

Memorandum

To: MR. GERRY MEIS, Chief
Office of Signs, Delineation
and Technical Support

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From: **DEPARTMENT OF TRANSPORTATION**
Traffic Operations
Office of Traffic Safety Program and Research
Mail Station 36

Subject: Changes to Traffic Manual 6-03.2 Rumble Strips

Attached are revisions to **Traffic Manual 6-03.2 – Rumble Strips** that were developed as part of a research study on Rumble Strips by the Traffic Safety Research Branch.

These changes should be effective immediately and sent to the districts as part of a manual supplement so that Traffic Manual changes will be in place with new Special Provisions and Standard Plans that will be distributed to the districts.

If you have any questions, please contact Mr. Craig Copelan of my staff at (916) 654-4682, or Mr. Troy Bucko at (619) 688-4275.



JESSE BHULLAR, Chief
Office of Traffic Safety Program
and Research

Attachments

Special Pavement Treatments 6-03

6-03.1 Advance Markers - Exit Ramps

A 3-2-1 countdown pattern of one-way clear reflective pavement markers may be used to help motorists locate exit ramps in heavy fog areas.

The pattern consists of three markers placed on the right shoulder about 630 m in advance of the neutral area (gore), two markers at about 420 m and one marker at about 210 m. The markers are placed on a line perpendicular to the lane line at 0.3 m spacing beginning 50 mm off the edge of traveled way.

6-03.2 Rumble Strips

Rumble strips are bands of raised material or indentations formed or grooved in the traveled way or shoulders. Rumble strips call the motorist's attention to standard warning or regulatory devices or otherwise alert drivers by transmitting sound and/or vibration through the vehicle.

Rumble strips should not be used **in the traveled way** on California's streets and highways unless standard traffic control devices have been thoroughly evaluated and documented and the traffic engineer considers their use as the optimal solution to the identified problem.

The use of rumble strips on State highways requires approval by the District Traffic Engineer. Requests should include a description of location, reasons for use, the alternatives which were considered, collision history and a discussion of standard traffic control devices which have been or are in place.

1. TRAVELED WAY RUMBLE STRIPS

Rumble strips on the traveled way are 19 mm or less in height if raised or 25 mm or less in depth if rolled-in indentations, 8.5 mm +/- 1.5 mm if ground-in indentations and generally extend across the travel lanes.

There are several significant disadvantages to the use of rumble strips across the travel lanes.

These include:

- An abrupt rise or depression in the roadway can present problems to bicyclists and motorcyclists. For this reason, there should be provisions made for cyclists to safely traverse through or around rumble strips.
- Nearby residents may be subjected to continuous noise and vibration in residential areas prompting citizen's complaints.
- All motorists are subjected to the noise and vibration whereas only a few are in need of this effect to be alerted.
- Motorists may make unusual maneuvers to avoid rumble strips.

Typical locations where rumble strips on the traveled way have been used include:

- End of a freeway.
- In advance of toll booths.
- Within a construction zone in advance of the workers.
- In advance of a "T" Intersection where the motorist is not expecting to stop.

2. SHOULDER RUMBLE STRIPS

Shoulder rumble strips are 19 mm or less in height if raised 25 mm in depth for rolled-in indentations and 8.5 mm +/- 1.5 mm for ground-in indentations that extend along the highway shoulder. The maximum width of shoulder rumble

strips is 300 mm for both rolled-in and ground-in indentations.

Where bicycles are permitted, shoulder rumble strips should not be used unless approximately 1.5 m of clear shoulder width for bicycle use is available between the rumble strips and the outer edge of the shoulder. If shoulder width is less than 1.5 m and rumble strips are required, then only raised and inverted profile thermoplastic stripe shall be used. Ground-in rumble strip treatments that are greater than 8.5 mm +/- 1.5 mm in depth shall not be installed on shoulders where bicyclists are allowed.

Research findings indicate that the use of rumble strips on shoulders of freeways in remote areas may reduce drift-off-road accidents. Drifting off

the road is most likely to be a problem on freeways with few interchanges and long tangents. The rumble strips may consist of grooves rolled into the hot mix as part of a resurfacing project, ground-in indentation in Portland Concrete Cement or Asphalt Concrete in existing roadway shoulders, or the application of a raised and inverted profile thermoplastic. When freeways in remote areas are to be resurfaced, consideration should be given to the drift-off-road problem and the use of rumble strips considered.

Table 6-1 may be used by the District Traffic Engineer to determine the appropriate rumble strip treatment for various shoulder types.

**Table 6-1
RUMBLE STRIP INSTALLATION GUIDE**

RUMBLE STRIP TREATMENT	RUMBLE STRIP DEPTH (mm)	SHOULDER TYPE	BICYCLES PERMITTED	SHOULDER WIDTH
Rolled-In Rumble Strip Treatment Standard Plan A40	25	ACC Only	YES	1.5 meters minimum
			NO	1.2 meters minimum
Ground-In Rumble Strip Treatment Standard Plan A40	8 (+/- 1.5)	ACC and PCC	YES	1.5 meters minimum
			NO	1.2 meters minimum
Raised and Inverted Profile Thermoplastic	N/A	ACC and PCC	YES	No minimum
			NO	No minimum
Centerline Ground-In Rumble Strip Treatment Experimental	13 max	ACC and PCC	N/A	N/A