

Safety on State Highway 6: 1999-2001

The following information applies to safety along State Highway 6 within Harris, Fort Bend, Brazoria, and Galveston counties. This road runs from the junction with US 290 and FM 1960 in the north and runs southward and eastward to the junction with IH 45 South.

Limitations of the Data

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 low severity crashes 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 on average.
3. To date, crashes for 1999-2001 have been geocoded. Thus, any conclusions about location are only applicable to these years.
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

1. Between 1999 and 2001, there were 4,013 serious crashes on SH 6. This represents an average of about 1,338 serious crashes a year over the three year period or about 3.6 serious crashes per day. Figure 1 shows the distribution of the crashes.
2. The severity levels of these crashes are high. There were 39 crashes involving fatalities, 2,437 crashes involving injuries, and 1,537 crashes involving serious property damage (defined as one or more vehicles being towed). In terms of people, 47 persons were killed and 4,206 persons were injured over the three year period. This represents an average of 15.7 persons killed per year (or one every 23 days) and 1,402 persons injured per year (or 3.8 per day).
3. Of the 4,013 serious crashes that occurred on SH 6, the majority – 3624 (90.3%) involved two or more motor vehicles. However, there were 262 crashes with fixed objects (6.5%) and 22 crashes with pedestrians (0.5%).

4. On the crash form, the police officer indicates contributing factors to the crashes. Because there is usually more than one vehicle involved, multiple factors can apply to individual crashes. Of these factors, speeding was, by far, the most important, contributing to 1,802 crashes (or 44.9%). To put this in perspective, for the region as a whole, speeding contributes to 39% of all crashes.
5. After speeding, the major contributing factors are failure to yield (23.9%), running a stop sign or a red light (9.9%), DWI (6.3%) though the percentage is most likely underestimated, and following too closely (5.2%).¹
6. A hazardous location is one where many crashes occur. We analyzed the distribution of crashes by location. Figure 2 shows the number of crashes at each intersection along SH 6 with the circle size being proportional to the number of crashes. As seen, the western and northern parts of SH 6, north and south of IH 10 West, have the highest number of hazardous locations while there are far fewer crashes to the east of US 90A.
7. In general, the higher density of crashes occurs on the northwestern part of SH 6. Figure 3 shows a density map with the approximate number of crashes per road segment. The map was put together with the *CrimeStat* program and interpolates crashes to small grid cells.²
8. Crash hot spots are small areas where there is a concentration of crashes. They are a better indicator of hazard than a single location since they consider the interaction of several roads in affecting safety. Again using the *CrimeStat* program, 18 hot spots were identified that had 60 or more crashes (20 or more a year). Figure 4 shows the hot spots in the northwestern part of SH 6. The five largest concentrations were:
 - A. A 1.1 mile stretch north and south of the intersection with Bellaire Blvd (256 crashes);
 - B. A 0.8 mile stretch north and south of the intersection with FM 529 (227 crashes);
 - C. A 0.7 mile stretch north and south of the intersection with IH 10 West (219 crashes);
 - D. A 0.8 mile stretch north and south of the intersection with Westheimer Rd/ FM 1093 (194 crashes); and
 - E. A 0.7 mile stretch north and south of the intersection with Kieth Harrow Rd (153 crashes).
9. Based on the estimate of VMT from our modeling group, *serious crash risk* was calculated. This is the number of serious crashes per 100 million vehicle miles traveled

¹ The crash data collected seriously underestimates Driving While Intoxicated (DWI). For the region as a whole, 37% of all fatalities are listed as involving alcohol or drugs on the crash form. Yet, the National Highway Traffic Safety Administration reports that around 65% of all fatalities in Texas involve alcohol or drugs.

² Ned Levine (2004). *CrimeStat III: A Spatial Statistics Program for the Analysis of Crime Incident Locations* (version 3.0). Ned Levine & Associates, Houston, TX.; National Institute of Justice, Washington, DC., November. Available at <http://www.icpsr.umich.edu/crimestat>.

per year (annual VMT). Between 1999 and 2001, the serious crash risk on SH 6 was 214 crashes per 100 million annual VMT. This is a little higher than the regional average of 204 serious crashes per 100 million annual VMT but higher than the statewide average of 149 serious crashes per 100 million annual VMT.

10. Nevertheless, there are some locations on SH 6 where crash risk is severe. Again, using the *CrimeStat* program, we calculated crash risk for different segments on the freeway (figure 5). As seen, some sections have a very high crash risk of 400 or more, double the risk along the entire SH 6 corridor.
11. Comparing figures 3 and 5, it can be seen that, in general, segments that have a high number (density) of crashes also have a high crash risk, for example segments in the cities of Sugar Land and Missouri City and north and south of IH 10 W. But, there are also segments that have a low crash density but a high crash risk. In particular, segments in the cities of Santa Fe and Hitchcock in the southern most part of SH 6 have low crash volumes but high crash risks. These latter locations have risk factors that are not related to traffic volumes.
12. In summary, while safety along the entire stretch of SH 6 appears to have approximately the same risk as our regional as a whole. However, there are two considerations.
 - A. First, regional safety is very bad, the worst in Texas. Our regional crash risk (204 serious crashes per 100 million annual VMT) is 37% higher than the statewide average. Further, the likelihood of a driver being involved in a fatal or injury crash is 149% higher than the national average. That SH 6 has a safety risk about equal to the regional average indicates that there are serious safety problems on the roadway; and
 - B. Second, there are sections of SH 6 which are extremely severe, having a crash risk more than double the regional average and the average for the road as a whole. Improvements need to be made at these locations in order to reduce the high number of crashes as well as the very high risk.

Figure 1:

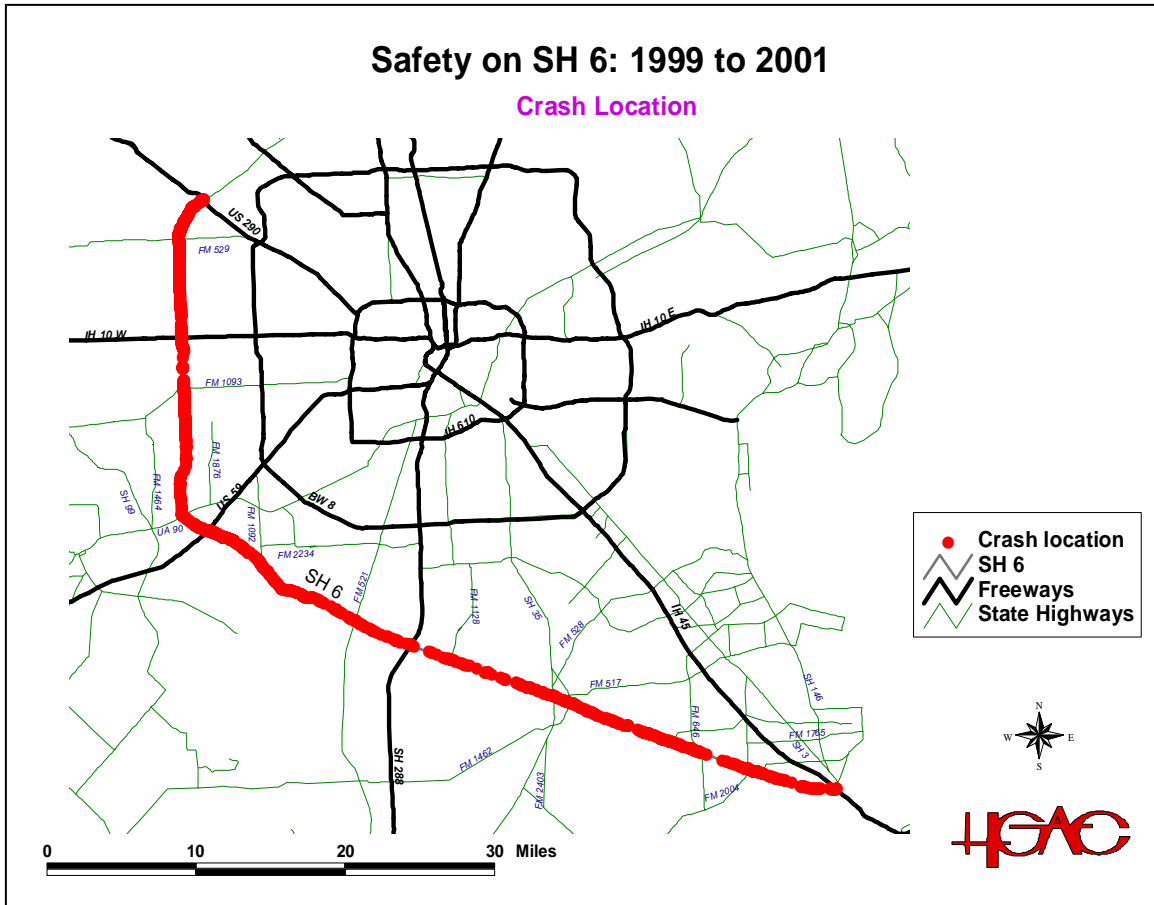


Figure 2:

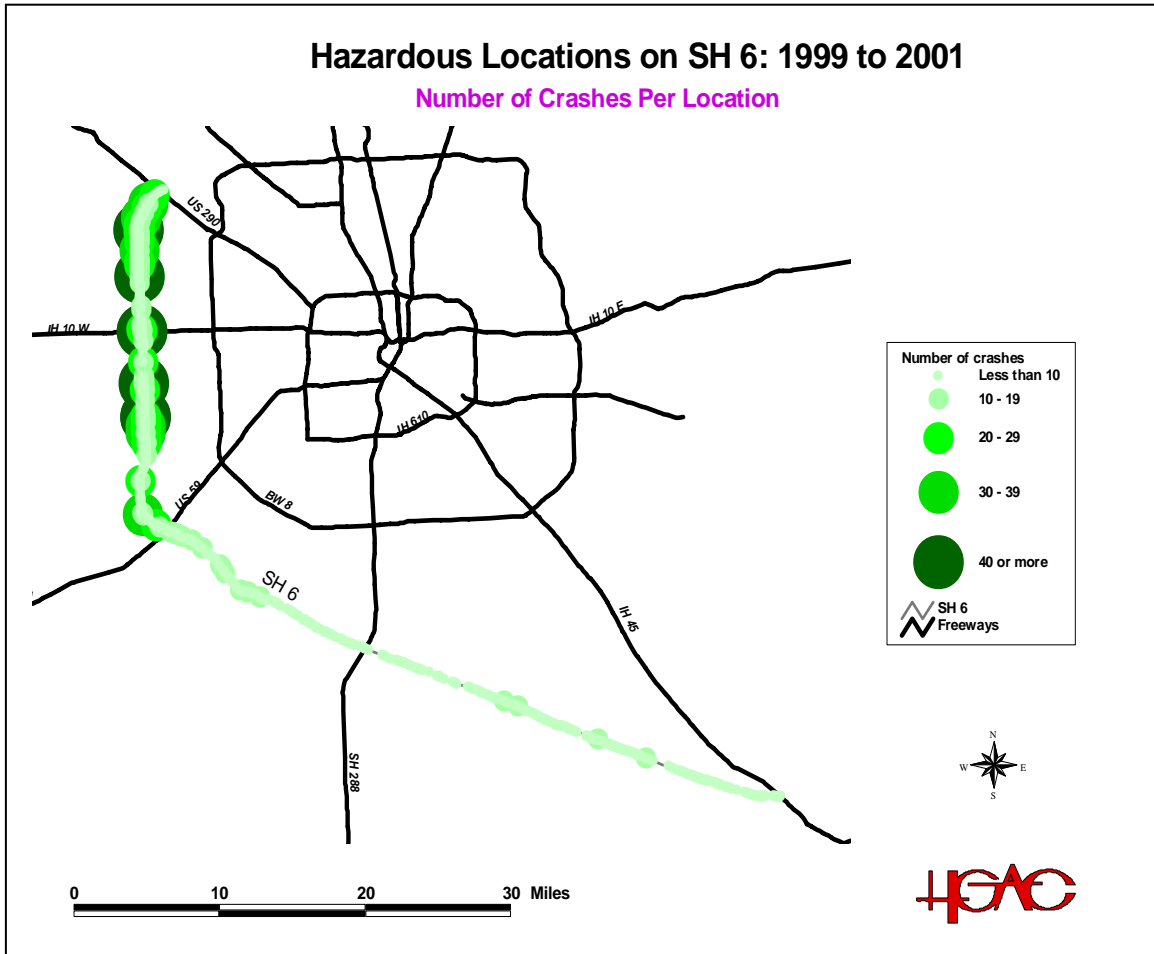


Figure 3:

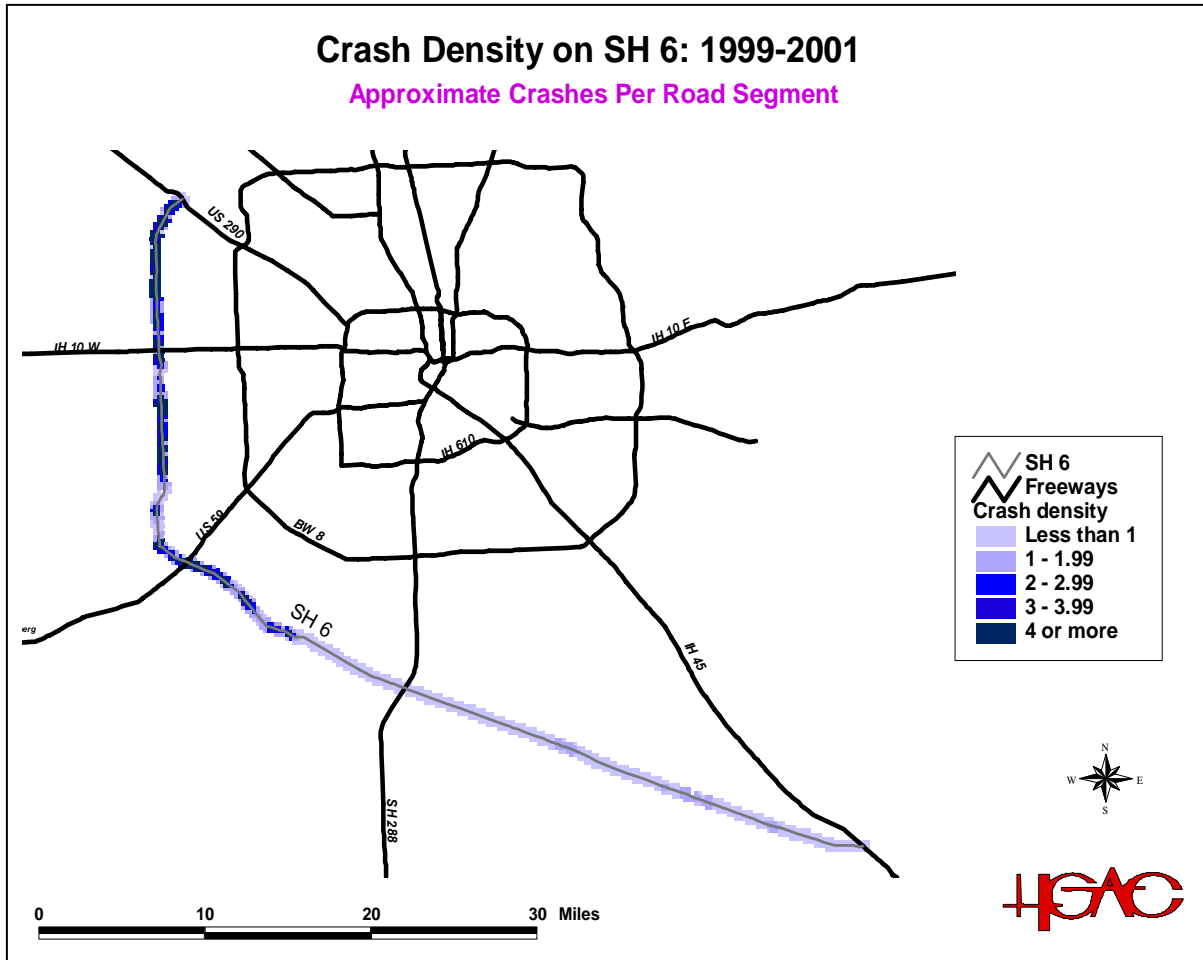


Figure 4:

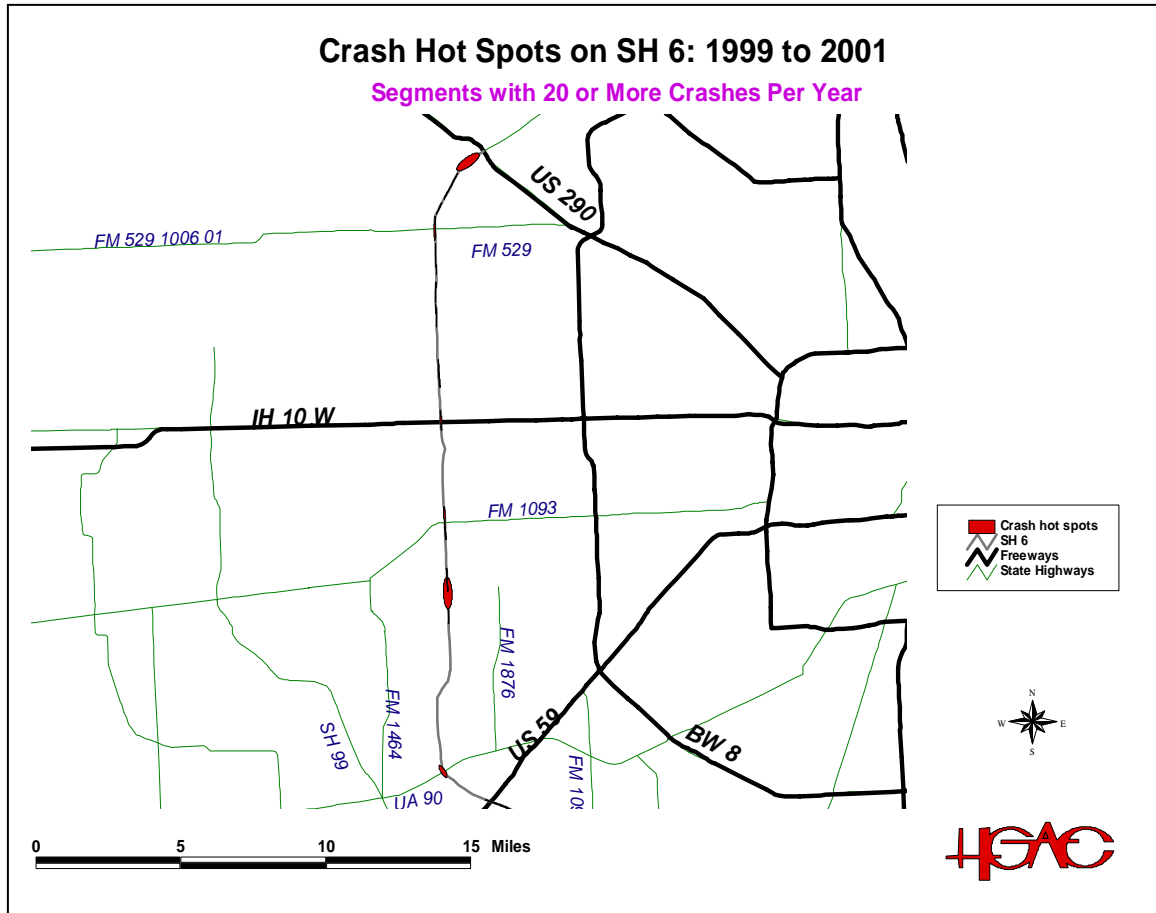


Figure 5:

