ABSTRACT

Does Cell Phone Use have an Effect on Queue Discharge Patterns?

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Anecdotal evidence indicates that a large number of drivers are distracted, often by cell phones, while waiting at traffic lights. These drivers tend to be slow to react, causing unnecessary delay for other road users. To test this effect, queue discharge patterns and cell phone usage patterns were analyzed for thru movements at four intersections in Charlotte, North Carolina.

Data was simultaneously recorded in two formats: (1) on location and (2) at the Charlotte Department of Transportation (CDOT) Traffic Management Center (TMC) with the use of a video camera. Field data collection was used to observe cell phone usage behavior while video footage was used for observation of vehicle headways. These data were then used for analysis.

Of the over 3700 drivers observed, about 13.3% were talking on a cell phone and approximately 1.8% were texting while driving. The saturation headways and start-up lost times of queues containing cell phone users were compared with queues lacking the presence of cell phone users. Results show that although text messaging has a clear negative impact on discharge patterns, talking on a cell phone has an insignificant effect. Secondary analyses imply that drivers talking on a cell phone have a stabilizing effect because they likely perform worse than attentive drivers but much better than those engaged in a visually demanding distraction. Findings also show that the performance of drivers talking on a cell phone is fairly consistent while the performance of non-users is inconsistent due to myriad other distractions with widely varying effects on driver abilities. The performance of texting drivers was found to be the most variable, perhaps due to the sporadic, often intense visual demands associated with texting while driving.

Keywords: driver, cell phone, talking, texting, queue discharge, signalized, intersection

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