Weir Seepage: Bligh and Lane Creep Length Check

Creep length under a weir or barrage on permeable soil by Bligh's theory and Lane's weighted creep, against the length the soil's creep coefficients need.

Method: Classical irrigation engineering relations (duty and delta, Bligh and Lane creep, Khosla exit gradient)

Input parameters

Unit system: SI

Parameter	Value	Unit
Head across the structure	4.0000	m
Horizontal creep length (floor)	45.000	m
Vertical creep length (both faces of all cut-offs)	14.000	m
Bligh coefficient	12.000	
Lane weighted creep ratio	7.0000	

Calculated results

Parameter	Value	Unit
Bligh creep length	59.000	m
Bligh factor (≥ 1 safe)	1.2292	
Lane weighted creep length	29.000	m
Lane factor (≥ 1 safe)	1.0357	
Mean hydraulic gradient	0.067797	

Notes for this case

• Bligh treated seepage as creeping along the contact of floor and cut-offs, needing a length L = C·H with C from about 5 (gravel) to 18 (fine silt). Lane found horizontal paths only a third as effective as vertical ones and proposed a weighted creep L_w = L_h/3 + L_v ≥ C_w·H. Both are preliminary checks; Khosla's method of independent variables (with the exit gradient) is used for final design of floors on permeable foundations.

Formula and method

$$L_B = L_h + L_v \geq C_B H, \quad L_W = \frac{L_h}{3} + L_v \geq C_W H$$

Variables

H	Head across the structure	m
L_h	Horizontal creep length (floor)	m
L_v	Vertical creep length (both faces of all cut-offs)	m
C_B	Bligh coefficient	-
C_W	Lane weighted creep ratio	-
L_B	Bligh creep length	m
$L_B/(C_B H)$	Bligh factor (≥ 1 safe)	-
L_W	Lane weighted creep length	m
$L_W/(C_W H)$	Lane factor (≥ 1 safe)	-
H/L_B	Mean hydraulic gradient	-

Method and standards

Creep length.

Assumptions and limits

- Homogeneous foundation.

References

Classical irrigation engineering relations (duty and delta, Bligh and Lane creep, Khosla exit gradient)

Report details

Report reference	FCC-3YTB-TZS9 (the same inputs always give the same reference)
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Release checks	3 reference cases of this calculator, computed independently, are checked on every release

Results are for engineering estimation. Verify critical designs against the referenced standards and your own data.

This calculator online

https://calc.firecad.com/civil/irrigation-farm/bligh-lane-creep

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.