

ALDEN

Modeling of Erosion & Sedimentation

Sediment erosion, transport, and deposition is common in rivers, lakes, reservoirs, estuaries and oceans. Through the use of physical and computer modeling, engineers and scientists can better understand and predict sediment behavior.

The Alden hydraulic modeling team uses both physical modeling and state-of-the-art numeric modeling software to solve erosion and sedimentation problems. Numerical methods involve the use of one-, two-, and three-dimensional computer models for predicting sediment deposition patterns and long term channel evolution and profile adjustment. These computer modeling techniques include:

One-dimensional modeling to study long term adjustment of channel profiles (time scale of years). Typical applications of this type of modeling include the prediction of channel response to the construction or removal of dams and other channel training structures, prediction of changes in bed elevation that lead to changes in flooding and the prediction of changes in bed gradation that can affect fish habitat.

Two-dimensional models to provide an understanding of where sediment deposition will occur within a channel by predicting the depth average velocity distribution within the water body. These models provide a good approximation for channel behavior for many applications. Alden uses the SMS software package along with MIKE21 and MIKE21C for 2-D modeling projects.

Three-dimensional models to study three-dimensional flow patterns which significantly affect sediment erosion and deposition patterns. Examples include secondary currents in river bends, stratified flow fields and flow through distributaries on river deltas where significant variation in channel depth can occur. Alden uses MIKE3 and CH3D-SED for simulation of sediment transport in three dimensions.

