

SHALLOW SURVEY 2008 CONFERENCE SHORT ABSTRACT

MULTIBEAM & SUB-BOTTOM PROFILING SURVEYS IN SUPPORT OF ENGINEERING DESIGN FOR MAJOR PORT EXPANSIONS: A CASE STUDY FROM DURBAN, SOUTH AFRICA

By

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The Port of Durban on the east coast of South Africa is the busiest port in Africa and has the biggest container terminal in the Southern Hemisphere. Other cargo functions include a car terminal (Ro-Ro), multi-purpose terminals, coal terminal and liquid bulk terminal. The Port is undergoing major expansion to the Port entrance and terminals to the value of \$1.4 billion with the plan to widen and deepen the entrance from 122 m wide and -12.8 m deep to 300 m wide and -19 m deep and expand the existing terminals. MGS was commissioned by the Port authorities to design and undertake a series of acoustic and sampling surveys to define the engineering properties of the harbour sediments and to assess the stability of various engineering structures to assist with design options for the expansion of the Port. The survey design, data acquisition and processing required technical excellence in all phases of the operation to achieve the desired goals.

The instrumentation used included high-resolution MBES, side-scan sonar, boomer & pinger sub-bottom profiling instrumentation and vibrocoring sampling. Data processing and visualization was accomplished using MGS proprietary software, CUBE, GEOCODER, FLEDERMAUS & GIS.

The MBES data was used to map the hydrography of the Port and determine the surficial harbour floor features. Rotated MBES transducer surveys were conducted to quantify any quaywall or pile damage, which affects the structural strength and loading potential of the berths. Side-scan sonar coverage was used to classify the bottom sediments and map cultural artefacts that might prove hazardous to dredging or shipping. The simultaneous acquisition of pinger and boomer sub-bottom profiling data and detailed geophysical interpretation of these data provided geotechnical foundation information for the founding design of breakwaters, berths, jetties and information on dredging conditions. The geotechnical properties of the various seismic stratigraphic units were ground-truthed using vibrocore and borehole geotechnical information.

The project was very successful in providing very high quality hydrographic and geophysical data to assist in the successful engineering design and implementation of the Port expansion plans.