



Ten tips for getting the highest quality data to support coastal engineering projects

- 1) Wave motion is strongest at the surface and weaker close to the bottom. Most wave measurement devices mounted on the bottom will only measure the longest wave so they cannot resolve the full spectrum of wave energy. Of all bottom mounted measurement devices, only the Nortek AWAC wave system with acoustic surface tracking will measure a time series of the actual surface elevation and provide the full spectrum of energy.
- 2) The surface waves can be described through a spectral analysis or by a direct measurement of the ocean surface elevation (time series). Only time series analysis will give you common engineering wave parameters like H_{\max} (the largest wave), $H_{1/10}$ (mean of the 10 highest waves), etc.
- 3) The most effective method for measuring currents is to measure the full current profile from the bottom to the surface. The Nortek AWAC will provide wave height, wave direction and the full current profile with one single instrument.
- 4) It is important to adapt the wave sampling period to the wave periods that are important in the area where the coastal structure will be located. For long waves, it may be necessary to increase the overall sampling period in order to ensure a proper statistical presentation.
- 5) Ice floating on the surface represents a large and destructive load for coastal structures. It is important to understand how this load may affect the coastal structure design. With the AWAC, it is possible to estimate the surface ice thickness in addition to the wave height, wave direction, and current profile.
- 6) Individual waves from ship traffic can be important both because of the direct load on the structure and the effect on the foundation through scouring. Combined wave and current measurements allow you to see the details of the hydrodynamic power unleashed by wakes from large ships. The acoustic backscatter measured by the Nortek instruments can be used as a corollary to observe sediment suspension and scour.
- 7) Surface wave buoys give good wave data as does the bottom mounted AWAC. Before you make your choice, consider the importance of also measuring the full current profile. Remember, the main reasons for loss of surface buoys are theft/vandalism, fishing activity and large storms. If any of these may become a problem, well-protected underwater structures used to hold the AWAC may be the better alternative.
- 8) Wave reflections can be important to understanding the wave forces acting on the structure. The AWAC can provide information both about the incident and the reflected waves.
- 9) As diving operations may pose additional bureaucracy, liability, and expense in some areas, consider solutions which forego the necessity for divers such as the ability to gimbal mount your AWAC, acoustic pop-up releases, and the Nortek Tell Tale for periodic in situ assessment of sensor diagnostics, including battery life, signal strength, and whether or not it has been moved or tilted by any local disturbances, such as ship traffic.
- 10) Transformation of wave parameters from offshore buoys often times may not provide sufficiently accurate wave parameters at the project location. A local AWAC with acoustic surface tracking will provide a better data set for navigational safety, post-construction performance monitoring, and local impact assessment.