motive

How to achieve up to 10x ROI

with AI-powered dash cams and coaching

Abstract

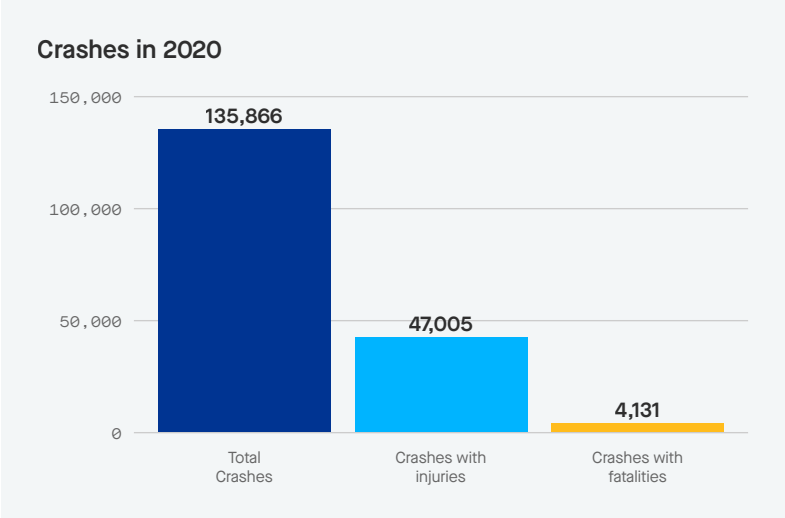
Motive studied how its AI-powered dash cams and safety platform helped reduce high-risk driving behaviors and crashes on the road. Our researchers analyzed more than 5,000 Motive fleets over two years, and concluded fleets that used Motive dash cams and frequently coached had **22% fewer accidents** and **56% fewer unsafe driving incidents** than fleets that didn't use dash cams and didn't coach. Fleets also saw **up to 10x return on investment** (ROI) in their first year with Motive. Our study showed that taking a proactive approach to safety helped prevent crashes and lower costs, all while keeping drivers safe.

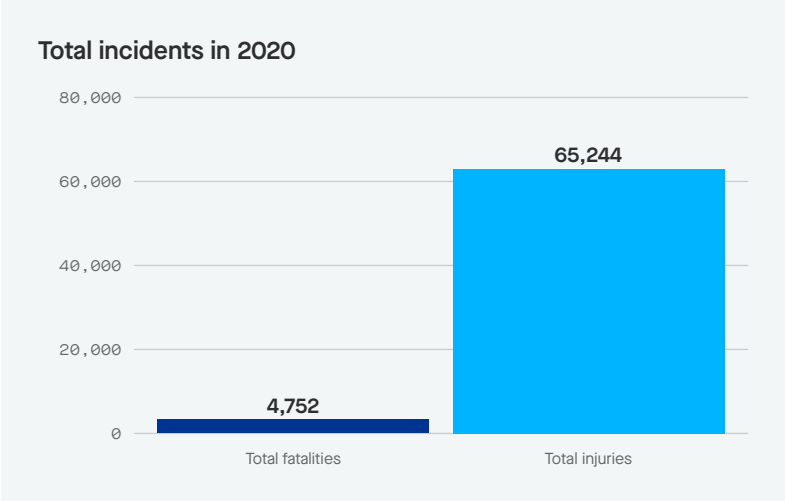
2023 update: A recent study showed that Motive fleets using the latest AI Dashcams saw significantly fewer accidents. Fleets using Motive AI Dashcams in the majority of their vehicles, and that frequently coach, had 50% fewer accidents compared to all active Motive fleets. These are severe crashes reported by the FMCSA and involve towaways, injuries, or fatalities. The 600 active fleets included in the study covered almost 100K drivers.

Table of contents

Executive summary

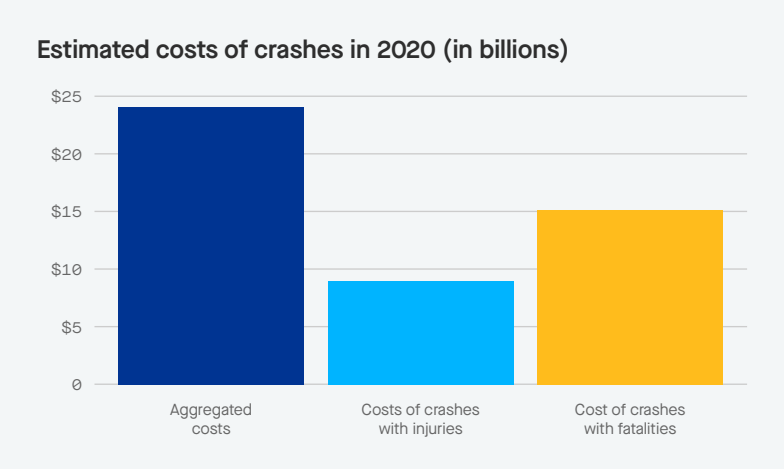
With insurance costs and nuclear verdicts on the rise, fleet safety has never been more critical to the health and success of a business. In 2020 the Federal Motor Carrier Safety Administration (FMCSA) [1] recorded 135,866 crashes, 47,005 crashes with injuries, and 4,131 crashes with fatalities. In aggregate, there were 65,244 injuries and 4,752 fatalities.





Alongside the tragic impact on lives lost and injuries, crashes are costly. Based on a study conducted by the FMCSA [2], the average cost of a large commercial vehicle crash is $91,000. When there's an injury, the cost increases to $200,000 and $3.6 million if there's a fatality. **In total, all crashes with injuries and fatalities recorded in 2020 cost fleets approximately $24.3 billion**[1].

[1] Estimated using the average cost of crashes in [2] and calculating total crashes and injuries in 2020 from the FMCSA public crashes database.



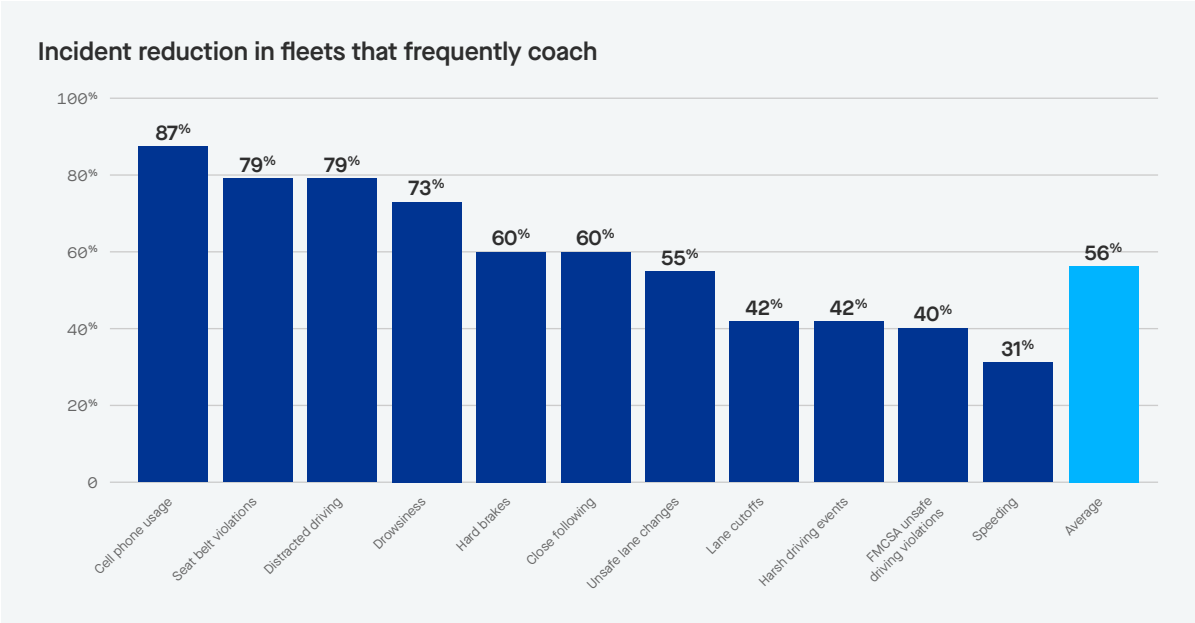
About the research

Since 2013 Motive has helped improve the safety, productivity, and profitability of businesses that power our physical economy. With more than 550,000 vehicles in the Motive network, over 73 million relevant driving events captured per year, and trillions of driving data points collected over the years, Motive is uniquely suited to assess the efficacy of fleet safety practice.

In this study we analyzed over 5,000 Motive fleets across two years to determine the impact our AI-powered dash cams and safety platform had on reducing high-risk driving behaviors and crashes on the road. We grouped fleets based on their usage of the coaching features and compared the average safety metrics across the three groups:

- **Frequent coaching:** Fleets with dashcams that received coachable events in their Fleet Dashboard and were in the top 10% of coaching activity. Coaching activity is defined as fleets changing events that were automatically tagged as “coachable” to “coached.”
- **Occasional coaching:** Fleets with dash cams that received coachable events in their Fleet Dashboard and were in the remaining 90% of coaching activity.
- **No dashcams:** Fleets that didn’t use dash cams and didn’t coach.

We discovered fleets that used Motive dash cams and frequently coached their drivers had **56% fewer unsafe driving incidents.**



Fewer safety incidents translated into fewer severe crashes, defined by the FMCSA as crashes with a towaway, injury, or fatality. Fleets that used dash cams and frequently coached experienced **22% fewer crashes** than fleets that didn't use dash cams and didn't coach.

Group	Crashes per 100k hours	% change vs. no dashcams
Frequent coaching	2.9	**-22%**
Occasional coaching	3.1	-16%
No dashcams	3.7	

We then estimated the financial impact of dash cams and coaching by multiplying the average cost of a crash ($91,000) by the crash difference (0.8) between fleets that used dash cams and frequently coached and fleets that didn't use dash cams and didn't coach. On average, Motive fleets that used dash cams and frequently coached **saved $72,800 per year**. Annual savings were estimated based on a 50-vehicle fleet driving 100,000 hours annually.

	No dashcams	Frequent coaching	Crashes avoided	Average savings
Crashes per 100k hours	3.7	2.9	0.8	**$72,800**

Based on these estimates and the typical cost of implementing a Motive dash cam, we estimated fleets that used dash cams and frequently coached received a **4x ROI** if the program helped them avoid a standard crash. This ROI jumps to **10x** if they avoided a crash with an injury, and **186x** if the fleet avoided a crash with a fatality.

The data and ROI metrics clearly show that implementing a fleet-wide, proactive safety strategy saves lives and money. The safety departments that are able to identify and modify high-risk driving behaviors early are the ones that will be successful. This proactive approach to safety can make all the difference in keeping both liability and costs low, and profit margins high. More importantly, drivers can get home safe and roads are safer for everyone.

The potential ROI of Motive's safety platform in year 1

4x

if Motive helped the fleet avoid a standard crash

10x

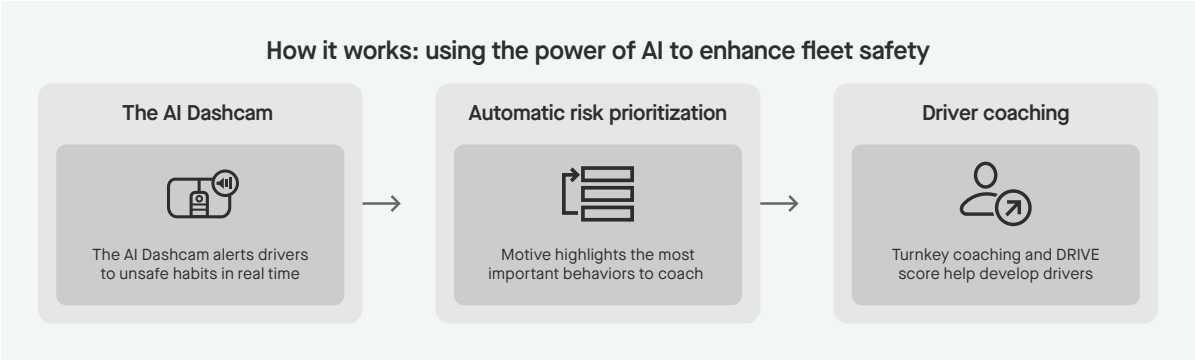
if Motive helped the fleet avoid a crash with an injury

186x

if Motive helped the fleet avoid a crash with a fatality

Motive background

Motive is an integrated fleet management solution that helps improve the safety, productivity, and profitability of the businesses that power our physical economy. Our AI-powered safety platform provides fleet managers with the tools and data they need to take a proactive approach to driver safety, prevent accidents, and lower costs.



It all starts with Motive AI-powered dash cams, which instantly detect unsafe driving behaviors and alert drivers in real time. When an unsafe driving event is detected, video footage of that incident is instantly uploaded to the cloud. Motive's AI technology automatically filters out videos that don't represent actual risk, and our in-house safety team analyzes the remaining videos to determine the context and severity.

Managers get prioritized videos with rich, actionable insights in their Safety Hub and can zero in on the most critical events. Based on this information, managers know exactly which drivers are in need of immediate coaching. Fleets can also choose to automatically coach drivers through the Motive Driver App when they complete their trip.

While managers can coach drivers on individual events, Motive's proprietary DRIVE risk score helps provide a holistic view of driver performance over time. DRIVE offers full context into factors surrounding the event, e.g., road conditions, vehicle class, and the behaviors of other drivers on the road. DRIVE benchmarks every driver behavior across Motive's network of over 550,000 vehicles to create an objective measure of risk, helping fleets understand the true risk profile of their drivers relative to their peers.

Managers can easily identify high-risk drivers with low DRIVE scores and address specific behaviors by reviewing the prioritized event footage, coaching drivers, and monitoring improvements in their driving performance. DRIVE can also be used as the foundation for driver incentive programs to help with driver retention.

Motive's comprehensive safety platform helps transform the way fleets manage their drivers and reduce the frequency of accidents.

The power of Motive's network

Other studies by bodies like the Department of Transportation (DOT) [3] and Virginia Tech's Transportation Institute [4] have attempted to assess the impact that dash cams and coaching have on safety. However, with a sample size of fewer than 80 drivers and the brief duration of just 13 weeks, these studies didn't produce enough data for researchers to formulate any statistically significant conclusions.

With more than 550,000 vehicles in the Motive network, over 73 million relevant driving events captured per year, and trillions of driving data points collected over the years, Motive has enough data points to reach statistically significant conclusions and to avoid the limitations encountered in the other industry studies.

We use proprietary machine learning models to analyze and understand this high volume of data. We create products that identify driving behavior impact on an aggregate level, averaging out unique fleet attributes such as internal safety policies, driving regions, industries, and more. We then use that information to determine the impact of how our AI-powered dash cams and safety platform help reduce high-risk driving behaviors and crashes on the road.

Methodology

For this historical correlation study, we analyzed over 5,000 Motive fleets across two years, looking at 1) fleets that used Motive dash cams and coached using the safety platform, and 2) fleets that didn't use dash cams and didn't coach.

Data sources

Motive: The 5,000 fleets in our study had at least 20 vehicles, with the dataset consisting of monthly data starting November 2019. We included fleets with at least 20 vehicles since they're more likely to have a safety program with managers focused on improving fleet safety.

FMCSA: We used FMCSA's Crash File [1] to identify crashes per fleet. We focused on high-impact crashes for this study since the dataset only includes crashes with towaways, injuries, or fatalities.

Segmentation

We grouped Motive fleets based on their usage of the coaching features and compared the average safety metrics across the groups. Segments included:

- **Frequent coaching:** Fleets with dash cams that received coachable events in their Fleet Dashboard and were in the top 10% of coaching activity. Coaching activity is defined as fleets changing events that were automatically tagged as "coachable" to "coached."
- **Occasional coaching:** Fleets with dash cams that received coachable events in their Fleet Dashboard and were in the remaining 90% of coaching activity.
- **No dashcams:** Fleets that didn't use dash cams and didn't coach.

The segments were recalibrated monthly. We only included fleets in the frequent coaching segment for a particular month if they were frequently coaching events during that period.

Data normalization

We normalized all of our results by hours driven to control for fleet size and activity. For example, for each given month, we divided the number of crashes by the total hours driven, since fleets that spend more time on the road tend to have more incidents. Outlier fleets were removed from that month's metrics if they drove less than 100 hours in a given month.

Safety metrics analyzed by segment

Unsafe driving behaviors: Safety events recorded by the Motive dash cams and tagged by our in-house safety team. Tags available are: close following, lane cutoff, unsafe lane change, cell phone usage, distracted driving (e.g., cell phone usage, smoking, eating), drowsiness, and seat belt violation. We normalized this metric by the monthly hours driven per fleet.

FMCSA crashes: Crashes reported by the FMCSA and only includes crashes with towaways, injuries, or fatalities. Crashes are aggregated at the company level to account for fleets with multiple DOTs. We normalized this metric by the monthly hours driven per fleet.

Since some fleets use a combination of Motive and non-Motive devices to record hours driven, we assumed that the vehicles using non-Motive devices drove the same average number of hours as those using Motive Vehicle Gateways. We extrapolated the monthly driven hours by multiplying the hours driven per Vehicle Gateway by the vehicles reported to the FMCSA by the fleet.

FMCSA unsafe driving violations: Number of FMCSA-reported unsafe driving violations observed during roadside inspections and audits. We aggregated violations on a company level and normalized this metric by the monthly hours driven per fleet.

Harsh driving events: Driving events recorded by the Vehicle Gateway when drivers exceed certain thresholds defined by fleets in terms of acceleration changes (g-force). We normalized this metric by the monthly hours driven per fleet. Since the acceleration logic is defined by the fleet, we should note that the differences between segments might not be as significant.

Speeding: Number of times per hour a vehicle drove above the posted limit, captured by the Vehicle Gateway. We normalized this metric by the monthly hours driven per fleet.

Fleets that had Motive's dash cams and frequently coached saw

69% fewer unsafe driving behaviors (e.g., cell phone usage, close following)

22% fewer FMCSA-reported crashes

40% fewer FMCSA-reported unsafe driving violations

67% fewer harsh driving events

31% fewer speeding events

Impact of dash cams and coaching

To understand the impact of dash cams and coaching on the various safety metrics, we studied the average impact broken out by each segment. We performed a simple T-test statistic on the difference between the groups to see if the difference was statistically significant. We multiplied metrics by 100,000 hours to reflect the average hours driven by a fleet with 50-500 vehicles per year. 100,000 hours is equivalent to 50 vehicles driving eight hours per day, 252 days per year.

Unsafe driving behaviors

Compared to fleets that used dash cams and occasionally coached, fleets that used dash cams and frequently coached had **69% fewer unsafe driving behaviors** such as close following and unsafe lane changes.

Unsafe driving behaviors per 100k hours	Observations	Mean	Standard deviation	Standard error	Lower confidence interval	Upper confidence interval	% change vs. occasional coaching
Frequent coaching	1,022	560	1,130	40	490	630	**-69%**
Occasional coaching	8,331	1,810	10,630	120	1,580	2,030	
No dash cams	-	-	-	-	-	-	-

Fleets that used dash cams and frequently coached saw an improvement in unsafe behavior across the board. Drivers saw the most improvement in cell phone usage. Since these behaviors are video-only events, we only looked at fleets with dash cams.

Unsafe driving behaviors per 100k hours	Cell phone usage	Close following	Unsafe lane changes	Distracted driving (cell phone use, smoking, eating)	Drowsiness	Seat belt violations
Frequent coaching	32.94	205.55	42.45	54.01	1.50	172.83
Occasional coaching	242.26	509.95	94.08	251.97	5.50	809.75
% change	-87%	-60%	-55%	-79%	-73%	-79%

FMCSA crashes

Compared to fleets that didn't use dash cams and didn't coach, fleets that used dash cams and frequently coached had **22% fewer FMCSA-reported crashes**.

Crashes per 100k hours	Observations	Mean	Standard deviation	Standard error	Lower confidence interval	Upper confidence interval	% change vs. no dash cams
Frequent coaching	1,924	2.9	9	0.2	2.5	3.3	**-22%**
Occasional coaching	17,882	3.1	13.6	0.1	2.9	3.3	-16%
No dash cams	31,444	3.7	19.2	0.1	3.5	3.9	

FMCSA unsafe driving violations

Compared to fleets that didn't use dash cams and didn't coach, fleets that used dash cams and frequently coached had **40% fewer FMCSA-reported unsafe driving violations**. Since these violations were logged during roadside inspections and FMCSA audits, the results may be skewed by routes, since certain routes have more inspection points.

Unsafe driving violations per 100k hours	Observations	Mean	Standard deviation	Standard error	Lower confidence interval	Upper confidence interval	% change vs. no dash cams
Frequent coaching	1,110	2.7	10.1	0.3	2.1	3.3	**-40%**
Occasional coaching	8,780	4.5	24.1	0.3	4	5	-26%
No dash cams	13,992	6.1	35.2	0.3	5.5	6.7	

Harsh driving events

Fleets that used dash cams and frequently coached had **67% fewer harsh driving events**, e.g., hard brakes and hard corners, compared to fleets that didn't use dash cams and didn't coach. However, since harsh driving events are basic safety behaviors highly dependent on context, we need to take this result with a grain of salt. Additionally, fleets can define unique thresholds for harsh driving events, which aren't accounted for in this analysis.

Harsh driving events per 100k hours	Observations	Mean	Standard deviation	Standard error	Lower confidence interval	Upper confidence interval	% change vs. no dash cams
Frequent coaching	1,996	6,630	8,570	190	6,260	7,010	**-67%**
Occasional coaching	18,239	19,810	57,290	420	18,980	20,650	
No dash cams	31,067	14,320	37,400	210	13,910	14,740	

That being said, we did see strong improvement across several harsh driving event types, especially for the fleets that used dash cams and frequently coached.

Harsh driving events per 100k hours	Hard corners	Hard accelerations	Hard brakes
Frequent coaching	779.6	406.7	9,305.9
Occasional coaching	3,992.4	3,062	29,688.8
No dash cams	3,057.2	3,616	23,619
% change	-75%	-89%	-61%

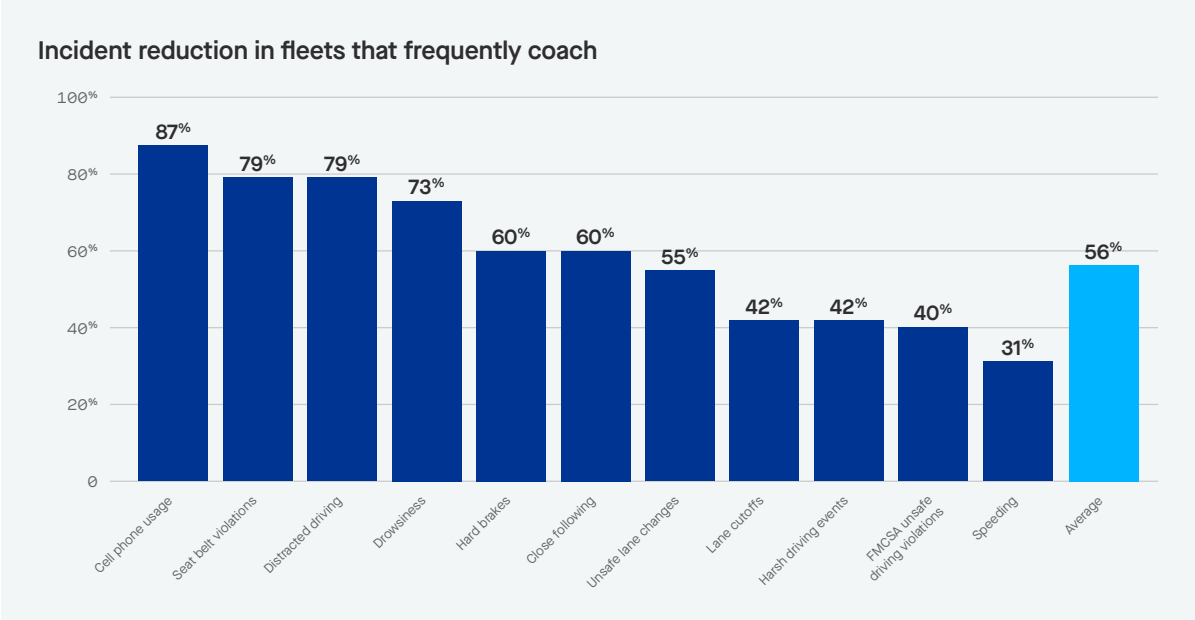
Speeding

Compared to fleets that didn't use dash cams and didn't coach, **fleets that used dash cams and frequently coached had 31% fewer speeding events.**

Speeding per 100k hours	Observations	Mean	Standard deviation	Standard error	Lower confidence interval	Upper confidence interval	% change vs. no dash cams
Frequent coaching	2,130	55,880	62,250	1,350	53,240	58,530	**-31%**
Occasional coaching	17,554	100,110	88,110	670	98,810	101,420	
No dash cams	21,620	82,130	97,420	660	80,830	83,420	

Aggregate impact on unsafe incidents

When we aggregated the benefits of dash cams and coaching across the board, we saw fleets that used Motive dash cams and frequently coached drivers through the safety platform had **56% fewer unsafe driving incidents.**



Financial impact of avoided crashes

To estimate the financial impact of dash cams and coaching, we multiplied the average cost of a crash by the crash difference between fleets that used dash cams and frequently coached and fleets that didn't use dash cams and didn't coach. If the average fleet of 50 vehicles drove eight hours per day for a total of 100,000 hours per year, then on average, fleets that frequently coached had 0.8 fewer crashes per 100,000 hours driven.

By multiplying the average cost of a crash ($91,000) by the 0.8 crash difference, we discovered fleets that used dash cams and frequently coached **saved $72,800 per year**.

	No dash cams	Frequent coaching	Crashes avoided	Average savings
Crashes per 100k hours	3.7	2.9	0.8	**$72,800**

Based on this scenario and the typical cost of implementing a Motive dash cam, we estimated fleets that used dash cams and frequently coached received a **4x ROI** if the program helped them avoid a standard crash. This ROI jumps to **10x** if they avoided a crash with an injury, and **186x** if the fleet avoided a crash with a fatality.

These ROI metrics clearly show that purchasing dash cams and safety technology upfront is a positive investment on long-term spend, rather than a cost, for businesses.

Fleets that used dash cams and frequently coached saved

$72,800

per year

Based on a 50 vehicle fleet

Conclusion

Taking a proactive approach to driver safety helps fleets prevent accidents, protect drivers, and lower costs. By using Motive, fleets achieved clear, measurable ROI in the first year alone. Those that used dash cams and frequently coached their drivers had 22% fewer accidents and 56% fewer unsafe driving incidents. Fleets also saw up to 10x ROI in their first year with Motive.

Proactively identifying and modifying high-risk behaviors with a robust safety program that uses dash cams and coaching can help drive significant bottom line improvements for businesses. Save money, save lives, and make our roads safer for everyone with Motive.

References

[1] MCMIS Catalog - Crashes
https://ai.fmcsa.dot.gov/SMS/Tools/Downloads.aspx

[2] Safety is Good Business. FMCSA.
https://www.fmcsa.dot.gov/safety/good-business/safety-good-business

[3] Potential Reduction in Large Truck and Bus Traffic Fatalities and Injuries Using Lytx's Drivecam Program; Susan Soccolich, and Jeffrey S. Hickman, 2014

[4] Evaluating the Safety Benefits of a Low-Cost Driving Behavior Management System in Commercial Vehicle Operations. US Department of Transportation, 2010

Unlock Potential

motive

gomotive.com

855-434-3564

sales@gomotive.com

About Motive

Motive builds technology to improve the safety, productivity, and profitability of businesses that power the physical economy. The Motive Automated Operations Platform combines IoT hardware with AI-powered applications to automate vehicle and equipment tracking, driver safety, compliance, maintenance, spend management, and more. Motive serves more than 120,000 businesses, across a wide range of industries including trucking and logistics, construction, oil and gas, food and beverages, field services, agriculture, passenger transit, and delivery. Visit **gomotive.com** to learn more.

2022Q1_849902893