



Inter Tribal Council of Arizona, Inc.

# Truck Tractor Trailer Crash Analysis

*Arizona Department of Transportation (ADOT)  
Motor Vehicle Crash (MVC) Data 2009-2013*

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*Motor Vehicle Crash (MVC) Data 2009-2013*

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## PURPOSE

The purpose of this report is to examine the impact of truck tractor trailer (TTT) motor vehicle crashes (MVCs) that occurred on Tribal lands in Arizona, 2009-2013. The primary focus is to describe the burden of injury and fatality due to TTT MVCs and identify opportunities for interventions to reduce the burden of morbidity and mortality from TTT MVCs on Tribal lands in Arizona.

## METHODS

The data analyzed for this report came from the Arizona Department of Transportation (ADOT). The data include all reports of MVCs in Arizona that were filed by law enforcement with the ADOT from 2009 to 2013. Statewide, 529,375 MVC reports were identified, 12,557 of which occurred within Tribal land boundaries. Crashes involving one or more TTT were identified using code 83 in the body style field of the ADOT database.

## SUMMARY OF FINDINGS

### TRUCK TRACTOR TRAILER CRASHES AND INJURY

1. **Burden of TTT MVCs:** Of the 529,375 MVCs statewide, 11,992 were identified as TTT MVCs that occurred 2009-2013. Of these TTT MVCs, 553 occurred on Tribal lands, representing 4% of total crashes as compared to 2% of total crashes off Tribal lands.
2. **Injury:** On Tribal lands, there were a total of 1,326 people injured in 553 crashes (mean 2.3 per crash). Of these injuries, 1% were fatal, 3% were incapacitating, 9% were non-incapacitating, and 5% were possible injuries. Off Tribal lands, there were 2,336 people injured in 11,439 crashes (mean 0.34 per crash). Of these injuries, 0.3% were fatal, 2% were incapacitating, 6% were non-incapacitating, and 10% were possible injuries.
3. **Fatality:** On Tribal lands, there were a total of 18 fatalities in 553 crashes (mean 0.03 per crash). Off Tribal lands there were 244 fatalities in 11,493 crashes (mean 0.02 per crash).

### RISK FACTORS FOR TRUCK TRACTOR TRAILER CRASHES

1. **Most Harmful Event:** The top five most harmful events on Tribal lands for non-TTT units (any motor vehicle or the combination of a power unit and a trailer) involved in TTT MVCs were, in rank order: 1) motor vehicle in transport; 2) collision with a non-fixed object; 3) overturn/rollover and struck by falling/shifting cargo; 4) non-collision crashes; and 5) cargo loss or shift and collision with a tree or bush.
2. **First Harmful Location:** The top five first harmful locations on Tribal lands, in rank order were: 1) on roadway; 2) shoulder; 3) roadside; 4) median; and 5) off roadway, location unknown. Off Tribal lands, the top five first harmful locations were: 1) on roadway; 2) shoulder; 3) roadside; 4) outside right-of-way traffic way; and 5) median.

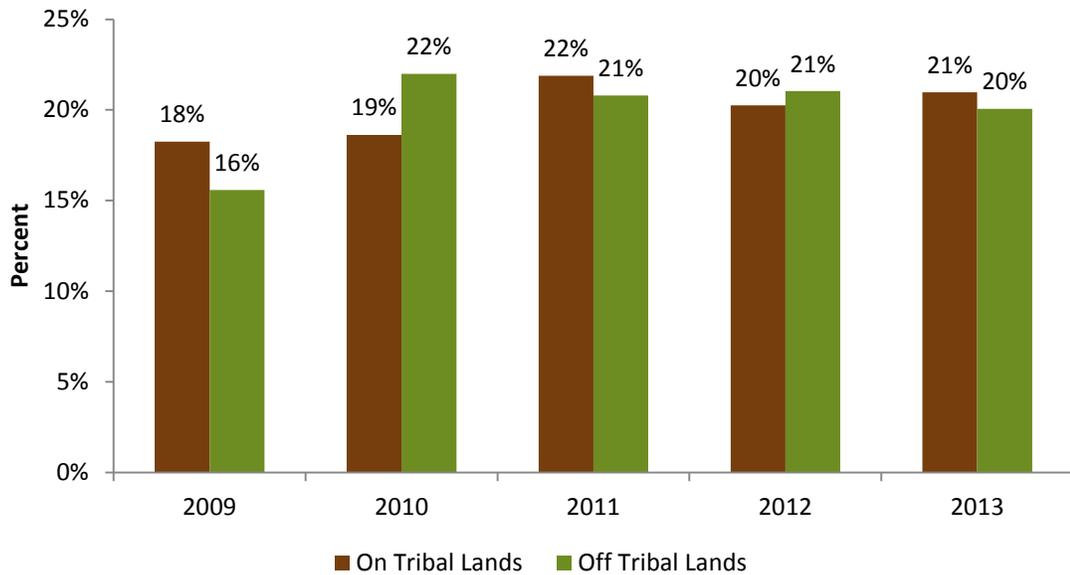
3. **Light Conditions:** Approximately 65% of TTT MVCs on Tribal lands occurred in daylight as compared to 69% off Tribal lands. Twenty-seven percent of TTT MVCs occurred in dark, unlighted conditions on Tribal lands while only 16% of TTT MVCs off Tribal lands occurred in dark, unlighted conditions. However, off Tribal lands, 10% of TTT MVCs occurred in dark, lighted, conditions as compared to 4% on Tribal lands.
4. **Driver Impairment:** Only 16 people (1.2%) were tested for alcohol or drug use. Of the TTT drivers, 25% of those tested on Tribal lands were positive as compared to 27% off Tribal lands. Of those tested for drug use, 14% of TTT drivers tested on Tribal lands were positive as compared to 23% of TTT drivers off Tribal lands. Eighty-six percent of non-TTT drivers tested positive for drug use on Tribal lands as compared to 70% of non-TTT drivers off Tribal land
5. **Safety Device Use:** Eighty-seven percent of non-TTT motor vehicle occupants on Tribal lands used appropriate safety devices at the time of the TTT MVCs.
6. **Violations:** The top five violations on Tribal lands for non-TTT units involved in TTT MVCs were, in rank order: 1) speed too fast for conditions; 2) inattention/distraction; 3) unknown violations; 4) other violations; and 5) failure to keep in proper lane. The top ten violation rankings differed in comparison to non-TTT units involved in off Tribal land crashes.

## INCIDENT CHARACTERISTICS

### YEAR

Graph 1 shows the percent of total TTT MVCs that occurred inside and outside Tribal lands in Arizona by year.

*Graph 1. Percent of TTT MVCs by year on and off Tribal lands in Arizona, 2009 -2013.*



On Tribal lands, the number of crashes per year ranged from 101, 18% of total TTT MVCs on Tribal lands, in 2009 to 121, 22% of total TTT MVC on Tribal lands, in 2011. In 2009, 2011, and 2013, the percent of TTT MVCs occurring on Tribal lands was higher than the percent of TTT MVCs occurring off Tribal lands.

## PERSONS AND UNITS INVOLVED IN TTT MVCS

Table 1 shows the sum, mean and 95% confidence intervals around the means for the units and people involved in TTT MVCs both inside and outside Tribal lands in Arizona, 2009-2013.

*Table 1. Total and average fatalities and injuries per MVC TTT for number of units and persons involved in TTT MVCs by person type both on and off Tribal lands in Arizona, 2009 –2013.*

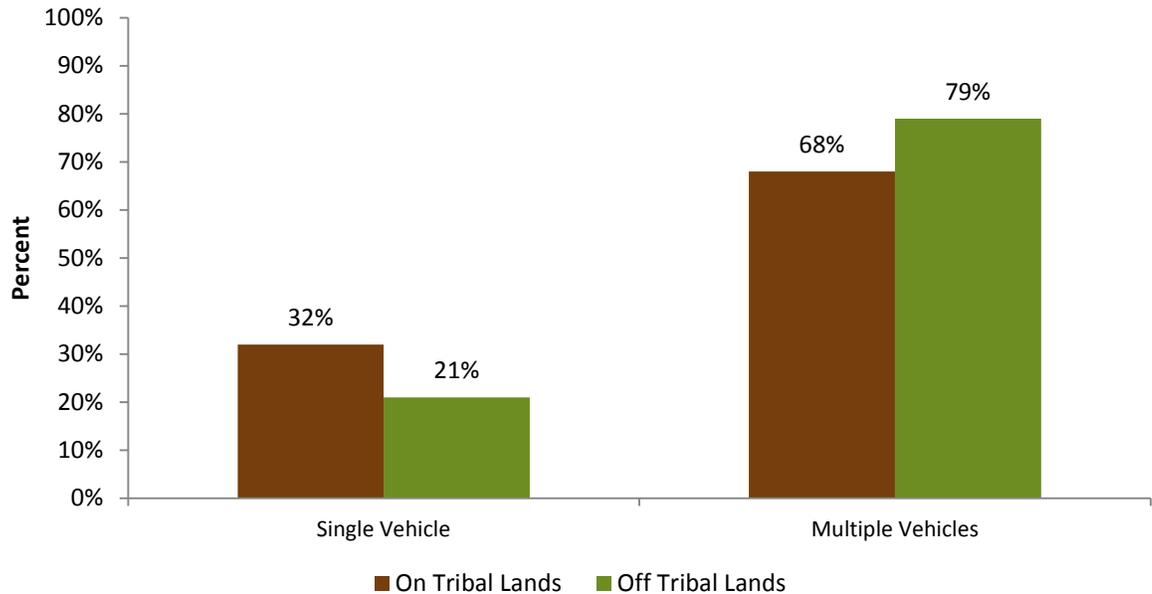
	On Tribal land		Off Tribal land	
	Total	Average per MVC	Total	Average per MVC
Total Units	993	1.8	21714	1.9
Total Motorists	1326	2.4	28388	2.4
Total Non-Motorists	3	0.005	95	0.008
Total Injuries	229	0.4	3951	0.34
Total Fatalities	18	0.03	232	0.02
Total Motorist Injuries	228	0.4	3892	0.33
Total Non-Motorist Injuries	1	N/A	59	0.005
Total Motorist Fatalities	16	0.02	200	0.02
Total Non-Motorist Fatalities	2	2	32	0.003

The average number of vehicles, pedestrians, driverless vehicles or pedalcyclists (units) per TTT MVCs was very similar both on (1.8) and off (1.9) Tribal lands. Multiple units can be involved in a single TTT MVC incident. The average number of motorists involved in TTT MVCs on and off Tribal lands was 2.4. Multiple motorists and non-motorists can be involved in a single incident. The average number of total injuries and fatalities per TTT MVC was slightly higher on Tribal lands as compared to off Tribal lands, with the majority of the injuries and fatalities occurring to people in or on non-TTT vehicles rather than pedestrians or pedalcyclists.

## NUMBER OF VEHICLES PER CRASH

Graph 2 shows percentage of single and multiple vehicle TTT MVCs inside and outside Tribal lands in Arizona, 2009-2013.

*Graph 2. Percent of single and multiple unit TTT MVC number of vehicles involved in crash on and off Tribal lands in Arizona, 2009 -2013.*

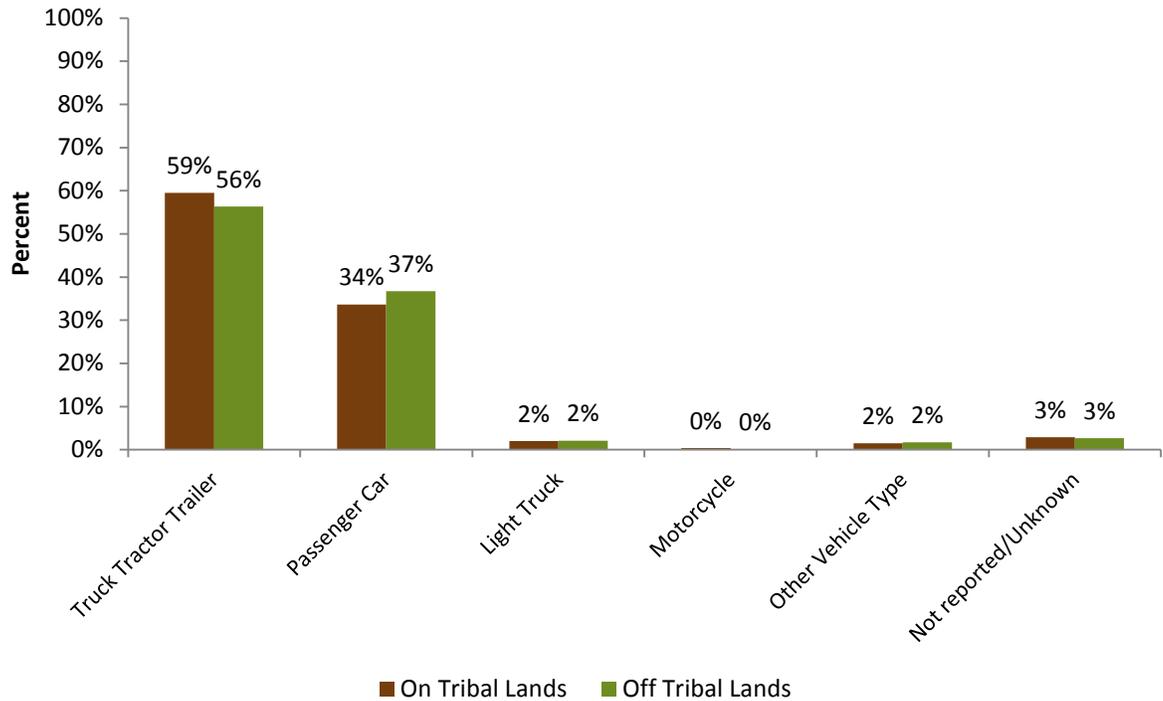


More of the TTT MVCs involved only single vehicles on Tribal lands as compared to off Tribal lands. On Tribal lands, there were 176 single vehicle TTT MVCs and 377 multiple vehicle TTT MVCs.

## VEHICLE TYPE

Graph 3 shows percent of TTT MVCs by vehicle type that occurred inside and outside Tribal lands in Arizona, 2009-2013. All crashes involved at least one TTT.

*Graph 3. Percent of TTT MVCs by vehicle type on and off Tribal lands in Arizona, 2009 – 2013.*

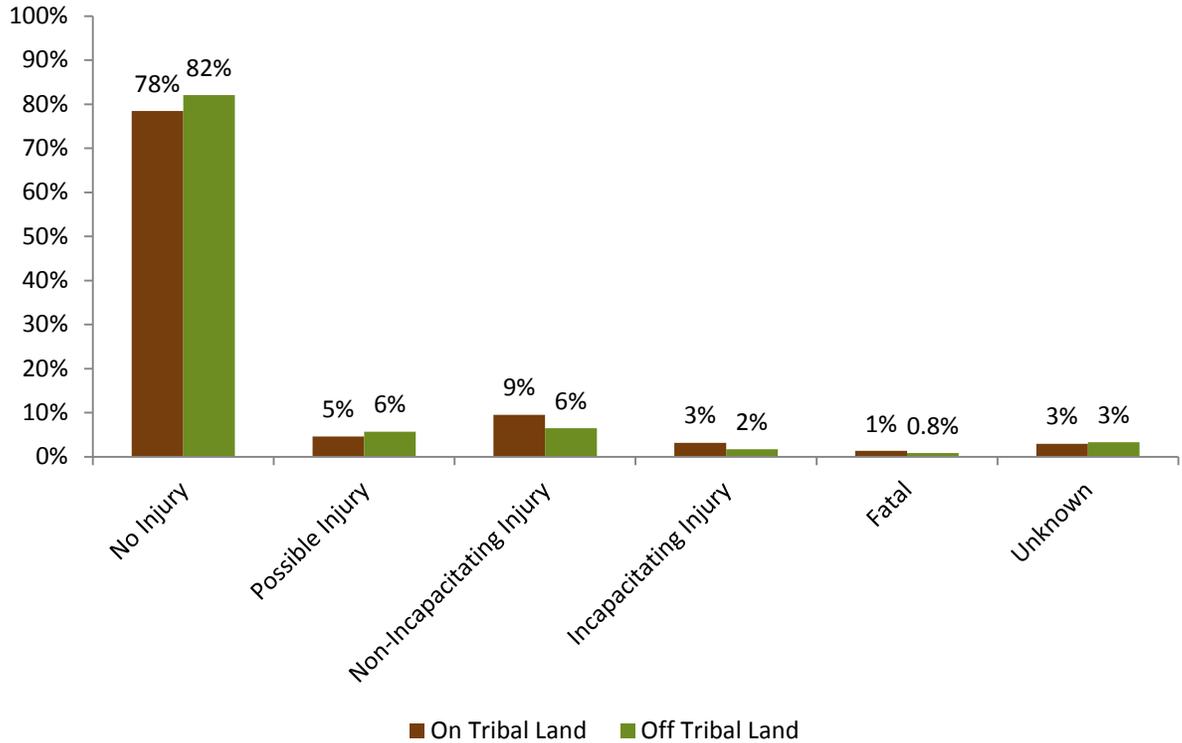


Each TTT MVC can involve multiple vehicle types in addition to TTT. On Tribal lands, more TTT MVCs involved only the TTT than off Tribal lands, since more TTT MVCs involved only a single vehicle.

## INJURIES & FATALITIES

Graph 4 shows percentage of TTT MVCs by injury status that occurred on and off Tribal lands in Arizona, 2009-2013.

**Graph 4. Percent of TTT MVCs by injury status on and off Tribal lands in Arizona, 2009 – 2013.**



Both on and off Tribal lands, the majority of TTT MVCs was property damage only and did not result in injury or fatality. On Tribal lands, 3% more TTT MVCs resulted in non-incapacitating injuries, 1% more TTT MVCs resulted in incapacitating injuries, and 0.2% more TTT MVCs resulted in fatalities.

## INJURIES & FATALITIES BY VEHICLE TYPE

Table 2 shows the number (N) and percentage of injuries and fatalities by vehicle type for TTT MVCs that occurred inside and outside Tribal lands in Arizona, 2009-2013.

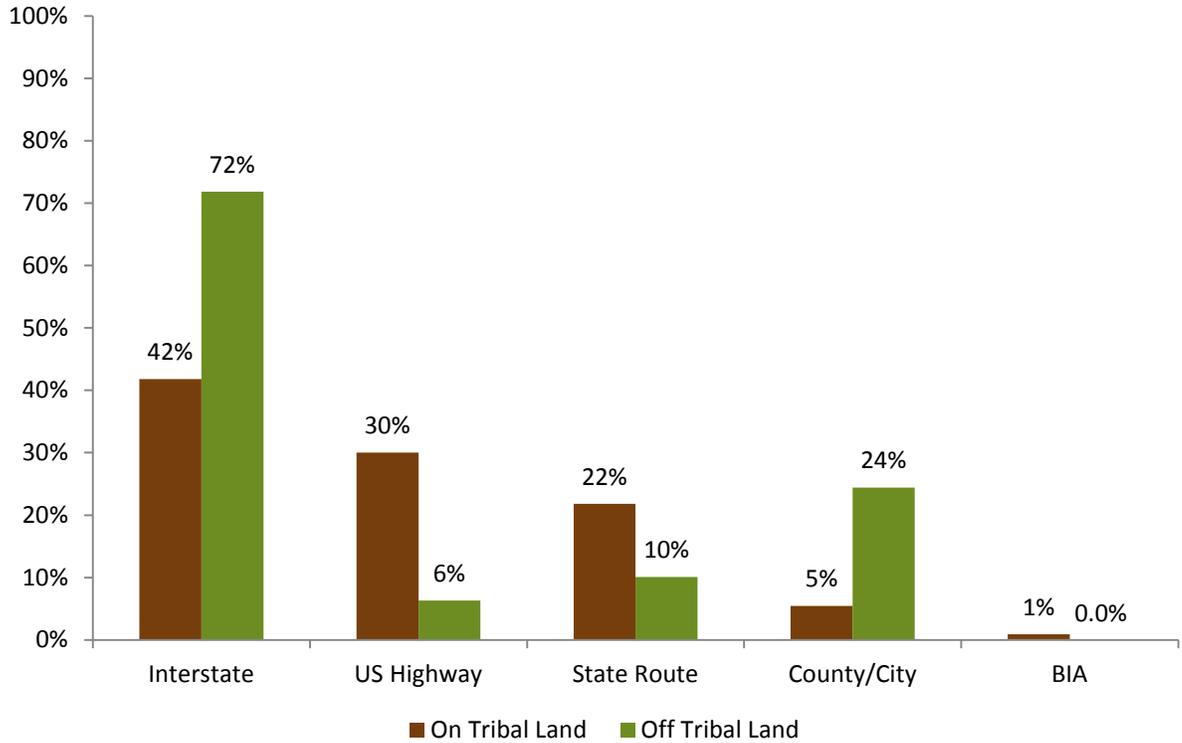
*Table 2. Injuries and fatalities by vehicle type on and off Tribal lands in Arizona, 2009 – 2013.*

	On Tribal land		Off Tribal land	
	N	%	N	%
<b>Fatalities</b>				
Occupants of TTTs	1	6	31	13
Occupants of other vehicles	17	94	201	87
Total Fatalities (out of total TTT MVCs)	18	1	232	0.8
<b>Injuries</b>				
Occupants of TTTs	66	39	665	28
Occupants of other vehicles	102	61	1671	72
Total Injuries (out of total TTT MVCs)	168	13	2336	8

On Tribal lands, a greater proportion of fatalities (94%) were occupants of non-TTT vehicles as compared to off Tribal lands (87%). The reverse was true for injuries where a greater percentage of TTT occupants involved in TTT MVCs on Tribal lands were injured (39%) as compared to off Tribal lands (28%). The total proportion of crashes that resulted in some type of injury (non-incapacitating or incapacitating) or fatality was higher on Tribal lands than off Tribal lands.

Graph 5 shows percentage of TTT MVCs that resulted in injuries by road owner that occurred inside and outside Tribal lands in Arizona, 2009-2013.

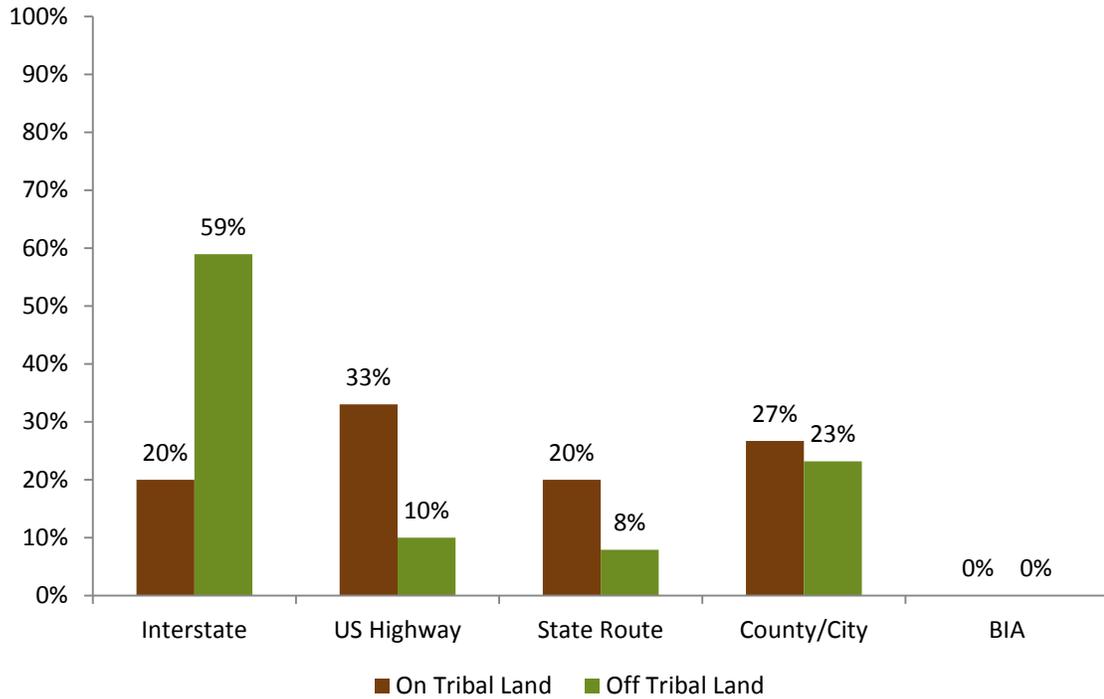
**Graph 5. Percent of TTT MVCs that resulted in injury by road owner on and off Tribal lands in Arizona, 2009 -2013.**



Out of all TTT MVCs on Tribal lands that resulted in injury, 52% occurred on either US Highways (30%) or State Routes (22%) as compared to 16% off Tribal lands.

Graph 6 shows percentage of TTT MVCs that resulted in fatalities by road owner that occurred inside and outside Tribal lands in Arizona, 2009-2013.

**Graph 6. Percent of TTT MVCs that resulted in fatalities by road owner on and off Tribal lands in Arizona, 2009 -2013.**

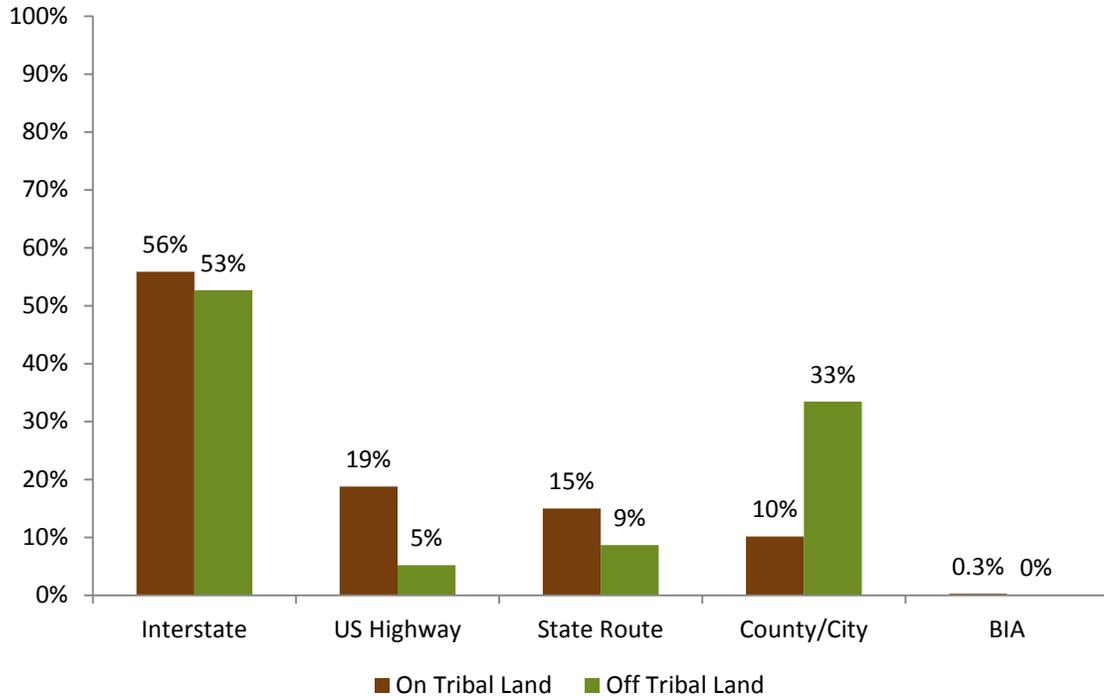


Out of all TTT MVCs on Tribal lands that resulted in fatalities, 53% occurred on either US Highways (33%) or State Routes (20%) as compared to 18% off Tribal lands.

## PROPERTY DAMAGE ONLY

Graph 8 shows percentage of TTT MVCs that resulted in fatalities by road owner that occurred inside and outside Tribal lands in Arizona, 2009-2013.

*Graph 8. Percent of TTT MVCs that resulted in property damage only by road owner on and off Tribal lands in Arizona, 2009 -2013.*



On Tribal lands, 56% of all property damage only TTT MVCs occurred on the interstate highways as compared to 53% off Tribal lands. Nineteen percent of property damage only TTT MVCs on Tribal lands occurred on US highways and 15% on state routes.

## MOST HARMFUL EVENT

Table 3 shows percentage and rank of the top five most harmful events for TTT MVCs by TTT and non-TTT vehicles that occurred inside and outside Tribal lands in Arizona, 2009-2013. Ranks are based on frequency of each harmful event. Events with the same number are listed with the same rank. Events outside of the top five are indicated with “—”. All events involved at least one TTT.

The Most Harmful Event is the event that resulted in the most severe injury or, if no injury, the greatest property damage involving a motor vehicle. Non-Fixed Object crashes are any crash initially involving a single vehicle and object not considered a fixed or permanent condition of the highway like ruts, bumps, sink- or potholes or other miscellaneous stationary or airborne road debris such as garbage, tree limbs, fallen-off parts of other vehicles, broken and scattered signs/posts, etc. Non-collision crashes are a class of crash in which the first harmful event does not involve a collision with a fixed object, non-fixed object, or a motor vehicle. This includes overturn, fire/explosion, falls from a vehicle, etc.

*Table 3. Number and rank of most harmful events of TTT MVCs on and off Tribal lands in Arizona, 2009 –2013.*

MOST HARMFUL EVENT	On Tribal land, TTT				Off Tribal land, TTT			
	TTT		Non-TTT		TTT		Non-TTT	
	Number	Rank	Number	Rank	Number	Rank	Number	Rank
Motor Vehicle in Transport	110	1	97	1	2704	1	2577	1
Overturn/Rollover	17	2	4	3	176	2	48	4
Other, Non-Fixed Object	8	3	5	2	123	3	108	2
Fire/Explosion	8	3	--	--	109	4	--	--
Animal, Livestock	8	3	--	--	--	--	--	--
Struck by Falling/Shifting Cargo	--	--	4	3	--	--	39	5
Other, Non-Collision	6	4	3	4	--	--	--	--
Cargo Loss/Shift	--	--	2	5	--	--	--	--
Tree/Bush, Standing	--	--	2	5	--	--	--	--
Parked Motor Vehicle	--	--	--	--	--	--	71	3
Animal, Wild Game	--	--	--	--	92	5	--	--

Both on and off Tribal lands, and for both TTT and non-TTT units, the number one ranked most harmful even was “motor vehicle in transport”. When applied to motor vehicles, 'in-transport' refers to being in motion or on a roadway and includes motor vehicles in traffic on a highway, driverless motor vehicles in motion, motionless motor vehicles abandoned on a roadway, disabled motor vehicles on a roadway, etc. For TTT on Tribal lands, “overturn/rollover” was the second ranked most harmful event, but tied for third with “struck by falling/shifting cargo” for non-TTT units. “Cargo loss/shift” was the fifth ranked most harmful event for non-TTT units on Tribal lands, but was not ranked in the top five off Tribal lands or for TTT on Tribal lands.

## FIRST HARMFUL LOCATION

Table 4 shows the number and percentage of TTT MVCs that occurred on and off Tribal lands by “First Harmful Location”. This is the location where the crash began.

*Table 4. TTT MVCs by first harmful location of on and off Tribal lands in Arizona, 2009-2013.*

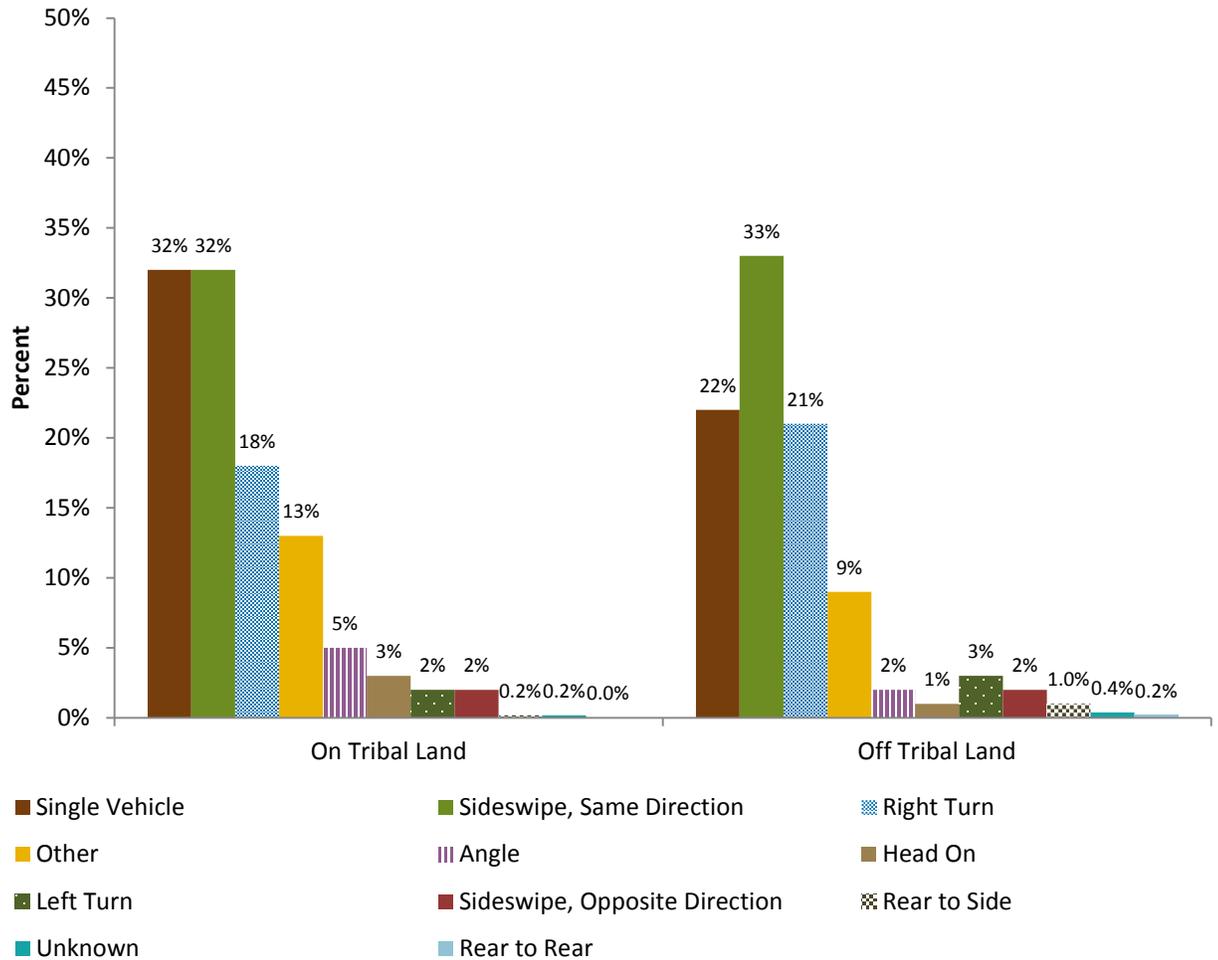
FIRST HARMFUL LOCATION	On Tribal land		Off Tribal land	
	N	%	N	%
On Roadway	146	26	2958	26
Shoulder	17	3	201	2
Roadside	10	2	74	1
Outside Right of Way Traffic-way	0	0	10	0.09
Median	6	1	55	0.5
Gore	0	0	2	0.02
Separator	0	0	1	0.01
In Parking Lane or Zone	0	0	6	0.05
Tunnel	0	0	7	0.06
Bridge	0	0	6	0.05
Off Roadway, Location Unknown	1	0.2	16	0.1
Unknown	0	0	7	0.06
Missing	373	67	8087	71

The location of the first harmful event was most commonly on the roadway both on and off Tribal lands. However, 67% of this information is missing for TTT MVCs on Tribal lands and 71% off Tribal lands. Proportionally more TTT MVCs were likely to have the first harmful location be the shoulder, roadside or median on Tribal lands than off Tribal lands.

## COLLISION MANNER

Graph 7 shows percentage of TTT MVCs by collision manner that occurred inside and outside Tribal lands in Arizona, 2009-2013. Collision manner describes how the crash occurred.

*Graph 7. Percent of TTT MVCs by collision manner on and off Tribal lands in Arizona, 2009 –2013.*



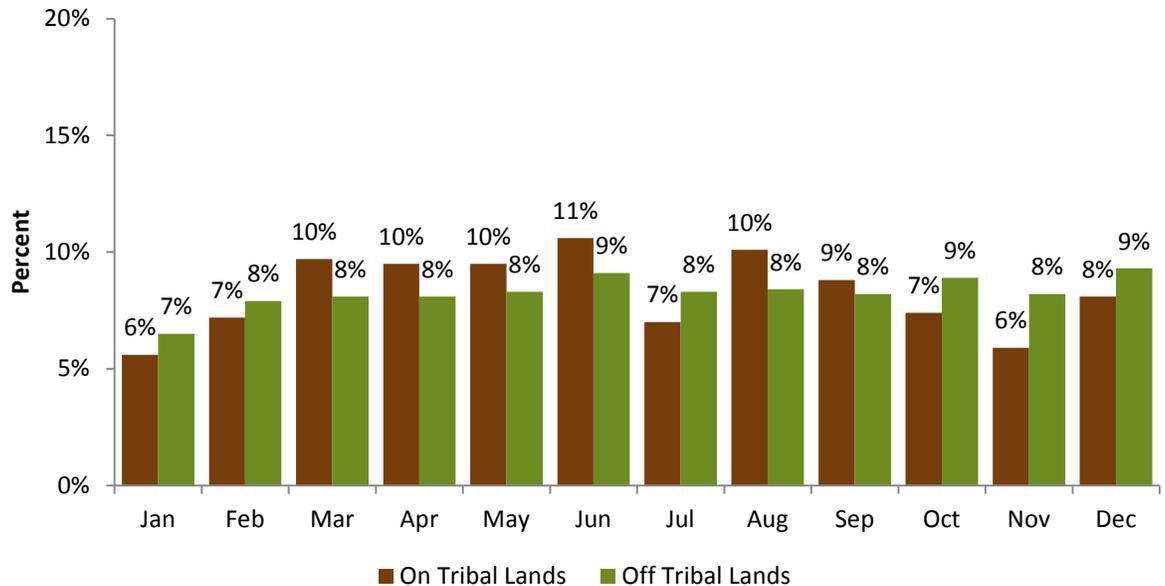
A higher proportion of TTT MVCs on Tribal lands involved a single vehicle (32%) as compared to TTT MVC off Tribal lands. On Tribal lands, 13% of TTT MVCs were defined as “other” as compared to 9% off Tribal lands. Angle (5% vs 2%) and head on (3% vs 1%) TTT MVCs were more common on Tribal lands than off Tribal lands.

## TEMPORAL & CLIMATE CHARACTERISTICS

### MONTH

Graph 8 shows percent of total TTT MVCs that occurred inside and outside Tribal lands in Arizona by month, 2009-2013.

*Graph 8. Percent of TTT MVCs by month on and off Tribal lands in Arizona, 2009 –2013.*

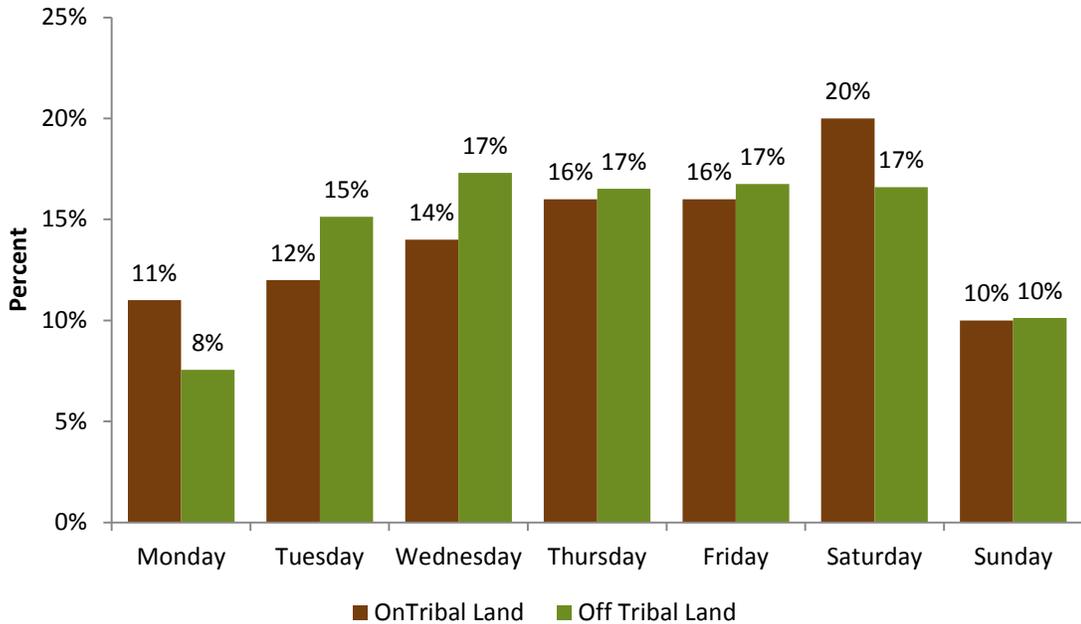


The percentage of TTT MVCs that occurred varied on and off Tribal lands by month. A higher percentage occurred on Tribal lands March-June and August-September as compared to off Tribal lands.

## DAY OF THE WEEK

Graph 9 shows the percentage of TTT MVCs that occurred on and off Tribal lands by day of the week, 2009-2013.

*Graph 9. TTT MVCs by day of week on and off Tribal lands in Arizona, 2009-2013.*

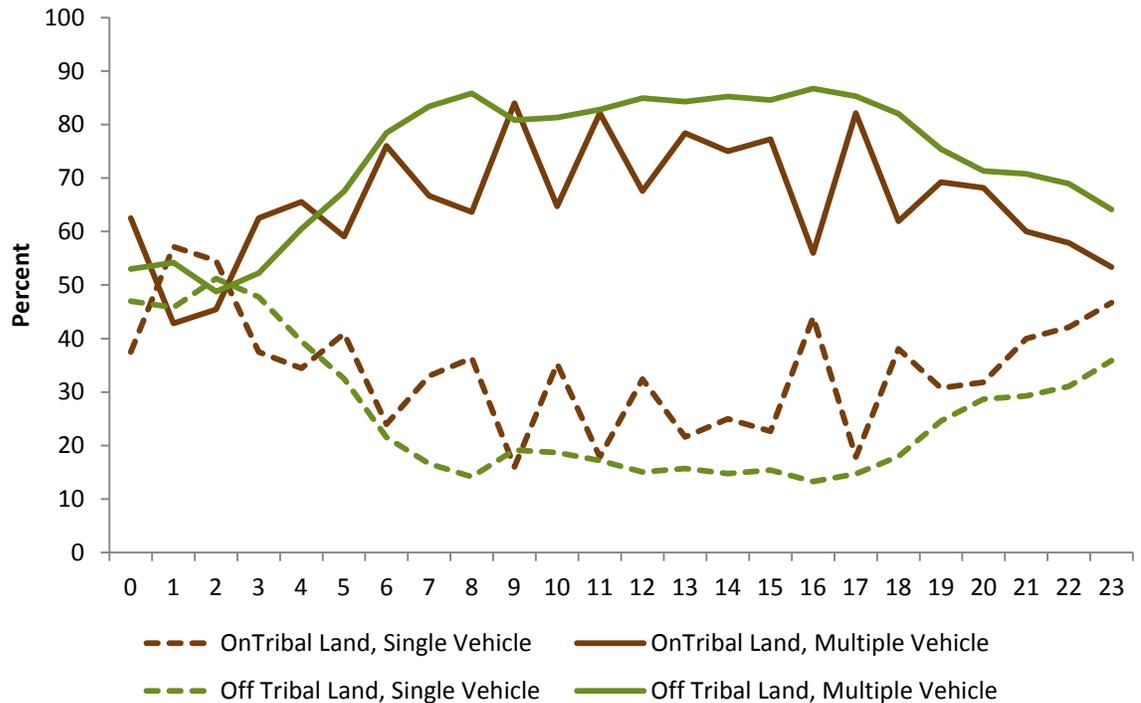


The percentage of TTT MVCs that occurred varied on and off Tribal lands by day of the week. A higher percentage occurred on Tribal lands Saturday and Monday compared to off Tribal lands.

## TIME OF DAY

Graph 10 shows the percentage of crashes within each hour for single and multiple vehicles involved in TTT MVCs on and off Tribal lands, 2009-2013. All crashes involved at least one TTT.

*Graph 10. TTT MVCs by hour for single vehicle and multiple vehicle crashes both on and off Tribal lands in Arizona, 2009-2013.*



The times that single vehicle and multiple vehicle TTT MVCs occur differ on and off Tribal lands. Single vehicle TTT on Tribal lands generally are more likely to occur during 5 am-11 pm as compared to single vehicle TTT off Tribal lands. Multiple vehicle TTT MVCs on Tribal lands are more likely to occur midnight to 1 am and 3-5 am as compared to multiple vehicle TTT MVCs off Tribal lands.

## WEATHER

Table 5 shows the number and percentage of TTT MVCs that occurred on and off Tribal lands by “First Harmful Location”. This is the location where the crash began.

*Table 5. TTT MVCs by weather conditions on and off Tribal lands in Arizona, 2009-2013.*

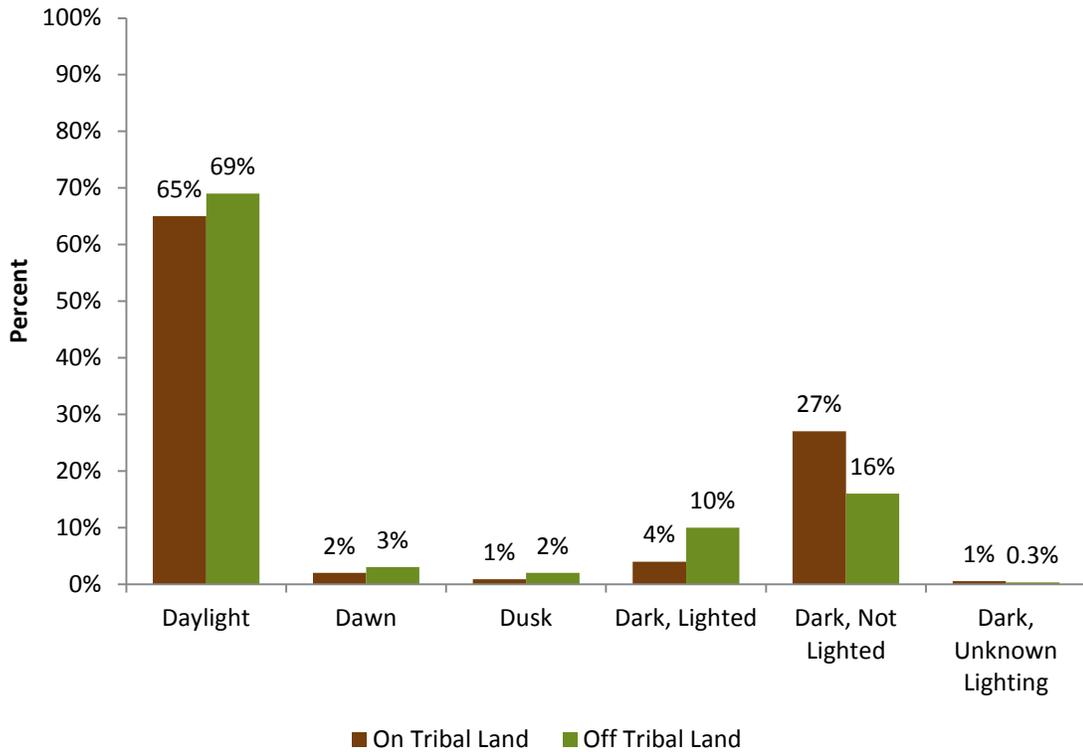
WEATHER CONDITIONS	On Tribal land		Off Tribal land	
	N	%	N	%
Clear	428	77	9596	84
Cloudy	62	11	924	8
Sleet, Hail, Freezing Rain, or Drizzle	2	0.4	25	0.2
Rain	23	4	277	2
Snow	15	3	345	3
Severe Crosswinds	7	1	77	0.7
Blowing Sand, Soil, or Dust	11	2	85	0.7
Fog, Smog, or Smoke	0	0	15	0.1
Blowing Snow	0	0	11	0.1
Other	1	0.2	16	0.1
Unknown	4	0.7	48	0.4

TTT MVCs were on Tribal lands were more likely to occur when the weather was cloudy, rainy, or if there was blowing sand, soil, dust or dirt as compared to TTT MVC off Tribal lands.

## LIGHT CONDITIONS

Graph 12 shows the percentage of TTT MVCs that occurred on and off Tribal lands in Arizona by weather conditions, 2009-2013.

*Graph 12. TTT MVCs by light conditions of on and off Tribal lands in Arizona, 2009-2013.*



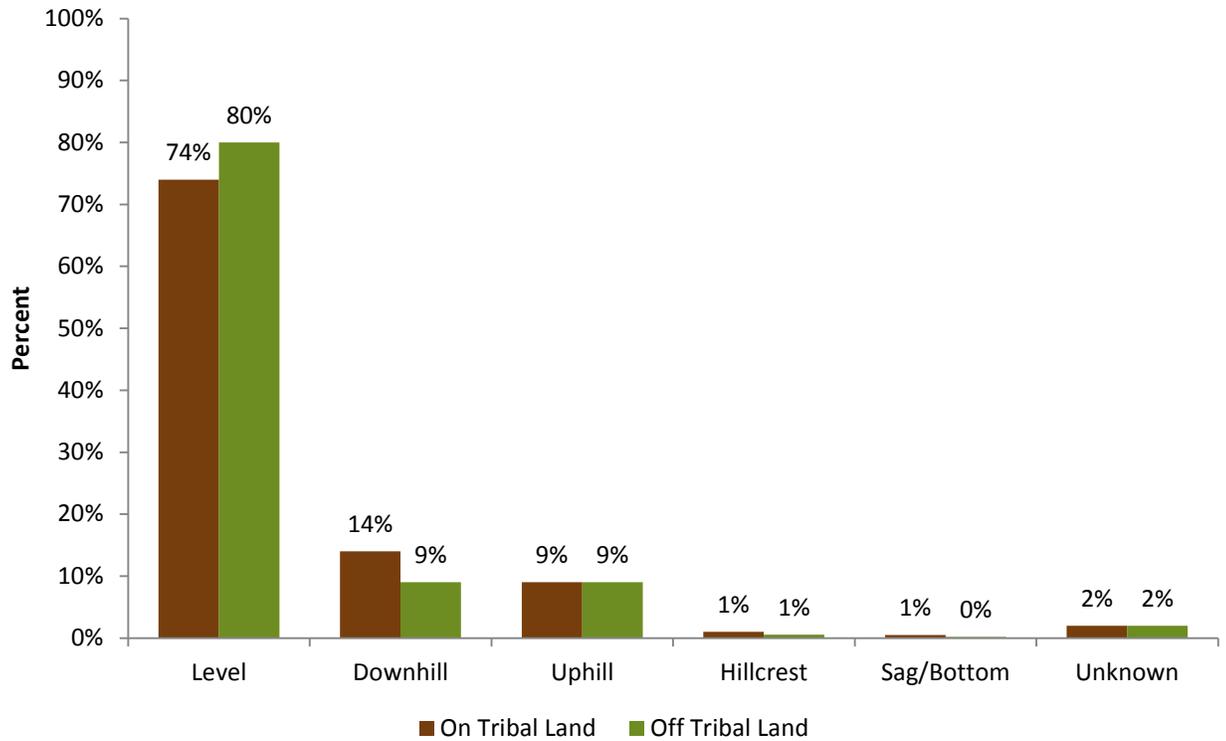
Dark, not lighted light conditions were more common when TTT MVCs occurred on Tribal lands as compared to off Tribal lands.

## ROADWAY CHARACTERISTICS

### ROAD GRADE

Graph 13 the percentage of TTT MVCs that occurred on and off Tribal lands in Arizona by road grade, 2009-2013

*Graph 13. TTT MVCs by road grade on and off Tribal lands in Arizona, 2009-2013.*

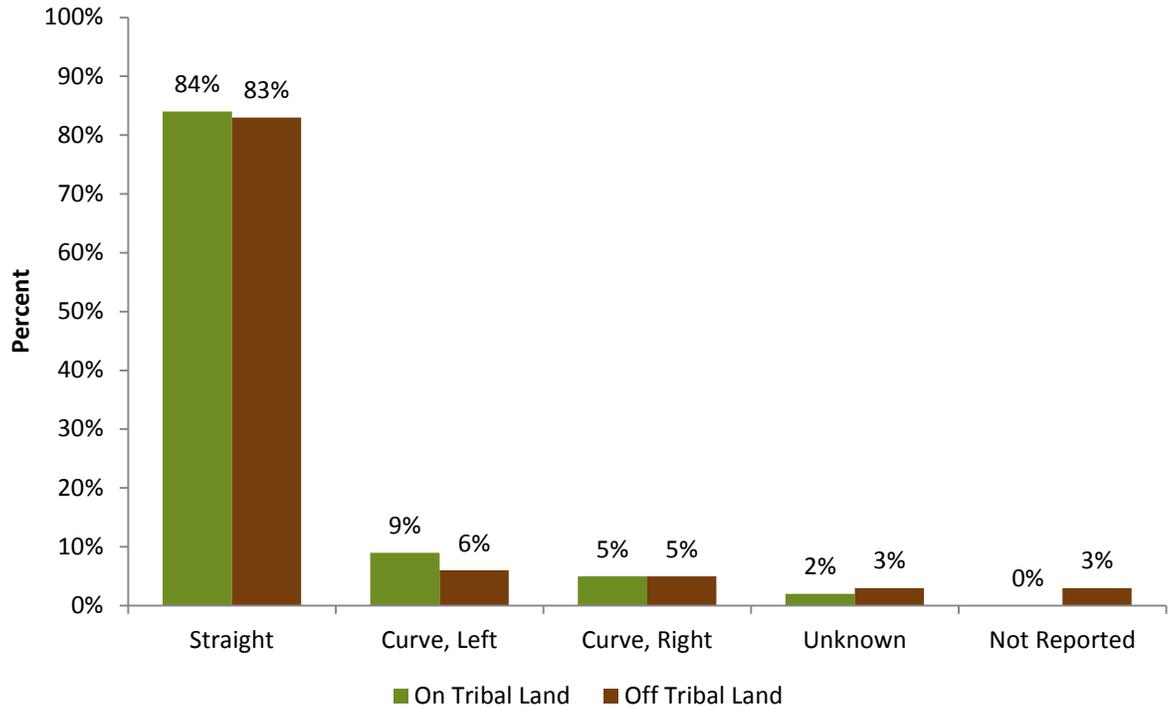


TTT MVCs on Tribal lands occurred on downhill grades more often than off Tribal lands.

## ROAD ALIGNMENT

Graph 14 the percentage of TTT MVCs that occurred on and off Tribal lands in Arizona by road alignment, 2009-2013

*Graph 14. TTT MVCs by road alignment on and off Tribal lands in Arizona, 2009-2013.*



TTT MVCs on Tribal lands were more likely to happen when the road alignment was curved left compared to TTT MVCs off Tribal lands.

## OCCUPANT CHARACTERISTICS

### DEMOGRAPHICS

Table 6 the number and percentage of gender, person type and age of those involved in TTT MVCs on and off Tribal lands in Arizona, 2009-2013

*Table 6. Demographics of people involved in TTT MVCs on and off Tribal lands in Arizona, 2009 –2013.*

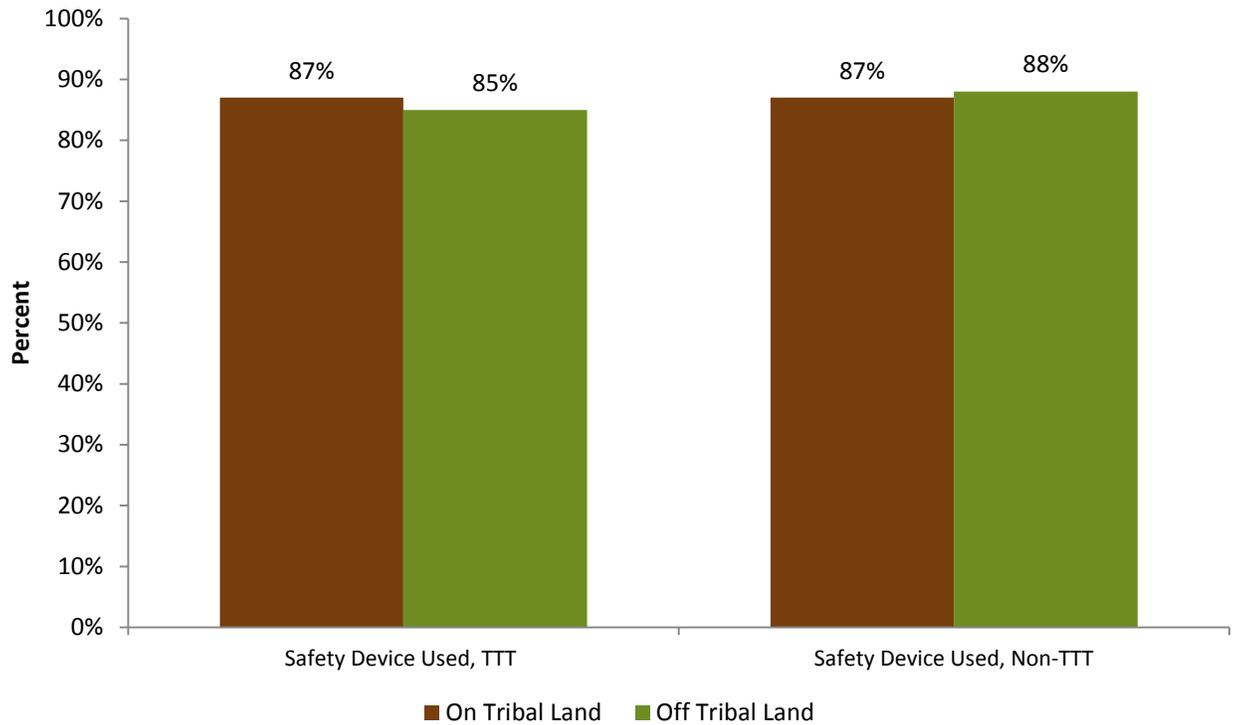
DEMOGRAPHICS	On Tribal land		Off Tribal land	
	N	%	N	%
Female	315	24	6845	25
Male	977	75	20643	74
Unknown	12	1	280	1
Driver	990	75	21624	76
Passenger	336	25	6714	34
Pedestrian	2	0.2	69	0.6
Pedalcyclist	1	0.08	28	0.1
	<b>Mean</b>	<b>Range</b>	<b>Mean</b>	<b>Range</b>
Age	41.7	(0-88)	41.7	(0-96)

The gender, person type and age of people involved in TTT MVCs on and off Tribal lands were nearly identical. More men than women were involved in TTT MVCs in both areas. The percent of drivers was almost identical on and off Tribal lands, but fewer passengers were involved in TTT MVCs on Tribal lands (25%) compared to off Tribal lands (34%).

## USE OF APPROPRIATE SAFETY DEVICE

Graph 15 the percentage of people involved in TTT MVCs on and off Tribal lands in Arizona by use of safety devices and being inside a TTT, 2009-2013

*Graph 15. TTT MVCs on and off Tribal lands in Arizona by usage of safety devices, 2009-2013.*

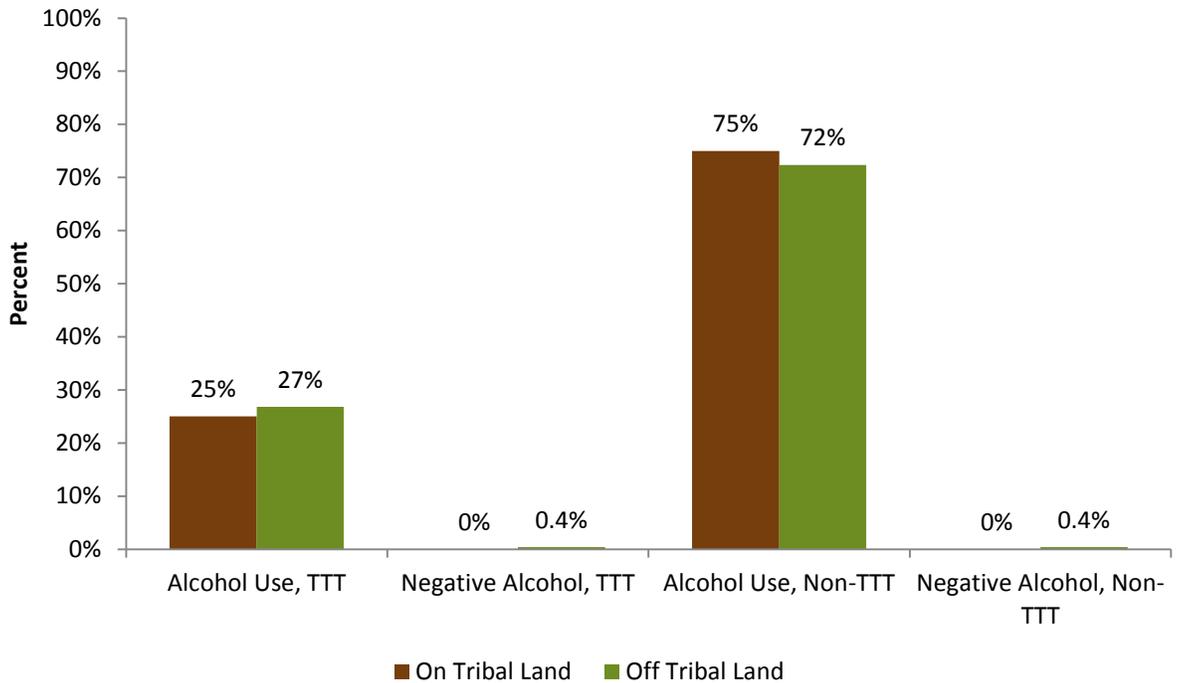


Slightly fewer occupants of non-TTT vehicles used an appropriate safety device as compared to those off Tribal lands (87% vs 88%). Occupants of TTT on Tribal lands were more likely to use an appropriate safety device on Tribal lands (87%) as compared to off Tribal lands (85%).

## IMPAIRMENT

Graph 14 the percentage of people involved in TTT MVCs on and off Tribal lands in Arizona by positive alcohol tests, 2009-2013

*Graph 14. Positive alcohol use tests in TTT MVCs by TTT and non-TTT, on and off Tribal lands in Arizona, 2009-2013.*

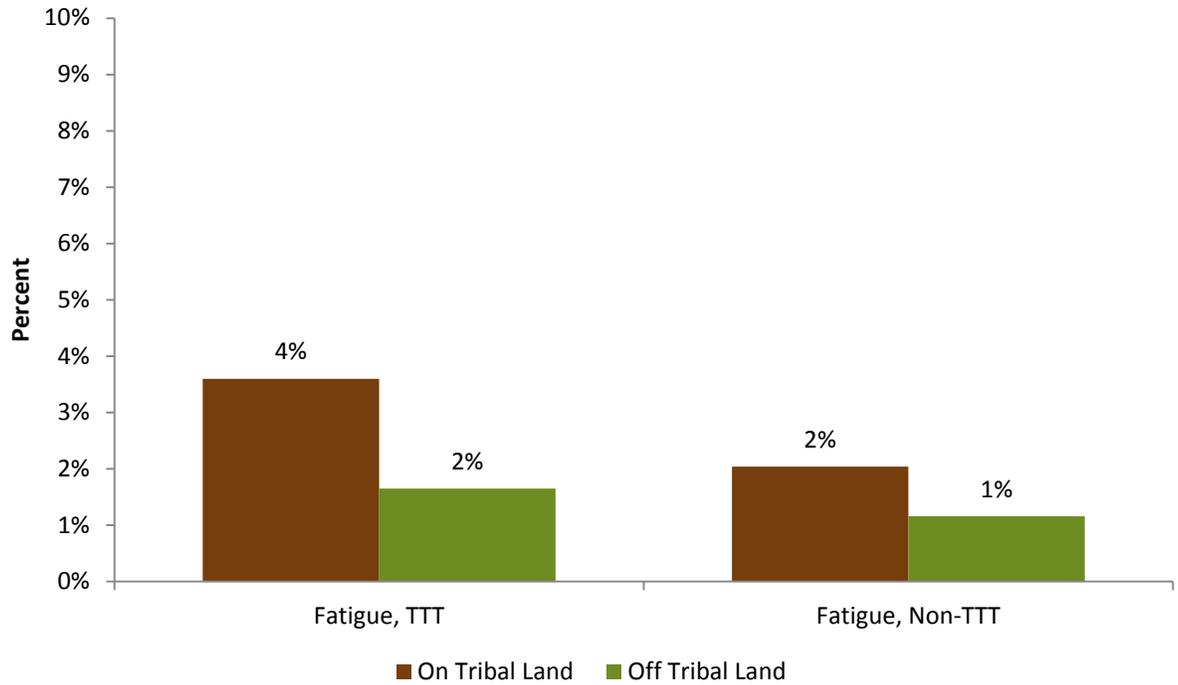


Of all people involved in TTT MVCs on Tribal lands, only 16 people (1.2%) were tested for alcohol use. Off Tribal lands 246 (0.9%) people involved in TTT MVCs were tested for alcohol use. Of the TTT drivers, 4 (25%) of those tested on Tribal lands were positive as compared to 66 (27%) off Tribal lands. Among non-TTT drivers tested for alcohol use, 12 (75%) on Tribal lands were positive as compared to 178 (72%) off Tribal lands.

## FATIGUE

Graph 15 shows the percentage of fatigued drivers involved in TTT MVCs on and off Tribal lands in Arizona by TTT vs. non-TTT, 2009-2013

*Graph 15. Fatigue in drivers involved in TTT MVCs by TTT and non-TTT, on and off Tribal lands in Arizona, 2009-2013.*



Of the TTT drivers, 4% on Tribal lands were fatigued as compared to 2% off Tribal lands. Among non-TTT drivers, 2% on Tribal lands were fatigued as compared to 1% off Tribal lands.

## VIOLATION

Table 7 shows percentage and rank of the top ten most common violations by TTT and non-TTT vehicle drivers involved in TTT MVCs that occurred inside and outside Tribal lands in Arizona, 2009-2013. Events with the same number are listed with the same rank. Events outside of the top ten are indicated with “--”. All crashes involved at least one TTT.

*Table 7. Percent and rank of violations by people involved in of TTT MVCs on and off Tribal lands in Arizona, 2009 -2013.*

VIOLATION	On Tribal land				Off Tribal land			
	TTT		Non-TTT		TTT		Non-TTT	
	N	Rank	N	Rank	N	Rank	N	Rank
Speed Too Fast For Conditions	94	1	50	1	1261	1	9400	1
Inattention/Distraction	50	2	25	2	1222	2	771	3
Unknown	29	3	23	3	940	3	774	2
Other	31	4	19	4	685	5	385	5
Failed to Keep in Proper Lane	22	5	16	5	403	6	280	7
Unsafe Lane Change	18	6	14	6	757	4	483	4
Failed to Yield Right of Way	--	--	12	7	210	8	327	6
Improper Turn	11	7	6	10	361	7	134	9
Drove in Opposing Traffic Lane	--	--	10	8	--	--	--	--
Followed too Closely	8	8	9	9	140	9	--	--
Other Unsafe Passing	4	9	--	--	--	--	129	10
Disregarded Traffic Signal	--	--	6	10	68	10	141	6

For both TTT drivers and non-TTT drivers on and off Tribal lands, speed too fast for conditions was the number one ranked violation. Inattention/Distraction was the second ranked violation for all drivers on Tribal lands and TTT drivers off Tribal lands. Failure to yield right of way (ranked 7<sup>th</sup>) and drove in opposing lane (ranked 8<sup>th</sup>) were top ten violations for non-TTT drivers on Tribal lands.

## ACTION AT TIME OF CRASH

Table 8 shows percentage and rank of the top ten most common driving actions involved in TTT MVCs that occurred inside and outside Tribal lands in Arizona, 2009-2013. Ranks are based on frequency of each action at time of crash. Events with the same number are listed with the same rank. Events outside of the top ten are indicated with “—”. Every incident involved at least one TTT.

*Table 8. Percent and rank of driving actions in TTT MVCs by TTT and non-TTT units on and off Tribal lands in Arizona, 2009 –2013.*

ACTION AT TIME OF CRASH	On Tribal land				Off Tribal land			
	TTT		Non-TTT		TTT		Non-TTT	
	N	Rank	N	Rank	N	Rank	N	Rank
Going Straight Ahead	378	<b>1</b>	222	<b>1</b>	6731	<b>1</b>	4913	<b>1</b>
Negotiating a Curve	33	<b>2</b>	6	<b>10</b>	222	<b>10</b>	--	--
Making a Left Turn	29	<b>3</b>	24	<b>4</b>	802	<b>4</b>	502	<b>5</b>
Slowing in Trafficway	26	<b>4</b>	26	<b>3</b>	620	<b>5</b>	515	<b>4</b>
Changing Lanes	24	<b>5</b>	19	<b>5</b>	946	<b>2</b>	671	<b>3</b>
Avoiding Vehicle/Object	20	<b>6</b>	13	<b>7</b>	226	<b>9</b>	174	<b>9</b>
Unknown	18	<b>7</b>	11	<b>8</b>	313	<b>7</b>	307	<b>7</b>
Stopped in Trafficway	17	<b>8</b>	44	<b>2</b>	595	<b>6</b>	1185	<b>2</b>
Making Right Turn	15	<b>9</b>	6	<b>10</b>	924	<b>3</b>	408	<b>6</b>
Overtaking/Passing	12	<b>10</b>	16	<b>6</b>	--	--	279	<b>8</b>
Other	--	--	8	<b>9</b>	--	--	--	--
Backing	--	--	--	--	303	<b>8</b>	--	--
Properly Parked	--	--	--	--	--	--	144	<b>10</b>

Going straight was the number one ranked unit action in all groups. For non-TTT MVCs on Tribal lands, being stopped in the roadway was the second highest ranked unit action, followed by slowing in roadway.

## STRENGTHS

The data set included all the variables of interest from the state of Arizona crash report form, which allowed analysis of location, person, and time. The data included all TTT MVCs located inside and outside Tribal land boundaries, determined by Global Positioning System (GPS) coordinates that were reported to ADOT. The majority of the variables were reported for most of the incidents.

## LIMITATIONS

The majority of Tribal police departments in Arizona do not submit crash reports to ADOT. Therefore the number of crashes that occur on Tribal lands are underestimated. Data is missing from several fields (Not Reported) or reported as “Unknown”, which makes a true picture of incidents difficult to assess. In addition, it is not possible to know whether the people involved in the crashes lived on the Tribal lands where the crashes occurred, making determining the impact on Tribal communities challenging.

## CONCLUSIONS

Analyzing the different circumstances around TTT MVCs on Tribal lands allows an opportunity to identify different intervention targets to reduce the burden of injury and fatality from TTT MVCs on Tribal lands. In this analysis, slowing and stopping in the trafficway by non-TTT vehicles were the number two and number three ranked unit actions at the time of the crash. This indicates that engineering improvements, such as turn lanes might reduce the number of TTT MVC. The top violations identified, going too fast for conditions and inattention/distraction, and the number of persons driving while fatigued suggest opportunities for public education. The presence of cargo loss/shift and struck by falling/shifting cargo, suggest that improved practices in securing loads on TTT might reduce TTT MVCs on and off Tribal lands. Through interventions that address the four Es (education, enforcement, EMS, and engineering), injuries and fatalities on Tribal lands due to TTT-MVCs can be reduced.