

Applied Hydraulics – Week 12 – Sediment Transport

Reading Assignment: Handout on web page.

Homework Problems and to be done later: will be added

Hands-on Assignment

This week you'll use the sediment transport demonstration channel to investigate the conditions that lead to bed and suspended sediment loads.

1. Measure the flow rates for the low, medium, and high flow settings. To measure the flow rate, capture water for 10-30 seconds into a basin, then measure the volume of water captured using the 1000 ml graduated cylinder.
2. Set the bed slope to 0 % and the flow to the low setting. Do not turn on the flow yet.
3. Use the bed leveling device to set the sediment depth to 30 mm. Add sediment if necessary to get a uniform sediment depth across the channel. The upper and lowermost ends of the channel (2 to 3 inches) can have a thinner sediment layer.
3. Turn the pump on.
4. Record the sediment and water depths along the length of the graduated section of the channel. Describe any sediment erosion that you observe. You may need to wait a minute or two to see the bed load transport begin, and for sand waves to form. Record any interesting features about sand patterns that you see (e.g. sand waves, ripples, diamond patterns, etc.)
5. Turn the pump off.
6. Reset the flow to another setting (medium, high), or reset the bed slope to another value (1%, 2%, 3%).
7. Go back to step 3 with the new flow or slope and repeat steps 3 through 6. Continue until all slope (0%, 1%, 2%, 3%), and flow combinations (low, medium, high) have been completed.
8. Now turn off the pump, relevel the bed, and put an underflow gate at the 100 mm location of the graduated section. Set the gate height to 50. Set the pump to high and the slope to 0%. Turn on the pump and observe the sand patterns up and downstream of the gate. Repeat for a depth of 40 mm. Wait long enough (a few minutes) until it seems a stable pattern in the sand has formed.
9. Now turn off the pump, relevel the bed, and put the bridge pier at the 100 mm location of the graduated section. Set the pump to high and the slope to 0%. Turn on the pump and observe the sand patterns up and downstream of the pier. Wait long enough (a few minutes) until it seems a stable pattern in the sand has formed.