Name Zakir ullah

ID 77411

SECTION C

SUBMITED TO SIR HADEED SAIB

SUBJECT HYDRAULIC STRUCTURE

DATE 24/6/2020

	Culvert	Causeway
1	Culvert is of a tunnel shape carrying a stream of water a road or railway It work as a bridge to pass on it. It is normally used for natural flows of water for controlling it.	A causeway is of ocean a kind road, it is built an embankment It is supported mostly by earth or stone. And it is not a bridge because it support a roadway between piers.

PART - B

CROSS DRAINAGE WORKS :-

(2) is a structure carrying the discharge from a natural stream across a canal intercepting the stream.

NECESSARY :-

It is required to dispose of the drainage water so that the canal supply water remains uninterupted.

TYPES :-

Some types of cross drainage are following.

① ADEQUATE :- It carry an irrigation canal over a drain.

control the flow rates of rivers during periods of high discharge.

BARRAGE :—

It is used to convert tidal energy into electrical by forcing water through turbines. by activating a Generator.

Question No. 2

Reynold's number :-

The product of density times length divided by viscosity coefficient.

It is proportional to the ratio of inertial force and viscous force in a fluid flow.

Answer :-

The flow in a pipe is binary if the reynold's number is less than 2000.

If the reynolds number is greater than 4000 than it is turbulent.

REYNOLDS LAMINAR AND TURBULENT FLOW :-

When the reynold number between 2000 and 2800, the flow is neither laminar or nor turbulent.

LOWER CRITICAL VELOCITY :-

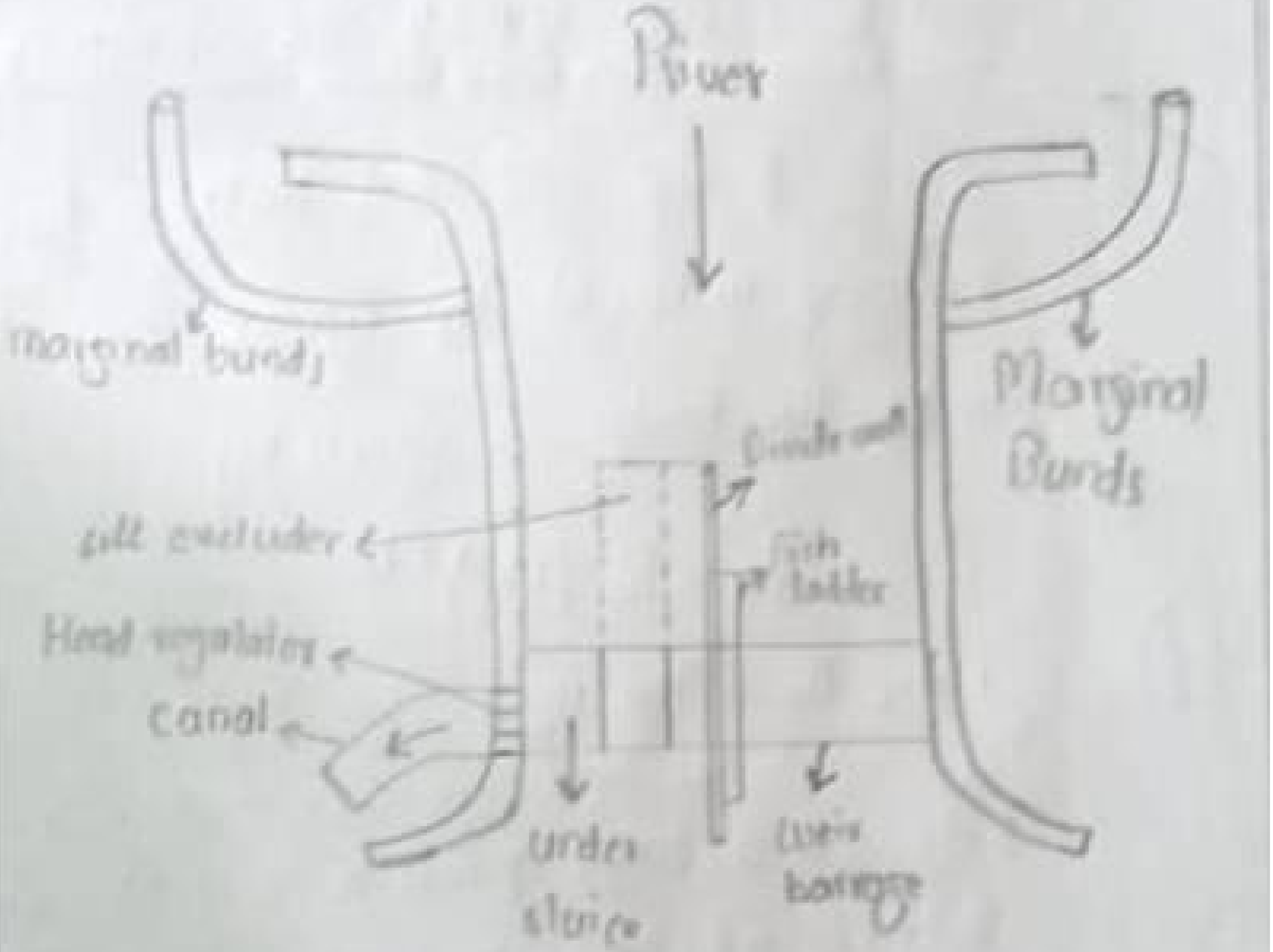
The velocity at which flow change from laminar to transition is called lower critical velocity.

HIGHER CRITICAL FLOW VELOCITY :-

The velocity at which flow changes from transition to turbulent is called Higher critical velocity.

QUESTION NO #03.

PART # A



(7)

net sketch of barrage showing its different Component.

QUESTION NO # 03

PART # B

SCOUR DEPTH UNDER THE BRIDGE :-

If the contracted width is less than the regime width, W, the normal scour depth, D_N, under the bridge is given by

$$D_N = R_s\,(W/L)^{0.41}$$

where Rs is the regime scour depth.

The maximum scour depth in a single span bridge with a straight approach is about 85% more than the normal scour given by equation, where as in the case of a multispan structure with a curved approach reach it is 10% more than the normal scour. If the contriction is predominant, the maximum scour depth is the maximum of case II or case 3 the value given by

$$D_{max} = R_s\,(W/L)^{0.52}$$

(9)

Given Data :-

L.L = 1.5 kip/ft²

D.L = 0.3 kip/ft²

ϕ = 30°

unit weight of soil = 100 lb/ft³

Dimension = 15' x 15'

f_y = 60 ksi steel

Concrete = 1:2:4 + Mix

D = 0.93 m thickness.

Solution :-

① Load :

Total load on top = self weight + L.L + D.L

self weight = 2.5 x 15 = 46 KN/m²

46 KN/m² = 0.959 kip/ft²

W = 1.5 + 0.959 + 0.3

P.T.O →

$\gamma = 9.737\ kN/m^3$

(i) Coefficient of earth pressure :-

$$K_a = \frac{1-\sin\phi}{1+\sin\phi}$$

$$= \frac{1-\sin(30)}{1+\sin(30)}$$

$$K_a = 0.33$$

(ii) Lateral pressure due to (Dead load + Live load) :-

= Total vertical load × K_a

= (1.1 + 0.4) × K_a

= (1.5 + 0.3) × 0.33

= 0.594 kg/cm²

OR

= 28.4 kN/m²

(iii) Lateral pressure due to soil :-

= $K_a \times \gamma_{soil} \times h$

= 0.33 × 0.1 × 18

= 0.594 kg/cm²

OR

= 28.4 kN/m²

⑤ lateral pressure at top due to

$$1.1 + 0.1 = 0.594 \text{ kip/ft}^2$$

or

$$= 28.4 \text{ kN/m}^2$$

⑥ lateral pressure at bottom :-

= lateral pressure due to (1.1 + 0.1) + lateral pressure due to soil.

$$= 0.594 + 0.594$$

$$= 1.188 \text{ kip/ft}^2$$

or

$$= 56.88 \text{ kN/m}^2$$