

GENERAL CRASH STATISTICS FOR CONTEXT

TRANSPORTATION INTERIM COMMITTEE
KATY CALLON - SEPTEMBER 2024

OVERVIEW

On July 10, 2024, the Transportation Interim Committee heard a staff presentation of national autonomous vehicle levels 3-5 crash data.¹ In response to some of the trends in the data, such as a higher number of rear-end crashes that were non-serious or property damage only, the committee requested information to better understand if these trends follow general crash statistics or are unique to autonomous vehicles.

One limitation of the autonomous vehicle data, the source of which is manufacturer and operator reports to the National Highway Traffic Safety Administration (NHTSA), is that there is no contextual data provided, such as the number of autonomous vehicle miles travelled or the number of autonomous vehicles that are on the road. With crash data, it can be tricky to infer trends from comparing a small subset to the larger set of general statistics; it could lead to faulty generalization and incorrect conclusions.

With that caution noted, general crash statistics are provided below in follow-up. Specific states include Texas, Arizona, and California, as those are the states in which the highest number of autonomous vehicle crashes were reported to occur. Montana's data is somewhat more limited compared to the other states but is included here for reference. The data is from calendar year 2022, as that is the latest year of data available for Montana and hopefully somewhat excludes impacts shown in crash data of COVID-19 closures, except for California, as their most recent data is from 2021.

OTHER STATES' GENERAL CRASH STATISTICS

ARIZONA

Motor Vehicle Crash Facts 2022 Report: <https://azdot.gov/sites/default/files/2023-09/2022-Crash-Facts.pdf>

In the NHTSA autonomous vehicle crash data, 117 of those 617 total crashes occurred in Arizona for the entire reporting period (July 2021 through May 2024); in calendar year 2022, 24 crashes were reported in Arizona.

As far as general crash statistics for Arizona:

- There was a total of 119,991 crashes in 2022.
- Of those, 103,571 or 86.3% occurred in urban areas.
- In urban crashes, 72,117 or 69.6% were property damage only.

¹ <https://leg.mt.gov/content/Committees/Interim/2023-2024/Transportation/Meetings/241007-July-10-2024/03.020-nhtsa-av-crash-data-summary-2024-posting2.pdf>

The following table shows the manner of collision in multi-unit crashes. Note that the highest percentage of crashes were rear end crashes.

Table 3 – 1
Manner of Collision in Multi-Unit Crashes

Manner of Collision Type	Number of Crashes							
	Total	Percent of Total Crashes	Fatal	Percent of Fatal Crashes	Injury	Percent of Injury Crashes	PDO	Percent of PDO Crashes
Angle	15,674	15.60%	113	13.58%	5,545	18.37%	10,016	14.42%
Left Turn	17,837	17.75%	104	12.50%	6,784	22.47%	10,949	15.76%
Rear End	38,697	38.51%	87	10.46%	11,578	38.35%	27,032	38.91%
Head-On	2,175	2.16%	85	10.22%	958	3.17%	1,132	1.63%
Sideswipe (same)	17,762	17.67%	32	3.85%	2,323	7.69%	15,407	22.18%
Sideswipe (opposite)	1,730	1.72%	25	3.00%	386	1.28%	1,319	1.90%
U-Turn	781	0.78%	9	1.08%	211	0.70%	561	0.81%
Other*	5,237	5.21%	368	44.23%	2,269	7.52%	2,600	3.74%
Unknown	605	0.60%	9	1.08%	137	0.45%	459	0.66%
TOTAL	100,498	100.00%	832	100.00%	30,191	100.00%	69,475	100.00%
*Other includes pedestrian and bicycle crashes								

TEXAS

Crash Statistic Data Webpage: <https://www.txdot.gov/data-maps/crash-reports-records/motor-vehicle-crash-statistics/archive/2022-crash-statistics.html>

In the NHTSA autonomous vehicle crash data, 56 of those 617 total crashes occurred in Texas for the entire reporting period (July 2021 through May 2024); in calendar year 2022, 10 crashes were reported in Texas.

Looking at the general crash statistics for Texas:

- Statewide there were 555,601 total crashes reported.
- Of those, 408,363 or 73.5% occurred in areas classified as urban, which is locations within the limits of cities or towns having a population of 5,000 or more.
- Of the total crashes in both urban and rural areas, 363,054 or 65.3% were non-injury crashes.
- Total vehicle miles travelled was 290.891 billion.

CALIFORNIA

2021 Crash Data on California State Highways: <https://dot.ca.gov/-/media/dot-media/programs/research-innovation-system-information/documents/annual-collision-data/2021-crash-data-on-cshwy-book-1-v2.pdf>

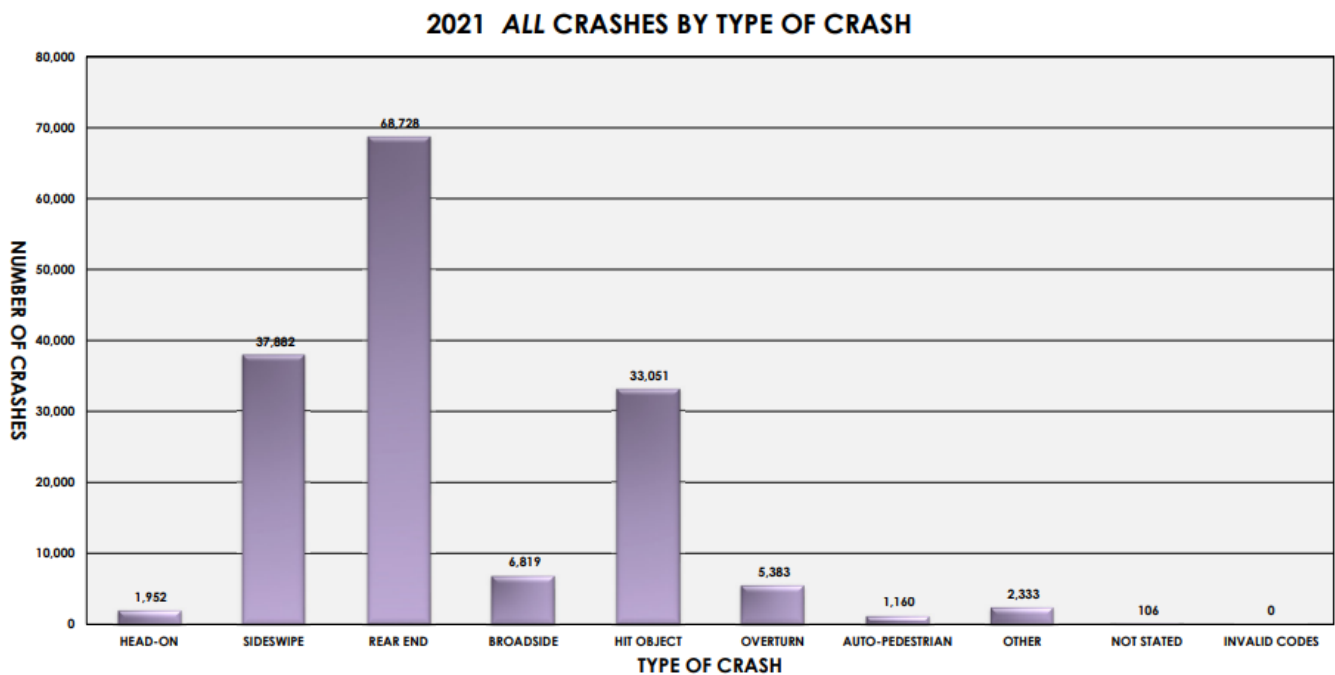
In the NHTSA autonomous vehicle crash data, 374 of those 617 total crashes occurred in California for the entire reporting period (July 2021 through May 2024); in calendar year 2021, 47 crashes were reported in California. Note that the reporting period for 2021 began in July, so it does not represent a full year of data.

In California's report, the crash data is presented as rates instead of totals. They calculate the crash rate as follows:

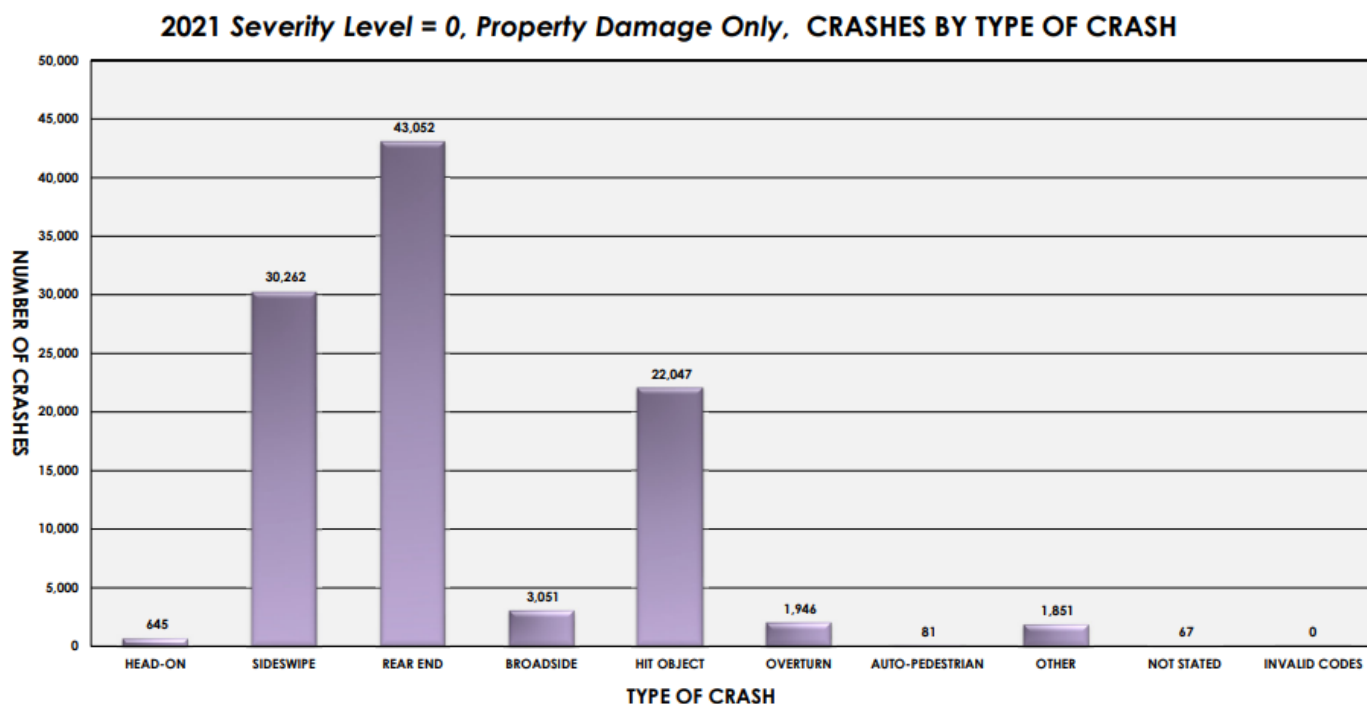
$$\text{Crash Rate} = \frac{(\text{Number of Crashes}) \times (1,000,000)}{\text{Vehicle Miles of Travel}}$$

In 2021, statewide, there were 180,575.0 million vehicle miles travelled. Of those, 138,126.1 million vehicle miles or 76.5% occurred in urban areas – both inside and outside of cities. In 2021, statewide the crash rate (total per million vehicle miles travelled) was 0.85. The urban freeway crash rate was 0.92.

The following chart shows all crashes by type of crash. As shown, rear end crashes were the most common type of crash.



In looking at crash severity, rear end crashes were also the most common for property damage only crashes, as shown in the following chart.



MONTANA

Montana Highway Patrol Annual Report 2022: <https://dojmt.gov/wp-content/uploads/2022-MHP-Annual-Report.pdf>

For the autonomous vehicle levels 3-5 crash data, there have not been any autonomous vehicle crashes reported to NHTSA.

In 2022, there were a total of 22,004 crashes in Montana. Of those, 16,870 or 76.7% were reported as property damage only crashes.

The following table shows all crashes reported by traffic way, including traffic ways classified as urban.

All Crashes

Trafficway	2018	2019	2020	2021	2022
Interstate	5,239	5,744	5,567	4,827	4,273
Primary	8,970	7,920	6,972	6,992	6,255
Secondary	1,434	1,423	1,389	1,478	1,409
Urban	6,161	6,052	5,320	8,278	8,585
Rural	1,212	1,314	1,238	1,122	1,026
Other	502	486	317	427	456
Total	23,518	22,939	20,803	23,124	22,004

In looking at crashes by collision type, the following table shows a breakdown of all crashes, fatal crashes, and injury crashes. The most common type of crash in 2022 was single vehicle at 45.9% of total crashes, followed by rear end crashes at 17.7%. Except for Arizona, which clearly states a focus on multi-unit crashes, it's not clear in comparison of Montana's data to the other states' data if the other states were including single vehicle crashes or multi-unit crashes in their charts on crash type.

Crashes by Collision 2022

Collision Type	All Crashes		Fatal Crashes		Injury Crashes	
Rear End	3,887	17.66%	7	3.70%	945	19.25%
Sideswipe, Same Direction	1,647	7.49%	2	1.06%	159	3.24%
Sideswipe, Opposite Direction	470	2.14%	4	2.12%	80	1.63%
Left Turn, Same Direction	181	0.82%	3	1.59%	56	1.14%
Left Turn, Opposite Direction	358	1.63%	5	2.65%	134	2.73%
Right Angle	3,370	15.32%	20	10.58%	981	19.99%
Right Turn, Same Direction	95	0.43%	0	0.00%	12	0.24%
Right Turn, Opposite Direction	63	0.29%	0	0.00%	13	0.26%
Head-On	724	3.29%	23	12.17%	229	4.67%
Other	1,115	5.07%	13	6.88%	217	4.42%
Single Vehicle	10,094	45.87%	112	59.26%	2,082	42.42%
Total	22,004	100.00%	189	100.00%	4,908	100.00%