

CE 717 RIVER MECHANICS

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Homework #3 - River Stability and Equilibrium – Chap. 6- 7, due March 26

Problem #1 (40%) – Downstream Hydraulic Geometry

With reference to HW #2, examine the discharge data and cross section data for the Missouri River. Estimate a dominant discharge or bankfull discharge for this river. From the field measurements, identify the channel width, depth, velocity, slope and Shields parameter. Use Google Earth or aerial photography to look at the planform geometry and sinuosity of the channel.

Compare the width, depth velocity and Shields parameter with those estimated from the Downstream Hydraulic Geometry equations using discharge, grain diameter and slope.

Problem #2 (60%) – Channel Meandering

With reference to Figure 9.22 p. 320, examine the reach between sections 140 and 150 and locate the centerpoint of the channel. Determine the following characteristics of the meandering channel:

1. mean channel width;
2. minimum radius of curvature;
3. sinuosity; and
4. wavelength.

Plot the orientation angle as a function of downstream distance, as shown in Figure 6.12. Determine the maximum angle θ_m for the upper half of the reach including Thompson Bend.

- Plot the results on as many figures as you can from Figure 6.13-6.16.
 - Compare with the measurements shown on Figures 6.19 and 6.20.
 - Do you expect the downstream shear stress and lateral mobility of the river to be high or low?
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