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Prediction of Sediment Distribution Formulas

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List of 16 Prediction of Sediment Distribution Formulas

Prediction of Sediment Distribution

Area Increment Method

1) Depth at which Reservoir is Completely Filled up

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

Open Calculator 

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

2) Incremental Sediment Volume

$$fx \quad V_o = (A_o \cdot \Delta H)$$

Open Calculator 

$$ex \quad 25m^3 = (50m^2 \cdot 0.5m)$$

3) Original Reservoir Area at New Zero Level

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

Open Calculator 

$$ex \quad 50m^2 = \frac{455m^3 - 5m^3}{11m - 2m}$$



4) Sediment Volume between Old Zero and New Zero Bed Level

$$fx \quad V_o = V_s - (A_o \cdot (H - h_o))$$

[Open Calculator !\[\]\(cbe80b694ebd74fcfe136a095b608235_img.jpg\)](#)

$$ex \quad 5m^3 = 455m^3 - (50m^2 \cdot (11m - 2m))$$

5) Sediment Volume to be Distributed in Reservoir

$$fx \quad V_s = A_o \cdot (H - h_o) + V_o$$

[Open Calculator !\[\]\(3e2231b1ad3ca8da8658228c00dd08e0_img.jpg\)](#)

$$ex \quad 455m^3 = 50m^2 \cdot (11m - 2m) + 5m^3$$

Empirical Area Reduction Method

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

$$fx \quad H = D + h_o$$

[Open Calculator !\[\]\(b792654f2cef9719eabeb6c5be00811e_img.jpg\)](#)

$$ex \quad 11m = 9m + 2m$$

7) Difference in Elevations of Full Reservoir Level and Original Bed of Reservoir

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

[Open Calculator !\[\]\(84f47badaad7772cd95667a7c387a639_img.jpg\)](#)

$$ex \quad 11.0011m = \frac{2m}{0.1818m}$$



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

$$fx \quad h_o = p \cdot H$$

[Open Calculator !\[\]\(e78f798d4ea5c530c9db49e7d26e6b95_img.jpg\)](#)

$$ex \quad 1.9998m = 0.1818m \cdot 11m$$

9) New Total Depth of Reservoir

$$fx \quad D = H - h_o$$

[Open Calculator !\[\]\(05be7c7a8995decd503647c99211f7c2_img.jpg\)](#)

$$ex \quad 9m = 11m - 2m$$

10) Relative Area for Different Type Classification of Reservoir

$$fx \quad A_p = C \cdot (p^m - \{1\}) \cdot (1 - p)^n - \{1\}$$

[Open Calculator !\[\]\(fe3aebe81acea8d45108cd2768939da7_img.jpg\)](#)

$$ex \quad 0.201478 = 5.074 \cdot \left((0.1818m)^{1.85} \right) \cdot (1 - 0.1818m)^{0.36}$$

11) Relative Area given Soil Erodibility Factor

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

[Open Calculator !\[\]\(899d8b7697d64725bf017d3296cfcf1b_img.jpg\)](#)

$$ex \quad 1.9 = \frac{0.323m^2}{0.17}$$




12) Relative Depth at New Zero Elevation 

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

[Open Calculator !\[\]\(e2376d476d06eb31946dc01a69a4403a_img.jpg\)](#)


$$ex \quad 0.181818m = \frac{2m}{11m}$$

13) Sediment Area at any Height above Datum 

$$fx \quad A_s = A_p \cdot K$$

[Open Calculator !\[\]\(0b5e7e25e8775f7e7e80906ada4f0021_img.jpg\)](#)


$$ex \quad 0.323m^2 = 1.9 \cdot 0.17$$

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

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

[Open Calculator !\[\]\(bd3b31712ad9bab5a241210fa6925cdd_img.jpg\)](#)

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


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

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

[Open Calculator !\[\]\(7bc43b319a082987e20f7bf78f4bab80_img.jpg\)](#)

$$ex \quad 4.860859m^3 = \left(14m^2 + 6m^2 + \sqrt{14m^2 \cdot 6m^2} \right) \cdot \left(\frac{0.5m}{3} \right)$$



16) Volume of Sediment Deposition given Incremental Area 

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

Open Calculator 

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






Variables Used

- A_1 Cross-Sectional Area at Point 1 (*Square Meter*)
- A_2 Cross-Sectional Area at Point 2 (*Square Meter*)
- A_0 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_0 Height above Bed (*Meter*)
- K Soil Erodibility Factor
- m_1 Coefficient m_1
- n_1 Coefficient n_1
- p Relative Depth (*Meter*)
- V_0 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

- **Function:** **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 (m³)
Volume Unit Conversion 
- **Measurement:** **Area** in Square Meter (m²)
Area Unit Conversion 



Check other formula lists

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- [Estimation of Watershed Erosion and Sediment Delivery Ratio](#)
- [Formulas](#) 
- [Prediction of Sediment Distribution Formulas](#) 
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