

Measuring the Vibrations of the Ocean: Environmental Impact of High Amplitude Acoustic Signals on Fish and Invertebrates

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Why?

- The offshore renewable market is growing rapidly.
- High amplitude acoustic signals have been identified as a threat to marine life.
- Fish and invertebrates detect the particle motion of an acoustic field rather than the SPL.
- Particle motion must be measured indirectly to cover the frequency range.
- Measurement sensors operate in narrow margins.
- Complexity is added due to the low frequency range of interest.
- Sound pressure level(SPL) is regularly measured for marine mammals.
- It is essential to understand the impact on fish and invertebrates to improve our treatment of the marine environment.



Shoal of green jacks - Sea of Cortez



Sound Sources

- Pile Driving and unexploded ordinance removal produce the highest amplitude acoustic signals and are known to be life threatening.
- The processes involved include impact/vibration hammers, drilling, and water jetting.
- The immediate effects of operational noise are smaller than that of construction.
- Cumulative impacts of operational noise from large projects are still under research.

References

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Measurement

- A system has been designed to measure marine acoustic particle motion.
- A triaxial accelerometer is supported in a near neutrally buoyant sphere.
- The sphere is compliantly mounted to allow movement in the acoustic field.
- With continued development the system will be able to measure intensity.

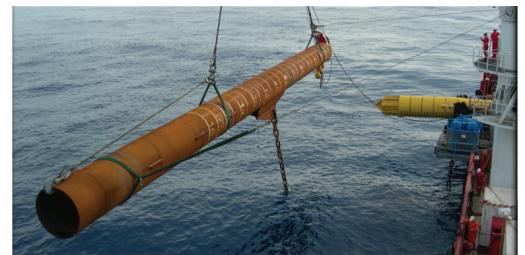


Marine acoustic particle motion sensor prototype, developed on partnership with Seiche Marine Acoustic Solutions

Objectives

Key objectives of this work include:

- Measure marine acoustic particle motion and intensity in the near field of offshore piling and/or unexploded ordinance removal.
- Development of a lower cost sensor system for marine particle motion and intensity measurement.



Foundation monopile pre-installation



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