Is My BMW Fast or Quick

Email Thread

BMWCCA member: Charlie Heavner
And
BMWCCA Roundel Publication Technical Editor: Mike Miller

Follows is a question and response session between myself and Mike Miller, BMW Car Club of America Roundel magazine publication Technical Editor.
I wanted to find out if my year 2000 BMW 328ci was fast enough to maneuver through average urban traffic situations better than most cars. I know that my rig can run very fast down large open sections of boulevards and interstates but could I get better than most acceleration in stop and go traffic.

Mike separated the facts quick and fast... there's a difference between fast and quick. He's offered extremely well-informed opinions as well. This is truly worth the read if you have an interest in the Ultimate Driving Experience.

Initial question:

Hi Mike,

I just reprogrammed the chip in my 2000 328ci BMW logging 40,000 miles with Jim Comforti's Shark Injector.
I plan on replacing the stock air box with a K&N air filter charger kit.
The projected increase in horsepower should be up around 225 horses.

My question is, how does that really translate into speed?

To simplify the question: make all things equal between the three cars with different horsepower ratings, put a driver behind the wheel of each car driving on the same stretch of one mile road. Who'd when? It seems obvious to me that the car with more horsepower would win.

Thanks for any help that you may be inclined to provide,
Charlie

In response:

Good question. But the answer is relatively simple. Initially, though, let's distinguish between "fast" and "quick". The former relates to top speed, whereas the latter refers to acceleration. I believe you're concerned with acceleration. The primary determining factors for acceleration are power-to-weight ratio and gearing. Torque has a great deal more to do with acceleration than horsepower.

It is definitely not always the case that the highest horsepower car wins an acceleration test. For example, Automobile magazine tested the BMW Z4 3.0 (225 hp, 3060 lbs), Honda S2000 (240 hp, 2820 lbs), Nissan 350Z roadster (287 hp, 3450

lbs), and the Porsche Boxter (228 hp, 3000 lbs). The Honda S2000 was quickest to 60 mph (5.6 seconds), but all four were within 0.6 seconds of each other -- power-to-weight ratio and gearing.

The Honda S2000's firebreathing dohc four-cylinder makes a lot of power, and the car is very lightweight by today's standards. But the Z4 3.0 is 0.1 seconds off it even with more weight and less horsepower -- gearing and torque. The Boxter lacks torque, so it came in last at 6.2 seconds.

My 1991 318is weights 2612 lbs and has 150 hp. I can run zero to sixty in 7.2 (1 second off a brand new Boxter) because of light weight and a 4.27 differential.

What you can count on is that minute differences in zero-to-sixty acceleration times count for very little in the real world, despite the emphasis placed upon them in the U.S. unless you are drag racing on the street, you'll never notice 0.6 seconds.

Best regards,
Mike Miller

Next Question:

That is great information, Mike! I simply was not aware of the distinction between fast and quick. I would agree that I am more interested in acceleration for the purpose of this discussion.

If the stock specs for my 2000 328ci rate the torque at 206 ft-lbs and the max horsepower has been increased from 5500 to 7000 due to the Shark Injector, did the torque rating change?

Bottom line: did an increase in HP result in an increase in torque on my rig?

What other toys would I need to maximize torque i.e., stabilizer, better wheels, tires, K&N air filter charger, reduce the weight of the car, etc.?

Thank you for any additional information that you may so inclined to provide.

Charlie

Response:

Hi Charlie,

Well, first I think you should recognize that BMWs are not necessarily about being the quickest cars on the block. Zero-to-60 acceleration time is all but meaningless in Germany, except in the context of U.S. market demands. There, 150-to-0 deceleration time will get you better press, and drag racing is unheard of. BMWs are more about the total driving experience, and performance-wise, far more about cornering, handling, braking, high-end acceleration and top speed cruising. Tell a

German engineer all you care about is 0-60, and he'll just stick a lower differential in your car and scratch his head. This won't score you many points amongst the Billy Bob set, but that's the way it is. The Ford Mustang will always be a better choice for standing start acceleration! So, to a certain extent, what you are trying to do with this car is kind of like using apples to make orange juice.

Yes, the Shark program increases torque as well as horsepower. Don't get me wrong, horsepower clearly affects acceleration too, but at the low speeds you're interest in, torque is a bigger factor.

Sway bars, wheels, tires, and air filters are not going to affect torque or horsepower. Oh, an open-element oiled cotton gauze cone air filter in place of the airbox may net you a little increase, but the benefit again is primarily at high rpm, when the engine is really breathing deeply and the absence of intake restriction makes itself known. Lightening the car would certainly help, but it order to make a difference you'd essentially have to strip down the interior so that it's not really a very nice street car anymore, and buy some very expensive lightweight body panels.

My feeling is, the only thing that's going to get you what you want on this car is a supercharger, plain and simple. Check out www.dinanbmw.com for more information. However, for less money, you could give low end acceleration quite a boost by swapping out your 2.93 differential for a 3.23 limited slip unit from a 1996-1999 M3. No, your speedometer won't be affected because the speed pickup is electronic, and no, top speed won't be affected because your car is drag limited either way with the Dinan software (stock software cuts it off at 128 mph). But you will experience higher rpms at any given road speed, which some people, particularly fans of American V8s, have a problem with. Technically, a lower (numerically higher) differential ratio makes more effective use of existing torque.

Hope this helps.

Best,
Mike

Next Question:

Hey Mike,
I basically want to know who is faster, ahhhh I mean, quicker than me on the "mean streets" of anytown, usa. Can I get around that big-ass SUV when we both pull away from the stoplight at the intersection...can I blast around the Audio A6, Jaguar X8, BMW 330ci, souped-up Mustang or Honda for that matter, etc.?

I was afraid that you would say what you said in paragraph two. It seems like there's nothing very easy that I can do to increase torque at low speeds. That's probably where the most action for me happens given in-town driving. I want to be able to get out of the way of distracted motorists in self-defense but I'd also like to have a little fun.

Understanding what the differential changes offer as a way to increase torque is the next bit of research that I need to do. The Shark injector and air box replacement (I like the *sound* of the less restricted air filter) will be all that I'll change on my rig. Seems like any more modifications to the 328ci and I'd might as well get an M series.

OK, I am very interested in this discussion so I must pick your brain again on the last paragraph. I need some info on the difference between V6 and V8. Are you saying that 8 cylinders are better than 6 cylinders, hands down or is it more like your mention of the Honda 4 cylinder rig and its ability to produce power? Here it comes...wait for it.....Is my 328ci 6 cylinder more powerful/as powerful/less powerful than an 8 cylinder?

I certainly appreciate you help. Your information is very valuable to me.

Thanks so much,
Charlie

Response

Hi Charlie,

I really don't know what to tell you regarding blasting around other cars. If your car isn't fast enough for you and you're not into supercharging, maybe it's time for a faster car. I'd say the driver is more important than the car, and blasting around other cars isn't always the answer to traffic. Obviously no one can shine crap, but as drivers it's more important to be able to adapt ourselves to a given car than the other way around. For example, I would take the same car to the racetrack and have lots of fun with it. It's not necessarily how much power you have, it's what you do with it. Suspension and brakes are more important than power, in my opinion.

Regarding your 8-cylinder versus 6-cylinder question, the answer is it depends. Better for what? I think it was Smokey Yunnick who said, "There's no substitute for cubic inches." To a certain extent, he's right. V8s certainly make lots of low end torque, and if they're overhead cam V8s like BMW's, then they make good high end power too. The trade off is more fuel, more weight (they come in heavy cars), more insurance, and on Bimmers more work -- BMW V8s can be somewhat labor intensive when they mature.

Whether your 2.8-liter M52 engine is more or less powerful than a given V8 depends on the V8 you're talking about. If it's the V8 in the 2003 540i, the answer is no, your engine is not more powerful. If you're talking about the V8 in a 1980 Ford Fairmont, the answer is yes, your engine is more powerful. See, despite what Yunnick said, engine configuration and size are the first words in the power equation, not the last. The last words are something called "volumetric efficiency," which you will learn about if you study automobile engines. In a nutshell, think about a car engine as an air pump. Air enters through the intake and exits out the exhaust. The greater volume of air you can move at a given rpm, the more power you are making. Size and configuration are not the only things that matter in how much air you are moving. Thinking of it this way will also help you understand how superchargers and turbochargers make power -- they move more air. Now, anticipating your next question, air volume is not the the only factor involved in power. But it is the biggest one. Air volume is responsible for the brunt of the the power question. Things like fuel metering and ignition timing -- the things you enhance with software on a modern BMW -- are like fine-scale adjustments.

Note that BMW doesn't make a V6 engine. All BMW 6-cylinder engines are of the longitudinal or inline configuration, also known as the "straight six."

Best,
Mike