Vermont 2014 Safety Belt Use Study

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Vermont 2014 Safety Belt Usage Survey

2014 represents the twenty-seventh annual safety belt observational survey conducted under the auspices of the Vermont Governor's Highway Safety Program. This survey continues to implement the protocol redesigned last year to reflect the requirements of 23CFR1340.

Based on the Federal Register, the purpose of the revised requirements is to "... select observation sites that are more representative of the road segments in the State in a more cost effective manner. For these reasons, NHTSA proposed to revise the Uniform Criteria so that future surveys would give States more accurate data to guide their occupant protection programs" (Federal Register/Vol. 76, No. 63/April 1, 2011/p.18043).

To this end, the survey protocol has been completely redesigned to reflect formal randomization of the data collected to be more representative of actual conditions in the field. Key features of this redesign have included:

- The total survey sample of 82 sites has been retained based on good statistical performance in previous years.
- The geographic stratification into seven county based geographic areas has been retained.
- The previous stratification of roads into three volume based groups has been replaced by a stratification into two groups based on functional classification. This has been deemed to better reflect actual roadway functionality than the volume based approach.
- Survey sites have been based on a formal random selection procedure from a statewide roadway data base with the probability of selection proportional to size (known as a PPS selection). The size criterion has been vehicle miles traveled on the roadway segments.
- These sites have been selected from a population of all roadways other than local roadways in the geographic areas of the state other than those designated as part of the Metropolitan Statistical Area (MSA) (i.e. Chittenden, Franklin, and Grand Isle Counties). In the MSA area, the population from which selections were made included most local roadways as well.
- The number selected in each geographic and functional classification stratum has been proportional to the total vehicle miles traveled in each of these strata compared to the statewide VMT.
- Further random selections were made for other survey characteristics such as time of observation.

Additional requirements relative to the permissible statistical "error" of the survey and its estimation, and the permissible levels of missed observations placed further constraints on the survey criteria.

In previous years, this survey would occur in two phases bracketing a "Click It Or Ticket" (CIOT) awareness and enforcement program. These would include both a pre- and post-enforcement survey of the same sites intended to assess the effectiveness of the usage enhancement program. However, this year, because of scheduling limitations and more rigorous statistical requirements for accuracy, only the post-enforcement survey was conducted.

This year's field survey was conducted during late June and July, 2014. Data were collected on laptop computers for front seat occupants of all passenger vehicles under 10,000 pounds gross vehicle weight (gvw) wearing safety belts at the 82 sample sites selected for the revised survey design.

Survey Results

Data were collected for all days of the week and both peak hours ("rush hours") and off-peak hours. The statewide results, weighted in accordance with NHTSA specified inverse PPS weighting, including standard error estimates and confidence interval limits, are displayed in Table 1.

Table 1. Statewide Weighted Survey Results

| Rate for	Rate	SE	95% Confidence Interval	
			Lower Bound	Upper Bound
Driver	84.4%	0.0073	82.9%	85.8%
All Occupants	84.1%	0.0069	82.8%	85.5%
Males	77.6%	0.0108	75.5%	79.8%
Females*	92.4%	0.0072	91.0%	93.8%
Cars*	87.8%	0.0082	86.2%	89.4%
Trucks*	72.7%	0.0190	69.0%	76.4%

*SID 4203 removed for calculation

The post-enforcement rate for all front seat occupants of 84.1% safety belt usage continues for the third year in a row at just below the nationally recognized criterion of 85% after remaining just above 85% for four consecutive years (since 2007). This represents a very modest decline from the previous year's rate of 84.9% but this is easily within the range of possible statistical variation.

The statistical methods used to evaluate the observational data are in conformance with those developed by NHTSA and specified in 23CFR1340. In conformance with those criteria, the standard error is less than 2.5% (0.69% for all sites/occupants statewide). Also, not reported in this table, the total incidence of unknown observations was less than 10% (0.6% for all observations statewide).

Historical Trends

Historical usage rates are displayed in the following graph.
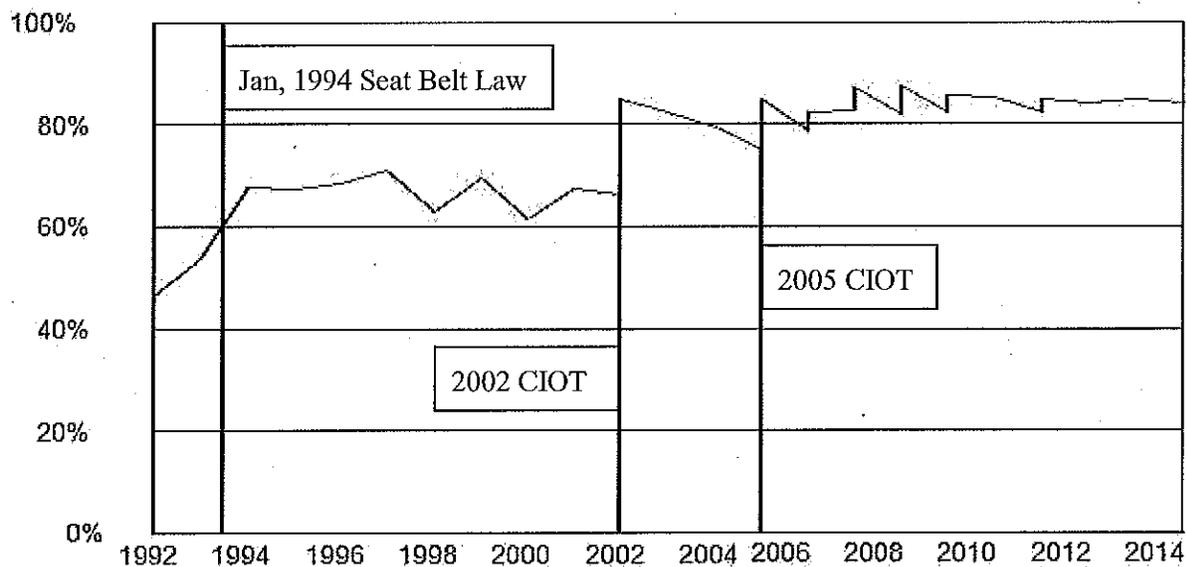
Historically, it may be seen that usage rates increased significantly between the enactment of Vermont's safety belt law in January of 1994 and the 1994 observational study by over 10 percentage points from 54% to 68%. This increase is preceded by a more gradual rise prior to 1994, although this may be the result of increased public awareness due to the publicity surrounding the discussion of the law in addition to the effect of the law itself.

After the enactment of the law, safety belt usage remained fairly constant, varying slightly around 65% until the public education and awareness campaign associated with the "Click-It-Or-Ticket" program in 2002. Directly associated with this program there was an increase of nearly 20 percentage points (from 66% to 85%). It may reasonably be inferred that these two events are causally related.

Prior to the 2005 enforcement effort, the rate drifted down gradually despite some effort at increased awareness and enforcement. The reasons for this are unclear. It is possible that the public was getting used to the low level awareness campaigns as they became more part of the normal background to living and generating little new awareness. For years, the rate had hovered between roughly 65 - 70%, suggesting a kind of "natural level" in the neighborhood of 2/3. Prior to 2005, each enforcement effort showed apparently diminishing returns with a subsequent drift toward lower rates immediately prior to the enforcement campaign. It is unclear whether this represented lower effectiveness of the campaigns when conducted from a higher base level, a gradual inuring of the public to the campaigns' methods or message, some quality of the campaign itself, or some other factor or combination of factors.

For the past several years the usage rate has continued to hold remarkably steady. For some years it seemed to vary in response to the CIOT campaigns, but for the past few years, even that variability has diminished, varying little at just below 85%. The overall rate has, for the past several years, also been unresponsive to the enforcement campaign, although without a pre-enforcement survey, it is impossible to know this for sure. It is entirely possible that the rate has settled into a new "natural rate" in the absence of a primary law of about 85%

It is somewhat notable that the revised survey design, especially the inverse PPS weighting, appears to both render the survey more sensitive to very low volume sites, and also result in an overall rate lower than both unweighted data and data weighted in proportion to both AADT and VMT.

Usage Rate: Additional Factors
In addition to the statewide weighted results, unweighted results have been analyzed in greater detail. These are displayed for the geographic and functional classification and other details in Table 2.

Table 2 Unweighted Rates by Subgroups and Geographic Area

	Arterial	Collector	Total	Male	Female	Cars	Pickups	Vans	SUVs
Chittenden	87.1%	87.8%	87.2%	80.6%	94.8%	90.6%	68.2%	86.9%	91.6%
Bennington/Addison	90.8%	85.3%	89.1%	84.0%	96.2%	91.0%	81.5%	91.0%	92.1%
Franklin/Grand Isle	67.2%	82.0%	74.5%	63.2%	88.0%	79.3%	63.9%	75.0%	73.0%
Northeast Kingdom	78.0%	78.3%	78.1%	70.7%	86.9%	84.5%	61.4%	87.1%	72.0%
Rutland	88.8%	88.0%	88.7%	82.8%	96.8%	93.0%	76.6%	93.1%	88.3%
Washington/Lamoille	85.9%	86.0%	85.9%	79.0%	93.9%	90.7%	64.7%	93.0%	90.4%
Windham/Orange/Windsor	86.4%	87.0%	86.6%	81.4%	92.5%	85.1%	81.0%	93.3%	89.1%
Statewide	86.3%	85.6%	86.1%	79.7%	93.7%	89.0%	71.7%	90.0%	89.2%

Table 3 illustrates variation by day of week and time of day.

Table 3. Day of Week and Hourly Variation; Unweighted

Func Class	Weekday	Weekend	Peak	Off-Peak
Arterial	86.5%	85.5%	85.8%	86.5%
Collector	84.1%	89.3%	90.1%	84.9%
Total	86.0%	86.5%	86.3%	86.1%

Observations

Detailed usage rates continue to show notable variations. Highest rates continue to be found among females, while the lowest rates continue to be found among males and pickup truck occupants. Regionally, there is noticeably lower usage along the entire northern tier of the State, which remains below 80%, while other counties all exhibit higher usage rates exceeding 85%.

Except for these general observations there appears to be little recognizable/consistent pattern among other sub-variables, including functional classification, day of week and time of day.

As in previous years enforcement appears to have reached a stable level (i.e., it appears that it is no longer engendering any broad, state-wide increase in the post enforcement rate), it has obviously been an effective tool in the past. It is at least possible that a more targeted approach may be effective in situations where usage is unusually lax. Based on the data, such an opportunity may exist geographically in the northern tier counties. Similarly, the uniquely low compliance rates among males and pickup truck occupants suggests a potential opportunity for more carefully targeted education/awareness/"consciousness raising" efforts.

Appendix A: Individual Sites: Counting Record and Raw Belt Usage Rates

Site Counting Record

SID	CG	Cls	Route	FC	CntSta	AADT	DATE	TIME	DIR	LNS	INIT	Count					
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1101	CC	Art	US-7	14	D243	18400	06/10/14	1301	S	1	zht	202	236	220	1	93.22%	0.42%
1102	CC	Art	I-89	1	W089	25500	06/21/14	710	N	1	zht	56	72	60	1	83.33%	1.37%
1103	CC	Art	TH-3	16	D331	6400	06/27/14	1256	N	1	zht	184	223	194	1	87.00%	0.45%
1104	CC	Art	US-2	14	WILL12	11590	06/10/14	722	E	1	zht	154	164	146	2	89.02%	1.20%
1105	CC	Art	TH-1	16	COLC19	14000	06/27/14	830	S	1	zht	203	236	203	3	86.02%	1.26%
1106	CC	Art	TH-4	14	D156	15300	06/27/14	1113	W	1	zht	212	271	223	2	82.29%	0.73%
1107	CC	Art	US-2	16	D019	10100	06/27/14	734	W	1	zht	185	200	173	0	86.50%	0.00%
1108	CC	Art	I-89	11	D423	8500	06/10/14	815	N	1	zht	139	156	142	1	91.03%	0.64%
1109	CC	Art	VT-116	6	D127	3700	07/01/14	814	N	1	zht	53	68	58	0	85.29%	0.00%
1110	CC	Art	VT-116	14	D525	5500	06/10/14	931	N	1	zht	58	72	66	0	91.67%	0.82%
1111	CC	Art	TH-9	12	D001	14600	06/27/14	921	S	1	zht	193	241	202	2	83.82%	0.00%
1112	CC	Art	VT-15	14	COLC13	20900	06/27/14	1204	E	1	zht	123	152	135	0	88.82%	0.00%
1113	CC	Art	VT-116	6	D296	10400	07/01/14	716	S	1	zht	224	243	211	0	86.83%	0.00%
1201	CC	Col	TH-10	17	SOBR40	4000	06/10/14	1019	W	1	zht	65	76	71	0	93.42%	0.00%
1202	CC	Col	VT-128	7	D309	2100	06/02/14	726	S	1	zht	103	121	112	1	92.56%	0.82%
1203	CC	Col	TH-5	19	SHEL01	3400	06/10/14	1107	N	1	zht	74	86	80	1	93.02%	1.15%
1204	CC	Col	TH-4	9	D370	770	07/01/14	1124	W	1	zht	19	28	21	0	75.00%	0.00%
1205	CC	Col	TH-5	7	D360	1600	07/01/14	905	E	1	zht	48	54	42	2	77.78%	3.57%
1206	CC	Col	TH-6	17	D524	5000	06/10/14	1159	N	1	zht	91	110	95	1	86.36%	0.90%
1207	CC	Col	TH-13	17	D447	11800	06/27/14	1016	S	1	zht	101	116	98	0	84.48%	0.00%
2101	BAd	Art	V022A	6	A113	4500	06/06/14	816	S	1	zht	79	86	77	2	89.53%	2.27%
2102	BAd	Art	V011-	6	B114	6900	06/23/14	1240	E	1	eeh	98	121	107	0	88.43%	0.00%
2103	BAd	Art	U007-	2	B112	6100	06/22/14	1715	S	1	eeh	67	98	93	0	94.90%	0.00%
2104	BAd	Art	V009-	2	B130	3500	06/22/14	1600	W	1	eeh	45	60	54	1	90.00%	1.64%
2105	BAd	Art	V030-	6	B121	2500	06/23/14	1130	N	1	eeh	29	33	30	0	90.91%	0.00%
2106	BAd	Art	U007-	2	A107	7900	06/06/14	1035	S	1	zht	109	133	121	2	90.98%	1.48%
2201	BAd	Col	V017-	7	A015	1600	07/01/14	1007	E	1	zht	88	107	85	2	79.44%	1.83%
2202	BAd	Col	V007A	7	B103	4900	06/23/14	1030	S	1	eeh	87	100	95	0	95.00%	0.00%
2203	BAd	Col	V074-	7	A154	1900	06/06/14	914	W	1	zht	25	25	18	0	72.00%	0.00%
3101	FGI	Art	VT-104A	6	F047	4700	06/02/14	819	W	1	zht	51	56	41	1	73.21%	1.75%
3102	FGI	Art	VT-105	6	NA	6400	06/15/14	1151	N	1	zht	32	47	33	1	70.21%	2.08%
3103	FGI	Art	US-2	6	G102	2900	06/15/14	732	N	1	zht	22	28	14	0	50.00%	0.00%
3201	FGI	Col	TH12	9	F165	1500	06/15/14	851	N	1	zht	8	10	6	0	60.00%	0.00%
3202	FGI	Col	VT-207	7	F155	3100	06/15/14	1047	E	1	zht	38	51	44	0	86.27%	0.00%
3203	FGI	Col	US-7	7	F149	4500	06/15/14	946	S	1	zht	48	67	55	1	82.09%	1.47%
4101	NEK	Art	U005-	16	C165	5600	06/20/14	846	N	1	zht	90	103	72	2	69.90%	1.90%
4102	NEK	Art	V016-	6	P022	1600	06/20/14	1510	S	1	zht	42	47	37	1	78.72%	2.08%
4103	NEK	Art	U002-	14	C160	8600	06/20/14	940	E	1	zht	110	137	110	2	80.29%	1.44%
4104	NEK	Art	V191-	6	NA	3300	06/15/14	1339	E	1	zht	30	44	30	2	68.18%	4.35%
4105	NEK	Art	U002-	2	E007	2600	06/20/14	1039	E	1	zht	50	56	53	0	94.64%	0.00%
4201	NEK	Col	U005-	7	C146/CYA	14300	06/20/14	1305	N	1	zht	146	190	148	0	77.89%	0.00%
4202	NEK	Col	U005-	7	C101	2700	06/20/14	1401	S	1	zht	18	24	21	0	87.50%	0.00%
4203	NEK	Col	S0277	7	E144/EZAF	160	06/20/14	1150	W	1	zht	3	3	1	0	33.33%	0.00%

SID	CG	Cls	Route	FC	CntSta	AADT	DATE	TIME	DIR	LNS	INIT	NVeh	NOcc	OccBlt	NUnk	Occ%	Unk%
5101	Rut	Art	U004-	2	R112	11200	06/04/14	1018	E	1	zht	154	179	164	0	91.62%	0.00%
5102	Rut	Art	V030-	6	R126	2800	06/04/14	1333	N	1	zht	56	64	54	2	84.38%	3.03%
5103	Rut	Art	U004-	14	R081	12900	06/04/14	1108	W	1	zht	147	188	171	1	90.96%	0.53%
5104	Rut	Art	V022A	6	NA	4900	06/04/14	1224	S	1	zht	54	70	55	1	78.57%	1.41%
5105	Rut	Art	U007-	2	R102	9000	06/04/14	829	S	1	zht	123	141	126	2	89.36%	1.40%
5201	Rut	Col	V140-	7	R316	910	06/25/14	945	E	1	eeh	33	39	33	0	84.62%	0.00%
5202	Rut	Col	S3216	17	R472	1200	06/04/14	927	W	1	zht	25	36	33	0	91.67%	0.00%
6101	WL	Art	V100-	6	W364	3800	06/21/14	1012	N	1	zht	70	97	89	0	91.75%	0.00%
6102	WL	Art	U302-	14	NA	6800	07/02/14	1014	W	1	zht	124	153	126	1	82.35%	0.65%
6103	WL	Art	V100-	6	L179	8700	06/02/14	1134	N	1	zht	112	136	115	1	84.56%	0.73%
6104	WL	Art	V015-	6	NA	5700	06/02/14	1010	E	1	zht	140	170	148	1	87.06%	0.58%
6105	WL	Art	I089-	1	W034	23100	06/21/14	819	S	1	zht	30	40	38	0	95.00%	0.00%
6106	WL	Art	V100-	6	W008	1300	06/21/14	1125	N	1	zht	39	54	42	1	77.78%	1.82%
6107	WL	Art	V104-	6	NA	3500	06/02/14	919	W	1	zht	45	61	53	0	86.89%	0.00%
6201	WL	Col	S6104	17	W239	2000	07/02/14	1131	W	1	zht	29	35	28	0	80.00%	0.00%
6202	WL	Col	V108-	7	L130	8400	06/02/14	1235	S	1	zht	61	84	76	2	90.48%	2.33%
6203	WL	Col	U002-	7	W145	3800	06/21/14	907	N	1	zht	46	59	49	0	83.05%	0.00%
7101	WOW	Art	V103-	2	Y062	9000	06/25/14	615	S	1	eeh	14	14	13	0	92.86%	0.00%
7102	WOW	Art	U005-	6	NA	4300	06/24/14	1320	S	1	eeh	52	60	52	0	86.67%	0.00%
7103	WOW	Art	V030-	6	X124	3800	06/23/14	1550	S	1	eeh	81	100	90	0	90.00%	0.00%
7104	WOW	Art	I089-	1	Y085	23300	06/22/14	715	N	2	eeh	16	18	15	0	83.33%	0.00%
7105	WOW	Art	V030-	6	NA	5200	06/23/14	1650	N	1	eeh	60	77	70	0	90.91%	0.00%
7106	WOW	Art	V030-	16	X130	6300	06/22/14	1245	N	1	eeh	35	47	38	0	80.85%	0.00%
7107	WOW	Art	V103-	2	Y427	5200	06/24/14	1645	W	1	eeh	71	90	79	0	87.78%	0.00%
7108	WOW	Art	V100-	6	NA	2500	06/23/14	1430	N	1	eeh	46	56	46	0	82.14%	0.00%
7109	WOW	Art	I091-	1	N002	7700	07/02/14	805	S	1	zht	36	41	40	1	97.56%	2.38%
7110	WOW	Art	V009-	2	X133	5700	06/22/14	1445	W	1	eeh	54	78	72	0	92.31%	0.00%
7111	WOW	Art	V103-	2	Y161	4600	06/24/14	1740	N	1	eeh	93	114	96	0	84.21%	0.00%
7112	WOW	Art	I091-	1	Y075	11900	06/24/14	945	S	1	eeh	20	23	21	0	91.30%	0.00%
7113	WOW	Art	V011-	6	Y133	9000	06/21/14	1145	W	2	eeh	106	128	101	0	78.91%	0.00%
7114	WOW	Art	I089-	1	Y001	14200	06/21/14	1630	N	2	eeh	48	71	58	0	81.69%	0.00%
7115	WOW	Art	V009-	2	X134	4800	06/22/14	1315	E	1	eeh	68	97	84	0	86.60%	0.00%
7116	WOW	Art	U004-	2	Y116	8600	06/22/14	1000	W	1	eeh	58	76	67	0	88.16%	0.00%
7201	WOW	Col	V014-	7	Y003	1600	06/21/14	1745	N	1	eeh	55	86	77	0	89.53%	0.00%
7202	WOW	Col	V131-	7	Y177	5400	06/24/14	840	E	1	eeh	26	31	30	0	96.77%	0.00%
7203	WOW	Col	S0117	7	X153	6700	06/24/14	1510	W	1	zht	55	69	58	0	84.06%	0.00%
7204	WOW	Col	S0176	7	Y300	1300	06/06/14	1158	E	1	zht	30	39	37	0	94.87%	0.00%
7205	WOW	Col	V110-	7	N127	860	07/02/14	918	S	1	zht	53	60	46	1	76.67%	1.64%
7206	WOW	Col	U005-	7	Y223	10400	06/22/14	830	N	1	eeh	47	61	53	0	86.89%	0.00%

Vermont Observation Sites

★ Site Location