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TRAFFIC TIPS

VOLUME 12, ISSUE 2 - May 2002

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Making Intersections Safer

Motor-vehicle collisions occur at intersections because of conflicts with crossing and turning traffic. Improving the engineering of intersectionis is the first step in reducing conflicts. Vehicle conflicts combined with poor highway or street design and inadequate traffic control measures often result in collisions of vehicles with other vehicles, with roadside objects, and with pedestrians.

Types of Collisions at Intersections

There are four major types of vehicle crashes at intersections.

Crossing collisions involve one vehicle striking the side of another; these are the most severe type of crash. They can result both from vehicles attempting straight-through maneuvers as well as from turning within the intersection.

Rear-end collisions are common at intersections. They can be the result of poor highway design or inadequate traffic engineering measures. These deficiencies, however, are often compounded by dangerous driver behavior, especially speeding, following too closely, and late braking.

Vehicles deviating from their designated travel paths (such as crossing a road's centerline) are less common at intersections as compared to crossing and rear-end collisions.

Pedestrian and bicycle collisions occur most frequently in urban areas, particularly with older and younger age groups. Thirty-six percent of pedestrian deaths among people 65 and older in 1999 occurred at intersections, compared with 7% of pedestrian deaths among children age four and younger. Only 2% of motor-vehicle-related deaths are bicyclists, but 35% of these deaths occurred at intersections.

Intersection Crashes have Multiple Causes

Poor physical design of both the intersections and their approach roadways. A major aspect of the design issues concerning safety is restricted sight distances. With restricted sight distances, drivers have inadequate time to stop or make evasive maneuvers.

Inadequate traffic engineering countermeasures. In some cases, improper devices are used, are used in the wrong locations, are too small to be seen and understood in enough time by drivers, or have suffered damage or deterioration. In other instances, rapidly growing traffic volumes have overwhelmed what once were acceptable traffic engineering measures.

Driver licensing and education often fail to adequately train drivers to safely negotiate intersections. Some

drivers do not know the basic traffic laws, fail to understand what standard traffic control devices mean, or do not respect the rights and safety of pedestrians.

Drivers disregard traffic control at intersections. Even knowledgeable drivers disregard the clear messages of traffic control devices, including stop signs, signals and pavement markings, and they repeatedly violate traffic laws. Combined with speeding, disregard for traffic control at intersections is a major source of serious crashes with injuries and deaths. In addition, two other "human factors" causes of traffic crashes include driver distractions such as cell phone use and inattention, and drug and alcohol use.

Countermeasures to Improve Intersection Safety

Safety deficiencies must be identified by an engineering review. A basic principle of remedial action for improving safety at intersections is that countermeasures that improve vehicle traffic flow or reduce crashes should not compromise pedestrian safety.

The approach to intersection safety design and operation consists of strategic decisions in the following order of consideration:

- Eliminate or reduce conflicts of vehicles and pedestrians where possible;
- reduce unavoidable vehicle and pedestrian conflicts to lower the chances for collisions; and
- Design intersections so that when collisions occur, their severity is lowered.

Traffic engineering strategies to improve movement of vehicles and pedestrians are crucial to improving intersection safety. These consist of a wide array of devices and operational changes such as:

- Addition of turn lanes at intersections. Turn lanes are used to separate turning traffic from through traffic. Studies have shown that providing turn lanes for left-turning vehicles can reduce accidents by approximately 32%. Personal injury accidents involving left-turning vehicles can be decreased by as much as 50%. Separate right-turning vehicles from other vehicles can significantly affect operations at an intersection. By adding a separate right-turn lane at a signalized intersection, the delay experienced by drivers on an approach can be reduced. At unsignalized intersections, right-turn lanes can serve to safely remove turning vehicles that are decelerating from the through traffic lanes. Turn lanes at major driveways can also improve efficiency and safety, especially on high volume or high speed roadways.
- Signals. Increasing the size of a signal head from 8 inches to 12 inches to increase visibility, provide a separate signal over each lane, provide higher intensity signal lenses and modify signal cycle length, including changes to yellow-clearance interval and the all-red phases.
- Non-traditional intersection design. Consideration of non-traditional intersections such as roundabouts.
- Pavement condition. Upgrade pavement quality to eliminate drainage problems and provide for increased skid resistance.
- Improve sight distance by restricting parking proximate to intersections and moving stop lines back from intersections.
- Upgrade and supplement signs.

Enforcement of laws prohibiting dangerous intersection driving is a necessity for even well-designed and regulated intersections. Enforcement cannot be intermittent because motorists who tend to violate traffic control are aware that the chances of receiving a citation are low. Sustained enforcement efforts have been proven to lower both intersection violations and crash rates, sometimes to a dramatic extent.

Adapted from Basic Countermeasures to Enhance Safety, Federal Highway Administration, 2002

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