

2.3 CLASSIFICATIONS

S.NO CHANNEL	CATEGORY	SYMBOL	CHARACTERISTIC CONDITION	REMARKS
1	Mild	M	$y_0 > y_c$	Subcritical flow at normal depth
2	Steep	S	$y_0 < y_c$	Supercritical flow at normal depth
3	Critical	C	$y_0 = y_c$	Critical flow at normal depth
4	Horizontal bed	H	$S_0 = 0$	Cannot sustain uniform flow
5	Adverse	A	$S_0 < 0$	Cannot sustain uniform flow

For each of the five categories of channels, lines representing the critical depth (y_c) and normal depth (y_0) (if it exists) can be drawn in the

longitudinal section. These would divide the whole flow space into three regions as:

Region 1: Space above the topmost line,

Region 2: Space between top line and the next lower line,

Region 3: Space between the second line and the bed

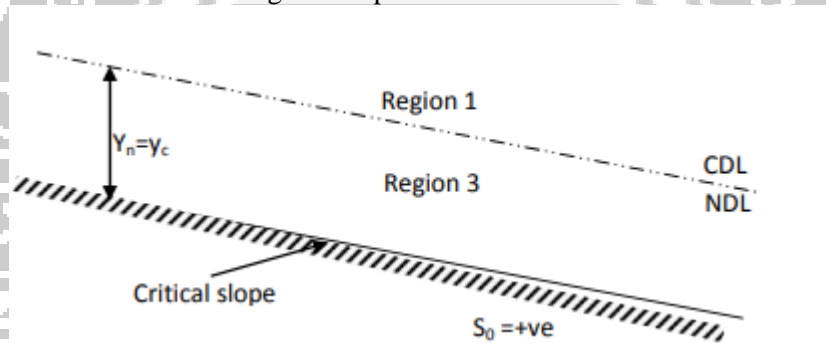
CHANNEL SLOPES

Channel slopes are classified based on the relative magnitude of: (i) bed slopes, S_0 with a critical slope, S_c and (ii) normal depth y_n with a critical depth, y_c . A channel bottom slope that falls in the direction of flow is called as sustaining slope. In a sustaining slope, value of S_0 is always +ve and therefore it is also called positive slope. The critical, mild (subcritical), and steep (super critical) slopes may be classified as sustaining slopes. When the slope of the channel bottom is either horizontal or rises in the direction of flow, then it is known as non-sustaining slope. For example, horizontal and adverse slopes are classified as non-sustaining slopes. Normal-depth line (NDL) is a line drawn parallel to bed and at a height of normal depth y_n from the bed. Critical-depth line (CDL) is a line drawn parallel to bed and at a height of critical depth y_c from the bed.

Critical Slope: - The channel bottom slope is termed as critical if the bottom slope S_0 is equal to the critical slope S_c , i.e. $S_0 = S_c$. where S_0 is +ve. For critical slope the normal depth of flow y_n will be equal to the critical depth y_c .

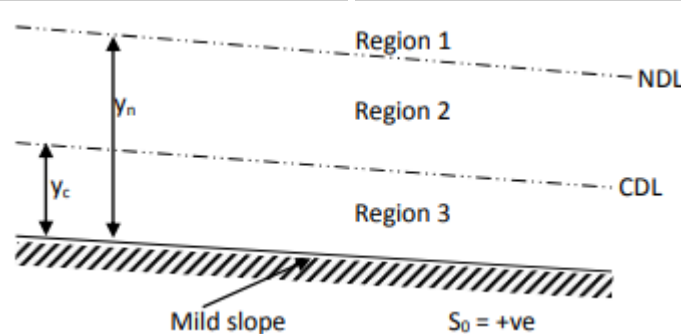
Region 1: Space above the NDL

Region 3: Space between the CDL and the bed line

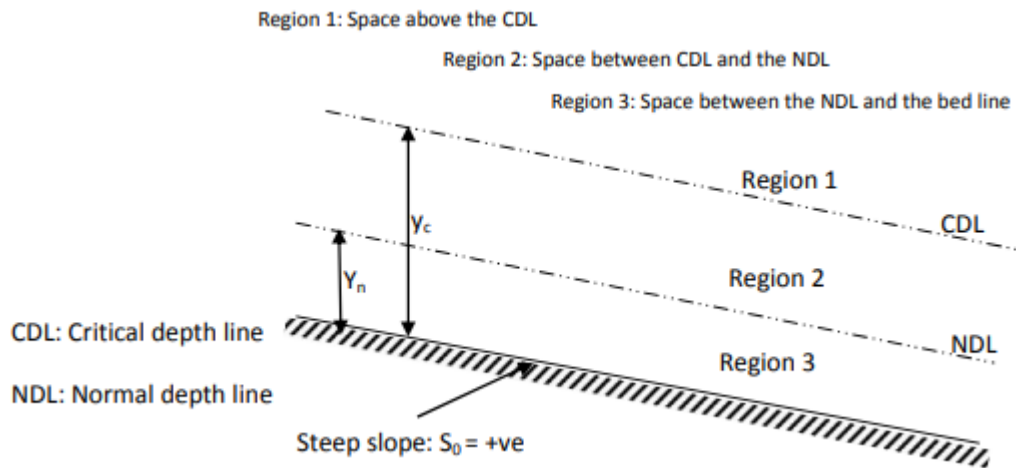


CDL: Critical depth line
NDL: Normal depth line

Mild slope (M): Channel is called mild (M) when, $S_0 < S_c$. since, in general, the value of conveyance increases with the increase in depth. Hence, for a mild slope the normal depth of flow is greater than the critical depth i.e. $y_n > y_c$.



Steep slope(S): In case of a steep channel (S) the, $S_0 > S_c$, where S_0 is +ve, therefore, $K_n < K_c$ and y_n . The normal flow in a steep sloped channel is in supercritical state.

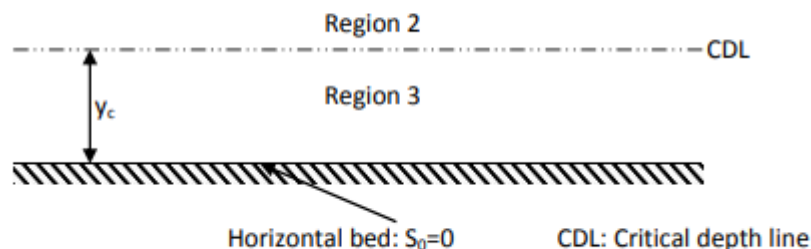


Horizontal slope, (H):

In the case of horizontal slope, $S_0=0$; Hence, the normal depth of flow $y_n = \infty$. Therefore, uniform flow can never occur on a horizontal bed.

Region 2: Space above CDL

Region 3: Space between CDL and the bed line



Adverse slope (A): When the channel bottom slope, rises in the direction of flow it is designated as an adverse slope; therefore, S_0

Region 2: Space above CDL

Region 3: Space between the CDL and the bed line

