



Engineering Analysis of the Installation of Spike Strips And Other Destructive Devices in Freeway Exit Ramps

A common suggestion for addressing the Wrong Way Driver issue is to place spike strip devices normally seen at the exits for paid parking lots on freeway exit ramps. These devices have been investigated as a potential wrong way driver counter measure as far back as the 1960's. These studies have shown that the installation of spike strips (or any other device placed in the travel lanes designed to damage a vehicle) presents a significant danger to the traveling public, including vehicles traveling in the correct direction on exit ramps.

Engineering reasons for NOT placing permanent spike strips or other destructive devices at exit ramps to prevent wrong way drivers include:

1. Tire spike strips are designed for very low-speed locations. They are effective when used at parking lots, parking garages, and toll booths, and are usually used in conjunction with gates. Manufacturers' literature specifies that they are intended for installation at locations where speeds do not exceed 5 mph. They are not designed to work at high-speed, high-volume traffic locations such as freeway exit ramps. If such a system was installed, the freeway exit speeds would have to be lowered to the design speed of the destructive system (5 miles per hour). This would result in significant traffic backups on urban freeways, and would not eliminate the threat created by the devices to vehicles traveling in the correct direction.
2. During testing, the spikes, even when modified in shape, did not cause the tires to deflate quickly enough to prevent a vehicle from entering the freeway.
3. During testing, under high-volume and high speed traffic conditions, the spikes broke, leaving stubs that damaged the tires of right-way vehicles.
4. Right-way drivers, seeing the spiked barrier devices in the pavement ahead, perceive them as a hazard, and hit their brakes creating a hazardous situation.
5. During an ice storm, the freezing conditions may prevent the spikes from folding down when driven over in the right direction.
6. Over time, dirt, debris, etc. will build up within the devices, impeding the ability of the device to fully fold down as intended.
7. The metal surface of the spike strips would be a hazard during rain, mist and ice conditions, due to the lack of traction across the device.
8. Even when functioning properly, the devices would pose an immediate hazard to motorcycles and small cars exiting in the correct direction.
9. Because no commercially available spike strip system exists that has been designed for permanent installation on roadways with speeds greater than 5 mph, the cost to pursue this would be extremely high. Such a system would have to be designed from scratch, with very detailed specifications developed. Extensive testing of the system would be required. This system would have to be built using extremely high quality (expensive) materials. Due to the significant potential hazard to right way drivers, the system would have to be monitored around the clock, requiring that some type of remote telemetry be included in the design. Any failure of the system could result in damage to a right-way vehicle, so maintenance technicians would have to be immediately dispatched 24/7 to address any issues that are detected with the destructive systems.
10. All traffic control devices installed on state highways must be in compliance with the Manual of Uniform Traffic Control Devices (MUTCD). Due to the risk of damaging vehicles traveling in the correct direction, and the associated injuries and fatalities for occupants of right way vehicles, such devices are not MUTCD compliant, and it is unlikely that a licensed professional engineer would sign and seal the plans to install such a device in a highway exit ramp situation.

The placement of spike strips or other destructive devices cannot be considered by the Texas Department of Transportation due to the significant risk the installation of such a device would create for drivers traveling in the correct direction on the ramps.