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## Bolster Boost Testing Report

### Synopsis

This report is an initial and general testing report of a prototype “Bolster Boost” product. The prototype unit tested was labeled “46A.” All testing done was conducted by professional racing driver Shields Bergstrom with the goal of evaluation of the performance of the Bolster Boost under varying driving circumstances. Assessment of functionality and performance gains as related to driver performance and comfort.

This report is to serve as a general overview of the product and an initial test of performance capabilities in a limited time and situation environment. Further testing would be required to deliver a more comprehensive report of all aspects of the unit.

The prototype unit was tested in a variety of vehicles on public roads and on a closed course autocross circuit. A full race track test was not conducted due to scheduling and seasonal restrictions.

### Initial Remarks

Every vehicle’s performance is ultimately determined by a single factor... the driver. The driver’s skills and experience coupled with their interactions with the vehicle determine how fast, or how slow, a vehicle is. A driver has essentially 3 points of contact within a vehicle, their hands, their feet and their butt. Those 3 points of contact take in information transmitted by the vehicle and are paired with what the driver can see to create “sensory input information.” This is the data that a driver uses to operate a vehicle during a drive to the grocery store as well as the data used by race drivers to get maximum performance from a racecar. **The more quality information the driver receives, the more quality actions the driver takes.** Vehicles that are numb or lacking in “feel” are often difficult to drive fast and they don’t provide enough quality information to the driver. The same is true of vehicle that don’t integrate the driver well. Vehicles that dull the sensations at the 3 contact points of the driver result in reduced vehicle and driver performance.

One of the ways that vehicles can dull the sensations of the driver are by utilizing seats and seating surfaces that allow too much movement of the driver. Ideally, for high performance driving, autocross, track driving, racing, drifting, etc. it is best for the driver to have limited movement in the seat. The use of snug fitting racing seats and harness systems, as opposed to the 3-point seat belts that are standard in vehicles, keep the driver in the proper position, and aid in the transfer of the information from the car to the driver.

Most street legal vehicles offer a “compromise” seating set-up for the driver. The seats in any given vehicle must accommodate a wide variety of body types and sizes and accommodate a wide variety of driving situations. Most of the standard seats in vehicles trend towards comfort over performance and information

transfer. This can cause problems for drivers in high-performance and competition situations. A lack of body support allows the driver to move independently from the vehicle, this has 3 major effects. First, the independent movement of the driver causes a net loss of information transfer or “feel.” Second, the driver is forced to expend energy supporting his/her body by bracing against the lateral cornering forces causing a loss of fine control of the vehicle. And third, that expenditure of energy in bracing increases driver fatigue. This is where a device like the Bolster Boost can benefit the driver.

Fundamentally, the Bolster Boost is a driver aid. **Its primary function is to improve the feedback loop of the driver and the vehicle.** By keeping the driver in a secure position, the **Bolster Boost can greatly reduce the effects of inadequate seating.**

### Installation, Fitting and Comfort

The Bolster Boost Prototype was tested in a wide variety of vehicles which had a wide variety of seat types. From Recaro performance seats to standard “comfort” seats. In each instance, it was possible to find an ideal position for the Bolster Boost. I tend to prefer lateral support in the area of the mid to upper ribcage, this would be similar to the type of support and bracing of a kart seat or an open wheel race car seat.

Vehicles that had “performance” seats often had additional side bolster for lateral support. **Even with the existing lateral support, the addition of the Bolster Boost made the seat feel more custom/tailored to my body.**

The most immediate observation was, that after installing the unit and finding a comfortable location, the Bolster Boost naturally puts you in the correct driving position. **The unit centers the driver in the seat and the most comfortable driving position becomes a more natural, racing style position.** It became less comfortable to drive the car “one-handed” and **there was no need to lean on the door rest or the center console rest. For that, the Bolster Boost should be commended.**

The Bolster Boost seemed to maintain its location on the seat relatively well. It “stayed put” better on leather/vinyl seats than on cloth. Perhaps the addition of a Velcro, or similar, backing as an option for cloth seats would be useful. On a few occasions, I found that it was necessary to adjust and readjust the position of the Bolster Boost due to slipping and/or creep. Minor adjustments, but it was noticeable and occurred more frequently than desired. Modifying the stiction of the unit would be an easy adjustment to improve performance.

Comfort is generally good. The Bolster Boost is firm, and I prefer a relatively tight fit, and after a long drive through twisty and hilly terrain, I did notice some minor discomfort caused by the firmness of the unit. It should be possible to retain the existing shape of the unit and offer a selection of foam densities. Soft for “spirited” drives through the mountains, to firm for track day and autocross use. Another option would be to utilize a soft layer above the firm foam. OR, utilize a gel covering that can more easily mold to the unique shape of the driver.

Comfort issues only appeared on drives longer than 1 hour and were comparatively minor. For drive times shorter than an hour, discomfort was a non-issue.

### Spirited Public Road Driving

The Bolster Boost prototype unit was tested on several segments of the Kettle Moraine scenic drive in Wisconsin. The route features elevation changes and a wide variety of corner types, sizes and speeds. All vehicles were driven within the speed limits of the various parts of the route.

On public roads, it is not possible, or practical, or safe to operate a vehicle at the limit of tire adhesion. For “spirited” driving, the vehicle is operated well within its performance capabilities and the object is to enjoy a spirited drive on a twisty and scenic section of road.

In this scenario, the Bolster Boost performed remarkably well. The unit, as mentioned above, centers the driver in the seat and promotes a race style driving position. Maintaining control of the vehicle without having to brace against the door or center console of the vehicle while cornering was near effortless. **By not having to brace, the driver maintains the fine control over the vehicle and the sensations are not damped by having to support the body against lateral loads.**

**Subjectively, this increased the fun factor of the drive.** I found myself driving faster than normal and with **much more ease and control of fine steering, throttle and brake inputs.** On public roads, actually being faster makes no difference, the important metric is the sensation of performance. In this case, **the sensation of performance was increased**, even in the slowest vehicle tested.

Also, as mentioned above, on longer stints, some minor comfort issues came into play along with having to re-install and set-up the unit after exiting and re-entering the car, after making fuel stops, food stops or other stops. In this scenario, it can get a bit tedious to have to re-install, re-adjust and try and find the “sweet spot” of the unit every time get into the car. For track day and autocross, this would not be an issue, but for a Sunday drive on a scenic route, it would be nice to have the ability to keep the Bolster Boost mounted to the seat without a driver present. It should be possible for the unit to have a circular strap that wraps around the seat, holding it in a single position.

The biggest benefit of the Bolster Boost on public roads is the promotion of proper driving position. This **enables the driver to more effectively and accurately control the vehicle. This subjectively increases the perceived performance of the vehicle. Slow cars instantly become sports cars, and sports cars seemingly are transformed into knife-edge racers.**

### Closed Circuit Autocross Driving

For the purpose of testing the Bolster Boost under high-performance and competition scenarios, a closed course autocross circuit was designed and set-up at a local parking lot. Permission was granted by the lot owners for the test.

The autocross circuit was designed to test the unit in a wide variety of cornering, braking and accelerating scenarios and featured a low and high-speed slalom, increasing and decreasing radius turns, hairpin turn, high speed sweeping turns and mid-speed turns. The course was run forward then backward to test lateral loading equally on both the left and right side. The course was designed to be driven with an average time of 1 minute. An AIM timing system was used to measure elapsed time of each run and each vehicle was run 3 times in each direction. The lap time was averaged for each vehicle. NO adjustments were made to compensate for variables like tire temperature and pressure and driver familiarity with the circuit. It should be noted that the more I drove the course, the faster I became. For this, and other reasons, this testing cannot be viewed as definitive and absolute.

Additionally, the test was done both with and without the Bolster Boost as a comparative performance test.

This section should be viewed as a rudimentary comparative performance test. The testing and testing data were collected as accurately as possible but should not be considered a rigorous scientific test of performance.

Running the first series of tests without the Bolster Boost installed revealed how much it was necessary to brace the body against the lateral forces generated by the vehicle. This required a non-insignificant amount of physical and mental energy which had a direct impact on the overall control of the vehicle. Have to use an arm to brace against a door or to have to use your left leg on the dead pedal to push back in the seat to support the upper body is detrimental to fine input control of the steering and pedals.

It required more energy and thought to bring the vehicle to limit of tire adhesion around the course, and maintaining that limit became more challenging as the body naturally strains to maintain a proper driving position.

**With the Bolster Boost installed, proper driving position was maintained, which enabled better control of the vehicle. Fine control of the steering and pedal systems was much easier,** and on a skid pad, the ability to maintain “at the limit control” was significantly easier.

The sensation of being “tossed” around in the car was negated by the Bolster Boost. By adding the lateral support of the Bolster Boost, **less mental and physical energy was spent in resisting lateral loading.** This contributed to **an increased sensation of performance** that was realized by the timing unit.

**There was a net decrease in lap time of the runs with the Bolster Boost** installed versus the runs without the unit installed. The time difference varied per vehicle and was influenced also by the type, style and shape of the existing seat within the vehicle. In vehicles with “standard, comfort” seats, the average difference in lap time was 0.500 seconds. In vehicles with “sports, performance” seats, the average difference in lap time was 0.300 seconds.

These results should be viewed as preliminary and not a direct indication of a verifiable performance gain. Please also keep in mind that the testing runs were done with professional race driver Shields Bergstrom, who has **won 2 SCCA Autocross Championships**. An amateur or novice driver might expect to see much larger performance gains with the addition of the Bolster Boost.

It was noticed, that on occasion the extension/tab/appendage of the Bolster Boost interfered with the driver’s arms and elbow. This was primarily experienced during rapid transitions in the slalom and in the hairpin turn. This extension may not be necessary, and if the unit is installed in a position near the upper rib cage, the extension will almost certainly interfere with the driver’s movement. Lowering the unit to below the rib cage eliminated this interference, but lateral support of the upper body diminished. *[I neglected to inform Shields that the handles are designed to be bent out of the way]*

Overall, the autocross testing revealed that the Bolster Boost fundamentally affects driver performance by way of **improving driver control of a given vehicle**. This in turn improves the overall performance of the vehicle resulting in reduced lap times around the course. A driver, making no other alterations to the vehicle, **should expect an increase in control, in support and should also expect a decrease in fatigue and strain.**

Conclusion

The Bolster Boost is a performance enhancing driver aid. Its function is to improve the performance of the driver and his/her control over the vehicle. This improvement to the driver directly translates to an improvement in the performance of the vehicle. If the driver is able to operate the vehicle more accurately and at a higher level of performance, then the vehicle will perform better.

Another interesting aspect of the device is in the promotion of proper driving position. By centering the driving in the seat of the vehicle, the natural driving position is to maintain good posture and have both hands on the wheel. The additional lateral support means that there is no longer a need to rest an arm on either the door rest or the center console. This **fundamentally improves the performance of the driver and leads to a more integrated driver.**

On the street, that driving position and the additional lateral support has a tendency to **produce a perceived increase in performance and integration.** That is to say, a driver will tend to feel more connected with the vehicle. **That connectedness enables the transfer of high-quality information to the driver, which then can be interpreted more accurately and used to produce high quality actions and reactions.**

While further testing should be conducted to further understand the performance gains and the facilitation of high-quality sensory input, the preliminary tests suggest that **the Bolster Boost has a real, measurable performance benefit to the driver.**

**Improving the performance of the driver has the single biggest impact on the performance of the vehicle. The Bolster Boost does that.**

#### Vehicles Used for Testing

1991 Acura NSX  
1995 BMW M3  
2007 Mini Cooper S  
2003 BMW 330i ZHP Touring (Custom built "tuner" car)  
2004 Ford Mustang Bullitt  
2011 Ferrari 458  
2015 Ford Fiesta ST  
2016 Porsche 911 Turbo  
2018 Subaru WRX STI