Alexander M. Gorlov:

1. Darrieus Turbine
2. Orthogonal Turbine
3. Helical Turbine

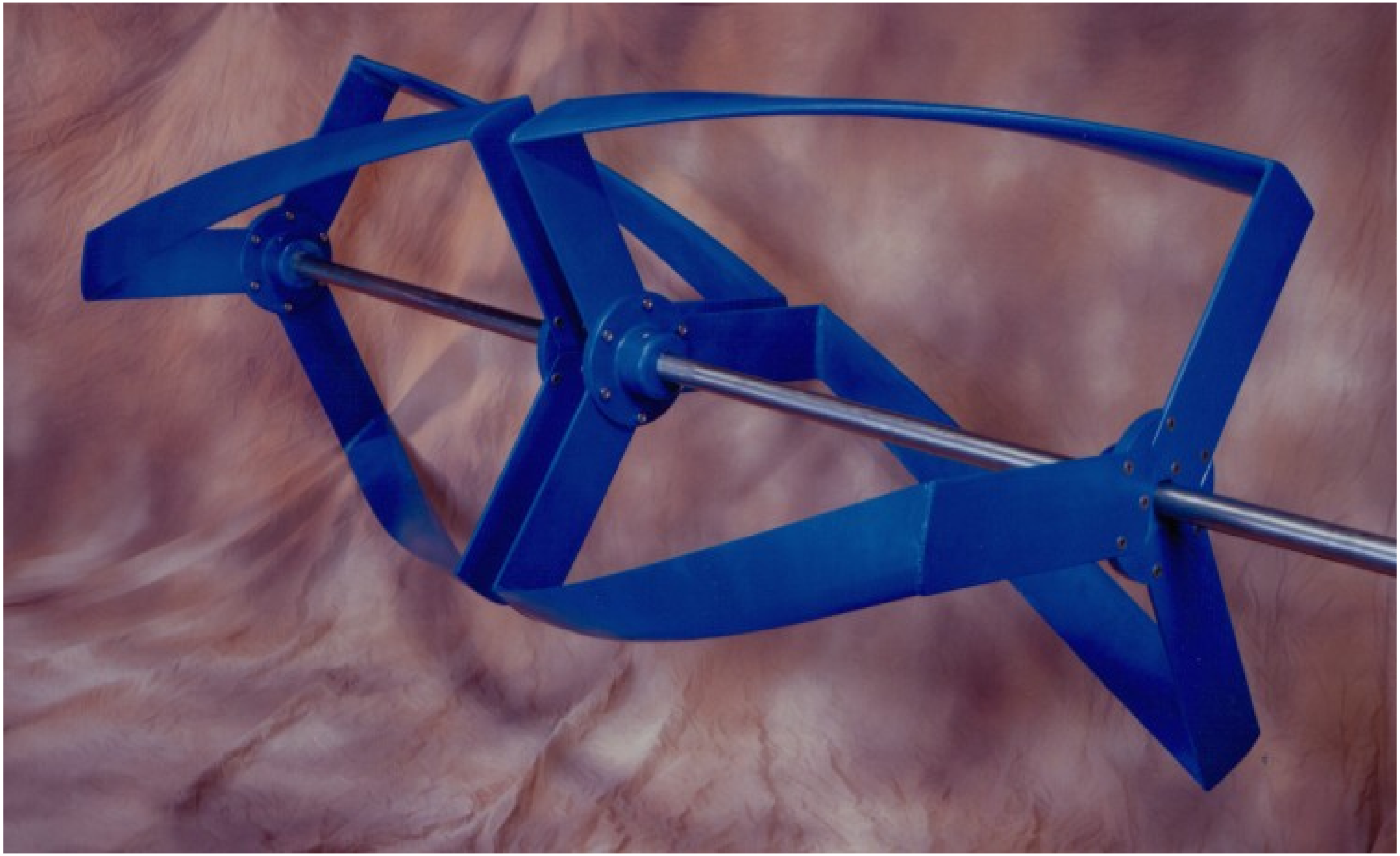
Hydraulic Cross-Flow Turbines

By Alexander M. Gorlov, Professor Emeritus

October 26 – 28, 2005

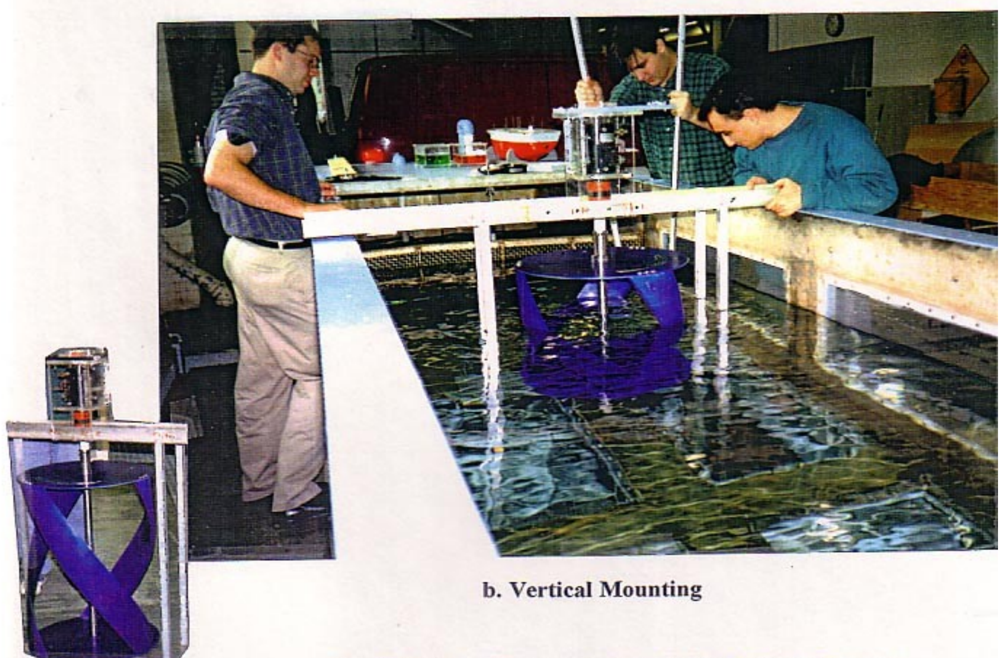
Double Helix GHT

Triple Helix GHT



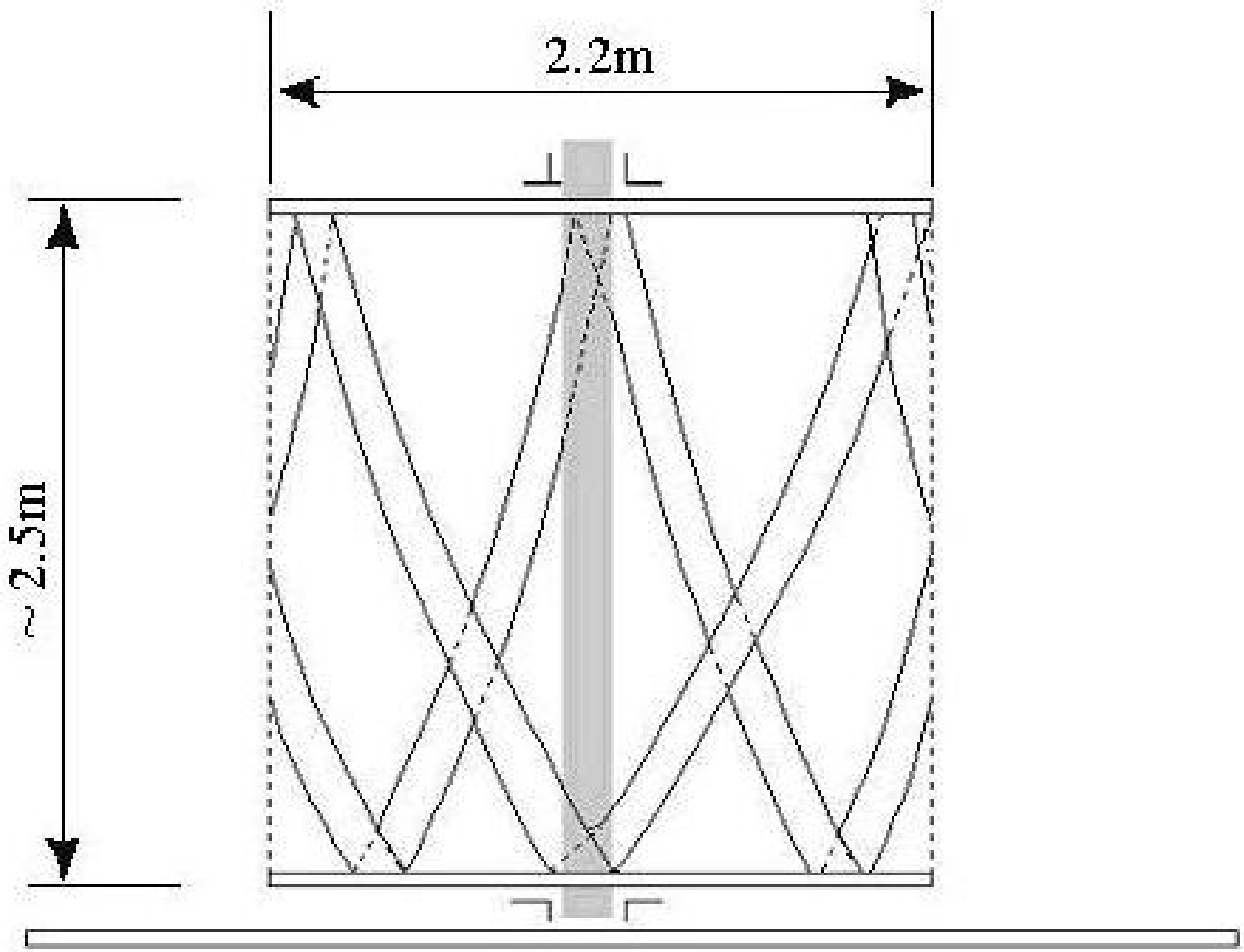
Various Configurations

a. **Horizontal Mounting**

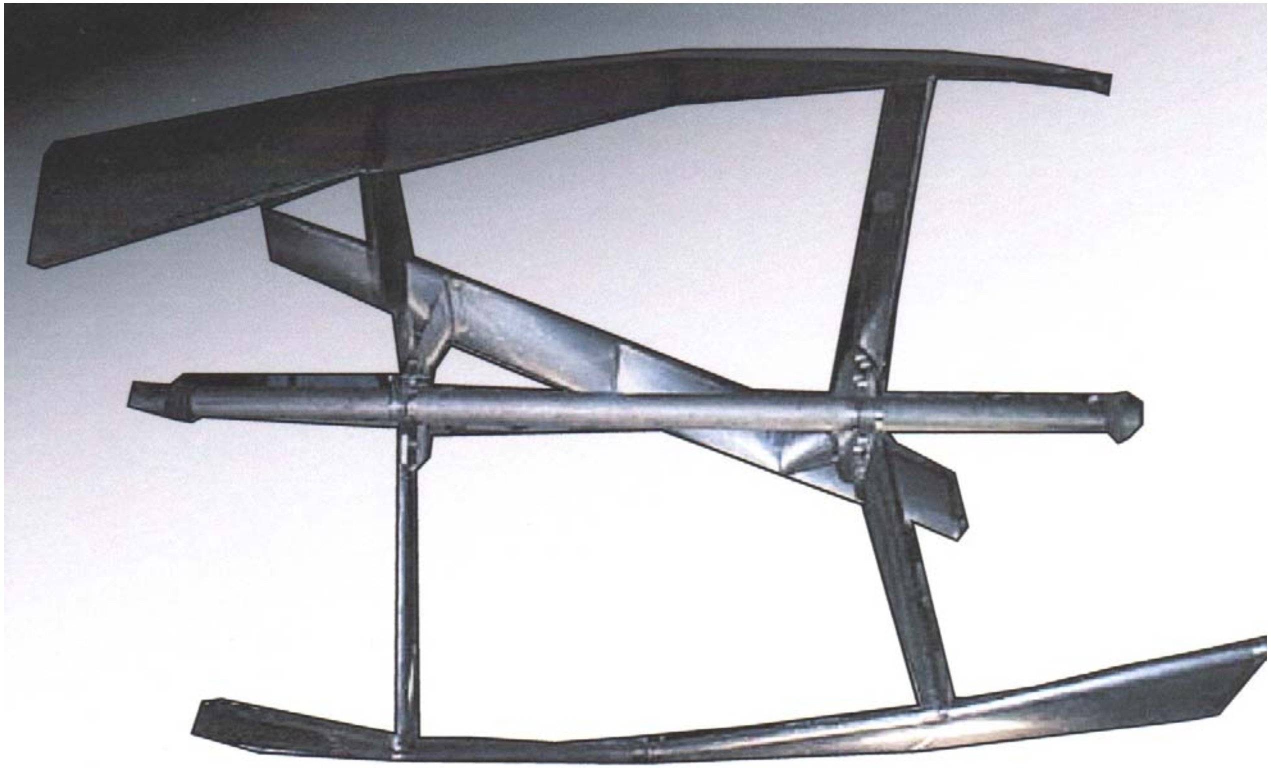


b. **Vertical Mounting**

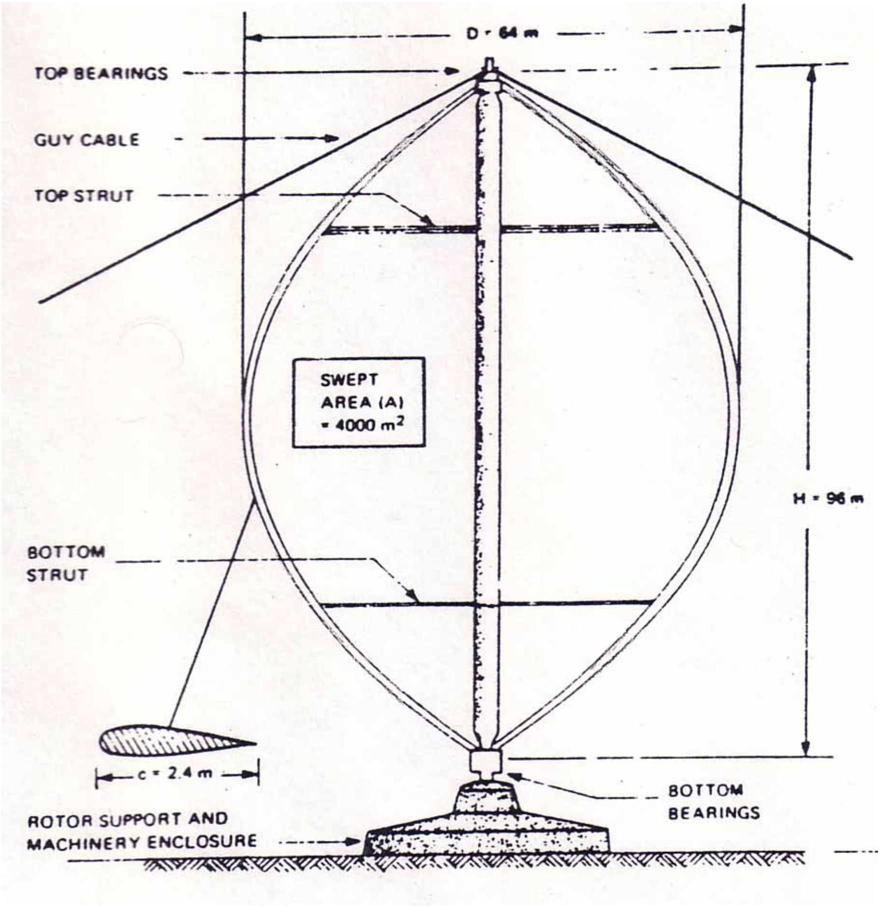
Hexagon Helical



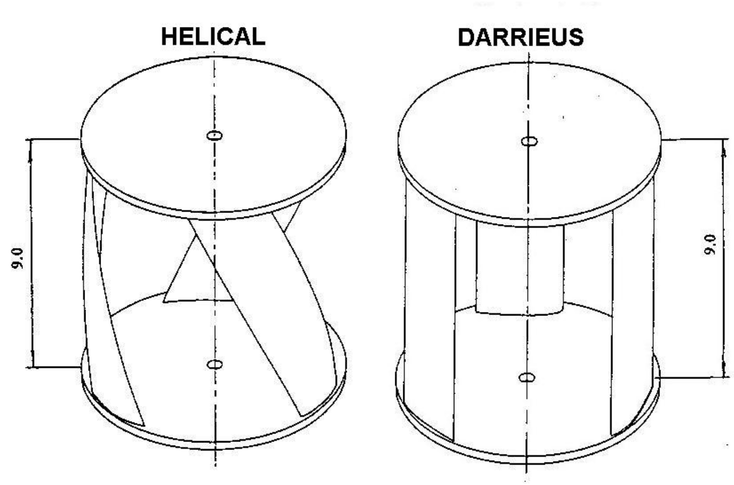
2.2 m Triple Helix Steel



Darrieus Classic

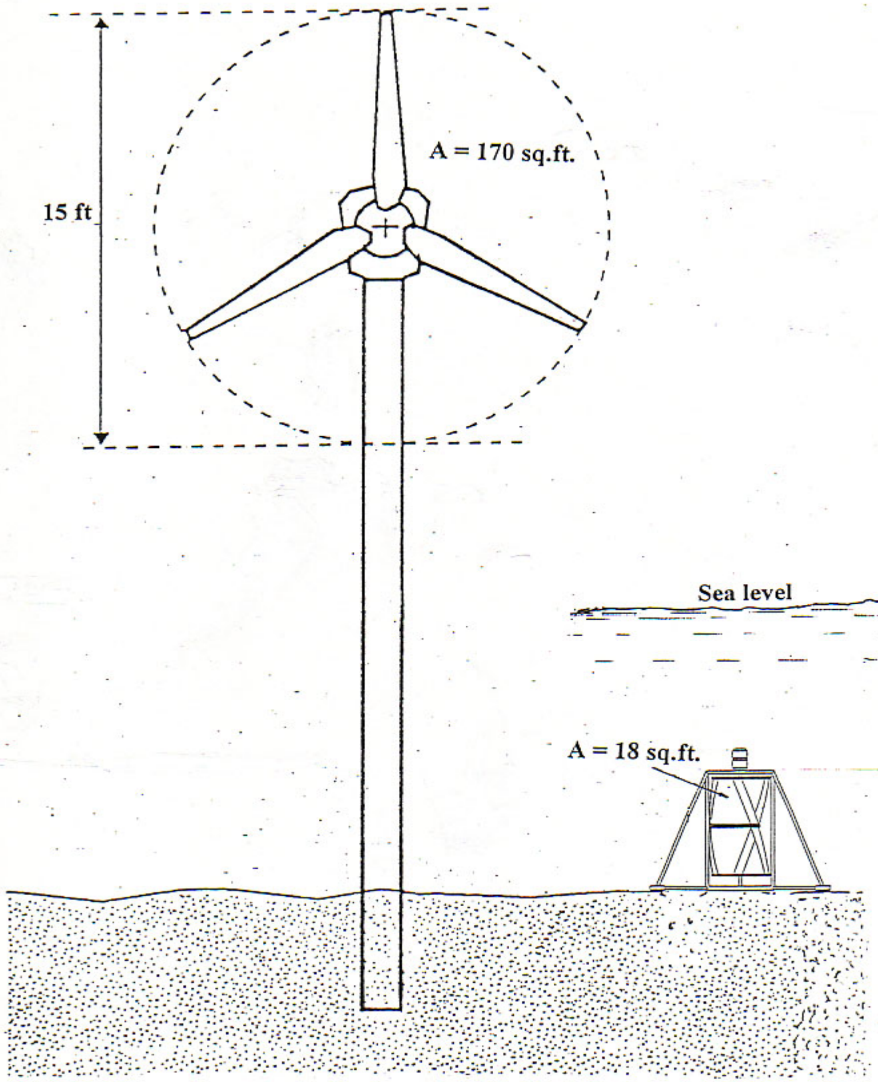


Helical VS Orthogonal



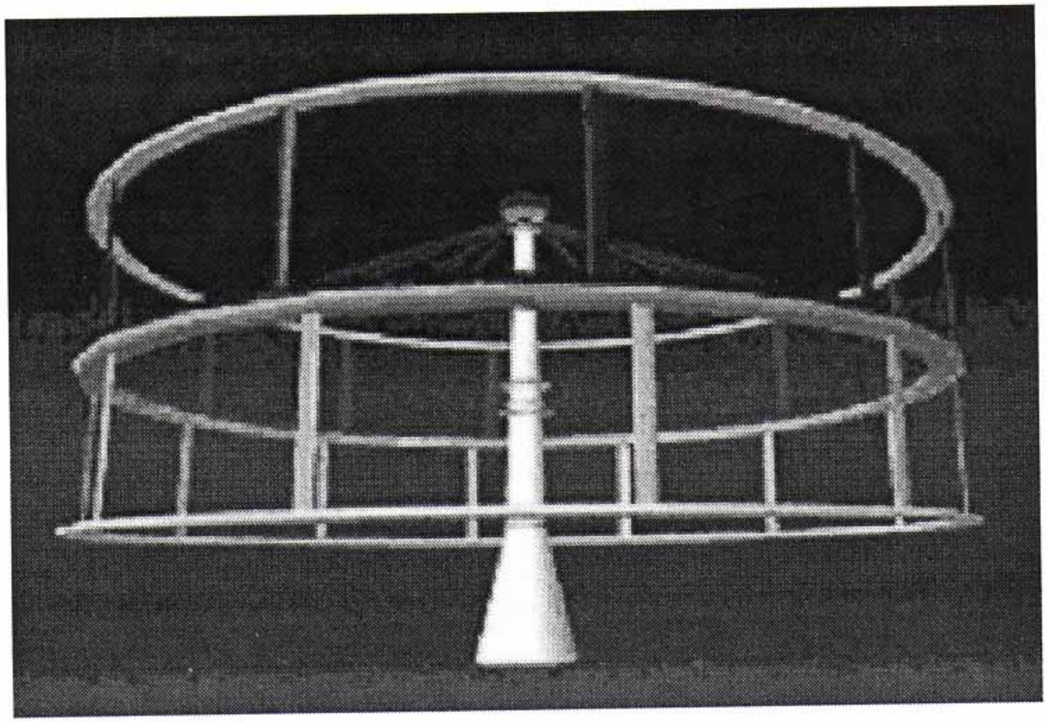
Low Head In Dam Use

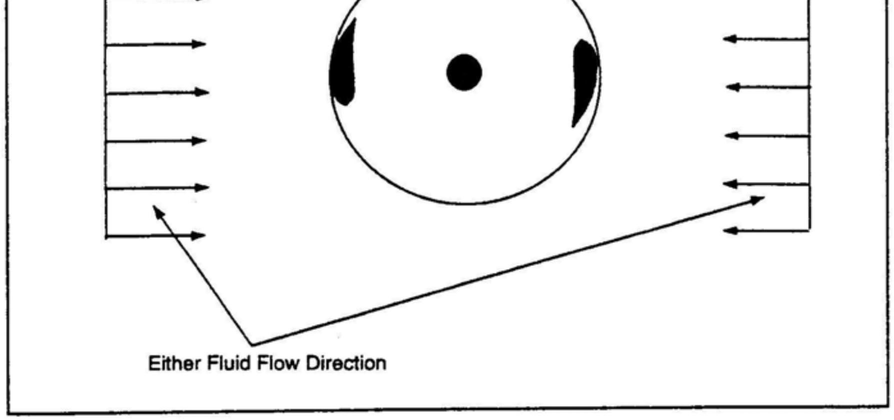
Why Hydra?



WIND PROPELLER VERSUS HELICAL HYDRAULIC TURBINE
FOR THE SAME 60 kW POWER

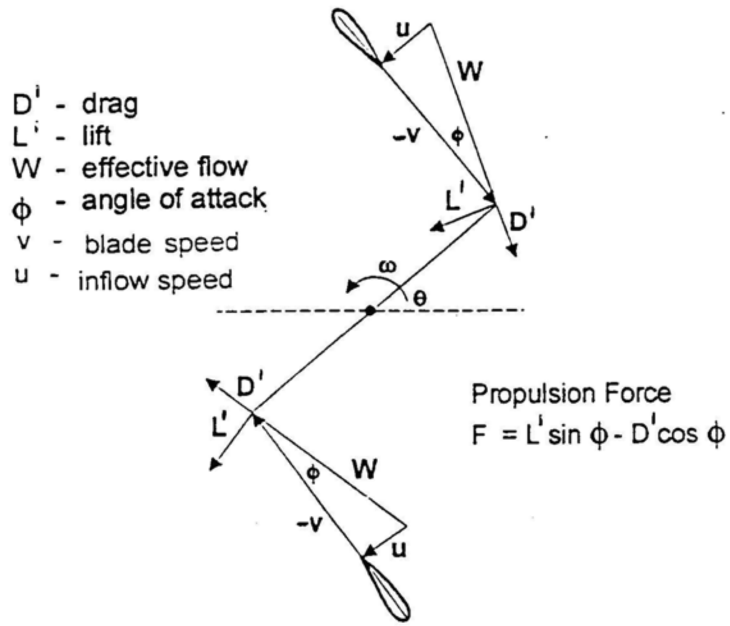
24 meters orthogonal



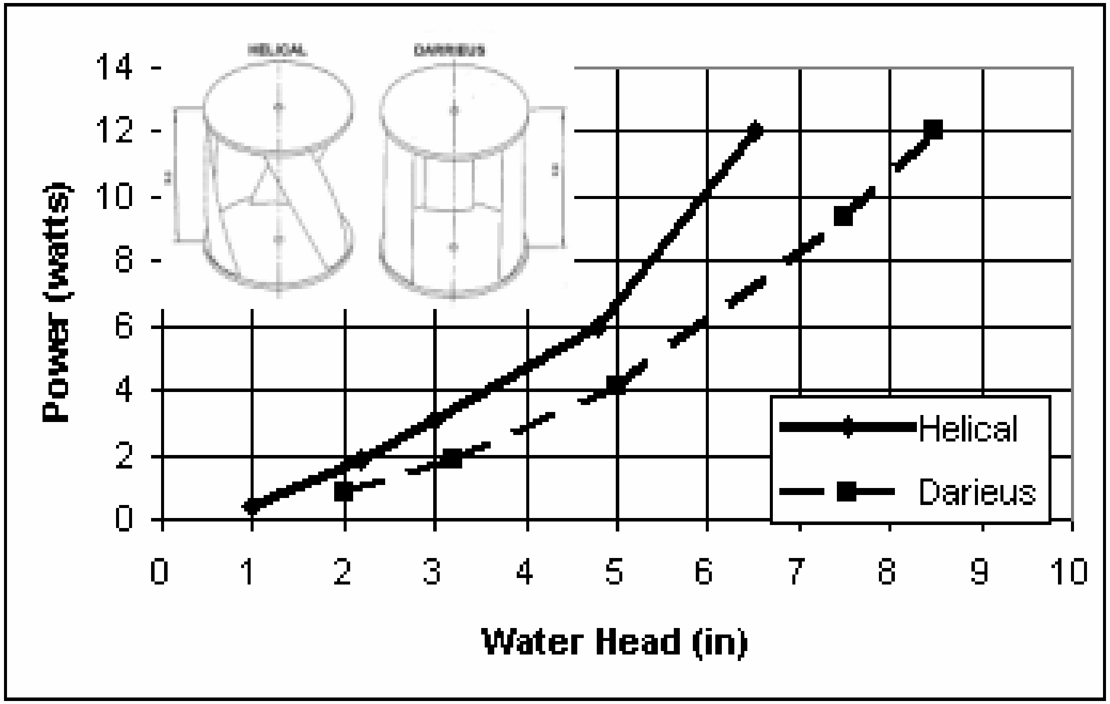


The helical turbine consists of long blades running along a cylindrical surface like a screw thread. The blades provide a reaction thrust from flows in either direction. The design of the turbine allows the engineer to reduce diameter D while increasing its length without power losses, providing important benefits in design.

Forces



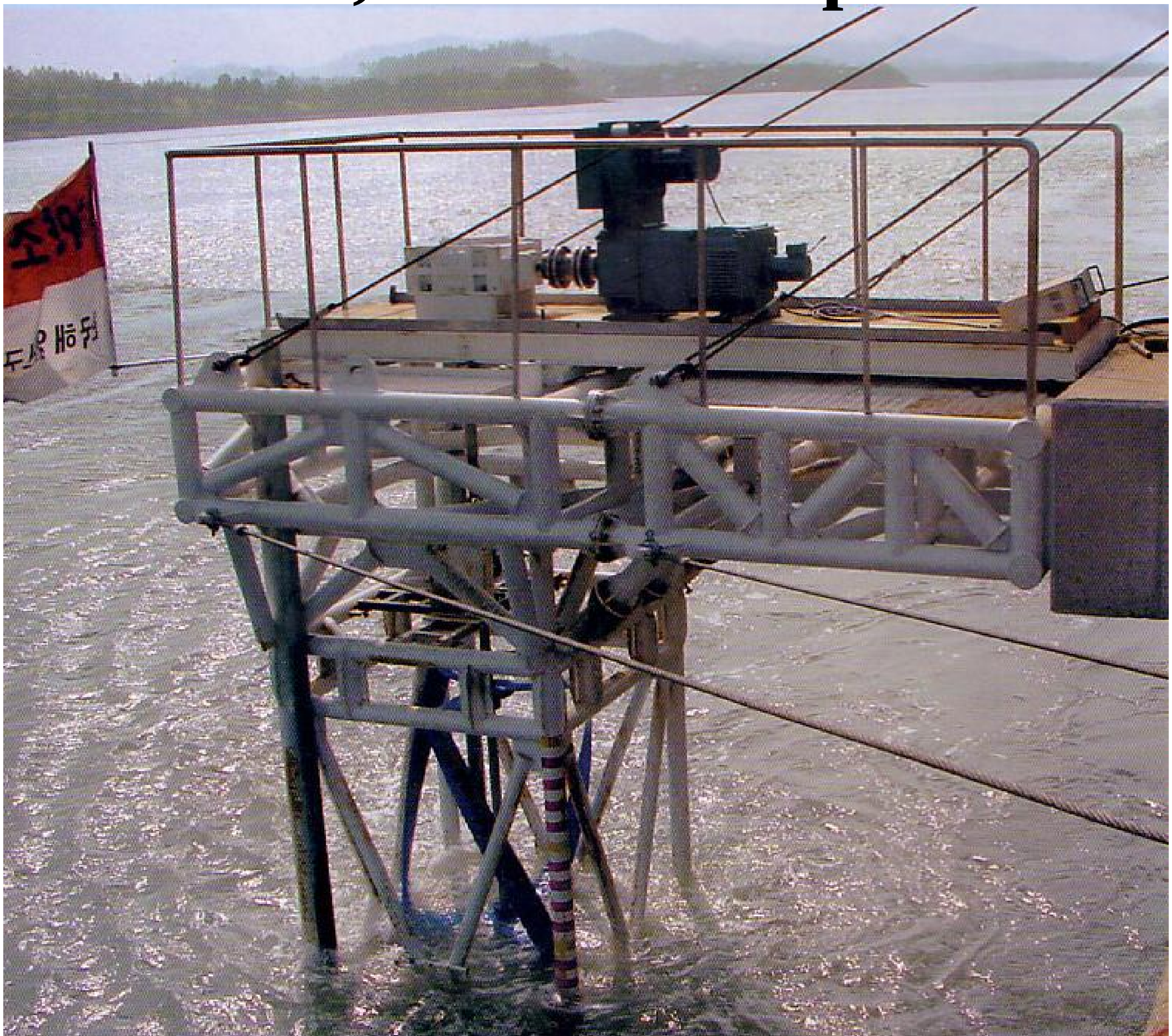
Various Rotors



Demo Projects. Cape Cod, 1996

Uldolmok, Korea

Korea, 2002. 1m Triple Helix



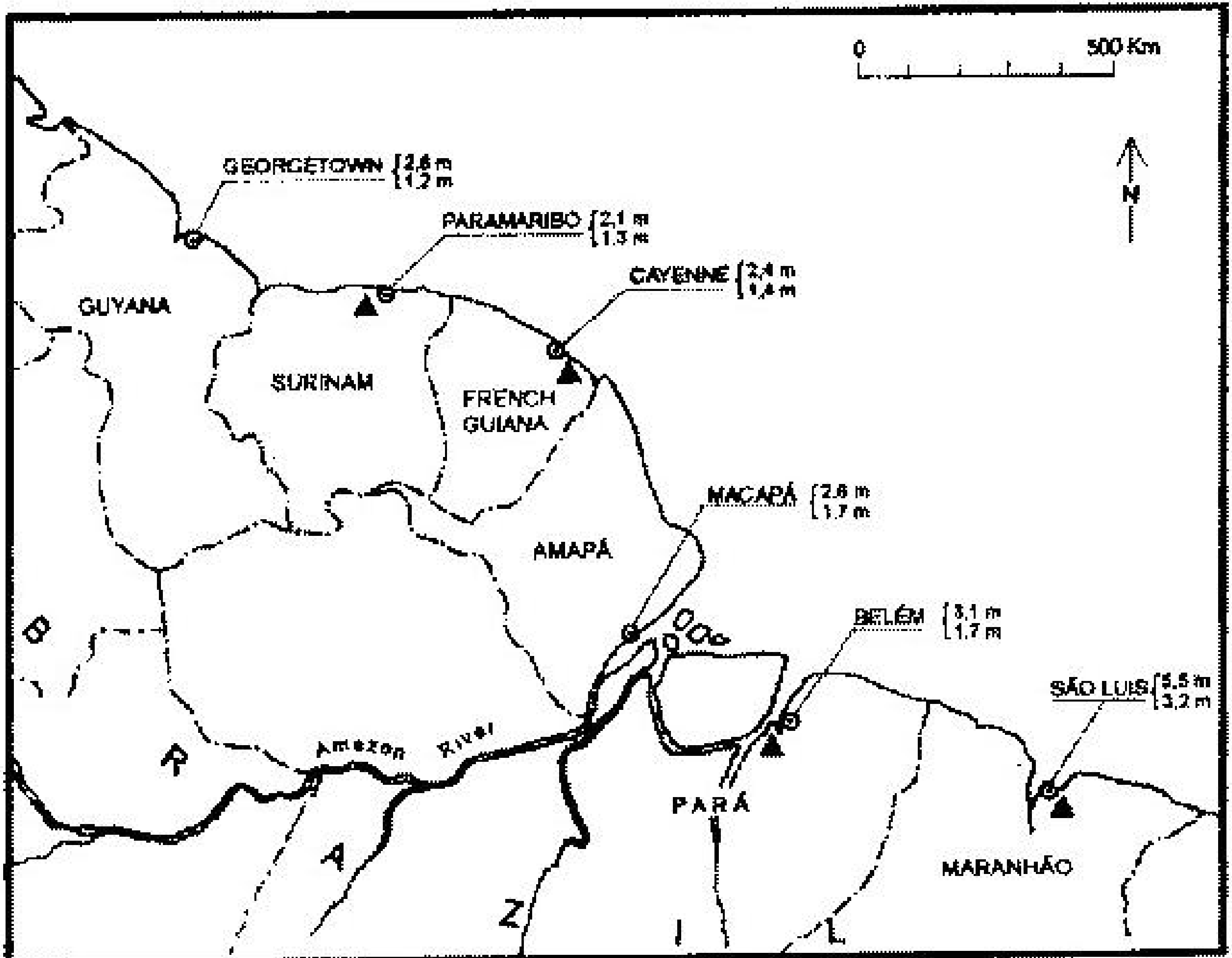
Korea, 2004. New Cage for 3m GHT

Maine 2001

Maine 2003

Tidal power system with three GHTs under motel, Maine, 5/03

Amazon



0
500 Km
N
GEORGETOWN 2,6 m 1,2 m
PARAMARIBO 2,1 m 1,3 m
CAYENNE 2,4 m 1,4 m
GUYANA
SURINAM
FRENCH GUIANA
AMAPÁ
MACAPÁ 2,6 m 1,7 m
BELÉM 3,1 m 1,7 m
SÃO LUIS 5,5 m 3,2 m
Amazon River
PARÁ
MARANHÃO
B R A Z I L

Amazon 2002

Amazon Tide-Energy Project

Field Site Installations - Combu Island

August 2002

Views of the pulley, belt drive, alterator, monitoring equipment, rheostat, and batteries.

Amazon GHT

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Figure 1 - Rural artisans with a 6-blade helical turbine

A significant improvement: the helical turbine. The technology we have developed uses jetties to force the flow of tidewater through a duct and run a helical-blade turbine. (See **Figure 1**.) This innovative turbine is more efficient in free flow than conventional, straight-blade versions and, when operating in a duct, can attain an efficiency of about 70%.

Amazon Electric Station

Figure 2. Field Research Station: managing tidal flow with jetties, a duct, and a gate

Location. Above is a view of our field station on Combu Island near the mouth of the Amazon. It is located in a rural community about one half-hour by boat from Belem, the largest city in the region.

Korea, Project 1

Korea, Project 2

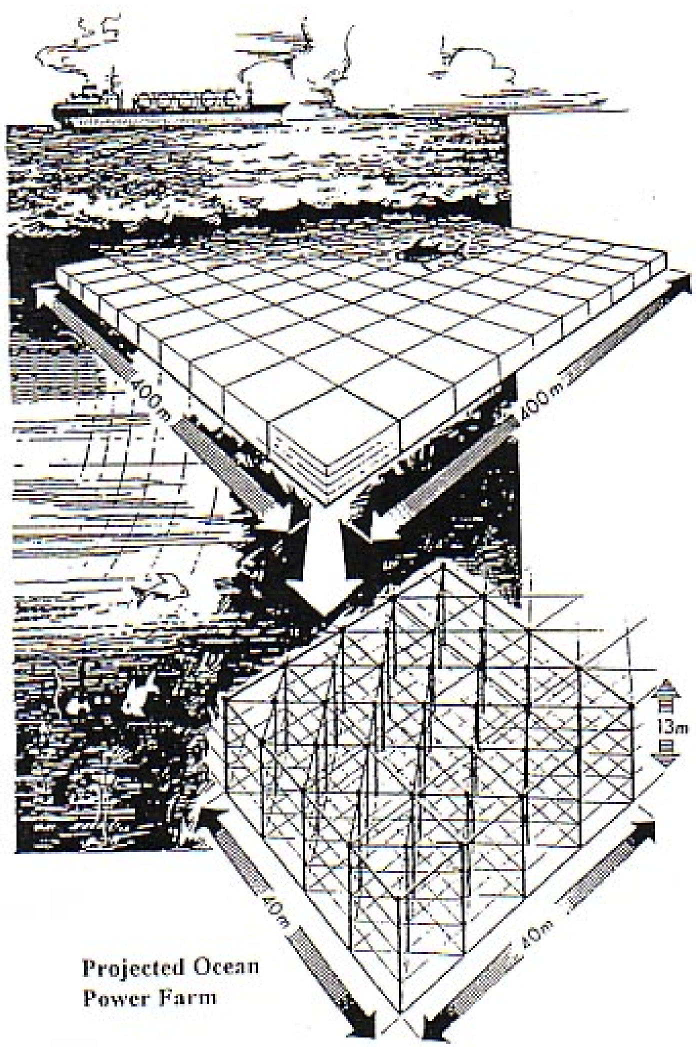
L.I. 2004


Shelter Island Strait, July 2004
L.I.-1

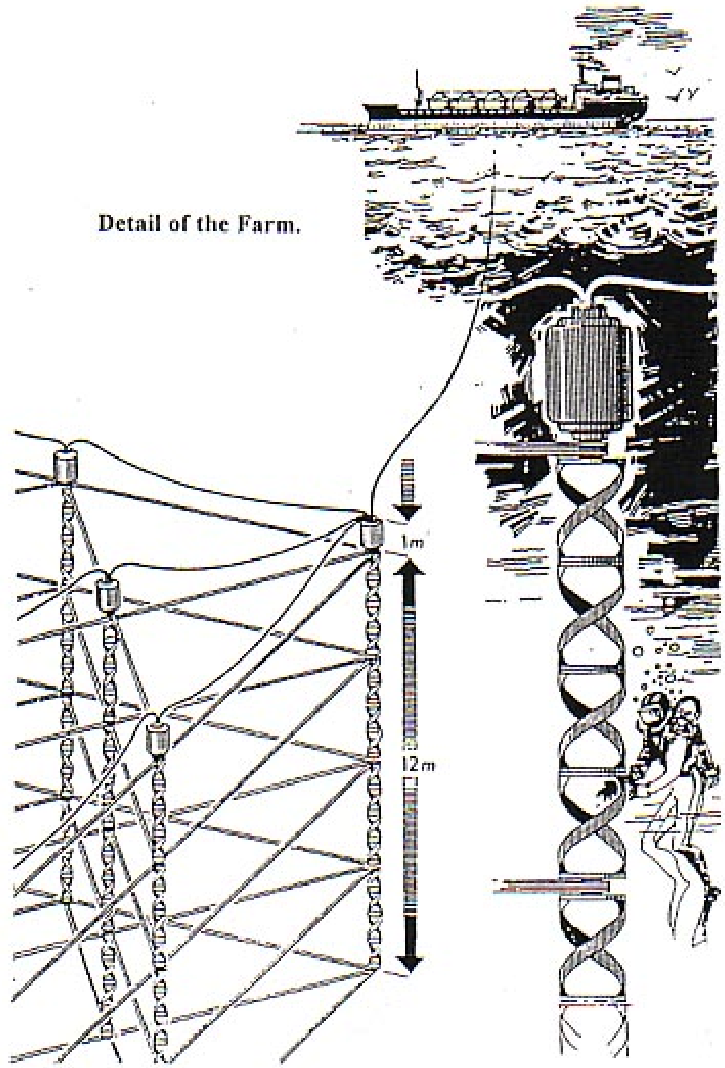
L.I.-2

Amesbury test

Ocean Power Farm



Projected Ocean Power Farm



Detail of the Farm.

Vortex and Aeration effect

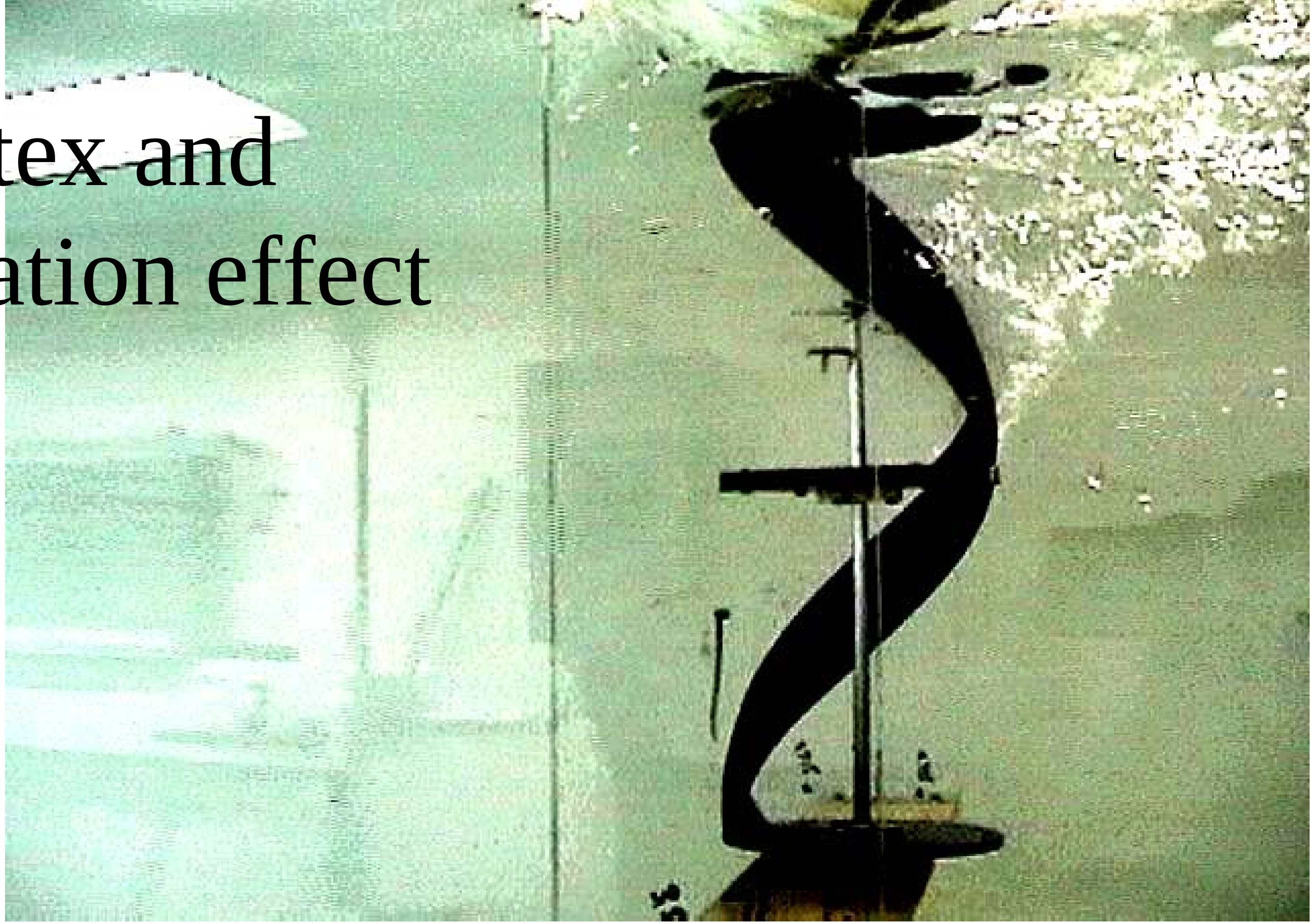


Fig. 1. Air bubbles created by a Single-Blade GHT in the Tow Tank at Woods Hole Oceanographic Institute (WHOI), July 2005. Current flows left to right. Turbine sits just under the water surface, rotating clockwise. Blade inclined towards the direction of rotation (worst case). Water velocity – 1 m/s.