Assignment

Subject : Hydraulic Structure

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Section : "C"

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Topic

Establish the stage discharge relationship for a concrete rectangular box culvert use suitable your own choice.

Also describe loads on bridge foundation due to scour and their working.

Stage discharge relationship is based on the relation ship between stream water depth stage and discharge at a cross section to estimate discharge over a wide range of value of discharge (Low flow) range of value of to peak flow.

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Assume Data.

Depth = $y$ = 1.3 m
width = $b$ = 5.5 m
Discharge = $Q$ = ?
Height = $P$ = 0.422 m
Velocity = $V$ = 1.2 m/sec

$Q = AV$

$Q = byV$ $\quad \because A = by$

$Q = byV$

$Q = (5.5) \times (1.3)(1.2)$

$\boxed{Q = 8.67\ m^3/sec}$

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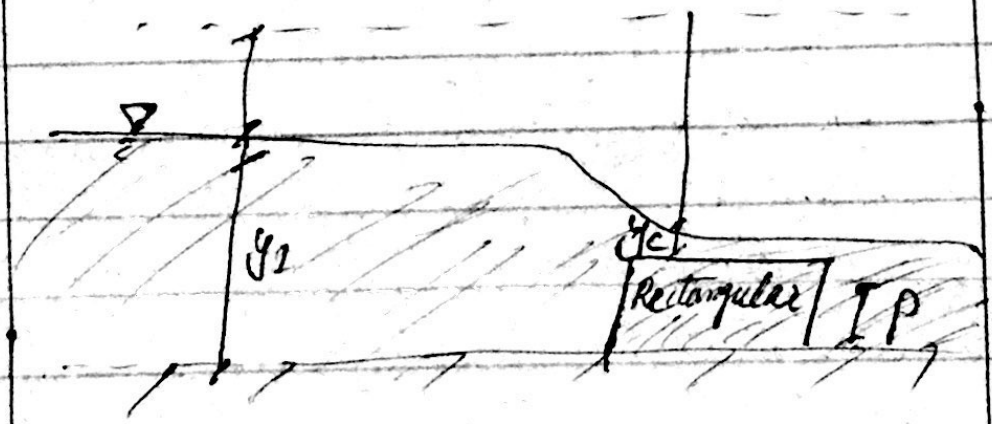
$$y_c = \left(\frac{q^2}{g}\right)^{1/3} = \left(\frac{Q^2}{b^2 g}\right)^{1/3}$$

$$y_c = \left(\frac{(8.6)^2}{(5.5)^2 \times 9.81}\right)^{1/3} \qquad \because Q = qb$$

$$q = (Q/b)$$

$$\boxed{y_c = 0.636\,m}$$

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Q2. Describe loads on bridge foundation due to scour and their working.

Answer (No. 02)

Scour of sediments around bridge foundation by the stream is the most significant factor for bridge failure. The scour failure tends to occur without warning and have led to facilities and economical loss every year. A significant amount of work has been conducted on bridge scour. Such effort can be broadly classified into two major categories namely science driven and Engineering.

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Science driven focus on understanding the scour mechanism and aim to explained the cause of scour due to different factor.

Engineering driven focuses on the estimation monitoring and countermeasure of bridge scour.

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