

## Locating Speed Limit Signs for Highway Tunnel Entrance and Exit

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**Abstract :** The brightness changes at highway tunnel entrance and exit have an effect on the physical and psychological conditions of drivers. It is more conducive for examining driving safety with quantitative analysis of the physical and psychological characteristics of drivers to determine the speed limit sign locations at the tunnel entrance and exit sections. In this study, the physical and psychological effects of tunnels on traffic sign recognition of drivers are analyzed; subsequently, experiments with the assistant of Eyelink-II Type eye movement monitoring system are conducted in the typical tunnels in Ji-Qing freeway and Xi-Zha freeway, to collect the data of eye movement indexes "Fixation Duration" and "Eyeball Rotating Speed", which typically represent drivers' mental load and visual characteristics. On this basis, the paper establishes a visual recognition model for the speed limit signs at the highway tunnel entrances and exits. In combination with related standards and regulations, it further presents the recommended values for locating speed limit signs under different tunnel conditions. A case application on Panlong tunnel in Ji-Qing freeway is given to generate the helpful improvement suggestions.

**Keywords :** driver psychological load, eye movement index, speed limit sign location, tunnel entrance and exit

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