

## **Rear End Collisions with Stopped Vehicles on Freeways: 1999 to 2001**

Given the adoption of a “Safe Clear” policy by the City of Houston, the issue of crashes to stopped vehicles on freeways becomes important. The following information applies to rear end collisions on the freeways in the eight county region for 1999 through 2001. First, there are some caveats about the data:

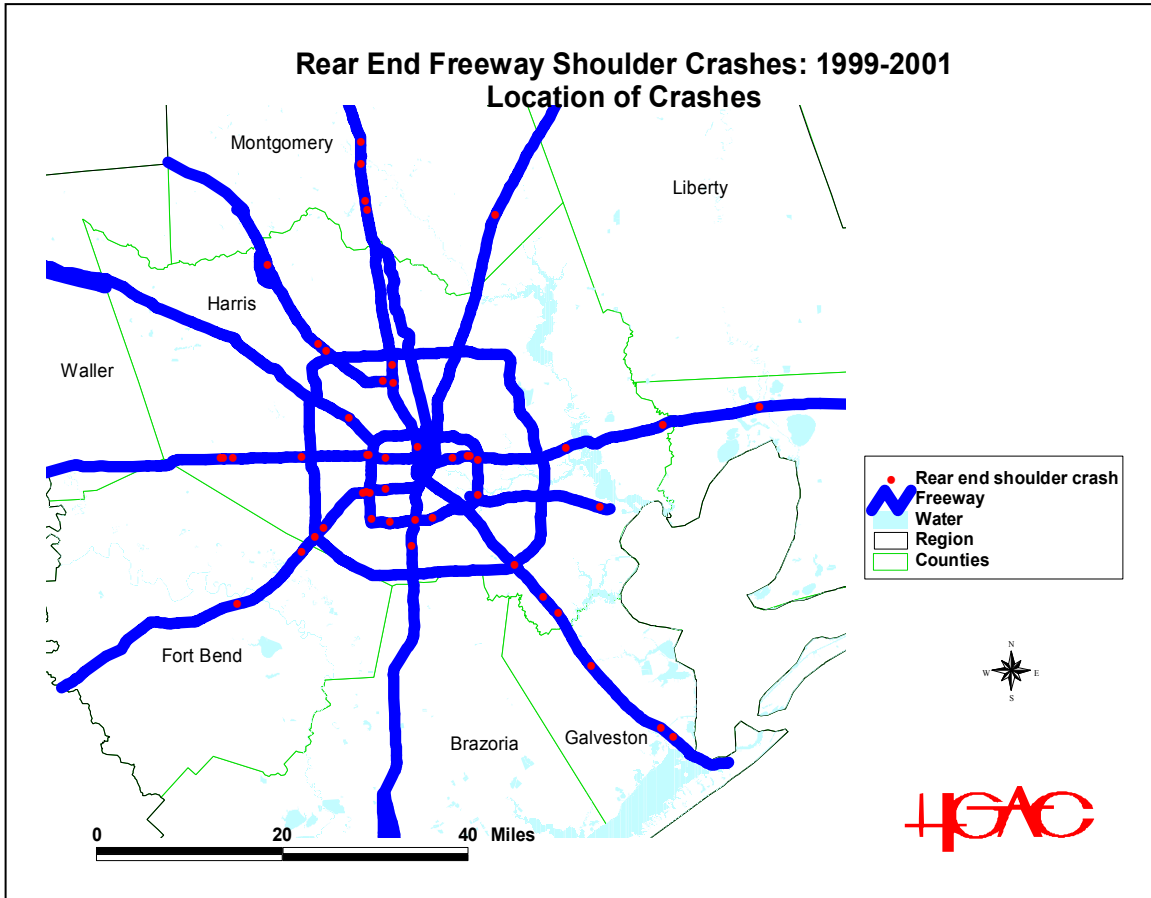
1. The data H-GAC has analyzed is distributed by the Crash Records Bureau of the Department of Public Safety. This is the state agency vested with documenting crashes for the State. Currently, their reporting requirements are that all fatal crashes, all injury crashes, and all property damage only (PDO) crashes in which one or more vehicles were towed be reported. Thus, they do not include the typical ‘fender bender’ in which no one is injured and all vehicles are driven away from the crash scene. In other words, the data we have represent the more serious crashes.
2. H-GAC has geocoded the crashes. However, because the data are kept in a very old information system by DPS in which road names are represented either by five-digit codes, the first five letters of the road name, or control-section numbers (for rural state roads), there is inevitably some geocoding error. H-GAC was able to geocode about 82% of all crashes in the DPS data set with about 90% accuracy.
3. In this report, only crashes for 1999-2001 are considered. Thus, any conclusions about location are only tentative.
4. Spatial accuracy is within 50-100 yards. One would need actual crash diagrams to have more accuracy.
5. Please cite the Crash Records Bureau of the Texas Department of Public Safety as the source for the crash data and cite the Houston-Galveston Area Council as the source for the crash analysis.

### **Results of the Analysis**

1. Between 1999 and 2001, there were 41,816 crashes that occurred on freeways in the eight county region around Houston.
2. Of these, 11,461 (or 27.4%) involved a rear end crash in which both vehicles were moving. In addition, there were 9,099 (or 21.8%) in which one vehicle was stopped and the other was going straight. Thus, about one in five freeway crashes involved a vehicle running into one that is stopped.
3. For those freeway crashes in which one vehicle was stopped and another ran into it from behind, severity levels were high. Of the 9,099 crashes of this type between 1999 and 2001, there were 12 involving fatalities, 203 involving incapacitating injuries, 1,059 involving probable injuries, and 4,849 involving possible injuries. There were also 2,976 that involved serious property damage only.

4. On the crash report, the investigating officer indicated a contributing factor. Of the 9,099 freeway rear end crashes in which one vehicle was stopped, speeding was indicated as the major contributing factor for 8,169 (or 89.8%) of these. Other factors included DUI (203 or 2.3%), following too close (713 or 7.8%), a teenage driver (1,607 or 17.7%), a male driver (7,992 or 85.6%), a female driver (5,860 or 64.5% -note, there can be at least one male driver and at least one female driver in a rear end crash).
5. Of the 9,099 freeway rear end crashes in which one vehicle was stopped, 8,616 (or 89.8%) occurred on the main lanes, 311 (or 3.4%) occurred at a connection between two freeways, 77 (or 0.8%) occurred at an entrance ramp, 61 (or 0.7%) occurred at an exit ramp, and 19 on an HOV lane or on an HOV entrance or exit ramp.
6. Of the 8,616 freeway rear end crashes in which one vehicle was stopped that occurred on the main lanes, 50 occurred off the roadway, either on a shoulder (35) or beyond the shoulder (15); the rest (8,566) occurred on the roadway. Thus, in the three year period from 1999 to 2001, there was an average of 16.7 rear end crashes a year on the shoulder. Two of these crashes involved incapacitating injuries, 6 involved probable injuries, 28 involved possible injuries, and 14 were serious property damage only crashes. Figure 1 shows the location of the crashes. Of the 50, 10 occurred on the IH 610 loop while almost half (23) occurred outside of Beltway 8.
7. Determining who was at fault is a little tricky. On the crash report, there is a separate record for each driver and vehicle, numbered 1 through 8. Generally, the driver who was seen as causing the crash is listed as number 1.
  - A. For the number 1 driver, of the 50 rear end crashes to a stopped vehicle on the shoulder, speeding was assigned the major contributing factor in 32 of the crashes followed by DUI (4 cases) and following too closely (2 cases).
  - B. For the number 2 driver (which will usually be the stopped vehicle) speeding was assigned a contributing factor in 1 case. No other contributing factor was assigned.
  - C. There was no information about driver 3 or higher.
  - D. Thus, for vehicles and drivers number 1 and 2, speeding is the overwhelming major factor associated with hitting a stopped vehicle on the shoulder.

Figure 1:



8. Of the 50 rear end crashes to a stopped vehicle on the freeway shoulder, a police vehicle was the rear-ended vehicle for only 1 of the crashes. In the one case, the driver suffered possible injuries.
9. Thus, in conclusion, even though there were a lot of rear end crashes on freeways between 1999 and 2001 in which one vehicle was stopped, the vast majority of those occurred on the roadway, rather than the shoulder. There was an average of 16.7 crashes a year that occurred on the shoulder.