

Design Standards Letter

Letter Number: **D-1960-15**

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Section/Plan No.: **None**

Subject: **Erosion Control Structures, Standard C-232**

Body

TO ALL DIVISION, DISTRICT AND URBAN ENGINEERS:

This office has been interested for some time in the design and development of an erosion control structure to reduce scouring at the outlet and of pipe culverts on steep grades.

During the past three years we have installed some twenty "Impact Type Energy Dissipaters" as experimental projects, the majority of which were along U. S. Route 24, Lafayette County, east of Lexington where loess soils were encountered and a considerable amount of property damage might have occurred unless some erosion control measure was taken or the outlet ditches protected with stone revetment or paved with concrete.

These twenty structures have been in service some three years now and according to latest reports received from the Districts, they have been functioning very satisfactorily. The outlet velocities have been reduced to where normal channel protection (sodding only) is adequate to control the erosion in loess soils between the culvert outlet and right-of-way line.

We have, therefore, decided to issue the "Impact Type Energy Dissipaters" as a Highway Standard and one print of the full set of C-232, Headwalls between 18" and 48" pipe sizes, is enclosed for your information and file.

The hydraulic characteristics as to velocity retard ratio is about 4.5:1. In other words, a 13.5 feet per second mean velocity in the section of pipe culvert on steep grade would be retarded to about 3.0 feet per second at the outlet end of structure after passing through the energy dissipater.

Should the outlet velocity exceed 3.0 feet per second, it is the recommendation of this office that a spillway around the outlet end of the dissipater be formed by placing a small amount of rock fill or broken concrete and then using a sodded ditch section the

remaining distance to the right-of-way line.

It is not our intention to permit the promiscuous use of this new standard but only in cases where loess or very erosive soils are encountered in combination with pipe culverts on very steep grades.

If you have any questions concerning the design or use of this new standard, please advise.

**C. C. Tevis
Engineer of Surveys and Plans**