Verification of
Seepage Through Cofferdam
and
Head Required to Blowout the Cofferdam

Objective

To verify experimentally the theoretical solution for seepage through a double walled cofferdam, and the critical hydraulic gradient to cause a blowout of the cofferdam.

Equipment

- Seepage tank
- Potassium phosphate dye
- Piezometer tubes
- Ruler
- Graduated cylinder
- Stop watch

Procedure

1. Make grids in scale on the outer side of the cofferdam glass.
2. Open the pump to pump the water out from the cofferdam so that you can make a head difference to cause the seepage flow. Let the head difference be stabilized for a while.
3. Place potassium phosphate dyes at suitable points on the sand exactly at the points of the origin of the flow net. These points should be approximately at the points that your flow net shows.
4. Trace the path of the dye continuously. Allow enough time for the fluorescence dye to flow all the way under the cofferdam until it comes out to the other side. These are the actual flow lines. Measure the coordinates of the flow line so that you can plot them on your drawing.
5. Take picture of flow lines if you have camera.
6. Measure the hydraulic heads by placing the piezometer tubes at suitable points at one equi-potential line to enable you to verify the meaning of equi-potential line. Follow this procedure for the other lines too, if you have time.
7. Draw the experimental flow net on the glass.
8. Plot the actual coordinates of the flow net on the same piece of paper you used last week. You need information from several piezometers to complete the actual flow net.
9. Measure the seepage flow for about 15 minutes by collecting the water that is flowing from the outlet tube in the excavation area while maintaining water level at the upstream end. Compare this discharge with the calculated value.
10. Increase the head difference by increasing the pumping rate until the cofferdam is blown out. Note down the head difference that was required to blowout the cofferdam. Compare this head difference with the calculated one.
11. Write a report based on the differences between the calculated seepage, head to blowout the cofferdam, equi-potential line and flow net. Write your comment.
Calculations
All pertinent calculations were supplied last week.

Seepage Discharge from one side = \( \frac{\text{Measured Volume}}{\text{Time}} \times \frac{1}{2} \)

SEEPAGE INTO A DOUBLE WALLED COFFERDAM

Group:

Date:

A) Initial Head Difference cm

B) Seepage Quantity

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<tr>
<th>Quantity</th>
<th>Time (minute)</th>
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<td>1.</td>
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C) Blow out

Total head difference for blowout cm