Broadband tonpilz underwater acoustic transducers based on multimode optimization

Head flapping has often been considered to be deleterious for obtaining a tonpilz transducer with broadband, high power performance. In the present work, broadband, high power tonpilz transducers have been designed using the finite element (FE) method. Optimized vibrational modes including the flapping mode of the head are effectively used to achieve the broadband performance. The behavior of the transducer in its longitudinal piston mode and in its flapping mode is analysed for in-air and in-water situations. For the 37.8% bandwidth of the center frequency from 28.5 to 41.8 kHz, the amplitude variation of the transmitting voltage response (TVR) does not exceed ±2 dB and a maximum TVR of 146.8 dB (ref. 1 μPa/volt at 1 meter) is obtained. Reasonable agreement between the experimental results and the numerical results is achieved. A maximum sound pressure level of 214.8 dB can be expected. Further numerical calculation indicates that there is potential for increasing the bandwidth by varying other parameters in the design.
Scopus rating (2011): CiteScore 1.95 SJR 0.733 SNIP 1.325
Web of Science (2011): Impact factor 1.694
ISI indexed (2011): ISI indexed yes
Web of Science (2011): Indexed yes
BFI (2010): BFI-level 2
Scopus rating (2010): SJR 0.928 SNIP 1.562
Web of Science (2010): Impact factor 1.462
Web of Science (2010): Indexed yes
BFI (2009): BFI-level 2
Scopus rating (2009): SJR 1.296 SNIP 1.775
Web of Science (2009): Indexed yes
BFI (2008): BFI-level 2
Scopus rating (2008): SJR 1.324 SNIP 1.567
Web of Science (2008): Indexed yes
Scopus rating (2007): SJR 1.328 SNIP 1.924
Web of Science (2007): Indexed yes
Scopus rating (2006): SJR 1.197 SNIP 2.162
Web of Science (2006): Indexed yes
Scopus rating (2005): SJR 1.104 SNIP 1.768
Web of Science (2005): Indexed yes
Scopus rating (2004): SJR 1.114 SNIP 1.918
Web of Science (2004): Indexed yes
Scopus rating (2003): SJR 1.437 SNIP 1.742
Web of Science (2003): Indexed yes
Scopus rating (2002): SJR 1.525 SNIP 1.916
Web of Science (2002): Indexed yes
Scopus rating (2001): SJR 1.703 SNIP 1.6
Web of Science (2001): Indexed yes
Scopus rating (2000): SJR 0.749 SNIP 2.005
Scopus rating (1999): SJR 0.808 SNIP 1.386
Original language: English
Electronic versions: Yao.pdf
DOIs: 10.1109/58.655631

Bibliographical note
Copyright: 1997 IEEE. Personal use of this material is permitted. However, permission to reprint/republish this material for advertising or promotional purposes or for creating new collective works for resale or redistribution to servers or lists, or to reuse any copyrighted component of this work in other works must be obtained from the IEEE
Source: orbit
Source-ID: 259026
Research output: Research - peer-review › Journal article – Annual report year: 1997