

RUNOFF ESTIMATION BY USING RATIONAL METHOD: A REVIEW

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ABSTRACT

The rational method is used to evaluate the surface runoffs on peak stages occurred at small areas like field lands, parking spots, public parks etc. This method does not provide any accurate infiltration rate. In this method we observe especially water movements and their inputs through hydrological cycle. By using of this method there is no timing collaboration between the peak flow.

KEYWORDS: *Rational Method*

Article History

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INTRODUCTION

Rational method was first used in 1889 developed by Emil Kuichling. The Rational equation is easiest method to obtain peak runoff from watershed. The most common and quickest method of runoff estimation. The rational method is the oldest method still probably the most widely used method for design of storm drains. This method is for small areas, especially the size of the drainage basin fixed to a few acres¹

RUNOFF ESTIMATION BY USING RATIONAL METHOD

Rational Equation: $Q = CIA$

Where, Q = peak discharge, CFS

C = Runoff Coefficient (Rational Method)

I = Rainfall Intensity, mm/hour

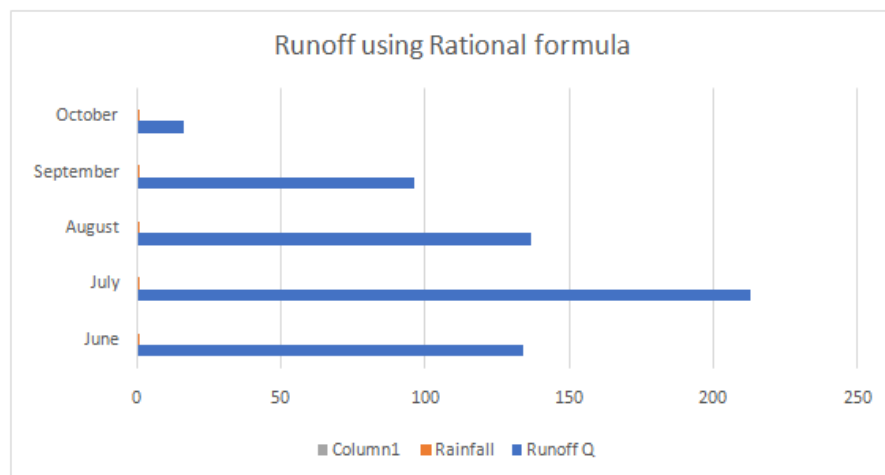
A = Drainage Area

Table 1: Calculation of C Value

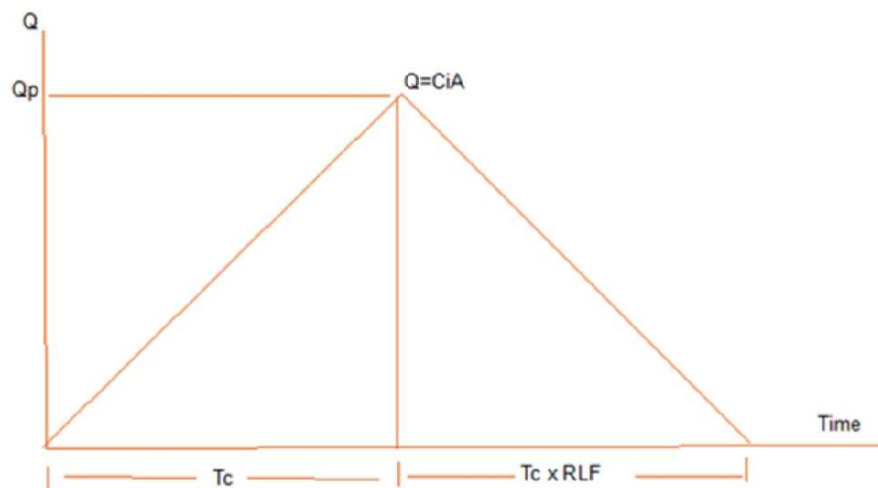
Land Use	Area	Value of C	Area* C	Final Value of C
Agriculture	2750.11	0.0605	166.382	
Built-up	46.25	0.0625	2.89063	
Forest	2.336	0.15	0.3504	
Grassland	5.14	0.0175	0.08995	0.06
Wastelands	526.95	0.05	26.3475	
Water bodies	103.81	0.095	9.86195	
Wet lands	1.11	0.9	0.999	
Other	39.19	0.2	7.838	
Total	3474.89		214.759	

Table 2: Calculation of Runoff from Rational Formula

Month	Average Rainfall of all Stations (mm)	Average Intensity of Rainfall(mm)	Area (km ²)	Q = CIA(mm)
June	134.054	0.335		69.874
July	212.897	0.515		107.390
August	136.965	0.331	3474.92	69.0885
September	96.261	0.240		50.175
October	16.193	0.039		8.1697

**Figure 1****LIMITATIONS**

- It suppose that rainfall intensity is constant over the whole watershed throughout the period of the storm, which is very rare.
- The foremost losses due to decline storage and foremost infiltration are not allowed.
- Runoff coefficient changes with regards to season as well as rainfall attributes, which is not allowed in rational formula.
- The considerable flaw to the Rational method is that it generally allows only one point on the runoff hydrograph.

**Figure 2**

CONCLUSIONS

This is a simple method to estimate the runoff in small areas by using 'c' value or runoff coefficient. It is much easier to represent variation in hydrological responses within that area. It is also used to calculate accurate evaluations than other models.

REFERENCES

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