

# Human-Factors Issues in Intersection Safety

Intersection safety is a product of the decisions that engineers make about the physical design and traffic control of each intersection.

Understanding the way people react to vehicle and pedestrian conflicts (drivers vary widely in their skills and their willingness to take risks at intersections) is also a part of a comprehensive safety improvement program.

## Driver Abilities and Limitations

- Driver ability to see signs, markings and signals: Many signs and signals, even when new, are not large or bright enough—especially at night or in dim lighting—for drivers to act safely on the information these traffic control devices are providing. Many drivers may have good vision but are not able to see well at night because of poor sensitivity to the contrast between light and dark.
- Driver risk taking: Older drivers usually are much less inclined to take risks with narrow margins of error than are younger drivers, especially those in their teens and 20s. However, older drivers often take risks unknowingly because of the diminished motor skills, poor vision and reduced cognitive ability that can come with old age. This can lead them to make poor judgments at intersections that can result in crashes.<sup>1</sup>
- Older drivers: Drivers 85 years of age and older are more than 10 times as likely as drivers in the 40-to-49 age group to have multi-vehicle intersection crashes.<sup>2</sup>
- Younger drivers: The youngest driver age groups have the highest traffic violation and crash involvement rates. This is often due to poor judgment and inexperience, especially among teenage drivers. This problem is also due to a willingness of young drivers to take

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risks that include speeding, dangerous maneuvers and violating red light signals and stop signs.<sup>3</sup>

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## Road Conditions that Compound Human Limitations

- Complex intersection designs: Drivers often commit errors and violations by mistake because of complex intersection design.
- Signal timing and phasing: Signal timing must be set so that drivers with slower perception and reaction times may brake in time to stop without entering an intersection and to clear an intersection before the red phase occurs. However, excessively long yellow signal phases can tempt drivers to enter intersections that cannot be cleared before the red phase.
- Roadway characteristics: Roads with bi-directional, multi-lane traffic, high speeds and/or high vehicle and pedestrian volumes are often difficult to ensure pedestrian safety.



### Technologies that Limit Human Issues in Intersection Safety

Intelligent Transportation System (ITS) technologies can help make up for some human and vehicle limitations. Some examples of ITS that could be used to limit the human-factor aspect of crashes are automated braking, limiting the distance of queued-vehicle trails and notifying drivers in advance of upcoming intersections that may not be seen quickly enough.

<sup>1</sup> Insurance Institute for Highway Safety (IIHS), States Report, September 2001.

<sup>2</sup> Insurance Institute for Highway Safety (IIHS), States Report, September 2001.

<sup>3</sup> Insurance Institute for Highway Safety (IIHS), Fatality Facts, October 2001.