

Chapter 7: Ramps / Ramp Treatment

7.1 Introduction

Stop signs used at ramps are no longer an accepted standard of practice in NC. When traffic control interferes at a ramp entrance to an interstate or freeway, proper acceleration length and yield signs are required. If the proper acceleration length can't be maintained, the ramp shall be closed. The minimum acceleration length (full acceleration lane) is 400' followed by a 300' merge taper. The same design standard applies when mainline traffic is shifted onto the shoulders. When this occurs, the existing acceleration lane length shall be maintained or at least the 400' full acceleration with 300' taper. If this can't be maintained, the ramp shall be closed.

The purpose of this chapter is to give the designer a feel for the guidelines set forth by the Work Zone Traffic Control Section concerning stop signs and ramps in the Work Zone and how to best utilize the resources used in designing Traffic Control plans.

7.2 Definitions & Abbreviations

The primary definitions/abbreviations needed for this chapter will be the following:

Acceleration Lane – The auxiliary lane leading from a ramp to a highway and designed to enable the motorist to accelerate and merge into highway traffic at highway speed.

Deceleration Lane – The auxiliary lane leading from a highway to a ramp and designed to enable the motorist to decelerate from highway speed to safely stop at the end of a ramp.

Entrance Ramp – The portion of a ramp that, in the flow of traffic, the motorist is encouraged to accelerate in order to merge with highway traffic.

Exit Ramp – The portion of a ramp that, in the flow of traffic, the motorist is encouraged to decelerate in order to stop at the intersection of another roadway.

Gore Area – In the case of an exit ramp, the part of a roadway at which the ramp and the highway become two separate roadways or the last place the motorist must decide if he/she will exit the highway or continue. In the case of an entrance ramp, the part of a roadway at which the ramp and the highway become one roadway or the place the motorist must start merging with traffic.

Terminal Section – The portion of a ramp where it intersects with (or t's into) another roadway.

Work Zone – Any continuous tract or area of a roadway in which construction or maintenance is being performed that will impact the acceleration lane of an entrance ramp.

7.3 Guidelines

Due to the extremely dangerous intersection angle that is created, the practice of designing a stop condition at an entrance ramp is strongly discouraged. Closure of the ramp should be investigated for feasibility as well as utilizing temporary acceleration lanes of sufficient length (400' +/- - 75% of existing acceleration lane or whichever is greater) or matching existing length.

A yield condition for the ramp with adequate signing warning the motorist is the most accepted method of moving traffic through the Work Zone (See Roadway Standard Drawings No. 1101.02). In these instances, lowering the highway speed limit aides the ramp traffic in acquiring adequate merging speed. The right lane should be closed sufficiently in advance to stabilize traffic flow before encountering the merge (See Roadway Standard Drawings 1101.02).

Engineering judgment is to be used in all instances. However, certain criteria can be used to justify stopping traffic on a ramp. For example, ramps approaching stop signs should be perpendicular or nearly perpendicular to the crossroad and be nearly level for storage of several vehicles. Open lines of communication to discuss justification amongst the Work Zone Traffic Control Section, Regional Traffic Engineer, and the Division Construction Engineer will be needed when considering a stop condition. Factors to consider on the ramp and the highway include stopping sight distance, average daily traffic, posted speed limits, and existing level of service of the ramp.

Additional consideration for stopping ramp traffic is setting a time limit on the ramp stop condition. Limiting the ramp stoppage to off peak hours or to three consecutive days or less will considerably improve the safety and management of the Work Zone area. However, stopping traffic on a ramp is still dangerous, even if only for a short time, and is still discouraged.

7.4 Design Resources

Design resources other than this book include:

- AASHTO A Policy on Geometric Design of Highways and Streets
- Highway Engineering Concepts Course textbook
- Roadway Design Manual
- Manual on Uniform Traffic Control Devices, Part 6
- Roadway Standard Drawings