

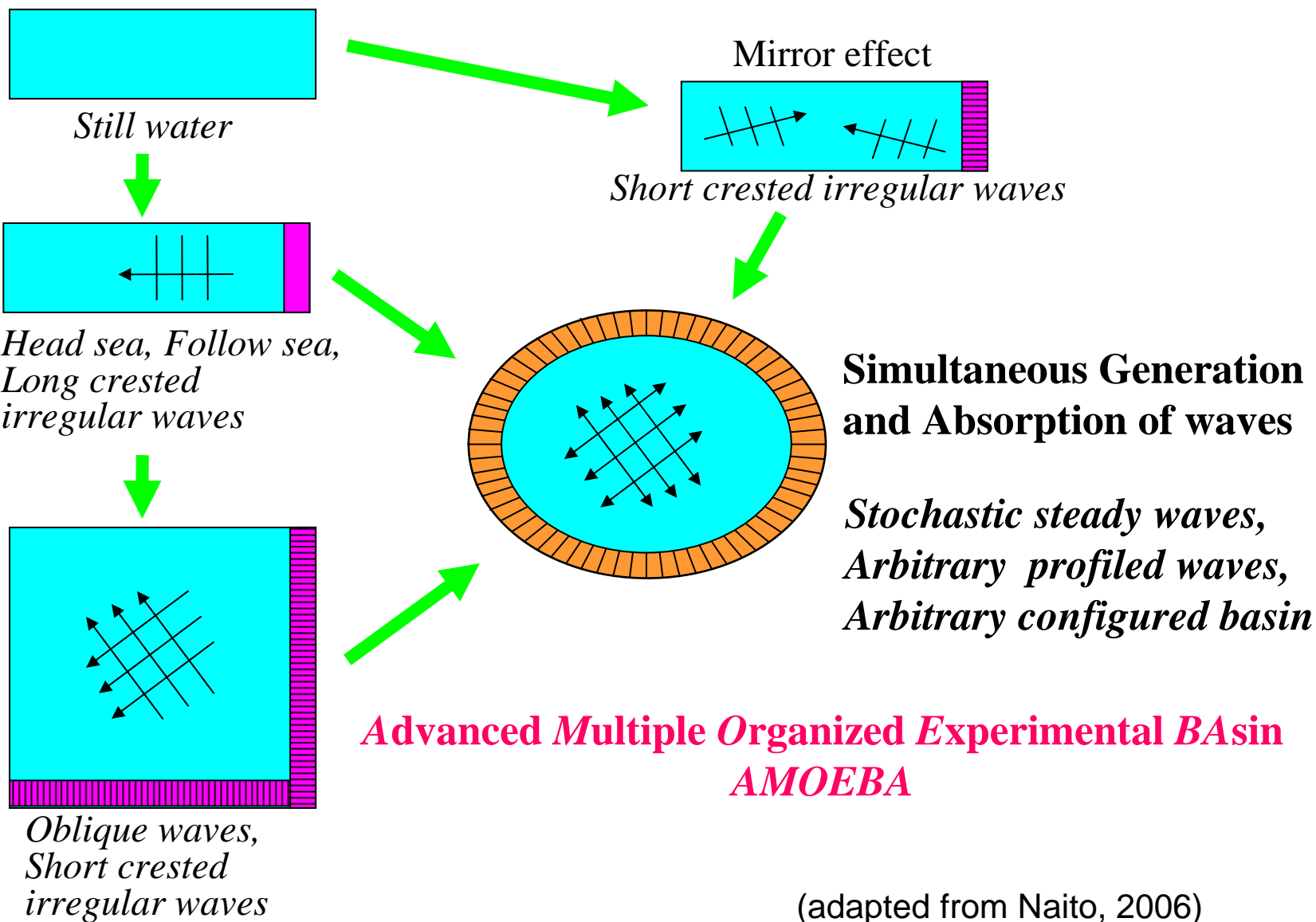
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Comments on the Wave Field of Circular Tank

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University of São Paulo – Brasil



Naval and Ocean Laboratory Test Tanks



(adapted from Naito, 2006)



Main Characteristics of Circular Tanks NMRI and AMOEBA

Tank	NMRI *	AMOEBA **
Geometry	Circular	Circular
Diameter	14 m	1.6 m
Depth	5 m	0.25 m
Actuator (qty)	Flap (128)	Plunger (50)
Driver	Servomotor CA (0.8 kW)	Voice Coil Motor
Actuator Dimensions	0.33 m x 2.7 m	0.1 m x 0.12 m
Wave Height MAX	0.5 m	0.02 m
Frequency Range	0.25 Hz a 2 Hz	1.6 Hz a 3.0 Hz

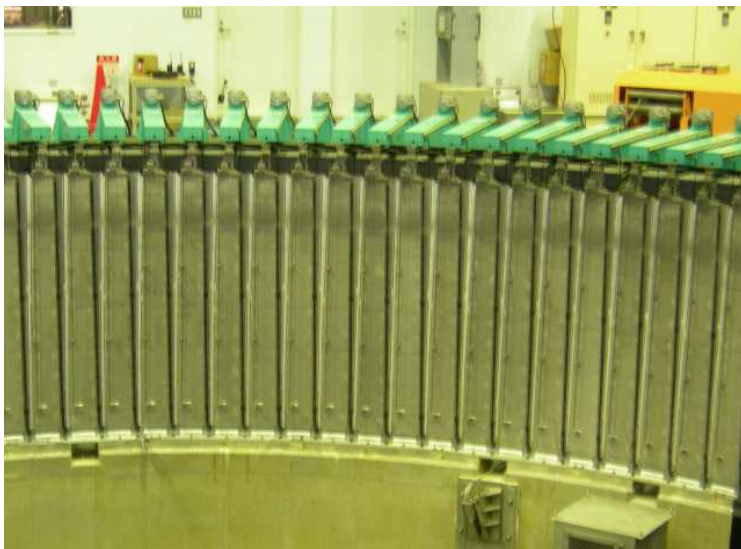
* According to Maeda, K. et alli (2004).

** According to Naito, S. et alli (1998).



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Circular Tanks Lay Out



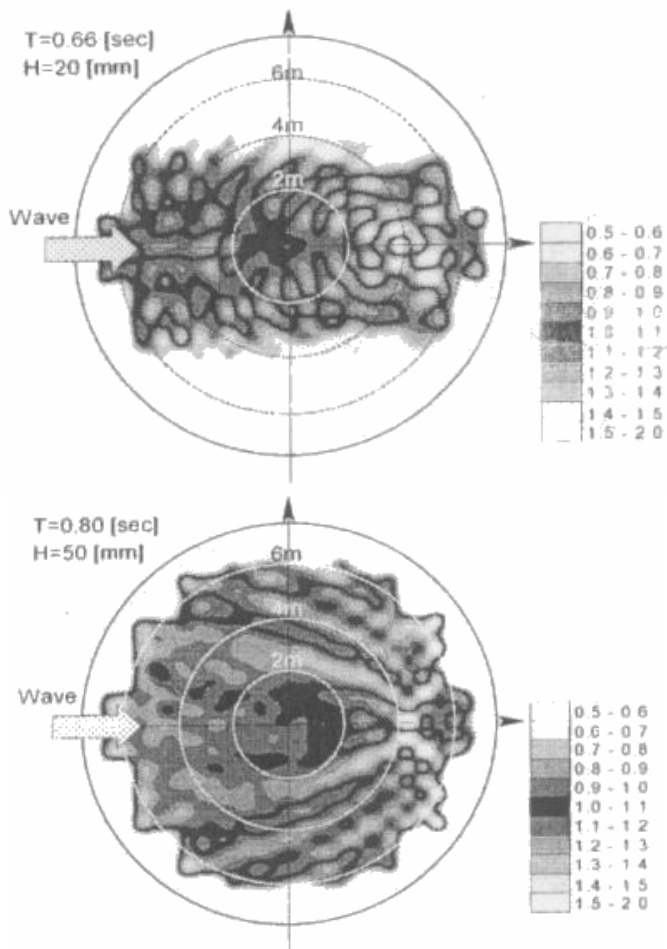
NMRI

AMOEBÁ

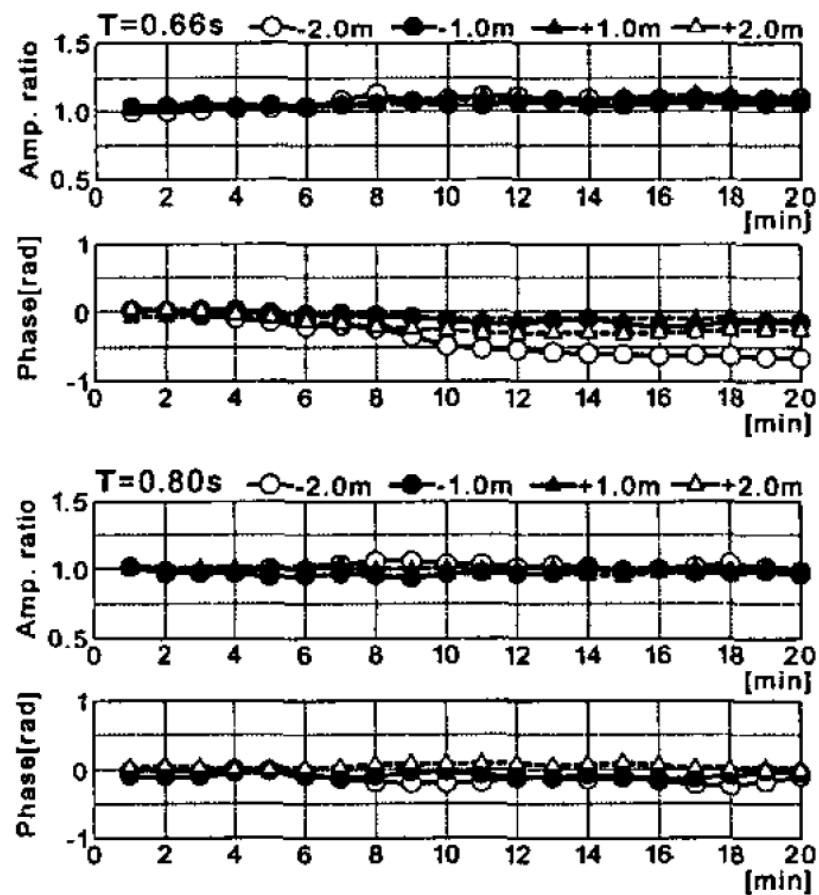


DeepSea Wave Tank Tests Results

Maeda, K. et alli (2004).



Wave Height Distribution

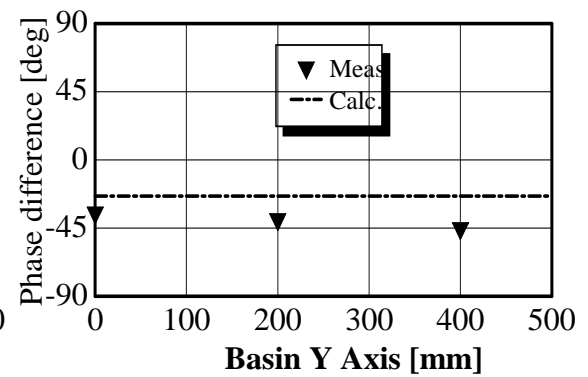
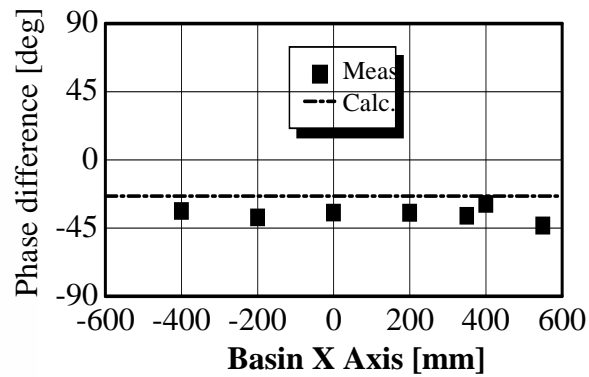
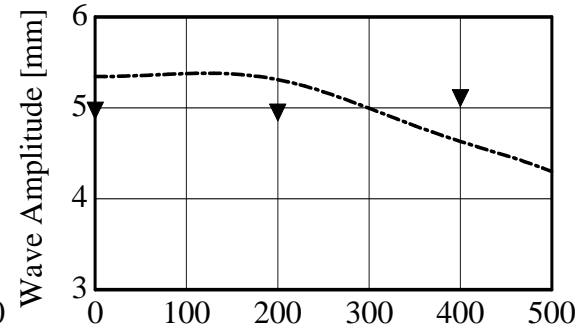
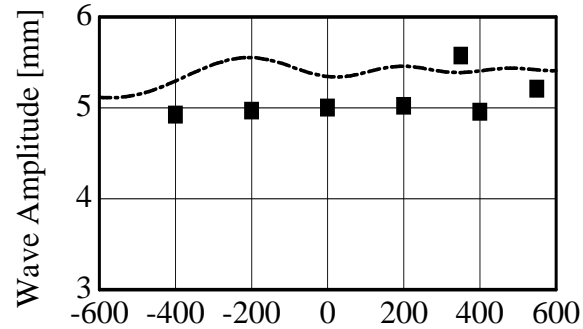
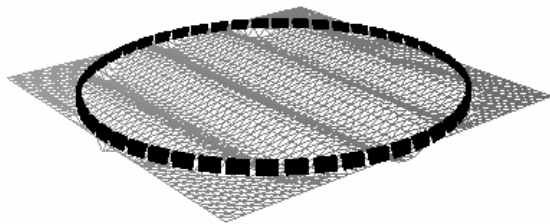
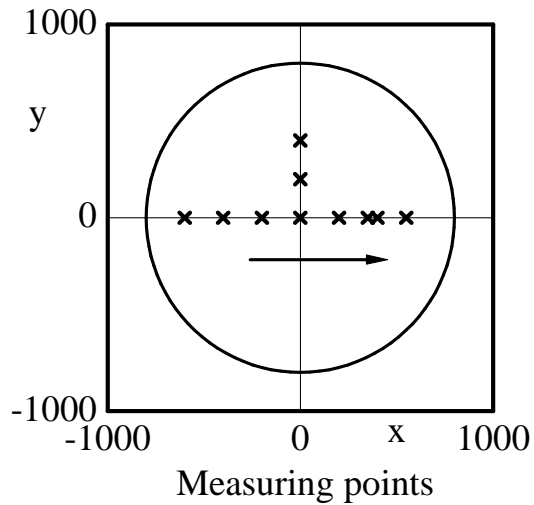


Wave Amplitude and Phase along time



Amoeba Wave Tank Tests Results

Naito et alli, 1998

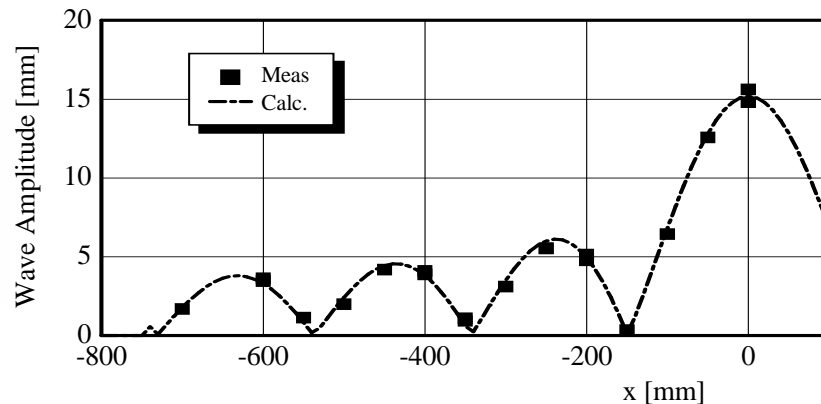
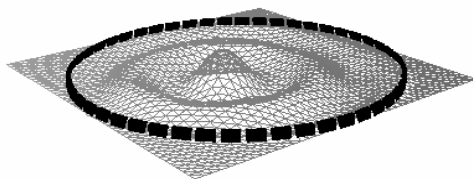
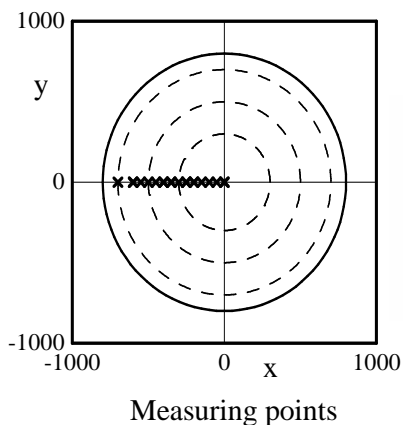


Amoeba regular wave field simulation and wave profile at measuring points

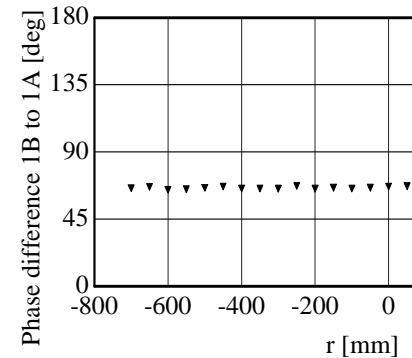
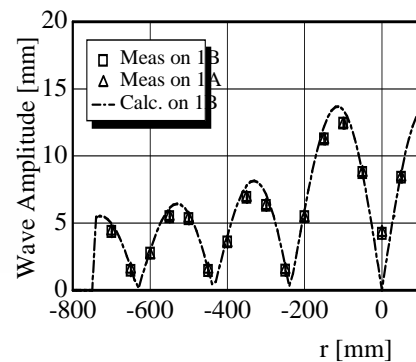
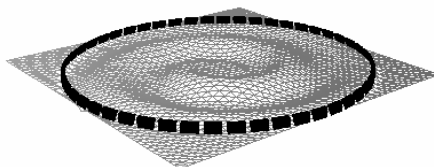
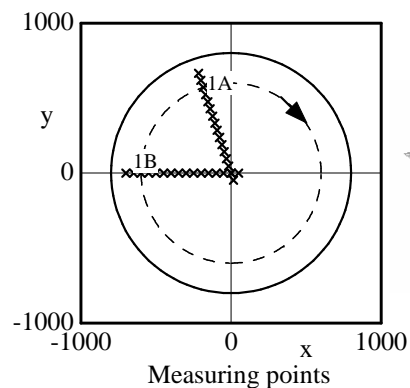


Amoeba Wave Tank Tests Results

Naito et alli, 1998



Amoeba concentration wave field simulation and wave profile at measuring points

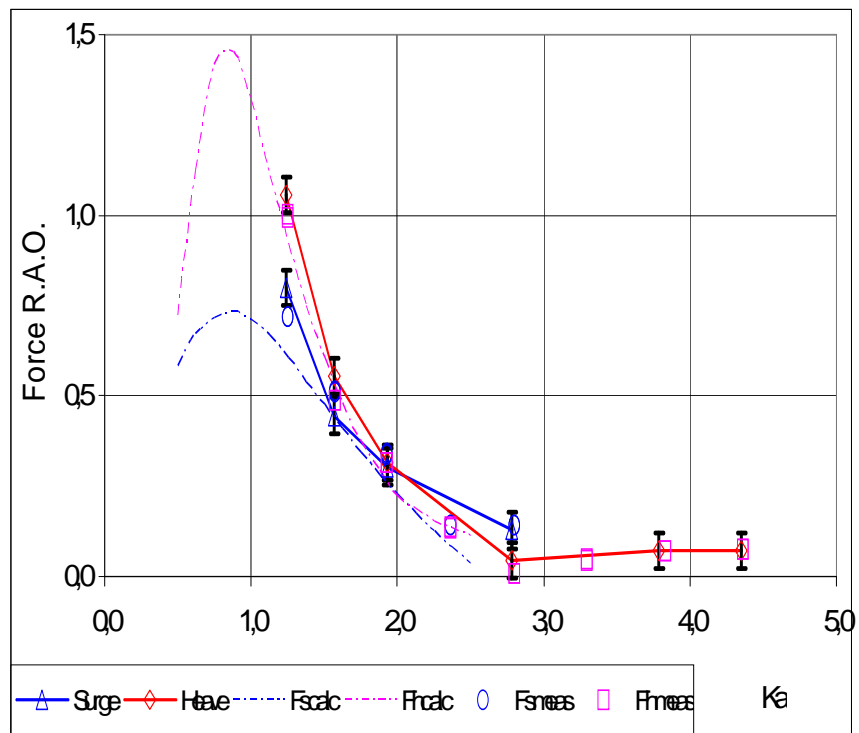
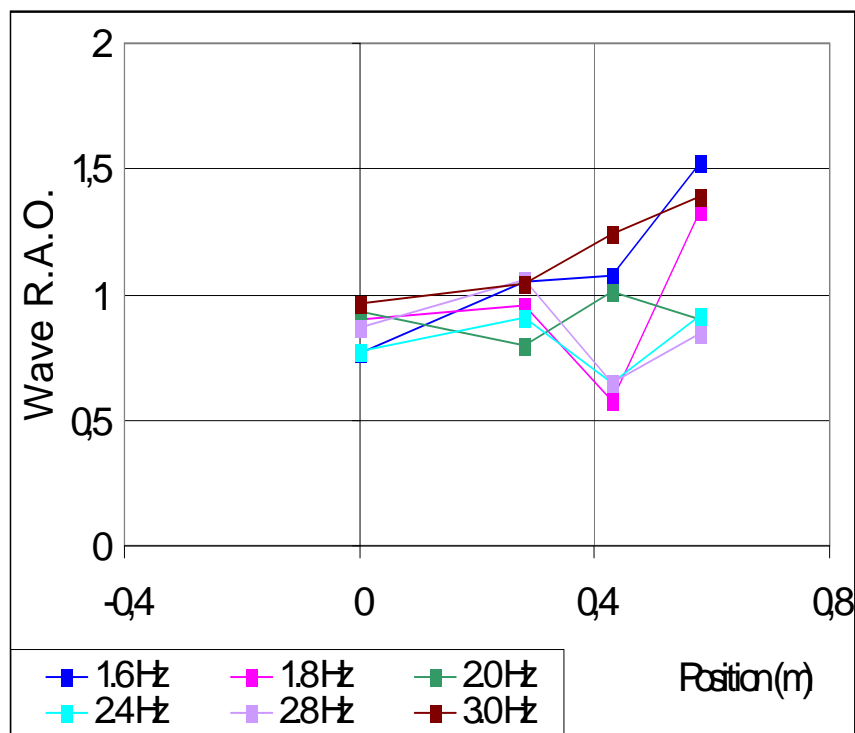


Amoeba spiral wave field simulation and wave profile at measuring points



Amoeba Wave Tank Tests Results

Martins, 2006



R.A.O. for Wave and Force in Amoeba Tank (platform four columns model)



Conclusions

- Deep Sea tank wave R.A.O. is constant within $\pm 5\%$ for all frequencies inside 1 m radius (14% of diameter), exception to 1.0 Hz which is for inside 4 m (57%);
- Deep Sea wave field changes after generation time greater than 7 minutes, for frequencies greater than 1.0 Hz and is constant almost for 20 minutes, to frequencies below 1.0 Hz;
- AMCEBA tank wave R.A.O. is constant within $\pm 5\%$ for inside 0,35 m radius (44% of diameter) for all frequencies;
- AMCEBA tank was able to keep amplitude and phase for all frequencies more than 20 minutes; and
- Both tanks exhibited some degree of wave reflections, depending on location and frequency, worst case in Deep Sea tank and less in the compact tank AMCEBA.



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