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Road Transition Design on Freeway Tunnel Entrance and Exit Based on Traffic Capacity

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Abstract : Road transition design on freeway tunnel entrance and exit is one vital factor in realizing smooth transition and improving traveling safety for vehicles. The goal of this research is to develop a horizontal road transition design tool that considers the transition technology of traffic capacity consistency to explore its accommodation mechanism. The influencing factors of capacity are synthesized and a modified capacity calculation model focusing on the influence of road width and lateral clearance is developed based on the VISSIM simulation to calculate the width of road transition sections. To keep the traffic capacity consistency, the right side of the transition section of the tunnel entrance and exit is divided into three parts: front arc, an intermediate transition section, and end arc; an optimization design on each transition part is conducted to improve the capacity stability and horizontal alignment transition. A case study on the Panlong Tunnel in Ji-Qing freeway illustrates the application of the tool.

Keywords : traffic safety, road transition, freeway tunnel, traffic capacity
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