

RESEARCH PROBLEM STATEMENT #TS-503

I – Problem Title

Safety of HOV Lane Ingress/ Egress Along Limited Access Buffer Separated Facilities (2004SAF.3)

II - Research Problem Statement

Freeways with buffer-separated HOV lanes (HOVL) operate as two separate highway facilities with independent signing and striping, all within the same roadbed. This configuration has been plagued by numerous Table C collision concentrations that may be attributed to the complexity and frequency of HOVL ingress / egress as described below:

- * Two-sided weaving (as a result of frequent left and right-side access points)
- * Inadequate merge / diverge geometry for high-volume conditions (i.e. length of HOVL ingress / egress)
- * Confusion due to the presence of signing and delineation for both “facilities” since these traffic control devices are visible to ALL traffic (that is, both HOV and mixed flow drivers)
- * The combination of closely-spaced interchanges with fixed ingress / egress locations, and the unprecedented number of lanes along the majority of Southern California freeways requires HOV users to make numerous and consecutive lane changes through high volume and/or high-speed conditions.

III – Objective

To reduce the frequency and/or severity of collisions that occur along freeways with buffer-separated HOV Lanes by:

- 1) Confirming the conditions / features which contribute to the creation of Table C collision concentrations, and
- 2) Identifying and evaluating alternative ingress / egress “designs” intended to simplify access-related decisions and maneuvers that are now required by limited access buffer-separated facilities; as a minimum, the following alternative treatments should be considered:
 - a. Buffer-separated facility with continuous ingress / egress
 - b. Buffer-separated facility with continuous egress (from HOVL), but limited ingress
 - c. Addition of an auxiliary HOVL through the ingress / egress area; this configuration has been employed in both District 7 and 12
 - d. Longer ingress / egress (based on cross-section)

IV - Background

Guidelines for the design and location of HOVL ingress/egress were developed without the benefit of historical safety and operational data. The guidance pertaining to buffer-separated facilities has been used for more than ten years with only minor adjustments, so it is not surprising to learn that problems may have emerged that could require re-engineering of the original design concepts.

In addition, the significant difference in HOV design and operational practice between northern and southern California continues to generate public inquiry and concern regarding the impact on driver expectations and safety. Therefore, to support this effort, it may be valuable to perform comparative analyses on the operational and safety performance of the two most common HOV facility types: 1) continuous ingress / egress (without a buffer), and 2) limited access buffer-separated HOV operation and safety to support this effort.

VI – Statement of Urgency and Benefits

This research is urgent because the number of fatal and injury collisions on freeways is increasing, the percentage of Table C collision concentrations related to HOVL ingress / egress is significant, and there are currently no countermeasures available to Traffic Investigators to address these safety needs.

VII – Related Research

We are not aware of any research that has been performed on this subject. However, informal comparisons of buffer-separated facilities (with limited access) and continuous access facilities may have been made in support of efforts to address inconsistencies in HOVL system marking and operation.

VIII – Deployment Potential

The products of this research may create new tools (countermeasures) for Traffic Safety Investigators, and could lead to a new “best practice” for HOV system design and operation.