

CIVE 716 EROSION AND SEDIMENTATION

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Computer problem #2 due April 12, 2023

A. The channel geometry was previously defined in Computer Problem #1. Replace the rigid boundary with uniform bed material with a grain diameter of 0.4 mm. Consider that the sediment inflow at the upstream end is that of steady-uniform flow and that the bed elevation is fixed at that point. At the downstream end, the remaining water and sediment discharges are conveyed downstream of the dam (no change in flow depth in the reservoir). Provide five diagrams showing: (1) the expected type of bed form; (2) Manning n; (3) the water surface profile with bedforms; (4) values of the transport parameter T; and (5) the total shear stress in Pa. Discuss the results in comparison with the water surface profile and shear stress calculation in the first computer problem.

B. Use the Einstein bedload formula to calculate bedload in metric tons per meter per day for the entire reach in A. Use the total shear stress for the calculations. Compare the results with the sediment discharge by volume

$$q_{sv} \sim 18 g^{0.5} d_s^{1.5} \tau^{*2}.$$

Provide a diagram showing the sediment transport distribution over the entire reach from these two equations.
