

STUDY ANALYZES CRASHES ON THE CAPITAL BELTWAY

In August 1993, a series of major crashes on the Washington Capital Beltway focused Federal, State, and local attention on the need to further improve safety on this 64-mile interstate facility. More than 120 public officials from all levels of government, concerned citizens, and safety group representatives became active partners in developing ideas and recommendations for action. By December 1993, 53 initiatives had been developed to improve safety on the Beltway.

The National Highway Traffic Safety Administration (NHTSA) sponsored six studies to better understand how and why crashes occur on the Beltway. This *TRAFFIC TECH* describes one of these studies. Preusser Research Group, Inc. of Trumbull, Connecticut examined the patterns of crashes during a two year period - 1993 and 1994. They looked beyond the physical characteristics of crashes to categorize driver behavioral errors that so often cause crashes.

In-Depth Study of Beltway Crashes

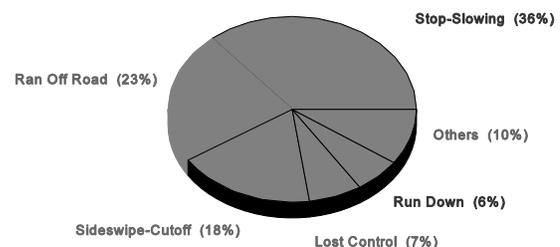
The narrative portion of each of 4,447 Virginia and Maryland police accident reports for Beltway crashes were analyzed and coded into a database for the two years of 1993 and 1994. Three types of crashes accounted for 78 percent of all Beltway crashes, many related to congestion problems during peak hours. No other crash type accounted for more than 7 percent of the crashes.

Stop-Slowing (36%) One vehicle slows or stops on the roadway and is rear-ended by some other vehicle. Typically, the first vehicle slows or stops because of traffic congestion.

Ran Off Road (23%) A vehicle leaves the road and strikes some object, or overturns, at the

Capital Beltway Crashes

1993 and 1994



roadside, on the shoulder, or at another point off the main travel lanes. This type typically involves a single vehicle, often late at night.

Sideswipe-Cutoff (18%) One vehicle is struck in the side by another vehicle that is changing lanes. Most commonly, this crash type involves a car sideswiping another car, followed by a tractor-trailer sideswiping a car, and less commonly, a car sideswiping a tractor-trailer. Typically, sideswipe-cutoff is related to congestion or frequent lane changes.

Drivers

Most drivers involved in Beltway crashes are local residents who live in Maryland, Virginia or the District of Columbia, not out-of-towners traveling through the metropolitan area. Drivers between the ages of 21 and 40 accounted for 57 percent of the crashes, with ages between 21 to 30 accounting for almost one third.

Vehicle Type

Over 9,000 vehicles were involved in the 4,447 Beltway crashes. Nearly 10 percent of these vehicles were tractor-trailers, and nearly 6 percent were straight trucks. These two vehicle types were involved in 1,148 crashes, or 25 percent of the total

for the two years. There are distinct differences in the type of crashes for different types of vehicles. Tractor-trailers were much more likely to be involved in a sideswipe-cutoff type of crash. This type accounted for almost half (46 percent) of tractor-trailer crashes. For cars and other nontrucks, the most frequently occurring crash type was stop-slowng.

Interchange Analysis

Interchanges are the most dynamic locations on the Beltway where drivers must navigate around other vehicles, change lanes, merge into the main travel lanes, and slow to exit. Beltway motorists expressed concern for improving conditions at interchanges in a series of focus groups conducted during the summer of 1994. The report summarizes crashes for each of the 14 Virginia and 25 Maryland Beltway interchanges into three categories.

Main Line crashes begin with at least one vehicle on the main line that subsequently collides with another vehicle(s) or object within half a mile of an interchange.

Ramp Related crashes include collisions between one or more vehicles on the main line and one or more vehicles in the acceleration or deceleration lane(s) at an interchange.

On Ramp crashes involve vehicles on the ramp including acceleration and deceleration lanes and collector or distribution lanes. Unlike Main Line and Ramp Related, there is no involvement with a vehicle on the main line.

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For all but one interchange, there were more Main Line crashes than either of the other two types. The only exception was the Springfield interchange (sometimes called *the mixing bowl*), where interstate highways intersect. There, the crashes were overwhelmingly in the On Ramp group.

Crashes Causing Crashes

Another database sorted crashes by date, time, mile marker, and by inner or outer loop of the Beltway. Subsequent crashes that occurred within a two hour window of the initial crash show that up to 10 percent of crashes are followed by subsequent crashes. Most of these subsequent crashes occur close to the primary crash, most within 5 minutes and within one-tenth of a mile. The effect was observed to extend at least one mile on the approach to the primary crash for the first hour. A smaller effect was also observed for up to one mile and up to one hour downstream of the crash.

NHTSA continues to support the Capital Beltway Safety Team and will publish additional studies in the near future.

HOW TO ORDER

For a copy of *Analysis of the Capital Beltway Crash Problem* (42 pages plus appendices) write to the Office of Program Development and Evaluation, NHTSA, NTS-33, 400 Seventh Street, S.W., Washington, DC 29050, send a fax to (202) 366-7096, or EMAIL to lcogrove@nhtsa.dot.gov Linda Cosgrove, Ph.D., was the contract manager for this project.