

# **Open sea aquaculture (OSA) technology and practices**

**Zhang Jihong**

**Yellow Sea Fisheries Research Institute, CAFS  
Qingdao 266071, China**



# Outline

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- ❑ **OSA technology and practices in the world;**
- ❑ **OSA technique and practice in china;**
- ❑ **Problems and prospect**

# OSA technology and practices in the world

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## Why moving the aquaculture activity from inshore to open sea

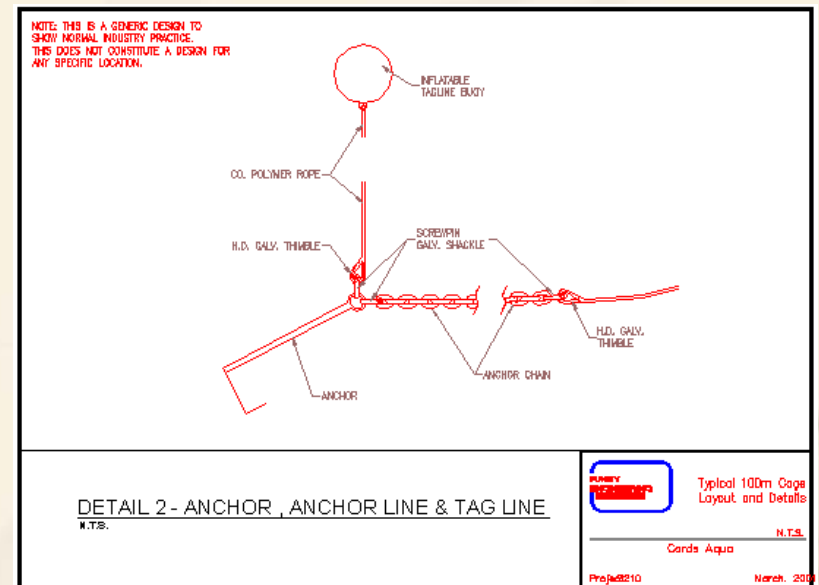
➤ **Space**

➤ **Environmental carrying capacity**

# OSA technology and practices in the world

## Technologies used in the world

### Mooring system



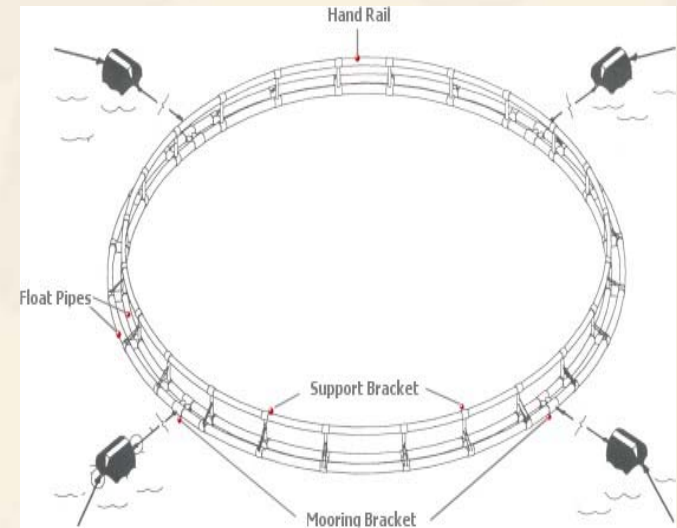
Single-point mooring system was tested for the aquaculture of Cobia in the Gulf of Mexico

# OSA technology and practices in the world

## Technologies used in the world

### Cages system

Atlantic salmon (*Salmo salar*) and  
rainbow trout (*Onchorynchus mykiss*)



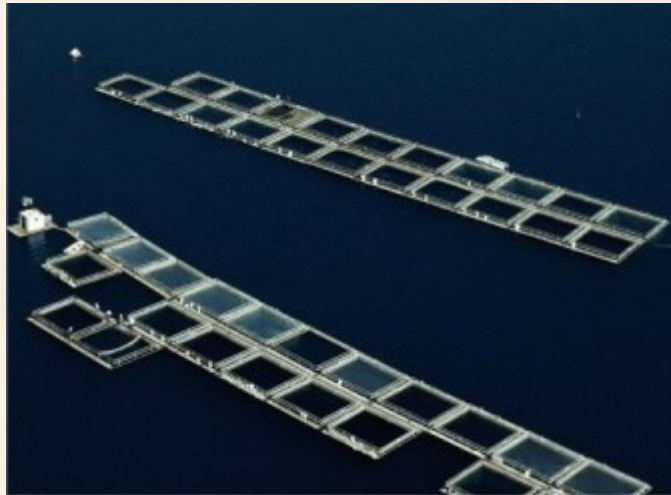
Standard sizes range from 30 up to 120 meters in circumference

# OSA technology and practices in the world

## Technologies used in the world

### Cages system

Square cages are easily assembled without specialized equipment



# OSA technology and practices in the world

## Technologies used in the world

### Nets and netting



long lasting netting ; antifouling



# OSA technology and practices in the world

## Technologies used in the world



Feeding Cannon on Wheels



Underwater Net  
Washing System



# OSA technology and practices in the world

## Technologies used in the world

Raft culture for green mussel in New Zealand



**Research focus on the anchors, floats and core ropes so as to decrease the cost.**

# OSA technique and practice in china

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- **Finfish aquaculture**
  - floating cage or net-pen
- **Shellfish aquaculture**
  - bottom culture (Epifaunal )
  - raft culture
- **Macroalgae aquaculture**
  - longline

# OSA technique and practice in china

The popular (traditional) cage  
(size: 3x3x3m)



Yield: 25-40kg/m<sup>2</sup>/cycle



Traditional cage farming



**Deepwater anti-wave cage :16m × (8~12)m**

**Imported from Norway in 1990's. Recently 10 years, over 3000 anti-wave cages were made in China**



**Anti-wave cages**

**large cage yield :  
120-150kg/m<sup>2</sup>/cycle**



# OSA technique and practice in china

## Anti-storm offshore cages — Quantities and Distributions



# OSA technique and practice in china

## Raft culture for shellfish



**Chinese scallop**  
*Chlamys farreri*



# OSA technique and practice in china

## Raft culture for shellfish



**In Lidao Island**

**Sea cucumber**  
*Apstichopus japonicus*



# OSA technique and practice in china

## Bottom culture (Epifaunal )



In Zhangzidao Island

➤ Annual yield:

- ❑ Sea cucumber: 300MT
- ❑ Abalone 130MT,



predators



Annual yield of  
Scallop *Patinopecten*  
*yessoensis*: 20000MT



# OSA technique and practice in china

## Macroalgae aquaculture---longline



**Laminaria annual  
yield in Sungou Bay:  
80,000 Tones (dw)**



# OSA technique and practice in china

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## Macroalgae aquaculture---longline



# Problems and prospect

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- ❖ To reach a balance between “extractive” aquaculture and “fed” aquaculture. Extractive aquaculture refers to seaweed and shellfish farming, which can play a significant role in nutrient recycling, and Fed aquaculture systems are, for example, the cage farming of carnivorous marine fish.

# Problems and prospect

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- ❖ Further development of the aquaculture industry must take a holistic approach to culturing technologies, socio-economics, natural resources and the environment, so that sustainability can be achieved.



Thanks

