

- 1 The students are asked to form 2-person groups and calculate the bed-load discharge using one of the methods presented below, using the sediment distribution obtained in Assignment #3. The flow cross section and the water free surface for the 500-yr flood ($661 \text{ m}^3/\text{s}$) are shown in the next page. The longitudinal slope is 0.0001. To master the method, students should find the relevant paper and read it carefully. The report should include a critical review of the presented method.

Then, download any related software to compute the bed-load discharge. Each group should compare the results of the software with their own results and comment on the software capabilities and faults, and present the findings. An oral presentation is also required.

- Kalinske (1947)
- Parker (1990)
- Van Rijn (1984)
- Wu et al. (2000)

References

- Kalinske, A.A., 1947, Movement of sediment as bedload in rivers, *American Geophysical Union Transactions*, 28, 615-620.
- Parker, G., 1990, Surface-based bedload transport relation for gravel rivers, *Journal of Hydraulic Research*, 28(4), 501-518.
- Van Rijn, L.C., 1984, Sediment transport, Part I: Bed load transport, *Journal of Hydraulic Engineering*, 110(10), 1431-1456.
- Wu, W., Wang, S.S.Y., and Jia, Y., 2000, Nonuniform sediment transport in alluvial rivers, *Journal of Hydraulic Research*, Vol. 38, No. 6, 427-434.

- 2 Given the following data, compute the suspended load weight discharge using Brooks method.

$$\begin{array}{llll}
 q = 9 \text{ m}^3/\text{s/m} & ; & n = 0.02 & ; & R = D = 5 \text{ m} & ; & S = 0.001 \\
 d_{50} = 0.2 \text{ mm} & ; & a = 0.25 \text{ m} & ; & C_a = 0.0001 & \text{by dry weight}
 \end{array}$$

- 3 Given the following data, compute the Total load using Einstein method.

$$\begin{array}{llll}
 Q = 55.5 \text{ m}^3/\text{s} & ; & W = 41.0 \text{ m} & ; & R = D = 2.0 \text{ m} \\
 S = 0.000077 & ; & V = 0.69 \text{ m/s} & ; & d_{65} = 0.195 \text{ mm}
 \end{array}$$

Sieve Analysis Results:

Size group (mm)	Geometric mean size (mm)	Percentage of material available
0.062-0.125	0.0888	40
0.125-0.250	0.1768	45
0.250-0.500	0.3536	15

