

HYDRAULIC PERFORMANCE OF SEVERAL CURB AND GUTTER INLETS

PROBLEM STATEMENT

Curb and gutter inlets are employed along roadways to capture and divert runoff from pavements. Planning for adequate capacity is important for vehicular safety, which can be adversely impacted by the spread of water into traffic lanes. Satisfactory design for pavement drainage requires an understanding of the hydraulic performance of the particular curb and gutter configuration to be installed. While some information is available, many questions and gaps in knowledge regarding hydraulic performance remain.

OBJECTIVES

This investigation into the hydraulic performance of several curb and gutter inlets was divided into three distinct phases, whose objectives included the following:

1. Extend the range of performance data (to lower longitudinal slopes) for three inlets tested previously (WPI# 0510790).
2. Re-examine Type 5 inlets; compare results to previously obtained data.
3. Examine grate gutter inlets to verify previously obtained data.

FINDINGS

Researchers constructed models at half scale and tested them in a hydraulics facility that has been used in several previous investigations. They then measured inlet capacity for each inlet tested, relating that data: (1) to the total flow in the gutter and (2) indirectly to the depth in the gutter. Results can be used to design an effective drainage system and to estimate spread onto the pavement.

CONCLUSIONS

1. Data and empirical correlations were extended for three inlets examined in previous investigation.
2. Researchers constructed and tested a model Type 5 inlet, deriving empirical correlations from the resulting data. Researchers then compared the results obtained with data obtained by Anderson in 1972. The data obtained from the current study predicts less capacity than was predicted by Anderson. No cause was found for this discrepancy, although it appears that his

capacity data may suffer from a systematic error. The results of the present investigation would be conservative if used for design.

3. The performance characteristics of a grated gutter inlet have been documented for several longitudinal slope conditions and for two grate configurations. Performance generally is in line with that of other gutter and curb inlets.

Researchers developed design information. They found that bypass can occur either by flow around the entrance or by flow traveling directly across the top of the grating. Researchers developed a simple model to explain transport directly across the grating. Inlet capture appears to be a function primarily of normal depth in the gutter upstream, at least for the range of parameters examined in this study. Researchers attempted to resolve the discrepancies with the results obtained in the 1972 study. The present research, however, did not support the unusual inversion in performance data observed by Anderson. Thus, the results of this investigation should replace the results of Anderson's investigation.

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