Crash Data Validation: An Iowa Case Study

Final Report
February 2007

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(CTRE Project 06-256)

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Technical Report Documentation Page

1. Report No. CTRE Project 06-256	2. Government Accession No.	3. Recipient's Catalog No.	
4. Title and Subtitle Crash Data Validation: An Iowa Case Study		5. Report Date February 2007	
		6. Performing Organization Code	
7. Author(s) Reginald Souleyrette and Tom Stout		8. Performing Organization Report No.	
9. Performing Organization Name and Address Center for Transportation Research and Education Iowa State University 2711 South Loop Drive, Suite 4700 Ames, IA 50010-8664		10. Work Unit No. (TRAIS)	
		11. Contract or Grant No.	
12. Sponsoring Organization Name and Address Iowa Department of Transportation 800 Lincoln Way Ames, IA 50010		13. Type of Report and Period Covered Final Report	
		14. Sponsoring Agency Code	
15. Supplementary Notes Visit www.ctre.iastate.edu for color PDF files of this and other research reports.			

16. Abstract

With the quickening pace of crash reporting, the statistical editing of data on a weekly basis, and the ability to provide working databases to users at CTRE/Iowa Traffic Safety Data Service, the University of Iowa, and the Iowa DOT, databases that would be considered incomplete by past standards of static data files are in "public use" even as the dynamic nature of the central DOT database allows changes to be made to both the aggregate of data and to the individual crashes already reported. Moreover, the "definitive" analyses of serious crashes will, by their nature, lag seriously behind the preliminary data files. Even after these analyses, the dynamic nature of the mainframe data file means that crash numbers can continue to change long after the incident year.

The Iowa DOT, its Office of Driver Services (the "data owner"), and institutional data users/distributors must establish data use, distribution, and labeling protocols to deal with the new, dynamic nature of data. In order to set these protocols, data must be collected concerning the magnitude of difference between database records and crash narratives and diagrams. This study determines the difference between database records and crash narratives for the Iowa Department of Transportation's Office of Traffic and Safety crash database and the impacts of this difference.

17. Key Words crash data analysis—crash records—database validation—DOT crash database		18. Distribution Statement No restrictions.	
19. Security Classification (of this report) Unclassified.	20. Security Classification (of this page) Unclassified.	21. No. of Pages 27	22. Price NA

Form DOT F 1700.7 (8-72) **Reproduction of completed page authorized**

CRASH DATA VALIDATION: AN IOWA CASE STUDY

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Preparation of this report was financed in part
through funds provided by the Iowa Department of Transportation
through its research management agreement with the
Center for Transportation Research and Education,
CTRE Project 06-256.

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ACKNOWLEDGMENTS

The authors would like to thank the Iowa Department of Transportation for sponsoring this research.

INTRODUCTION

The Iowa Department of Transportation (Iowa DOT) Office of Driver Services (ODS) maintains a comprehensive database covering crashes over the preceding 10 years. The Iowa DOT Office of Traffic and Safety (TAS) maintains a database of output files from the ODS database; these data are used extensively by safety specialists and researchers for a variety of studies and reports. Because a study can be no better than its input data, ODS and TAS were concerned about how well the information in this database represents the actual data for the recorded crashes. Evidence suggested that a specific study to assess the validity of the crash data records would be appropriate. For example, in a separate study conducted by Iowa State University's Center for Transportation Research and Education (CTRE), involving 316 crashes and 511 vehicles during the 2002–2005 timeframe, it was found that 64 vehicle records (56 crashes) did not indicate the direction of travel in the appropriate INITDIR field. After reviewing crash diagrams and narratives, directional data were found for 54 of the vehicle records.

As reported below, the conclusion of the present study is that the ODS and TAS data are consistent with the narrative reports and diagrams, especially with regard to the major causes and contributing circumstances.

PRE-STUDY

A pre-study was conducted on a sample of 226 crashes taken from the 2005 records. Narratives were copied, after personal identifying information was redacted, for use by CTRE staff. These narratives, which included crash diagrams, were then compared to the data in the DOT crash record database. In this comparison, every effort was made to examine all data records and fields. The first step in the evaluation process for a specific crash record was to read the narrative and examine the crash diagram (when available). The next step was to check each of the records that related to the information presented in the narrative and/or diagram. A brief summary of any differences between the data and the narrative/diagram was written and entered into an Excel spreadsheet to allow for sorting and counting of these differences.

The results of the pre-study were somewhat different from the full study. Possible explanations for the differing results are that the pre-study involved a single year, involved different crashes than the full study, and used a smaller sample size than the full study.

In the pre-study, slightly more than half of the cases (115 of 226) showed no inconsistency between the data in the DOT records and the information presented in the narratives. In two cases, the narratives and diagrams were not available. In some 44 cases, there were minor differences in data that were not related to crash causes. For several of these 44 cases, available codes had to be used when a strict interpretation of the code used may have suggested a different type of crash. For example, there were a number of vehicles that crashed into stopped vehicles; such a code does not exist, and thus the code describing "follow too close" was used. For some other crashes in this grouping, the narrative indicated that a citation was issued, but the data did not reflect any charges. Another group of about a dozen cases included a vehicle age that had been entered incorrectly (if it is assumed that no vehicles over 100 years old are being crashed).

In 11 cases, the cause code used was related or similar to the cause described in the narrative. For example, in one case the major cause listed was “ran off road right,” with “icy road” listed as a contributing factor; in the narrative, the officer noted that the driver lost control on an icy downgrade. In another case, the major cause was listed as “speed too fast for conditions,” while the narrative indicated that the driver was fleeing police.

There were 43 cases that showed a significant difference between the data entered and the crash narratives. These include the following examples:

- Record shows “ran off road right” as major cause; narrative states driver was attempting to break up a fight within the vehicle and lost control
- Record shows first harmful event as collision with vehicle in traffic; narrative says the vehicle hit a deer
- Record shows major cause as “disregarded RR signal”; narrative cites witnesses stating that the vehicle slid on ice
- Record shows major cause as “crossed centerline”; narrative mentions speeding and loss of control, while diagram shows that one vehicle turned left from cross-street and hit the other vehicle

The summarized results of this analysis are provided in Appendix A.

FULL STUDY

The initial portion of this study involved a comparison between narrative descriptions of crashes, crash diagrams, and crash data recorded in DOT databases. For the full study, four years of crash records were sampled, with sample sizes ranging from 237 (2002) to 502 (2005). Errors were defined as discrepancies between the information in the narrative descriptions and the data recorded in the DOT databases. The analyses were grouped into three major categories, with results as follows:

Crashes

1. First harmful event: average error rate 6.2%
2. Road type: average error rate 2.0% (but no errors in 2002 and 2003)
3. Contributing surface condition: average error rate 0.5%
4. Manner of crash/collision: average error rate 0.7%
5. These four categories were those most discussed; all other categories were very rarely mentioned in narratives, and no errors were found.

Vehicle-Driver

1. Initial direction: average error rate 4.9%
2. Vehicle action: average error rate 8.1%
3. Driver gender: average error rate 0.4%
4. Driver contributing circumstances: average error rate 4.1% for first and 1.4% for second

5. Sequence of events: average error rate 14.6% for first, 6.4% for second, 1.9% for third, and 1.3% for fourth
6. Vision obstruction, injuries, damage, initial impact (point on vehicle), and defect (vehicle) had error rates less than 1%.
7. All other categories were rarely mentioned in the narratives, and no were errors found.

Injuries

1. Injury status: average error rate 0.4% in 2002; no errors found in other years
2. Ejection: mentioned once each year in 2002 and 2003; narratives agreed with the data
3. It should be noted that more attention is paid to injury crashes than to property damage-only crashes (many of the latter are assumed to go unreported), and therefore it may be expected that the injury crash data are recorded more accurately.

The summarized results of these comparisons are included in Appendix B. For space considerations, columns with null data have been hidden.

CONCLUSION

With regard to those categories of data of major concern to the TAS, the results of this study indicate that the recording of data is generally accurate in terms of consistency between the data, on the one hand, and the narrative reports and crash diagrams, on the other hand. Most categories of data either showed very low error rates (less than 1%) or were not mentioned in narratives or crash diagrams (and thus could not be evaluated). The highest percentage of errors was found in the category "sequence of events," which showed an error rate of 14.6% for the first event in the sequence. Other categories with lower but significant error rates include "vehicle action" (8.1%), "first harmful event" (6.2%), "initial direction" (4.9%), and "driver contributing circumstance" (4.1%).

It should be noted that the total number of crashes in these years (2002 to 2005) ranged from 58,493 to 59,666; the samples ranged in size from 237 to 502. The pre-study examined 226 crashes in 2005 that were not part of the full-study sample for 2005.

Additionally, the study proposal included a plan for analyzing and comparing traffic investigator (TI) reports (prepared by specially trained state troopers for fatal crashes) to the DOT crash database. It was the intent of such an analysis to determine whether the TI reports differed from the officer crash reports prepared by the responding officer, the purpose being to determine whether including the data from the TI reports in the Fatal Accident Reporting System (FARS) would benefit FARS. Due to the unavailability of the TI reports, however, this analysis could not be completed. Consideration should be given to addressing this question in a future study.

APPENDIX A. PRINTOUT OF PRE-TEST SUMMARY

In the following table, “0” in the match code column indicates a match between the DOT database and the crash narrative, “1” indicates an error or problem, “2” indicates a related or similar cause, “3” indicates an error in vehicle year, “4” indicates another minor inconsistency, and “9” indicates no narrative present.

Crash Key	Case Number	Match	Commentary
2005047048	2005251799	9	Diagram and narrative not present
2005054314	2005256602	9	Diagram and narrative not present
2005010635	2005211713	4	Data consistent with narrative as to cause, although both drivers appear to have been charged (not clear why #2 charged)
2005007816	2005211877	4	Data consistent with narrative as to cause, although both drivers appear to have been charged (not clear why #2 charged)
2005013181	2005213887	4	Data consistent with narrative as to cause, although both drivers appear to have been charged (not clear why #1 charged)
2005013941	2005214856	4	Data consistent with narrative, although data show driver Veh #1 was drunk (not mentioned in narrative)
2005015507	2005215831	4	Data consistent with narrative (need code for hitting stopped vehicle)
2005016024	2005217719	4	Data consistent with narrative, although driver 2 not charged for FTYROW
2005018615	2005218100	4	Data consistent with narrative, although driver was cited for unknown violation
2005016546	2005218949	4	Data consistent with narrative, although driver 1 was not cited for FTYROW or for running traffic signal
2005016815	2005219235	4	Data consistent with narrative, although vehicle 2 (legally parked according to the narrative) was charged with unknown violation
2005022026	2005224784	4	Data consistent with narrative; neither driver charged per data although narrative states both drivers at fault
2005024085	2005225726	4	Data consistent with narrative as to cause, although both drivers appear to have been charged (not clear why #2 charged)

Crash Key	Case Number	Match	Commentary
2005024348	2005226289	4	Major cause listed as following too close, narrative indicates Veh #2 hit stopped vehicle (need code for hitting stopped vehicle)
2005024609	2005226500	4	First harmful event listed as collision with vehicle in traffic; need code for collision with stopped vehicle. Narrative implies that a citation was issued (by the wording) but data show no charge
2005026438	2005227526	4	Data consistent with narrative. Narrative implies a citation was issued to driver #2; driver not charged per data
2005025139	2005227558	4	Major cause listed as following too close, narrative indicates Veh #2 hit stopped vehicle (need code for hitting stopped vehicle) Veh #2 year as 1904
2005025398	2005227786	4	Data consistent with narrative as to cause, although Driver #2 not charged for following too close (major cause listed)
2005026699	2005228352	4	Data consistent with narrative as to cause. Driver had BAC of 0.145; yet data show no citation
2005027486	2005229079	4	Data consistent with narrative as to cause, although Driver #1 not charged for following too close (major cause listed)
2005026180	2005229090	4	First harmful event listed as collision with vehicle in traffic; need code for collision with stopped vehicle. Major cause given as Other (improper), could be following too close or inattention
2005030100	2005231957	4	Data consistent with narrative, although no one charged
2005028285	2005231988	4	Data consistent with narrative, although no one charged
2005030735	2005234208	4	Major cause given as Other (improper), could be following too close or inattention
2005032831	2005234595	4	Major cause consistent with narrative. Narrative identifies Driver 1 as running stop sign, yet Driver 2 is listed as charged (cited) and Driver 1 listed as code 77. Vehicle #1 year 1903
2005031771	2005235317	4	Major cause given as Other (improper), could be following too close or inattention
2005033083	2005236754	4	Data consistent as to most factors, estimated repair cost given in data as $3000; on narrative estimated at $5000 to $6000.
2005035968	2005240250	4	Data consistent with narrative, although no alcohol result included

Crash Key	Case Number	Match	Commentary
2005036469	2005240620	4	First harmful event listed as collision with vehicle in traffic; need code for collision with stopped vehicle. Major cause given as Other (improper), could be following too close or inattention
2005047576	2005242029	4	Data mostly consistent with narrative. CSEVERITY given as "4", indicating possible injuries; INJSTATUS given as "9", indicating unknown. Data indicate rain; narrative does not mention rain.
2005041366	2005244166	4	Data mostly consistent with narrative. Vehicle #2 year given as 1903. Both drivers charged; no indication in narrative why driver 1 charged (driver 2 at fault).
2005042135	2005245604	4	Data mostly consistent with narrative. Both drivers charged; no indication in narrative why driver 1 charged (driver 2 at fault).
2005043154	2005247648	4	Data consistent as to cause. Driver #2 BAC at 0.296, yet not charged.
2005046527	2005249245	4	First harmful event listed as collision with vehicle in traffic; need code for collision with stopped vehicle. Major cause given as Other (improper), could be following too close or inattention
2005048084	2005253181	4	First harmful event listed as collision with vehicle in traffic; need code for collision with stopped vehicle.
2005051411	2005254029	4	Data consistent with narrative. Major cause could have also been listed as improper lane change.
2005055068	2005256297	4	Data consistent with narrative. First harmful event listed as Collision with vehicle in traffic; need code for collision with stopped vehicle.
2005051932	2005258050	4	Data consistent with narrative. Excess speed and reckless driving in data not mentioned in narrative. Car (2005) listed as totalled, yet damage estimated at $1000.
2005058689	2005258442	4	Data consistent with narrative, although it appears that major cause was driving too fast for conditions rather than loss of control as per data. Injury status listed as 4 for crash, yet injury status on zinj record shows driver 1 as 5 and driver 2 as 9.
2005057154	2005258803	4	Data consistent with narrative, although citation could have been for driving too fast for conditions. Vehicle 2 year given as "1903"

Crash Key	Case Number	Match	Commentary
2005053275	2005259345	4	Data consistent with narrative in most areas. Vehicle 1 described as totalled, yet damage estimated at $4000. Vehicle 1 configuration listed as minivan, yet shown with an 80,000 lb GVW. Diagram shows it as a tractor-trailer rig.
2005056893	2005264419	4	Data generally consistent, although driver gender listed as female while narrative indicates driver was male
2005060202	2005264601	4	Data consistent with narrative. Need first harmful event code for collision with stopped vehicle
2005059187	2005265620	4	Data mostly consistent, although damage cost figures do not agree
2005061743	2005266351	4	Data mostly consistent. Driver cited, no apparent reason
2005037500	2005241597	4	Data consistent with narrative. Driver contributing circumstance listed as ran traffic signal; narrative indicates driver was distracted by another vehicle.
2005009114	2005208596	3	Data consistent with narrative, although vehicle #2 year not given
2005011669	2005210432	3	Data consistent with narrative, although vehicle year given as 1903
2005010127	2005211666	3	Data consistent with narrative, although vehicle year given as 1903
2005012674	2005214248	3	Data consistent with narrative, although vehicle #1 year given as 2
2005020754	2005223280	3	Data consistent with narrative, although vehicle year given as 1904
2005023042	2005223967	3	Data consistent with narrative, although vehicle year given as 1904 (both vehicles)
2005036221	2005239378	3	Data consistent with narrative. Vehicle 1 year given as "2"
2005038023	2005241538	3	Data consistent with narrative. Vehicle 1 year given as "2"
2005046790	2005249898	3	Data consistent with narrative. Vehicle 1 year given as "2"
2005047828	2005251410	3	Data consistent with narrative. Vehicle 1 year given as "1903"
2005053802	2005256989	3	Data consistent with narrative. Snow conditions in data not mentioned in narrative. Excess speed in data not mentioned in narrative. Vehicle 1 year given as "1904"

Crash Key	Case Number	Match	Commentary
2005001593	2005203588	2	Record says road surface was ice; narrative says "lost control due to weather conditions." Most likely related but not specific
2005003729	2005205195	2	Major cause coded as run-off-road right with icy road a contributing factor; narrative notes vehicle lost control on icy downgrade
2005002658	2005206368	2	Major cause listed as "other (explain in narrative)". Vehicle #2 hit stopped vehicle. Could have used code 19 (following too close). Need code for hitting stopped vehicle
2005061482	2005207460	2	Major cause listed as "other (explain in narrative)". Vehicle #1 hit parked vehicle while backing up. Could have used major cause code 23
2005007548	2005211313	2	Major cause listed as "Other (explain in narrative) Other improper action" Narrative indicates Veh #1 hit stopped vehicle (no code available)
2005014207	2005216740	2	Data consistent with narrative, although major cause listed as speed too fast for conditions when narrative says driver was speeding (fleeing police)
2005014991	2005216790	2	Data consistent with narrative, although major cause listed as erratic driving (22) versus narrative saying speed too fast
2005018361	2005219474	2	Data consistent with narrative, although major cause could have been coded as improper backing (23)
2005018879	2005221217	2	Major cause listed as following too close, narrative indicates Veh #2 hit stopped vehicle (need code for hitting stopped vehicle)
2005019920	2005221667	2	Major cause listed as "Other (explain in narrative) Other improper action" Narrative indicates Veh #1 hit stopped vehicle (no code available)
2005020499	2005221781	2	Data show Veh #1 FTYROW from stop sign, not reflected in narrative but shown on diagram
2005001849	2005200622	1	Occupant protection indicates lap/shoulder belt was used. Narrative says vehicle was unoccupied when officer arrived.
2005000797	2005202131	1	Data record (zcta) indicates ran off road right as the major cause. Narrative states driver was attempting to break up a fight within the vehicle and lost control. Inattention listed as contributing factor

Crash Key	Case Number	Match	Commentary
2005007294	2005202762	1	Data indicates first harmful event as collision with vehicle in traffic; narrative states collision was with a deer.
2005006039	2005204278	1	Record says veh # 1 left scene; narrative says veh #2 left scene. First harmful event listed as hit and run.
2005005526	2005204455	1	Veh #3 struck stopped vehicle (per narrative); per data veh #3 was following too close.
2005004491	2005204739	1	Narrative states that witnesses saw veh#1 sliding on ice; data show major cause as disregarding RR signal
2005004243	2005204968	1	First harmful event listed as non-collision..overturn/rollover; narrative states vehicle #2 ran into stopped vehicle #1. Also, vehicle #2 listed as a 1904, probably an error
2005006536	2005205366	1	Major cause coded as "99"; narrative indicates FTYROW after stopping.
2005003473	2005205698	1	Veh #3 struck stopped vehicle (per narrative); per data veh #3 was driving too fast for conditions.
2005002955	2005207001	1	Major cause listed as "driving too fast for conditions"; narrative does not indicate speed was involved but that turning vehicle (not numbered) caused Veh #1 to crash (after avoiding turning vehicle?)
2005005784	2005209578	1	Major cause listed as unknown; narrative notes citations for unsafe entry onto a roadway (Veh#3) and speed restriction (Veh#2). Veh #2 hit Veh #1 (stopped to avoid Veh #3)
2005007035	2005210588	1	Narrative describes loss of control on ice and does not mention speed; data lists major cause as speed too fast for conditions. No citation issued
2005011913	2005211416	1	Narrative notes excess speed was involved, consistent with the data indicating speed exceeding authorized speed. However, data note that driver was not charged
2005012413	2005215370	1	Data indicate major cause as other (41); narrative shows as unsafe lane change (18)
2005016279	2005217451	1	Narrative not available; little data on file

Crash Key	Case Number	Match	Commentary
2005017589	2005218624	1	Major caused coded as "Other, no improper action" yet narrative indicates cause was improper lane change (18). Diagram shows vehicles as eastbound, while narrative states they were westbound
2005019392	2005221958	1	Data consistent with narrative as to major cause, however, data show 9-yr old male suffered major injuries, narrative says three juveniles were treated for minor injuries
2005019664	2005222271	1	Major cause listed as unknown; narrative notes improper backing from parked position as the cause.
2005020998	2005223689	1	Major caused listed as ran off road left (32), narrative indicates that vehicle became airborne, implying that excess speed was involved.
2005023816	2005225603	1	Narrative indicates FTYROW from driveway as major cause; data show traveling wrong way or on wrong side of road (14)
2005023312	2005226300	1	First harmful event listed as collision with animal, yet narrative says driver ran off road after swerving to avoid a deer.
2005025652	2005227742	1	Data consistent with narrative as to cause, although both drivers appear to have been charged (not clear why #2 charged). Contributing circumstances show Driver 2 was following too close, not consistent with narrative. Also shows Driver 1 ContCirm as no
2005025918	2005228890	1	Major cause shown as Swerving/Evasive Action (25); narrative states that Veh #1 hit rear of turning Veh #2. (Code could be 19) No citation issued
2005026963	2005230342	1	Major cause listed as unknown, yet narrative suggests improper backing (23) was cause
2005029323	2005230738	1	Major cause listed as Other improper action (41). From narrative appears to be improper lane change (18)
2005027995	2005231407	1	Major cause listed as Swerving/Evasive Action (25), yet narrative says driver lost control (33)
2005028808	2005231558	1	Major cause listed as unknown, yet narrative and diagram suggest FTYROW from stop sign was cause

Crash Key	Case Number	Match	Commentary
2005030350	2005232637	1	Major cause listed as Other improper action (41). From narrative appears to be improper lane change (18). First Harmful Event listed as non-collision other (13), not consistent with narrative
2005031007	2005233464	1	Major cause listed as Other improper action (41). From narrative appears to be improper lane change (18)
2005033335	2005235008	1	Major cause listed as "crossed centerline" (4), yet narrative mentions speeding and loss of control. Diagram shows Veh #2 (S/B) hitting Veh #1(W/B) when turning to go east
2005035166	2005238037	1	Major cause coded as FTYROW other; narrative suggests could have been improper lane change (18)
2005035441	2005239622	1	Major cause given as FTYROW from parked position (11). Could also be code 22, willful reckless.
2005036728	2005240474	1	Major cause coded as Excess Speed (16), yet narrative suggests inattention caused rear-end crash. Veh #1 year given as "2"
2005043932	2005248400	1	Major cause coded as Operating vehicle in reckless etc manner (22). From narrative should be coded as Improper backing (23)
2005050136	2005254178	1	Major cause listed as Swerving/Evasive Action (25), yet narrative says veh #2 brakes locked up on wet pavement. Implies that cause was driving too fast for conditions (15). Veh #1 year coded as "1903"
2005049120	2005254359	1	Major cause listed as Following too close (19); narrative indicates collision was a side-swipe when the at-fault vehicle was along side Veh 2. Could have been coded as improper lane change or reckless driving
2005050898	2005256391	1	Major cause listed as "Driving too fast for conditions"; narrative does not indicate speed was involved but that the vehicle lost control. Narrative states driver admitted having been drinking; not mentioned in contributing circumstances.
2005053532	2005257479	1	Major cause listed as FTYROW: making left turn. Narrative states was improper left turn (code 17).

Crash Key	Case Number	Match	Commentary
2005058167	2005258229	1	Major cause listed as FTYROW: other. Narrative states driver lost control on snow covered road, could be coded as driving too fast for conditions (15).
2005056618	2005263979	1	Major cause coded as 22, recklessly operating. Probably should be coded as 23, improper backing
2005057663	2005265075	1	Major cause listed as runoff road right, yet the vehicle that was hit was in the roadway. Probably should be 33 lost control.
2005061223	2005265084	1	Code 99 given for major cause. Narrative suggests that excess speed (16) or reckless driving (22) should be coded
2005062023	2005267379	1	Data show mostly "unknown" coding as to cause, etc. Driver loss of control due to ice appears to be the problem.

APPENDIX B. PRINTOUT OF STUDY SUMMARIES

Crash Record Summaries

		FIRST HARM	ROAD TYPE	CSURF COND	CRCO MANNER	ECONTCIRC	WEATHER1	WEATHER2
2005	CRASHES	502						
	NO MENTION	90	217	467		502	501	501
	AGREE	385	265	33		0	1	1
	DISAGREE	27	20	2		0	0	0
2004	CRASHES	257						
	NO MENTION	15	93	220	97	257	257	257
	AGREE	222	154	36	158	0	0	0
	DISAGREE	20	10	1	2	0	0	0
2003	CRASHES	246						
	NO MENTION	37	246	226	205	245	245	246
	AGREE	199	0	20	39	1	1	0
	DISAGREE	10	0	0	2	0	0	0
2002	CRASHES	237						
	NO MENTION	14	237	218	127	237	236	237
	AGREE	205	0	16	107	0	1	0
	DISAGREE	18	0	3	3	0	0	0

COMPARISONS IN PERCENTS		FIRST HARM	ROAD TYPE	CSURF COND	CRCO MANNER	ECONTCIRC	WEATHER1	WEATHER2
2005	NO MENTION	17.9%	43.2%	93.0%	0.0%	100.0%	99.8%	99.8%
	AGREE	76.7%	52.8%	6.6%	0.0%	0.0%	0.2%	0.2%
	DISAGREE	5.4%	4.0%	0.4%	0.0%	0.0%	0.0%	0.0%
2004	NO MENTION	5.8%	36.2%	85.6%	37.7%	100.0%	100.0%	100.0%
	AGREE	86.4%	59.9%	14.0%	61.5%	0.0%	0.0%	0.0%
	DISAGREE	7.8%	3.9%	0.4%	0.8%	0.0%	0.0%	0.0%
2003	NO MENTION	15.0%	100.0%	91.9%	83.3%	99.6%	99.6%	100.0%
	AGREE	80.9%	0.0%	8.1%	15.9%	0.4%	0.4%	0.0%
	DISAGREE	4.1%	0.0%	0.0%	0.8%	0.0%	0.0%	0.0%
2002	NO MENTION	5.9%	100.0%	92.0%	53.6%	100.0%	99.6%	100.0%
	AGREE	86.5%	0.0%	6.8%	45.1%	0.0%	0.4%	0.0%
	DISAGREE	7.6%	0.0%	1.3%	1.3%	0.0%	0.0%	0.0%
STUDY AVERAGE								
NO MENTION		11.2%	69.9%	90.6%	43.7%	99.9%	99.7%	100.0%
AGREE		82.6%	28.2%	8.9%	30.6%	0.1%	0.3%	0.0%
DISAGREE		6.2%	2.0%	0.5%	0.7%	0.0%	0.0%	0.0%

Vehicle-Driver Summaries

		INITDIR	VACTION	DRIVER GEN	DCONT CIRC1	DCONT CIRC2	SEQ EVENTS1	SEQ EVENTS2	SEQ EVENTS3	SEQ EVENTS4
2005	VEHICLES	824								
	NO MENTION	176	169	809	248	755	128	632	759	794
	AGREE	610	599	15	561	53	577	150	56	20
	DISAGREE	38	56	0	15	16	114	42	9	10
	CRASHES	502								
2004	VEHICLES	445								
	NO MENTION	36	46	443	85	406	35	324	393	422
	AGREE	387	367	0	341	30	358	97	39	15
	DISAGREE	20	32	2	19	9	52	24	13	8
	CRASHES	257								
2003	VEHICLES	422								
	NO MENTION	55	62	397	87	392	31	309	384	409
	AGREE	339	325	23	309	25	328	86	27	7
	DISAGREE	26	35	2	23	5	63	26	11	6
	CRASHES	246								
2002	VEHICLES	428								
	NO MENTION	29	46	399	105	403	40	311	394	419
	AGREE	380	339	26	302	23	311	78	29	6
	DISAGREE	19	43	3	21	2	77	39	5	3
	CRASHES	237								

COMPARISONS IN PERCENTS

		INITDIR	VACTION	DRIVER GEN	DCONT CIRC1	DCONT CIRC2	SEQ EVENTS1	SEQ EVENTS2	SEQ EVENTS3	SEQ EVENTS4
2005	NO MENTION	21.4%	20.5%	98.2%	30.1%	91.6%	15.5%	76.7%	92.1%	96.4%
	AGREE	74.0%	72.7%	1.8%	68.1%	6.4%	70.0%	18.2%	6.8%	2.4%
	DISAGREE	4.6%	6.8%	0.0%	1.8%	1.9%	13.8%	5.1%	1.1%	1.2%
2004	NO MENTION	8.1%	10.3%	99.6%	19.1%	91.2%	7.9%	72.8%	88.3%	94.8%
	AGREE	87.0%	82.5%	0.0%	76.6%	6.7%	80.4%	21.8%	8.8%	3.4%
	DISAGREE	4.5%	7.2%	0.4%	4.3%	2.0%	11.7%	5.4%	2.9%	1.8%
2003	NO MENTION	13.0%	14.7%	94.1%	20.6%	92.9%	7.3%	73.2%	91.0%	96.9%
	AGREE	80.3%	77.0%	5.5%	73.2%	5.9%	77.7%	20.4%	6.4%	1.7%
	DISAGREE	6.2%	8.3%	0.5%	5.5%	1.2%	14.9%	6.2%	2.6%	1.4%
2002	NO MENTION	6.8%	10.7%	93.2%	24.5%	94.2%	9.3%	72.7%	92.1%	97.9%
	AGREE	88.8%	79.2%	6.1%	70.6%	5.4%	72.7%	18.2%	6.8%	1.4%
	DISAGREE	4.4%	10.0%	0.7%	4.9%	0.5%	18.0%	9.1%	1.2%	0.7%

STUDY AVERAGE

	NO MENTION	12.3%	14.1%	96.3%	23.6%	92.5%	10.0%	73.8%	90.9%	96.5%
	AGREE	82.5%	77.8%	3.3%	72.1%	6.1%	75.2%	19.7%	7.2%	2.2%
	DISAGREE	4.9%	8.1%	0.4%	4.1%	1.4%	14.6%	6.4%	1.9%	1.3%

		VISION OBS	DRIVER COND	CSURF COND	INJURIES	INIT IMPACT	MOST DAMAGE	DAMAGE	DEFECT
2005	VEHICLES								
	NO MENTION	803	805	774	807	766	816	816	816
	AGREE	21	19	47	16	57	8	7	6
	DISAGREE	0	0	3	1	1	0	1	2
	CRASHES								

2004	VEHICLES								
	NO MENTION	435	434	400	427	438	444	434	441
	AGREE	7	11	44	18	5	1	9	4
	DISAGREE	3	0	1	0	2	0	2	0
	CRASHES								

2003	VEHICLES								
	NO MENTION	413	421	399	422	411	418	411	422
	AGREE	9	1	22	0	9	4	11	0
	DISAGREE	0	0	1	0	2	0	0	0
	CRASHES								

2002	VEHICLES								
	NO MENTION	415	424	402	421	421	426	424	427
	AGREE	13	4	22	7	7	2	2	1
	DISAGREE	0	0	4	0	0	0	2	0
	CRASHES								

COMPARISONS IN PERCENTS

		VISION OBS	DRIVER COND	CSURF COND	INJURIES	INIT IMPACT	MOST DAMAGE	DAMAGE	DEFECT
2005	NO MENTION	97.5%	97.7%	93.9%	97.9%	93.0%	99.0%	99.0%	99.0%
	AGREE	2.5%	2.3%	5.7%	1.9%	6.9%	1.0%	0.8%	0.7%
	DISAGREE	0.0%	0.0%	0.4%	0.1%	0.1%	0.0%	0.1%	0.2%

2004	NO MENTION	97.8%	97.5%	89.9%	96.0%	98.4%	99.8%	97.5%	99.1%
	AGREE	1.6%	2.5%	9.9%	4.0%	1.1%	0.2%	2.0%	0.9%
	DISAGREE	0.7%	0.0%	0.2%	0.0%	0.4%	0.0%	0.4%	0.0%

2003	NO MENTION	97.9%	99.8%	94.5%	100.0%	97.4%	99.1%	97.4%	100.0%
	AGREE	2.1%	0.2%	5.2%	0.0%	2.1%	0.9%	2.6%	0.0%
	DISAGREE	0.0%	0.0%	0.2%	0.0%	0.5%	0.0%	0.0%	0.0%

2002	NO MENTION	97.0%	99.1%	93.9%	98.4%	98.4%	99.5%	99.1%	99.8%
	AGREE	3.0%	0.9%	5.1%	1.6%	1.6%	0.5%	0.5%	0.2%
	DISAGREE	0.0%	0.0%	0.9%	0.0%	0.0%	0.0%	0.5%	0.0%

STUDY AVERAGE

	NO MENTION	97.5%	98.5%	93.1%	98.1%	96.8%	99.3%	98.3%	99.5%
	AGREE	2.3%	1.5%	6.5%	1.9%	3.0%	0.7%	1.5%	0.5%
	DISAGREE	0.2%	0.0%	0.4%	0.0%	0.3%	0.0%	0.3%	0.1%

		REPAIR COST	DRIVER AGE	OCCUPANTS	DL_ STATE	DL_ CLASS1	EJECTION	EJECT PATH	FATALITIES	RCONT CIRC
2005	VEHICLES									
	NO MENTION	824	824	824	824	822	824	824	824	824
	AGREE	0	0	0	0	2	0	0	0	0
	DISAGREE	0	0	0	0	0	0	0	0	0
	CRASHES									
2004	VEHICLES									
	NO MENTION	445	445	445	445	445	445	444	444	444
	AGREE	0	0	0	0	0	0	1	1	1
	DISAGREE	0	0	0	0	0	0	0	0	0
	CRASHES									
2003	VEHICLES									
	NO MENTION	421	421	421	421	422	421	422	422	422
	AGREE	1	1	1	1	0	1	0	0	0
	DISAGREE	0	0	0	0	0	0	0	0	0
	CRASHES									
2002	VEHICLES									
	NO MENTION	428	428	427	428	428	428	428	427	427
	AGREE	0	0	1	0	0	0	0	0	0
	DISAGREE	0	0	0	0	0	0	0	1	1
	CRASHES									

COMPARISONS IN PERCENTS

		REPAIR COST	DRIVER AGE	OCCUPANTS	DL_ STATE	DL_ CLASS1	EJECTION	EJECT PATH	FATALITIES	RCONT CIRC
2005	NO MENTION	100.0%	100.0%	100.0%	100.0%	99.8%	100.0%	100.0%	100.0%	100.0%
	AGREE	0.0%	0.0%	0.0%	0.0%	0.2%	0.0%	0.0%	0.0%	0.0%
	DISAGREE	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
2004	NO MENTION	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	99.8%	99.8%	99.8%
	AGREE	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.2%	0.2%	0.2%
	DISAGREE	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
2003	NO MENTION	99.8%	99.8%	99.8%	99.8%	100.0%	99.8%	100.0%	100.0%	100.0%
	AGREE	0.2%	0.2%	0.2%	0.2%	0.0%	0.2%	0.0%	0.0%	0.0%
	DISAGREE	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
2002	NO MENTION	100.0%	100.0%	99.8%	100.0%	100.0%	100.0%	100.0%	99.8%	99.8%
	AGREE	0.0%	0.0%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	DISAGREE	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.2%	0.2%

STUDY AVERAGE

	NO MENTION	99.9%	99.9%	99.9%	99.9%	99.9%	99.9%	99.9%	99.9%	99.9%
	AGREE	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%
	DISAGREE	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%

Injury Summaries

		INJSTATUS	EJECTION
2005	INJURIES	774	
	NO MENTION	773	774
	AGREE	1	0
	DISAGREE	0	0
	CRASHES	502	
2004	INJURIES	467	
	NO MENTION	463	467
	AGREE	4	0
	DISAGREE	0	0
	CRASHES	257	
2003	INJURIES	440	
	NO MENTION	436	439
	AGREE	4	1
	DISAGREE	0	0
	CRASHES	246	
2002	INJURIES	265	
	NO MENTION	261	264
	AGREE	3	1
	DISAGREE	1	0
	CRASHES	237	

COMPARISONS IN PERCENTS		INJSTATUS	EJECTION
2005	NO MENTION	99.9%	100.0%
	AGREE	0.1%	0.0%
	DISAGREE	0.0%	0.0%
2004	NO MENTION	99.1%	100.0%
	AGREE	0.9%	0.0%
	DISAGREE	0.0%	0.0%
2003	NO MENTION	99.1%	99.8%
	AGREE	0.9%	0.2%
	DISAGREE	0.0%	0.0%
2002	NO MENTION	98.5%	99.6%
	AGREE	1.1%	0.4%
	DISAGREE	0.4%	0.0%
STUDY AVERAGE	NO MENTION	99.1%	99.8%
	AGREE	0.8%	0.2%
	DISAGREE	0.1%	0.0%