



G-Force Comparison

Fuel Oil Company 1-18

SURGE BUSTERS are documented, by independent university researchers, to reduce 96.7% of the kinetic energy generated by the liquid surge in a truck tank. To date, the primary application of SURGE BUSTERS has been to achieve safety objectives, ie: better truck handling, less driver fatigue, and reduced rollovers, etc.

Since the invention of SURGE BUSTERS over 15 years ago, many companies have anecdotally reported a reduction in truck maintenance as well, specifically less tire wear, fewer brake jobs and overall reduction in the service of truck suspension parts.

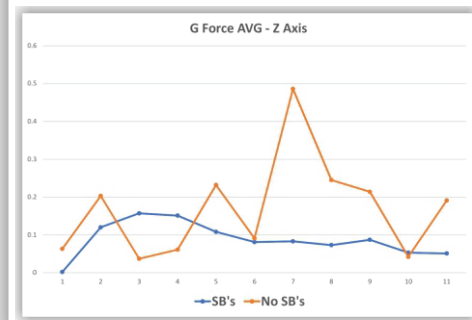
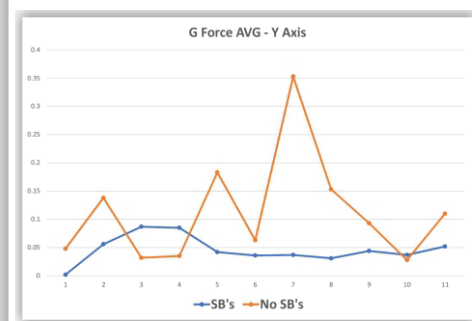
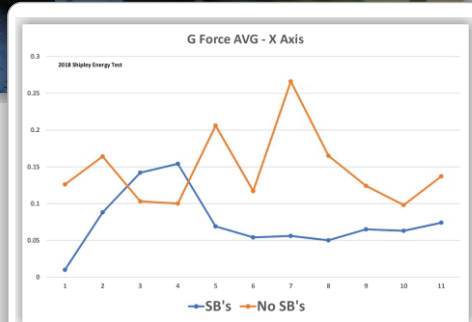
To move beyond the anecdotal reports, we're working with a fuel oil delivery company to conduct a year-long test to factually document the reduction of maintenance that could be expected due to the use of SURGE BUSTERS, (SB's). While this long-term test is on-going, we're also conducting a short-term test to measure and compare the G-Force 3-axis movements between the (2) trucks. **Here's a summary of the initial G-Force testing.**

Two similar 2800 gallon fuel oil trucks were selected and one was equipped with SURGE BUSTERS.

In addition to tracking the maintenance for a year, G-Force sensors were installed on both trucks to measure the surge energy exerted on the chassis.

G-Force sensors measure movement on 3 axis, X, Y, and Z as shown on the graphs at right. Measurements are taken every 10 seconds on each axis. Individual measurements are then averaged and reported to the cloud every 10 minutes.

A recent report (below) showed a **51.9%** decrease in G-Force movement on the truck with SB's. This is favorable, although the final analysis will be the actual reduction of truck maintenance over a year. To track the results of this ongoing test, visit LiquidSurgeControl.com



Data Selected for GRAPH Comparison					
AVG - X, G-Force		AVG - Y, G-Force		AVG - Z, G-Force	
SB's	No SB's	SB's	No SB's	SB's	No SB's
0.01	0.126	0.002	0.048	0.002	0.063
0.088	0.164	0.056	0.138	0.12	0.203
0.142	0.103	0.087	0.032	0.157	0.037
0.154	0.1	0.085	0.035	0.151	0.061
0.069	0.206	0.042	0.183	0.108	0.232
0.054	0.117	0.036	0.063	0.081	0.091
0.056	0.266	0.037	0.353	0.083	0.486
0.05	0.165	0.031	0.153	0.073	0.245
0.065	0.124	0.044	0.093	0.087	0.214
0.063	0.098	0.037	0.028	0.053	0.042
0.074	0.137	0.052	0.11	0.051	0.191
0.825	1.606	0.509	1.236	0.966	1.865
48.6%		58.8%		48.2%	



3 Axis AVG of

51.9%

G-Force Decrease on the truck with SB's compared to the truck without SB's.

Liquid Surge Control, LLC.

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Home Heating Oil Distributors – Participation Program

Version 06/21

Two (2) comparable (2800 gallon) delivery trucks.

Purchase 88 Surge Busters at Dealer Cost (25% discount).

We will assemble (including training someone on your staff) and install the units.

We will provide and install electronics on the 2 trucks, continuously monitoring the impact difference on the 2 truck frames from the force of the liquid surge (one with Surge Busters – one without Surge Busters).

We require that you participate with us for a minimum of 6 months by providing copies of your normal maintenance reports on those 2 trucks – oil changes, brake repairs/replacements, transmission repairs, tire wear or replacement, etc. (If you monitor engine or transmission operating temperatures we would be interested.) These reports can be copies of your normal maintenance personnel handwritten forms.

We want to briefly communicate with the maintenance supervisor and the driver of the Surge Buster truck in 4-6 week intervals for their honest feedback.

We will provide a comparison report using your specific data to show the possible maintenance savings in addition to improved safety.

There is no obligation or commitment required to purchase additional Surge Busters. We certainly would hope the evidence is conclusive enough for you to consider more Surge Busters for other trucks in your fleet, but that is not a requirement.

Surge Buster® Monitoring Program

Objective: In cooperation with and support of select customers, we intend to compare two nearly identical tank trucks, collecting relevant data during their operations in normal daily work environments and activity over a 6 month or longer time frame.

Functionality: One tank will have the appropriate number of Surge Busters installed, the other will run without Surge Busters. Electronic sensors will be installed on each truck measuring the impact of the liquid surge energy on the frame of each truck respectively. The sensors measure that impact in 3 axes, side to side, front to back, and up and down. Readings are taken in 10 second intervals, sent to a gateway in the cab, and uploaded to the cloud data base every 10 minutes.

Relevant Information: Although these sensors will record the impact results of acceleration, braking, rough roads, cornering, swerving to avoid traffic emergencies, and bad weather road conditions (rain, ice, and snow), the data provided is only part of the total consideration. The other integral factors are the maintenance reports and comparisons for the two trucks.

- Brake pad wear and replacement frequency along with better braking performance while driving.
- Tire wear and replacement
- Drive train components, transmission fluids and wear
- Engine oil performance due to less back compression during decelerations
- Driver confidence, safety, and even comfort
- Decreased rollover potentials

Reporting: Results of the electronic data collection will be translated and graphed into a meaningful report and provided on a regular basis. While we do not intend or request our customers get into cumbersome record keeping, we do request and need some shared information of maintenance records; brake pad wear / replacement, tire wear / replacement, oil usage / replacement and any related issues. We also request an opportunity to get driver feedback, obviously from the drivers operating the truck with the Surge Busters.

It is our intent to provide actual data that will support the premise that Surge Busters do indeed reduce overall maintenance costs significantly, while providing an increased level of driver safety and decreased potential for rollovers.