Important SCS Triangular Unit Hydrograph Formulas PDF

Formulas
Examples
with Units

List of 13
Important SCS Triangular Unit Hydrograph Formulas

1) Base Length in SCS Triangular Unit Hydrograph Formula

Evaluate Formula

Formula

$$T_b = 2.67 \cdot T_p$$

Example with Units

$$18.69\,\text{m} = 2.67 \cdot 7\,\text{h}$$

2) Catchment Area given Peak Discharge Formula

Evaluate Formula

Formula

$$A = T_p \cdot \frac{Q_p}{2.08}$$

Example with Units

$$2.9986\,\text{km}^2 = 7\,\text{h} \cdot \frac{0.891\,\text{m}^3/\text{s}}{2.08}$$

3) Duration of Effective Rainfall for given Time of Peak Formula

Evaluate Formula

Formula

$$t_r = 2 \cdot \left(T_p - 0.6 \cdot t_c \right)$$

Example with Units

$$2\,\text{h} = 2 \cdot \left(7\,\text{h} - 0.6 \cdot 10\,\text{h} \right)$$

4) Duration of Effective Rainfall given Time of Peak Formula

Evaluate Formula

Formula

$$t_r = 2 \cdot \left(T_p - t_p \right)$$

Example with Units

$$2\,\text{h} = 2 \cdot \left(7\,\text{h} - 6\,\text{h} \right)$$

5) Lag Time given Time of Peak Formula

Evaluate Formula

Formula

$$t_p = T_p - \frac{t_r}{2}$$

Example with Units

$$6\,\text{h} = 7\,\text{h} - \frac{2\,\text{h}}{2}$$

6) Peak Discharge Formula

Evaluate Formula

Formula

$$Q_p = 2.08 \cdot \frac{A}{T_p}$$

Example with Units

$$0.8914\,\text{m}^3/\text{s} = 2.08 \cdot \frac{3.00\,\text{km}^2}{7\,\text{h}}$$

7) Time of Concentration given Time of Peak Formula

Evaluate Formula

Formula

$$t_c = \frac{T_p - \left(\frac{t_r}{2}\right)}{0.6}$$

Example with Units

$$10\,\text{h} = \frac{7\,\text{h} - \left(\frac{2\,\text{h}}{2}\right)}{0.6}$$

8) Time of Peak given Base Length Formula

Evaluate Formula

Formula

$$T_p = \frac{T_b}{2.67}$$

Example with Units

$$7\,\text{h} = \frac{18.69\,\text{m}}{2.67}$$

9) Time of Peak given Peak Discharge Formula

Evaluate Formula

Formula

$$T_p = 2.08 \cdot \frac{A}{Q_p}$$

Example with Units

$$0.0019\,\text{h} = 2.08 \cdot \frac{3.00\,\text{km}^2}{0.891\,\text{m}^3/\text{s}}$$

10) Time of Peak given Time of Concentration Formula

Evaluate Formula

Formula

$$T_p = 0.6 \cdot t_c + \frac{t_r}{2}$$

Example with Units

$$7\,\text{h} = 0.6 \cdot 10\,\text{h} + \frac{2\,\text{h}}{2}$$

11) Time of Peak given Time of Recession Formula

Evaluate Formula

Formula

$$T_p = \frac{Tc}{1.67}$$

Example with Units

$$7.1856\,\text{h} = \frac{12\,\text{h}}{1.67}$$

12) Time of Peak or Time of Rise Formula

Evaluate Formula

Formula

$$T_p = \left(\frac{t_r}{2}\right) + t_p$$

Example with Units

$$7\,\text{h} = \left(\frac{2\,\text{h}}{2}\right) + 6\,\text{h}$$

13) Time of Recession as Suggested in SCS Formula

Evaluate Formula

Formula

$$Tc = 1.67 \cdot T_p$$

Example with Units

$$11.69\,\text{h} = 1.67 \cdot 7\,\text{h}$$

Variables used in list of SCS Triangular Unit Hydrograph Formulas above

- **A** Area of Catchment *(Square Kilometer)*
- Q_p Peak Discharge *(Cubic Meter per Second)*
- T_b Base Length *(Meter)*
- t_c Time of Concentration *(Hour)*
- t_p Basin Lag *(Hour)*
- T_p Time of Peak *(Hour)*
- t_r Standard Duration of Effective Rainfall *(Hour)*
- **Tc** Time of Recession *(Hour)*

Constants, Functions, Measurements used in list of SCS Triangular Unit Hydrograph Formulas above

- Measurement: **Length** in Meter (m)
  Length Unit Conversion
- Measurement: **Time** in Hour (h)
  Time Unit Conversion
- Measurement: **Area** in Square Kilometer (km²)
  Area Unit Conversion
- Measurement: **Volumetric Flow Rate** in Cubic Meter per Second (m³/s)
  Volumetric Flow Rate Unit Conversion

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