



TIDAL DATUMS FOR DREDGING

U.S. ARMY CORPS OF ENGINEERS

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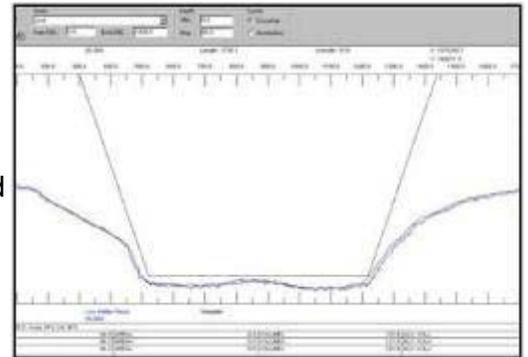
Background

Tidal datums, or models of tide behavior across a specific body of water, are normally based on a time series of gauge measurements recorded at fixed structures along a water-way. Where fixed platforms are not available, such as channel approaches to harbors or the middle of bays and estuaries, uncertainty exists for the exact tide from minute to minute and also the water piling up or going away due to wind effects on the water levels. However, the development of Real Time Kinematic (RTK) Global Positioning System (GPS), which provides high accuracy in three dimensions, enables tide measurements on vessels, which results in more accurate vertical locations for dredging or navigation.



A plan for the GPS Water Level System is developed by combining historic conventional tide gauge information with locations selected for direct GPS tidal measurements in open embayments or offshore. Once executed, measurements are taken every second, twenty-four hours per day, and seven days a week, for one month at each required location. For river measurements the direct GPS tidal measurements may not be required. The information is compiled and verified by the National Oceanic and Atmospheric Administration (NOAA). A tidal model is then created and stored in the vessel computer to be used during survey or dredging operations.

During survey or dredge operations using GPS Water Levels, only the vessel personnel are needed, no shoreline support personnel are required for tide staff reading. Start the vessel, go to the project, and begin operations immediately with tide information available every second on the vessel measured at the vessel's actual location. This alone saves at least \$200,000 per year per District for floating plant and personnel costs incurred by in-house and dredge contractor hydrographic surveys. Eliminating dredging disputes saves far more than this figure depending on the project. Savannah District thinks they save \$800,000 in Savannah Harbor per year by using this system.



Hydrographic surveys are repeatable time after time for both contractors and government survey vessels using this system. Dredged volumes between government and contractor surveys match within one percent, saving millions of dollars for USACE Districts and dredge contractors annually. Dredges can also use this system to ensure the proper channel clearance is dredged and verified at the same time.

Current Operations

Most USACE Districts as well as dredge contractors prefer the GPS Water Level System. Only one district on each of the three coastlines does not use this system. In fact, this system has become the standard worldwide for dredging.

Future Developments

No future developments to the method are being sought; however, challenges to the implementation of the method continue to arise as channels are being created farther offshore to accommodate the Super Post-Panamax Vessels.

Point of Contact

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