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QNO#1

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Assume that:

A steep slope entry gives entrance controls.

Here we have the stop of culvert is mild and hence subcritical flow analysis give the following results.

$$Q = 1.2 y_0 [1.2 y_0 (1.2 + 2 y_0)]^{2/3} (0.001)^{1/2} / 0.013$$
$$= 2.92 y_0 [1.2 y_0 / (1.2 + 2 y_0)]^{2/3}$$

$y_0 \approx 0.6$  equation  $\rightarrow$  (i)

$\uparrow$	$H(m)$	$Q (m^3 s^{-1})$
	0.691	$\leftarrow$ 0.723
	0.72	$\uparrow$ 0.805
	1.00	1.364
	2.00	2.487
	3.00	$\downarrow$ 3.242

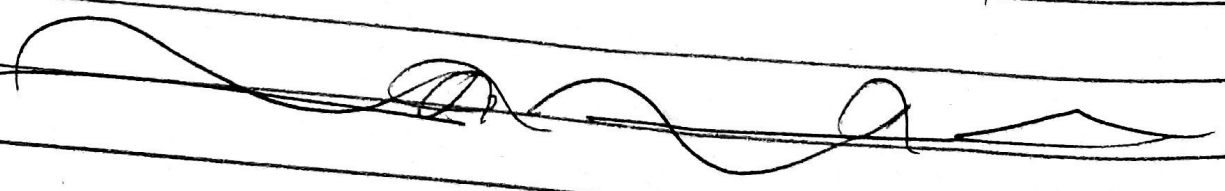
During raising stages the barrel flows full from  $H = 0.72$  m and during falling stage the flow become free surface

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flow when  $H = 0.691 \text{ m}$ .

The following table summarizes the table.

$H \text{ (m)}$	$Q \text{ (m}^3/\text{sec)}$	Type of flow
Rising stage		
0.236	0.165	open channel
0.467	0.451	"
0.691	0.785	"
0.720	0.805	Pipe flow
1.00	1.364	"
2.00	2.487	"
3.00	3.242	"
Falling stages		
2.00	2.487	Pipe flow
1.00	1.364	"
0.72	0.805	"
0.691	0.723	"
0.467	0.785	open channel
0.236	0.451	"
	0.165	"



Q. No 2

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Scour of sediments around bridge foundation by the stream is the most significant contributing factor for bridge failures.

The scour failures tend to occur without prior warning and have lead to fatalities and economic 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 driven.

The science driven research focuses on understanding the scour mechanism and aim to explain the cause of scour due to different

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factors.

While Engineering driven research focuses on the estimation, monitoring and countermeasures of bridge scour.

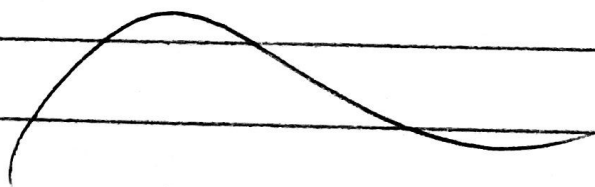
This paper presents a comprehensive and up to date literature review of bridge scour research and practice.

Scour can be defined as the excavation and removal of material from the bed and banks of streams as a result of the erosive action of flowing water. Scour occurs in three main forms, namely, general scour, contraction scour and local scour.

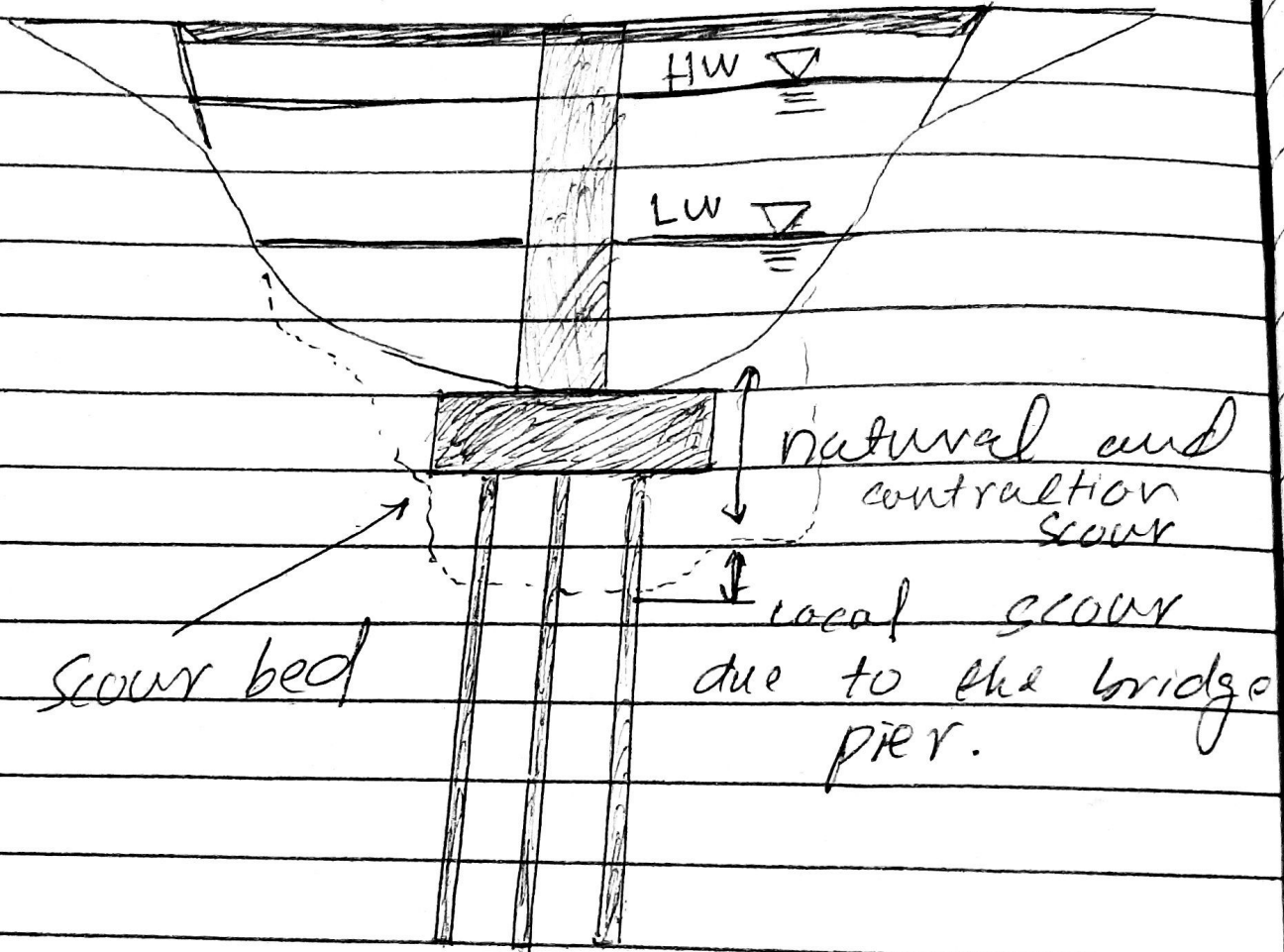
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Generally silt occurs naturally in river channels and includes the aggradation and degradation of the river bed that may occur as a result of changes in the hydraulic parameters governing the channel form such as changes in the flow rate or change in the quantity of sediment in the channel.



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Scour at bridge