Proffesional Experience Nitai Drimer

NAMCO – Naval & Mechanical Engineering Company Ltd.

Designer 1984-2014, director and owner 1998-2014
NAMCO is a private design firm for Naval Architecture and Ocean Engineering, specialized in the design of unique offshore structures and vessels such as: Offshore Fish Farms, Work and Patrol Boats, Undersea Observatories; Founded on 1965 by Moshe Drimer, Naval Architect and Marine Engineer.

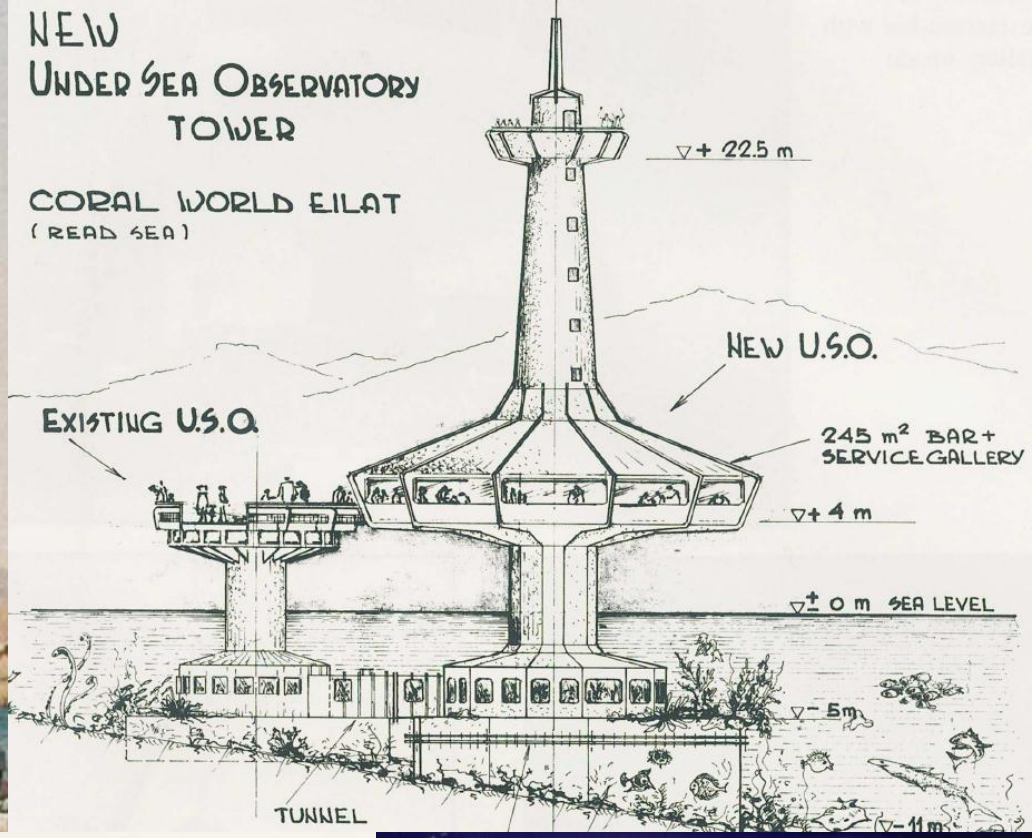
CAMERI – Coastal and Marine Engineering Research Institute

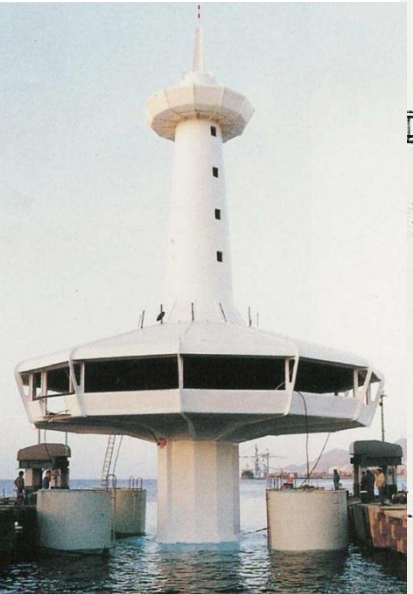
Research Engineer 1994-1999, Director and Research Engineer 2000-2012.

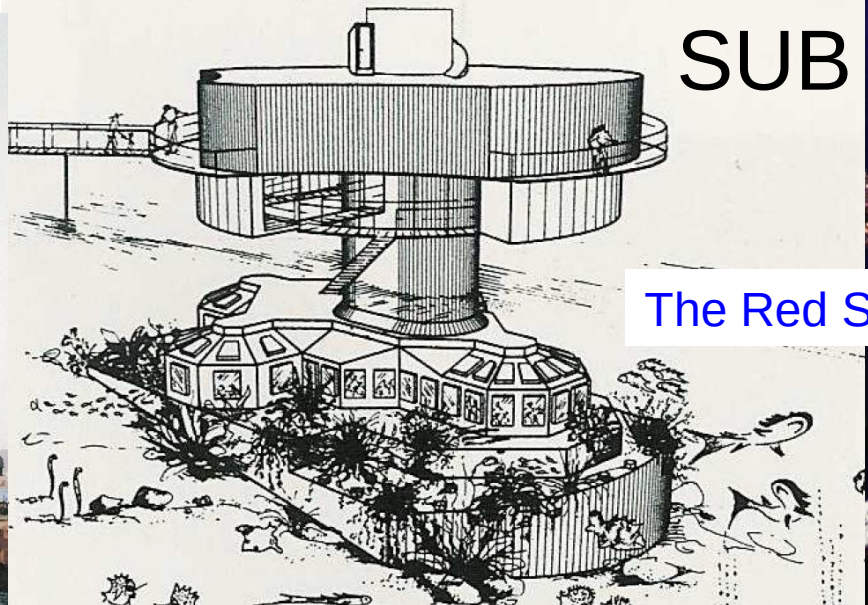
Technion – Israel Institute of Technology

Since October 2012 associate Professor, Faculty of Mechanical Engineering, Head of Naval Architecture and Ocean Engineering Major.

The following pictures present some selected projects, designed by NAMCO and modeling projects with CAMERI

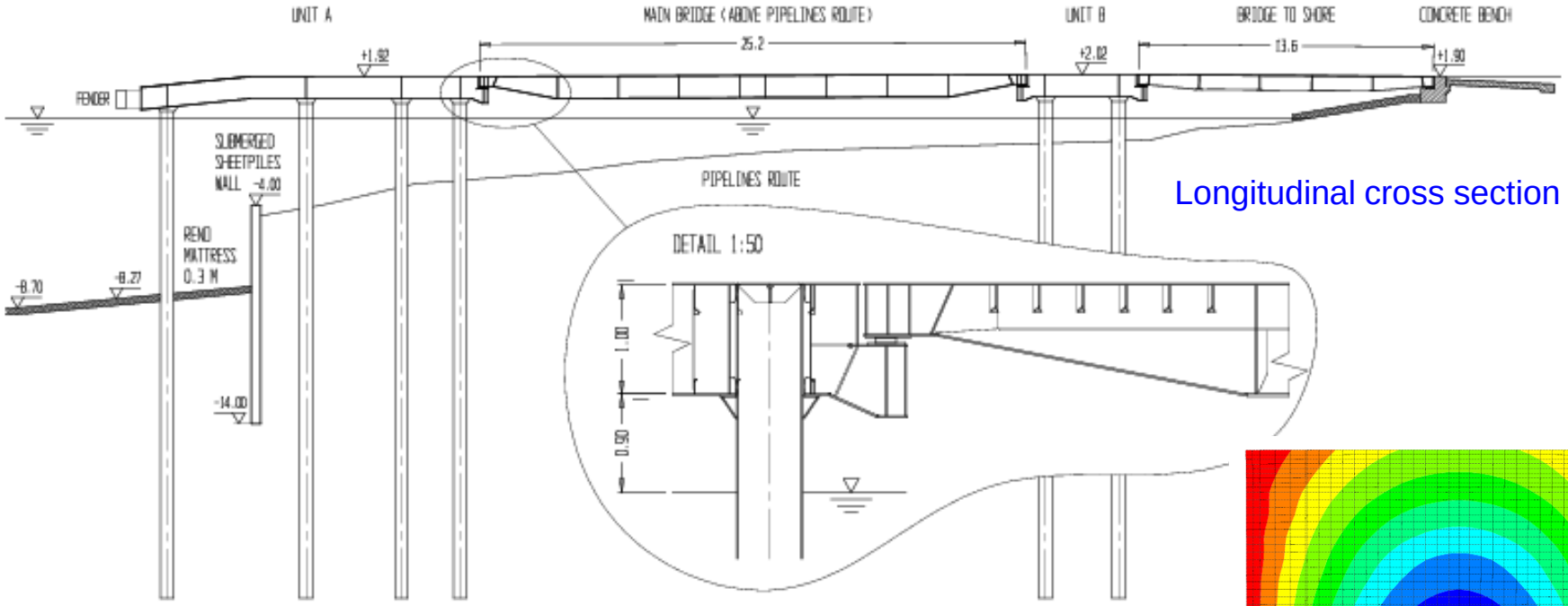




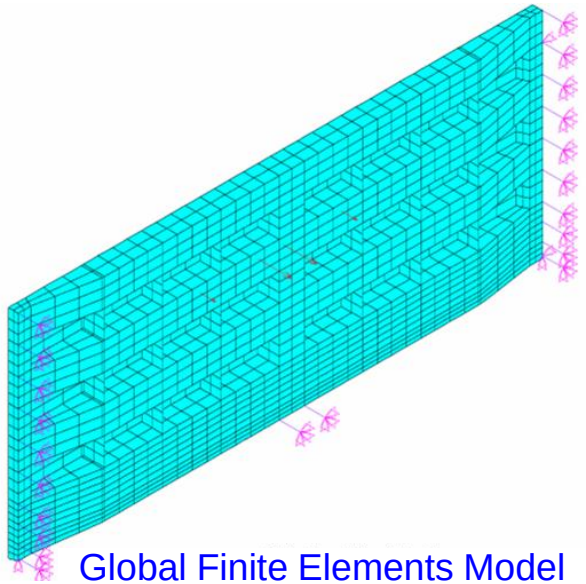


SUB SEA Structures

The Red Sea Star



Longitudinal cross section

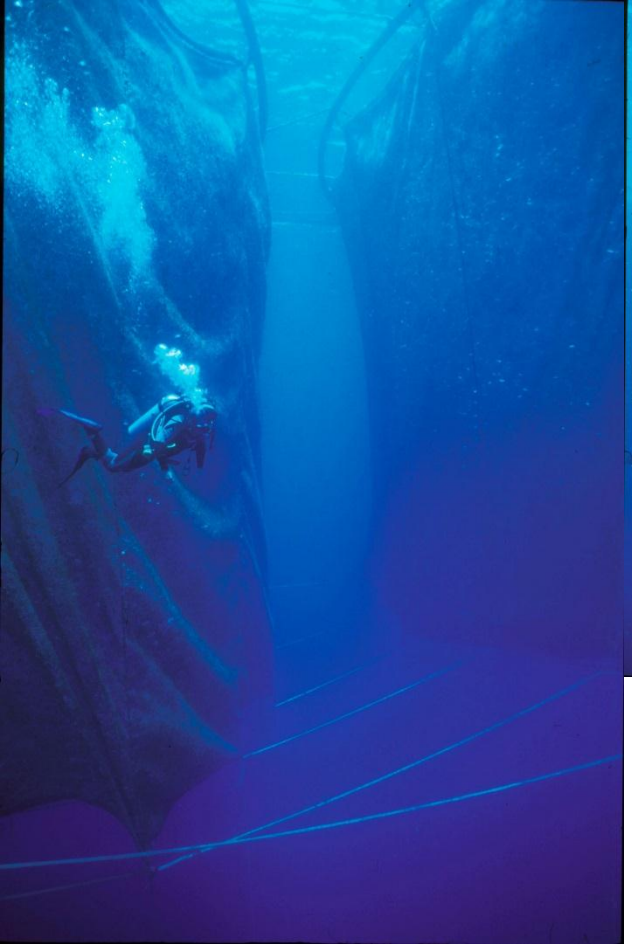


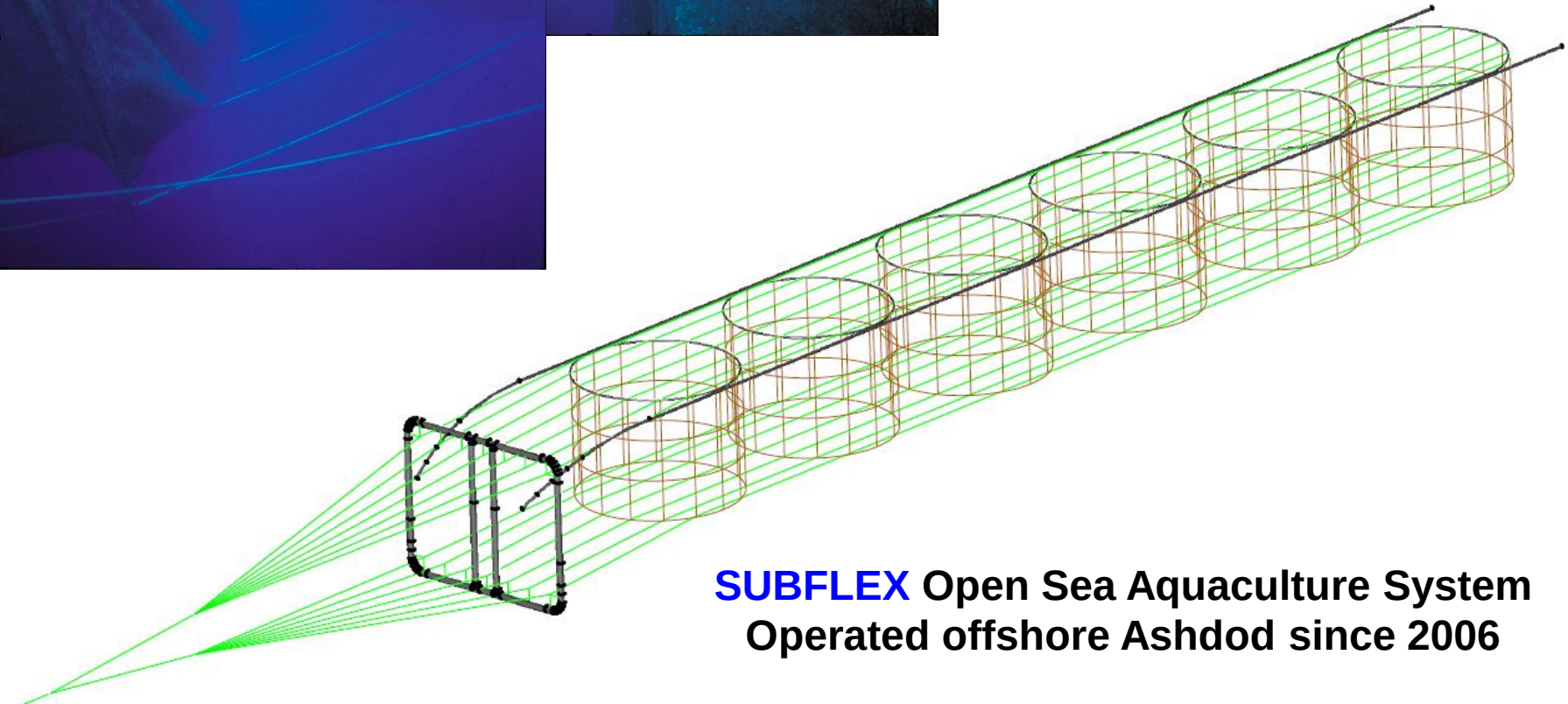
Global Finite Elements Model of the Bridge

PROTECTOR – Unmanned Boat RAFAEL

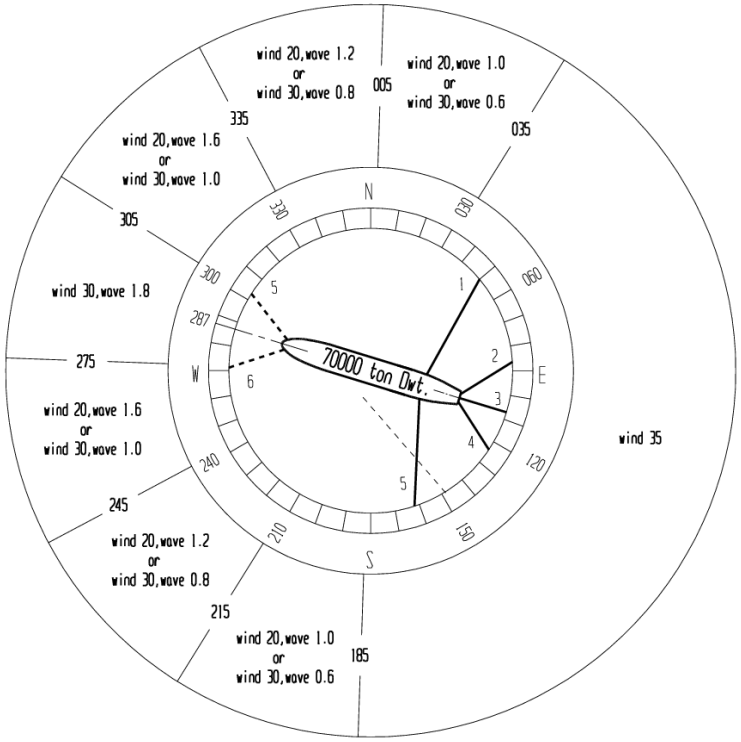
PROTECTOR 4 Unmanned Patrol Boat RAFAEL

Semi-Rigid Aquaculture Farm
ARDAG
The Red Sea

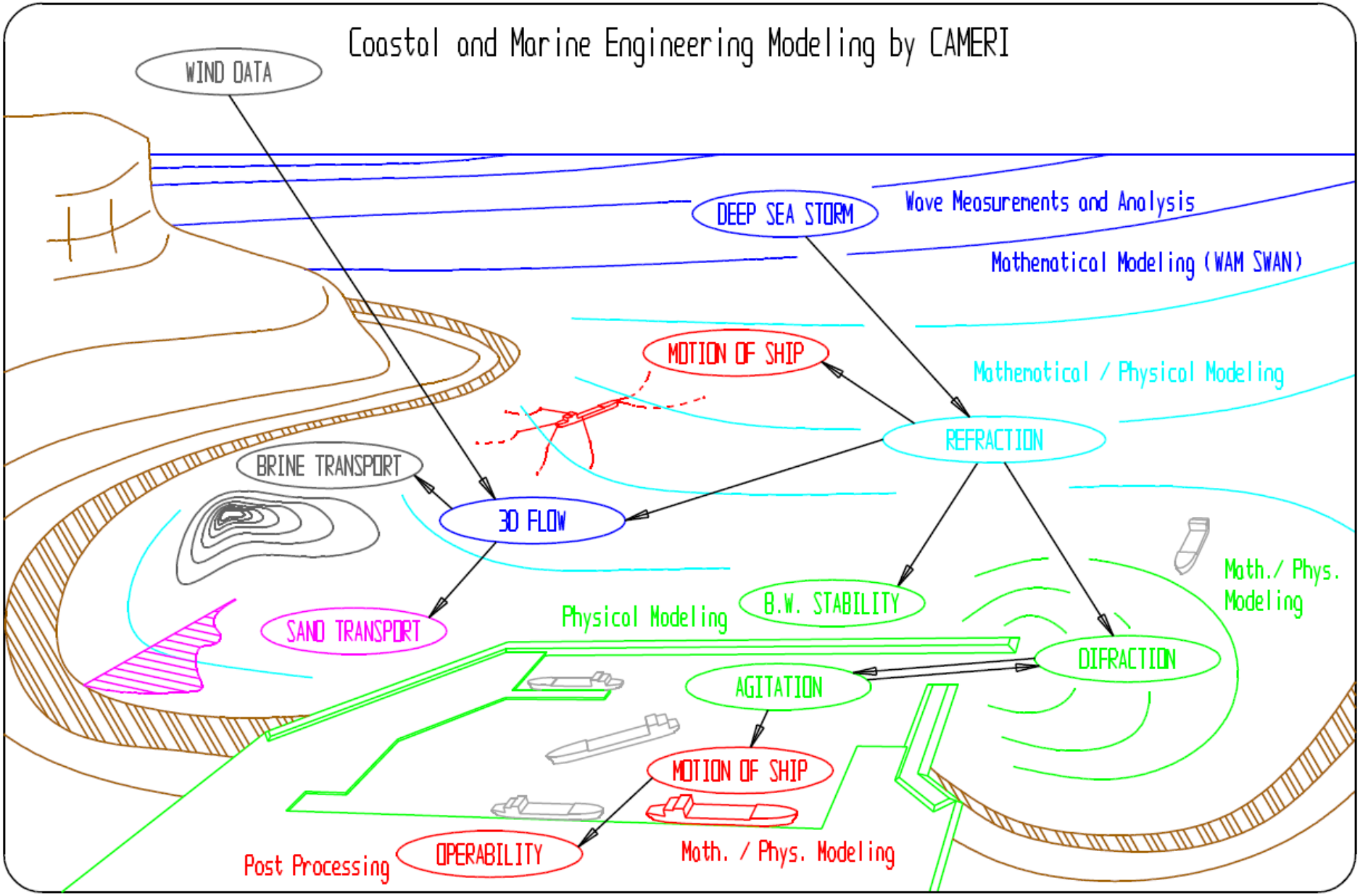




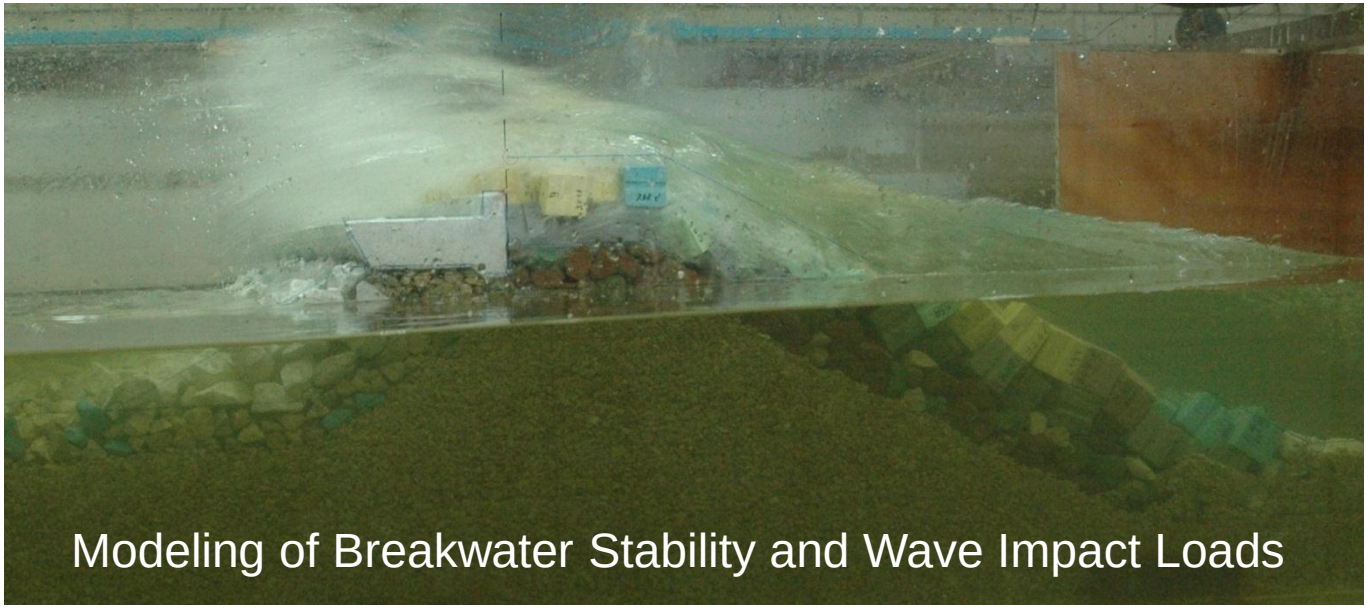
SUBFLEX Open Sea Aquaculture System
Operated offshore Ashdod since 2006



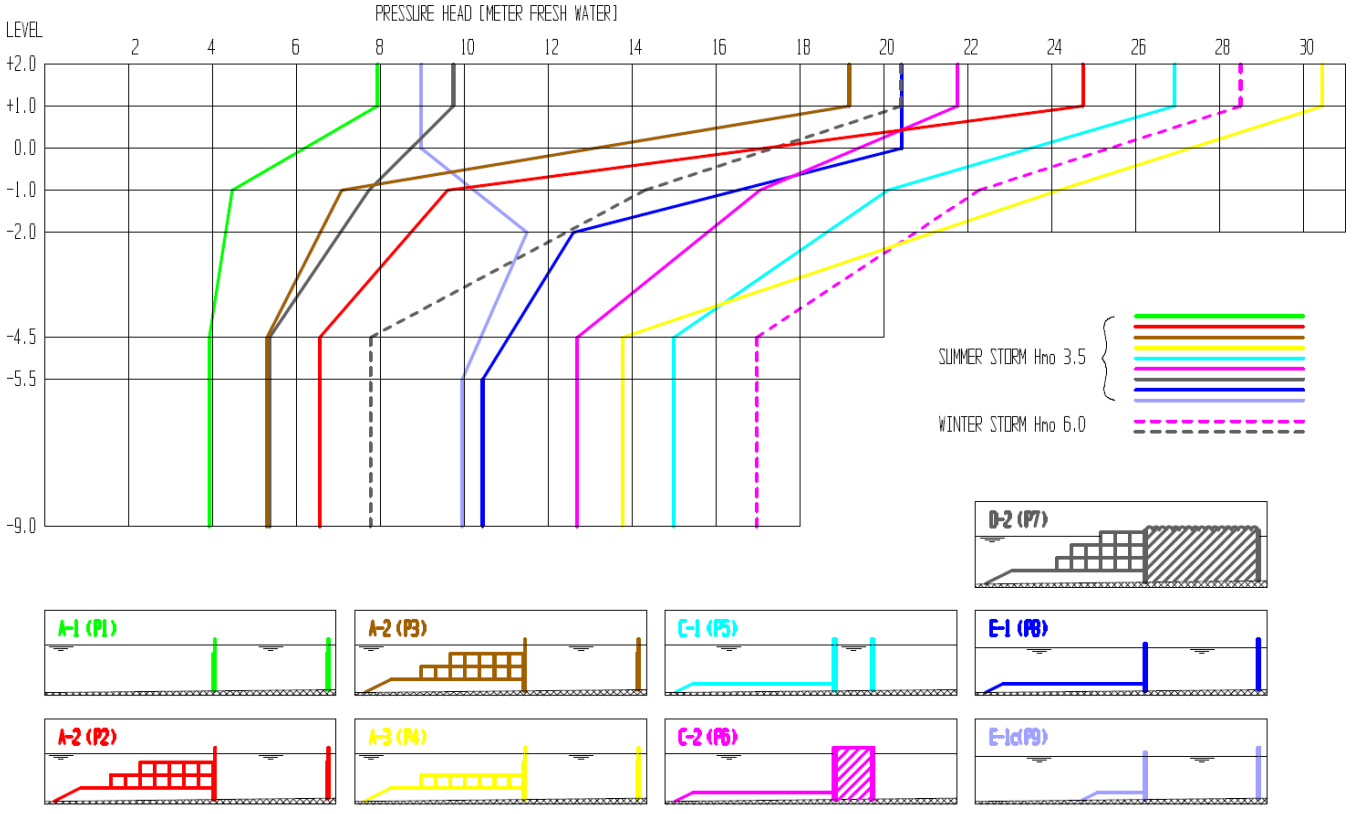
Modeling of Multi Buoy Mooring (MBM) and assessment of operational envelope



Development of Mathematical Model for motion of Vessel in Port (VIP)



Modeling of Breakwater Stability and Wave Impact Loads



Technion
Israel Institute of Technology
Faculty of Mechanical Engineering

הטכניון
מכון טכנולוגי לישראל
הפקולטה להנדסת מכונות

Innovations in ocean engineering for utilization of the open sea

This booklet presents a collection of research projects, which introduced innovations for the utilization of the open sea, in the basic aspects of: Artificial Land for infrastructures or habitation; the Food Industry; and Sea Transportation.

A new type of Very Large Floating Structure (VLFS) for infrastructures or habitation

A Very Large Floating Structure (VLFS) is a promising concept for the utilization of the sea. Currently, VLFSs are classified into two broad categories: the Pontoon-type, limited to relatively sheltered water, and the Semi-submersible type, for open-ocean. We present a new concept, the Delta-type VLFS, for intermediate open-sea conditions. An important feature of the Delta type is the formation of a sheltered basin, providing accessibility in most weather conditions. Drimer and Gafter (2017), [1], present the Delta VLFS concept and study its hydrodynamic aspects.

A new system for aquaculture at open sea

The Offshore Aquaculture sector is one of the most rapidly developing and promising sectors of the food industry. However, the popular design for fish farms for sheltered water cannot survive open sea conditions. In order to move offshore, new designs with the ability to reduce the wave loads are needed. One promising concept, from the structural and hydrodynamic aspects, is a flexible, submerged, Single Point Mooring (SPM) system. Recently Gili Ocean Technologies developed and launched such a new system, which is operated offshore Ashdod. Drimer (2016), [2], presents a first principle approach to the design of flexible open sea aquaculture systems, while Milich and Drimer (2018), [3], present the design and analysis the new aquaculture system produced by Gili Ocean Technologies.

A new rational approach to the hull design of fast boats

The dominant load for the structural design of a planing hull is slamming, while sailing fast at head seas. The slamming is a violent fluid structure interaction, where dynamics, hydro-elasticity, and nonlinear structural effects are important. Considering these effects in a rational design may reduce the scantlings as compare to design by rules, which assess the scantlings by applying a quasi-static design pressure and linear beam theory.

Associate Professor Nitai Drimer – Head of Naval Architecture and Ocean Engineering Major
Faculty of Mechanical Engineering
Technion - Israel Institute of Technology
Technion City Haifa 32000, Israel
nitaid@technion.ac.il
https://meeng.technion.ac.il/members/nitai-drimer/

Drimer, Moskovits and Neuberg (2016), [4], present a new design method for planing hulls, considering hydro-elasticity and nonlinear dynamic structural response, implementing the Allowable Stress Design (ASD) philosophy.

More substantial reduction of the scantlings is expected in a limit state design (LSD), where extreme loading conditions increase the importance of hydro-elasticity and non-linearity. While applied rules specify allowable stresses that typically provide a service life of 20 years, without the need to check for fatigue; rational LDS must incorporate the Fatigue Limit State (FLS). Neuberg and Drimer (2017), [5], present a new FLS design method of fast boats, to assess the fatigue service life, based on an operation plan specified by the client.

Drimer, Neuberg, Moshkovich, Hakmon (2017), [6], present full scale sea trials of a prototype, which demonstrate the potential of reduction of scantlings while applying our rational design method, as compare to design by rules.

A new concept of hydraulic actuator for fishlike propulsion

Drimer, Mendelson and Peleg (2016), [7], present the invention and development of a new fundamental type of hydraulic actuator, aimed at delivering better actuation efficiency. The concept is simple to produce, and allows adaptation of the deflected shape by the design parameters. Among other applications, it is mostly suitable for the activation of fins of nature-like marine robots.

References

[1] N. Drimer, R Gafter, Delta Type VLFS – Hydrodynamic aspects. Ships and Offshore Structures (2017), DOI: 10.1080/17445302.2017.1384440.

[2] N. Drimer, First Principle Approach to the Design of an Open Sea Aquaculture System. Ships and Offshore Structures (2016), DOI: 10.1080/17445302.2016.1213491.

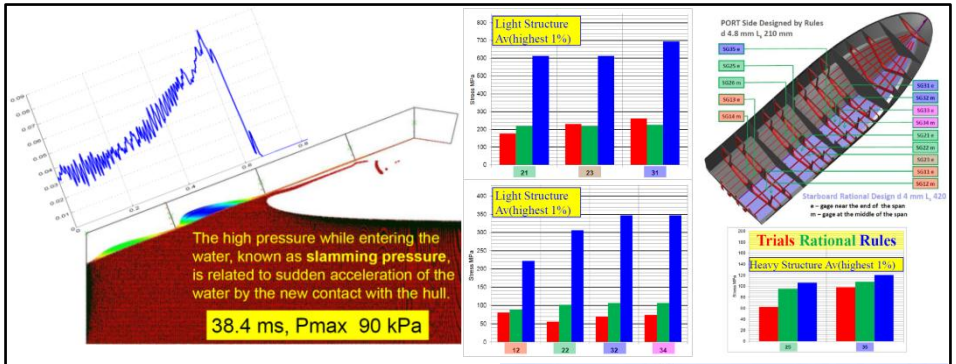
[3] M. Milich, N. Drimer, Design and Analysis of an Innovative Open-sea Aquaculture System, submitted to IEEE Journal of Oceanic Engineering.

[4] N. Drimer, Y. Moskovits and O. Neuberg. A design method for planing hulls, considering hydro-elasticity and nonlinear dynamic structural response. Ships and Offshore Structures (2016), DOI: 10.1080/17445302.2016.1187362.

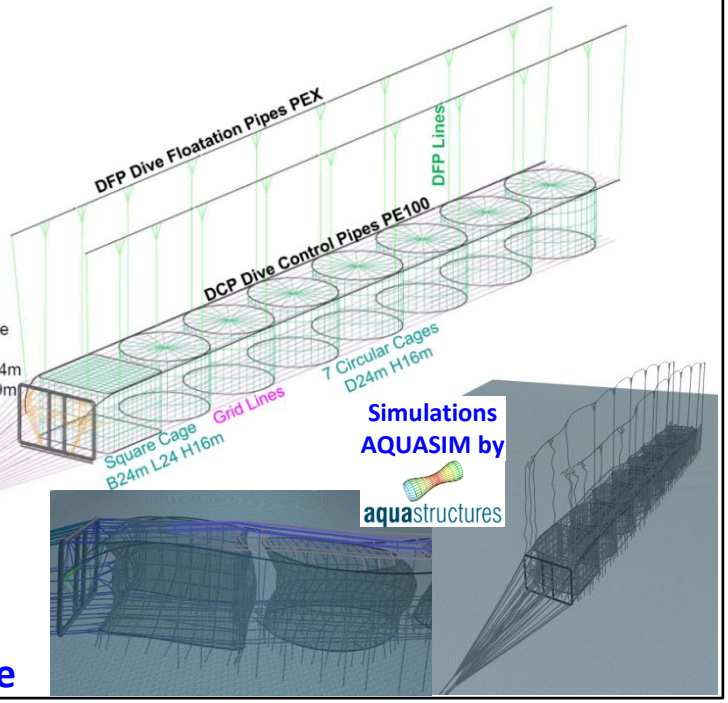
[5] O. Neuberg, N. Drimer, Fatigue Limit State Design of Fast Boats, Marine Structures (2017), DOI: 10.1016/j.marstruc.2017.05.002.

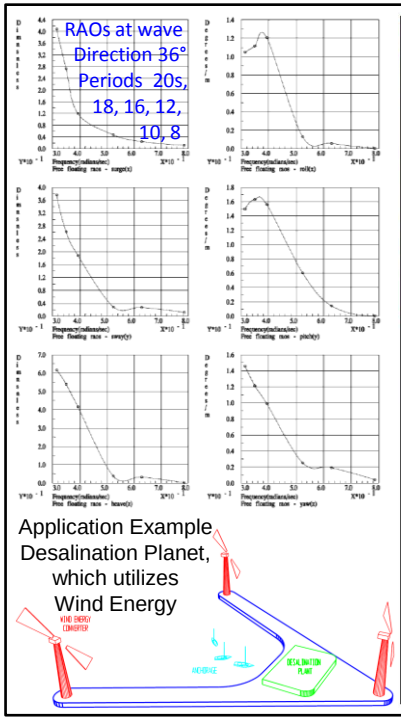
[6] N. Drimer, O. Neuberg, Y. Moshkovich & R. Hakmon. Rational design of fast boat hull. The seventh Conference on Computational Methods in Marine Engineering Marine 2017, Nantes, France, May 2017.

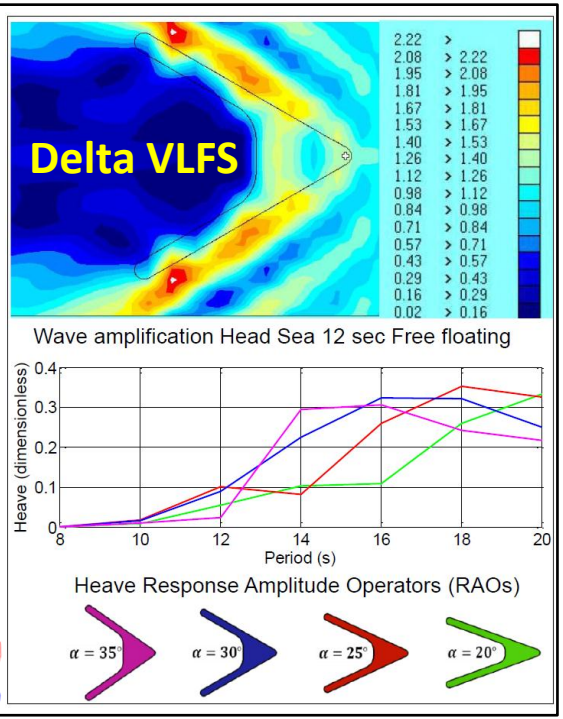
[7] N. Drimer, J. Mendelson and A. Peleg, A New Type of Hydraulic Muscle, Actuators (2016) 5, 3, MDPI.

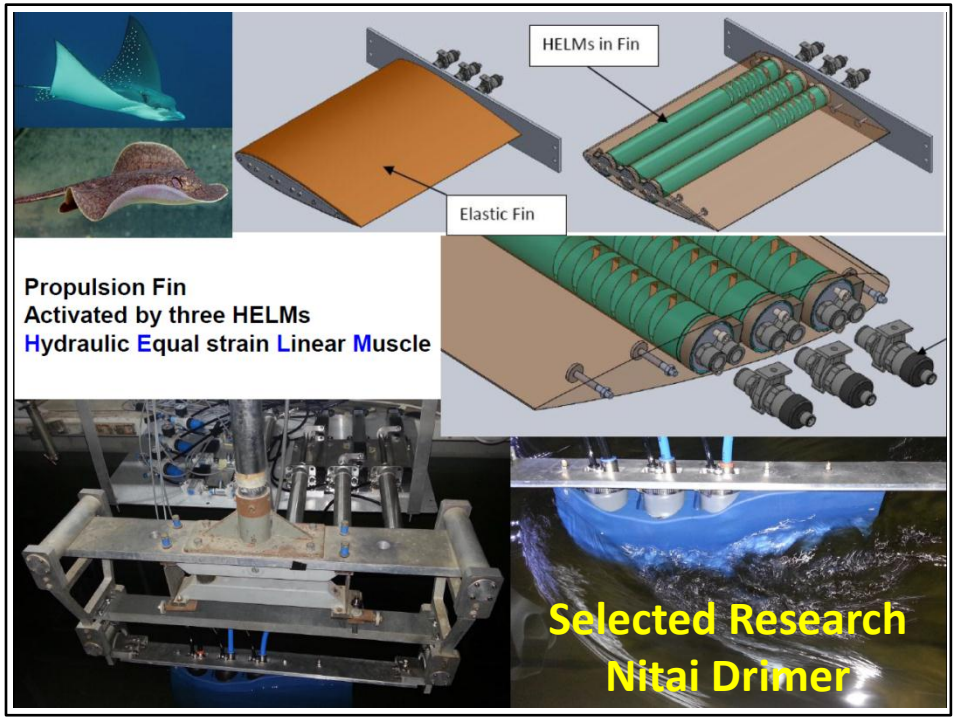

The high pressure while entering the water, known as slamming pressure, is related to sudden acceleration of the water by the new contact with the hull.
38.4 ms, Pmax 90 kPa
Light Structure Av(highest 1%)
Light Structure Av(highest 1%)
PORT Side Designed by Rules
Trials Rational Rules
Heavy Structure Av(highest 1%)


Limit State Hydro-Elastic Design of Fast Boats


DFP Dive Floatation Pipes PEX
DFP Lines
DCP Dive Control Pipes PE100
Front Frame
PE100
Beam 25.4m
Height 16.9m
7 Circular Cages D24m H16m
Square Cage B24m L24 H16m
Grid Lines
Main Hawser
Simulations AQUASIM by
aquastructures
Open Sea Aquaculture


RAOs at wave Direction 36° Periods 20s, 18, 16, 12, 10, 8
Application Example Desalination Planet, which utilizes Wind Energy


Delta VLFS
Wave amplification Head Sea 12 sec Free floating
Heave (dimensionless)
Period (s)
Heave Response Amplitude Operators (RAOs)
α = 35°
α = 30°
α = 25°
α = 20°


HELMs in Fin
Elastic Fin
Propulsion Fin
Activated by three HELMs
Hydraulic Equal strain Linear Muscle
Selected Research
Nitai Drimer