

3-D Sedimentation Model Study of Cooper River South Carolina State Ports Authority (SCSPA)

Services Rendered

- 3-D EFDC Hydrodynamic and Cohesive Sediment Transport Modeling
- ADCP Monitoring and Sediment Sampling
- Sediment Minimization Recommendations
- Berth Alignment and Design Recommendations

Project Summary

South Carolina State Ports Authority (SCSPA) retained Applied Technology and Management, Inc. (ATM) to evaluate the change in sedimentation rates and patterns of the Cooper River resulting from construction of container terminals at the Charleston Naval Complex (CNC). The study was designed to evaluate the change in sedimentation rates in the area of the proposed terminals and to optimize the location of the wharf structure to minimize sedimentation.

ATM applied a three-dimensional hydrodynamic and cohesive sediment-transport model to evaluate four final wharf orientation alternatives for each of the two potential terminal sites. These alternatives were identified based on an initial two-dimensional model screening, which evaluated ten initial wharf design alternatives for each of the North and South terminal locations.

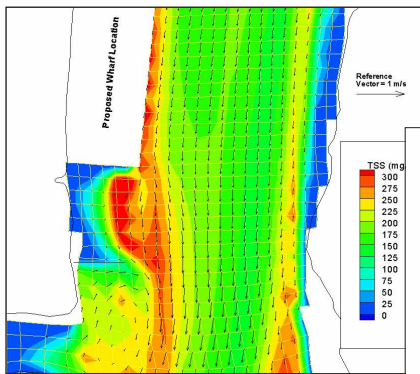
The three-dimensional model was used to simulate various wharf alignments, contracting dike options and turning basin geometries in order to identify the design with the smallest shoaling rates. In addition to evaluating wharf alignment with the numerical model, ATM provided specific recommendations and techniques for minimizing sedimentation.



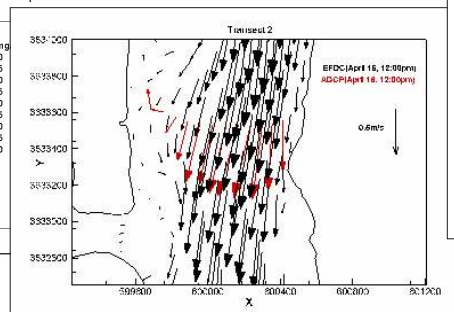
ADCP Data Collection to quantify river discharge and velocity characteristics of the Charleston Naval Complex



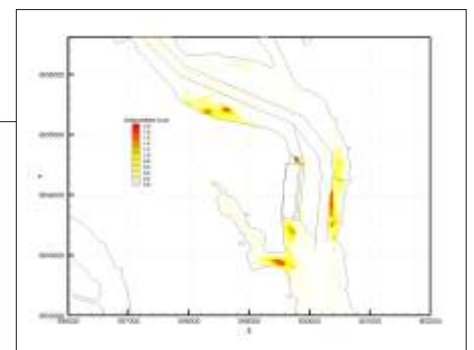
Dredge at SCSPA's Wando-Welch Container Terminal



3-D Sedimentation Model Output: Velocity vectors and suspended sediment color contours



Model velocity vectors compared to measured ADCP current velocity



3-D Sedimentation Model Output: Color contours of annual sedimentation rates