

An equation for evaluating the depth of stormwater on pavement is expressed as:

$$WD = 25.4 \{0.00338 [(0.039TXD0.110.305L0.430.039i0.59) / Sx0.42] - 0.039TXD\}$$

(Eq. A3-2)

where:

- L = pavement width, in metres
I = rainfall intensity, in millimetres/hr
S_x = pavement cross slope, in m/m

The following guidelines for pavement drainage can help reduce the potential for hydroplaning problems:

- A permeable surface course or a high macrotexture surface course appears to have the highest potential for reducing hydroplaning accidents. This has been accomplished using friction courses.
- Pavement cross slope is the dominant factor in removing water from the pavement surface. A minimum cross slope of 1.5 percent is recommended.
- As a guideline, a wheel path depression in excess of 5 millimetres should be considered as a threshold to indicate the need for resurfacing to reduce the potential for pavement drainage problems on dense asphaltic concrete or portland cement concrete pavements. The potential for hydroplaning is greater from wheel path settlement and wear depressions than from sheet flow depth. This is also true for most multi-lane facilities.
- Surface drains located parallel to the lane lines will probably not solve potential drainage problems caused by the creation of wheel path depressions.
- Transverse surface drains located on the pavement surface would probably result in a rough pavement, increase maintenance costs, and increase potential for ponding water, and are not recommended for general use.
- Grooving may be considered as a corrective measure for severe localized hydroplaning problems.

A3.4 Spread

The design storm frequency for pavement drainage should be consistent with the frequency selected for other components of the drainage system.

A3.4.1 Selection Considerations

The major considerations for selecting a design frequency and spread are:

- Highway classification, because it defines and reflects public expectations for finding water on the pavement surface. Ponding should be minimized on the traffic lanes of high-speed, high-volume highways, where it is not expected to occur.
- Highway speed, because at speeds greater than 75 kilometres per hour, even a shallow depth of water on the pavement can cause hydroplaning. Design speed is recommended for use in evaluating hydroplaning potential. When the design speed is selected, consideration should be given to the likelihood that legal posted speeds may be exceeded. It is clearly unreasonable to provide the same level of pavement drainage for low speed facilities as for high speed facilities.