Important Prediction of Sediment Distribution Formulas PDF

Formulas
Examples
with Units

List of 16
Important Prediction of Sediment Distribution Formulas

1) Area Increment Method Formulas

1.1) Depth at which Reservoir is Completely Filled up Formula

Evaluate Formula

Formula

$$h_o = H - \left(\frac{V_s - V_o}{A_o} \right)$$

Example with Units

$$2\,\text{m} = 11\,\text{m} - \left(\frac{455\,\text{m}^3 - 5\,\text{m}^3}{50\,\text{m}^2} \right)$$

1.2) Incremental Sediment Volume Formula

Evaluate Formula

Formula

$$V_o = \left(A_o \cdot \Delta H \right)$$

Example with Units

$$25\,\text{m}^3 = \left(50\,\text{m}^2 \cdot 0.5\,\text{m} \right)$$

1.3) Original Reservoir Area at New Zero Level Formula

Evaluate Formula

Formula

$$A_o = \frac{V_s - V_o}{H - h_o}$$

Example with Units

$$50\,\text{m}^2 = \frac{455\,\text{m}^3 - 5\,\text{m}^3}{11\,\text{m} - 2\,\text{m}}$$

1.4) Sediment Volume between Old Zero and New Zero Bed Level Formula

Evaluate Formula

Formula

$$V_o = V_s - \left(A_o \cdot \left(H - h_o \right) \right)$$

Example with Units

$$5\,\text{m}^3 = 455\,\text{m}^3 - \left(50\,\text{m}^2 \cdot \left(11\,\text{m} - 2\,\text{m} \right) \right)$$

1.5) Sediment Volume to be Distributed in Reservoir Formula

Evaluate Formula

Formula

$$V_s = A_o \cdot \left(H - h_o \right) + V_o$$

Example with Units

$$455\,\text{m}^3 = 50\,\text{m}^2 \cdot \left(11\,\text{m} - 2\,\text{m} \right) + 5\,\text{m}^3$$

2) Empirical Area Reduction Method Formulas

2.1) Difference in Elevations and Original Bed of Reservoir given New Total Depth of Reservoir Formula

Evaluate Formula

Formula

$$H = D + h_o$$

Example with Units

$$11\,\text{m} = 9\,\text{m} + 2\,\text{m}$$

2.2) Difference in Elevations of Full Reservoir Level and Original Bed of Reservoir Formula

Evaluate Formula

Formula

$$H = \frac{h_o}{p}$$

Example with Units

$$11.0011\,\text{m} = \frac{2\,\text{m}}{0.1818\,\text{m}}$$

2.3) Height up to which Sediment Completely Fills up given New Relative Depth Formula

Evaluate Formula

Formula

$$h_o = p \cdot H$$

Example with Units

$$1.9998\,\text{m} = 0.1818\,\text{m} \cdot 11\,\text{m}$$

2.4) New Total Depth of Reservoir Formula

Evaluate Formula

Formula

$$D = H - h_o$$

Example with Units

$$9\,\text{m} = 11\,\text{m} - 2\,\text{m}$$

2.5) Relative Area for Different Type Classification of Reservoir Formula

Evaluate Formula

Formula

$$A_p = C \cdot \left(p^{m_1} \right) \cdot \left(1 - p \right)^{n_1}$$

Example with Units

$$0.2015 = 5.074 \cdot \left(0.1818\,\text{m}^{1.85} \right) \cdot \left(1 - 0.1818\,\text{m} \right)^{0.36}$$

2.6) Relative Area given Soil Erodibility Factor Formula

Evaluate Formula

Formula

$$A_p = \frac{A_s}{K}$$

Example with Units

$$1.9 = \frac{0.323\,\text{m}^2}{0.17}$$

2.7) Relative Depth at New Zero Elevation Formula

Evaluate Formula

Formula

$$p = \frac{h_o}{H}$$

Example with Units

$$0.1818\,\text{m} = \frac{2\,\text{m}}{11\,\text{m}}$$

2.8) Sediment Area at any Height above Datum Formula

Evaluate Formula

Formula

$$A_s = A_p \cdot K$$

Example with Units

$$0.323\,\text{m}^2 = 1.9 \cdot 0.17$$

2.9) Volume of Sediment Deposited between two Consecutive Heights by Average End Area Method Formula

Evaluate Formula

Formula

$$\Delta V_s = \left(A_1 + A_2 \right) \cdot \left(\frac{\Delta H}{2} \right)$$

Example with Units

$$5\,\text{m}^3 = \left(14\,\text{m}^2 + 6\,\text{m}^2 \right) \cdot \left(\frac{0.5\,\text{m}}{2} \right)$$

2.10) Volume of Sediment Deposited between two Consecutive Heights by Weighted Area Method Formula

Evaluate Formula

Formula

$$\Delta V_s = \left(A_1 + A_2 + \sqrt{A_1 \cdot A_2} \right) \cdot \left(\frac{\Delta H}{3} \right)$$

Example with Units

$$4.8609\,\text{m}^3 = \left(14\,\text{m}^2 + 6\,\text{m}^2 + \sqrt{14\,\text{m}^2 \cdot 6\,\text{m}^2} \right) \cdot \left(\frac{0.5\,\text{m}}{3} \right)$$

2.11) Volume of Sediment Deposition given Incremental Area Formula

Evaluate Formula

Formula

$$\Delta V_s = 0.5 \cdot \left(\left(A_1 + A_2 \right) \cdot \Delta H \right)$$

Example with Units

$$5\,\text{m}^3 = 0.5 \cdot \left(\left(14\,\text{m}^2 + 6\,\text{m}^2 \right) \cdot 0.5\,\text{m} \right)$$

Variables used in list of Prediction of Sediment Distribution Formulas above

- A_1 Cross-Sectional Area at Point 1 *(Square Meter)*
- A_2 Cross-Sectional Area at Point 2 *(Square Meter)*
- A_o Area at the New Zero Elevation *(Square Meter)*
- A_p Dimensionless Relative Area
- A_s Sediment Area *(Square Meter)*
- **C** Coefficient c
- **D** New Total Depth of Reservoir *(Meter)*
- **H** Difference in the Elevation (FRL and Original bed) *(Meter)*
- h_o Height above Bed *(Meter)*
- **K** Soil Erodibility Factor
- m_1 Coefficient m1
- n_1 Coefficient n1
- **p** Relative Depth *(Meter)*
- V_o Volume of Sediment *(Cubic Meter)*
- V_s Volume of Sediment to be Distributed *(Cubic Meter)*
- ΔH Change in Head Between the Points *(Meter)*
- ΔV_s Volume of Sediment Deposit *(Cubic Meter)*

Constants, Functions, Measurements used in list of Prediction of Sediment Distribution Formulas above

- Functions: **sqrt**, sqrt(Number)
  A square root function is a function that takes a non-negative number as an input and returns the square root of the given input number.
- Measurement: **Length** in Meter (m)
  Length Unit Conversion
- Measurement: **Volume** in Cubic Meter (m^3)
  Volume Unit Conversion
- Measurement: **Area** in Square Meter (m^2)
  Area Unit Conversion

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