Design of Purse Seines and Fishing Method

Shri K.K. Kunjipalu

Sr. Scientist

Purse seine comes under Round Haul nets. Others in the group are Lampara, Ring net and Bait net. (ring seine and Mini purse seine of Kerala also come under this.)

1. **Lampara** has a large central bunt or bag with short wings of larger meshes. Two wings are pulled simultaneously. There is no pursing mechanism other than closing of lead line as the net is pulled.
2. **Ring net** is a hybrid of Lampara and purse seine. It is similar seine, except that the two wings are pulled simultaneously. It has purse rings all around the length of the lead line. There is either no bunt or if present is very small.
3. **Bait nets** are for the most cases lamparas, without purse rings. They are smaller in size than that of lamparas of ring nets.
4. **Purse seine** is a long wall of webbing without prominent bunt or bag. Webbing almost hangs straight down between float and lead lines. Main body is with uniform mesh. After encircling, seine is pulled aboard from one end only to concentrate fish on the other end. Pursing is by pulling a draw string (purse line) - a rope/wire passing through a series of rings along the bottom below the lead line

Fish landings by:

a) Trawls : 40%
b) Purse seines : 20%
c) Gill nets : 20%
d) Lines : 10%
e) Others : 10%

5. **Origin and evolution of purse seine and other round haul nets:**

Beach seine is a very ancient type of net. Then cane boat seine. Here the seine is hauled into a boat. But the fish escaped under the lower edge of the net and under the boat.

6. Lampara type of net was the next stage in development from the beach seine/boat seine. The pursing of the net bottom seems to have been a relatively late development. The pursing to close the net bottom is said to have orginated in 1826 in the Rhode Island Menhaden Fishery of Atlantic coast.

   And now 20% of the world fish catch landed by purse seines, which come second to trawls.

7. **General principles in the design of purse seines:**

   A rough rule of thump is that depth of the purse seine is one-tenth of the float line. Most purse seines are 1/7-10 depth length ratio or L = 10H. Varies to ¼ to 1/3 for deep swimming and quick diving shoals.

   The lead line is usually shorter than the float line by 5 to 12 percent.

   The overall size of purse seine is best expressed as length of float line. A purse seine in water is not a truly vertical wall of webbing but the net is hung so that it is roughly cup-shaped when laid out in a circle. This is accomplished by a lead line shorter than the float line.

Common sizes of famous purse seines in the world:

a) Modern Peruvian Anchoveta purse seines	:	585M x 52M
b) California Tuna purse seines	:	900M x 81M
c) Norweigian Tuna purse seines	:	1440 x162 M
d) South African Pilchard purse seines	:	668 x 72 M
e) Anchovy purse seines	:	477 x 63 M
f) Icelandic purse seines (Deeperseines)	:	414-252M x 162 - 252M

Purse seines can be much longer in the two-boat seines as in the case of Japanese Tuna seiners (1900 M) than in one-boat type (100M). Large purse seines have a depth of upto 300M.

Materials for purse seines and Ring Seines:

The most essential requirements for purse seines (nettings) are high breaking strength, rapid sinking and water shedding capacity. Polyamide (Nylon), Polyester (Terylene), Polvinyalcohol netting yarns best meet these requirements. Polyvinyl linden chloride has the highest specific gravity (1.7), but poor breaking strength, while nylon is strong but has only 1.14 sp. Gravity (sinking speed of Nylon 210/5/3 is 2.24 cms/sec.). Polythylene fibres are probably unsuitable for purse seines and ring nets as their specific gravity is 0.93 to 0.96 and they float on the surface.

The twisted knotless netting and Rachel braided netting are lighter and are widely used for purse seines and ring seines. But, of late knotted webbing is preferred now, because knotless netting is difficult to repair when damaged.

Common mesh sizes for purse seines			Twine size
Sarine and Mackerel	:	20 mm	210/2/3, 3/3 and 4/3
Tuna	:	50 - 70 mm	210/4/3, 5/3, 6/3 and 7/3.

The **Mesh size** of purse seines must be small enough **Not to gill** the fish in any part of the seine. A common practice is to select a mesh size considerably smaller in the bunt, but a larger mesh is enough in the other parts of the seine.

Twine Size: The main criterion for determining the twine thickness for netting in a purse seine is to provide sufficient strength for pursing and hauling when the load due to the fish is maximum. The wing ends and the lower and upper selvedges of the seine are subjected to the greatest stresses. Therefore twines of greater

thickness are used in these parts. Minimal loads are imposed on the central sections of the seine.

The bunt is made of heavier netting, with two or three times greater than for the netting of the body. The bunt should be at least as long and deep as the length of the boat. Generally, fishermen like bunts about 50% bigger.

Sardine and Mackerel purse seines are generally 200 - 300 m long, the tuna seine range in length from 350 - 1000m and are usually deeper in proportion, twine size in thicker and mesh size is larger.

Japanese two-boat purse seines are the largest in the world with 2300 x 300m. The American and other tuna purse seines are of one-boat type for catching skipjack, yellowfin, bluefin and Albarore. Japanese two-boat purse seines are the best suited for catching fast moving Blue fin.

The biggest single boat purse seines are the Japanese Mackerel purse seines with 100m x 30m.

US Tuna purse seine vessels are the largest and most powerful in the world.

Norwegian and Icelandic purse seines for herring and mackerel are shorter but deeper with 500m x 200m.

Selvedges or guarding are strips of strong netting between the body and the bunt of the purse seine and the ropes.

Usually double float line with one rope has a right hand thrust and the other has a left hand twist, which will prevent each other twisting. Braided rope is very good for float line because once stretched it does not kink twist (turn around itself) or twist

Hanging co-efficient: Horizontal hanging co-efficient on float line: 0.7 for body and 0.65 for bunt. Lead line : 0.75 for body and 0.7 for bunt.