Safety on Interstate Highway 45 North: 1999-2001

The following information applies to safety along Interstate Highway 45 North (the North Freeway) within the eight country region. This road runs from the northern border of Montgomery County southward to the junction with US 59 East.

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 10,185 serious crashes on IH 45 North. This represents an average of 3,385 serious crashes a year over the three year period or about 9.3 serious crashes per day. Figure 1 shows the distribution of the crashes.

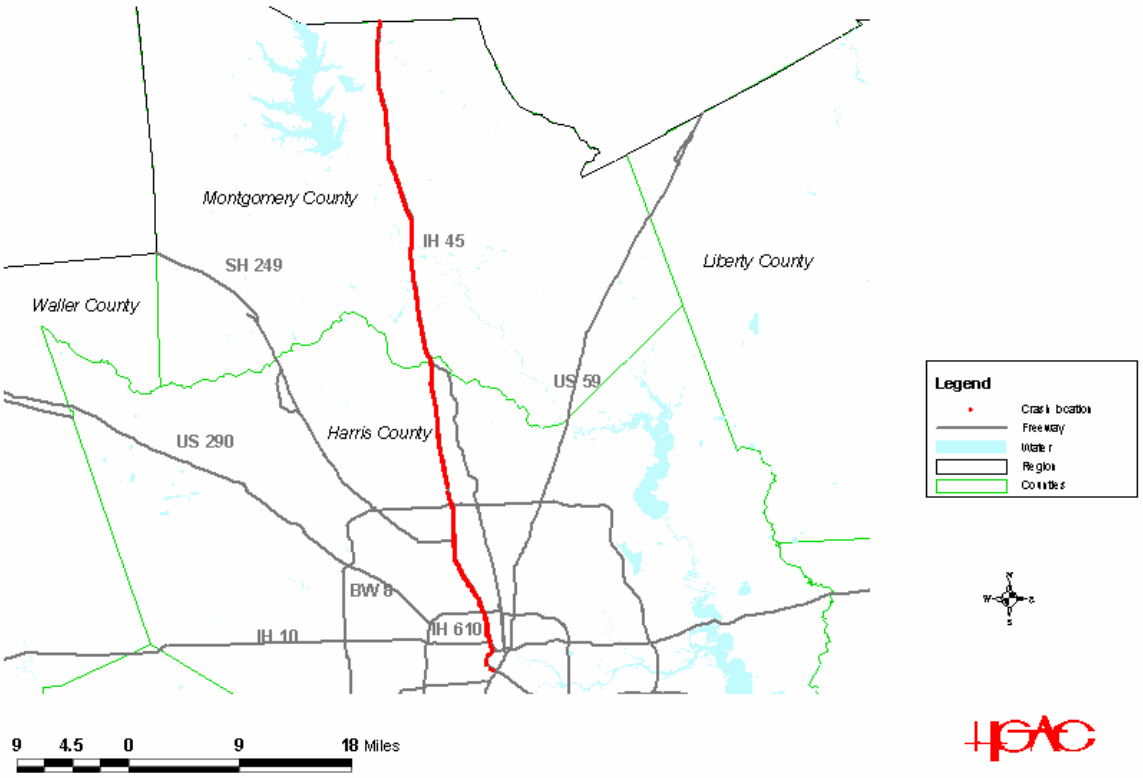
2. Of the 10,185 serious crashes, 6,625 occurred on the main lanes of the freeway (65% of all the crashes), while 3,182 occurred on the frontage roads parallel to the freeway (31% of all the crashes). An additional 244 occurred at the connections between IH 45 N and another freeway, 40 occurred at one of the exit ramps, 28 occurred at one of the entrance ramps, 16 occurred in the HOV lane or on an HOV ramp, and there was no information about location for 50 of the crashes.

3. The severity levels of these crashes are high. There were 69 crashes involving fatalities, 6,343 crashes involving injuries, and 3,773 involving serious property damage crashes (defined as one or more vehicles being towed). In terms of people, 81 persons were killed (including 17 pedestrians) and 11,087 persons were injured. This represents an average of 27 fatalities per year (or one every 13.5 days) and 3,696 injuries per year (or 10.1 per day).

Figure 1:

Safety on IH 45 North: 1999-2001

Location of Crashes



4. The severity levels of the main lanes and the frontage differ only slightly. For example, 0.8% of all main lane crashes involved fatalities compared to 0.5% on the frontage roads. Similarly, 4.2% of all main lane crashes involved incapacitating injuries compared to 3.5% on the frontage roads. Conversely, 47% of all frontage road crashes involved less serious (possible) injuries compared to 42.9% for the main lanes. It would be expected that the main lanes will have more serious crashes than the frontage roads. Yet, we find that there are only slight differences. The probable reason is that speeds on the frontage roads are fairly fast and don't differ very much from the speeds on the main lanes, especially during congested time periods.

5. Of the 10,185 serious crashes that occurred on IH 45 North, the majority – 7,551 (74.1%) involved two or more motor vehicles. However, there were 2,109 crashes with fixed objects (20.7%), suggesting that the use of alcohol and drugs was a contributor to crashes on IH 45 N. Of the 10,185 serious crashes, driving under the influence of alcohol or drugs was explicitly identified in 527 cases (or 5.2%), though the actual use is probably higher due to underreporting.

6. 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 5,155 crashes (or 50.6%). To put this in perspective, for the region as a whole, speeding contributes to 39% of all crashes. Typically, speeding crashes are more likely to occur on freeways than arterials. For the region as a whole, 54.1% of all freeway crashes involved speeding.

7. After speeding, the major contributing factors are failure to stop (7.6%), red light running (5.9%), DWI (5.2% as mentioned above), following too close (5.0%) and failure to yield (3.9%).

8. As might be expected, there are some differences in the contributing factors on the main lanes compared to the frontage roads. Speeding is a factor in 52.9% of the crashes on the main lanes compared to 45.5% on the frontage roads. Conversely, failure to stop is involved in 16.6% of the crashes on the frontage roads compared to 3.5% on the main lanes. Red light running is involved in 12.2% of the crashes on the frontage roads, whereas it is non-existent on the main lanes.

9. 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. Using the *CrimeStat* program, 32 hot spots were identified that had 100 or more crashes. Figure 2 shows the hot spots in the southern part of IH 45 North near downtown Houston. The five largest concentrations were:

    A. The section around North Main Street (386 crashes between 1999 and 2001);

    B. The junction with Beltway 8 (323 crashes);

    C. The section around Rittenhouse (263 crashes);

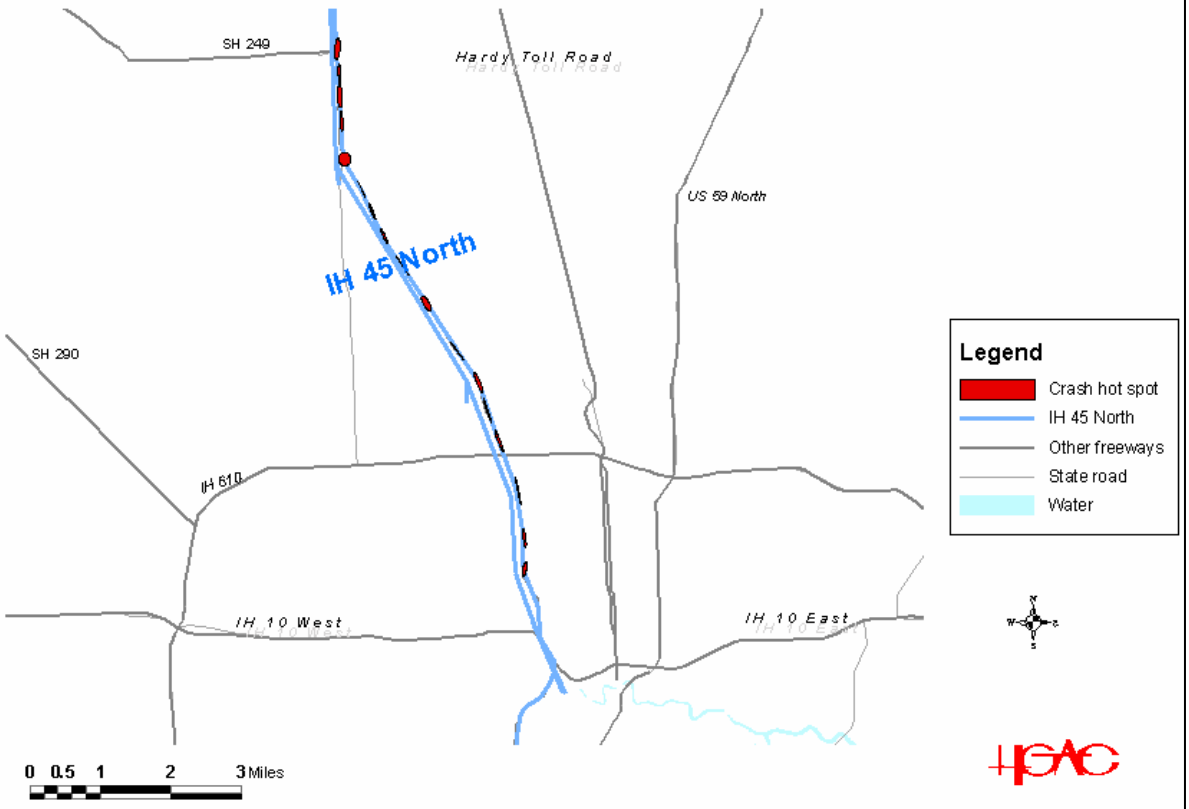
    E. The section between Cavalcade and Robert Lee (237 crashes); and

    F. The section around Crosstimbers (223 crashes)

Figure 2:

Crash Hot Spots on IH 45 North: 1999-2001

Sections with 100 or More Crashes



10. 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 (VMT). Between 1999 and 2001, the serious crash risk on IH 45 North was 118.7 crashes per 100 million VMT. This is significantly lower than the regional average of 204 serious crashes per 100 million VMT. In general, the crash risk on freeways is much lower than on arterials.

11. Nevertheless, there are some serious safety problems on IH 45 North. Again, using the *CrimeStat* program, we calculated crash risk for different segments on the freeway. While the segments near to downtown Houston had a higher frequency of crashes, the sections just north of the Harris County border in Montgomery County had the worst risk. Figure 3 shows the results for this northern part of IH 45 North. As can be seen, there are some high risk segments in the City of Conroe at the junctions with SH 105, FM 2854, and the southern part of Loop 336 (SH 336). There are also some moderately high risk segments at the junction with FM 2920, SH 242, at the junction with Sawdust/Rayford roads in the southern part of Montgomery County, and at the junction with Cypresswood in northern Harris County. The serious crash risk in these hot spots is around 200, almost double the risk along the entire IH 45 North corridor.

12. In summary, while crash risk is not very high for the whole of IH 45 North, there are locations which are hazardous, both in absolute number and relative to vehicle miles traveled.

Figure 3:

Crash Risk on IH 45 North: 1999-2001

Crashes Relative to Vehicle Miles Traveled