# A New Method to Conduct Hot Spot Identification

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## Abstract

Identification of site hot spots, also known as the site with promise, black-spots, accident prone locations, or priority investigation locations, is a crucial step to improve the safety performance of roadway network. Due to the public interests in traffic safety, efficient public fund utilization, and needs of professional safety analyses, Hot Spots Identification (HSID) has received much attention.

Traditionally, the process of roadway safety improvement is conducted and divided into separate individual stages. This process includes HSID, safety problem diagnosis, selection of potential treatment candidates, and prioritization of treatments based on benefit to cost analysis. As the first and very important step to improve the overall safety within a road network, hot spots identification (HSID) has been the focuses of many research efforts. Among the multitude of identification methods proposed, one of the disagreements remaining unresolved is regarding which kind of criterion should be employed to identify the hot spots, the accident number or the accident reduction potential.

Rather than favor either of the criteria, the authors proposed a methodology combining the two criteria to conduct HSID. To improve the identification accuracy, the well accepted empirical Bayesian technique is used to compute the expected accident number and accident reduction potential. In addition, the confidence levels are also adopted to guard against the uncertainties revolving around the estimated values. The confidence level associated with expected accident number is obtained by using the gamma distribution of the expected number of accidents of specific road sites, whereas the confidence level related with accident reduction potential is computed by using the normal distributions.

The methodology was applied to four functional classifications of road sections in Arizona. The results have illustrated the great advantages of this methodology over couple of other identification methods.

**Keywords: Safety, hot spots, Empirical Bayesian technique, expected accident number, accident reduction potential, confidence levels.**