LABORATORY AND *IN SITU* MEASUREMENT OF SOUND VELOCITY AND MASS PHYSICAL PROPERTIES OF SOME UNCONSOLIDATED MARINE SEDIMENT CORES

A THESIS SUBMITTED TO THE GRADUATE DIVISION OF THE
UNIVERSITY OF HAWAII IN PARTIAL FULFILLMENT
OF THE REQUIREMENTS FOR THE DEGREE OF

MASTER OF SCIENCE

IN OCEANOGRAPHY

SEPTEMBER 1971

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ABSTRACT

Following development of a portable sediment velocimeter, direct sound velocity measurements were made on marine-sediment cores retained in their original plastic liners. In order to study possible changes in sound velocity and mass physical properties various shallow- and deep-water cores were investigated. A group of shallow-water cores taken at one location was studied for variations of velocity and mass physical properties due to length and type of storage conditions. Little significant variation was evident under the conditions of the experiment. Velocities of 1500 ±10 m/sec were measured in the cores. *In situ* seismic measurements gave velocities of 1540 ±20 m/sec in the area where the cores had been taken. These latter values probably indicate sea water velocities. In general, velocity measurements from both shallow- and deep-water cores showed direct correlation with shear strength, bulk density, and grain size, whereas the correlations with porosity, water content and void ratio were inverse. Grain density showed little correlation with sound velocity. Seismic signature patterns and sound velocity appeared to correlate with sediment type and mass physical properties. In general, coarser-grained sediment showed greater attentuation ($\leq$ 0.5 v first arrival amplitude), higher velocity, and lower porosity than finer-grained sediment with lesser attenuation ($\geq$ 5 v first arrival amplitude), lower sound velocity, and higher porosity. Constancy of signal signature correlates well with degree of sediment homogeneity.