

Development of left-turn lane warrants for Saudi Arabia.

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Abstract

The previous studies carried out to establish left-turn lane warrants showed that it is effective in reducing accidents and delays. These studies were carried out in their local conditions, therefore, we do not know how effective it is in Saudi Arabia. The main objectives of the study were : a) to determine the safety and operational-effectiveness of left-turn lanes and b) to determine the cost-effectiveness of left-turn lanes. The study includes statistical and economic analysis of major arterial intersections. 18 with and 22 without left-turn lanes signalized approaches and 10 with and 10 without left-turn lane uncontrolled approaches were selected. Necessary data was collected. Since no reliable and complete accident record was available traffic conflicts were used in place of accidents. Delays were measured using a field technique.

Models were developed for rear-end conflicts, right-angle conflicts and delay time. The left-turn lane was found effective in reducing rear-end conflicts and delay time at signalized approaches only. Economic analysis was done for these approaches. Reduction factors were derived. Equations to estimate the benefits and a cost of a left-turn lane were established. Finally some charts and tables were developed for some common traffic and operational conditions.