

# OCEANSCIENCE

INNOVATIVE TOOLS FOR OCEANOGRAPHERS AND HYDROLOGISTS

## Z-Boat 1800 Application Note #4

### Mining Companies Improve Safety and Water Balance Data Using the Z-Boat 1800

#### Summary



The Z-Boat 1800 has been used in tailings storage facilities (TSF), pit lakes and freshwater storage reservoirs on mine sites where safely accessing the water for a conventional survey is difficult. In addition to improved personnel safety, the convenience of the Z-Boat approach leads to the possibility of more regular bathymetric surveys which results in a better understanding of the site water balance and reservoir evolution.

#### Background

Mine operators have recognized that if available TSF bathymetry data across many of their sites could be improved by faster, easier or more cost-effective surveys, then operational decision making and planning could be improved.



Often, TSF surveys are conducted with time-consuming and rudimentary methods, leading to sparse and inconsistent datasets available for water managers. Additionally these methods usually rely on surveyors being out on the TSF to collect the data – a potentially unsafe situation.

#### The Z-Boat Approach to TSF Surveying

With the Z-Boat 1800, a single surveyor can carry out bathymetry mapping with no requirement to go onto the water. The boat can be carried in the back of a truck and deployed with little or no assistance. Real time data radio telemetry allows the operator to view the navigation display on the shore in real time to accurately guide the boat around the TSF. Alternatively, a robotic waypoint navigation package may be used for fully automated surveys.



The figure above shows a map of the Z-Boat track and color-coded depth soundings from <60cm to over 10m for a TSF located in the South-western US. The TSF is about 1.3 miles across with the survey conducted from three locations on the west side. The volume error for this survey is less than 5%

## Key Requirements

Mine operators are typically looking for low complexity and high ease of use, and surveyors tasked with generating the bathymetry data usually require a system with simple work processes to limit the requirement for additional training or technical support. They also require resistivity to corrosion and degradation, as the mine water is typically significantly more aggressive than natural waters. Portability is important, with safe access often limited as illustrated below.



Unlike a manned boat, the Z-Boat can access almost the entire TSF area by nature of its extremely low draft. As much of a typical TSF is shallow, the accessible surface area may increase by a substantial proportion. The echosounder offers repeatable and accurate mudline estimation, and the GPS positioning system can be tied into the mine's local RTK network allowing a consistent survey basis for final contour maps.



## Benefits

Compared to point shots using a sounding pole or a rudimentary sonar system, not only is there far better accuracy, but confidence in the engineering calculations that are based on this dataset increases significantly.



Z-Boat depths may be converted to elevation and the data set imported into ArcMap (ESRI), MineSight, AutoCAD, or other mine management software. The bathymetry dataset can be merged with existing land survey topographic data to generate stage / volume / area curves for the TSF, offering engineers accurate existing water volumes and available storage above the existing water, along with identifying deposition patterns in the TSF.