

Project 2: Drivers' Intersection Safety

Background and Motivation. In many communities, street intersections offer only impeded views of oncoming traffic to a driver who is about to enter the intersection. Some of these intersections have Stop Signs, usually on the lesser traveled of the two streets. (A four-way Stop Sign intersection is not usually a problem and can be excluded from this study.) Some intersections have no Stop Signs, but expect the driver entering the intersection to look carefully both ways, and enter only when there are no nearby approaching cars in either direction, cars that could risk a damaging collision if the stopped driver left too soon.

As communities have grown and owners of land that includes a corner of the intersection have landscaped their properties, a path of clear vision in one or both directions can be impeded by one or more of many things: shrubs, hedges, fences, trees, etc. In such cases, the driver of the car entering the intersection cannot see a safe distance down the other road to assure that there are no too-close cars coming toward him/her. This problem, left ignored, can increase the chances of auto accidents, leading to damage, injury and even death.

The objective of this student project is to examine this problem for their own community, with the aim of describing the problem using data that they collect, a methodology that they create, and a summary report that they write.

Student Activities. Students will scout as many intersections in the community as possible and flag those with mean free visibility at the Stop line below some threshold. If there is no Stop line painted on the street, then the intersection's score will be assigned at the point on the street that most safe drivers stop to look. Each intersection can be given a "safety score," say on a one to ten scale, with ten being a perfect safe intersection and a one being revealing that the intersection should be shut down immediately until improved. Since the idea is to locate potentially dangerous intersections, it is likely that the students will spend most of their time at problematic intersections. The vast majority of intersections that are safe can be "eyeballed" and given a high score. Eventually the students will plot all computed safety scores in a histogram, and compute the mean, median, mode and the two 5% tails. A sample size of at least 60 is recommended, with each team member responsible for 15 sample intersections. We suggest that students work in pairs, accompanying each other to view and score their sample intersections.

To identify the problematic intersections, students may ask their parents (and friends of the parents) for recommendations. Any stories of accidents or near-accidents at any of these intersections can be included in the students' work.

The students should invent their own intersection-scoring scheme and be able to defend it to their parents, their class and – eventually – professionals in the community whose job responsibility it is to keep intersections safe. The teacher may guide the students in ways to think about the scoring: speed limit on the more travelled street, the number of feet that a vehicle would travel at a given speed, eye height (above the ground) of the stopped driver, creating a type of "triangular geometry" of the street intersection – the stopped vehicle, the

oncoming vehicle and the visual obstruction. To prove their points regarding dangerous intersections, photographs of these intersections would benefit the students' presentations.

During this process, students must educate themselves about their local community's laws, rules and regulations regarding responsibility of homeowners to keep their street-corner property safe for drivers, and – equally important – the authority that the community has to enforce change of unsafe situations.

Eventually students create their histograms, photographs and explanations of their work, and then go interview local Transportation or "Roads" Department professionals regarding their findings. At the briefing, they may ask for intersection-specific accident reports. And they will argue for safety improvements on the low score intersections.

The project ends with the formal presentation at the Final Event and submission of a final report.

Potentially useful web sites:

The Intersection of Trees and Safety

<http://www.accessmagazine.org/fall-2007/intersection-trees-safety/>

Sight Obstructions

<https://static.spokanecity.org/documents/streets/handouts/sight-obstructions-handout-2018-01-17.pdf>