WHITE PAPER

Understanding the Potential Cost Savings of SpeedGauge®:

Large Trucks

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SpeedGauge Inc.

This study was sponsored by SpeedGauge Inc. but was designed and executed as an independent, analytical evaluation of publicly available data from U.S. Federal Government safety studies, the American Trucking Association, truck equipment manufacturers, truck driver surveys, publicly available private research, and operational field data collected from truck fleets using SpeedGauge between 2006 and 2008.

Executive Summary

Vehicle speed is the single most significant operational cost variable directly attributable to driver behavior: how fast truck drivers choose to drive corresponds directly to the rate and cost of truck crashes, maintenance costs and fuel consumption.

This paper set out to estimate: first, the all-in cost of speeding per truck mile driven in terms of the direct and indirect financial costs of truck crashes, incremental maintenance, and excess fuel consumption attributable to speeding; and second, the potential cost savings truck fleets can achieve by using SpeedGauge as a method for monitoring and controlling vehicle speed in truck fleets.

The data sources utilized by this paper include publicly available data from U.S. Federal Government safety studies, the American Trucking Association, truck equipment manufacturers, truck driver surveys, publicly available private research, and operational field data collected from vehicles monitored by SpeedGauge between 2006 and 2008. In addition, this paper incorporates the opinions and insights of independent third-party transportation operators and risk-management professionals.

A detailed analysis of this data leads to the following conclusions:

- **The cost of speeding for a large truck in the U.S. is estimated to be between $0.037-$0.1016 per mile on Interstates and expressways and $0.050-$0.065 per mile on non-Interstate roads (arterials, connectors, surface streets etc.).** These per-mile figures incorporate the direct and indirect financial costs of truck crashes, increased maintenance, and higher fuel consumption attributable to speeding:
    - **The direct and indirect crash-related costs attributable to speeding in the U.S. are estimated at $0.050 per mile on roads on non-Interstates, and $0.019 per mile for Interstates.** This comprehensive figure takes into account medically-related costs, emergency services costs, property damage costs, lost productivity costs, truck repair costs, and damages to third-party property. 59% of all large truck travel is non-Interstate roads.
    - **Speeding can increase maintenance costs by up to $0.015 per truck mile driven across all types of roads.** This per-mile figure is a preliminary estimate; it incorporates potential decreases in miles-to-engine overhaul, higher oil consumption, shortened mileage between preventive maintenance intervals, lower tire-casing life, and reduced brake-lining life.
    - **Speeding by 10 mph increases fuel consumption costs by up to $0.018-$0.067 per mile on roads with speed limits above 55 mph.** This estimated range assumes $2.00 per gallon and 6.0 mpg at 55 mph, and is based upon multiple studies conducted over the past three decades.
- **SpeedGauge successfully modifies driver behavior, reducing speeding incidents by up to 67% within six months of deployment.** This figure comes directly from field data measured and reported by truck fleets utilizing SpeedGauge. This reduction in speeding incidents is highly concentrated in non-Interstate and non-freeway roads—where three-quarters of all fatal truck crashes take place.
- **Consequently, SpeedGauge can reduce a large truck's operating costs by as much as $0.034-$0.044 per mile on non-Interstates, and by as much as $0.025-$0.068 per mile on Interstates.** These estimates represent *maximum possible savings* for *large trucks*, and are obtained by applying the reduction in speeding incidents observed in real-world deployments to the all-in costs of speeding per mile driven. The comparable savings for smaller vehicles is likely to be lower. Of course, actual results can—and will—vary from fleet to fleet.

In short, deploying SpeedGauge can result in substantial ongoing savings for all fleets—including those using speed limiters at speeds above 55 mph. The remainder of this white paper present the data and prior research collected, analyzed and documented in this study, and the analysis which led to these findings.

Cost of Speeding Per Truck Mile Driven

This paper estimates the all-in cost of speeding per truck mile driven for large trucks in terms of the direct and indirect financial costs of large truck crashes, incremental maintenance costs, and excess fuel consumption attributable to speeding. The figures are obtained by surveying the available literature and data, estimating the incremental overall costs caused by speeding under different driving scenarios and then dividing the aggregate figures by the total number of miles traveled by large trucks.

The analysis which follows estimates costs per mile attributable to speeding in the following order:

- Direct and Indirect Crash-Related Costs per Mile Attributable to Speeding
- Maintenance Costs per Mile Attributable to Speeding
- Fuel Consumption Costs per Mile Attributable to Speeding

Direct and Indirect Crash-Related Costs per Mile Attributable to Speeding

The analysis of crash-related costs per truck mile driven attributable to speeding begins with a determination of average crash-related costs per mile, according to the following formula:

$$\frac{(\text{Cost per Large Truck Crash} \times \text{No. of Large Truck Crashes})}{(\text{Total Miles Traveled by Large Trucks})} = \text{Crash-Related Cost per Mile}$$

The Federal Motor Carrier Safety Administration estimates that the average cost of a large truck crash in 2005 was $91,112.[1] According to the study, "These costs represent the present value, computed at a 4% discount rate, of all costs over the victims' expected life span that result from a crash. They include medically related costs, emergency services costs, property damage costs, lost productivity, and the monetized value of the pain, suffering, and quality of life that the family loses because of a death or injury." Adjusting for inflation as reported by the Bureau of Labor Statistics, the equivalent figure in 2008 dollars is $100,470 per large truck crash.

This figure attempts to account for all direct and indirect costs experienced by all stakeholders. However, in a more practical sense, the costs of legal settlements or insurance rates may be substituted for many of these costs, and the actual costs experienced by individual large-truck fleets may of course be higher or lower than the figure used in this paper.

Also note that this figure is an average across all 8.4 million large trucks in the U.S. (as of 2006). In reality, large trucks are operated under many different types of conditions, by both full-time professional drivers and by occasional drivers, so individual truck results can vary significantly from this average.

Per-mile crash rates vary significantly by whether or not the road traveled has 1) limited access uni-directional travel (ie. Interstate) and 2) the speed limit. Therefore, this white paper estimates crash-related costs separately for Interstates/expressways and non-Interstates.Interstate,.

1 Zaloshnja, Eduard, Ph.D. and Miller, Ted, Ph.D. Unit Costs of Medium and Heavy Truck Crashes. (2006). Federal Motor Carrier Safety Administration. At the time of writing, this figure is also published online on the Federal Motor Carrier Safety Administration's "Commercial Motor Vehicle Facts" website.

According to the U.S. Department of Transportation, large truck crashes are distributed by road speed limits, and Interstate status, approximately as shown on the following table:[2]

Crashes by Road Speed Limit	Pct. Of All Truck Crashes
30 mph or less	21.7%
35 or 40 mph	22.6%
45 or 50 mph	15.4%
55 mph	18.7%
60 mph or higher	20.6%
No Statutory Limit	0.9%
Percentage of Crashes on Interstate Roads	20.73%

The number of police-reported large truck crashes in 2006 was 368,321, 20.73% of which occurred on Interstate roads.[3] Based on the above table, this white paper estimates that 291,168 police-reported large truck crashes occurred outside the Interstate/expressway system —and the remaining 76,353 crash incidents occurred on on the Interstate System.

According to the Federal Highway Administration, large trucks travel a total of approximately 223.0 billion miles per year, of which approximately 131.9 billion miles are traveled on non-Interstate roads and the remainder, approximately 91.1 billion miles, are traveled on Interstate roads:[4]

2 National Automotive Sampling System (NASS) of the General Estimates System (GES), 2007. The 61,282 police accident reports used for this analysis are a probability sample of all police-reported crashes that occurred in the U.S.

3 Federal Motor Carrier Safety Administration. (November 2007). “Commercial Motor Vehicle Facts.” At the time of writing, this data is available at http://www.fmcsa.dot.gov/facts-research/facts-figures/analysis-statistics/cmvfacts.htm.

4 Federal Highway Administration. (2008). Highway Statistics. At the time of writing the breakdown of large truck miles traveled by road function class is available here: http://www.fhwa.dot.gov/policy/ohim/hs06/htm/vm1.htm.

Truck Miles Traveled by Road Function Class	Large Truck Miles Traveled
Interstate Rural	51,385,000,000
Other Arterial Rural	39,626,000,000
Other Rural	29,075,000,000
Interstate Urban	39,731,000,000
Other Urban	63,220,000,000
Total Interstate	91,116,000,000
Total Non-Interstate	131,921,000,000
Total	223,037,000,000

Based on these figures, this white paper estimates that the all-in the crash-related costs for large trucks in the U.S. on all roads total approximately \$0.166/mile, calculated as follows:

$$\frac{(\$100{,}470 \text{ Avg Cost/Crash}) \times (368{,}321 \text{ Crashes})}{(223{,}037{,}000{,}000 \text{ Miles Traveled})} = \$0.166/\text{mile}$$

Based on analogous calculations, the crash-related costs per mile on non-Interstate roads are estimated to be higher, at approximately \$0.222/mile, whereas the comparable figure on Interstate and expressway roads is estimated to be considerably lower at \$0.084/mile.

The following table summarizes these results:

	All Roads	Non-Interstate	Interstates / Expressways
Large Truck Miles Traveled (2006)	223,037,000,000	131,921,000,000	91,116,000,000
Number of Police-Reported Large Truck Crashes (2006)	368,321	291,968	76,353
Average Cost per Large Truck Crash (2008 Dollars)	\$100,470	\$100,470	\$100,470
Crash-Related Costs per Mile (Average)	\$0.166	\$0.222	\$0.084

A percentage of these crash-related costs per mile can be attributed to speeding. Some older studies estimate that speeding is a leading cause of up to one-third of all crashes; however, this white paper uses a much lower figure based on a recent study by the Federal Motor Carrier Safety Administration in 2006.[5] The following table shows the different risk factors associated with truck crashes according to this recent study:

5 Craft, Robert, Ph.D. Large Truck Crash Causation Study. (2006). Federal Motor Carrier Safety Administration. At the time of writing this white paper, a summary of the results and conclusions of this study are available for free download at http://ai.fmcsa.dot.gov/ltccs/data/documents/06NTSB.ppt.

Associated Risk Factors	Number of Crashes	Percentage of Crashes	Relative Risk Factor
Legal Drug Use	52,000	37%	1.00
Traffic Flow Interruption	40,000	28%	0.85
Brake Problems	39,000	28%	1.67
Too Fast for Conditions	32,000	23%	2.05
Unfamiliar with Roadway	31,000	22%	1.39
Inadequate Surveillance	20,000	14%	1.87
Fatigue	19,000	13%	1.82
Distraction	14,000	10%	1.64
Crash Study Sample Size *	141,000	100%	N/A

* Does not add up to the sum of all associated factors because multiple factors influenced each crash incident.

While other factors—specifically, legal drug use, traffic flow interruptions, and brake problems—are associated with crashes more frequently than speeding, the latter has the highest relative risk of all factors. This means that whenever speeding is present as a factor in a crash, it is more likely than any other factor to be among the critical factors leading to the crash. For instance, as the above table indicates, whenever speeding is present as a factor in a large truck crash, it is 2.05 times more likely to also be a critical factor than legal drug use. (For a more detailed explanation of relative risk, please see the study.)

A note of caution is warranted. Determining the exact cause of vehicle crashes is difficult and there is disagreement amongst experts. Many truck crashes have multiple causes and the initial cause of the crash may not account for the severity of the crash. For example, poor tire maintenance may be a primary cause of a crash but excessive vehicle speed may account for the severity of the crash.

For simplicity's sake, this white paper does not try to isolate the impact of each of these factors with a complex multi-factor analysis of variance of all the factors associated with crash incidents. This paper simply points out that speeding is a factor in 23% of all crashes and that its relative risk is higher than any other factor (i.e., whenever speeding is present as a factor, it is more likely than any other factor to also be a critical factor).

It follows that up to 23% of all crash-related costs can be attributed to speeding. Therefore, all-in, the crash-related costs attributable to speeding are estimated to be potentially as high as $0.038/mile:

$$\text{Crash-Related Costs } (\$0.166/mile) \times \text{ Pct. Attributable to Speeding } (23\%) = \$0.038/mile$$

Based on analogous calculations, the direct and indirect crash-related costs per mile attributable to speeding on non-Interstates are estimated to be as high as $0.050/mile, and Interstates as high as $0.019/mile. It should be noted that these last two figures are rougher estimates, because the causal factor of 23% percent for speeding is applied to both Interstate and non-Interstate roads.

The following table summarizes these results:

	All Roads	Non-Interstate	Interstates / Expressways
Crash-Related Costs per Mile (Average)	$0.166	$0.222	$0.084
Percentage of Vehicle Crashes in which "Traveling too Fast for Conditions" was an Associated Factor	23%	23%	23%
Crash-Related Costs per Mile Attributable to Speeding	$0.038	$0.050	$0.019

Maintenance Costs per Mile Attributable to Speeding

The Maintenance Council of the American Trucking Association (ATA) analyzed the effects of speed on operation costs in a landmark study conducted a decade ago.[6] The operating speed was assumed to affect the component durability. According to this document, an increase in operating speed from 55 mph to 65 mph had the following effects:

- 10 to 15% decrease in miles-to-engine overhaul
- oil consumption increase of 15%
- shortened mileage between preventive maintenance intervals
- decrease in effective tire casing life
- reduction of up to 15% in brake lining life

Unfortunately, no detailed data was presented in the ATA study—most of the results obtained were based on the consensus among the council members. Subsequent to the ATA study, a number of attempts have been made to quantify the increase in maintenance costs attributable to speeding.

With respect to the effect of higher truck speeds on engine life, in a 2005 survey, the opinions of engine manufacturers were split.[7] The estimates of the additional engine wear ranged from no effect to a 20% reduction in engine life for a truck with a 70 mph operating speed compared to a 60 mph speed. Unfortunately, engine manufacturers did not provide detailed research data to backup these figures.

Regarding the effect of higher truck speeds on tire life, a recent survey of tire manufacturers indicated that a truck speed change from 65 to 75 mph reduces tire life.[8] The estimate was as high as a 1% reduction in tire life for each additional 1 mph in average speed over the life of a tire. Unfortunately, the tire manufacturers participating in this survey did not provide detailed research data to backup these figures.

In 2005, 205 truck drivers were surveyed to obtain their opinion on the relationship between speed and maintenance costs.[9] For reference purposes, drivers were asked to compare the maintenance costs for 60 mph versus 70 mph. Most of the drivers (64%) stated that, assuming that the maintenance is done at regular intervals (by mileage), maintenance costs are independent of the truck's speed. Some of the drivers (28%) felt that higher speeds would cause more wear on the engine and thus increase the maintenance costs. Only 8% of the drivers

6 The Maintenance Council. (1996). 55 vs. 65+, An Equipment Operating Costs Comparison, The Maintenance Council, American Trucking Association.

7 Steven L. Johnson and Naveen Pawar. (2005). "Cost-Benefit Evaluation of Large Truck-Automobile Speed Limit Differentials on Rural Interstate Highways."

8 *Idem.*

9 *Idem.* Of the 205 truck drivers surveyed, 115 were company drivers, 68 were owner-operators, and the remaining 22 drivers did not indicate their status, 20 were leasing their trucks to fleets, and 48 operated under their own authority.

thought that operating at 70 mph would have lower maintenance costs compared to operating at 60 mph. In short, the findings were at best inconclusive.

Truck Driver Survey (2005) Maintenance Costs at 60 mph versus 70 mph	Percentage of Respondents
Drivers who responded that maintenance costs are independent of speed—assuming maintenance is done at regular mile intervals	64%
Drivers who responded that higher speeds cause more engine wear and thus increase the maintenance costs	28%
Drivers who responded that maintenance costs are lower at 70 mph as compared to 60 mph	8%

Finally, according to SafetyFirst Systems, LLC, a small provider of safety-related fleet services, aggressive and unsafe driving habits can add as much as $0.010 to $0.015 per mile in accelerated tire, brake and engine wear on a large bore diesel tractor.[10] This range is consistent with the findings of the ATA study, the survey of engine manufacturers, and the survey of tire manufacturers referenced above. Note that these per-mile figures are comprehensive averages incorporating the impact of speeding across all maintenance items—including potential decreases in miles-to-engine overhaul, increases in oil consumption, shortened mileage between preventive maintenance intervals, decreases in effective tire life, and reductions in brake lining life.

In summary, although there are many opinions regarding the impact of speeding on maintenance costs, there is very little verifiable, detailed data that can be used to estimate the increased maintenance costs attributable to speeding. Based on the available literature and published survey results, however, this white paper concludes that the impact on maintenance and operating costs from speeding likely ranges between zero (i.e., it has no impact) and $0.015/mile, the highest value found in the available literature.

The following table summarizes these findings:

Operating and Maintenance Costs per Mile Attributable to Speeding	Increase in Cost per Truck Mile
Highest estimate available (SafetyFirst Systems, LLC research)	$0.015
Lowest estimate available (2005 truck-driver survey)	$0.000

10 SafetyFirst Systems, LLC. (2005). Aggressive, Unsafe Driving & Its Impact On Maintenance Costs. At the time of writing this document was available online at my.safetyfirst.com/newsfart/MaintenanceCostsR1.pdf.

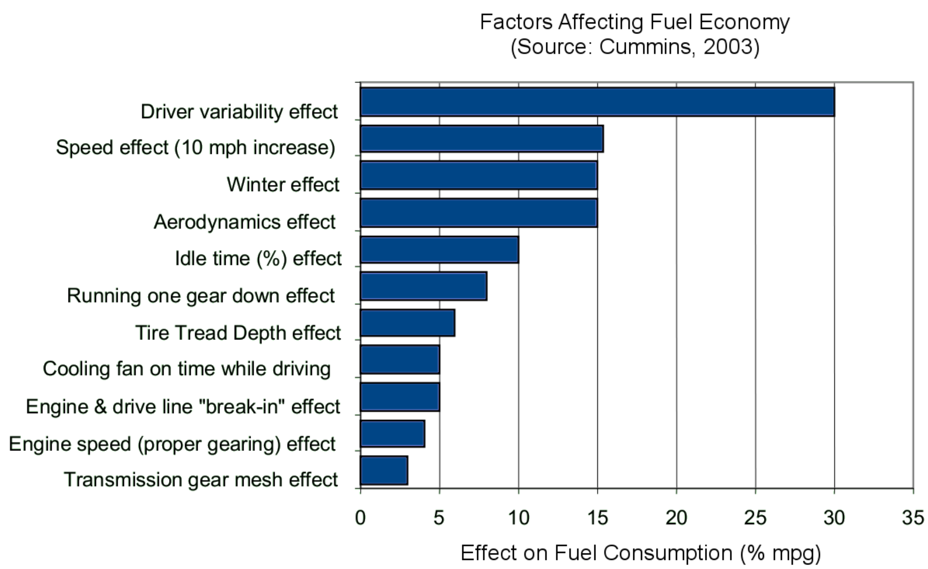
Fuel Consumption Costs per Mile Attributable to Speeding

Within the trucking industry, there is a longstanding "rule of thumb" that "each increase in vehicle speed of 1 mph reduces the fuel efficiency by 0.1 mpg."[11] While this estimate is generally considered valid by many fleet managers, recent research points to a lesser impact, particularly on newer engines.

A recent survey of maintenance and operations managers indicated that a more accurate estimate for current fleets is probably 0.08 mph for each mile per hour increase in speed.[12] According to the same survey, "some recent, unpublished data, indicates that, for rural Interstates, the cost of increased speed is 0.03 to 0.05 mpg per mile per hour increase."

A brochure published by Cummins, Inc. in 2003 listed recommendations for improving the fuel economy of heavy trucks.[13] The company brochure stated that the "rule of thumb" is for each 1 mph increase in speed above 55 mph the fuel economy decreases by 0.1 mpg. It was also indicated in this brochure that tires have the largest effect on fuel consumption below 50 mph, whereas aerodynamics is the most important factor above 50 mph. The brochure estimated that a 10 mph increase in speed increases fuel consumption by 15%.

There were other factors listed in the Cummins brochure that could improve the efficiency of trucks. These factors are summarized in the following chart:



The following table summarizes these findings in terms of increased cost per mile traveled—assuming baseline fuel consumption of 6 mpg at 55 mph, and fuel costs of $2 per gallon:

11 The Maintenance Council. (1996). 55 vs. 65+, An Equipment Operating Costs Comparison, The Maintenance Council, American Trucking Association.

12 Steven L. Johnson and Naveen Pawar. (2005). Cost-Benefit Evaluation of Large Truck-Automobile Speed Limit Differentials on Rural Interstate Highways. Of the 205 truck drivers surveyed, 115 were company drivers, 68 were owner-operators, and the remaining 22 drivers did not indicate their status, 20 were leasing their trucks to fleets, and 48 operated under their own authority.

13 Cummins (2003). Secrets of Better Fuel Economy- The Physics of MPG. Cummins MPG Guide

	MPG Impact of 1MPH Increase	MPG Impact of 10MPH Increase	MPG at 55MPH	MPG at 65MPH	Percentage Increase in Consumption	Increase in Cost per Truck Mile
Increase in fuel consumption resulting from a 10MPH increase in speed according to the American Truck Association's "rule of thumb"	0.10	1.0	6.0	5.0	20.000%	$0.067
Increase in fuel consumption resulting from a 10MPH increase in speed, according to the fuel consumption study by Cummins (2003)	N/A	N/A	6.0	5.2	15.000%	$0.050
Increase in fuel consumption resulting from a 10MPH increase in speed according to the 2005 survey of Maintenance and Operations managers						
Highest estimate provided by Maintenance and Operations managers	0.08	0.8	6.0	5.2	15.385%	$0.051
Lowest estimate provided by Maintenance and Operations managers	0.03	0.3	6.0	5.7	5.263%	$0.018

Based on the above table, this paper estimates that fuel-consumption costs attributable to speeding by 10 mph range from $0.018/mile (the lowest figure reported across the available literature) to $0.067/mile (the highest figure reported across the available literature). Note that these fuel-consumption estimates apply only to trucks traveling faster than a baseline maximum speed of 55 mph so these cost figures do not readily apply to roads with speed limits below 55 mph. Because this study makes the assumption that all non-Interstate/expressway roads have speed limits of 55 mph or less, which is not true in some states, this study understates the potential fuel economy gain somewhat on non-Interstate roads.

Reduction in Speeding Incidents Achieved by SpeedGauge

The SpeedGauge driver monitoring and reporting system has been commercially deployed since 2004 and is now in use by tens of thousands of commercial vehicles, a sizable portion of which are large trucks. This paper draws on the real-world experience of these fleets to estimate the potential reduction in speeding incidents that can be achieved by fleets through the deployment of SpeedGauge.

SpeedGauge, Inc. and end-user fleets have conducted various performance analysis of the impact of SpeedGauge on driver behavior. These studies, across all types of fleets and across all types of vehicles, have consistently found dramatic reductions in excessive speeding incidents, particularly on arterial and surface streets—that is, on non-Interstate roads—where other tools such as speed limiters are not effective. In other words, SpeedGauge successfully modifies driver behavior on roads previously largely outside the control of fleet managers.

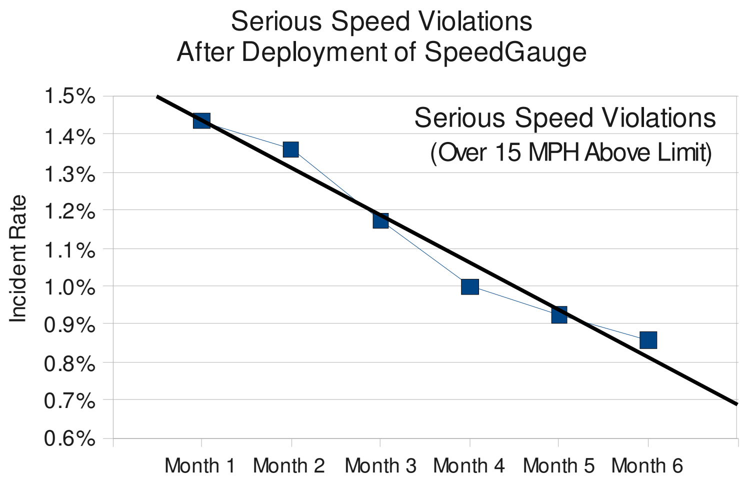
SpeedGauge goes beyond traditional speed-control technologies by bringing context ("where exactly was the driver speeding?") and analysis ("is this particular driver doing better or worse than last week?") and by providing fleet managers with a variety of easy-to-use, point-and-click software tools for fine-tuning precisely how, where, when, and to what extent aggressive driving is to be discouraged within a fleet. With SpeedGauge, a fleet manager can control speeding on residential streets, rural roads, Interstate ramps, and other areas where slower speed is prudent. Beyond simple control, a fleet manager also gets reporting and analytical tools to help identify problem areas quickly and track and train drivers over time. SpeedGauge, in other words, allows fleet managers to fine-tune driver behavior in highly-granular ways not previously possible.

Consequently, the impact of SpeedGauge depends to a considerable degree on fleet priorities and constraints. For instance, one fleet manager might be quite lenient with speeding incidents occurring on rural routes where there is normally little or no other traffic whereas another fleet manager might be quite aggressive about eradicating all speeding incidents occurring on heavily congested urban routes where there is normally a lot of other traffic. As another example, a fleet manager might want to minimize speeding incidents only on certain roads within a territory, such as those with heavy pedestrian traffic, but not on most others, thereby focusing efforts where safety is a highest priority. As a final example, a fleet manager might decide to focus only on speeding incidents above a certain threshold beyond legal speed limits instead of focusing on every single speeding incident no matter how minor.

Hence, the reduction in speeding incidents that can be achieved with SpeedGauge is limited primarily by fleet-manager priorities—not by any intrinsic limitations of the product. Indeed, it might be theoretically possible for a fleet manager using SpeedGauge to eliminate virtually all speeding incidents. In practice, however, most fleet managers achieve reductions well below 100% due to practical considerations.

One study conducted by SpeedGauge, Inc. in 2007 examined the impact of deploying SpeedGauge across 24 different fleets encompassing 1,000 vehicles over a six-month period. The field data gathered for this study showed that SpeedGauge reduced the rate of serious speed violations across all fleets by an average of 40.31% within six months of deployment as shown on the following table and chart:

Results from 24 fleets, 1,000 vehicles, six months	Serious Speed Violations Incident Rate
Month 1	1.435%
Month 2	1.360%
Month 3	1.172%
Month 4	0.999%
Month 5	0.925%
Month 6	0.856%



It should be stressed that this is the *average* reduction achieved across 24 different fleets—each of which faces different circumstances and operates under a different set of priorities and constraints. No two fleets are alike. The 40.31% figure was achieved by all 1,000 vehicles in the study as a group. Individual fleets and vehicles achieved diverse results, both higher and lower than this average.

The highest reduction in speeding incidents achieved with SpeedGauge to date is 67%, based on written customer testimony: "We have used SpeedGauge for 6 months and it has lowered speed events by more than 67%." – Mr. Kelly Peeks, Inland Intermodal Logistics Services, LLC.

"SpeedGauge has been the single most useful tool on our GPS system for our industrial fleet of vehicles." – H. Wayne Leiser, President & Owner, Colorado Asphalt Services, Inc.

For the purpose of this white paper, it is assumed that the maximum potential reduction in speeding incidents with SpeedGauge is 67% even though it might well be possible for some fleets to achieve reductions beyond this figure for the reasons discussed above.

Maximum Reduction in Speeding Attained by SpeedGauge Customers in Actual, Real-World Deployments Over Six Months	67%

Potential Cost Reductions Achievable with SpeedGauge

The potential cost reductions achievable with SpeedGauge can be estimated by multiplying the costs per mile attributable to speeding by the maximum reduction in the rate of speeding incidents achieved in real-world deployments by SpeedGauge:

Costs/Mile Attributable to Speeding × Pct. Reduction in Speeding Incidents = Savings/Mile

The costs per mile attributable to speeding include direct and indirect crash-related costs, incremental maintenance costs (if any), and incremental fuel consumption (only on roads with speed limits at or above 55 mph, assumed to be Interstates for this study). The following table summarizes potential costs per mile as estimated by this white paper—costs range between $0.050/mile and $0.065/mile for non-Interstate, and between $0.037/mile and $0.101/mile for Interstates:

	Non-Interstates		Interstates / Expressways	
Estimated Costs per Mile	Low Estimate	High Estimate	Low Estimate	High Estimate
Crash-Related Costs per Mile Attributable to Speeding	$0.050	$0.050	$0.019	$0.019
Maintenance Costs per Mile Attributable to Speeding	$0.000	$0.015	$0.000	$0.015
Fuel Consumption Costs per Mile Attributable to Speeding	N/A	N/A	$0.018	$0.067
Estimated Total Costs Per Mile Attributable To Speeding	$0.050	$0.065	$0.037	$0.101

Applying the 67% maximum reduction in the rate of speeding incidents observed to date in SpeedGauge deployments to these cost-per-mile figures yields potential cost reductions between $0.34/mile and $0.044/mile for non-Interstate roads, and between $0.025/mile and $0.068/mile for Interstates. It should be noted that the savings estimates for Interstates assume no other speed-control technologies (e.g., speed limiters) are in use.

The following table shows the potential savings per mile achievable with SpeedGauge in terms of direct and indirect crash-related costs, incremental maintenance, and fuel consumption, for Interstates and non-InterstatesInterstateInterstate:

Cost Reductions After Deploying SpeedGauge	Non-Interstates Low Estimate	Non-Interstates High Estimate	Interstates / Expressways Low Estimate	Interstates / Expressways High Estimate
Potential Reduction in Crash-Related Costs per Mile	$0.034	$0.034	$0.013	$0.013
Potential Reduction in Maintenance Costs per Mile	$0.000	$0.010	$0.000	$0.010
Potential Reduction in Fuel Costs per Mile	N/A	N/A	$0.012	$0.045
Total Potential reduction in Cost per Mile	$0.034	$0.044	$0.025	$0.068

It should be stressed that these ranges represent *maximum* potential cost reductions for *large trucks* based upon the maximum reduction in the rate of speeding incidents achieved with SpeedGauge to date. Comparable figures for smaller vehicles is likely to be lower; moreover, actual results can—and will—vary from fleet to fleet. No two fleets are alike, and fleet managers operate under a wide variety of priorities and constraints.

Despite these caveats, the results are clear: deploying SpeedGauge can result in substantial ongoing savings for all fleets. The following two charts show how estimated costs-per-mile attributable to speeding can change before and after the deployment of SpeedGauge: