

Numerical Model Development



Numerical Model Validation



Concept Evaluation

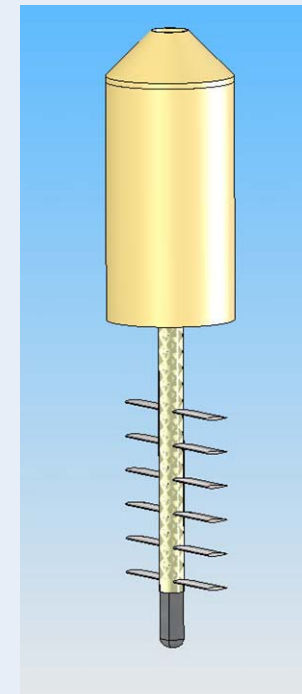
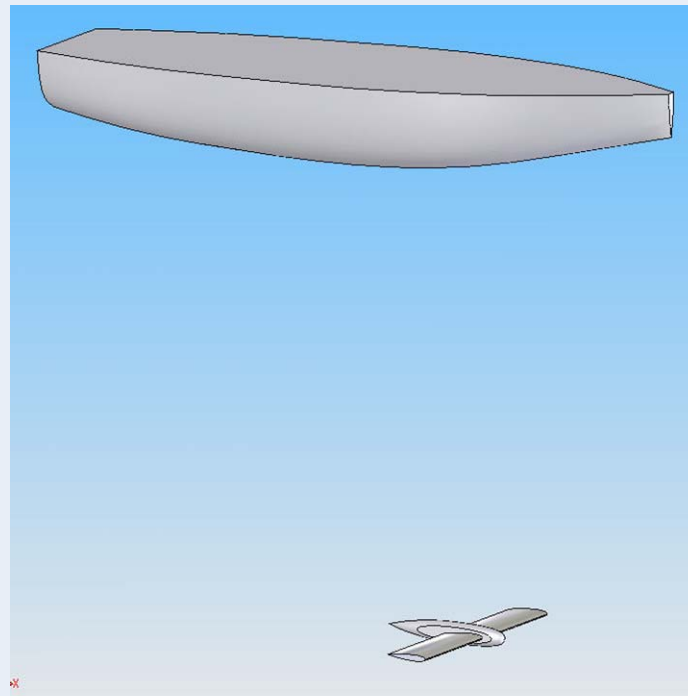
Flapping
Foil
Propulsion

OWC

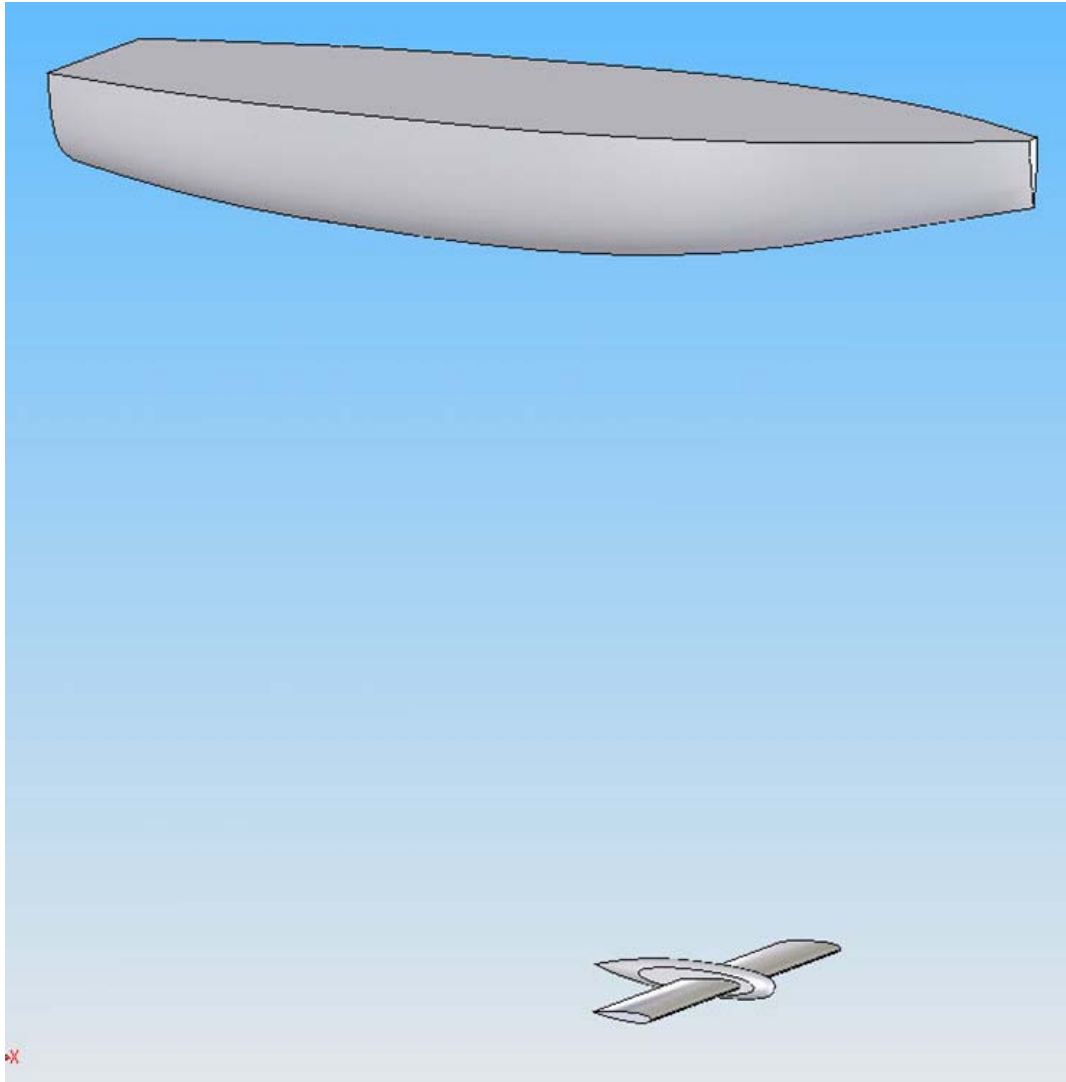
Submerged
Turbine

Ratchet
Device

Linear Generator
Evaluations



Flapping Foil Propulsion



Hull as Shown:

$L = 17$ feet

$\text{Disp} = 5.3 \text{ m}^3 = 12,000\text{lb SW}$

$S = 10.5 \text{ m}^2$

Wing as Shown:

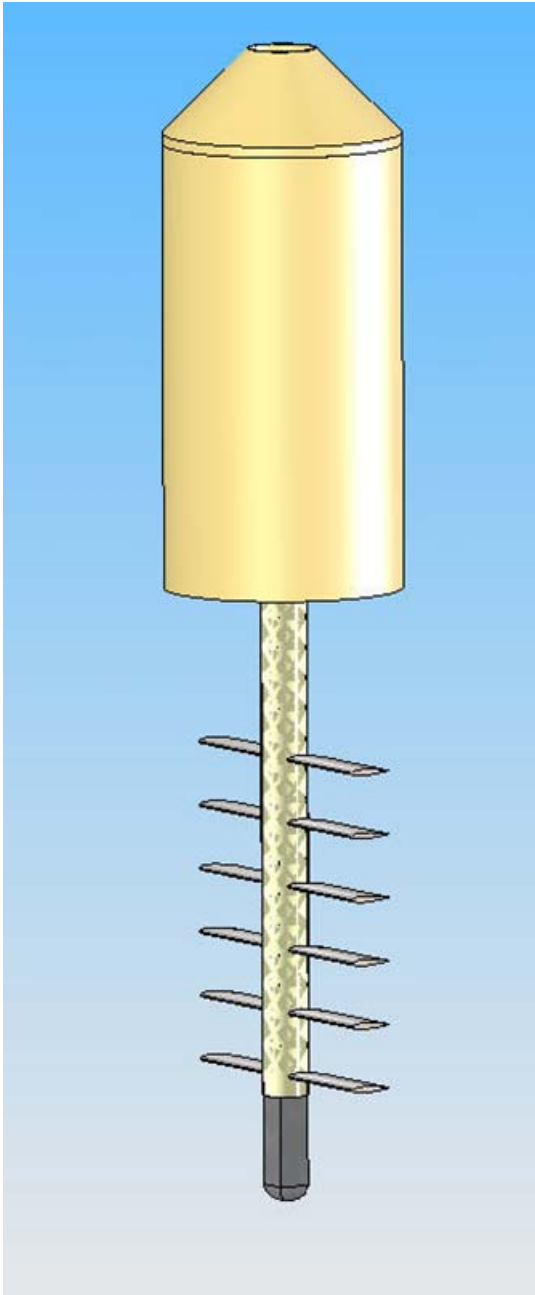
$S = 1.0 \text{ m}^2$

Power take-off (not shown):

Linear Generator Device

Electrical or Hydraulic

OWC – Oscillating Water Column with attached foil propulsion



Hull as Shown:

$$L = 17 \text{ feet}$$

$$\text{Disp} = 4.1 \text{ m}^3 = 9,300 \text{ lb SW}$$

$$S_o = 1.5 \text{ m}^2$$

$$S_c = 4.1 \text{ m}^2$$

Wings as Shown:

$$S = 6.0 \text{ m}^2$$

Power take-off:

Oscillating Water Column driving turbine

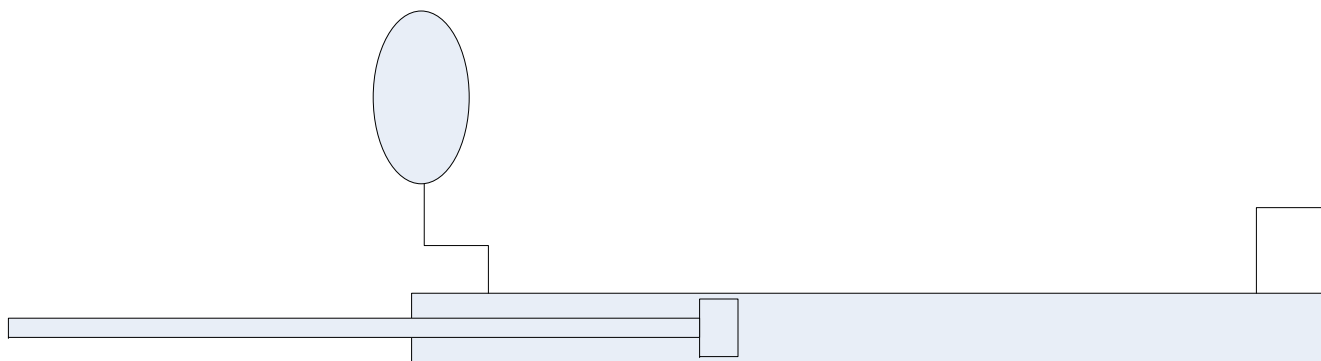
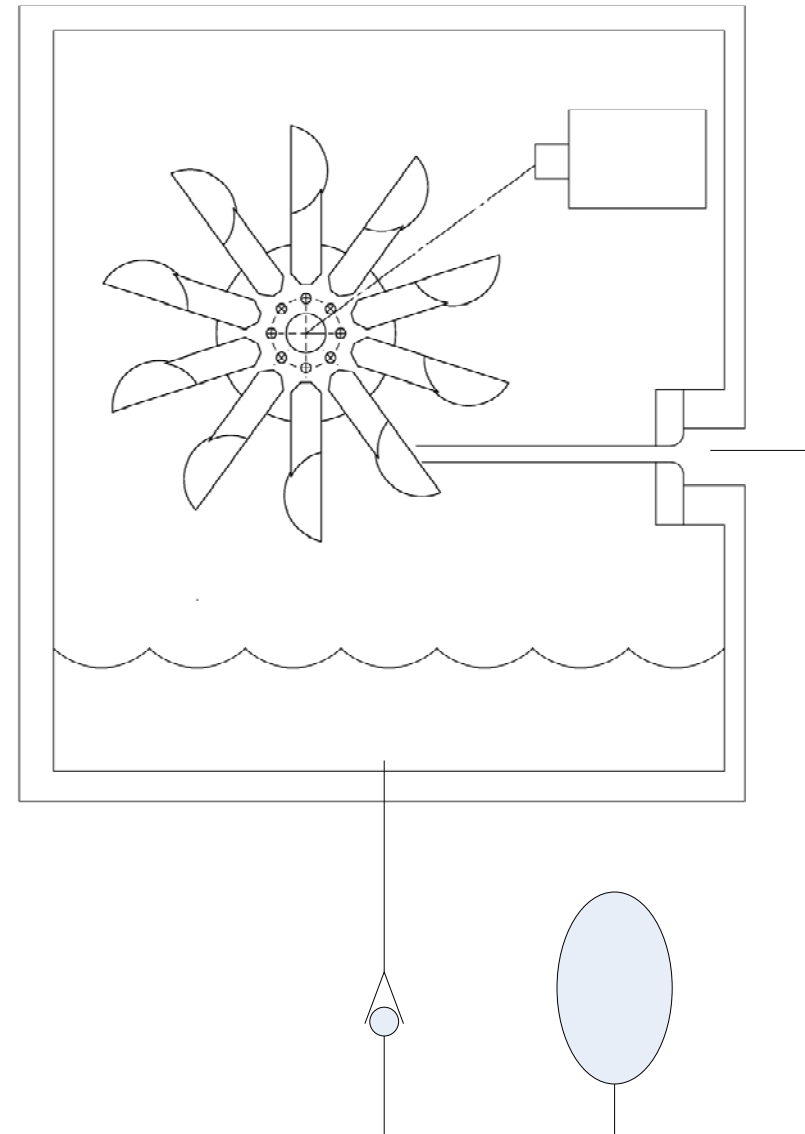
Linear Generator Evaluations

Electro-Mechanical:

- LeadScrew/Rack-and-Pinion
- Ferrofluid based
- Artificial Muscle (SRI)

Hydraulic:

- Industrial Gear-Motors
- Turbines – Pelton Wheel



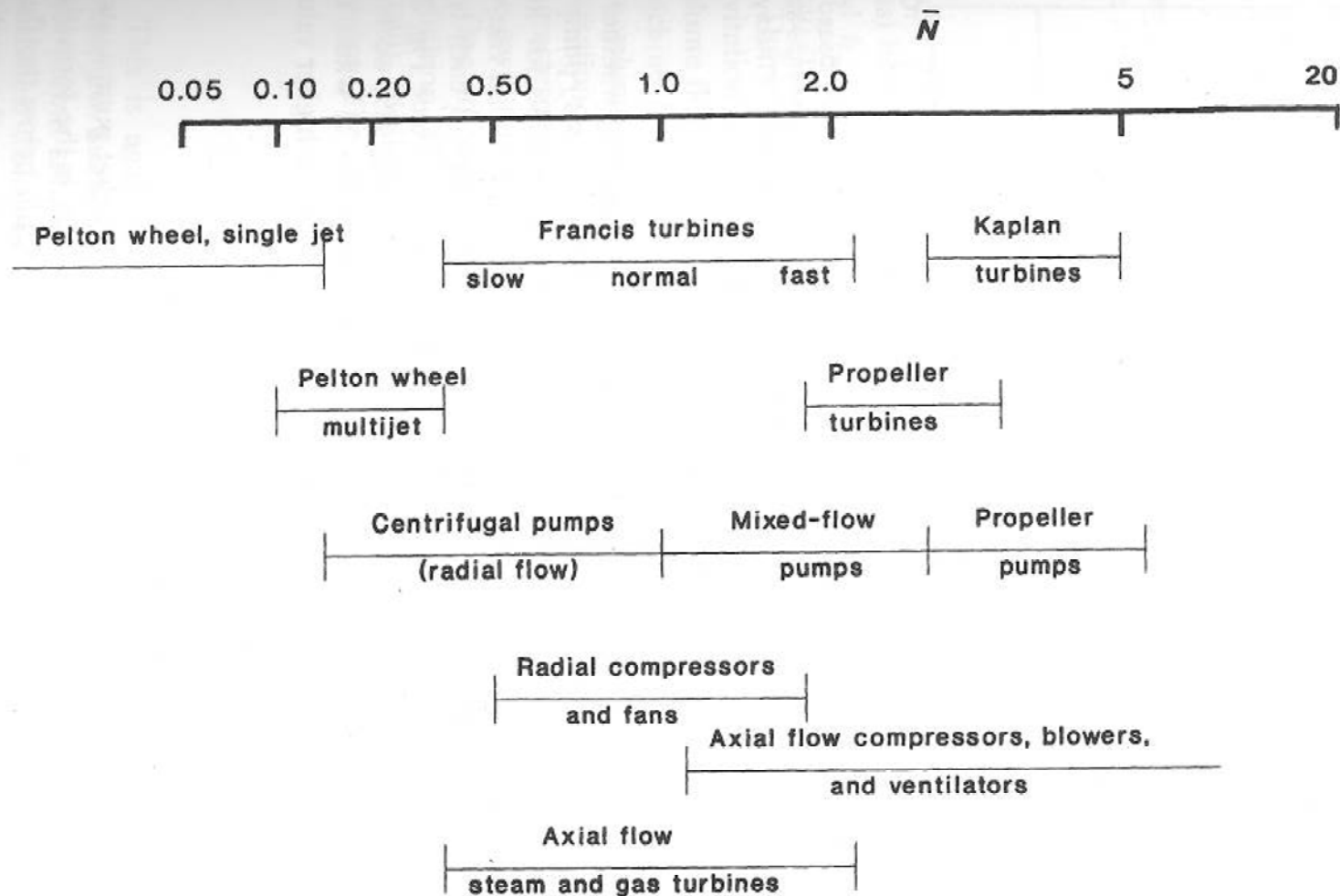


Figure 2.8 Correlation of rotor design and specific speed suitability ranges of various designs (Csanady, "Theory of Turbomachinery" 1964; reprinted with permission from McGraw-Hill.)

$$\text{Specific Speed} = N = \frac{N^*Q^{0.5}}{(gh)^{0.75}}$$