I SCS RUNOFF CURVE

The SCS Runoff Curve Number method is developed by the United States Department of Agriculture (USDA) Soil Conservation Service (SCS) and is a method of estimating rainfall excess from rainfall (Hjelmfelt, 1991). The method is described in detail in National Engineering Handbook (2004). The chapter was prepared originally by Mockus (1964), and was revised by Hjelmfelt (1998) with assistance from the NRCS Curve Number work group and H.F. Moody.

Soil Conservation Service - Curve Number (SCS - CN) method is employed to estimate the runoff. It is one of the physical based and spatially distributed hydrological models. In this model, the curve number is a primary factor used for runoff calculation

1.1 ADVANTAGES

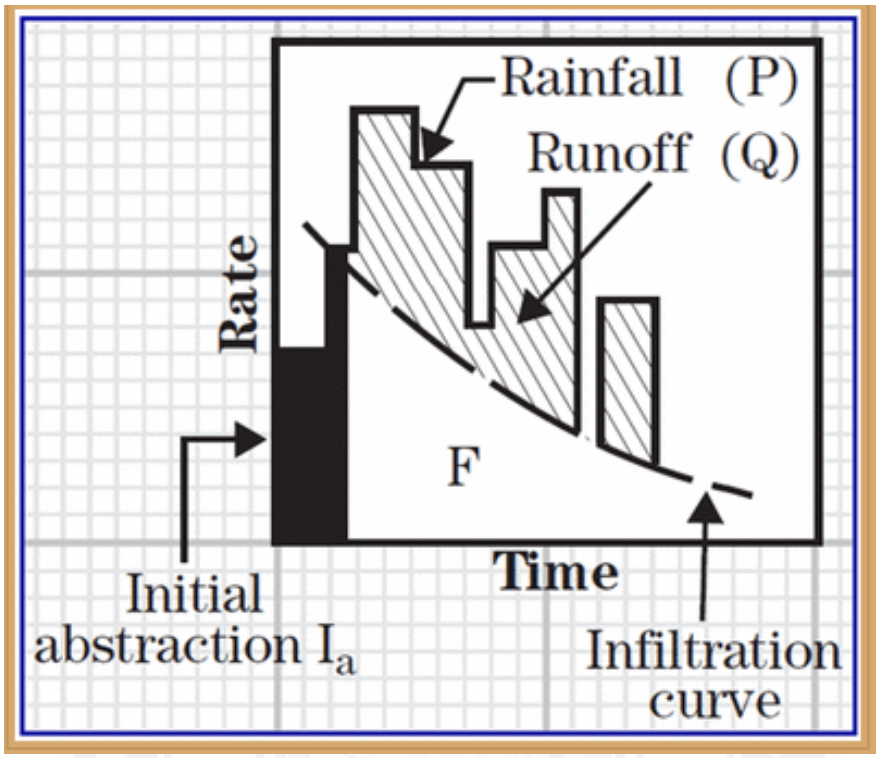
It is one of the most popular methods for computing the volume of surface runoff for a given rainfall event from small agricultural, forest, and urban watersheds. The method is simple, easy to understand and apply, stable, and useful for ungauged watersheds.

$$Q = \frac{(P - Ia)^2}{(P - Ia) + S} \quad \text{----------(1)}$$

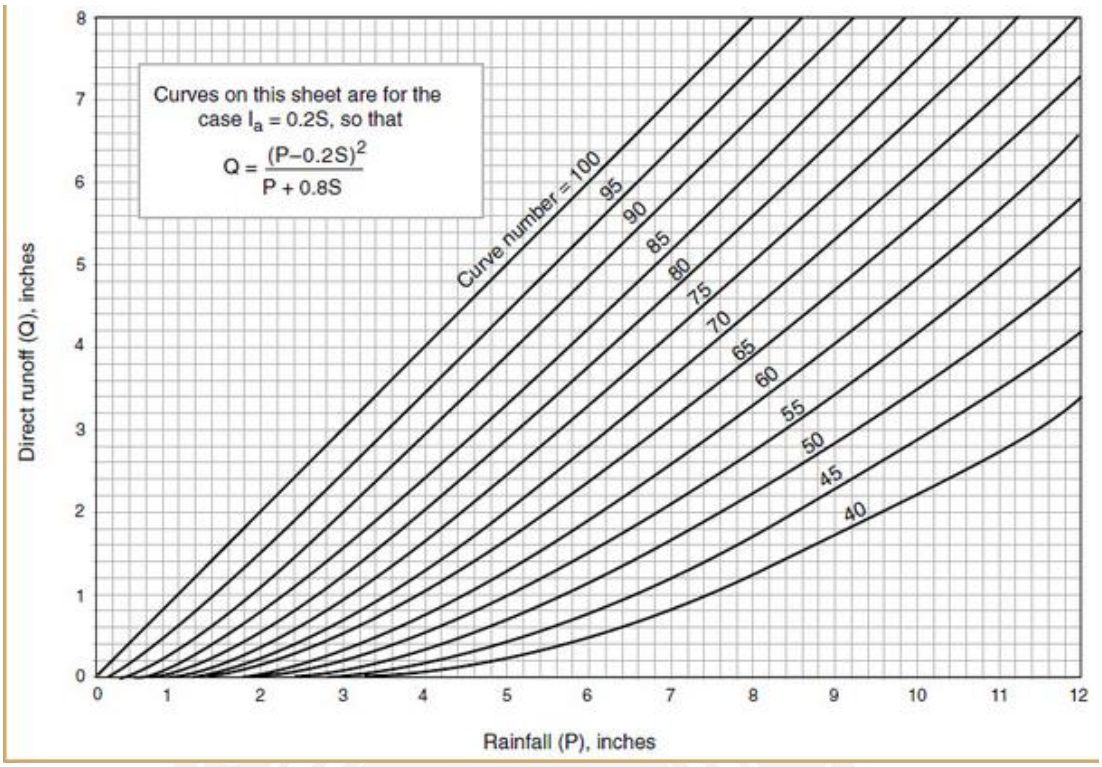
Ia=0.2S

$$S = \left(\frac{1000}{CN}\right) - 10) \quad \text{----------(2)}$$

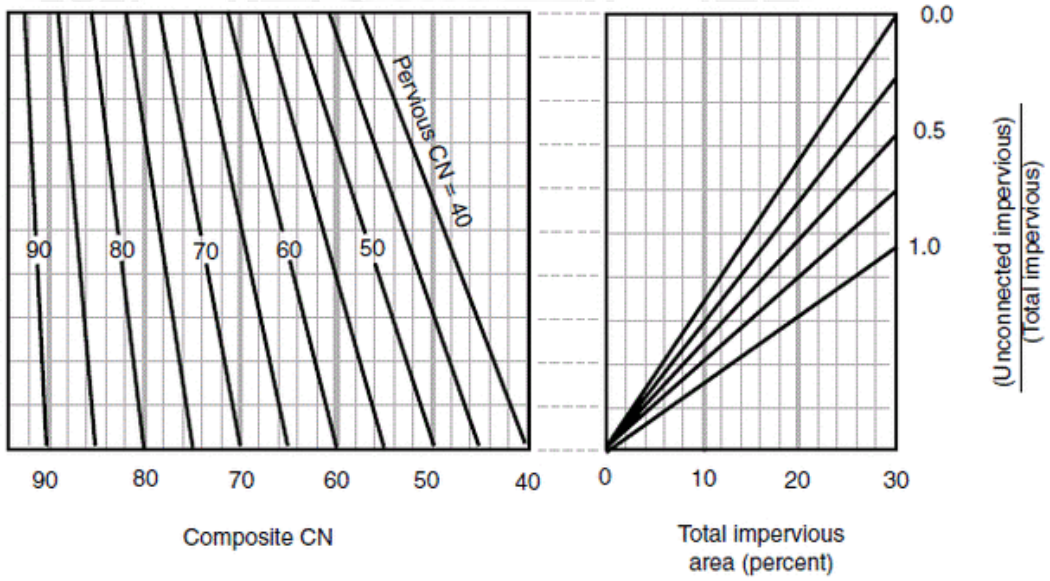
$$Q = \frac{(P - 0.2S)^2}{(P + 0.8S)} \quad \text{----------(3)}$$



When the drainage area consists of landuse with impervious cover (Directly Connected or Unconnected), TR 55 provides separate graphs for computing the composite curve number values depending on the percent of the impervious cover. However, it is a good practice to calculate the runoff from impervious area and pervious area separately and then add the volume.



SCS runoff curve pervious layer



SCS runoff curve unconnected impervious layer

Example:

Calculate the runoff depth for the 100 year storm event over the watershed with an average CN of 75 using the SCS Runoff Method. The design rainfall for 100 year storm event is 8.5 inches and drainage area is approximately 120 acres.

Solution: Follow the steps below:

Using equation 2above, calculate the maximum potential retention S.

Using equation 3 above, calculate the runoff depth.

Multiply the Q inches with the drainage area and convert the units to commonly used volume units of 'ac-ft'.