

Abstract

Traffic facilities (like highways, signalized intersections, and toll plazas) are designed to provide a certain level of service (LOS). Traffic design manuals relate physical variables at these facilities to their LOS. One of the facilities is toll plaza, which is generally provided on expressways or highways to collect toll. Surprisingly, traffic design manuals don't offer any LOS conditions for toll plazas. Therefore, in this thesis, an attempt is made to determine the LOS condition at toll plazas.

The purpose of the study is to propose a new framework that analyses the level of service based on a perceived service variable and then relates the LOS definition to some measurable variable. The proposed framework can be used not only in other traffic facilities but also in different waiting scenarios.

In waiting line situation, waiting time (delay) is the primary determinant the people's perception of service. Thus, it can be hypothesized that service quality, as perceived by humans, is dependent on perceived waiting time (perceived delay) and not on actual waiting time (actual delay). In this study, a modelling framework is developed that first relates actual delay to perceived delay and then uses perceived delay in an ordered response modelling setup to determine LOS definitions in both perceived delay and actual delay universes. The proposed method of relating actual delay to its perceived value is obtained by marrying both Weber's and Vierordt's law. In this process, a method that is an improvement over the often-used Stevens' law emerges.

This study confirms (i) humans view service levels differently in different waiting line situations. (ii) perception has both a systematic bias and random error; ignoring bias will lead to an erroneous conclusion.