

Appendix 12C-2 Tidal Bridge Scour Data and Worksheet

VIRGINIA DEPARTMENT OF TRANSPORTATION
TIDAL BRIDGE SCOUR DATA & WORKSHEET

Hydraulic Engineer: _____
Date: _____

I. BRIDGE LOCATION

BRIDGE No. _____ Route: _____ County No. _____
Length: _____ Ft. River: _____

TIDAL BRIDGE CATEGORY: Islands Semi-Enclosed Estuary
Bays & Inlets

II. CHANNEL CROSS SECTION

Channel Width (U/S 100 ft) $W_u =$ _____ Ft. Channel Width (at Bridge) $W_o =$ _____ Ft.
Width (between abutment) $W_d =$ _____ Ft.
Average Water Depth (below MSL/MLW/MTL) $D =$ _____ Ft.
Clearance (from MSL/MLW/MTL to Lower Chord) $C =$ _____ Ft.
Note: Mean sea level (MSL), mean low water (MLW), mean tide level (MTL)
Skew Angle (Centerline of Bridge with Channel) $\Phi (\phi) =$ _____ ° (Degrees)

II. DRAINAGE AREA CHARACTERISTICS

(Information per USGS Report 94-4148 for Virginia Department of Transportation dated 1995)
Drainage Area: _____ Sq. Mi.; Forest: $F =$ _____ %; Average basin elevation: $EL =$ _____ Ft.
Main Channel Slope: $SI =$ _____ Ft/Mi; Main Channel length: $L =$ _____ Mi.
Peak Discharge Region Used: _____

Compute from USGS Regression Equation:

$Q_{r100} =$ _____ CFS; $Q_{r500} = 1.7 (Q_{r100}) =$ _____ CFS

III. STORM TIDES

100-year High Tide: $H_{100} =$ _____ Ft. Period: $T_{100} =$ _____ Hrs.
500-year High Tide: $H_{500} =$ _____ Ft. Period: $T_{500} =$ _____ Hrs.
Surface Area of Tidal basin at MSL: $A_s =$ _____ Sq. Mi.
at _____ Ft.: $A_s =$ _____ Sq. Mi.
at _____ Ft.: $A_s =$ _____ Sq. Mi.

Compute Tidal Flows:

$Q_{t100} =$ _____ CFS; $Q_{t500} = 1.7 (Q_{t100}) =$ _____ CFS

IV. FLOW VELOCITY

- Based on Cross Sectional Area at MSL/MLW
Cross Sectional Area, $A_1 = W_o D =$ _____ Ft^2
 $V_{r100} = Q_{r100}/A_1 =$ _____ Ft/S $V_{r500} = Q_{r500}/A_1 =$ _____ Ft/S
- Based on Cross Sectional Area at Midtide Elevation
 $V_{t100} = (Q_{t100} + Q_{t500}) / (A_1 + W_o H_{100}/2) =$ _____ Ft/S
 $V_{t500} = (Q_{t500} + Q_{t100}) / (A_1 + W_o H_{500}/2) =$ _____ Ft/S
- Based on Manning Equation ($n = 0.025$; $s = 0.0005$)
 $V_{t100} = 1.2 ((Q_{r100} = Q_{t100}) / W_o)^{0.4} =$ _____ Ft/S
 $V_{t500} = 1.2 ((Q_{r500} = Q_{t500}) / W_o)^{0.4} =$ _____ Ft/S

Attach a Sketch of Cross-Section at Upstream (U/S) Side of Bridge