TEXAS SCHOOL BUS ACCIDENT DATA (1986-1990): COMPARISONS TO A PROPOSED NATIONAL STANDARD FOR SCHOOL BUS ACCIDENT REPORTING

Prepared for the
Traffic Safety Section
Texas Department of Transportation

by

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October 1991

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NOTICE

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This report does not constitute a standard, specification or regulation.

ACKNOWLEDGEMENTS

The author would like to thank several individuals who reviewed and commented upon an earlier draft of this report:

Mr. Terry Pence	Traffic Safety Section, Texas Department of Transportation
Mr. Jim Templeton	Statistical Services, Texas Department of Public Safety
Mr. Sam Dixon	Division of School Transportation, Texas Education Agency

Special appreciation is extended to Ms. Robin Wilson, Traffic Safety Section, Texas Department of Transportation, who served as the technical representative on this project and oversaw the development of this report.

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INTRODUCTION

In the Surface Transportation and Uniform Relocation Assistance Act of 1987 the United States Congress called upon the National Academy of Sciences to determine "... the principal causes of fatalities and injuries to school children riding in school buses and of the use of seat belts in school buses and other measures that may improve the safety of school bus transportation ... to determine those safety measures that are most effective in protecting the safety of school children while boarding, leaving, and riding in school buses."[1]

Pursuant to this request the National Research Council of the National Academy of Sciences impaneled a committee to carry out the study requested by Congress. In 1989 the findings of the committee were published in a report that documented the current status of school bus transportation and recommended several steps (e.g., the rapid replacement of pre-1977 school buses, higher seat backs, improvements to emergency exits, pupil education) that might be undertaken to improve upon what is already the safest form of surface transportation.

In documenting the safety of school bus transportation and recommending enhancements to the system, the committee noted, however, that it's efforts were "... seriously hampered by a lack of reliable and valid school bus accident data and a dearth of information on the effectiveness of potential school bus safety programs and devices. The committee recommends that NHTSA work with the states and other interested parties to upgrade and standardize school bus accident data collected by the states."[2] (emphasis added)

At the Eleventh National Standards Conference on School Transportation (held in Warrensburg, Missouri, May 14-19, 1990) a National Standard for School Transportation Uniform Accident Reporting was adopted. The standard adopted by the conference was in response to the study by the National Academy of Sciences and based upon recommendations provided in a subcommittee report.[3] When this standard, or some variation on this standard, is implemented throughout the states, we will at long last begin to have reliable school bus accident data with which to (1) develop rational school bus safety policies and (2) evaluate existing and proposed school bus safety programs and devices.

The purpose of the present study is to (1) determine how the existing Texas traffic accident data base might be manipulated to bring Texas school bus data into line with the adopted standard and (2) to suggest which data elements will have to be collected on a supplemental basis to meet the standard.

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[1] Improving School Bus Safety (Special Report 222), Transportation Research Board, National Research Council, National Academy of Sciences, Washington, D.C., 1989, p. v.

[2] *Ibid.* p 158.

[3] Griffin, L.I. (Chairman), C. Baker, B.J. Edwards, J. Taylor and D. Reinfurt."A Review of the 1985 National Minimum Standard School Transportation Uniform Accident Report Form," Subcommittee for the National Accident Reporting Form, National Standards Conference Miscellaneous Committee, February 1990.

Table 1: School Bus Accidents, Accident-Involved Vehicles/Drivers and Persons (Pedestrians, Pedalcyclists, and Passengers) Reported in Texas by Year (1986-1990)

	Calendar Year					
	1986	1987	1988	1989	1990	Total
School Bus Accidents	1969	1685	1643	1746	1781	8551
Vehicles/Drivers	3197	3174	3205	3431	3545	16552
Persons[a]	1220	4654	9413	11907	12309	39503

[a]Excluding drivers

pedestrians and nine pedalcyclists sustained incapacitating (A-level) injuries. (Table 2)

Where do School Bus Accidents Occur?

Nearly one-fourth of all school bus accidents in Texas are recorded in Highway District 12 (Houston). One in ten are recorded in the District 19 (Dallas), and another one in ten are recorded in District 2 (Ft Worth). (Figure 1)

Almost half of all school bus accidents are recorded in towns and cities with populations in excess of 50,000, but over 20 percent are recorded in rural areas. (Figure 2)

In the appendix to this report, school bus accidents are cross tabulated by year (1986-1990) and county (Table A1) and city (Table A2).

Nearly half of all school bus accidents occur on city streets; one in four occurs on US and State highways. (Figure 3)

When do School Bus Accidents Occur?

Not surprisingly, school bus accidents are concentrated between the months of September and May, with a slight decline in December due, perhaps, to the Christmas vacation period when school buses are traditionally not in operation. (Figure 4)

Again, as might have been expected, school bus accidents are fairly rare on Saturdays and Sundays. During the school week (Monday through Friday) school bus accidents may be slightly more common on Fridays and slightly less common on Mondays. (Figure 5)

By hour of day, school bus accidents are most common in the morning and afternoon, i.e., 7 and 8 am and 3 and 4 pm. Generally speaking, the variance of accidents about the afternoon peak is greater than the variance about the morning peak. (Figure 6)

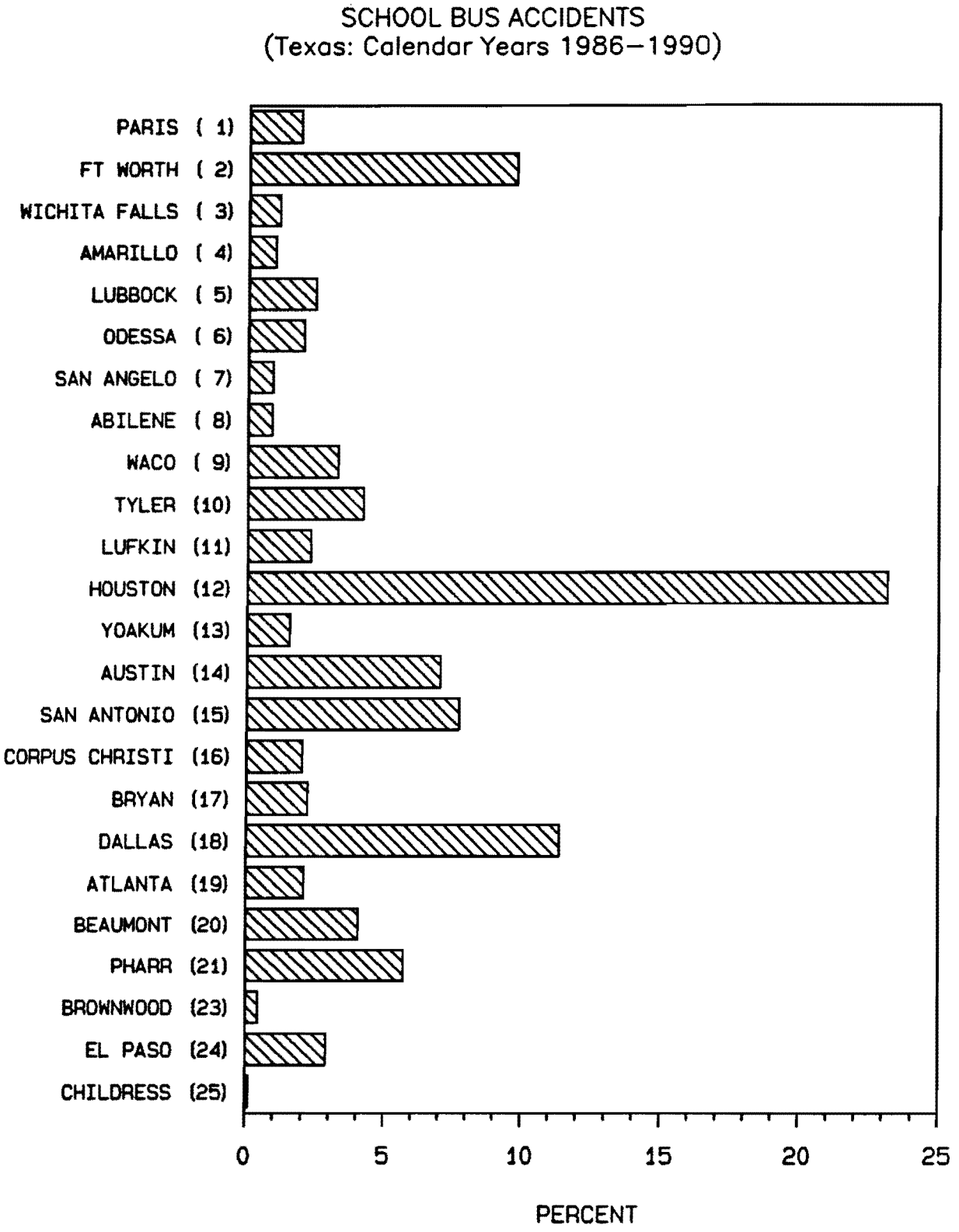

Figure 1: SCHOOL BUS ACCIDENTS (N=8,551) BY HIGHWAY DISTRICT

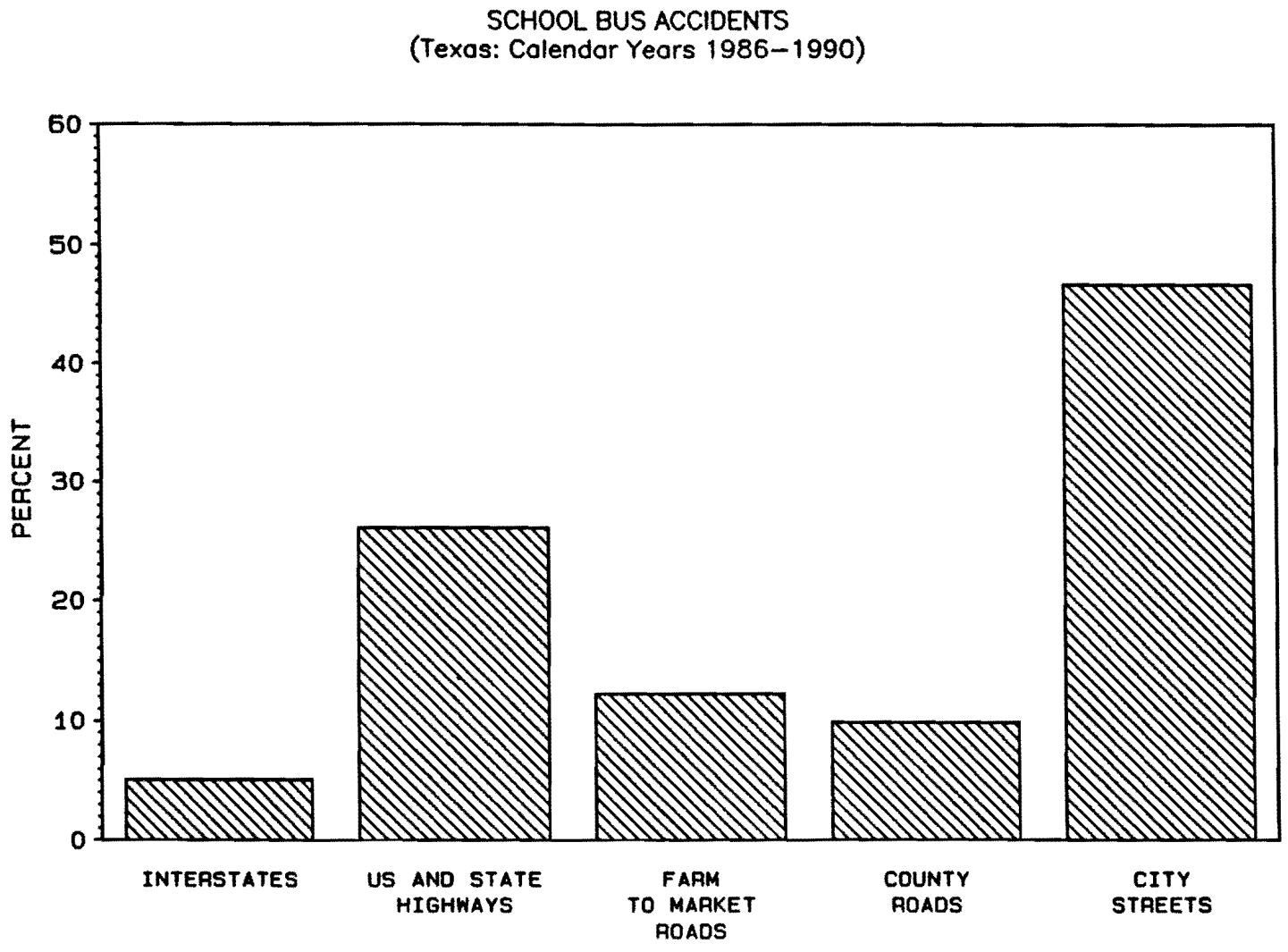

Figure 3: SCHOOL BUS ACCIDENTS (N=8,547) BY ROAD CLASS

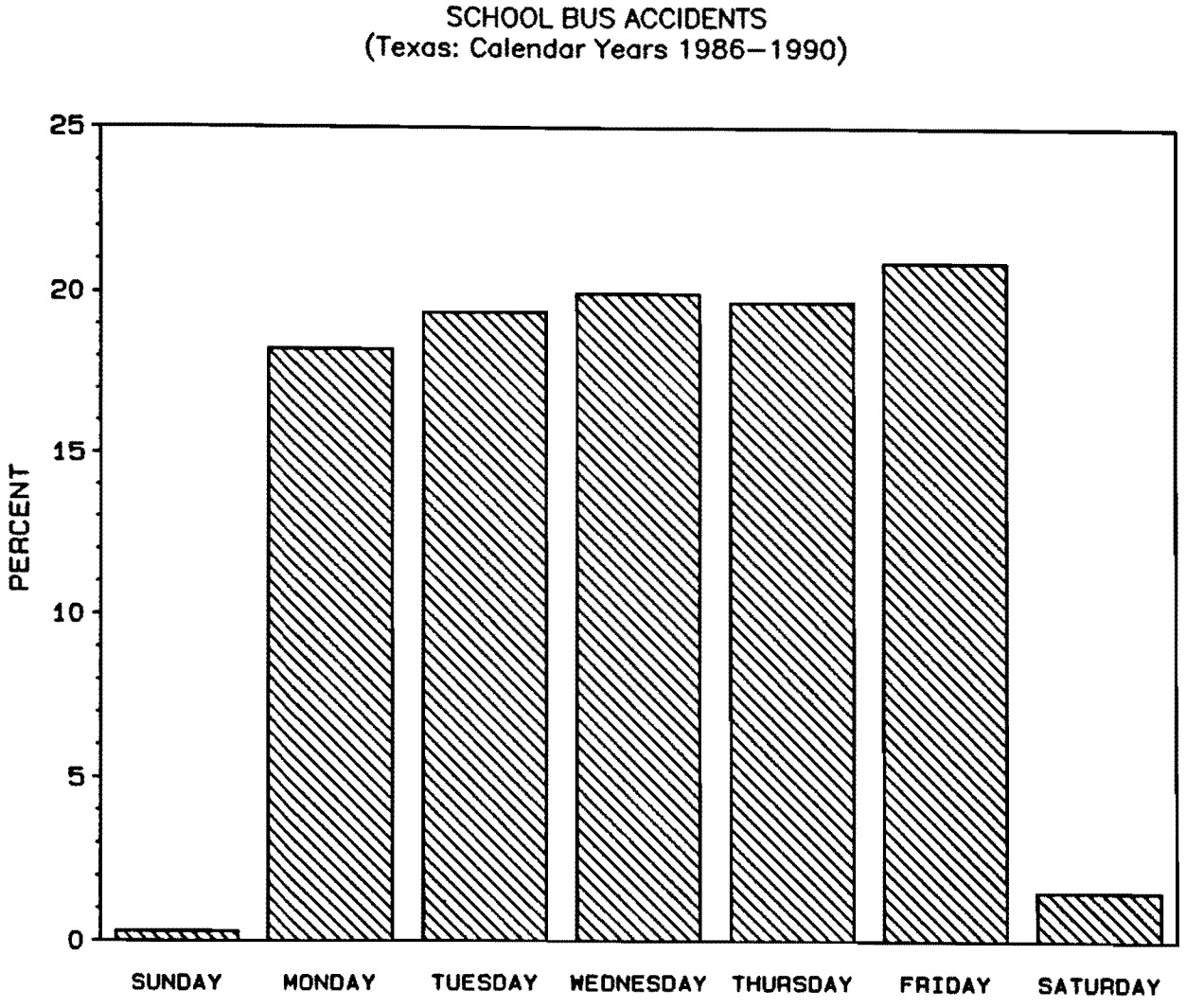

Figure 5: SCHOOL BUS ACCIDENTS (N=8,551) BY DAY OF WEEK

Why and How do School Bus Accidents Occur?

The responses to several questions on the Texas accident report form (e.g., first harmful event, traffic control device, driver contributing factors, driver defects, vehicle defects, etc.) provide some clues that help explain why and how school bus accidents occur. Unfortunately, most of these clues do not provide sufficient leverage for purposes of redressing the frequency or severity of school bus accidents. That is to say, school bus accidents do not appear to be highly correlated with any one causal factor – or any obvious combination of several causal factors.

The first harmful event in over eight out of ten school bus accidents is a collision with another motor vehicle in transit. The first harmful event in one out of 20 school bus accidents is a collision with a parked car. (Figure 7)

Some 18 percent of all school bus accidents occur at stop-sign controlled intersections. (Figure 8) Of all the accidents recorded in Texas in 1989 (390,249), 54,021 (14 percent) occurred at stop-sign controlled intersections.[6]

In the Texas accident data base, driver factors contributing to an accident are divided into two groups: contributing factor (1) and contributing factor (2). For contributing factor (1), the most often cited factor for school bus drivers was failure to yield the right of way (one in ten school bus drivers); for other vehicle drivers the most cited factor was driving at a speed that was unsafe for the prevailing conditions (one in four other drivers). (Figure 9)

For contributing factor (2), no factor stands out for school bus drivers or other drivers. It is worth noting, however, that driving under the influence of alcohol plays a relatively small role in school bus accidents – as explained, presumably, by the hours of the day and the days of the week that school buses are traditionally operated. (Figure 10)

Although driver defects and vehicle defects may serve to explain the occurrence of a particular accident, or the severity of that accident, such defects are not often observed or reported in school bus accidents. (Figures 11 and 12)

Who is Involved in School Bus Accidents?

The majority of accident-involved school bus drivers are women; the majority of accident-involved drivers of other vehicles are men. The accident involvement rates for men and women are, presumably, reflective of the driving exposure of men and women in school buses and other vehicles. (Figure 13)

Young drivers are well over represented in many types of traffic accidents. This statement is particularly true for the drivers of "other vehicles" involved in school bus accidents. Relative to older drivers, 17-, 18-, 19- and 20-year-old drivers are conspicuously over represented in school bus accidents. Part of this over representation results, presumably, from exposure, i.e., 17-, 18-, 19- and

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[6]"1989 Tabulations of Accidents in the State of Texas" (TARE 85). Accident Analysis Division, Texas Transportation Institute, Texas A&M University System, College Station, Texas, July 1990, p 40.

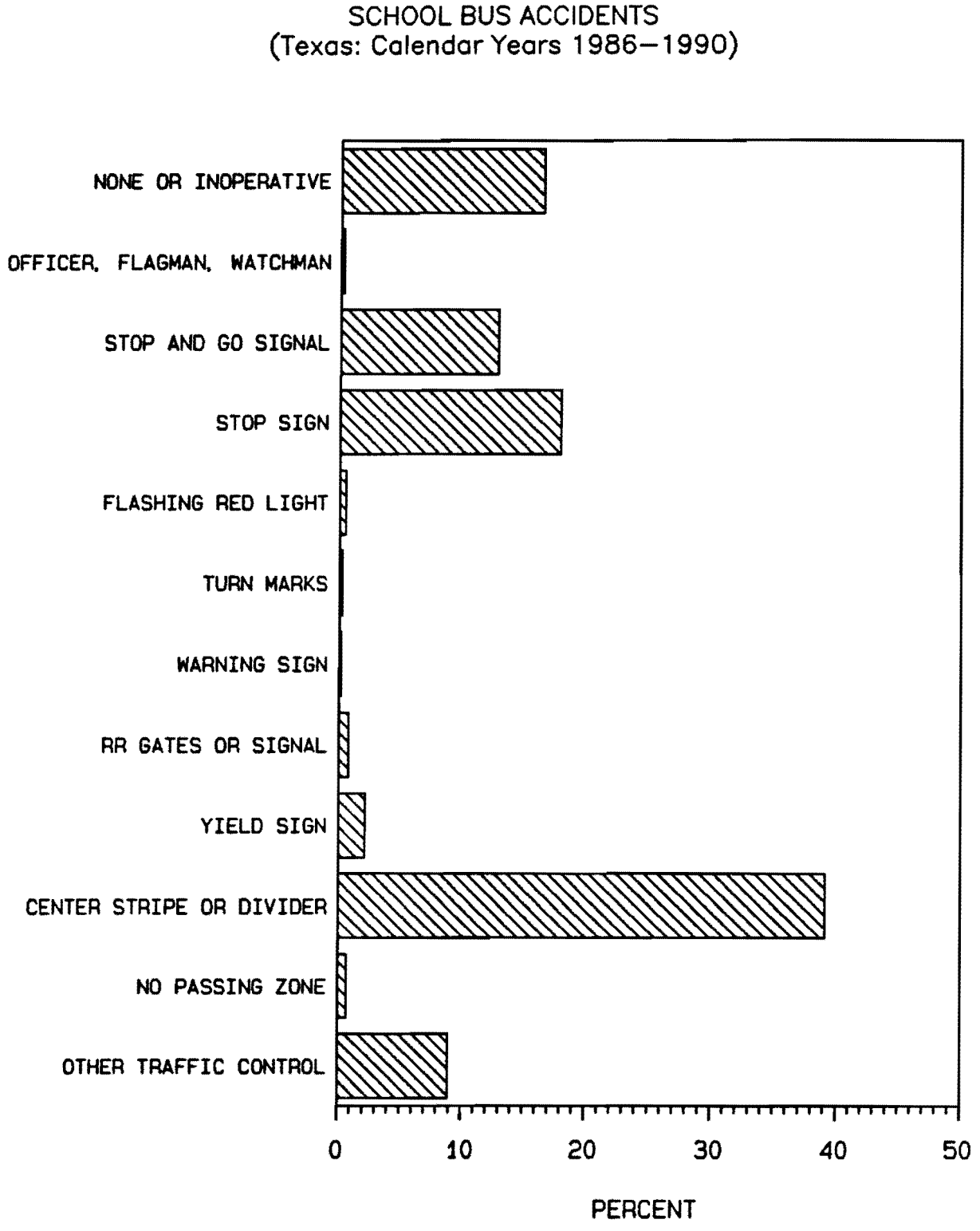

Figure 8: SCHOOL BUS ACCIDENTS (N=8,551) BY TRAFFIC CONTROL

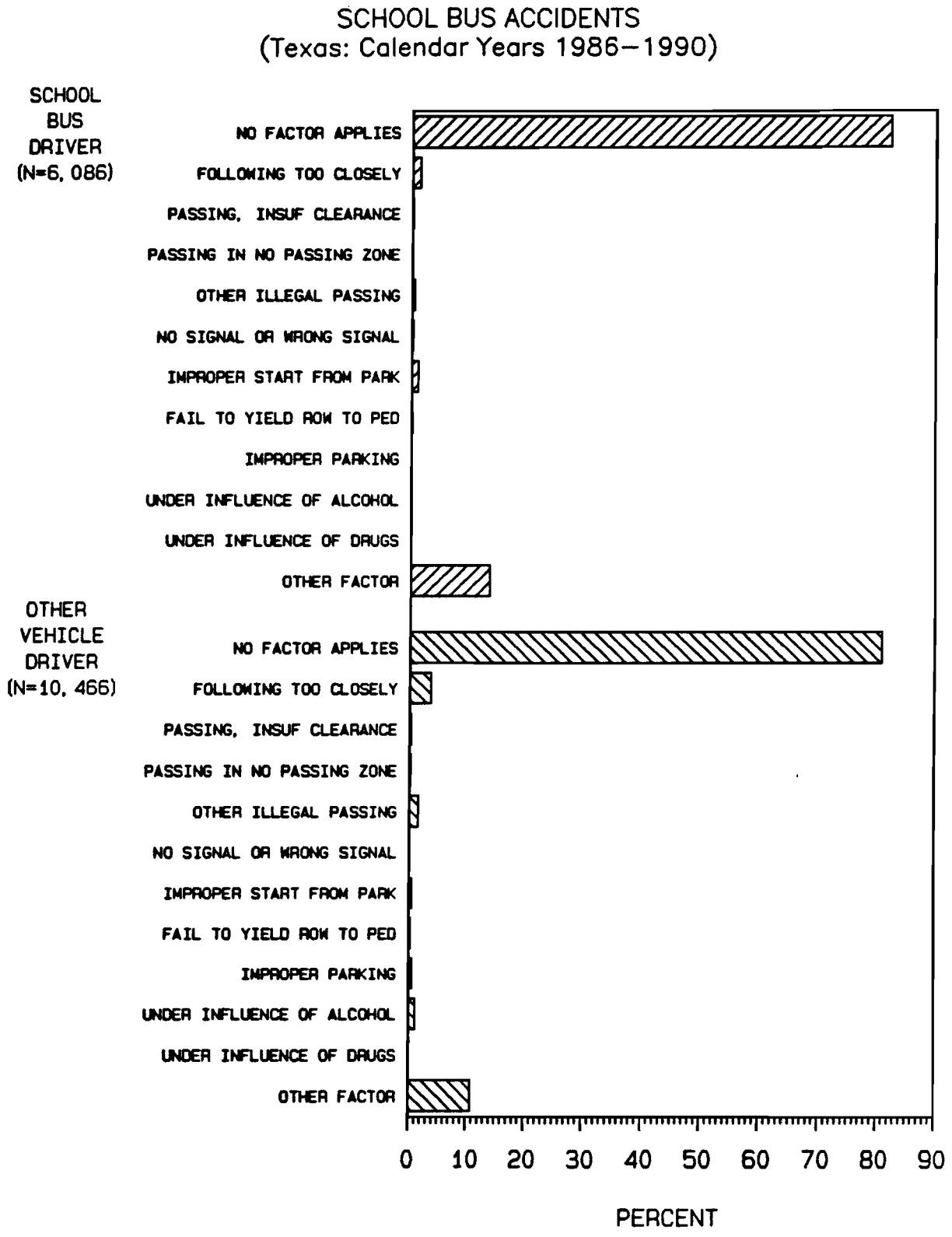

Figure 10: ACCIDENT–INVOLVED DRIVERS (N=16,552) BY CONTRIBUTING FACTOR (2)

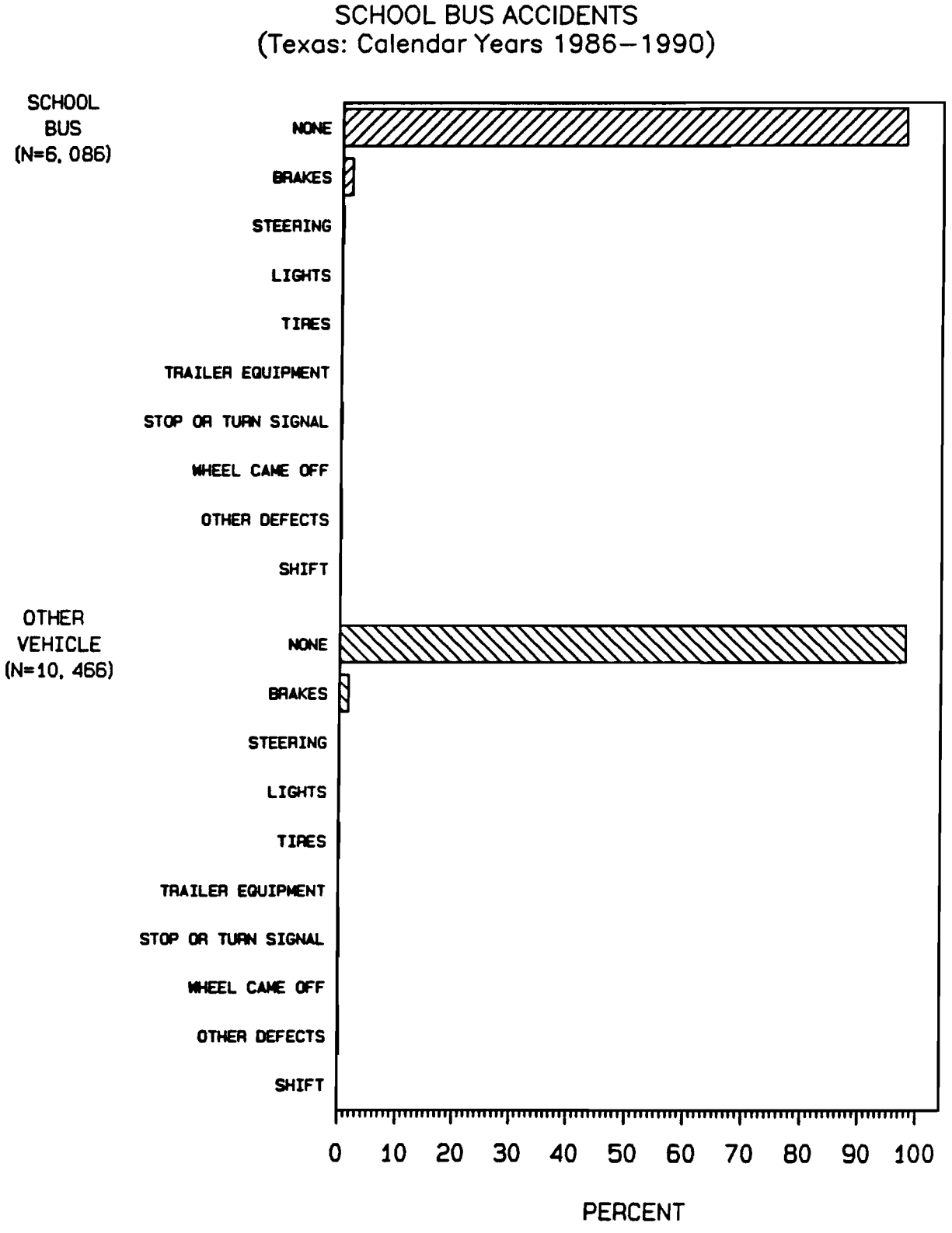

Figure 12: ACCIDENT–INVOLVED VEHICLES (N=16,552) BY VEHICLE DEFECT

20-year-old drivers are often drive in the vicinity of schools when school buses are in operation. Nevertheless, safety countermeasures aimed at young drivers should be considered in future efforts to reduce school bus accidents. (Figure 14)

Definitions of "School Bus" and "School Bus Accident"

If the Texas school bus accident data base is to comply with the proposed national data base, it is essential that the definitions of "school bus" and "school bus accident" as used in the Texas data base and the national data base be comparable. The National Standard for School Transportation Uniform Accident Reporting defines "school bus" as follows:[7]

> **School Bus** - A motor vehicle used, or maintained, for the transportation of any school pupil at or below the 12th grade level to or from a public or private school or to or from a public or private school related activity. Vehicle that fit this definition are externally identifiable as school buses, by color (national school bus yellow), the wording school bus and flashing red and (amber lights, if applicable) located on the front and rear of the vehicle and lettering on the side of the vehicle that identifies the school district or company served by the bus. Vehicles that are structurally recognizable as school buses, and other vehicles, such as vans and station wagons that are distinguished by school bus colors, lights and markings are also classified as school buses. Vehicles that are designed and built as school buses, but are not distinguished by school bus colors, lights, and markings, that are operated by the military or other federal, state, or local governmental agencies, churches, schools, colleges or universities are not classified as school buses.

In its instructions to police officers, the DPS defines a school bus as:[8]

> A motor vehicle used for the transportation of any school pupil at or below the 12th grade level to or from a public or private school or school related activity. To be considered a school bus, the bus must be national school bus yellow, have the wording school bus and flashing red and amber lights at the front and rear of the bus, and

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[7]The Proceedings of the Eleventh National Standards Conference on School Transportation - including the National Standard for School Transportation Uniform Accident Reporting - are being published by the National Safety Council, Chicago, Illinois. The quoted definitions of school bus and school bus accident were taken from the enclosure to a letter dated December 6, 1990 to the Honorable Jerry R. Curry, Administrator of the National Highway Traffic Safety Administration from Ron Kinney, Chairman of the Uniform School Bus Accident Reporting Committee and Supervisor of School Transportation for the State of California.

[8]"State of Texas Instructions (to Police) for Reporting Accidents on Texas Peace Officer's Accident Report Form and Texas Peace Officer's Accident Casualty Supplement Form (1991 Edition)," Statistical Services Bureau, Texas Department of Public Safety, Austin, Texas, p 43.

the identification of the school district or company operating the bus. Any other bus transporting school pupils which is not marked in that manner is not considered a school bus.

This DPS definition of a school bus is clearly, very similar to the definition adopted by the National Standards Conference. How reliably individual investigating officers actually apply this definition, however, is unknown.

The National Standard for School Transportation Uniform Accident Reporting defines "school bus accident" as follows:[9]

> **School Bus Accident** – A motor vehicle accident resulting in property damage of $500.00 or more in which a school bus (as previously defined) with or without a pupil on board is involved either directly or indirectly; a collision involving a vehicle or any pupil while the pupil is crossing the street under the protection of the school bus flashing red light and (stop arm(s), if applicable) system. If, for example, a school bus and passenger vehicle collide, the collision is a school bus accident. The school bus is directly involved. If a pupil is crossing the street under the protection of the school bus flashing red light (stop arm(s), if applicable) system and is struck by a motor vehicle, this is also a school bus accident, even though the school bus sustained no physical damage. The school bus was indirectly involved.

DPS does not define "school bus accidents," but "school bus related accidents" in its accident coding manual:[10,11]

> A school bus related accident occurs when " ... a school bus is involved in the accident, either as a participant or non-contact vehicle. Also includes accidents involving pedestrians struck while alighting, boarding or crossing to/from school bus or accidents between other vehicles related to the presence of a school bus."

There is no question on the Texas Peace Officer's Accident Report Form (ST-3) that specifically asks whether or not the accident being investigated is school bus related. Rather, this designation is made in Austin based upon several pieces of information submitted by the officer (e.g., the narrative and diagrammatic depiction of the accident, statements by witnesses, etc.). When a coder reviews a completed ST-3, a decision is made with regard to the accident's etiology, i.e., with regard to the presence of some "other factor" that was instrumental in precipitating the accident. Other factors that might be checked by the coder as having precipitated the accident include: passenger interfered

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[9]See footnote 7.

[10]"Motor Vehicle Traffic Accident Coding Instructions, January 1, 1990," Texas Department of Public Safety, State Department of Highways & Public Transportation, Austin, Texas, p 13.

[11]"Beginning January 1, 1990 the property damage limits for reportable traffic accidents was increased from $250 to $500...." Texas Department of Public Safety Statewide School Bus Accidents: Calendar Year – 1990.

damage to a school bus nor a collision with a pedestrian were eliminated from the data set. Table 4 is a re-tabulation of Table 3 after all accidents not meeting this new definition were eliminated. There were 8,551 accidents depicted in Table 3, and only 6,182 accidents depicted in Table 4. Or, if we accept the more conservative definition of school bus accidents offered here, we would conclude that reported Texas school bus accidents are 38 percent too high.

Table 4: School Bus Accidents (Under a More Conservative Definition) by Physical Damage to the School Bus and First Harmful Event[12]

	SCHOOL BUS ACCIDENTS			
	SCHOOL BUS NOT PHYSICALLY INVOLVED		SCHOOL BUS PHYSICALLY INVOLVED	
FIRST HARMFUL EVENT	FREQ	PERCENT	FREQ	PERCENT
OTHER NON-COLLISION	1	0.56	26	0.43
OVERTURNED	1	0.56	20	0.33
PEDESTRIAN	170	96.05	55	0.92
ANOTHER MV IN TRANSPORT	5	2.83	5404	89.98
RR TRAIN	0	0	2	0.03
PARKED CAR	0	0	278	4.63
PEDALCYCLIST	0	0	34	0.57
ANIMAL	0	0	22	0.37
FIXED OBJECT	0	0	149	2.48
OTHER OBJECT	0	0	15	0.25
TOTAL	177	100.00	6005	100.00

It should be noted that some of the 177 pedestrian accidents in Table 4 (in which no school bus was physically involved) still might not be acceptable under the proposed national standard. If the only pedestrian(s) struck in what otherwise might appear to be a school bus accidents are non-pupils, the accident should not be reported as a school bus accident. As a practical matter, nearly all of the 188 pedestrians involved in the 177 accidents under consideration were no doubt pupils. Therefore, any over reporting of school bus accidents due to this anomaly would be small.

Since pedestrians are not categorized into pupil/non-pupil categories in the Texas traffic accident data base, it is not possible to further eliminate

[12]In the 177 school bus accidents in which no school bus was physically involved, 188 pedestrians were struck. In one of these accidents four pedestrians were struck. In seven accidents, two pedestrians were struck.

Information Requested	Potential Source of Information
1. Carrier's Name	ST-3 (not automated)
2. School District	Supplemental Data Collection
3. School Bus Contractor	Not Applicable in Texas
4. Driver's Name	ST-3 (not automated)
5. Driver's License Number	ST-3 (not automated)
6. Birth Date	Automated File
7. Sex	Automated File
8. Driving Record	Supplemental Data Collection (merging of school bus driver license numbers with driver record file)
9. Vehicle Make	Supplemental Data Collection
10. Body Make	Supplemental Data Collection
11. Chassis Make	Supplemental Data Collection[15]
12. Model Year	Automated File
13. Vehicle Identification Number	ST-3 (not automated)
14. Engine Location (forward, beneath or behind windshield)	Supplemental Data Collection
15. Gross Vehicle Weight Rating	Automated File (ST-3C info)
16. Rated Seating Capacity	Automated File (ST-3C info)
17. Wheelchair Equipped (mark W)	Supplemental Data Collection
18. Number of Passengers on Bus, Excluding Driver	Automated File
19. Date of Accident	Automated File
20. Time of Accident	Automated File
21. Location Accident	Automated File
22. Police Report Number	Automated File
23. Citation Issued (yes or no)	ST-3 (not automated)

(2) School Bus Physically Involved

Fifteen (15) questions contained in the proposed national school bus accident reporting standard pertain to school bus accidents in which the school bus was physically involved. Most of these questions can be answered directly or indirectly from existing automated files, as will now be demonstrated using Texas school bus accident data collected between 1986 and 1990.

Question 1: Type of Accident?

Responses: Between Motor Vehicles, Fixed Object, Non-Collision, Pedalcycle, Pedestrian, Other Collision, Railroad Train

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[15]The three types or makes of school bus recognized in the proposed national standards (i.e., vehicle make, body make and chassis make) require clarification. If a school bus manufacturer (e.g., Thomas or Blue Bird) attaches one of its school bus bodies to a truck manufacturer's chassis (e.g., a truck chassis manufactured by Ford or GMC), the body make and the chassis make of the resulting vehicle are clear. But, the vehicle make for the resulting school bus is not clear.

Table 6: School Bus Accidents in Which the School Bus Was Physically Involved by Object Struck

OBJECT STRUCK	SCHOOL BUS PHYSICALLY INVOLVED	
	FREQ	PERCENT
NO CODE APPLICABLE	5715	95.17
VEHICLE OVERTURNED	4	0.07
JACK-KNIFED	1	0.02
PERSON EJECTED	6	0.10
TRAIN MOVING FORWARDS	2	0.03
HIGHWAY SIGN	32	0.53
CURB	10	0.17
CULVERT, HEADWALL	6	0.10
POST, CULVERT, HEADWALL	2	0.03
GUARD RAIL	13	0.22
POST OR GUARD RAIL	4	0.07
RAILROAD CROSSING GATES	1	0.02
TRAFFIC SIGNAL POLE	6	0.10
SIGN, SIGNAL LIGHT, WIRES	1	0.02
LUMINAIRE POLE	10	0.17
UTILITY POLE	23	0.38
MAILBOX	6	0.10
TREE OR SHRUB	29	0.48

OBJECT STRUCK	SCHOOL BUS PHYSICALLY INVOLVED	
	FREQ	PERCENT
FENCE	45	0.75
HOUSE OR BUILDING	11	0.18
COMMERCIAL SIGN	2	0.03
OTHER FIXED OBJECT	43	0.72
MAINTENANCE/CONSTRUCT BARRIER	1	0.02
MAINT/CONSTRUCT MACHINERY	1	0.02
MEDIAN BARRIER	3	0.05
END OF BRIDGE	1	0.02
SIDE OF BRIDGE	6	0.10
SIGN, UNDERPASS PIER	1	0.02
PREVIOUS WRECKED VEHICLE	3	0.05
OTHER MACHINERY	4	0.07
OTHER OBJECT	10	0.17
CONCRETE TRAFFIC BARRIER	1	0.02
DELINEATOR OR MARKER POST	2	0.03
TOTAL	6005	100.00

Question 3: Did Accident Result in?

Responses: Fatality, Incapacitating (serious) Injury, Non-Incapacitating (moderate) Injury, Possible (minor) Injury, Property Damage Only

Table 7 is directly responsive to this question. Between 1986 and 1990 there were 32 fatal school bus accidents in which a school bus sustained physical damage. In another 203, the most severe injury sustained was an incapacitating (A-Level or serious) injury.

Question 5: Bus Direction Analysis

Collision with Pedestrian

Intersection	Non-Intersection
Bus Going Straight	Bus Going Straight
Bus Turning Right	Bus Turning Right
Bus Turning Left	Bus Turning Left
Bus Backing	Bus Backing
Other Action	Other Action

Collision with Other Vehicle

Intersection	Non-Intersection
Entering at Angle, Both Moving	Same Direction, Both Moving
Entering Same Direction, Both Moving	Opposite Direction, Both Moving
Entering Opp Direction, Both Moving	One Vehicle Stopped

All Other Collisions

Intersection	Non-Intersection
Fixed Object	Fixed Object
Other Rd Vehicle, Train, Pedalcycle	Other Rd Vehicle, Train, Pedalcycle
Other Object, Animal	Other Object, Animal

Non-Collision

Intersection	Non-Intersection
Overturn	Overturn
Other Non-Collision	Other Non-Collision

Question 5 is certainly ambitious. In fact, there are several questions embedded within this question:

- Did the accident occur at an intersection or non-intersection?
- What was the first harmful event?
- What was the manner of collision?

Table 9 answers Question 5 in much more detail than requested. Again, many of the cells in Table 9 could be collapsed to provide the specific information requested in the national proposal.

Question 6: Point of Impact? (Diagram on state collision report)

Many states use vehicular diagrams on their accident report forms to allow investigating officers to indicate where an accident involved vehicle sustained its initial damage. Texas does not make use of such a vehicular diagram.

The Traffic Accident Data (TAD) scale which is used by investigating officers in Texas provides somewhat similar information to point of impact, but it is not directly comparable. Answers to this Question 6 would have to be obtained through supplemental coding.

		SCHOOL BUS PHYSICALLY INVOLVED			
		INTERSECTION		NON-INTERSECTION	
FIRST HARMFUL EVENT	MANNER OF COLLISION	FREQ	PERCENT	FREQ	PERCENT
COLLISION WITH OTHER VEHICLE (continued)	ANGLE COLL, 1 R-TURN, 2 L-TURN	21	1.19	16	0.44
	ANGLE COLL, 1 R-TURN, 2 STOP	4	0.23	54	1.48
	ANGLE COLL, BOTH L-TURN	9	0.51	2	0.05
	ANGLE COLL, 1 L-TURN, 2 STOP	23	1.30	101	2.78
	SAME DIR, STRAIGHT REAREND	24	1.36	373	10.25
	SAME DIR, STRAIGHT SIDESWIPE	41	2.32	335	9.21
	SAME DIR, 1 STRAIGHT, 2 STOP	62	3.51	1403	38.55
	SAME DIR, 1 STRAIGHT, 2 R-TURN	73	4.14	103	2.83
	SAME DIR, 1 STRAIGHT, 2 L-TURN	123	6.97	72	1.98
	SAME DIR, BOTH R-TURN	20	1.13	17	0.47
	SAME DIR, 1 R-TURN, 2 L-TURN	1	0.06	2	0.05
	SAME DIR, 1 R-TURN, 2 STOP	10	0.57	52	1.43
	SAME DIR, BOTH L-TURN	37	2.10	11	0.30
	SAME DIR, 1 L-TURN, 2 STOP	2	0.11	13	0.36
	OPP DIR, STRAIGHT	16	0.91	301	8.27
	OPP DIR, 1 STRAIGHT, 2 BACK	9	0.51	78	2.14
	OPP DIR, 1 STRAIGHT, 2 STOP	0	0	31	0.85
	OPP DIR, 1 STRAIGHT, 2 R-TURN	1	0.06	1	0.03
	OPP DIR, 1 STRAIGHT, 2 L-TURN	165	9.35	32	0.88
	OPP DIR, 1 BACK, 2 STOP	7	0.40	130	3.57
	OPP DIR, 1 R-TURN, 2 L-TURN	7	0.40	4	0.11

Question 7 is another ambitious question. And, again it contains questions embedded within questions. For example, speeding and failing to yield the right of way are responses to a driver-oriented question. Tires and brakes are responses to a vehicle-oriented question. Defective surface and slippery are responses to an accident-oriented question.

Example: An intoxicated school bus driver operating on a slippery surface strikes a speeding driver operating a vehicle with defective brakes. How would we answer this question?

Tables 10a through 10c provide partial answers to Question 7. The roadway information requested in Question 7 is provided in response to Question 13.

Table 10a: School Bus Accidents in Which the School Bus Was Physically Involved by Contributing Factor (1) and Driver

	SCHOOL BUS PHYSICALLY INVOLVED			
	OTHER DRIVER		SCHOOL BUS DRIVER	
CONTRIBUTING FACTOR (1)	FREQ	PERCENT	FREQ	PERCENT
NONE APPLIES	6259	59.80	4565	75.01
SPEEDING, LIMIT	136	1.30	13	0.21
SPEEDING, UNSAFE	2588	24.73	470	7.72
FAIL YIELD RIGHT OF WAY	981	9.37	628	10.32
DISREGARD STOP SIGN	88	0.84	23	0.38
DISREGARD STOP & GO	187	1.79	46	0.76
TURN, WIDE RIGHT	41	0.39	96	1.58
TURN, CUT LEFT CORNER	16	0.15	141	2.32
TURN, WRONG LANE	65	0.62	44	0.72
WRONG SIDE	101	0.97	59	0.97
WRONG WAY ON A 1-WAY	4	0.04	1	0.02
TOTAL	10466	100.00	6086	100.00

Table 10c: School Bus Accidents in Which the School Bus Was Physically Involved by Vehicle Defect and Vehicle

	SCHOOL BUS PHYSICALLY INVOLVED			
	OTHER VEHICLE		SCHOOL BUS	
VEHICLE DEFECT	FREQ	PERCENT	FREQ	PERCENT
NO DEFECTS	10257	98.00	5956	97.86
BRAKES	158	1.51	104	1.71
STEERING	3	0.03	7	0.12
LIGHTS	5	0.05	1	0.02
TIRES	12	0.11	3	0.05
TRAILER EQUIPMENT	5	0.05	0	0
STOP OR TURN SIGNAL	12	0.11	7	0.12
WHEEL CAME OFF VEHICLE	4	0.04	0	0
OTHER DEFECTS	10	0.10	7	0.12
SHIFT	0	0	1	0.02
TOTAL	10466	100.00	6086	100.00

Question 8: Total Number of Lanes on Roadway?

For accidents that occur on the state-maintained highway system, the number of lanes present at the accident site can be determined by merging the accident data file with the road inventory file (Table 11). For accidents on county roads or city streets such information is not available. Therefore, this information would have to be collected on a supplemental basis.

Question 9: Posted Speed Limit?

Posted speed limit can be determined for accidents that occur on the state maintained highway system, but not for accidents on county roads or city streets. Responses to this question should be obtained on a supplemental basis.

Question 10: Approximate Speed of the Bus?

The Texas accident report form does not ask the investigating officer to estimate the traveling speed of vehicles prior to impact, nor should this information be collected on a supplemental basis unless it is collected by the investigating officer.

Table 12: School Bus Accidents in Which the School Bus Was Physically Involved by Restraint Usage and Driver

	SCHOOL BUS PHYSICALLY INVOLVED			
	OTHER VEHICLE DRIVER		SCHOOL BUS DRIVER	
DRIVER RESTRAINT USAGE	FREQ	PERCENT	FREQ	PERCENT
NOT APPLICABLE	115	1.10	8	0.13
BELT AND STRAP	7494	71.60	1022	16.79
BELT ONLY	694	6.63	2958	48.60
AIR BAG DEPLOYED	3	0.03	1	0.02
OTHER RESTRAINT	1	0.01	2	0.03
NONE USED	1113	10.63	1226	20.14
UNKNOWN	1045	9.98	867	14.25
SHOULDER STRAP ONLY	1	0.01	2	0.03
TOTAL	10466	100.00	6086	100.00

Question 13: Condition of Road at Time of Accident?

Responses: Dry, Under Repair, Icy, Snow Packed, Holes or Ruts, Muddy, Wet, Other

This question, like several others, is really a question embedded within a question. How would this question be answered if the accident being investigated took place on an icy road that was under repair – or on a muddy road with holes or ruts?

In Tables 13a and 13b a partial response to Question 13 is provided.

Table 14: School Bus Accidents in Which the School Bus Was Physically Involved by Light Condition

LIGHT CONDITION	SCHOOL BUS PHYSICALLY INVOLVED	
	FREQ	PERCENT
DAYLIGHT	5643	93.97
DAWN	159	2.65
DARK NOT LIGHTED	83	1.38
DARK LIGHTED	94	1.57
DUSK	26	0.43
TOTAL	6005	100.00

Question 15: Weather Condition?

Responses: Clear, Raining, Snowing, Dust, Sleeting, Fog, Smog/Smoke, Other

As Table 15 shows, this question can be answered from the Texas traffic accident data base.

Table 15: School Bus Accidents in Which the School Bus Was Physically Involved by Weather Condition

WEATHER	SCHOOL BUS PHYSICALLY INVOLVED	
	FREQ	PERCENT
CLEAR (CLOUDY)	5113	85.15
RAINING	734	12.22
SNOWING	20	0.33
FOG	118	1.97
BLOWING DUST	2	0.03
OTHER	1	0.02
SLEETING	17	0.28
TOTAL	6005	100.00

Table 16: Pedestrians Involved in School Bus Accidents by Age and Injury Severity

PEDESTRIAN AGE	INJURY SEVERITY			
	POSSIBLE INJURY	NON-INCAPACITATING INJURY	INCAPACITATING INJURY	FATAL INJURY
0	0	1	0	0
2	0	1	0	0
3	0	1	2	1
4	0	4	0	1
5	1	5	5	3
6	3	13	9	3
7	6	13	5	0
8	5	13	4	0
9	4	8	3	2
10	4	9	3	2
11	4	9	1	0
12	2	9	2	0
13	3	8	2	0
14	2	11	7	0
15	2	2	2	0
16	1	9	1	0
17	4	0	1	0
18	3	0	1	0
19	1	0	0	0
21	0	1	0	0
22	0	1	0	0
23	1	0	0	1
25	0	0	1	0
26	1	1	0	0
31	0	1	0	0
32	0	1	0	0
35	1	0	0	0
38	1	0	0	0

Table 17: Pedestrians Involved in School Bus Accidents by Pedestrian Action and Injury Severity

PEDESTRIAN ACTION	SCHOOL BUS ACCIDENTS			
	POSSIBLE INJURY	NON-INCAPACITATING INJURY	INCAPACITATING INJURY	FATAL INJURY
OTHER IN ROADWAY	1	6	4	3
CROSSING AT INTERSECTION	14	22	8	0
CROSSING NOT AT INTERSECTION	12	62	27	8
GETTING ON/OFF VEHICLE	12	31	10	1
WALKING WITH TRAFFIC	0	1	0	0
WALKING AGAINST TRAFFIC	0	1	0	0
STANDING IN ROAD	3	0	1	1
PUSHING/WORKING ON VEHICLE	2	0	0	0
PLAYING IN ROAD	1	0	1	0
NOT IN ROAD	2	5	2	2
UNKNOWN	3	0	1	0
TOTAL	50	128	54	15

(4) Injury Tally Sheet

There are two questions in this section:

Question 1: Ages and Injury Severities for all Persons on Bus?

The data to respond to the first question are currently available in Texas. The ages and injury severities for all school bus passengers involved in school bus accidents are produced in Table 18.

Question 2: Ages and Injury Severities for Persons Off Bus, in Loading/Unloading Zones?

Table 16 seems the appropriate response to the Question 2 with the proviso that the pedestrians shown in the table were not necessarily in loading/unloading zones. The loading/unloading zone status of pedestrians will have to be determined on a supplemental basis.

SCHOOL BUS PASSENGER AGE	INJURY SEVERITY				
	NON-INJURY	POSSIBLE INJURY	NON-INCAPACITATING INJURY	INCAPACITATING INJURY	FATAL INJURY
28	16	3	1	0	0
29	12	3	0	0	0
30	10	2	0	0	0
31	8	1	0	0	0
32	18	2	1	0	0
33	8	2	1	0	0
34	7	1	2	0	0
35	12	2	0	0	0
36	10	2	0	0	0
37	10	4	0	0	0
38	11	2	1	0	0
39	13	2	0	0	0
40	10	2	1	0	0
41	9	1	0	0	0
42	6	2	0	0	0
43	11	0	1	0	0
44	5	0	2	0	0
45	9	2	0	0	0
46	11	0	0	0	0
47	7	1	0	0	0
48	6	0	0	1	0
49	5	1	0	0	0
50	6	0	0	0	0
51	4	2	0	0	0
52	10	0	1	0	0
53	7	0	0	0	0
54	3	2	1	0	0
55	6	1	0	0	0
56	3	2	1	1	0
57	5	1	1	0	0

Question 2: Type of Buses[16]

Type A
Type B
Type C
Type D

Question 3: Seat Back Height

COMMENTS AND RECOMMENDATIONS

Many of the items proposed in the national standard for school bus accident reporting can already be addressed with existing accident data collected by city police, sheriffs deputies and Department of Public Safety officers. Other items will have to be collected on a supplemental basis and merged into the existing data base to provide all of the information that is being requested.

Some might argue that rather than collecting supplemental school bus accident data, the existing accident report form (ST-3) should be modified to collect the added information being requested. And, no doubt, there are some questions on the ST-3 that might be modified to better accommodate the requests of the National Minimum Standards Conference. But, before any notion of changing the ST-3 to better report school bus accidents is even entertained, it should be realized that school bus accidents constitute only a small fraction of one percent of all reported traffic accidents in Texas. To expect that the generic accident reporting form for the state should be altered in any significant way to accommodate the proposed school bus standard is unrealistic, if not presumptuous.

With the cooperation of the Texas Department of Public Safety (DPS) and the Texas Education Agency (TEA), a supplemental school bus accident data collection form should be devised. This form would serve as the vehicle for collecting those pieces of accident information that are not now available through existing accident data reports, either in automated files or as hard copy reports.

The envisioned supplemental data collection form should not duplicate the information that is already being collected through the ST-3 or the ST-3C, but must contain sufficient information to allow the data elements collected through the supplemental data form to be merged into the Texas traffic accident data base.

The collectors of the supplemental school bus accident data should be drawn from personnel within the independent school districts throughout the state.

Once a supplemental data collection form has been constructed and agreed

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[16]School Bus Type (A, B, C and D) is defined in "School Bus Design Objectives," School Bus Manufacturers Institute, Bethesda, Maryland, January 1985.

APPENDIX

Table A1: School Bus Accidents in Texas Counties (1986-1990)

COUNTY	YEAR				
	1986	1987	1988	1989	1990
ANDERSON	6	7	8	7	10
ANDREWS	1	0	0	0	1
ANGELINA	6	16	10	9	15
ARANSAS	1	2	1	1	2
ARCHER	2	0	2	0	0
ATASCOSA	4	0	2	0	1
AUSTIN	0	2	1	1	2
BAILEY	0	0	1	0	0
BANDERA	1	0	2	0	0
BASTROP	7	6	4	5	10
BAYLOR	0	0	1	0	0
BEE	2	0	0	0	2
BELL	30	16	19	21	18
BEXAR	109	108	92	114	107
BLANCO	0	0	0	2	0
BOSQUE	0	3	2	2	0
BOWIE	4	8	9	9	5
BRAZORIA	32	20	22	38	36
BRAZOS	12	24	14	15	6
BROOKS	0	3	1	0	0
BROWN	3	2	2	1	0
BURLESON	3	2	1	4	3
BURNET	5	2	2	7	2
CALDWELL	3	1	3	4	3
CALHOUN	0	5	0	2	5
CALLAHAN	1	1	0	0	0
CAMERON	20	40	38	34	30
CAMP	0	2	1	1	4
CARSON	1	0	1	0	0

COUNTY	YEAR				
	1986	1987	1988	1989	1990
EL PASO	53	49	39	56	48
ERATH	8	2	4	9	6
FALLS	1	0	0	5	1
FANNIN	3	3	2	2	0
FAYETTE	2	2	7	1	1
FISHER	0	0	1	0	0
FLOYD	1	1	1	0	0
FORT BEND	15	27	21	36	25
FRANKLIN	0	1	0	2	2
FREESTONE	1	0	2	0	3
FRIO	0	0	0	1	1
GAINES	0	1	1	0	0
GALVESTON	14	25	23	25	28
GARZA	0	1	0	0	0
GILLESPIE	3	0	4	0	1
GOLIAD	0	0	0	0	2
GONZALES	0	1	2	1	1
GRAY	0	2	2	0	1
GRAYSON	9	12	16	9	7
GREGG	23	21	19	28	26
GRIMES	2	4	5	2	1
GUADALUPE	4	10	5	9	6
HALE	3	6	6	3	5
HAMILTON	2	1	1	0	1
HARDEMAN	0	0	0	1	1
HARDIN	8	3	8	4	5
HARRIS	304	254	290	291	322
HARRISON	11	11	15	8	10
HAYS	13	12	9	11	11
HEMPHILL	0	0	0	1	0
HENDERSON	10	6	7	7	9

COUNTY	YEAR				
	1986	1987	1988	1989	1990
LIBERTY	5	4	6	10	8
LIMESTONE	1	2	3	1	2
LIVE OAK	0	0	2	1	2
LLANO	1	1	1	0	1
LUBBOCK	25	21	26	22	39
LYNN	0	1	0	0	1
MCCULLOCH	0	0	1	1	1
MCLENNAN	22	42	24	19	13
MADISON	0	0	3	2	0
MARION	1	0	3	0	2
MARTIN	1	1	1	1	1
MASON	0	0	1	2	1
MATAGORDA	2	5	5	5	3
MAVERICK	0	1	1	2	1
MEDINA	1	1	1	1	0
MENARD	1	0	0	0	0
MIDLAND	14	12	14	23	11
MILAM	3	5	4	3	2
MILLS	0	1	0	0	0
MITCHELL	0	0	0	0	1
MONTAGUE	0	0	0	1	1
MONTGOMERY	28	22	29	26	18
MOORE	0	1	0	0	0
MORRIS	0	0	1	3	1
MOTLEY	0	1	0	0	0
NACOGDOCHES	8	13	7	11	12
NAVARRO	1	8	5	6	8
NEWTON	1	2	1	2	4
NOLAN	0	0	1	1	1
NUECES	26	28	23	15	22
OCHILTREE	0	1	2	1	0

COUNTY	YEAR				
	1986	1987	1988	1989	1990
SUTTON	0	0	0	2	1
SWISHER	1	0	0	0	1
TARRANT	115	123	118	136	127
TAYLOR	8	6	11	10	11
TERRY	0	0	2	3	2
THROCKMORTON	0	0	1	0	0
TITUS	2	4	5	3	7
TOM GREEN	8	11	7	6	5
TRAVIS	115	67	65	70	68
TRINITY	1	0	5	2	0
TYLER	5	3	6	1	4
UPSHUR	4	4	2	3	5
UVALDE	0	2	3	3	2
VAL VERDE	5	3	3	9	1
VAN ZANDT	4	5	4	1	3
VICTORIA	8	8	4	4	9
WALKER	7	4	6	7	7
WALLER	3	4	0	1	2
WARD	2	1	0	0	1
WASHINGTON	2	4	2	0	7
WEBB	9	10	11	10	15
WHARTON	3	4	4	4	5
WHEELER	1	0	1	0	1
WICHITA	13	14	10	12	14
WILBARGER	2	1	2	3	1
WILLACY	1	1	0	0	0
WILLIAMSON	17	17	13	8	20
WILSON	2	3	0	3	2
WISE	4	3	2	7	3
WOOD	2	3	3	3	1
YOAKUM	1	2	0	0	1

Table A2: School Bus Accidents in Texas Cities (1986-1990)

CITY	YEAR				
	1986	1987	1988	1989	1990
PALESTINE	2	5	6	6	6
ANDREWS	0	0	0	0	1
DIBOLL	1	0	1	0	0
LUFKIN	3	10	7	4	9
ARANSAS PASS	0	0	1	0	0
ROCKPORT	1	1	0	0	0
PLEASANTON	0	0	1	0	1
JOURDANTON	0	0	1	0	0
BELLVILLE	0	0	0	0	1
SEALY	0	0	0	1	0
BASTROP	1	0	1	1	3
ELGIN	1	0	0	0	0
SMITHVILLE	1	2	0	0	0
SEYMOUR	0	0	1	0	0
BEEVILLE	2	0	0	0	1
BELTON	6	2	2	5	3
HARKER HEIGHTS	2	2	2	0	0
KILLEEN	12	8	9	9	6
TEMPLE	5	1	2	1	2
ALAMO HEIGHTS	0	1	0	0	0
BALCONES HEIGHTS	0	0	1	0	0
CASTLE HILLS	1	1	1	0	0
CONVERSE	5	3	3	3	1
LEON VALLEY	3	0	1	1	2
UNIVERSAL CITY	2	0	0	1	0
OWINDCREST	0	1	0	0	0
LIVE OAK	0	1	0	1	0
SAN ANTONIO	83	83	68	97	90
CLIFTON	0	0	1	1	0

CITY	YEAR				
	1986	1987	1988	1989	1990
COLEMAN	1	1	0	0	0
ALLEN	0	2	0	1	1
FRISCO	1	0	0	0	0
MC KINNEY	1	2	0	3	2
PLANO	15	9	19	20	24
WYLIE	0	1	0	0	1
PRINCETON	4	1	1	1	0
COLUMBUS	0	1	0	0	0
EAGLE LAKE	0	0	0	1	0
NEW BRAUNFELS	5	3	2	4	5
COMANCHE	2	0	1	0	0
GAINESVILLE	0	2	0	0	1
COPPERAS COVE	1	1	1	5	2
GATESVILLE	0	0	0	1	0
DALHART	0	1	0	0	1
ADDISON	1	1	1	1	1
BALCH SPRINGS	0	1	1	1	0
CARROLLTON	10	3	5	6	7
COCKRELL HILL	0	0	1	0	0
COPPELL	1	0	1	1	0
DE SOTO	2	0	1	0	2
DUNCANVILLE	5	5	3	4	2
FARMERS BRANCH	1	2	3	2	2
GARLAND	9	9	16	20	28
GRAND PRAIRIE	5	3	7	4	10
HUTCHINS	0	0	0	0	1
IRVING	8	8	9	7	3
LANCASTER	1	1	2	1	2
MESQUITE	5	4	5	5	3
RICHARDSON	6	2	6	2	6
UNIVERSITY PARK	0	0	1	1	1

CITY	YEAR				
	1986	1987	1988	1989	1990
SUGAR LAND	0	0	1	1	2
FAIRFIELD	1	0	1	0	1
TEAGUE	0	0	0	0	1
PEARSALL	0	0	0	1	1
DICKINSON	1	2	3	2	7
FRIENDSWOOD	2	2	3	3	1
GALVESTON	2	7	2	5	3
HITCHCOCK	1	3	1	2	2
LA MARQUE	1	0	3	2	0
LEAGUE CITY	1	4	7	4	4
TEXAS CITY	2	3	3	0	2
SANTA FE	0	2	1	2	4
FREDERICKSBURG	2	0	2	0	1
GONZALES	0	0	1	1	0
PAMPA	0	1	2	0	0
DENISON	2	1	4	3	1
SHERMAN	3	5	9	4	1
WHITESBORO	0	1	0	0	0
GLADEWATER	0	0	3	2	4
KILGORE	2	0	1	2	3
LONGVIEW	14	16	9	19	14
WHITE OAK	2	0	2	0	0
NAVASOTA	0	2	3	2	1
SCHERTZ	0	4	1	3	2
SEGUIN	3	2	1	1	2
PLAINVIEW	2	4	4	3	4
HAMILTON	2	1	0	0	0
QUANAH	0	0	0	1	1
KOUNTZE	0	1	0	0	1
SILSBEE	1	0	1	3	1
BAYTOWN	9	7	10	10	9

CITY	YEAR				
	1986	1987	1988	1989	1990
ALTON	0	1	0	1	0
LEVELLAND	0	7	3	3	3
GRANBURY	2	2	3	3	2
SULPHUR SPRINGS	1	1	1	1	0
CROCKETT	0	2	0	0	0
BIG SPRINGS	2	1	2	0	3
COMMERCE	0	1	0	1	3
GREENVILLE	5	2	2	6	2
BORGER	0	0	0	0	1
JACKSBORO	0	0	1	0	0
EDNA	1	0	0	0	0
JASPER	2	0	0	0	0
BEAUMONT	10	16	13	15	9
GROVES	1	0	2	0	1
NEDERLAND	2	1	1	1	0
PORT ARTHUR	4	10	9	11	9
PORT NECHES	1	0	0	1	3
ALICE	1	0	1	1	2
ALVARADO	0	2	1	1	3
BURLESON	4	2	2	2	1
CLEBURNE	3	2	4	4	3
KEENE	0	1	0	0	0
HAMLIN	0	1	0	0	0
STAMFORD	0	0	0	0	1
KAUFMAN	2	1	1	0	3
TERRELL	1	3	0	2	1
BOERNE	1	1	0	0	0
KERRVILLE	0	2	3	3	1
JUNCTION	0	0	0	1	0
KINGSVILLE	3	3	1	2	4
PARIS	4	4	6	1	5

CITY	YEAR				
	1986	1987	1988	1989	1990
DAINGERFIELD	0	0	1	1	0
NACOGDOCHES	7	5	4	4	5
CORSICANA	1	6	4	6	7
SWEETWATER	0	0	1	1	0
CORPUS CHRISTI	24	25	19	14	20
PERRYTON	0	1	2	1	0
BRIDGE CITY	4	0	2	1	0
ORANGE	4	3	9	9	6
PINEHURST	0	1	0	0	1
VIDOR	3	3	3	4	8
WEST ORANGE	1	4	1	0	3
MINERAL WELLS	4	1	5	1	1
CARTHAGE	1	1	0	1	2
WEATHERFORD	2	4	1	3	3
FORT STOCKTON	1	1	0	1	2
LIVINGSTON	0	0	2	1	5
AMARILLO	6	6	4	4	4
CANYON	1	0	3	1	2
BIG LAKE	0	0	0	1	0
CLARKSVILLE	2	0	0	0	0
PECOS	0	0	1	1	0
HEARNE	1	1	0	0	0
ROCKWALL	1	1	2	2	2
BALLINGER	0	2	0	1	0
HENDERSON	0	3	0	2	4
SAN AUGUSTINE	0	0	0	0	1
INGLESIDE	1	0	0	0	0
SINTON	0	1	1	2	0
TAFT	0	0	0	1	0
SNYDER	2	0	0	1	1
CENTER	2	0	0	2	1

CITY	YEAR				
	1986	1987	1988	1989	1990
BROWNFIELD	0	0	1	3	2
MOUNT PLEASANT	2	2	4	2	6
SAN ANGELO	8	11	6	6	4
AUSTIN	102	54	52	55	53
WOODVILLE	2	0	1	0	0
GILMER	2	0	0	0	0
UVALDE	0	2	3	2	2
DEL RIO	5	3	3	8	0
CANTON	0	0	0	0	1
GRAND SALINE	1	1	0	0	1
WILLS POINT	0	1	1	0	0
VICTORIA	4	5	2	2	4
HUNTSVILLE	5	2	5	5	4
PRAIRIE VIEW	0	1	0	1	0
MONAHANS	1	1	0	0	1
BRENHAM	2	2	2	0	3
LAREDO	8	9	11	9	14
EL CAMPO	1	1	1	2	1
WHARTON	0	1	0	0	2
SHAMROCK	1	0	1	0	1
BURKBURNETT	2	1	0	0	0
ELECTRA	0	1	0	0	0
IOWA PARK	2	0	1	0	0
WICHITA FALLS	9	10	8	12	13
VERNON	1	0	2	3	1
RAYMONDVILLE	1	1	0	0	0
GEORGETOWN	4	1	1	2	5
ROUND ROCK	1	6	6	1	5
TAYLOR	0	0	0	0	1
CEDAR PARK	3	1	2	0	1
FLORESVILLE	1	0	0	1	0