5 Comparison with Ship Squat Data from St. Lawrence Seaway

Field Data Description

Tothill (1966) conducted measurements of deep draft ship squat on the Caughnawaga Section of the St Lawrence Seaway. In restricted channels like the Caughnawaga Section, vessel squat generally correlates well with water level drawdown. The cross-section was trapezoidal with a 72.3 m bottom width and 1V:1.8H side slopes. Input data for NAVEFF are shown in Table 5. The vessels used in the comparison were limited to those having an average draft greater than 7.3 m or average squat greater than or equal to 0.46 m. The data were further restricted to vessels having near zero initial trim by using fore draft/aft draft from 0.97 to 1.03. Fifty-four ships met these criteria out of Tothill's data base of 190 ships. Vessels in the data set had a minimum depth/ draft ratio of 1.14. The beam shown in Table 5 is 98 percent of the actual beam to account for the actual sectional area of the ship. Vessels were assumed to travel in the middle of the channel and the V_w shown in Table 5 is the vessel speed relative to the water.

Results

The comparison of observed average ship squat versus the maximum water level drawdown from NAVEFF is shown in Figure 23. While NAVEFF provides a conservative estimate of the vessel squat for most of the vessels, the amount of conservatism is not excessive. MRE and MTE were 0.23 and 0.18, respectively.