# 308 BARRIERS

## 308.01 BARRIER NEED

The roadside barrier's primary function is to prevent errant vehicles from leaving the roadway. Barrier need is based on the premise that installing a barrier will reduce the number of accidents and/or reduce the magnitude of an accident at that location. The engineer must also evaluate the barrier installation itself to be less hazardous than the hazard. Efforts shall be made to eliminate hazards within the clear zone prior to considering any barrier installations.

When determining barrier requirements, the following factors must be considered:

- Risks involved with encroaching on a hazard versus colliding with a barrier.
- Evaluating roadway design speed and traffic volumes to barrier need.
- Evaluating costs of installing and maintaining a barrier system versus not installing a barrier system.
- Costs of accidents involving barriers versus not involving a barriers.

Figure 300.07 for example, compares the risks involved with encroaching on an embankment versus colliding with a barrier. Embankments that fall outside the shaded region do not warrant shielding. Figure 300.07 however does not not take into account other factors such as, object hazards on the embankments within the clear zone, installation and maintenance costs of a barrier system, and accident costs involving a barrier system. All these factors must be considered together when evaluating barrier needs.

As previously stated, if hazards exist within the borders of the clear zone, efforts shall be made to eliminate the hazard first, prior to considering barrier installation. These considerations can include any of the following:

- Regrading of roadside topography in the clear zone to a smooth and safe cross section.
- Extend exposed pipes, culverts and install headwalls outside the clear zone.
- Install drop inlets for roadside drainage systems rather than exposed pipes and culverts.
- Remove or relocate all manmade or natural fixed obstacles such as utility poles, signs, luminare supports, trees, and boulders.
- Install breakaway bases for signs and luminare supports if removal or relocation is not practical.

## 308.02 ROADSIDE BARRIER TYPES AND FEATURES

There are two types of roadside barriers commonly used. See Figure 300.08.

- Blocked-Out W-Beam Barrier
- Roadside Concrete Barriers

**Block-Out W-Beam Barrier** - This barrier system is the mainly used as a guardrail system. It shall be installed in most locations that warrants a guardrail system, except for urban areas and locations that require a concrete barrier. This system has been tested to successfully redirect 800-2000 kg vehicles. It has also successfully redirected a 2100 kg van at impact conditions of 21° at 95 kph.

**Concrete Safety Shape Barrier** - The concrete safety shape roadside barrier is a rigid system designed to redirect vehicles without any deflection. Because of its rigidity, vehicles would have a higher probability of overturning or vaulting over the barrier. Therefore, shape of the front face of the barrier is critical to its performance. The distance from the top of the roadway surface to the break between the upper and lower slopes shall not exceed 330 mm.

Roadside barriers are also designed with varying heights to counteract overturning moments of trucks with high centers of gravity. The basic roadside barrier is designed at 810 mm high. At this height, the roadside barrier can successfully redirect 820-2000 kg vehicles, and occasionally redirect 18,000 kg buses at moderate impact. A roadside barrier designed at 1070 mm high, have successfully redirected a 36,300 kg tractor-trailer with impact conditions of 15° at 84 kph.