HLDI
Highway Loss Data Institute

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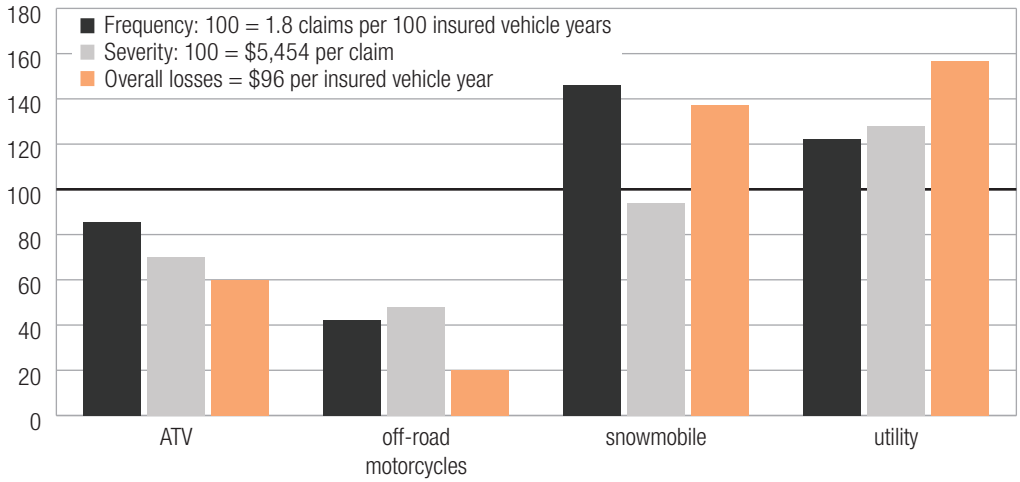
Motorcycle collision losses for off-road classes, 2010–14 models

Off-road vehicles including off-road motorcycles, ATVs, snowmobiles, and utility vehicles have lower losses than street-legal motorcycle classes. However, there is large variation in the insurance losses by off-road vehicle class.

Relative collision losses for off-road vehicles by class, 2010–14 models



Introduction

To date, the Highway Loss Data Institute (HLDI) has issued nine reports on motorcycle collision losses. Each showed that claim frequency varies significantly by motorcycle class (HLDI, 2014). Losses for off-road vehicle classes have not been included in these reports. This bulletin is HLDI's second evaluation of off-road machines. The first was published in 2012 and included model years 2008-12. Off-road vehicles generally are not permitted on state and federal roads, and their operators are not subject to the same licensing requirements as those operating "street-legal" machines.

This HLDI bulletin presents results of an analysis of off-road vehicles insured under motorcycle collision policies. Off-road vehicles have unique design characteristics that differentiate them from on-road motorcycles. A description of each class can be found in the **Appendix**. The purpose of this study is to quantify off-road collision losses as a whole and further assess the individual off-road classes.

Methods

Results were based on 2010–14 model year vehicles that accumulated 131,161 years of exposure and 2,316 collision claims in calendar years 2009–13. Off-road vehicles vary in design and characteristics and therefore are separated into four different classes: off-road motorcycles, ATVs, snowmobiles, and utility vehicles. Results are presented when there are at least 1,000 insured vehicle years or 100 claims.

As a group, off-road vehicles had a collision claim frequency of 1.8 claims per 100 years of exposure, a claim severity of $5,454 per claim, and overall losses of $96 per insured vehicle year. For comparison, 2010–14 on-road motorcycles had a collision claim frequency of 3.0 claims per 100 insured vehicle years of exposure, a claim severity of $7,322 per claim, and overall losses of $219 per insured vehicle year.

Results

Table 1 lists collision losses for 2010–14 off-road vehicles by class and model year. For all classes, claim frequencies and overall losses generally showed increases with later model years. Snowmobiles had the highest claim frequency. Utility-class vehicles had the highest claim severities and overall losses.

Table 1 : Collision losses for off-road vehicles by class and model year, 2010–14 models

	Model year					
Class	2010	2011	2012	2013	2014	2010–14
Exposure						
ATV	17,727	20,150	17,753	8,772	1,713	66,115
Off-road motorcycle	1,440	2,027	2,153	1,121	384	7,125
Snowmobile	901	1,179	819	187	17	3,103
Utility	9,665	15,332	14,796	11,054	3,972	54,818
All classes	**29,733**	**38,687**	**35,521**	**21,135**	**6,085**	**131,161**
Claim frequency						
ATV	1.2	1.4	1.7	2.0	2.1	1.5
Off-road motorcycle	1.0	0.8	0.4	0.7	—	0.7
Snowmobile	—	1.9	—	—	—	2.6
Utility	1.9	1.8	2.3	2.1	3.8	2.2
All classes	**1.4**	**1.6**	**1.9**	**2.0**	**3.2**	**1.8**
Claim severity						
ATV	$3,487	$3,763	$3,679	$4,236	$5,119	$3,813
Off-road motorcycle	$2,061	$2,278	$2,544	$2,760	—	$2,626
Snowmobile	—	$4,960	—	—	—	$5,125
Utility	$5,547	$6,827	$7,147	$7,280	$8,186	$6,987
All classes	**$4,422**	**$5,186**	**$5,477**	**$5,915**	**$7,507**	**$5,454**
Overall losses						
ATV	$41	$53	$61	$85	$108	$58
Off-road motorcycle	$20	$19	$9	$20	—	$20
Snowmobile	—	$93	—	—	—	$132
Utility	$103	$125	$166	$152	$309	$151
All classes	**$64**	**$81**	**$103**	**$118**	**$237**	**$96**

Table 2 lists relative collision losses for 2010–14 off-road vehicles by class. Snowmobiles had the highest relative claim frequency (146), while utility-class vehicles had the highest relative claim severity (128) and overall losses (157).

Table 2 : Relative collision losses for off-road vehicles by class, 2010–14 models

Class	Exposure	Claims	Payments	Claim frequency	Claim severity	Overall losses
ATV	66,115	999	$3,808,797	86	70	60
Off-road motorcycle	7,125	53	$139,194	42	48	20
Snowmobile	3,103	80	$409,982	146	94	137
Utility	54,818	1,184	$8,272,567	122	128	157
All off-road	**131,161**	**2,316**	**$12,630,540**	**100 = 1.8**	**100 = $5,454**	**100 = $96**

Figure 1 illustrates the data in **Table 2**. ATVs and off-road motorcycle had relative collision losses that were below the all-class average, while snowmobiles and utility vehicles had relative losses that exceeded the average with the exception of snowmobile claim severity.

Figure 1: Relative collision losses for off-road vehicles by class, 2010–14 models

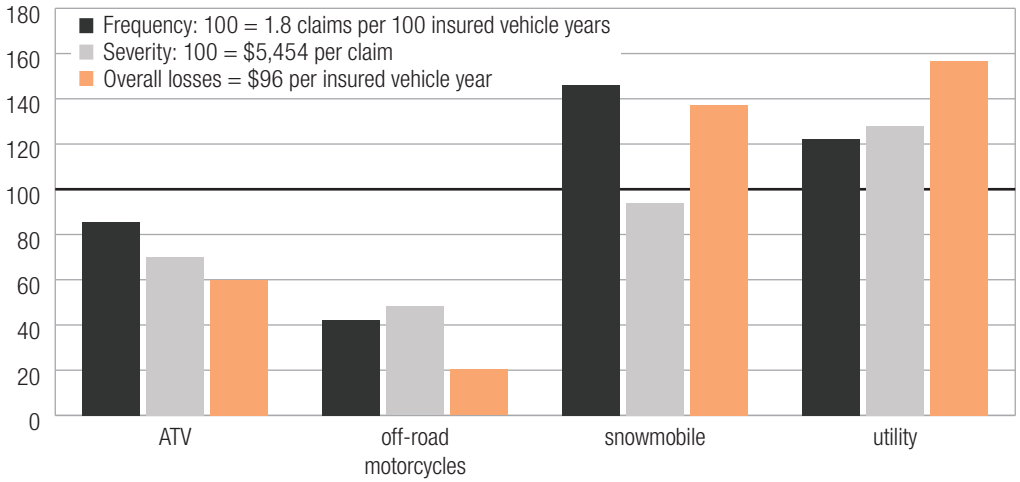


Table 3 lists collision losses for 2010–14 off-road vehicles by class relative to losses for all 2010–14 on-road motorcycles. Collision losses for all classes of off-road vehicles were lower than the all-on-road motorcycle averages.

Table 3 : Collision losses for off-road vehicles by class relative to collision losses for all on-road motorcycles, 2010–14 models

Class	Exposure	Claims	Payments	Claim frequency	Claim severity	Overall losses
ATV	66,115	999	$3,808,797	51	52	26
Off-road motorcycle	7,125	53	$139,194	25	36	9
Snowmobile	3,103	80	$409,982	86	70	60
Utility	54,818	1,184	$8,272,567	72	95	69
All off-road	**131,161**	**2,316**	**$12,630,540**	**59**	**74**	**44**
All on-road	**1,346,344**	**40,222**	**$294,491,106**	**100 = 3.0**	**100 = $7,322**	**100 = $219**

Figure 2 illustrates the data in **Table 3**. Collision losses for off-road vehicles were lower than those for on-road motorcycles.

Figure 2: Collision losses for off-road vehicles by class relative to collision losses for all on-road motorcycles, 2010–14 models

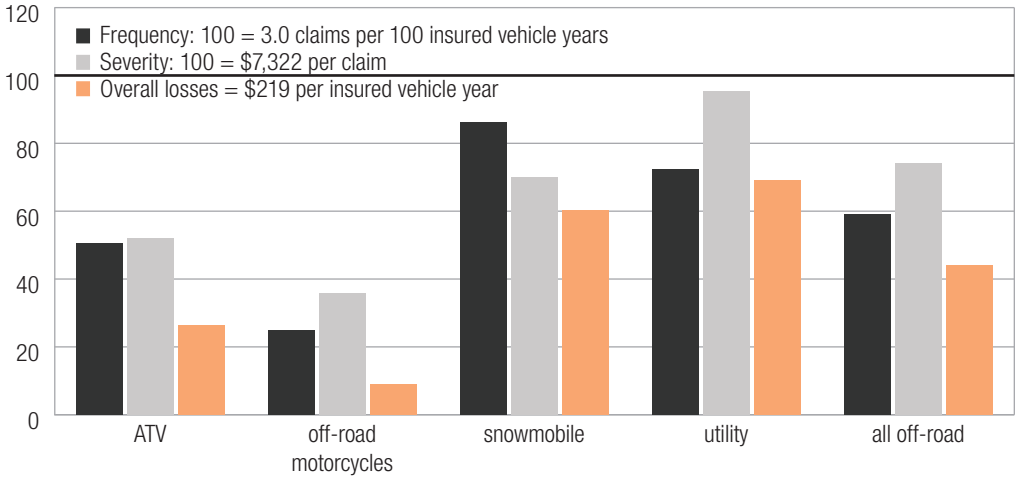


Figure 3 shows the collision claim frequency for 2010–14 off-road vehicles by engine displacement range, shown in cc's. In general, collision claim frequency increased with engine displacement.

Figure 3: Collision claim frequency for off-road vehicles by engine displacement range, 2010–14 models

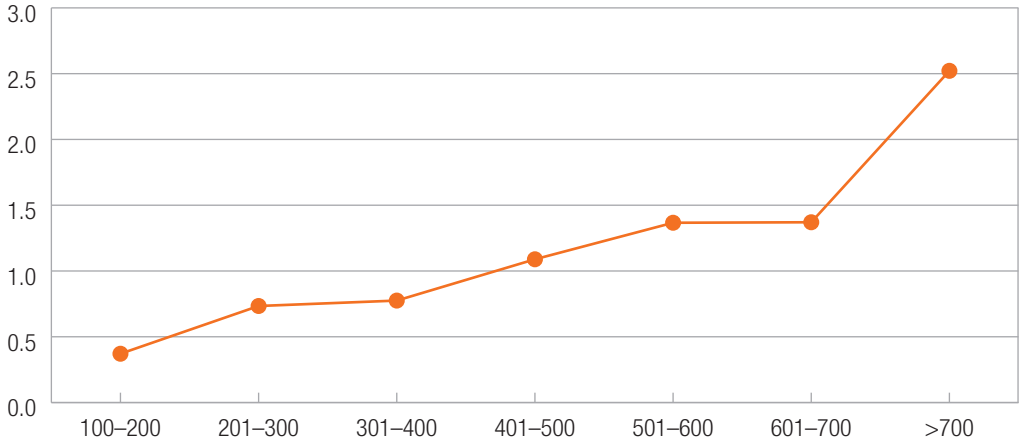


Figure 4 shows collision claim frequencies for 2010–14 off-road vehicles by class and engine displacement range, measured in cc's. Results are shown when there are at least 1,000 insured vehicle years or 100 claims. Snowmobiles with an engine displacement greater than 700 cc had the highest claim frequency (2.9 claims per 100 insured vehicle years). Typically, claim frequency increased with engine displacement for each class.

Figure 4: Collision claim frequency for off-road vehicles by class and engine displacement range, 2010–14 models

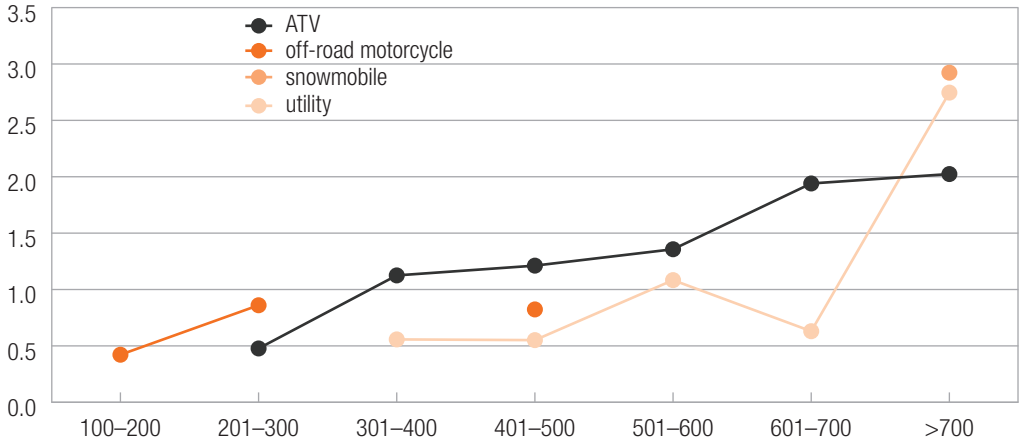


Figure 5 illustrates the collision exposure distribution for off-road vehicles and on-road motorcycles by rated driver age group. The highest percentage of exposure occurred in the 46–55 age group for both on-road motorcycles (31 percent) and off-road vehicles (26 percent), but off-road vehicles tended to have younger riders.

Figure 5: Distribution of collision exposure for off-road vehicles and on-road motorcycles by rated driver age group, 2010–14 models

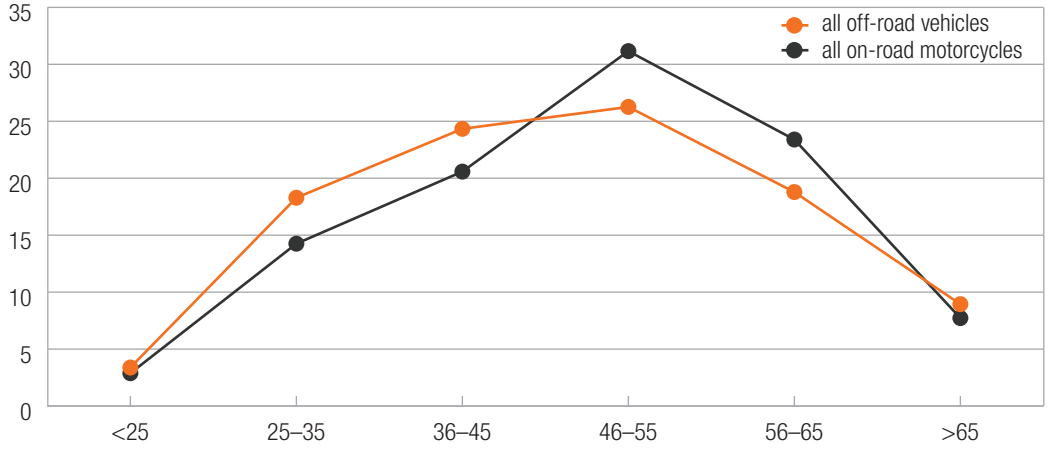


Figure 6 illustrates the collision exposure distribution for off-road vehicles by class and rated driver age group. The highest collision exposure for off-road motorcycles occurred for rated drivers aged 36–45, while snowmobile, ATV, and utility classes peaked for the 46–55 age group.

Figure 6: Distribution of collision exposure for off-road vehicles by class and rated driver age group, 2010–14 models

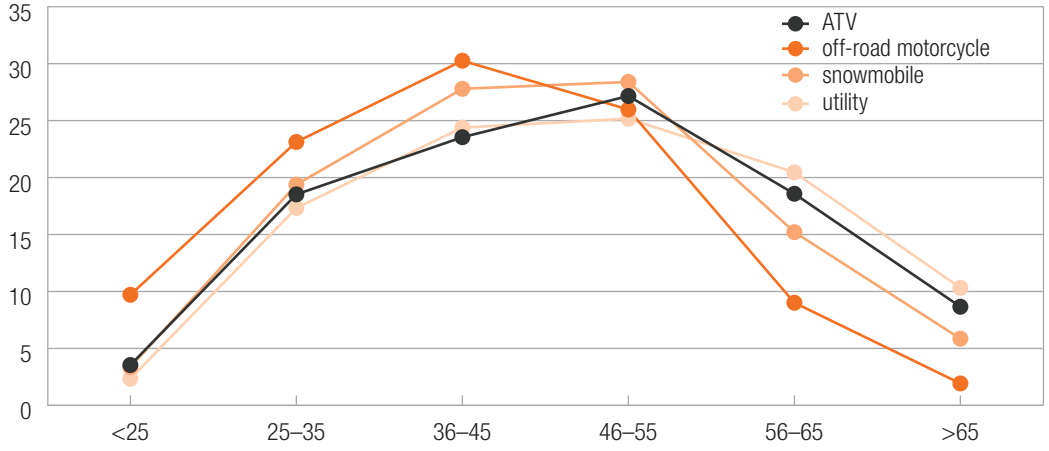


Figure 7 shows collision claim frequencies for off-road vehicles by class and rated driver age group. The highest claim frequency occurred for rated drivers younger than 25 operating utility class vehicles (7.5 claims per 100 insured vehicle years). There was a clear trend of decreasing claim frequency with increased driver age for each class.

Figure 7: Collision claim frequency for off-road vehicles by class and rated driver age group, 2010–14 models

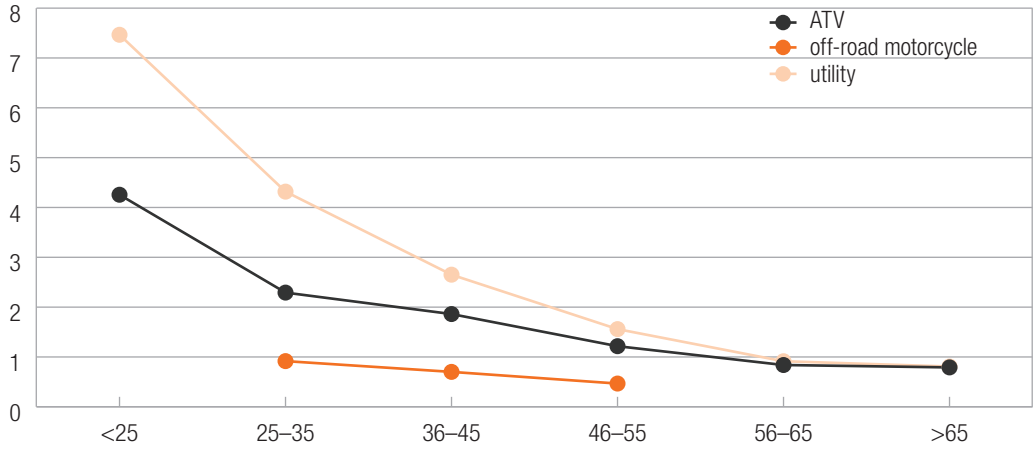


Figure 8 illustrates collision claim frequencies for both off-road vehicles and on-road motorcycles by rated driver age group. As rated driver age increased, collision claim frequency decreased for both vehicle groups.

Figure 8: Collision claim frequency for off-road vehicles and on-road motorcycles by rated driver age group, 2010–14 models

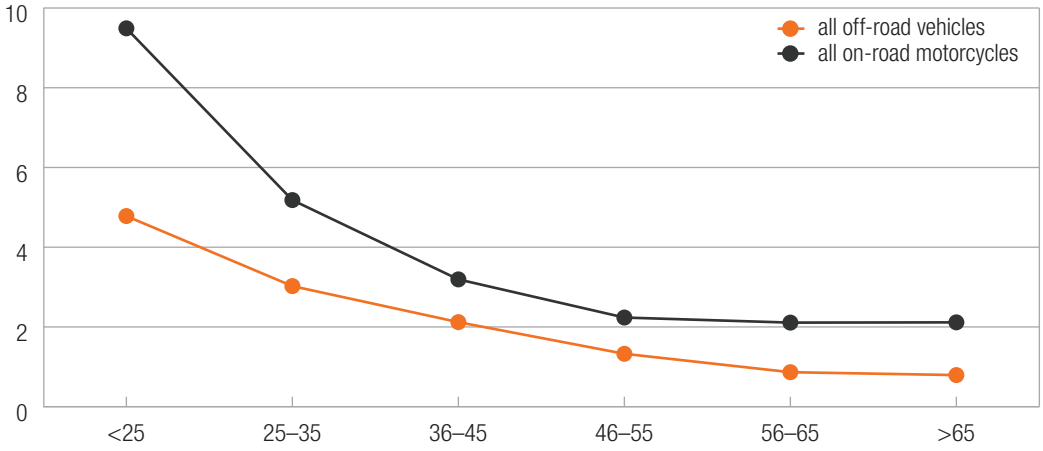


Table 4 lists relative collision losses for off-road vehicles by class, make, and series. Results are shown only for those series having 1,000 insured vehicle years or 100 claims. There were not any snowmobiles that met this criterion. The Polaris RZR 900, a 900 cc utility-class machine, had the highest relative claim frequency (340) and overall loss (497), while the four-seat equivalent, the Polaris RZR 4 900, had the highest claim severity (181). If compared with the 2010–14 on-road motorcycle collision results of 3.0 claims per 100 insured vehicle years, $7,322 per claim, and $219 per insured vehicle year, the Polaris RZR 900 would have relative loss results of 204 for claim frequency and 218 for overall loss; the Polaris RZR 4 900 would have a relative loss result of 135 for claim severity.

Table 4 : Relative collision losses for off-road vehicles by class, make, and series, 2010–14 models

Make	Series	Displacement	Exposure	Claims	Claim frequency	Claim severity	Overall losses
All Off-road			**143,202**	**2,578**	**100 = 1.8**	**100 = $3,812**	**100 = $69**
ATV							
Suzuki	King Quad 400	400	1,375	9	36	47	17
Polaris	Sportsman X2 500	500	1,367	11	45	42	19
Honda	FourTrax Foreman Rubicon	500	4,417	40	50	54	27
Honda	FourTrax Rancher	420	6,233	72	64	57	36
Yamaha	Grizzly 450	450	2,335	28	67	70	46
Polaris	Sportsman 450	450	1,503	20	74	75	55
Polaris	Sportsman 500	500	10,566	166	87	64	56
Kawasaki	Prairie 360	360	1,432	16	62	91	56
Kawasaki	Brute Force 650 4X4	650	1,936	29	83	71	59
Polaris	Sportsman 700	700	3,261	32	55	119	65
Yamaha	Grizzly 550	550	2,997	39	72	102	74
Polaris	Sportsman X2 800	800	3,692	46	69	114	79
Kawasaki	KFX 450R	450	1,118	28	139	64	89
Suzuki	King Quad 450 AXi	450	1,287	30	130	77	100
Polaris	Sportsman 550	550	3,172	57	100	100	100
Yamaha	Grizzly 700	700	8,285	144	97	108	104
Honda	FourTrax Rincon	680	1,551	38	136	79	108
Polaris	Sportsman 800	800	3,595	93	144	87	125
Kawasaki	Brute Force 750 4x4i	750	3,567	98	153	105	160
Suzuki	KingQuad 750	750	1,953	67	191	86	163
Yamaha	Raptor 700R	700	1,509	53	195	91	178
Polaris	Sportsman 850	850	1,700	58	190	124	236
Off-road motorcycle							
Honda	CRF450	450	1,172	9	43	77	33
Yamaha	YZ450F	450	1,093	11	61	67	41
Honda	CRF250	250	1,007	8	48	87	42
Utility							
Kawasaki	Mule 610	400	1,141	6	29	100	29
Polaris	Ranger 400	400	1,076	10	52	60	31
Polaris	Ranger XP 700	700	4,895	38	43	85	37
Polaris	Ranger 500	500	1,652	18	61	76	46
Yamaha	Rhino 700	700	4,376	39	50	108	53
Polaris	Ranger Crew	700	1,796	21	65	107	69
Polaris	Ranger 800 Crew	800	1,264	20	88	82	72
Polaris	Ranger 800	800	1,178	14	66	166	109
Polaris	RZR 800	800	11,370	375	183	132	243
Polaris	Ranger RZR	800	5,230	201	218	127	276
Polaris	RZR 4 900	900	1,258	50	225	181	407
Polaris	Ranger RZR XP	900	3,219	167	294	150	441
Polaris	RZR 900	900	1,232	74	340	146	497

Discussion

The collision loss experience of off-road vehicles varies by class and is different from those of on-road motorcycles. All measures of loss for all four off-road vehicle classes were lower than the average for all on-road motorcycles. Snowmobiles had the highest collision claim frequency, which is notable given that they can only be operated in the snow, severely limiting when and where they can be ridden. However, snow and ice are not ideal surfaces for braking and handling. Though when compared to the prior report, snowmobile claim frequency has decreased. This may be due to the smaller sample group, which went from 8,551 insured vehicle years in the prior report to 3,103 insured vehicle years in the current report.

References

Highway Loss Data Institute. 2014. Insurance motorcycle collision report (MR-14): 2010–14 model years. Arlington, VA.

Appendix: Off-road motorcycle classes defined

Off-road motorcycle

Off-road motorcycles generally are light weight with small displacement engines. The suspension travel is longer than a typical motorcycle, with higher ground clearance. Their construction is rugged, simple, and without bodywork and fairings. Tires typically are knobby for tractability because off-road motorcycles are designed to be ridden through rough and muddy terrain. Many off-road motorcycles are produced strictly for recreational or competitive use and are not street legal. Generally, they are equipped with two-stroke engines.

All-terrain vehicle

All-terrain vehicles (ATVs) are designed with four wheels and may not be ridden on public roads. There are variations in vehicle designs to allow off-road sport riding or serve utilitarian purposes. Engine displacements tend to be low, but some engines share the same advanced designs as street legal motorcycles. ATVs generally accommodate one rider and are operated with the use of motorcycle-like controls including handle bars. Newer designs include automatic transmissions, electric shifters, GPS navigation systems, and larger engine displacements.

Utility vehicle

Similar to ATVs, utility vehicles are designed with four wheels and typical motorcycle engines. Utility vehicles differ in that the steering mechanism incorporates a steering wheel rather than handle bars. The passenger capacity of utility vehicles differs from other off-road motorcycles in that they use a bench seat design to accommodate more than one occupant. Although utility vehicles generally do not possess many ATV attributes, they do offer off-road ability and typically include cargo capacity.

Snowmobile

Snowmobiles are similar to motorcycles but are intended to be ridden on terrain covered by a layer of snow or ice. The basic design provides an open riding position, handle bar steering control, and motorcycle-like engine configuration. Instead of a front wheel to control vehicle direction, two ski-like sleds pivot with the direction of the handle bars. Propulsion is provided by tank-like treads in lieu of a rear tire. Snowmobiles are not intended to be ridden on public roads.

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