

The Vertical Force-Couple Generator

Shear waves may be generated by a force or force-couple acting on a single interface, or by vertical separation of the forces in the medium. An example of the former is the Love-wave generator of Stoll and Bautista (1994) using a self erecting bottom sled towed behind a vessel. The source impulse was from a horizontal flywheel brought to a sudden stop from running at 500 rpm. The rotational energy was transmitted to the underlying sediments via a base plate equipped with ribs. Vertical inhomogeneity of the sub-bottom sediments gave rise to predominantly Love-waves which could be inverted to find the geoacoustic properties of the sediments.

We wanted to study a case where the the force impuls comes from two opposite and vertically separated horizontal forces. A vertical force couple generator was designed and built by Y. Kristoffersen (Fig. 1). A 150 kg flywheel is mounted in a case equipped with wings and the source is totally immersed in the sediment. The impulse from sudden arrest of the rotating flywheel is transferred to the medium by the case and wings.

Theoretical calculation of the radiation pattern of shear waves from a vertical force-couple generator and results of a field experiment are documented in a Master of Science thesis by Kjetil Festervoll (now at Statoil, Sandsli, Bergen).

Festervoll, Kjetil, 2003: Impulsive overflatekilder for seismisk prospektering. Master of Science thesis, Institute of Earth Science, University of Bergen, Norway, 140 pp.

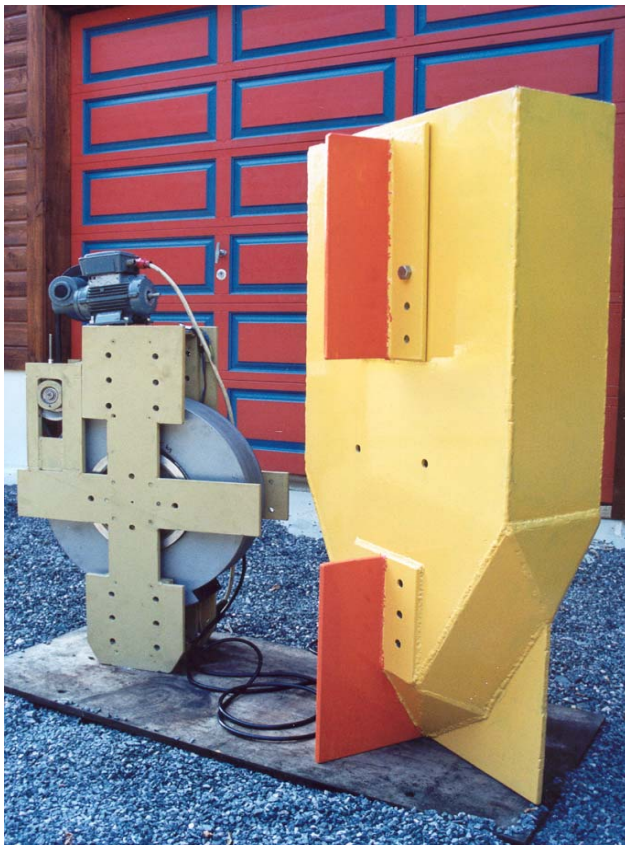


Fig. 1 Shear wave generator