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ORIGINAL : ENGLISH

SOUTH PACIFIC COMMISSION

FIFTEENTH REGIONAL TECHNICAL MEETING ON FISHERIES

(Noumea, New Caledonia, 1 - 5 August 1983)

COUNTRY STATEMENT - WESTERN SAMOA

SUMMARY

Fifteen fish aggregation devices (FADs) are presently in place around the two main islands of Western Samoa, of a total of 37 deployed since late 1979. Various types of floats, appendages, tethers and anchors have been used, to economise on cost while maintaining FAD performance. Deployment is in 900-1,400 fathoms of water, and is performed anchor first, with twists being taken out of the rope prior to attaching the float. Some FADs were lost within a short time of being deployed, probably due to wilful damage, but some have been in place for up to 22 months.

Trolling, purse seining and the use of deep baited hooks are all fishing techniques successfully used around the FADs. Additionally, gill netting trials have been conducted, with encouraging initial results. Although only three sets have been made, over 1,100 fish were caught, ranging from 2 to 5 lbs each. On two sets mollies were used to seed the net, and this is thought to have contributed significantly to the catches. Some problems were encountered, particularly damage to the net by large fish. Further experimental work is planned to try to minimise these occurrences and refine the technique.

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A.L. Philipp - Chief Fisheries Officer

I. Fish Aggregation Devices (FAD)

1. In September 1979 five FADs were deployed around the island of Upolu in Western Samoa.

2. This being a new form of fishing the FAD off the capital, Apia, was closely monitored. After 2 weeks, tuna, both yellowfin and skipjack, dophin fish, rainbow runners and wahoo began to inhabit the area immediately around the FAD. These first FADs lasted for about 8 months before breaking away. Fishermen were encouraged to troll around these FADs. Since then fisheries has deployed a further total of 37 FADs, 15 of which are presently in place, around the two main islands of Western Samoa.

II. FAD - Construction:

3. A FAD consists of the following:-

- (a) float
- (b) appendage
- (c) tether
- (d) anchor

(a) The float can consist of anything that has a buoyancy value of approximately 1000 lbs. In areas where the current is swift the buoyancy value should be increased. In Western Samoa three types of floats have been tried out.

- (1) Twin hulled type with a buoyancy value of 1400 lbs. Made of 1/10" sheet aluminium. Cost WS\$850.00.
- (2) Single hull with a buoyancy value of 1200 lbs. Made of 1/10" sheet aluminium. Cost WS\$650.00.
- (3) A 42" x 23" round polyurethane float supplied from Japan for net fishing. The float is fibreglassed with cloth and resin and placed in a square aluminium cage. Cost WS\$400.00. Buoyancy value 600 lbs.

Above each of the 3 floats a radar reflector and marine 4 second flashing light is installed. Of the three types, float (1) is the most popular due to its large size and height making it easier to locate.

- (b) The appendage or fish attractant is something hanging below the float to attract and make a home for bait fish. The presence of bait fish attract larger predator fish like tuna and marlin.

Western Samoa has tried out several different appendages - i.e. Old 13", 14" and 15" tyres cut in half along the middle (the portion that contacts the road surface) Dan band; old rope; old nets.

We have found that the best of these is the tyres - about 40 half tyres wired on to 80 feet of 1/2" chain and hung U fashion beneath the float. It appears like the longer the appendage the better the fad would be as far as attracting tuna is concerned. The quantity of bait around does not appear to be increased by the length of the appendage. The float and appendage in every instance outlasts the tether. Electrosis is a minor problem.

- (c) The tether, it appears in every instance is the cause of the eventual loss of the FAD. A FAD off Apia was still there after 22 months. Realising that it would break away anytime it was cut loose and replaced with a new FAD and new tether. It was anchored at 1200 fathoms with 16 mm polypropylene Japanese made rope. The replacement FAD is anchored at the same spot with 18mm superfilm rope from Donaghy's Industries Ltd, Auckland. Its breaking load is approximately 5000 kg. Its floatation value is 22 lbs to a 220 M. Coil.

Due to the fact that the tether and appendage are attached to the float in a manner that causes the appendage to act as a rudder, the float is totally directional facing the current, the direction flow of which seldom changes. Consequently there is practically no spin or turning of the FAD float. Nevertheless a large 16mm eye and eye swivel is attached at the point where the rope starts beneath the float. This swivel has in some instance been placed further down but due to the almost total absence of float turning it does not matter too much as to the siting of the swivel. In our form of "Anchoring Procedure" the swivel caters for the rope twist at the time of anchoring as will be related later.

- (d) The anchor is a slab of concrete reinforced with iron rods. Its weight is about 1200 lbs. Connected to this anchor is 60 feet of 1/2" Galv. chain. The anchor end of the chain is imbedded in the concrete with pieces of reinforcement rods inserted through several of the chain links inside of the concrete. The concrete mix is 3 parts lava sand and small lava rocks to 1 part cement and the reinforcement rods. The tether is connected as shown in appendix "A".

III. Anchoring Procedure:

4. The approximate site is decided prior to departure. An echo sounder is used to locate as level an area as can be found at a depth of between 900 and 1400 fathoms. Prior to departure about 15 coils of rope are spliced together with the coils intact. The splicing is done in a manner so as the releasing would commence from the inner end of the rope in each coil. Being Z laid the rope strands would tighten and in some cases twist slightly as the rope is released from the coils.

5. The anchor is resting on two 4" x 4" x 8ft beams at the stern of the vessel. The anchor with the chain coiled on top of the anchor is heaved overboard. The ship's captain keeps the engine running and moving forward at 1 to 2 Knots to ensure no tangle with the ship's rudder or propeller. The rope is released out of the coils by hand. The anchor descent with our type of anchor is at the beginning about 4-5 mph gradually decreasing to about 3 mph at 1000 fathoms. Whenever a kink appears the rope is held to tighten the rope and remove the kink. No problem has ever been encountered in this area. As soon as it is realised that the anchor has hit bottom the captain manoeuvres the vessel into a position where the anchor rope is as perpendicular as possible, slack rope is pulled aboard. The rope is fastened to the vessel's bollard.

6. The rope is cut about 2 fathoms from the bollard. The cut rope at the anchor end is spliced into the thimble at one end of the 100 lbs of chain indicated in appendix "A". The other end of the cut rope is spliced into the thimble at the opposite end of the chain. In other words the chain is spliced into the tether. From that point about 1 coil of rope, about 10% of total depth, is payed out as slack rope. The rope is released as described earlier. When the correct amount has been released the rope is cut and the end is spliced into the thimble attached to the swivel at the end of the chain below the FAD float. In some instances the swivel has been located at the top end of the chain used to weigh down the rope. At whichever point the swivel is placed the rope is given a strong tug as soon as the swivel is in place. Invariably the rope begins to unwind in tight places and the swivel spins and removes these tight points.

7. Without a doubt it would spin a lot more when the device is at anchor. After the tether has been completed the float and appendage are heaved overboard. One of the crew jumps overboard and waits on the float for about 15 minutes to ensure that no tangle takes place between the tether and appendage. When the float has come to correct position according to the current the anchoring vessel picks up the person. The navigation light is in place at time of anchoring. The changing of batteries is left to the fishermen who fish around the FADs. The whole of the anchoring procedure takes about 45 minutes. Since FAD have been deployed around Western Samoa 3 have been lost through a whale getting entangled in the tether.

8. FADs have been in place for up to 22 months. Two were lost after 6 months. One was lost after 2 weeks. We suspect wilful damage or theft of the float by a purse-seiner.

9. The average total life of a FAD is 14-15 months. In several instances the floats have been retrieved. The break has always been in the tether rope and not in the chain under the float.

10. About 100 feet of rope was still attached to one float that was retrieved before it washed up on a reef. The break in the rope appeared to be caused by fish bite. This FAD had been in for 14 months. All other floats retrieved had been washed on to a reef and the rope was all in shreds. The total cost of a FAD anchored is between WS\$2,600 and \$3,000, depending on depth.

IV. Types of Fishing Around Fads:

11. In Western Samoa the following types of fishing have been carried out around FADs:-

- (1) Trolling using plastic lures or dead bait.
Most fishermen use plastic lures
- (2) Deep baited hooks with a live tuna as bait or dead bait.
Usually sharks, marlin or large yellow fin are caught.
- (3) Purse-seining has been successfully carried out around FADs with catches of up to 100 tons a set. The set is made about 1/2 hour before sun up.

12. Recently the writer tried out gill netting around a FAD. It is difficult to find a FAD that is not being trolled at any time. To set a gill net by a FAD would exclude any other form of fishing. The writer has tried this form of fishing only three times between January and June 1983.

13. The type of net used was:-

Manufacturer: Amikan Fishing Net MFG. Co. Ltd. Tomida,
Yokkaichi, Mieken, Japan.

Net: Nylon 210/30 - L3" x 6" x 120 MD x 1700 ML.
Natural white, double selvage on T & B

Floats: 5.1/2" x 3" Spacing 10 ft. End floats 30 lb
buoyancy.

Sinkers: One 14 lbs at each end only.

Float rope: Polypropylene - 10mm.

14. There is only one top rope - floats are attached to top rope. This is to facilitate ease of removal or addition of floats. With minimum of floats and no sinkers other than the two - one at each end, the net is made pliable and soft and would enfold any fish running into it. A 10 mm rope is included at each end. A large float is attached at top ends with the sinker at the bottom end - refer to appendix "B".

15. On the first try out 198 -4-5 lb skipjack netted.

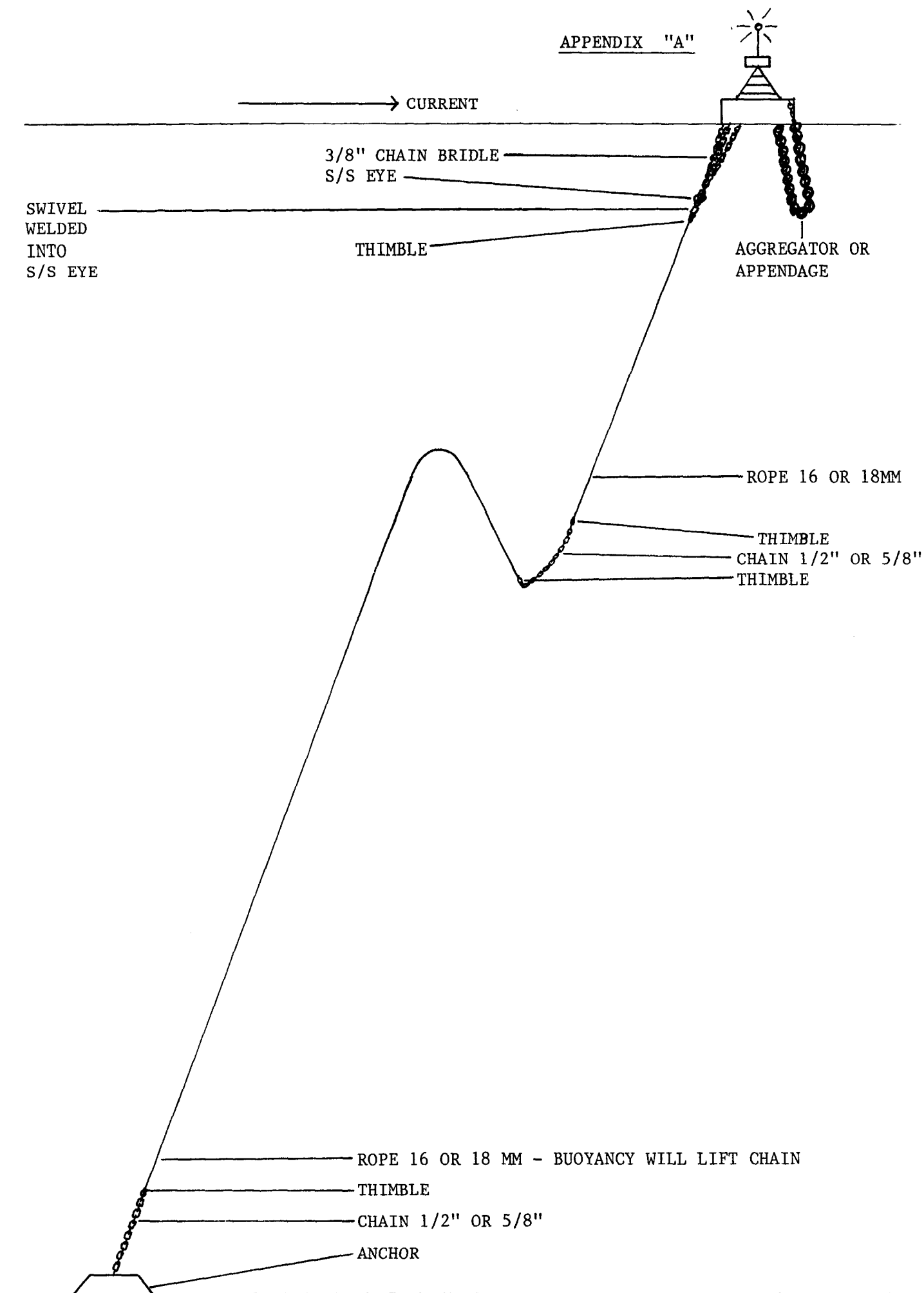
16. The second try out was accompanied by the use of mollies to seed the top section of the net. In this operation 980 tuna - yellow fin and skipjack were netted. They were mostly small, 2-3 lbs in weight. A shark ripped the net near to the end. The net was left too long in the water. It appears that the ideal time for setting the net against the current with eventual tie-up at the FAD, is about 1 hour before sun up. Seeding to take place as soon as tuna begin to surface which is about 1/4 hour before sun up. The greatest number of tuna are caught near to the top where the mollies are. The mollies will stay near to the float rope for protection.

17. A lot of predator small fish like travelly 3" to 4" in length hang around directly under the FAD float. They also participate in the eating of the mollies. It is therefore prudent to keep the net at least 50 feet or more from the FAD float. The third try out was a disaster. Some large fish ran into the net and ripped it up near the middle. A few tuna were netted. The seeding had not started when this happened. A lot of net mending is needed. The large fish was not identified. It could have been a large shark or a large marlin. The net is not made for this type of monster.

18. Marlin a 1000 lbs and over have been caught with hand line at the FAD. Not every country has mollies. I do not know how other types of fish - wild bait - would react. The question is - Would they stay near to the net for protection like mollies? I have not tried this out.

19. Although the exercise was not totally conclusive it appears that gill netting at a FAD associated with the use of live bait could be another type of fishing that could be successfully carried out at a fish aggregation device.

APPENDIX "A"

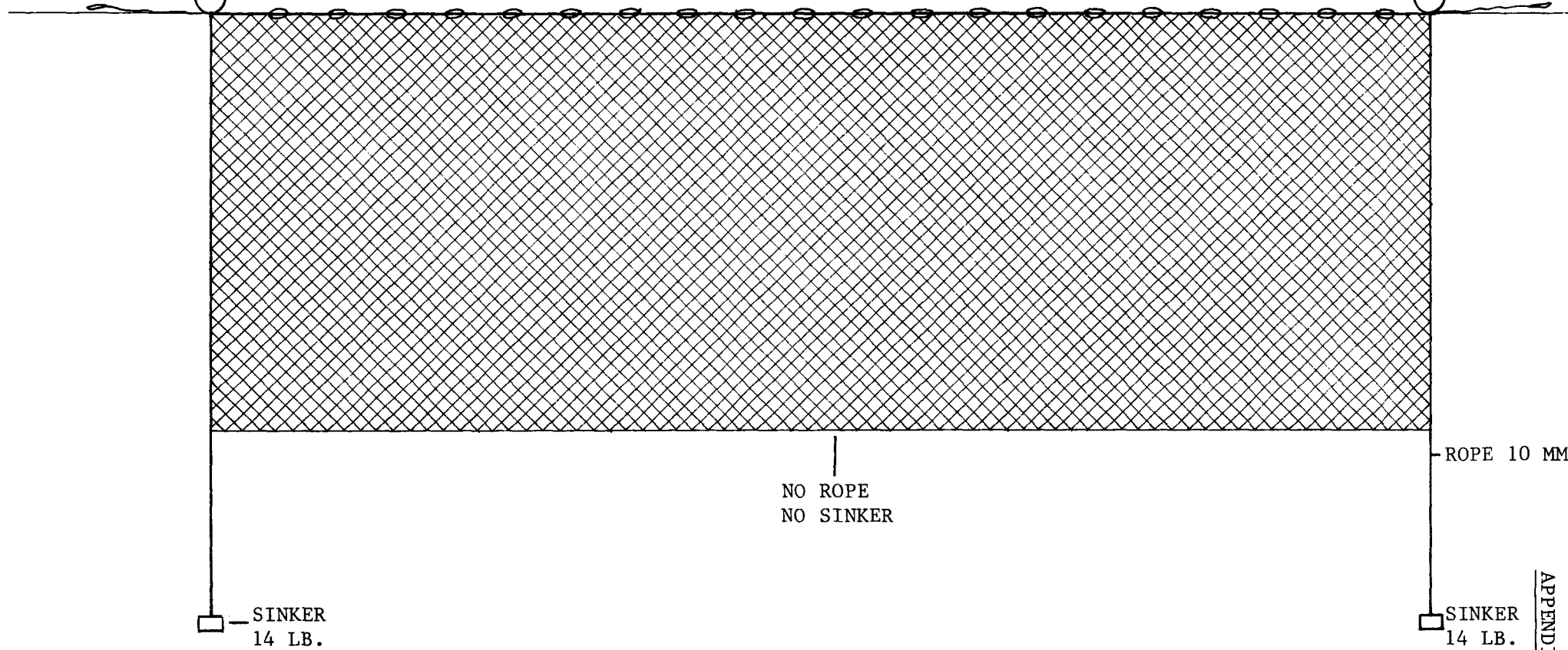


FLOAT - 30 LB
BUOYANCY

APPENDIX "B"

FLOAT - 30 LB
BUOYANCY

SMALL FLOATS SPACE 10 FT.



APPENDIX "B"