

Marine Vibrator Bubble Source Simulation and Testing

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Abstract

Marine Vibrators are a coherent type of sound source, which can be quieter and less harmful for marine habitants than traditional air-gun technology. Such source gives clearer, more precise and higher resolution imaging of the bottom properties due to the coherent signal and streamer array processing.

Teledyne Marine Systems is developing a coherent seismic marine sound source technology based on the application of an underwater, gas-filled bubble as a low frequency resonator. That innovative system is a promising candidate for a very high power, high efficiency, and coherent seismic source. The bubble seismic source approach is a high efficiency, simple way to achieve high volume displacement, sound pressure and large radiation aperture, design containing standard commercial components. In principle, it has no cavitation damaging effects.

The parameters of underwater bubble resonator were predicted by finite element analysis using COMSOL Multiphysics® software. A bubble resonator was build and very successfully tested for a limited power at the frequency band 30-60 Hz. Application of COMSOL modeling allowed source parameters estimation and avoided a long series of water tests with parameters adjustment. The parameters of the sound source prototype were reasonably close to the simulations.

Reference

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Figures used in the abstract

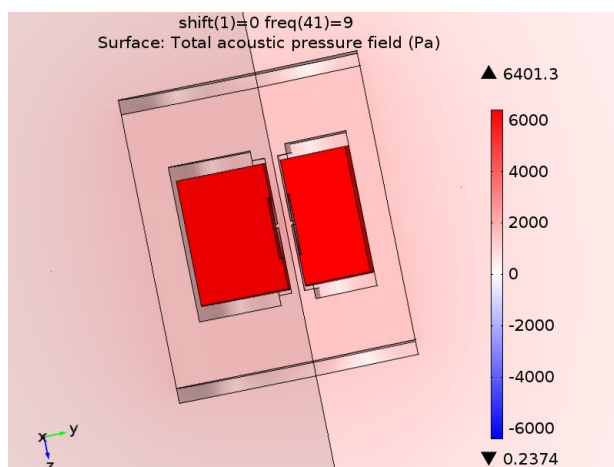


Figure 1: Sound pressure simulation results.



Figure 2



Figure 3



Figure 4