National offshore sand resources study in the Straits of Malacca: geophysical and sampling survey techniques

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Geophysical and Sampling techniques are commonly used in marine exploration to study the large number of seabed and sub seabed present. This paper discusses the geophysical and sampling techniques used to map the sand resources in a marine environment. The geophysical survey encompasses three (3) different techniques, namely echo sounding, side scan sonar survey and sub bottom profiling. Using these techniques the bathymetry, seabed features and the sub seabed features were studied. Sandy deposits are usually associated with seabed features such as ripples, mega ripples, sand waves and sand dunes usually clearly identified on sonograms. These features are also seen on echograms. Sub seabed sand deposits are associated with various types of seismic signatures on seismograms. By combining the results from the various techniques, maps of sand deposits along with their deposition features can be charted.

Almost every geophysical survey has to be supplemented with a sediment sampling survey to validate the geophysical findings as well as to determine the grain size of the sandy deposits. Three (3) sediment-sampling techniques were used i.e., grab sampling for seabed sediments, piston coring for unconsolidated sediments and vibro coring for consolidated sediments. An average of five (5) meters samples were obtained with the coring techniques. The sediment samples were analysed for particle size, carbonate, organic and quartz contents.

The results of the geophysical and sampling surveys were used to identify and compute the sand deposit volumes. The findings also formed the basis for the environmental impact assessment studies.

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