Installation time: 10 mins

Installation difficulty: Very Easy

Installation Place: Media City Auto Repair in Burbank, California – Specializing in Toyota and Lexus

I got the Meg Stabilizer Bars around 500 miles and now the car has 2,800 miles. I had a fair amount of time with the car driving all around Southern California, I feel I have enough information to share to everyone. Plus being into Material Science I can share the nitty gritty details about MEG's material selection and how I am pleased with this decision.

To start off, the MEG Stabilizer Bars are (thankfully) made out of 7075 Alum. Here's why…

The verity of Aluminums are known for their wide applications due to need for high strength and lightweight structures – it's practically an industry standard in the aerospace field. For the Al 7075 which is based on Al-Zn-Mg-Cu mixture, it has high yield stress requirement and good fracture toughness. Its use parallels that of 2000 series, but the 7000 series are selected since since they exhibit higher mechanical properties when the application desires it.

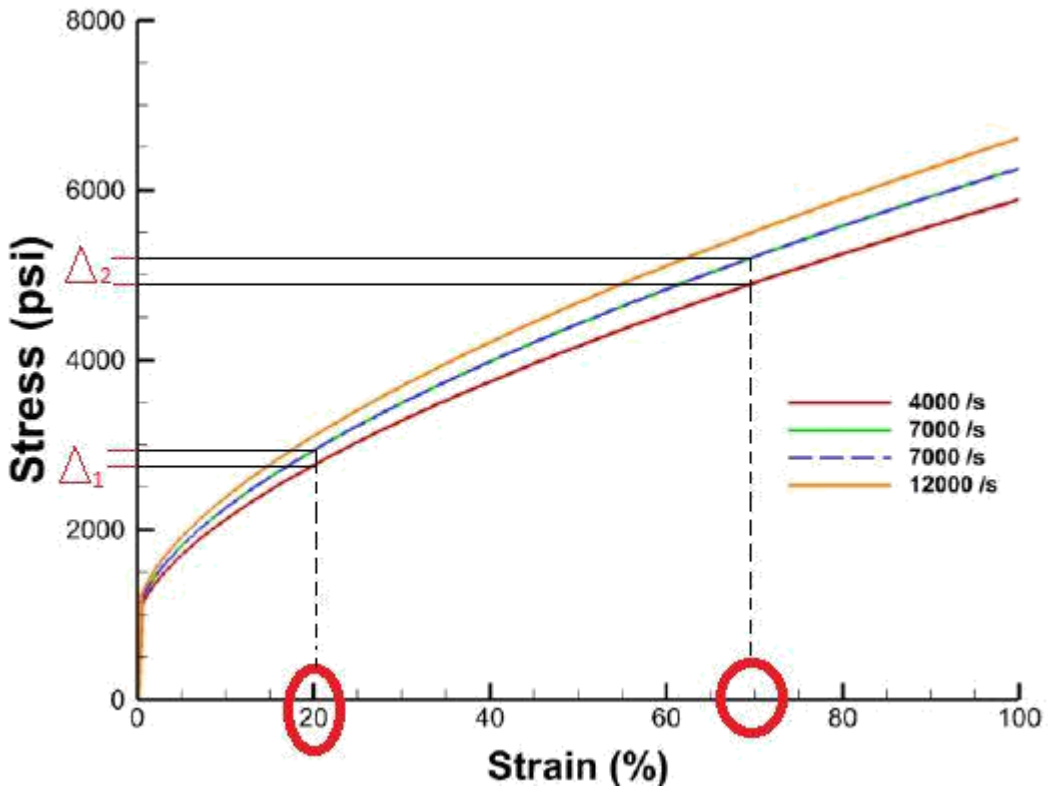
Al 7075 offers good machinability when machined using single-point or multi-spindle carbide tools. MEG's finished product is a nice smooth to the touch with no sharp edges! Attention to detail.

The first part of the product and the preparation. Al 7075 has moderate corrosion resistance (mechanically) once anodized it is aided chemically. This two step procedure allows the product to demonstrate a higher performance against corrosion resistance. The anodizing "response rating" for 7075 alloy is greatly improved using commercially available methods - thankfully it's commercially available which helps keeps the costs down. The alloy can be both hard and clear-coat anodized.

Now to the secondary part of the preparation of this stabilizer bar, the optimum properties of Al are achieved by alloying additions (doping) and heat treatments. This promotes the formation of small hard precipitates which interfere with the motion of dislocations and improve its mechanical properties (second picture illustrates this). Because aluminum-zinc alloy as it is in 7075 Al alloy is susceptible to embrittlement because of micro segregation of $MgZn_2$ precipitates which may lead to catastrophic failure of components produced from it. The alloy is also susceptibility to stress corrosion cracking. So heat treating is a good solution to this, thankfully MEG has taken care of that. This is a 7075 T-6.

Diagram below is the Stress **Strain Yield Curve**for Aluminum 7000 series (what MEG is offering) versus 4000 series (some models have 4000 series some have 2000 series). So I'll choose the stronger product to compare to MEG's - otherwise the delta is greater.

*(Chassis Stress Analysis is usually done below 6000 psi)
With some calculations weight of my model, tire footprint and following my engineering dynamics textbook with a few concepts referenced from my material science text book:



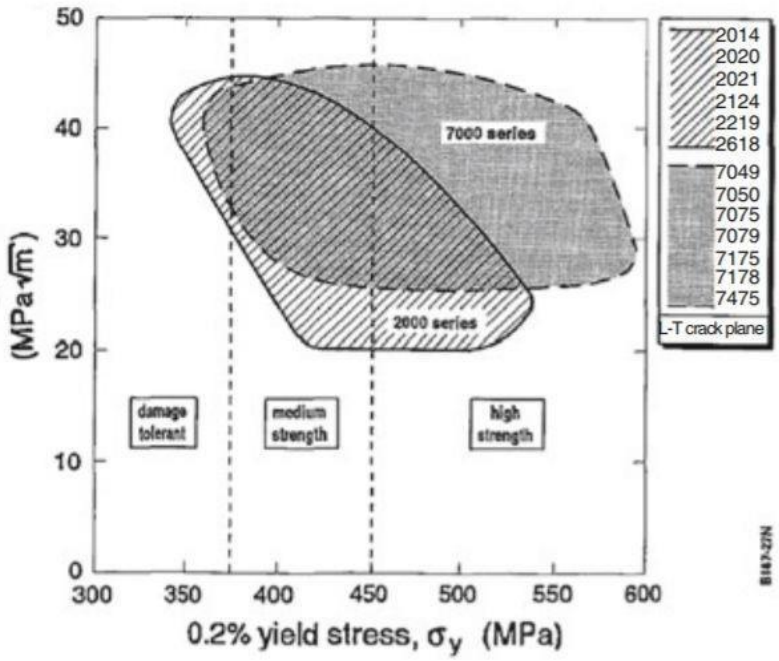
First Delta: has an improvement of 12% with the factory fuel efficient tires

Second Delta:has an improvement of 19.3% with the factory fuel efficient tires
(with sportier tries, the delta will increase since I will have greater grip and will be able to go at higher speeds around a corner. Higher speeds at a corner ... the greater stress the chassis will see thus the difference will increase - IMO slightly though some small percent like 0.3 to 1 percent these are thin tires afterall).

The "butt dyno" felt an obvious but subtle improvement at lower speeds which confirms with the about 12% improvement (of course! the car is not experiencing any significant load or torsional twisting) however, once I got the car up the speed there was an immediate difference close to 20%. Also I noticed that at the 60 MPH speed limit I was able to carry the car's momentum around the freeway turns about 3 to 6 mph higher than before - depending on the radius hence the range.

Lastly how compliant the car is on the road has been improved! The entire car feels like there's been a tidy up from the factory sloopy springy like behavior the Prime has. Note it's with this mod a lone! I am still experiencing "springy-ness" like behavior, it could be the eco efficient tires or soft springs and it's thin rear/front strut bars. But it's a lot more controlled.

Oh yes! Back to the 2000 versus 7000 series on strength and fracture. The 2000 and 7000 alloys covering three strength regimes (left region exhibiting lower performance, middle common ground, and right region superior performance).



Yield strength is important for resisting deformation under loads, but in the presence of cracks and other flaws it is the fracture toughness that generally becomes the more important parameter since a fracture will only propagate in time, it will never "heal" it self (que in a handful of "smart" materials). Minimum fracture toughness requirements have become mandatory, and in the high-strength alloys the generally inverse relationship between strength and toughness.

The diagram above shows that the 7000 series of alloys exhibits superior combinations of strength and fracture toughness compared with the stock 2000 alloys.

Conclusion:

This is a well calibrated part for the Prius, seriously, it's over engineered, which is a good thing! Over engineered products last longer than the products lifetime – it's a damn good thing. In this day in age where so many consumer goods are constructed poorly it's nice to see the money spent here will last. It's a heat treated aerospace grade aluminum – 7075 T-6. I am familiar with this material since it's my job. I am very pleased with this product and can recommend to anyone.