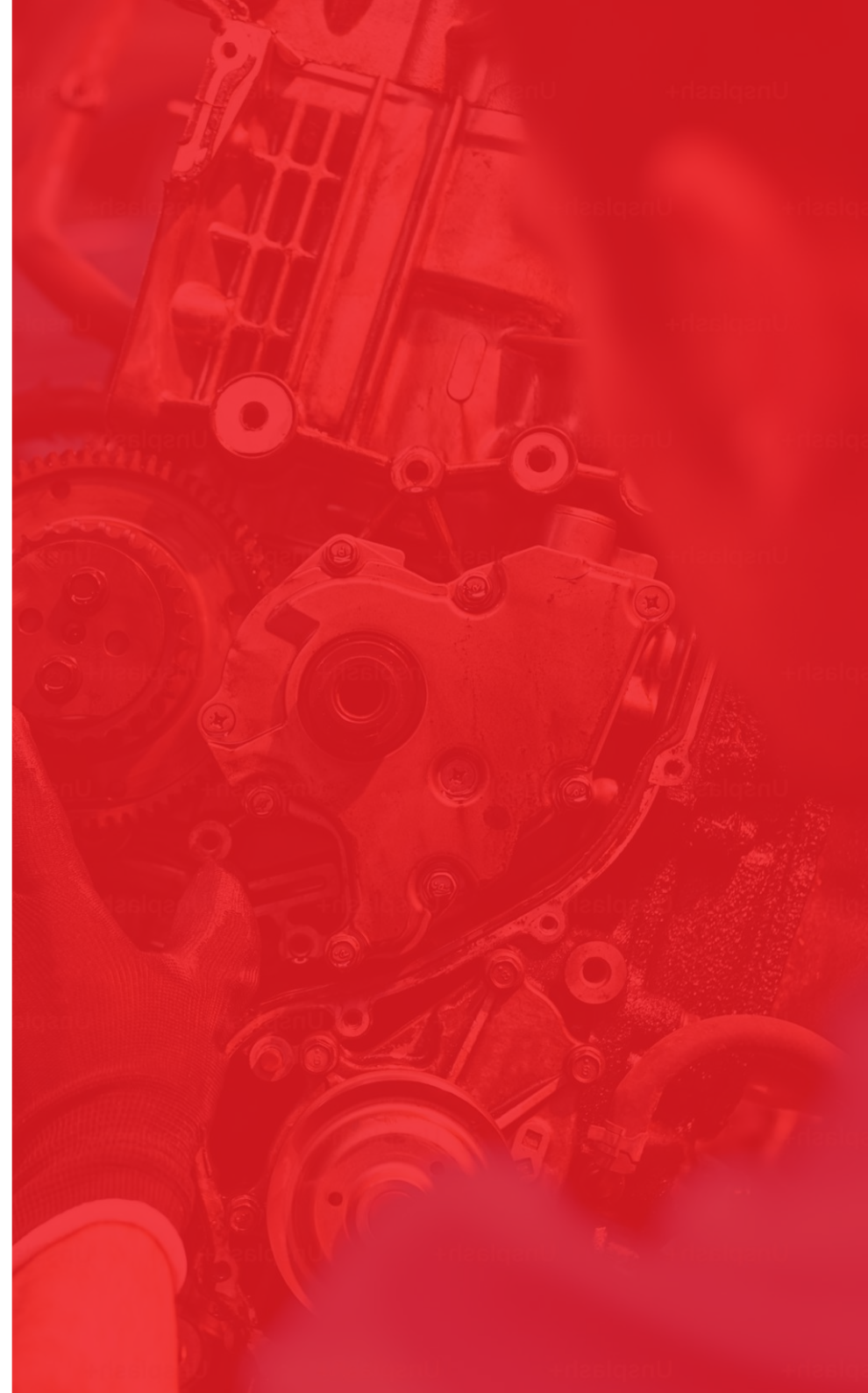


Rear Suspension Upgrades:

- ❖ **Adjustable Coilovers** matched to 200 lb/in rear springs
- ❖ **BMR Upper and Lower Control Arms (Boxed Steel, PolyEnds):** Took care of wheel hop and rear-end wiggle under power.
- ❖ **Adjustable Panhard Bar:** Allowed us to re-center the axle after lowering.
- ❖ **Watts Link Considered, but not installed yet:** Budget constraints, left it for a future upgrade.
- ❖ **14mm GT500 Sway Bar (Stock):** Retained for now, pending road tests.

Chassis Bracing:

- ❖ **Weld-In Subframe Connectors (Stifflers):** Tied everything together.
- ❖ **Strut Tower Brace:** A mild gain in front-end rigidity, mostly helpful for street feel.



Step 3: Alignment & Road Testing

With all components installed, we set the ride height evenly and aligned the car for aggressive street use:

Front Specs

- ◆ Camber: -1.6°
- ◆ Caster: $+6.3^{\circ}$
- ◆ Toe: 0.05° in

Rear Axle

Centered via panhard adjustment. Toe was neutral.

Once dialed in, Daniel took the car for two days of mixed driving. We did a full re-check of all bolts and torques after 100 miles. The control arms stayed tight, but we needed to fine-tune the coil over damping for street comfort. Rear rebound was turned down two clicks.

Results After Modifications

Here's what Daniel reported after two weeks of daily driving and one afternoon at NCM Motorsports Park:

- ❖ **Cornering Feel:** Vast improvement. Body roll nearly eliminated. Predictable steering response.
- ❖ **Traction:** Rear-end squat under hard launches was mostly gone. Car stayed planted through fast sweepers.
- ❖ **Ride Quality:** Firm but street able. No bottoming out. Slight increase in road noise due to poly bushings, expected.
- ❖ **Launch Behavior:** Reduced wheel hop. Still present on cold tires but much improved.
- ❖ **Heat Management:** No suspension-related overheating or fade observed during track sessions.

He was especially pleased that the car remained drivable — no harsh ride, no wandering on the freeway, no major NVH issues outside of some added firmness.

Lessons from the Build

For owners increasing power in an S197 platform, it's easy to focus on the engine and forget how much stress that power adds to the suspension. The stock components can't keep up past a certain point, especially when torque delivery changes how the car reacts during load shifts.

Real-world points from Daniel's case:

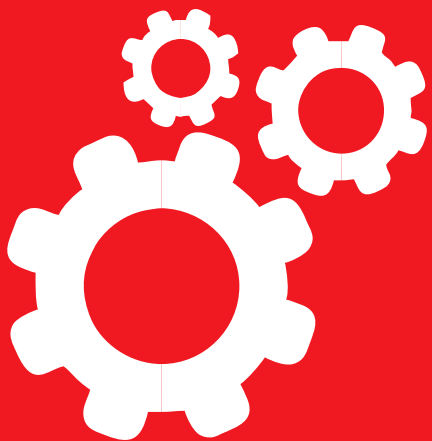
- ❖ A big engine makes everything else work harder suspension included.
- ❖ Replacing bushings and arms isn't glamorous, but it fixes most of the feel issues.
- ❖ Adjustable coil overs and a proper alignment make the biggest difference in confidence.
- ❖ Don't skip chassis bracing. It pays off in overall consistency.

Conclusion

Power means nothing if you can't control it. After the completion of the suspension change, the car was well balanced. It was able to handle the high torque of the engine more efficiently.

This wasn't about building a show car or trailer queen. It was about making the car usable every day, on real roads, with real horsepower.

For anyone looking to swap in a high-output engine or boost their GT500's output past 650–700 hp, start budgeting for a full suspension plan. Without it, all you've got is noise and horsepower with nowhere to go.



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Thank You

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