



TRANSDUCER TESTING

WHOI Ocean Bottom Seismograph Laboratory

Testing acoustic release transducers for WHOI OBS



Why?

- Every OBS is recovered using acoustic signals
- Transducers are vital to recovery!
- Also used for surveys to determine exact position of instrument on seafloor

How?

- Every transducer is qualified in the lab prior to shipment.
- Visual inspection – identify corrosion, oil leaks, connector damage, etc
- Electrical admittance test in air and in water tank identifies badly performing transducers
- Test insulation breakdown between shield and conductors of signal cabling (CableEye® Hi-Pot test)
- Drive high-voltage audio signal into transducer observing waveform (ping test)

Visual Inspections

- Corrosion on baseplate may allow water intrusion or oil leak
- Look for oil on the transducer
- Inspect penetrator cable and connector for damage
- Inspect boot for wear or damage
- Disassemble transducer for further inspection if warranted

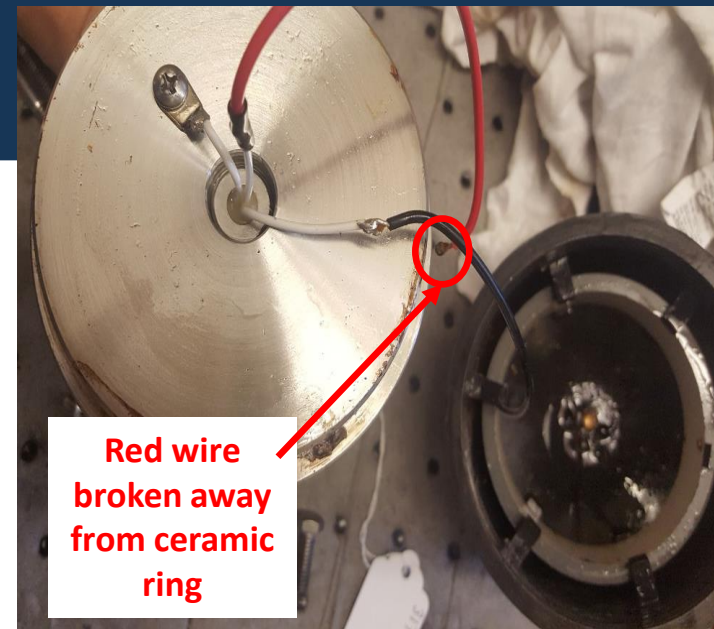


Severe corrosion identified on baseplate and penetrator

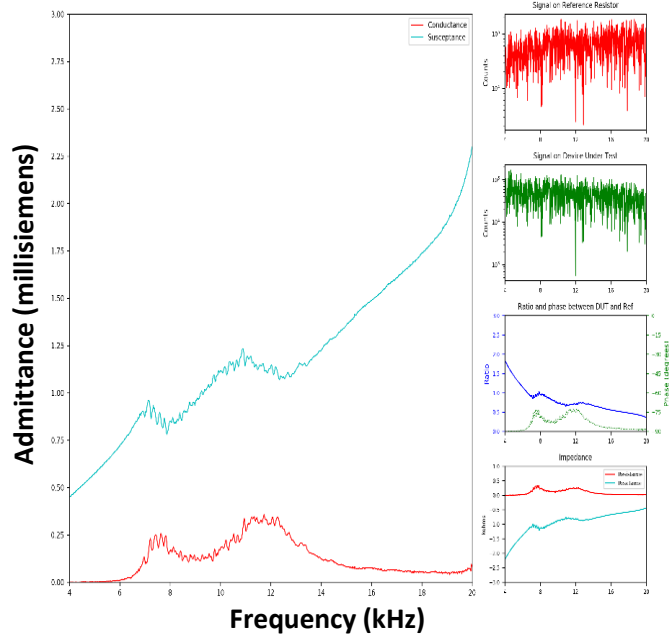


Admittance Tests

- Quick test using PC identifies many potential issues
- We can run tests both in air and in water
- No high voltage needed

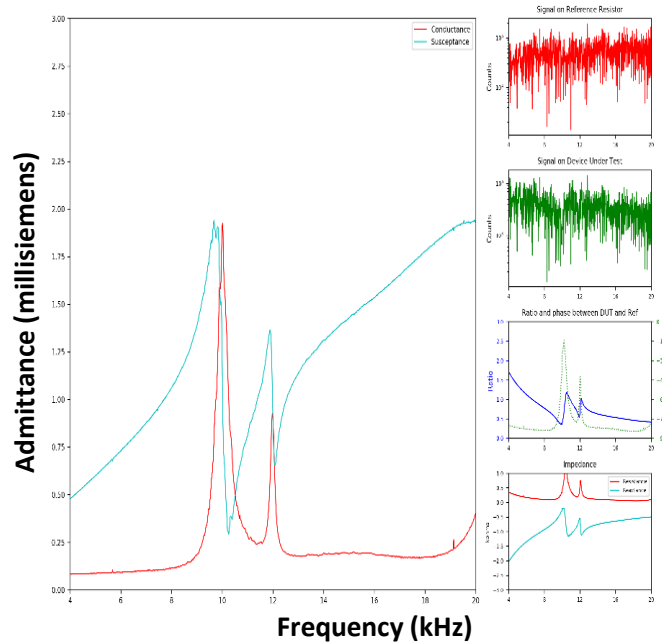


Admittance measurement of good transducer in water tank



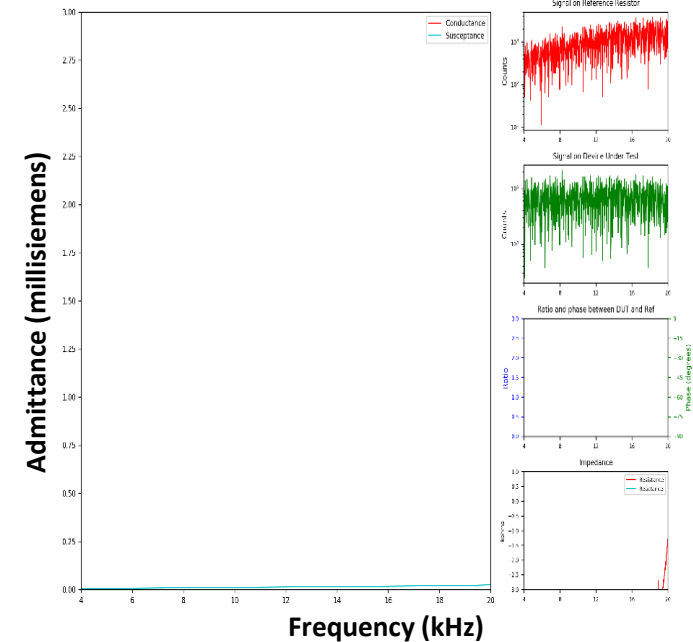
This admittance plot is typical of a functional transducer. Major deviations from this plot indicate an electromechanical problem.

Admittance measurement of bad transducer in water tank



This transducer was disassembled and found to have lost roughly 1/3 of its oil (replaced by air). The reduced coupling caused by the air is responsible for the dramatic change in admittance seen above.

Admittance measurement of bad transducer in water tank



This transducer was disassembled and found to have water intrusion which caused corrosion and failure of one of the delicate solder joints to the ceramic

Ping Test

How? Where?

- Drive high voltage audio frequency signal into transducer while monitoring the voltage waveform
- Typically done in lab
- Also done on deck immediately prior to deployment as final test of complete acoustic system (conditions permitting)

Tests What?

- Tests insulation breakdown (like CableEye®)
- Also tests for certain ceramic and mechanical failures
- Tests entire release system, including release board and cabling.

Ping waveform showing dislodged ceramic shorting against baseplate

