

## Topic 7-02 – Clear Recovery Zone Concept

### 7-02.1 Introduction

An area clear of fixed objects adjacent to the traveled way is desirable to provide a clear recovery zone (CRZ) for vehicles that leave the traveled way. Studies have indicated that on high-speed highways, a clear width of 30 feet from the edge of the traveled way permits about 80 percent of the errant vehicles that leave the traveled way to recover. Thirty feet should be considered the minimum clear recovery zone where possible for free-ways and high-speed expressways. High-speed is defined as operating speeds greater than 45 mph.

On most conventional highways, a 30-foot CRZ may be difficult to justify for engineering, environmental or economic reasons. For these reasons, a minimum CRZ of 20 feet on conventional highways is advised.

Site-specific conditions such as volume, speed, alignment, side slope, weather, and environmental conditions need to be considered when determining the CRZ. Refer to the Caltrans *Highway Design Manual*, Topic 309.1, and the *Roadside Design Guide*, Chapter 3, published by the American Association of State Highway and Transportation Officials (AASHTO) for more information on the CRZ and how it can vary depending upon the roadway alignment, side slope, and traffic volumes.

The installation of new fixed objects within the CRZ is to be avoided whenever practical on all projects. Fixed objects located in the CRZ, in order of preference, should be:

1. Removed/relocated, or
2. Made breakaway, or
3. Shielded

### 7-02.2 Remove/Relocate the Fixed Object

The available options to remove or relocate a fixed object are as follows:

1. Remove the fixed object if practicable.
2. Move the fixed object to a location that is less likely to be hit, such as up a slope or behind guardrail or wall required for other reasons. A fixed object placed at least 4 feet up a cut slope (measured vertically from the hinge point) is considered outside of the CRZ. See the *California MUTCD*, Section 2A-19.

3. Relocate the fixed object as far as possible from the traveled way to minimize its chances of being struck. Non-traversable ditches, drainage structures, columns, utility poles, and overhead sign structures may be handled by this method.
4. Relocate a fixed object in the median or gore to a location beyond the right CRZ, thereby reducing the risk of exposure to at least one direction of travel.

### 7-02.3 Make the Fixed Object Breakaway

Fixed objects that cannot be moved out of the CRZ should be considered for breakaway treatment. These include but are not limited to the following:

- light standards
- ground-mounted sign supports
- mailbox supports
- call boxes
- chain control signs

Light standards are used with a three-point triangular slip-base where breakaway treatment is needed. The Standard Plans contain details for this feature. All light standards located within the CRZ are to have a slip-base except where there is high potential for pedestrians to be struck by the falling light standard, or when there are conflicts with traffic.

The laminated wood box beam is the standard breakaway support system for large ground-mounted signs. Intermediate size ground-mounted signs may be mounted on dimensioned wood posts. Any sign post 4 inches x 6 inches or larger is to be drilled to make it breakaway. Details for the size and location of the holes are contained in the Standard Plans.

Small ground-mounted signs may be supported on dimensioned wood posts or approved commercially available yielding steel supports. Contact your District Traffic Safety Systems Coordinator for information regarding commercially available yielding steel supports.

If non-proprietary supports are used, mailboxes are to be mounted either on wood posts no larger than a nominal 4 inches x 4 inches or a steel pipe no larger than a nominal 2 inches in diameter. Spacing between mailbox posts shall be at least  $\frac{3}{4}$  the height of the post. Multiple mailboxes are not

to be mounted on a longitudinal rail within the CRZ. There is an approved commercially available yielding mailbox support system that will accommodate up to four mailboxes. The steel mailboxes installed by the U.S. Postal Service should not be installed in the CRZ. For more information about mailbox support design and placement, see the *Roadside Design Guide*, Chapter 11, “Erecting Mailboxes on Streets and Highways.”

Call boxes and chain control signs on steel posts should be mounted on slip-bases, unless otherwise shielded. Other features in the vicinity are not to impede the function of the breakaway device or adversely influence the vehicle response.

Breakaway objects are not to be placed behind guardrail or bridge rail. For more information about breakaway electrical devices and slip bases see the *Traffic Manual*, Chapter 9.

#### **7-02.4 Shield the Fixed Object**

If it is not practical to eliminate, relocate, or make a fixed object breakaway, it should be considered for shielding. All traffic safety systems used to shield fixed objects are also fixed objects. Traffic safety systems do not prevent collisions but are intended to reduce the severity by shielding a fixed object. See also Topic 7-03.5, Guardrail at Fixed Objects, for more information.

Longitudinal railings or barriers such as guardrail, median barrier, and bridge railing are designed to redirect a vehicle, and can be used to shield fixed objects.

Crash cushions can be used to shield fixed objects or the ends of barriers, and are designed to safely decelerate passenger vehicles to a stop in head-on impacts. See Topic 7-06 for more information about crash cushions.