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Underwater Radiated Noise Measurement and Management with KINETIX

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KINETIX

IMPACT MONITORING TECHNOLOGY

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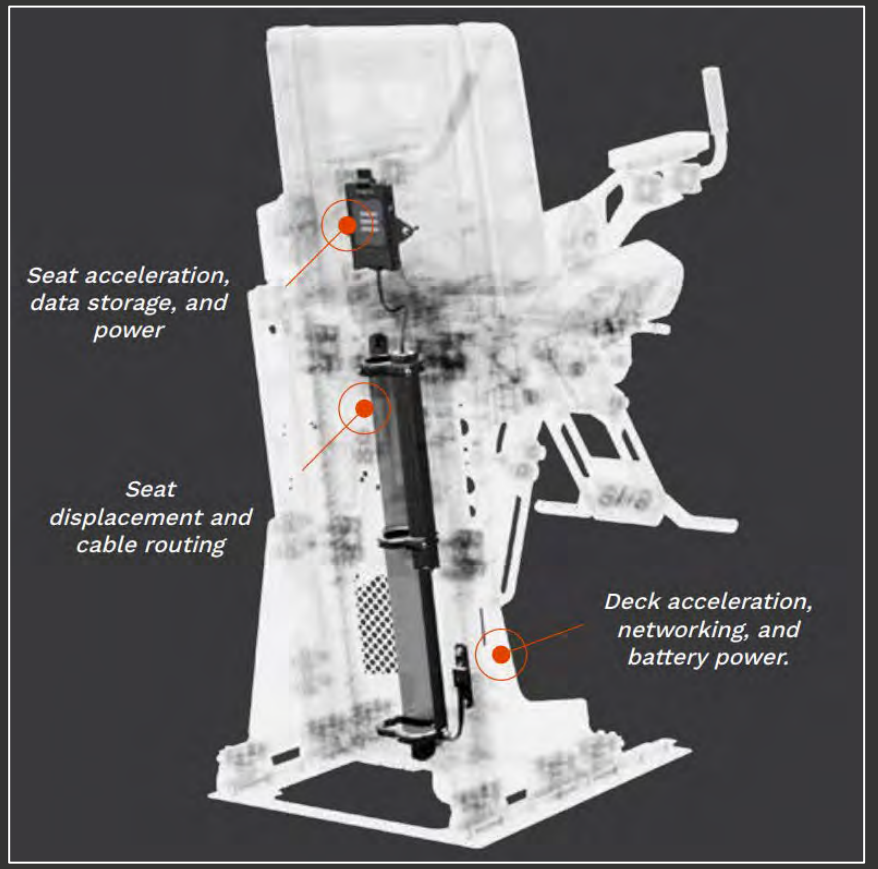
Project Overview

Kinetix is a product and service package originally designed for shock and vibration monitoring of high speed craft

The system is under evaluation in a Transport Canada project to detect hull-induced vibrations due to propeller cavitation

The initial project focus is on small boats, trials on larger fishing vessels are upcoming



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Project Overview

First trial on a small planing craft with a 150 hp outboard

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Project Overview

Second trial on a planing craft with twin 200 hp outboards

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Test Procedure

250 RPM steps from 700 to 4,000 RPM

3 craft load conditions:

- Standard - **Free running**
- Moderate – Towing sea anchors
- High – Boat **tethered** to dock

Noise measurements in the enclosed aft hatch area ~20 Hz to 20 kHz

Dry side vibration measurements on the transom and hull

Hydrophone measurements (upcoming)

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Results

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Early Results

1) Cavitation observed, distinct from exhaust and aeration/ventilation
2) Cavitation onset observed on the leading blade edges
3) PSDs for free vs tethered non cavitating states were similar
4) PSDs indicate earlier cavitation onset with higher prop loading
5) PSDs indicate cavitation before it can be seen
6) Prop cavitating in normal use at high speed
7) PSDs suggest clearer differences at higher frequencies

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Exhaust, no cavitation

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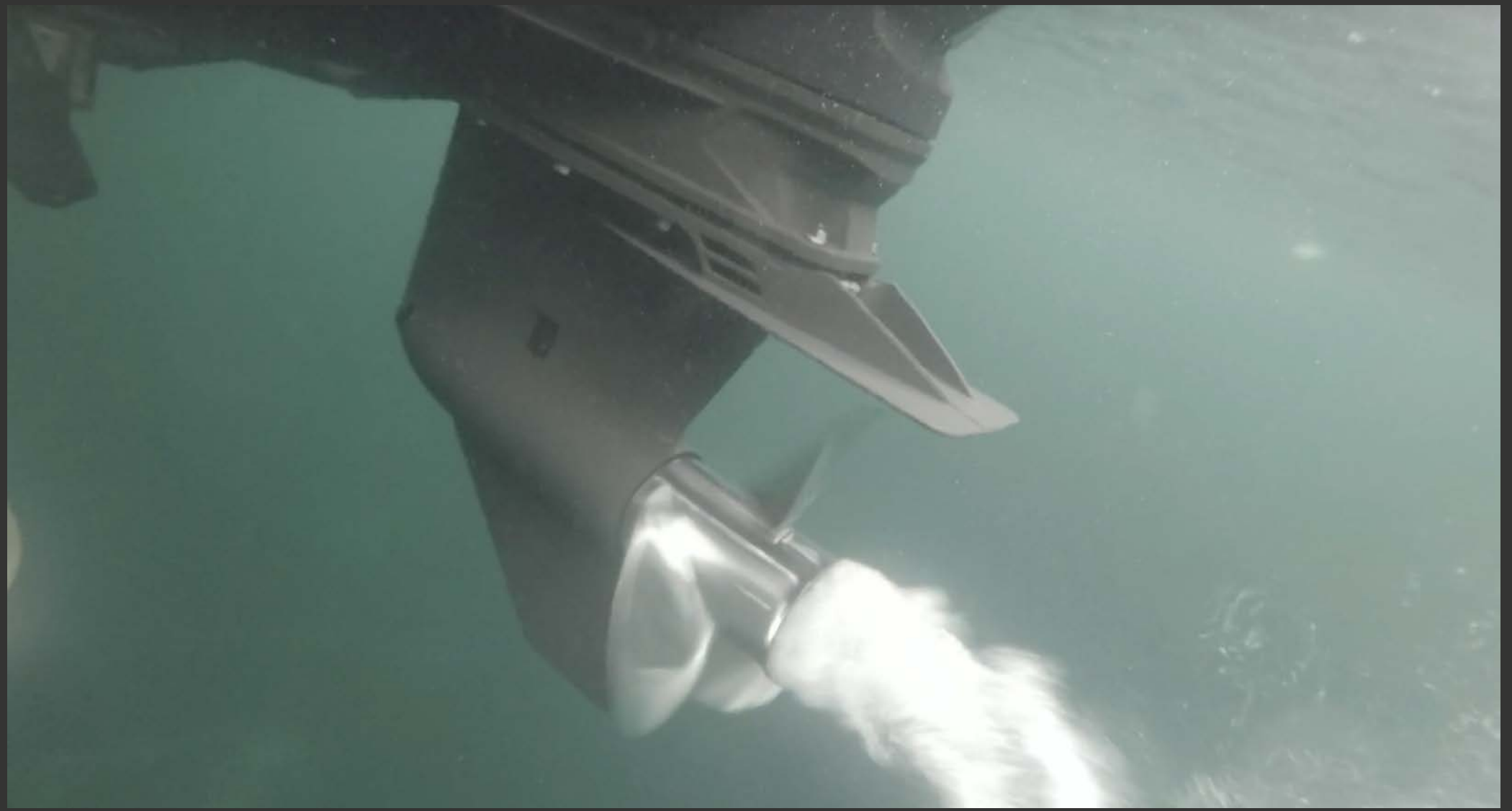
Exhaust, no cavitation



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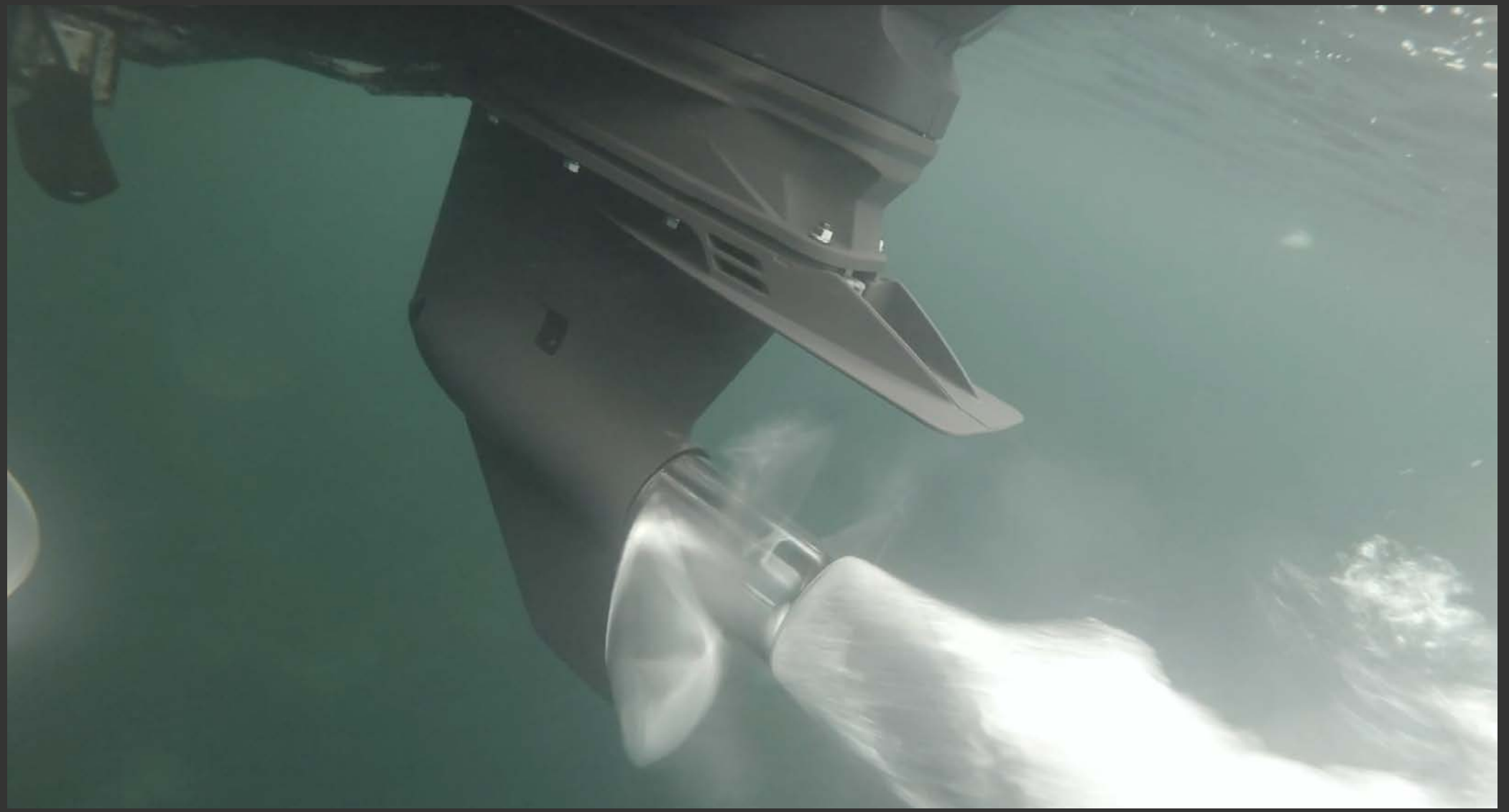
Cavitation onset



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Cavitation

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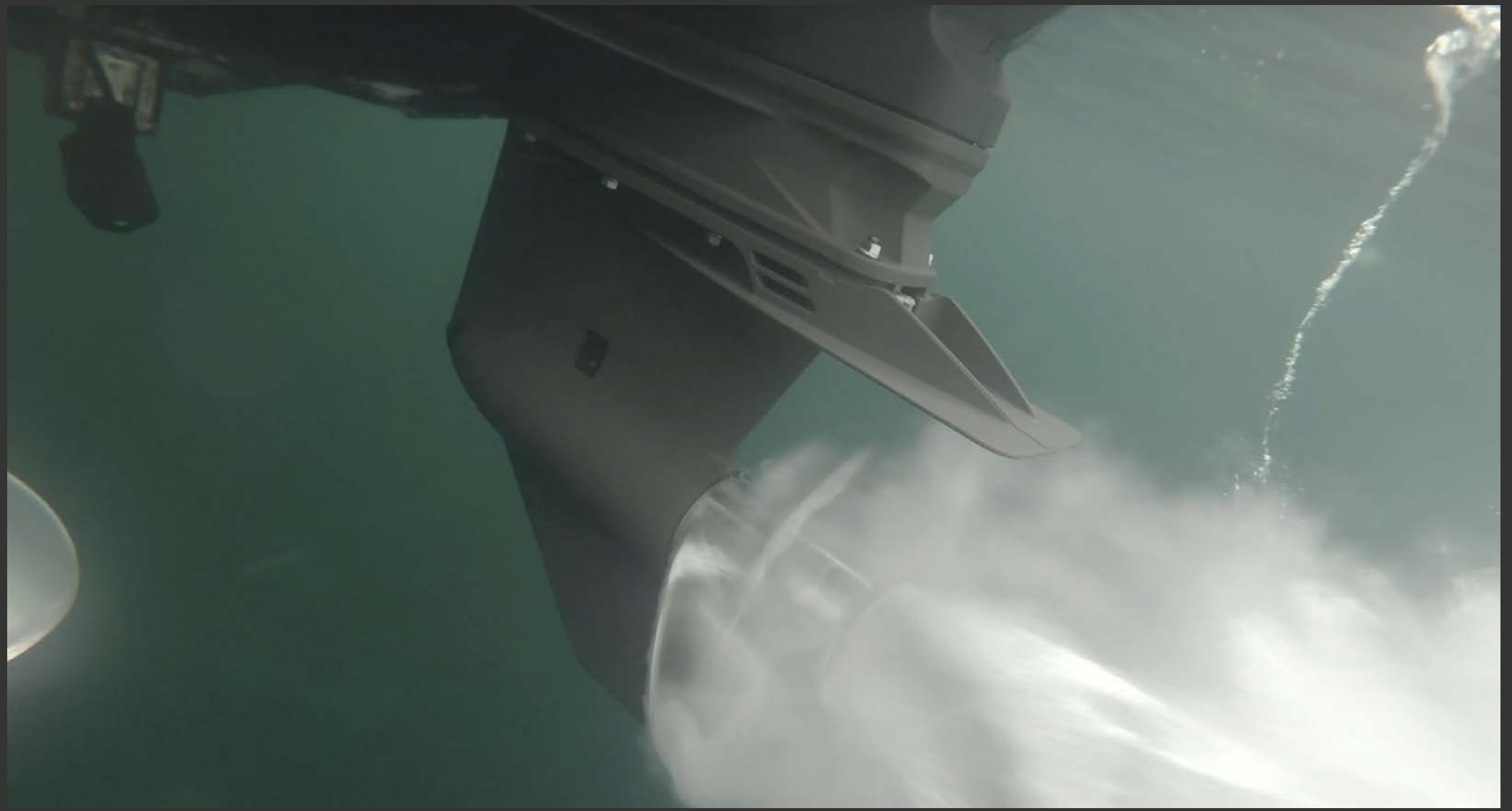
Cavitation



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Leading edge cavitation onset

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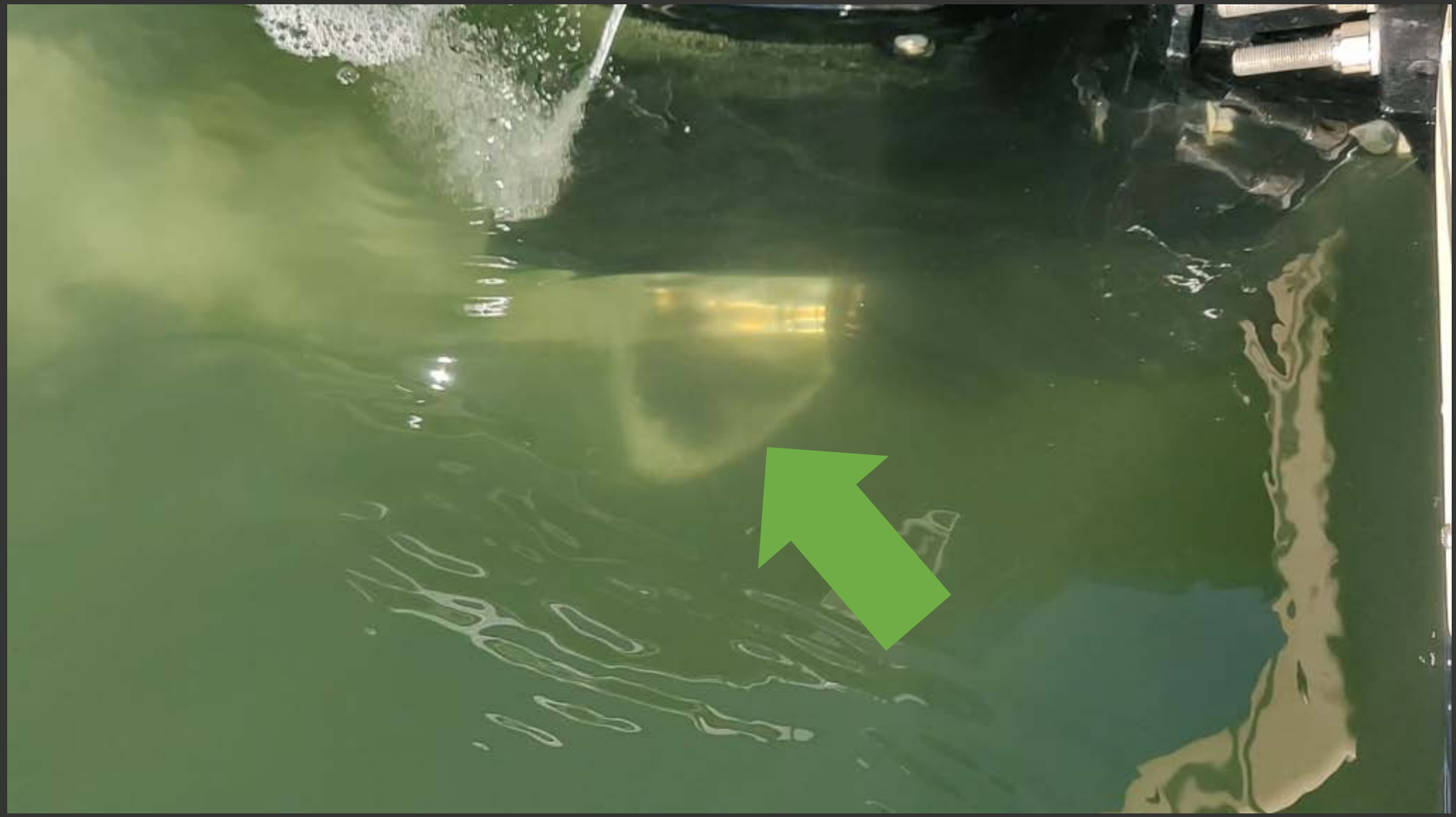
Leading edge cavitation onset



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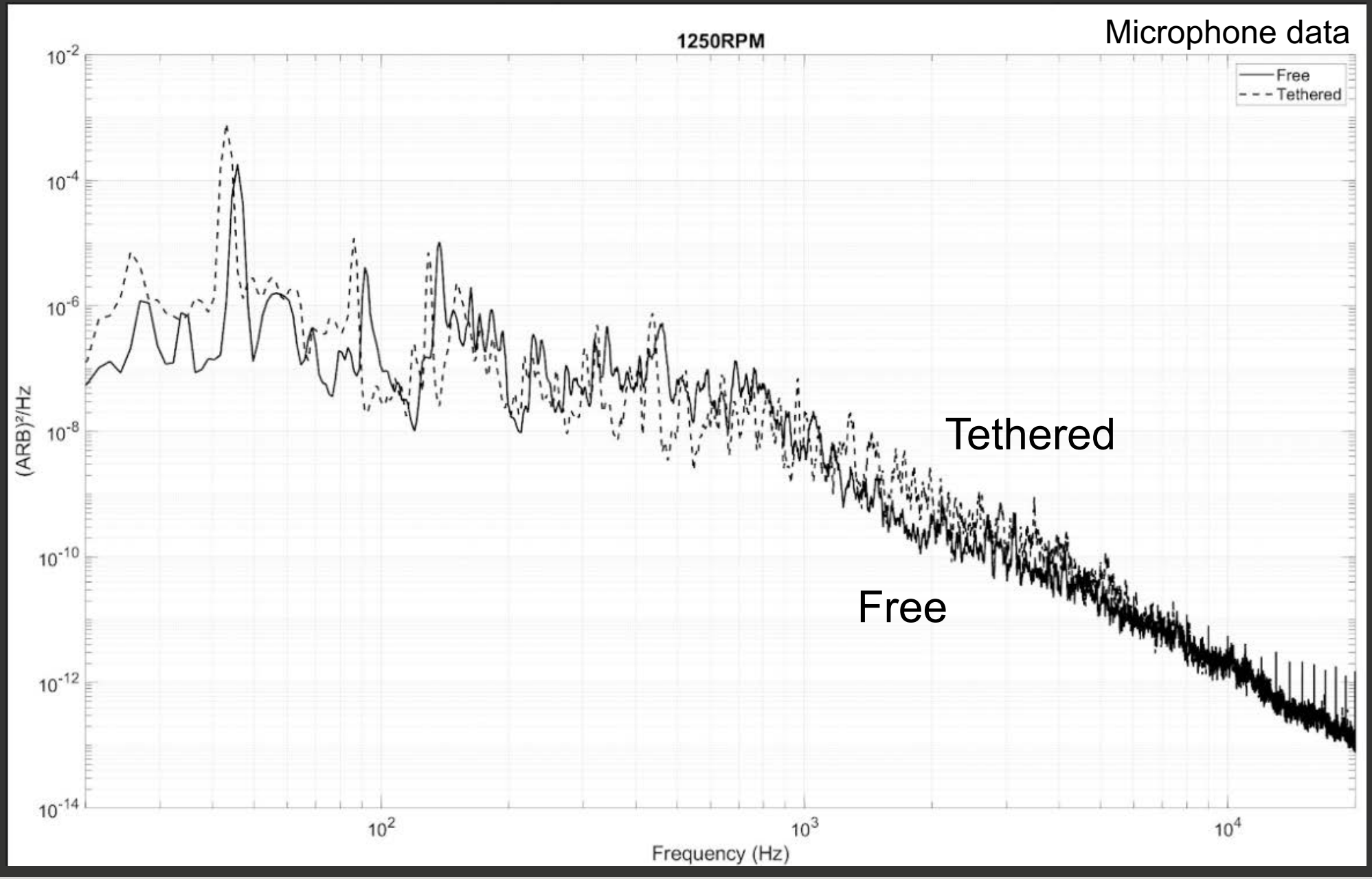
PSD 1250 RPM – No cavitation



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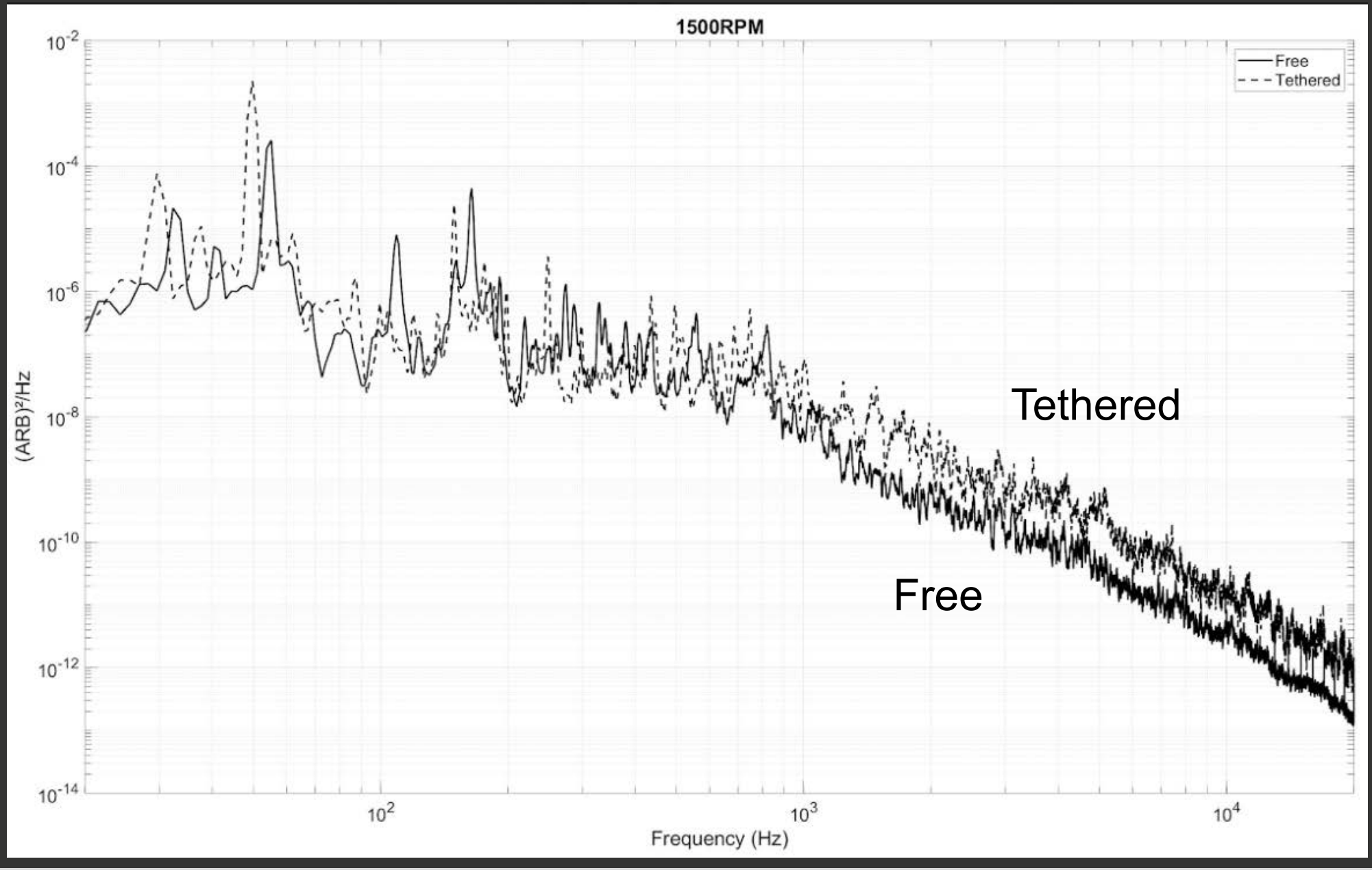
PSD 1500 RPM – No cavitation visible



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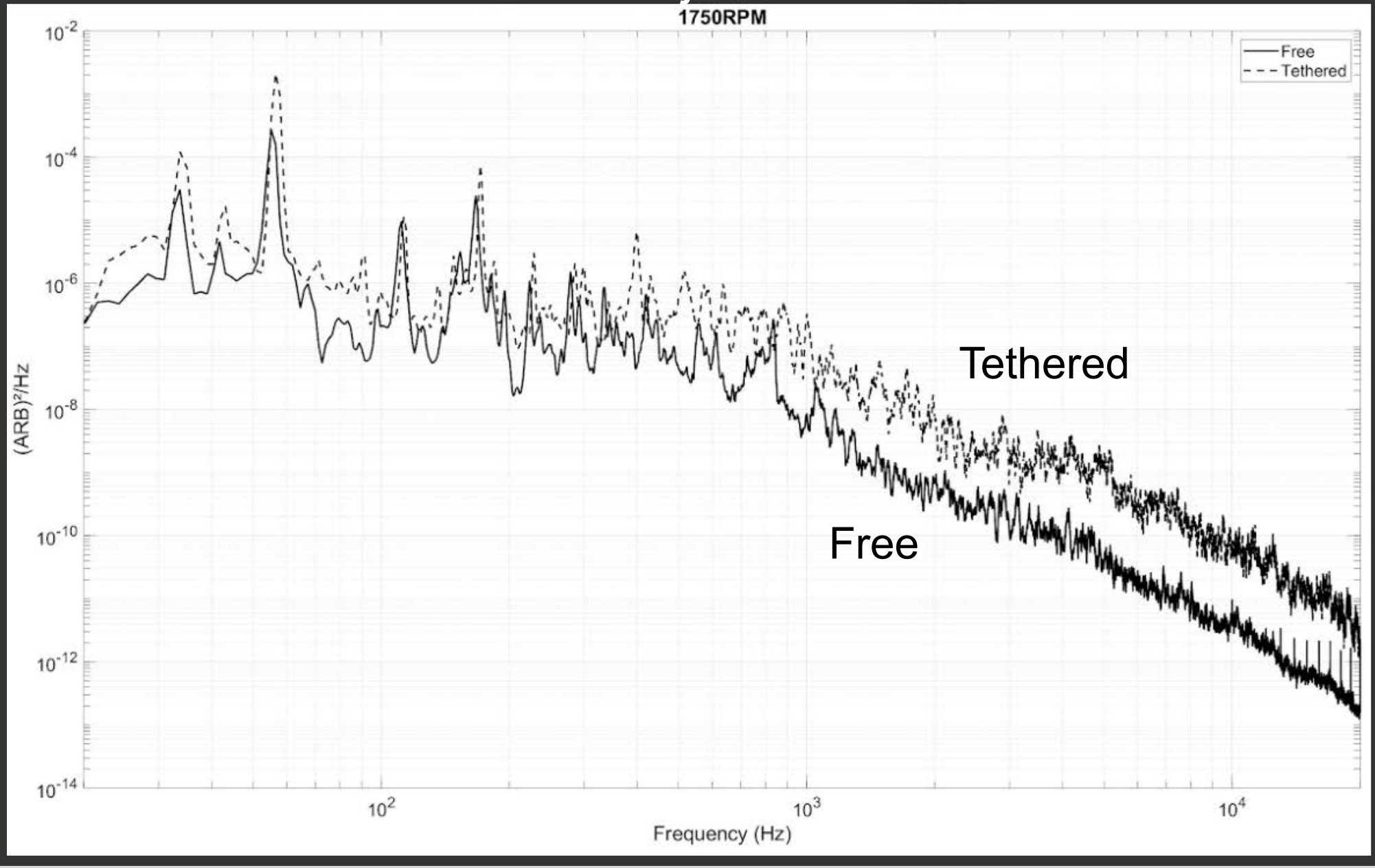
PSD 1750 RPM – Cavitation just visible



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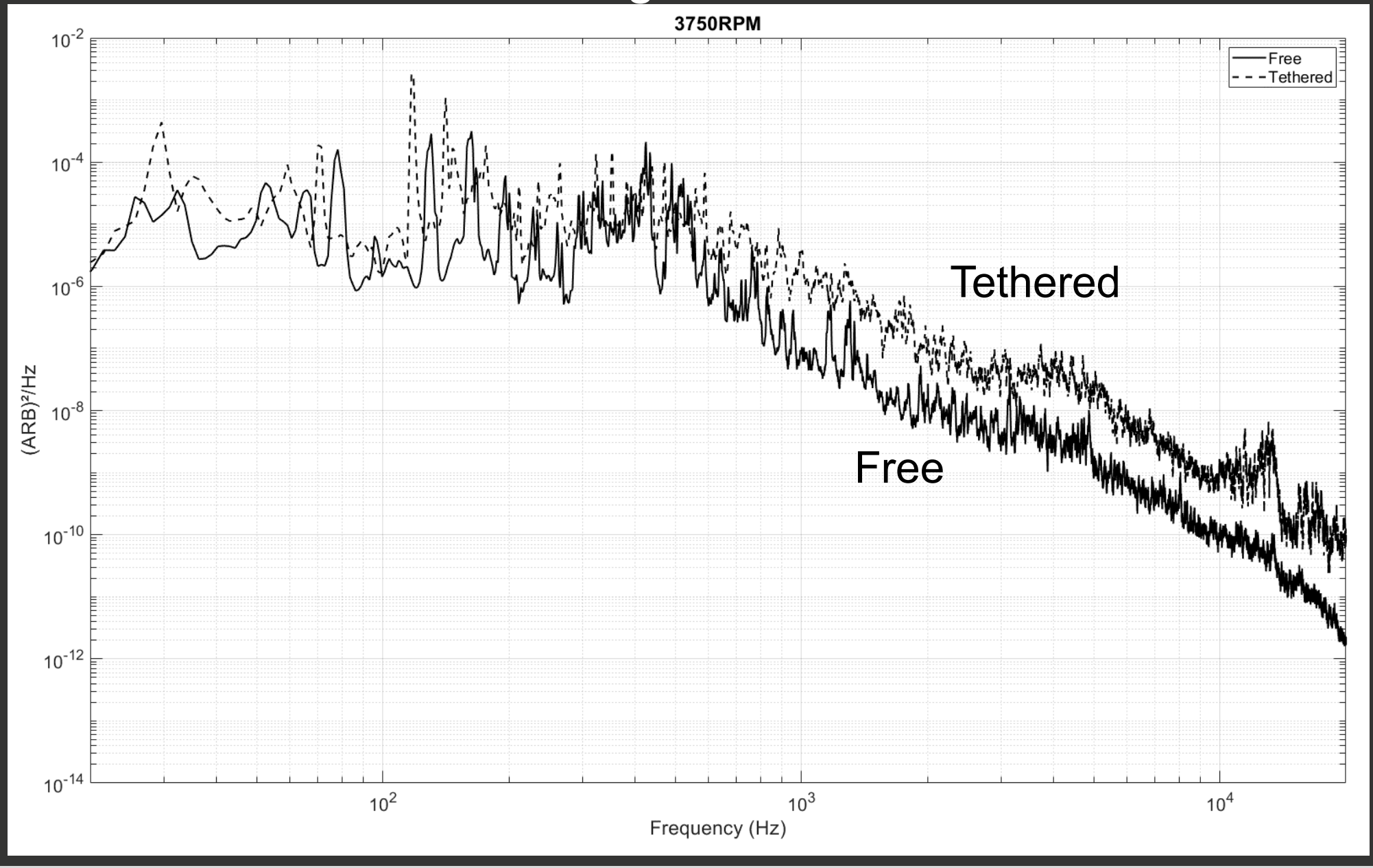
PSD 3750 RPM - Cavitating



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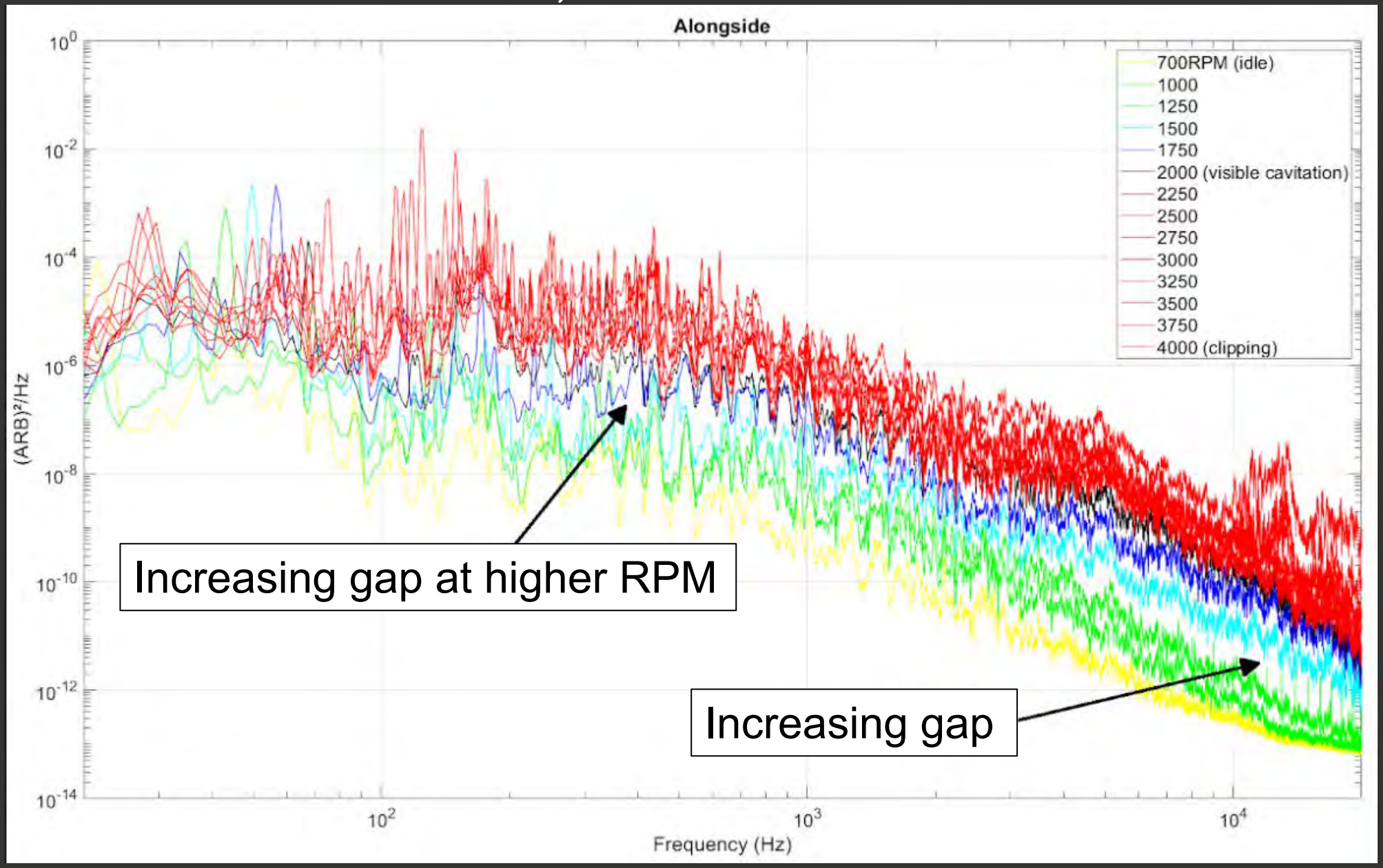
PSD tethered condition, Trial 1



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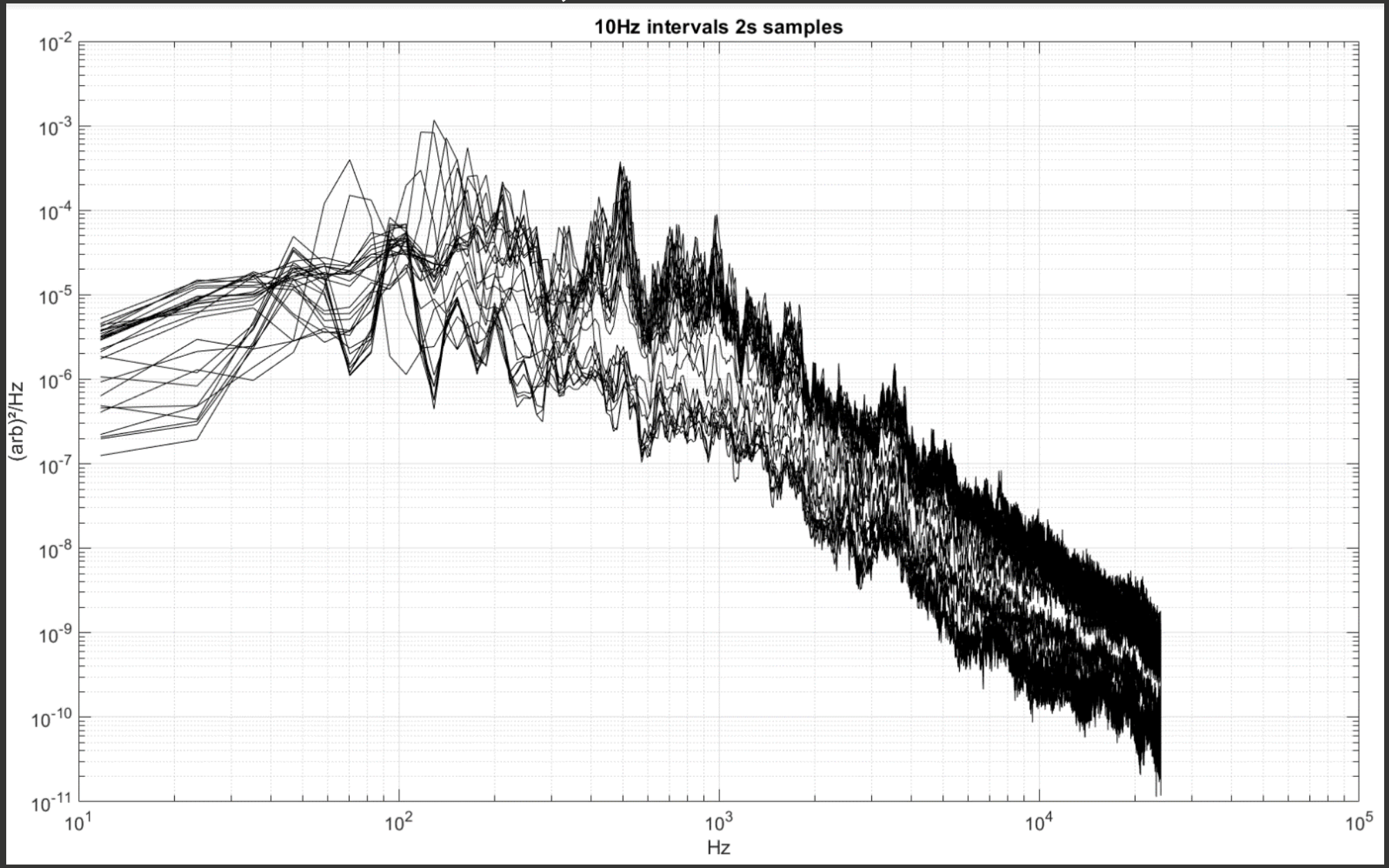
PSD tethered condition, Trial 2



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Vibration Data

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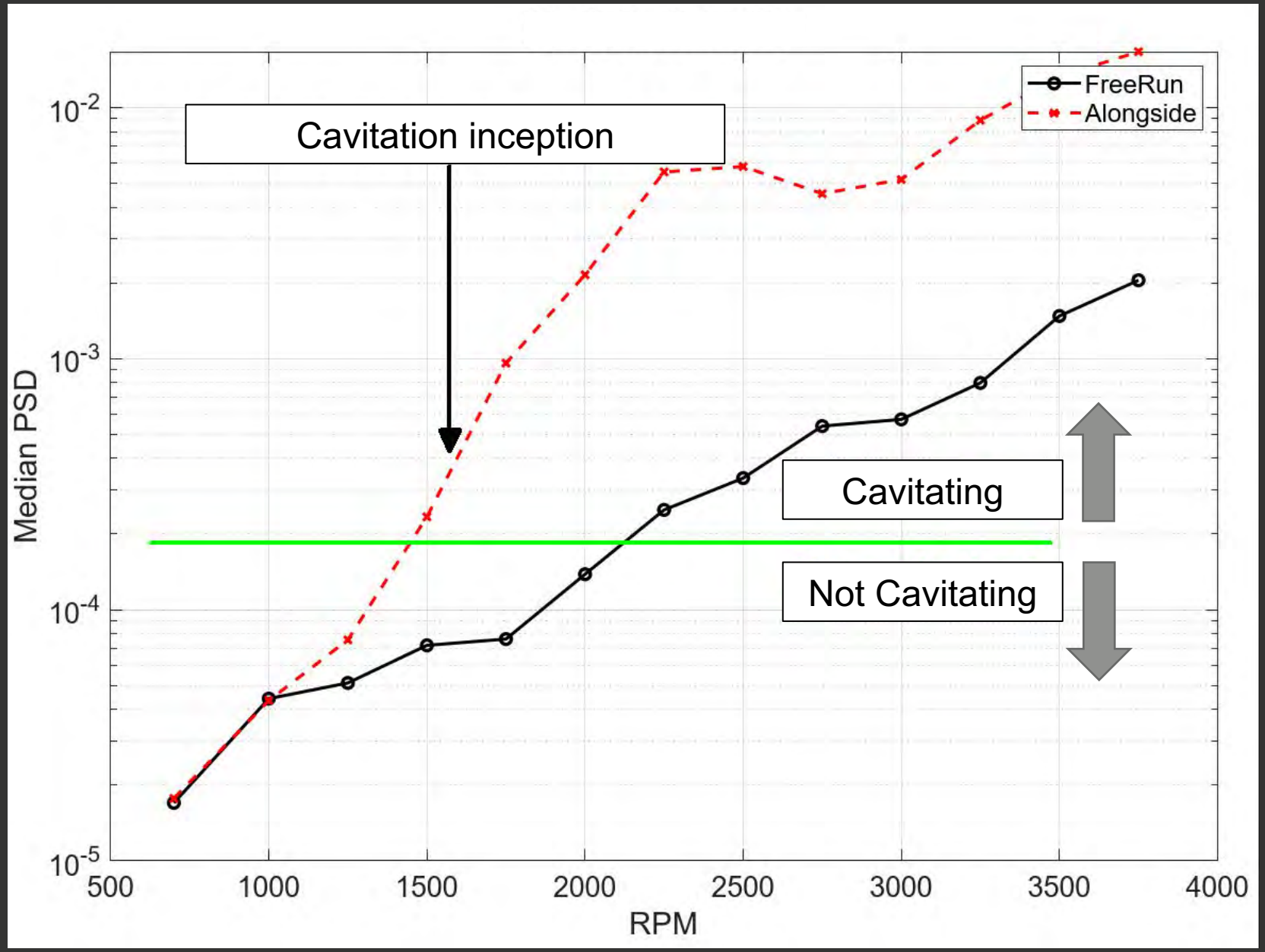
Hull vibration - tethered



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Cavitation Detection Alerts on Kinetix Real-time Display

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THANK YOU

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