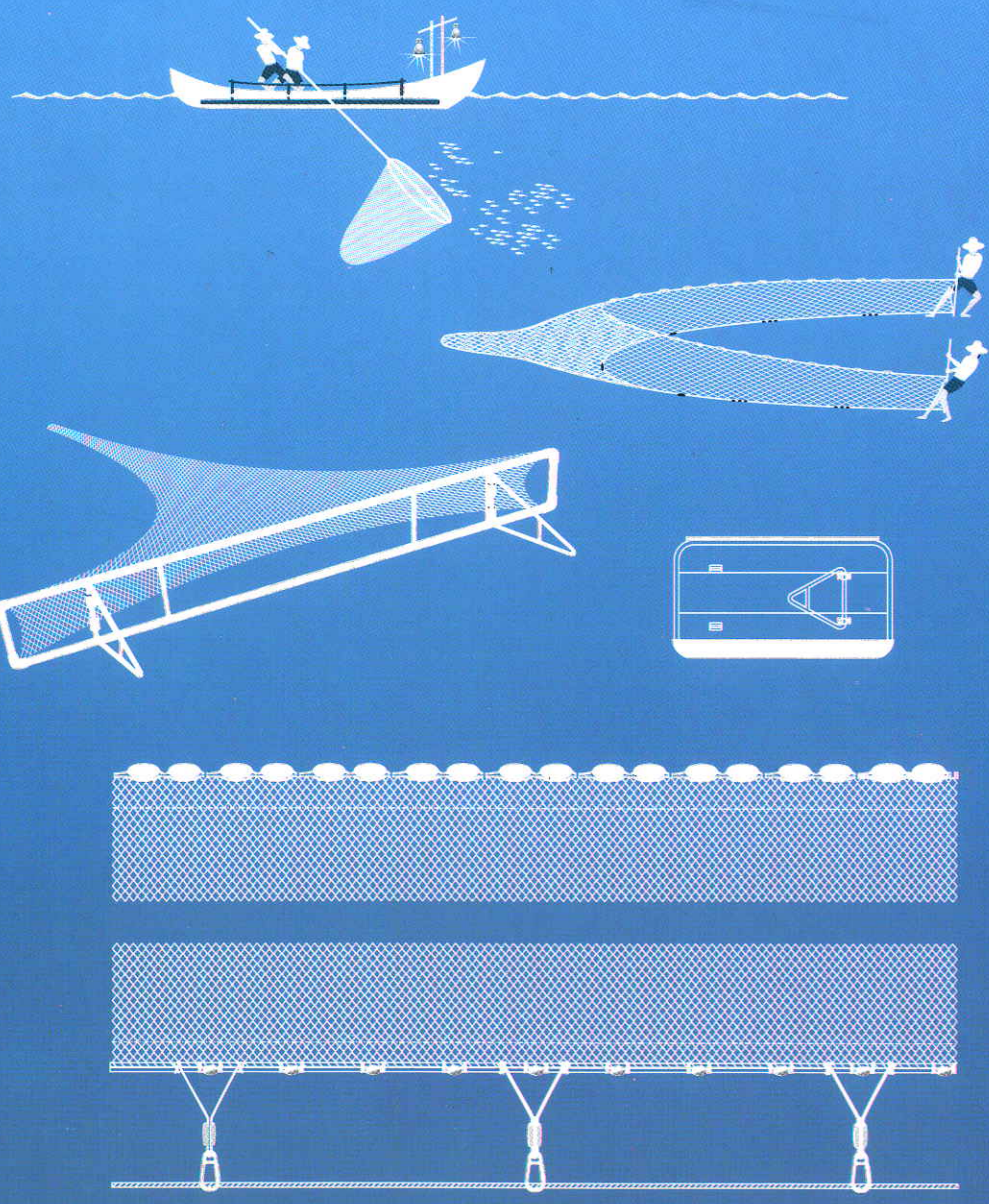
FISHING GEAR AND METHODS IN SOUTHEAST ASIA :

III. PHILIPPINES PART 1



SOUTHEAST ASIAN FISHERIES DEVELOPMENT CENTER

What is SEAFDEC?

The Southeast Asian Fisheries Development Center (SEAFDEC) is an autonomous intergovernmental body established as a regional treaty organization in 1967 to promote fisheries development in Southeast Asia.

Objectives

SEAFDEC aims specifically to develop the fishery potential in the region through training, research and information services in order to improve the food supply by rational utilization of the fisheries resources in the region.

Functions

To achieve its objectives, the Center has the following functions:

1. To offer training courses, and organize workshops and seminars in fishing technology, marine engineering, extension methodology, post-harvest technology, and aquaculture.

2. To conduct research on fishing gear technology, fishing ground survey, post-harvest technology and aquaculture, to examine problems related to the handling of fish at sea and quality control, and to undertake studies on the fishery resources in the region.

3. To facilitate the transfer of technology to the countries in the region and to provide information materials to the print and non-print media, including the publication of statistical bulletins and reports for the dissemination of survey, research and other data on fisheries and aquaculture.

Membership

SEAFDEC membership is open to all Southeast Asian Countries. The Member Countries of SEAFDEC at present are Brunei Darussalam, Cambodia, Japan, Indonesia, Malaysia, Myanmar, the Philippines, Singapore, Thailand and the Socialist Republic of Vietnam.

FISHING GEAR AND METHODS IN SOUTHEAST ASIA:
III. Philippines, Part 1

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Printed in cooperation with the Financial Assistance of Japanese Trust Fund Project

1st Revision

TD/RES/38-1 **Jan 2003**

Printed in 2003 by the Southeast Asian Fisheries Development, Training Department
PO.Box 97, Phrasamutchedi, Samutprakan 10290, Thailand

ISBN 974-9509-33-1

Printed in Thailand

Preface

This compilation of the most important fishing gears and methods in use in the Philippines is the third (3rd) volume in the Monograph Series, "FISHING GEARS AND METHODS IN SOUTHEAST ASIA". It consists of 337 designs of marine and inland fishing gears and fishing methods of the various regions of the country.

The importance of this monograph cannot be overemphasized. The present precarious situation of the environment requires concerted efforts to arrest the depletion of our fishery resources, aggravated by the use of destructive fishing gears. This monograph identifies fishing gears and methods specific to particular regions of the country, and provides necessary information on the possible ecological implications of their use, thereby assisting mandated government agencies, both local and national, in instituting management strategies/measures that will ensure their use to be within the context of precaution and continuing ecological concern.

The collaborative efforts of the Southeast Asian Fisheries Development Center (SEAFDEC) and the Bureau of Fisheries and Aquatic Resources (BFAR) in coming up with this compilation is truly commendable, as it makes available a useful reference for the institution of effective fisheries management and appropriate fishing gear application.

MALCOLM I. SARMIENTO Jr
Director

Foreword

The utilization of fisheries resources increases year by year to support the need for food in the world population. Fishing gear, the tools for harvesting the resource, are also being improved and developed. On the other hand, if it is used without a sense of resource conservation it will also be the means of destroying the resource. At present, the fisheries resources in the Southeast Asia region is heavily exploited, especially in coastal waters. In order to gain the high efficiency of fisheries development and less depletion, the fishing gear and methods of the region should be carefully studied and identify those that would contribute sustainably. Simultaneously, the fisheries industry of the region is introducing modern fishing techniques and equipment to solve the problems of crew shortage, high cost of investment, protection of the environment and resources and low process for fisheries products. These modern techniques and equipment should be suitable to the fishing condition including fishery resources in the region.

The fishing gear and methods in Thailand was surveyed in 1984 and published in 1986. A similar survey was conducted in Malaysia in 1987 and published in 1989 as the second volume. The Southeast Asian Fisheries Development Center, Training Department continued this study for the Philippines again in 1988 to 1989. 204 designs and fishing methods were collected from 7 regions of the Philippines and they were confirmed and revised again by a fishing gear specialist of the Philippines in 1995 before publishing. This volume contains description of 175 types of marine fishing gear presently employed in the marine fisheries of the Philippines. Fishing methods of twelve important types of fishing gear are also described.

With the initiative of SEAFDEC, this revised volume is being made to include marine and inland fishing gear and methods from eight (8) additional regions, namely; regions II, IV, V, VI, VIII, IX, X and XI focussing on responsible fishing gear and methods. New and specific gear and methods in a particular area targeting a potential species are prioritized.

A total of 756 designs of fishing gear and methods were dissected and screened for selection. The 133 selected drawings are inserted in the revised volume. Nomenclature for english and local names of the fishing gears are also added to indicate their countrywide distribution and utilization. It is hoped that this publication can serve as useful reference for those who are interested in the Philippines fisheries.

Panu Tavarutmaneegul

Secretary-General
and Chief of the Training Department

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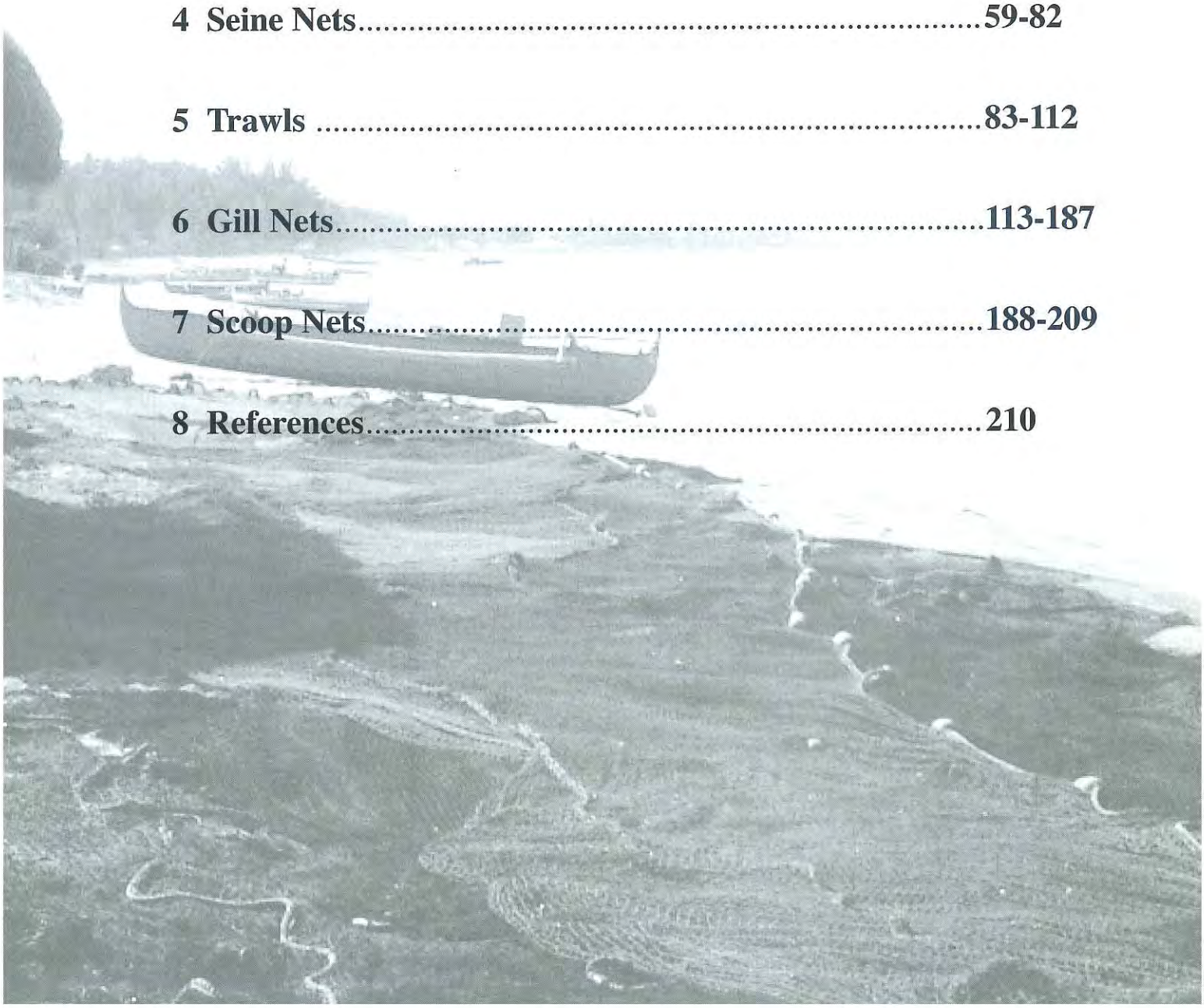
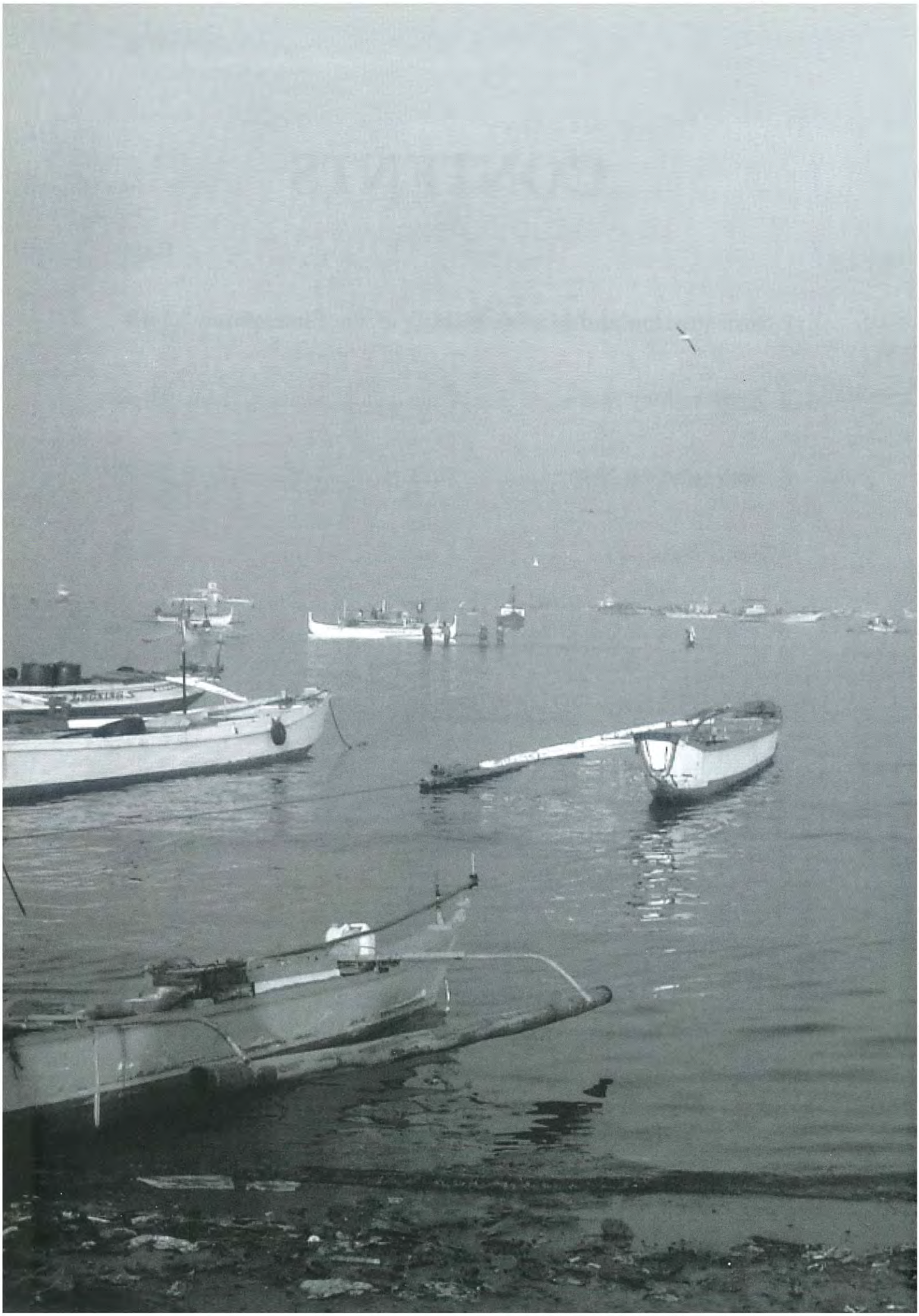




< Chapter 1 >

Introduction and Marine Fishing of the Philippines

Introduction

The revised third volume of the series of Fishing Gear and Methods in Southeast Asia covers the Philippines. In the old volume, four (4) survey trips were made from September 1988 to August 1989 covering the fishing villages of seven (7) regions and 204 designs of fishing gear and methods. Additional 133 designs of marine and inland fishing gear and methods were obtained from another eight (8) regions through the survey conducted by BFAR gear technologists from 1996-2001. The work described in this revised report is the result of a team effort by members of the SEAFDEC Training Department and technologists from the Bureau of Fisheries and Aquatic Resources of the Philippines. The topics presented are the same as in volume I and II consisting of a compilation of data, information and schematic drawings of existing fishing gear and methods. The boundaries of the study area, shown on the chart have been drawn according to technical requirement, and for the purposes of this survey only.

We acknowledge with special thanks the Bureau of Fisheries and Aquatic Resources and the Department of Agriculture of the Philippines for their cooperation and technical support. We are grateful to many persons who helped us in collecting the data, particularly to Mr. Jonathan O. Dickson and Mr. Elmer B. Alba who were our coordinators throughout the first and second surveys respectively. For this revised volume, we thank Mr. Cesar M. Drilon, Jr. SEAFDEC Council Director and Undersecretary for Fisheries and Livestocks of the Department of Agriculture, and Atty. Malcolm I. Sarmiento, Jr., Director of the BFAR for their support.

We also wish to express our sincere thanks to Dr. Veravat Hongskul, Dr. Thiraphan Bhukaswan, the Former Secretary-General of SEAFDEC for extending financial support for the survey. And also our heartfelt gratitude to Dr. Maitree Duangsawasdi, the former Secretary-General who approved financial support of Mr. Jonathan O. Dickson's travel to SEAFDEC/TD for final revision and publication of this book. We wish to thank also Dr. Panu Tavarutmaneegul, Secretary General and Chief, TD for his initiative in revising the monograph and Dr. Yasuhisa Kato for including the financial support from the RCCRF funds.

We thank again, Ms. Marylene M. Mandreza of BFAR for assistance in all of the typing work. Finally, we thank Mr. Rupert Elstow, Technical Editor of SEAFDEC Training Department, for editing the descriptions in this volume.

Marine Fishing in the Philippines

The Philippines is an archipelago composed of more than 7,000 islands bounded on the east by the Pacific Ocean, on the west by the South China Sea, in the south by the Celebes Sea and Bornean waters just a few degrees north of the equator and in the north by Taiwanese waters. Territorial waters defined in the 1898 Treaty of Paris, had an area of about 1,666,000 sq. km but with the promulgation of the Exclusive Economic Zone, the territorial marine area is increased to 2,200,000 sq. km.

Fisheries is officially classified into commercial fisheries, municipal fisheries and aquaculture sectors. Commercial fisheries include capture fishing operations using vessels of over 3 Gross tannage (GT) while municipal fisheries include capture fishing operations using boats of 3 GT or less including other forms of fishing not involving the use of water craft. Aquaculture involves fish culture activities in marine and inland waters.

In 2000, total fish production was 2,868,605 MT of which 32.99% came from the commercial sector, 32.9% came from the municipal sector and 34.1% from the aquaculture sector (**Table 1**).

TABLE 1. TOTAL FISH PRODUCTION BY SECTOR, 2000

Sector	Quantity (MT)	%	Value (10^9 Pesos)	%
1. Aquaculture	978	34.1	28.87	30.31
2. Municipal Fisheries	944	32.91	32.52	34.13
3. Commercial Fisheries	946	32.99	33.88	35.56
TOTAL	**2,868**	**100**	**95.27**	**100**

Source of Data: Bureau of Agricultural Statistics, 2001

Marine fishing is conducted by both the municipal and commercial fishery sectors. Municipal fishing is concentrated within an area extending 15 km from the shoreline while commercial fishing takes place beyond the 15 km limit, as defined by the Philippine Fisheries Code of 1998 (Republic Act # 8550). However, small and medium commercial fishing vessels are allowed to operate within 10.1 to 15 km area provided all the requirements under section 18 of R.A. #8550 are complied with.

The marine fishery resources are composed of marine flora (plants) and fauna (animals), which are typical of the central Indo-West Pacific region, and are characterized by generally high species diversity. A majority of the marine animals are fish of which about 2,400 species

are known to inhabit Philippine waters. The fishes, invertebrate fauna and the seaweeds contribute significantly to the total marine production. Fish are grouped into two according to the layers of the ocean which they occupy. The first is the pelagic group consisting of the large and small pelagic fish, the second, are the demersal fish which maybe soft or hard bottom fish. Also contributing to the production are invertebrates and fry resources.

Based on the latest data of the number of municipal fishing bancas, it is estimated that there were 469,807 bancas (less than 3 gt) existing in 2000 and 3,601 commercial fishing vessels (more than 3 gt) in 1999. Fishing bancas are mostly concentrated in Regions IV, VIII, VII, and V while commercial fishing boats are registered mostly in Regions NCR, XI, VI, and IX (**Tables 2 and 3**).

Fish production for both the aquaculture and commercial sectors generally increased from 1991-2000 (**Table 4**). However, the municipal sector showed declining production in 1994 to 1999 compared to previous years but increased a little in 2000. The value of fish production for the three sectors showed an increasing trend (**Table 5**).

TABLE 2. NUMBER OF MUNICIPAL FISHING BANCAS BY REGION 2000*

Region	Total	Motorized	Non-Motorized
CAR	660	49	611
I	17,678	11,641	6,037
II	3,304	1,502	1,802
III	27,038	18,375	8,663
IV	69,927	26,569	43,358
V	54,715	19,453	35,262
VI	41,808	16,234	25,574
VII	56,142	19,100	37,042
VIII	58,068	16,255	41,813
IX	45,650	13,280	32,370
X	9,041	2,472	6,569
XI	24,099	11,382	12,717
XII	10,759	2,671	8,088
XIII	31,283	11,202	20,081
ARMM	19,635	7,442	12,193
TOTAL	**469,807**	**177,627**	**292,180**
PERCENT	**100**	**38**	**62**

Source of Data: * Regional Yearbook, 2000, BFAR Philippine Fisheries Profile, 2000

TABLE 3. NUMBER OF COMMERCIAL FISHING VESSELS BY REGION, 1999

Region	Number	Gross Tonnage
NCR	1,351	158,509.59
I	113	1,832.99
II	64	717.94
III	40	1,080.67
IV	221	3,857.38
V	160	4,385.85
VI	404	25,674.39
VII	94	2,053.81
VIII	124	1,740.27
IX	392	22,758.66
X	43	1215.1
XI	555	45,893.86
XII	7	85.09
XIII	26	293.86
ARMM	7	181.94
TOTAL	**3,601**	**270,281.40**

Source: BFAR Philippine Fisheries Profile, 2000

TABLE 4. VOLUME OF FISH PRODUCTION, 1991-2000 (METRIC TONS)

Year	Aquaculture	Municipal	Commercial	Total
2000	978,169	943,951	946,485	2,868,605
1999	948,995	918,781	948,754	2,816,530
1998	954,656	891,146	940,533	2,786,335
1997	957,390	942,466	884,651	2,784,507
1996	980,829	909,248	879,073	2,769,150
1995	919,810	972,043	893,232	2,785,085
1994	791,444	1,009,738	885,446	2,686,628
1993	772,082	1,030,274	845,431	2,647,787
1992	736,381	1,084,360	804,866	2,625,607
1991	692,401	1,146,765	759,815	2,598,981

TABLE 5. VALUE OF FISH PRODUCTION (106 PESOS), 1991-2000

Year	Aquaculture	Municipal	Commercial	Total
2000	28,876	32,515	33,878	95,269
1999	26,810	30,175	32,242	89,227
1998	26,161	28,966	29,737	84,864
1997	27,383	27,393	25,935	80,711
1996	33,206	25,373	24,555	83,134
1995	33,555	26,464	23,065	83,084
1994	35,003	24,475	20,714	80,192
1993	30,163	22,031	18,021	70,215
1992	25,986	22,656	16,801	65,443
1991	22,656	22,133	15,245	60,034
TOTAL	**289,799**	**262,181**	**240,193**	**792,173**

Source: 1999 BFAR Philippine Fisheries Profile, Bureau of Agricultural Statistics, 2001

TABLE 6. MUNICIPAL FISH PRODUCTION BY REGION, PHILIPPINES, 1996-2000 (METRIC TONS)

Region	1996	1997	1998	1999	2000
Philippines	**909,248**	**924,466**	**891,146**	**924,693**	**943,951**
NCR	3,665	3,529	4,605	4,156	3,982
CAR	198	254	763	1,071	1,075
I	18,677	18,811	23,182	23,006	23,392
II	11,854	12,171	11,571	14,622	17,037
III	10,925	10,760	11,242	10,220	11,176
IV	275,418	266,418	255,912	259,580	257,835
V	65,395	73,373	72,968	72,478	73,803
VI	141,387	136,536	126,695	132,617	134,227
VII	40,530	44,881	41,257	45,323	47,482
VIII	35,411	37,282	36,026	36,927	37,203
IX	134,724	129,211	113,598	116,686	122,479
X	14,898	16,273	16,361	15,751	17,079
XI	39,537	51,021	46,463	48,637	48,119
XII	9,092	12,140	17,950	18,313	19,673
ARMM	42,718	49,552	52,300	61,012	62,790
CARAGA	64,819	62,254	60,253	64,294	66,599

Source: Bureau of Agricultural Statistics, 2001

TABLE 7. COMMERCIAL FISH PRODUCTION BY REGION, 2000 (METRIC TONS)

Region	Marine Commercial
NCR	142,849
I	2,250
II	14,130
III	12,286
IV	124,849
V	21,732
VI	130,486
VII	64,109
VIII	32,497
IX	166,224
X	21,207
XI	147,592
XII	10,861
XIII	4,825
ARMM	40,686
TOTAL	**936,583**

Source: Bureau of Agricultural Statistics, 2001

The most productive regions in the municipal sector are IV, VI, IX and V (**Table 6**) and in the commercial sector are IX, XI, NCR and VI. The NCR (National Capital Region) only has the highest landings and not the highest productivity of the area. (**Table 7**).

In terms of fishing grounds, municipal production comes mostly from the Visayan Sea, Bohol Sea, East Sulu Sea, Moro Gulf and Guimaras Strait (**Table 8**) while commercial production comes from West Palawan Waters, South Sulu Sea, Visayan Sea, Moro Gulf and Lamon Bay (**Table 9**).

There are 14 types of fishing gear being used by the commercial sector. In terms of production, purse seine and ring net produced 51.41% and 16.31%, respectively in 1995 (**Table 10**). On the other hand, the gillnet and hook and line were the most productive for municipal fishing gear, producing 32.85% and 23.87%, respectively (**Table 11**).

Pelagic fishing for tuna and other smaller pelagics and invertebrates is done by purse seine, ring net, bag net, hook and line, push net, gillnet, troll line, drift filter net and round haul seine. Demersal fishing is done primarily by trawl, danish seine, beach seine, and drive-in-net. The utilization of these fishing gears vary from region to region, and their operation is affected by the prevailing monsoon and fishing season. In coastal waters, many kinds of fishing gear and methods are used by the fishermen making the fishing effort very high and contributing to overfishing.

TABLE 8. MUNICIPAL FISHERY PRODUCTION BY MAJOR FISHING GROUNDS, 1994-1995

(METRIC TONS)

Fishing Ground	1994		1995	
	Quantity	% Share	Quantity	% Share
1. Visayan Sea	89,695	11.4	88,616	11.28
2. Bohol Sea	88,312	11.22	70,756	9.01
3. East Sulu Sea	69,498	8.83	71,486	9.1
4. Moro Gulf	71,441	9.08	73,938	9.41
5. Guimaras Strait	53,776	6.83	51,332	6.54
6. South Sulu Sea	42,990	5.46	42,019	5.35
7. West Palawan Waters	40,161	5.1	46,948	5.98
8. Lamon Bay	37,279	4.74	41,862	5.33
9. Leyte Gulf	32,655	4.15	49,901	6.35
10. Samar Sea	37,005	4.7	40,236	5.12
11. Davao Gulf	29,573	3.76	33,743	4.3
12. Cuyo Pass	29,440	3.74	25,587	3.26
13. Tayabas Bay	26,482	3.37	17,498	2.23
14. Others	138,540	17.61	131,447	16.74
TOTAL	**786,847**	**100**	**785,369**	**100**

Source: Fisheries Statistics, 1997, Bureau of Agricultural Statistics

With the promulgation of the Republic Act No. 8550, also known as the Philippine Fisheries Code of 1998, fishing boats of less than 3 GT are provided with a wider area in which to operate to include municipal and national waters up to 200 nautical miles from the shoreline. Commercial fishing boats are allowed by law to fish outside the 15 km area of the municipal waters. Because of declining catch and over-exploitation of coastal waters, some of the

TABLE 9. COMMERCIAL FISHERY PRODUCTION BY MAJOR FISHING GROUNDS, 1994-1995 (METRIC TONS)

Fishing Ground	1994		1995	
	Quantity	% Share	Quantity	% Share
1. West Palawan Waters	150,949	17.57	187,728	21.02
2. South Sulu Sea	149,095	17.35	180,532	20.21
3. Visayan Sea	134,537	15.66	120,267	13.46
4. Moro Gulf	102,575	11.94	83,352	9.33
5. Lamon Bay	48,572	5.65	55,325	6.19
6. Bohol Sea	36,981	4.3	36,161	4.05
7. East Sulu Sea	27,431	3.19	18,994	2.13
8. International Waters	19,373	2.25	44,140	4.94
9. Samar Sea	30,944	3.6	25,602	2.87
10. Guimaras Strait	30,209	3.52	24,163	2.71
11. Manila Bay	26,222	3.05	25,046	2.8
12. Tayabas Bay	21,661	2.52	17,140	1.92
13. Sibuyan Sea	8,756	1.02	20,065	2.25
14. Others	72,023	8.38	54,717	6.13
TOTAL	**859,328**	**100**	**893,232**	**100**

TABLE 10. COMMERCIAL FISHERY PRODUCTION BY FISHING GEAR, 1994-1995 (METRIC TONS)

Fishing Gear	1994		1995	
	Quantity	% Share	Quantity	% Share
1. Purse Seine	400,246	46.58	459,229	51.41
2. Ring net	145,676	16.95	145,676	16.31
3. Trawl	66,089	7.69	66,089	7.4
4. Danish Seine	93,325	10.86	93,325	10.45
5. Bag net	77,891	9.06	77,891	8.72
6. Hook and Line	24,270	2.82	24,270	2.72
7. Others	26,752	3.11	26,752	2.99

Source: Fisheries Statistics, 1997, Bureau of Agricultural Statistics

commercial fishing boat operators are now fishing in the Exclusive Economic Zone and on the high seas. It is expected that this will reduce fishing effort in coastal waters.

TABLE 11. MUNICIPAL FISHERY PRODUCTION BY FISHING GEAR, 1994-1995 (METRIC TONS)

Fishing Gear	1994		1995	
	Quantity	% Share	Quantity	% Share
1. Gill net	249,710	31.74	258,021	32.85
2. Hook and Line	183,502	23.32	187,502	23.87
3. Beach Seine	57,216	7.27	40,101	5.11
4. Fish Corral	38,155	4.85	31,056	3.95
5. Ring net	32,308	4.11	40,516	5.16
6. Baby Trawl	27,277	3.47	23,517	2.99
7. Spear	25,142	3.2	27,910	3.55
8. Longline	22,936	2.91	24,885	3.17
9. Danish Seine	17,146	2.18	11,776	1.5
10. Fish Pot	19,361	2.46	16,532	2.1
11. Bag net	13,838	1.76	8,663	1.1
12. Crab Lift net	7,913	1.01	6,148	0.78
13. Purse Seine	10,214	1.3	14,576	1.86
14. Others	81,729	10.39	94,166	11.99
TOTAL	**786,847**	**100**	**785,369**	**100**

Source: Fisheries Statistics, 1997, Bureau of Agricultural Statistics

< Chapter 2 >

Explanatory Notes

This revised volume is a combination report of the survey on Marine Fishing Gear and Methods, conducted in the Philippines between August 1988 and September 1989 and the additional surveys conducted in another six (6) regions from 1996-2001. The survey was conducted using the same methods as in the first and second volume (Thailand and Malaysia). Survey sites are shown in **Figure 1**.

In this volume, 756 designs of fishing gear and methods were dissected and were the basis for the choices of selected drawings in the revised monograph. The data, which was collected by the same method as in the former volumes, is shown in **Table 12**. Background information on the current status of different fisheries was based on data contained in the annual "Fishery Statistical Bulletin for the South China Sea Area of 1997" and the National Fisheries Statistics of the Philippines, 1991-2000.

In this revised volume, the classification of fishing gear is presented with a description of each group. This is based on the system adopted in the "Definition and Classification of Fishing Gear Categories" by C. Nedelec, FAO Fisheries, Technical Paper 222. The mode of presentation is summarized below.

Illustrations

1) The horizontal lengths of surrounding nets, purse seines and gill nets are drawn according to the length of the floatline, and the vertical depth according to the fully stretched netting. In the case of gill nets with side lines, the depth is drawn according to their length. Some types of gear are shown by schematic or partly perspective overall sketches, with dimensions indicated where applicable.

2) General outline drawings, such as of the rig of a complete gear, and detailed drawings of components, are mostly not to scale, but the main dimensions are given.

3) Dimensions are given only in metres (m) and millimetres (mm). The units are not indicated but can easily be recognized, as follows:

Metre:	Length of footropes, headlines, floatlines etc., used with two decimals (e.g., 5.25, 90.20)
Millimetre :	Mesh size (stretched), diameters of ropes, floats, etc. used without a decimal point or with one decimal only (e.g., 12; 527 or 1.2; 20.5)

4) Mass and weight are indicated in the units of kilogram (kg) and gram (g). Buoyancies of floats and breaking load of netting yarns or ropes are shown by kilogram-force (kgf) or gram-force (gf).

5) Materials are indicated by the abbreviations listed in **Appendix 1**.

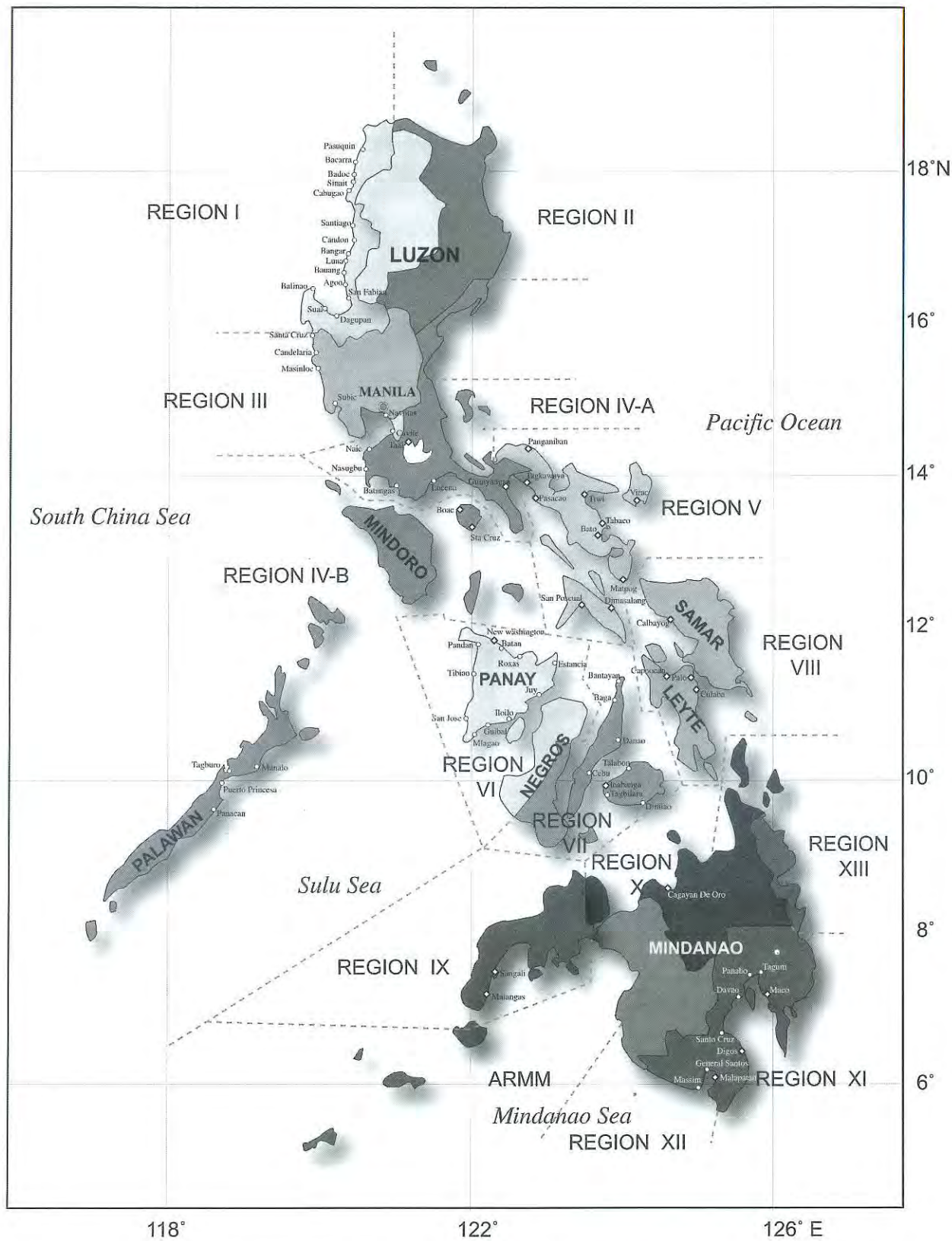


Figure 1. Location (o)where the surveys of fishing gear and methods used were carried out in the old monograph.
Location (◇) where the additional surveys of fishing gear and methods were carried out for the revised monograph.

TABLE 12. NUMBERS OF FISHING GEAR DESIGNS AND TECHNICAL PAPERS COLLECTED FROM THE SURVEY IN THE PHILIPPINES

Type of Monograph / Group of Fishing Gears	Old Monograph Designs	Revised Monograph Additional Designs	Technical Papers/ Travel Reports	
	Total	Total	Old	Revised
1. Surrounding Net	14	2	6	2
2. Seine Net	15	2	1	2
3. Trawl	13	4	2	1
4. Lift Net	7	11	4	7
5. Falling Gear	3	2	-	1
6. Gill Net	43	37	8	18
7. Trap	31	24	3	10
8. Hook and Line	51	31	3	9
9. Scoop Net	9	12	-	7
10. Drive-in-Net	3	5	2	2
11. Dredges	3	1	-	1
12. Miscellaneous	12	2	8	2
Total	**204**	**133**	**37**	**62**

6) The size of netting yarns is shown in the denier system:

7) The mesh size, given in millimetres (mm) is understood to be the distance between the centres of the two opposite knots in the same mesh when fully stretched.

8) The number of meshes in a straight row along the edge indicate the width and length or depth of net panels or sections.

9) The shape of a netting section is indicated by the cutting rate at its edge. A tabulation of common cutting rates for practical ranges of taper ratios is given in **Appendix 2**, together with a diagram of different cutting rates.

10) The term hanging ratio (E) designates the ratio between the length of a given portion of the mounting rope and the length of the stretched netting hung on this portion of the rope.

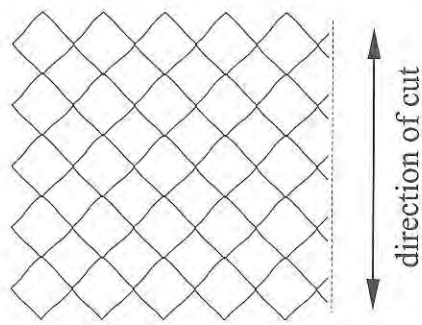
11) When there are two or more variants in the construction of gear or manner of use, this is indicated in the title and opposite the drawing by Roman numerals (I, II, ...). Where these

APPENDIX 1

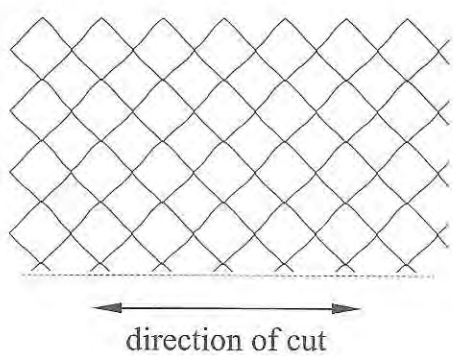
ABBREVIATIONS AND SYMBOLS USED IN ILLUSTRATIONS.

ALT	=	Alternative
BAIT	=	Bait
BAM	=	Bamboo
BR	=	Brass
CEM	=	Cement
CLAY	=	Baked clay
COMB	=	Combination rope
COT	=	Cotton
EG	=	Electric generator
Fe	=	Iron
Fp	=	Foam plastic
GALV	=	Galvanize
GT	=	Gross tonnage
Hp	=	Horse power
LIVE	=	Live bait
LL	=	Luring lamp
Loa	=	Length of overall fishing boat
MAT	=	Material
MONO	=	Monofilament
OM	=	Outboard motor
PA	=	Polyamide
Pb	=	Lead
PE	=	Polyethylene
PES	=	Polyester
PL	=	Plastic
PP	=	Polypropylene
PVA	=	Polyvinyl alcohol
RA	=	Rattan
RUB	=	Rubber
S	=	S twist
SN	=	Saran nylon
SST	=	Stainless steel
ST	=	Steel
SW	=	Swivel
WD	=	Wood
WIRE	=	Steel wire rope
Z	=	Z twist
Ø	=	Diameter
	=	Upper panel
	=	Lower panel
	=	Side panel
	=	Purse ring
	=	Thickness
	=	Approximately
	=	Circumference
	=	Braided
	=	Twisted
	=	Current
	=	Wind

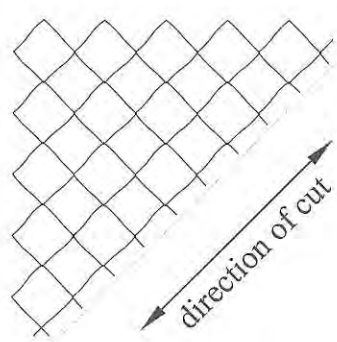
N(normal) cut. The cut is the perpendicular to the general course of the yarn in knotted netting



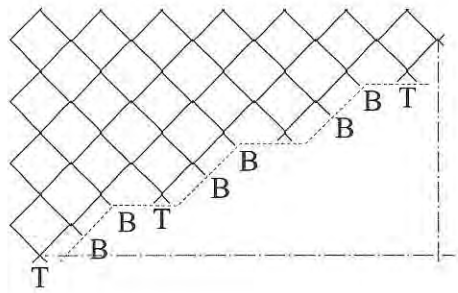
T(transversal) cut. The cut is the parallel to the general direction of the yarn in knotted netting



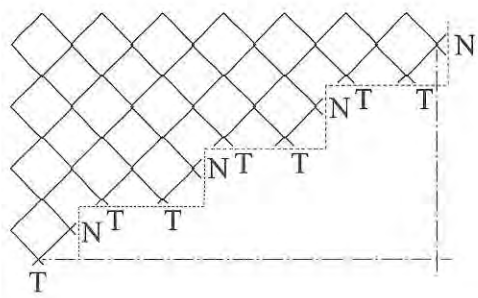
B(bar) cut. The cut is the parallel to a line of sequential mesh bars



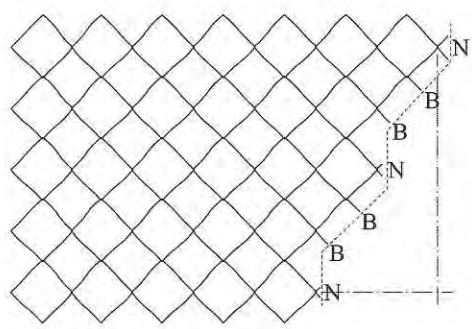
Cutting rate 1T2B



Cutting rate 1N2T



Cutting rate 1N2B



variants refer to only one component part of the gear, other possible ways of making this part are shown with the abbreviation ALT.

12) The sequence in fishing operation is shown by sketches with circled Arabic numerals (1, 2 ...) which indicate the sequence of operational stages.

13) Parts of gear drawn in detail are indicated by circled capital letters (A, B ...)

Fishing Gear Classification

Type of Gear	Local Name
1. SURROUNDING NETS	
1.1 Municipal ring net	Kalansisi, likom-likom, kubkub, basnig, likos, puna
1.2 Commercial ring net	Likom-likom, kubkub, pukot, pangulong, taksay
1.3 Scad/mackerel/sardine purse seine	Pangulong, kubkub
1.4 Tuna purse seine	Pangulong
2. SEINE NETS	
2.1 Beach seine	Baling, sinsoro, sahid, pangkit, patalang, daklis
2.2 Boat seine	Boli-boli, holbot-holbot, liba-liba, hulahop, zipper
3. TRAWLS	
3.1 Otter Trawl	Galadgad, palupad
- High Opening trawl	Galadgad, mangkwerna, koto-koto
- Ordinary trawl	Paguyod, norway
3.2 Pair Trawl	Paranzella, parehas
3.3 Beam Trawl	Karkar, utase, mangkwerna
4. GILL NETS	
4.1 Surface gill net	Panteng pang-ibabaw, pangtalbok, sapaw
4.2 Drift gill net	Liting, kurantay, sigay, panteng paanod, panti, barangay, patalang
4.3 Bottom gill net	Rabnot, panteng palunod, pukot, idos-idos, pakatang
4.4 Trammel net	Paradual, transmaliyo, pukot, pamalu, 3 ply, pangbalo
4.5 Encircling gill net	Panglikos, pukot, takibo, sapyaw, patitig

Type of Gear	Local Name
5. SCOOP NETS	
5.1 Man push net	Sakag, sudsod, sayap, sayot, sayudsod, pangahig, batbateng
5.2 Boat push net	Dalungkit, sudsod, sarap, suro, sapyaw
5.3 Scoop net	Sigpaw, tikpaw, salap, pangsalok, agahid
6. LIFTNETS	
6.1 Portable lift net	
- Crab liftnet	Bintol
- Shrimp lift net	Pakik-kik
6.2 Fish lift nets	Basnig, singapong, pantalukap
6.3 Stationary lift nets	New look, Lap-gap, tangkal, salambaw, bukatot
6.4 Round haul seine	Sapyaw, Lawag
7. FALLING GEAR	
7.1 Freshwater cast net	Dala, tabukol
7.2 Marine water cast net	Dala, bintay, laya
8. TRAPS	
8.1 Fish pot/trap	Bubo, nasa
8.2 Crab trap	Bubo, panggal
8.3 Squid trap	Pangnocos/choco
8.4 Nautilus trap	Bubo, lagang
8.5 Shrimp trap	Barekbek
8.6 Barrier net	Likos
8.7 Fyke net	Banwar, dayakus
8.8 Stake trap	Baklad, pahubas
8.9 Cover pot	Salakab
8.10 Set net (Otoshi-ami)	Lambaklad

Type of Gear	Local Name
9. HOOK AND LINE	
9.1 Handlines	
- Ordinary handline	Kawil, pasol, tangkab, og-og, sabiki, banniit
- Floating hook and line	Floating, bira-bira
9.2 Troll lines	Saba-saba, hila-hila, sibid-sibid, rabok, bilog-bilog, paguyod, paguroy, bantak
9.3 Longlines	
- Bottom set longline	Kitang
- Tuna drift longline	Kitang paanod
10. DRIVE-IN-NETS	
10.1 Drive-in-net for flying fish and half-beak	Pukot pamarongoy, pukot paaboy, pukot, tapsay, pangnokus, seket
10.2 Drive-in-net for fusiliers and other coral reef fish	Paaling, pornas
11. DREDGES	
11.1 Hand Dredge	Sudsod, sarap, galadgad, pangahig
11.2 Boat Dredge	Karkar, Sudsod
12. MISCELLANEOUS	
12.1 Octopus luring device	Pangati
12.2 Spear gun/Harpoon	Pana, harpoon, sibat
12.3 Squid luring device	Laki, masi-masi, ferries wheel
12.4 Miracle hole	
12.5 Gaff hook	Pangiliti, panikwat, ganso

Groups of Fishing Gear and Description

1. SURROUNDING NET

A net roughly rectangular in shape without a distinct bag is set vertically in the water to surround the school of fish, generally of pelagic nature. The nets are subdivided into three major types: One boat purse seine; Two boat purse seine; and Surrounding net without a purse line. The ring net type is included in this category.

2. SEINE NET

A bag shaped net with two wings, normally, the wings are larger than those of trawl nets. The net is pulled towards a stationary boat or onto a beach. A seine net of a primitive nature sometimes does not have a bag. Insofar as the net is pulled towards a stationary boat or beach, it is included herein.

3. TRAWL

A conical bag shaped-net with two or more wings, pulled by one to two boats for a period of time, to catch mainly fish or other aquatic animals that live directly on, or stay near the sea bed. When such a gear is used in mid-water with the same catching mechanism, the mid-water trawl is included herein.

The trawl is also divided into three major types : Otter trawl, Pair trawl, and Beam trawl.

4. GILL NET

A net wall, with its lower end weighted by sinkers (or heavy net, as in drift gill net) and the upper end raised by floats, is set across the path of migrating fish. Fish trying to make their way through the net wall are gilled or entangled in the mesh. The trammel net with two to three wall nets is also included herein. The migrating fish are entangled between two layers of net and not in the mesh where a combination of different types of nets are used.

5. SCOOP NET

A bag net with a fixed or variable opening is operated in shallow waters or from boats. Some large scale scoop nets are operated from a motorized boat such as the boat push net.

6. LIFT NET

A sheet of net, usually square, but may sometimes be conical, is stretched by several rods, ropes, or a frame and is set either at the bottom or in mid-water for some time and then lifted to trap the fish swimming above it.

7. FALLING GEAR

The gear is usually a cone shaped net or other material which is dropped or cast to cover aquatic animals and impound them. Generally hand-operated in shallow waters, some cast nets are operated from a boat or raft.

8. TRAP

Gear that is set or stationed in the water for a certain period, regardless of the kind of material used for their construction. The fish when caught are naturally confined in a collecting unit from which escape is prevented by labyrinths and/or retarding devices such as gorges, funnels, etc. without any active fishing operation taking place.

9. HOOK AND LINE

This gear generally consists of line(s) and hook(s) where natural or artificial baits are hooked to attract fish or other aquatic animals. Unbaited hooks or a jig may also be used.

10. DRIVE-IN-NET

A bag net with two wings, scoop net and wall with a coconut leaf fence are usually set in the water against the current. To a larger-scale drive-in net, one to two hundred fishermen with their frightening ropes and plastic hoses which emit bubbles drive the fish to enter the bag net and/or scoop net. A lift net is used to catch fish which are circling the net wall.

11. DREDGE

An iron or net basket with a hard rectangular frame at the opening. This gear is dragged or pushed along the sea bed usually to collect molluscs such as mussels, oysters, scallops, clams, etc. The shellfish are held in an attached bag or sieve which allows the water, sand or mud to pass through.

12. MISCELLANEOUS

This group covers a great variety of other fishing gear and methods not specified elsewhere or that are based on mixed principles. For example hand hooks, harpoons or spears, gaff, etc.

< Chapter 3 >

Surrounding Nets

Surrounding Net Fishing

Surrounding Net fishing started in the latter part of the 19th century. It evolved from the beach seine which was modified to catch surface dwelling species in deep waters. Initially, the leadline is made much shorter than the float line. With continuing innovations, commercial operation of surrounding net using dugout bancas was introduced in the 1930. It was mechanized, but operation was mostly in shallow waters. The half-ring net was also introduced and operated during the dark phases of the moon.

Modern purse seining was introduced in the 1960, while the traditional ringnet was used primarily in coastal waters. The purse seine is operated using a hydraulic winch, power block and fish finding equipment. The original purse seine net dimension were 348 to 439 m hung length and 64 to 75 m stretched depth. With convincing results of fishing operation, many trawlers were converted into purse seiners in 1964. Its development was further accepted by the private sector with the assistance of the United Nations-Food and Agriculture Organization (UN-FAO) in their special project on Deep-Sea Fishing. Existing net designs were modified and hanging rates were staggered rather than uniform throughout the net. The tapered bottom corner of the net was also introduced. Tuna daytime purse seining in the project was tried, but was not successful.

Eventually, the catching of tuna became successful with the use of ring net/purse seine in small-scale fishing in Cotabato province in 1974. Light attraction and payaws led to increased production. Fishery was accelerated when the South China Sea Development and Coordinating Program of the UN-FAO chartered two (2) Canadian purse seiners. The most productive sets were made with the aid of floating logs, payaws and light attraction. By the middle of 1976, a private fishing company ventured into big scale tuna purse seining. It was so successful that more companies followed its operation. Late in the 1980s, purse seiners increased in number using the latest electronic gadgets such as sonar/fish finders, radar, satellite navigation, and others. Until today, surrounding nets developed rapidly and are still the most productive types of fishing gear for catching pelagic species. They contributed about 68% of the commercial fishery production and 7.0% of the municipal fishery production. It is however noticeable that the production from ringnets in the municipal sector is increasing while the commercial sector shows an increase from 159,270 MT in 1993 to 179,331 MT in 1995. On the other hand, purse seining increased its production in the commercial sector from 425,261 MT in 1993 to 459, 229 MT in 1995 (**Table 13**).

TABLE 13 MUNICIPAL AND COMMERCIAL FISHERY PRODUCTION OF THE RING NET AND PURSE SEINE, 1993-1995 (METRIC TONS)

Fishing Gear	1993		1994		1995	
	Municipal	Commercial	Municipal	Commercial	Municipal	Commercial
Ring Net	34,995	159,270	32,308	208,732	40,516	179,331
Purse Seine	22,491	425,261	10,214	400,246	14,576	459,229

The major fishing grounds for the ring net and purse seine vary. The ring nets are concentrated in the Bohol Sea, the Moro Gulf, the East Sulu Sea and the South Sulu Sea. The purse seine is operated mostly in west Palawan waters, the South Sulu Sea, the Visayan Sea, the Moro Gulf and Lamon Bay (**Table 14**). The major species caught are roundscad, sardines, skipjack, frigate tuna and mackerel (**Table 15**).

TABLE 14 MAJOR FISHING GROUNDS AND PRODUCTION OF COMMERCIAL RING NET AND PURSE SEINE, 1995 (METRIC TONS)

Fishing Grounds	Ring Net	Purse Seine
West Palawan Water	22	179,727
South Sulu Sea	27,086	102,392
Visayan Sea	481	71,025
Moro Gulf	29,104	26,406
East Sulu Sea	13,204	1,807
Manila Bay	13	8,236
West Sulu Sea	3,895	1,524
Bohol Sea	61,416	2,686
Samar Sea	9,950	773
Lamon Bay	103,551	5,849

Source : Fisheries Statistics 1995. BAS

TABLE 15 DOMINANT SPECIES CAUGHT BY MUNICIPAL AND COMMERCIAL RING NET AND PURSE SEINE, 1994-1995 (IN METRIC TONS)

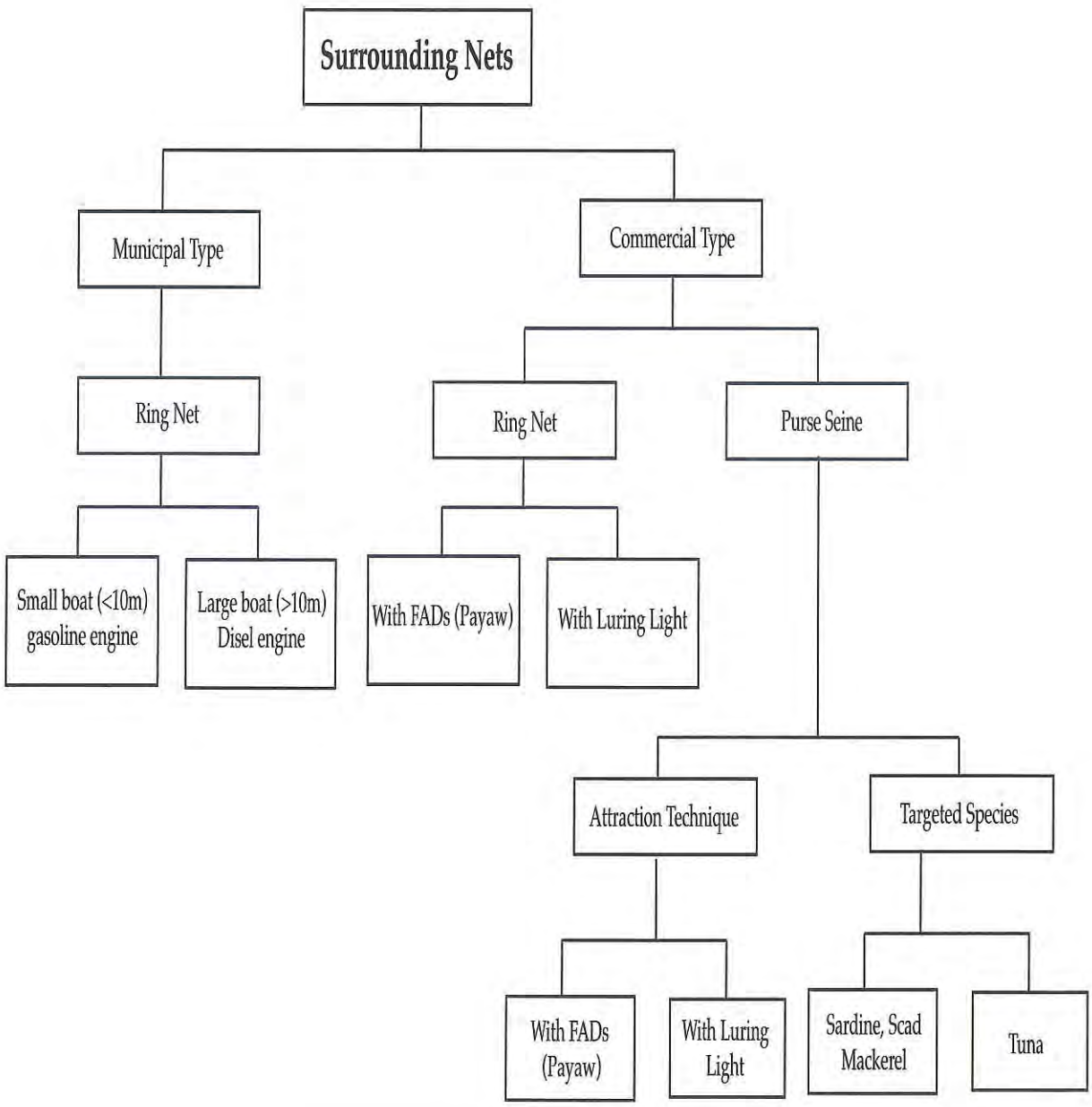
Species	1994		1995	
	Ring Net	Purse Seine	Ring Net	Purse Seine
1. Roundscad	38,864	135,767	337,841	166,322
2. Indian Sardines	39,273	96,201	36,249	106,698
3. Skipjack	15,691	48,465	30,529	61,185
4. Fimbriated Sardines	6,250	12,449	8,103	14,433
5. Frigate Tuna	29,600	20,936	19,818	25,666
6. Indian Mackerel	5,148	17,517	4,329	14,270
7. Indo-Pacific Mackerel	4,876	7,112	2,815	8,674
8. Eastern Little Tuna	27,430	7,885	455,338	2,675
9. Big-eyed Scad	8,216	8,773	5,981	8,927
10. Slipmouth	1,565	3,226	3,313	1,819

Source : Fisheries Statistics, 1994-1995, Bureau of Agricultural Statistics

Fishing Gear and Methods

Surrounding nets are of two types : the ring net and the purse seine. These are further classified into municipal and commercial types based on attraction techniques, size of boat, and targeted species as shown in the diagram. The municipal type is operated by boats less than 3 Gross tonnage (GT) which may be motorized or non motorized. The commercial type used boats of more than 3 GT. The ring net has its bunt at the center and hauling is done manually by pulling simultaneously both sides of the net. The purse seine has its bunt at one end of the net and hauling is carried out at the opposite end by means of a power block.

Classification of Surrounding Nets



1.1 Municipal Ring Net

The net measures 250-400 m long by 30-50 m deep. It is operated by a fishing banca which is a dugout carved from logs and provided with marine plywood planking and bamboo outriggers. The banca typically measures 7-10 m long by 60 cm wide by 60 cm deep. It is powered by 10-16 horsepower gasoline engine. An improvised net platform is provided in the stern portion. The net is a combination of nylon monofilament dia. 0.50 mm to 0.70 mm or 210x/2-9 and polyethylene 380d-400d/ 9-15 with mesh sizes of 20 mm to 80 mm distributed in the bunt, body and wing portions. The polyethylene nettings serve as selvage in many cases. It is operated by 3 to 5 fishermen.

At sunrise and before sundown, fishermen locate feeding schools at the surface and encircle them rapidly. Fishes caught are small scad, mackerel, herrings and frigate tuna.

Another type of banca for larger scale operation measures 10-15 m long by 1-2 m wide by 1 meter deep powered by 80 to 190 Hp diesel engines. The net is stacked in front of the engine or at the middle the banca. The net is also a combination of nylon multifilament and polyethylene netting with are hung length of 400-500 m long by 50 to 80 m deep. The boat is provided with an improvised winch coupled to the main engine. It is operated by 7-10 fishermen and its time of operation is similar to the smaller type net.

Aside from scouting fish schools, fishing operations can also involve light attraction and payaws. In light attraction, the boats are equipped with 4-8, 200-500 watts bulb and start lighting at sundown. Fish concentrations are detected through diving or fish bubbles being emitted at the surface. Before setting, the attracted fish school is transferred to a dim boat where the lighted area is reduced by providing a cone shaped cover over one remaining bulb. Setting is usually conducted at dawn. Payaws are anchored vertical single whole seasoned bamboo with coconut/ palm leaves underneath. These are anchored in waters from 50 to 200 m deep. Two to four light bulbs (500 watts each) are commonly used and operation takes place at dawn. Pressurized gas lamps (petromax) are also used. After fish aggregation, the net is set around the drifting payaw. Fish caught are mostly small scad, sardine, and mackerel.

1.2 Commercial Ring Net

The net is operated by 15 to 50 GT boats. It measures 500 to 800 m long by 100 to 150 m deep. Common nettings are 210d/15-24 for the bunt and 210d/6-12 for the wings and body. Mesh sizes vary from species to species and range from 17-30 mm. The netting for the selvage is 210/26-36 with mesh sizes of 50-80 mm. Floats measuring 9 cm x 12 cm x 500 gram each. The lead sinker is No. 6, 110 g/pc and measures 25 mm by 35 mm. Rings are made of stainless steel of 10 mm thickness and 75 mm diameter.

The typical ring net boat is wooden and powered by a 80-220 Hp diesel engine. An auxiliary engine is installed on the maindeck to drive an improvised winch during pursing operation and heaving the 150-250 kg tom weight. It has no radar or fish finder. It has only a small compass for navigation and an ordinary radio-cassette for weather forecasts. The catcher boat is assisted by an outrigger pumpboat or light boat, powered by 16 Hp gasoline engine or 80 Hp diesel engine. The light boat is assigned to select the payaw with the most fish aggregation

which will be lighted and tended for the operation. The catcher boat is manned by 20-30 fishermen while the light boat has 2-3 fishermen.

The pilot house is located at mid-deck. In some areas, it is located in the forward or bow section. The working deck is for hauling the net and purse rope, the fish hold and the improvised winch differ for various deck arrangements.

Fishing operations utilize mostly payaws that are lighted at night. At a determined time (0400-0500 hrs.), the fisherman from the light boat signal the catcher boat to prepare for the setting. The payaw attractant is detached and tied to the light boat. After determining the wind and current, and the light boat is freed from the payaw anchor line, the net is set by surrounding the light boat. The purse line is taken on board and hauled using the improvised winch. A 250 kg tom weight is released with the two rings passing the purse line to make the lower portion come close together. Pursing will draw all the purse rings above the water and hang them at the davit block. A complete normal pursing operation takes about 25-30 minutes. Both wings are then hauled simultaneously until the bunt is clear of the water. The catch is brought and poured on deck for sorting, or direct to the fish hold for chilling. The net is then stacked on the net platform ready for the next operation.

1.3 Scad/Mackerel/Sardine Purse Seine

The sardine and mackerel purse seine net is similar in structure and materials used. For sardines and scad, the net measures 540-720 m long and 108-144 m deep. The mackerel purse seine is 720-900 m long and 126-144 m deep. A deeper net is necessary as mackerel are observed to stay in the deeper layers and are more mobile than sardines and scad. The netting used is knotless nylon with sizes from 210d/9-21 in the body and wing portions and 210d/24-36 at the bunt section. Mesh sizes range from 20 to 33.8 mm at the bunt and 30 mm to 60.9 mm at the body and wing. The selvage uses 210/30 to 210/120, 38.1 and 152.4 mm mesh sizes.

The vessels range from 30 to 150 GT, and normally measure 25 m long, 7 m wide and 3 m deep. They are powered by 300 to 1,200 Hp diesel engines. Electronic navigational and fishing equipment such as radar, GPS, fish finder, SATNAV, sonar, winch and power block are commonly used. In the purse seine fleet, each purse seiner is normally complemented with 3-5 light boats, 1-2 sonar boats and 2-3 fish carriers. In some areas, wooden purse seiners are provided with a "ferris wheel", an improvised mechanically operated net hauler.

Both net types utilize lights for attraction and sonar for finding fish schools. The lights are of two types; the incandescent 1,000 watts per bulb with 10-12 bulbs per boat and the halogen bulbs with 1,000-5,000 watts/bulb with six to ten bulbs per boat. Lighting operations commences at dusk, and the presence of a fish school is determined by fish finder or sonar. With sufficient fish concentration, the light boat calls the catcher boat, and simultaneously reduces its light to one bulb which is provided with a conical shade to keep the fish school roaming in a smaller radius. The light boat then weight anchor and the catcher boat encircles it.

Using the sonar which can detect and locate fish schools in a 360° circle around the boat, fish and their abundance are determined. The catcher boat is called for the net setting with close contact and instructions from the sonar boat on both the fish school's direction, depth and speed.

The net is set around the fish school. In some cases, the sonar boat installs a light on board if the fish school is stationary. The sonar boat is then encircled by the catcher boat until the bottom part of the net is totally closed. The sonar boat moves outside the net and continues searching for other fish schools. The catcher boat hauls the net until the catch is brought on deck for sorting and finally storing in the fish hold. In other hauling operations, the catch is directly guided to a big plastic container and stacked in the refrigerated fish hold.

1.4 Tuna Purse Seine

Two types of tuna purse seine nets are used: the hybrid net which catches small pelagics and tuna in coastal and offshore waters, and the super seine net which is used in offshore and international waters where the major catches are skipjack, yellowfin and big-eyed tuna. The first type is operated on board vessels from 200 to 300 GT. The net measures 720-1080 m long and 144-250 m deep. The inshore tuna net uses 210d/30-48 in the body and wings and 210d/60-72 at the bunt portion. Mesh sizes range from 50.8-76.2 mm in the bunt section and 88.9-203.2 mm in the body and wing portions.

The second type is used in boats of 400 and above GT with refrigerated brine solution as standard for preserving the catch. The net measures 1,080-2,160 m long and 216-324 m deep. The offshore tuna net uses 210/60-168 in the bunt while 210/36-60 in the body and wings. Mesh sizes vary from 88.9-127 mm in the bunt and 76.2-254 mm in body and wing.

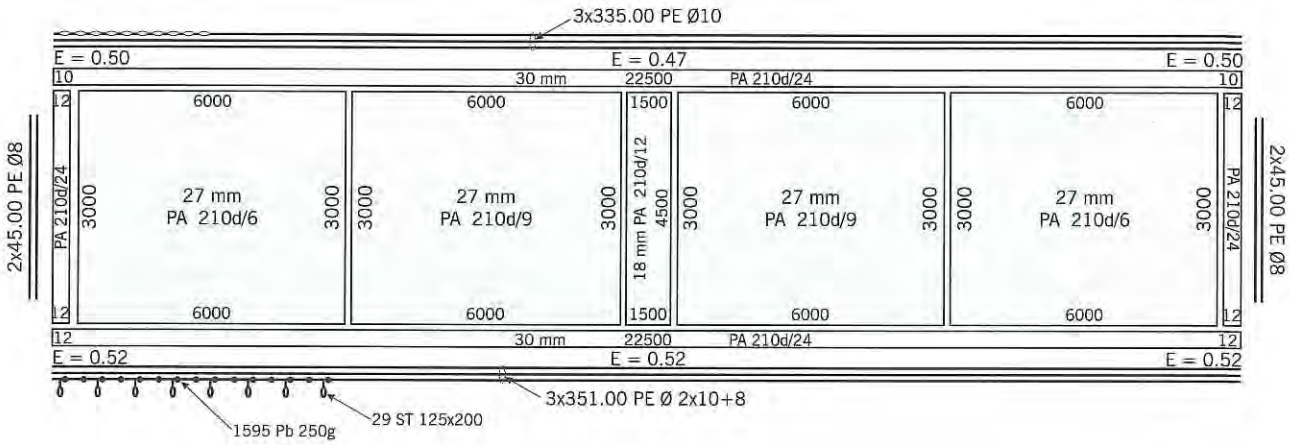
Night time fishing is largely done using anchored rafts or payaws to concentrate the fish. The floating section of the payaw is made of bamboo, steel pontoons or galvanized drums. One purse seiner may work with several payaws but fish one or two in one night using strong mercury lamps or superlights. Another technique being used to maximize fish concentration in one payaw is to pull five to ten payaw attractants or habong during the day into one central or terminal payaw. The concentration of fish increases in the central or terminal payaw due to fish accumulation from other attractants. It is then lighted at night and encircled by the catcher boat at dawn. It was estimated that such a technique increases catch by 20% to 30%. Payaws are lighted at dusk by the dim boat which has two-four 1,000 watt/bulbs. With a sufficient tuna school, the attractant is removed from the floating section, tied to the dim boat and allowed to drift away. The catcher boat then encircles the dim boat and completes operations until the catch is poured into the fish hold with brine solution. The fish is chilled and frozen to a temperature range of -15° to –30°C.

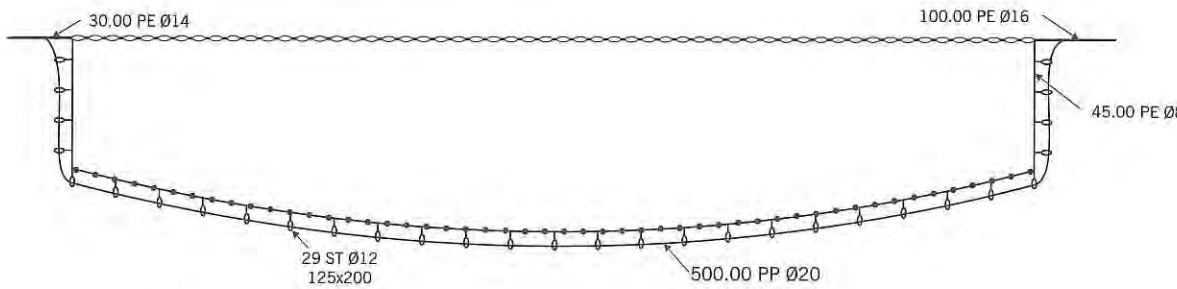
SURROUNDING NET
Purse Seine (Ring Net)
Puna or Lambat
Sardine, Mackerel, Scad

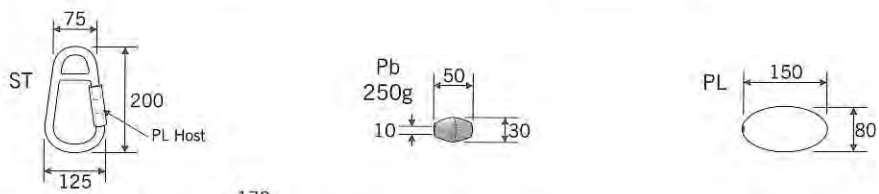
VESSEL
Loa : 12 m
GT : 30
Hp : 225

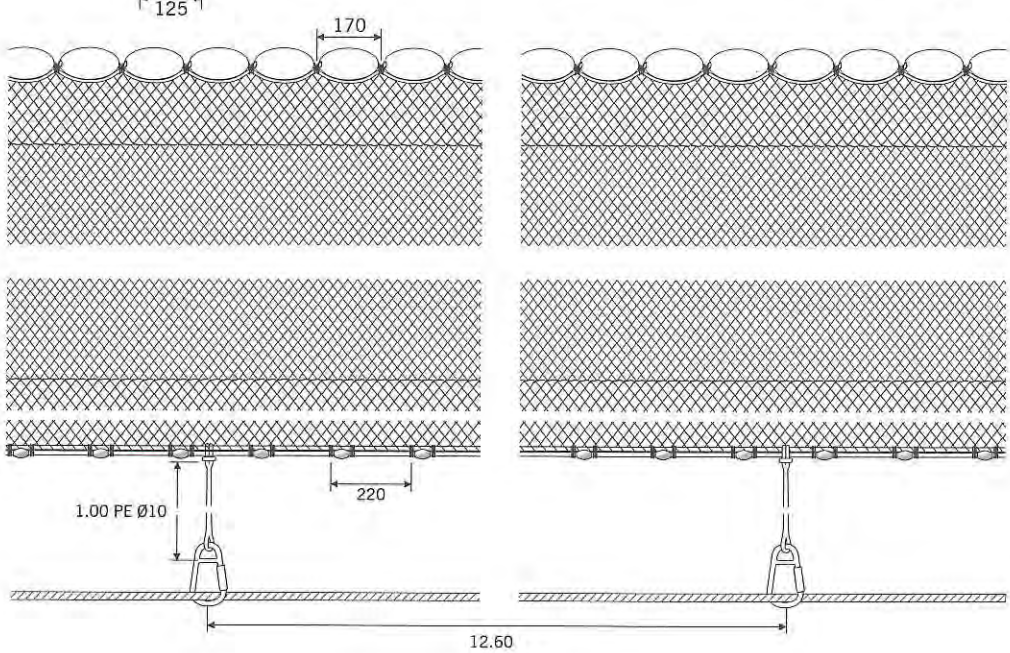
LOCATION
Magaba, Pandan

Antique





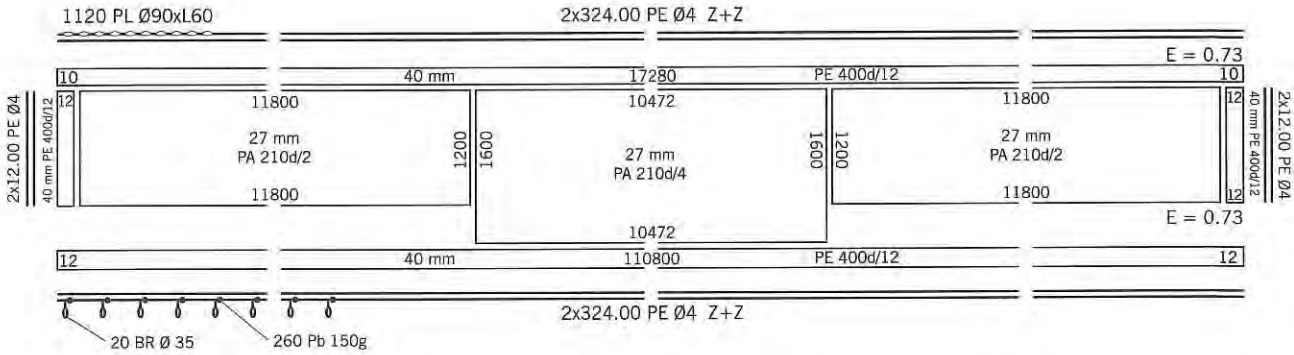


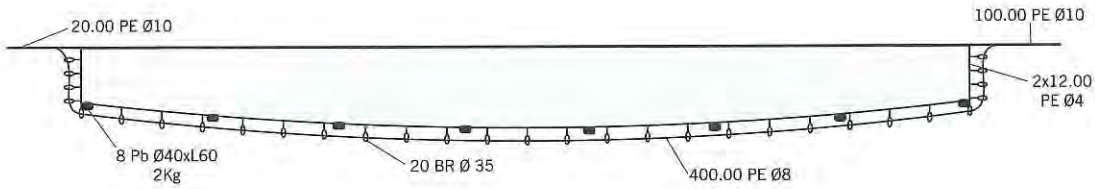


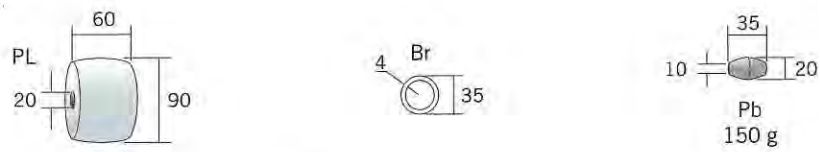
SURROUNDING NET
Baby Ring Net
Likom - Likom
Sardine, Mackerel, Anchovy
Slipmount

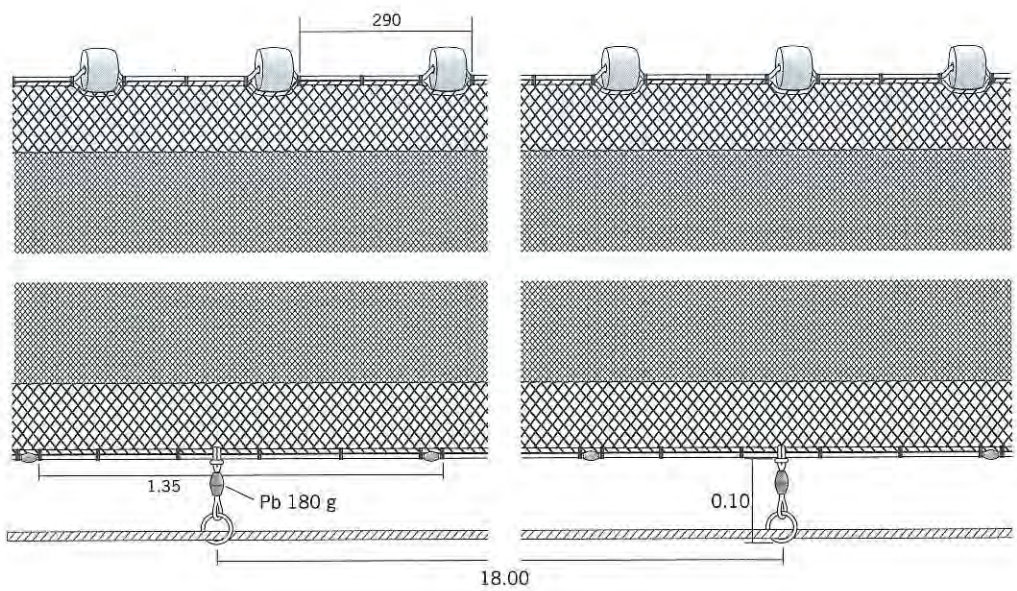
VESSEL
Loa : 6 m
GT : -
Hp : 16

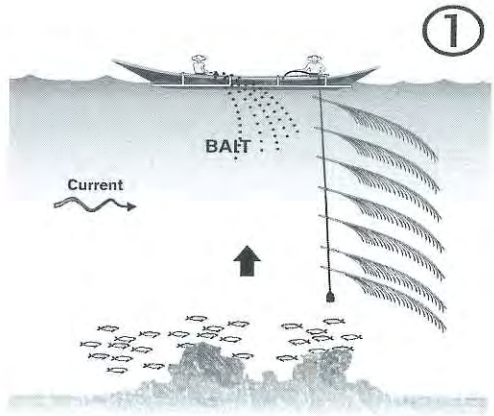
LOCATION
Antajon, Manga
Tagbilaran City
Bohol

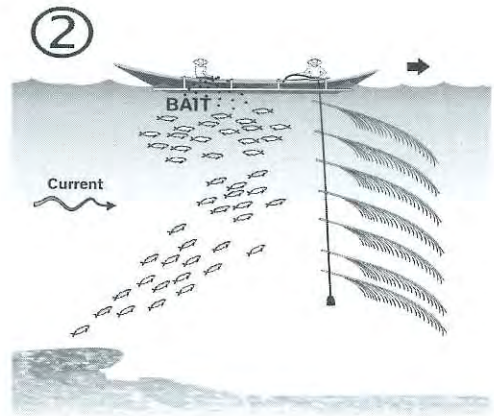


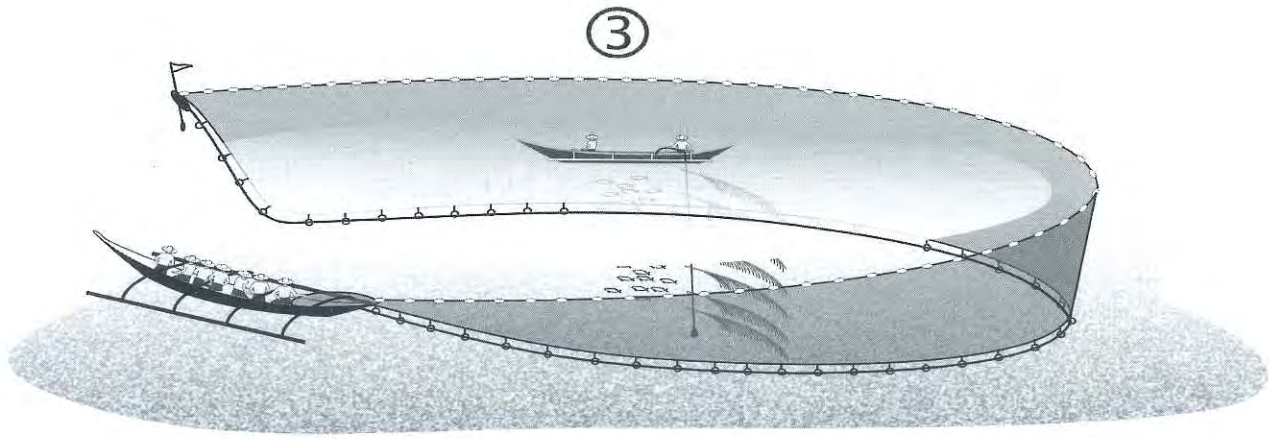


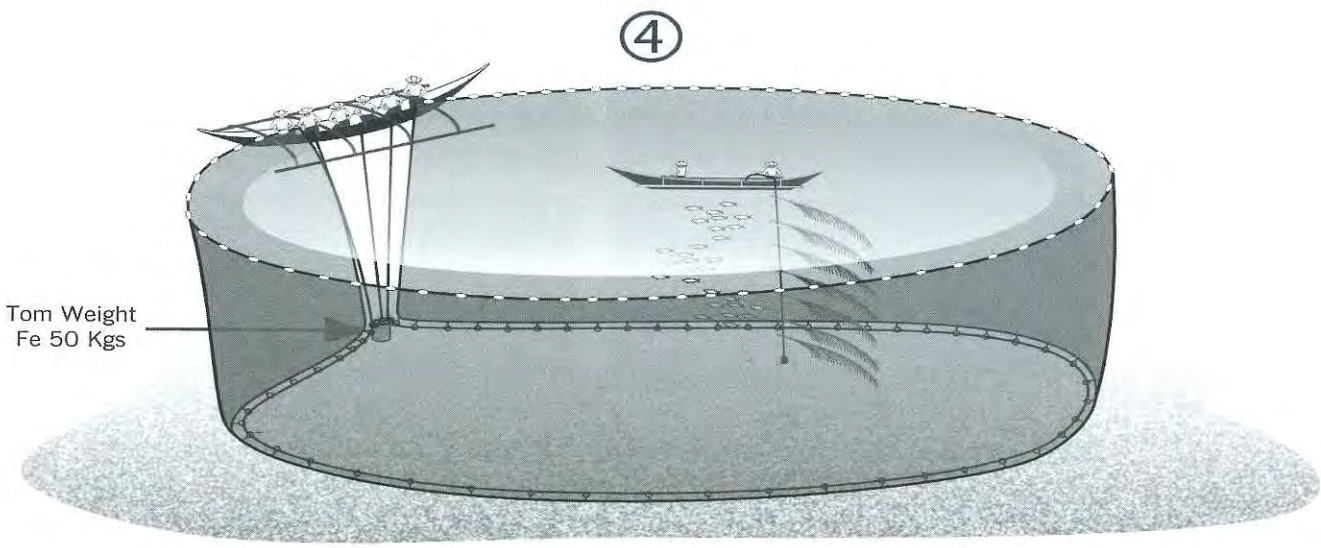





①
BAIT
Current


②
BAIT
Current


③

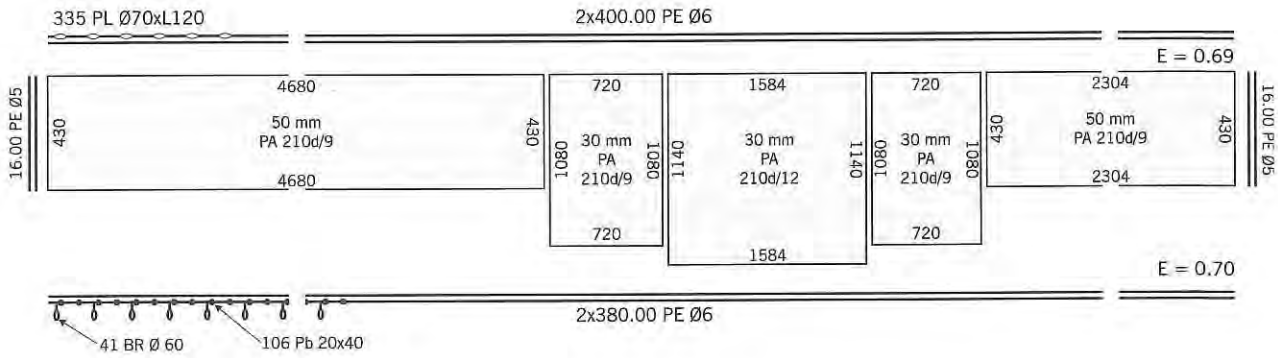

④
Tom Weight
Fe 50 Kgs

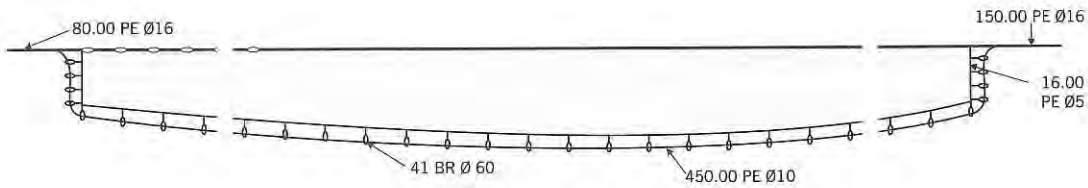
SURROUNDING NET
Baby Ring Net
Likom
Skipjack, Mackerel, Sardine

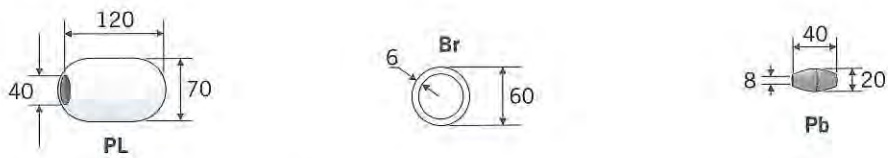
VESSEL
Loa : 8 m
GT : -
Hp : 16

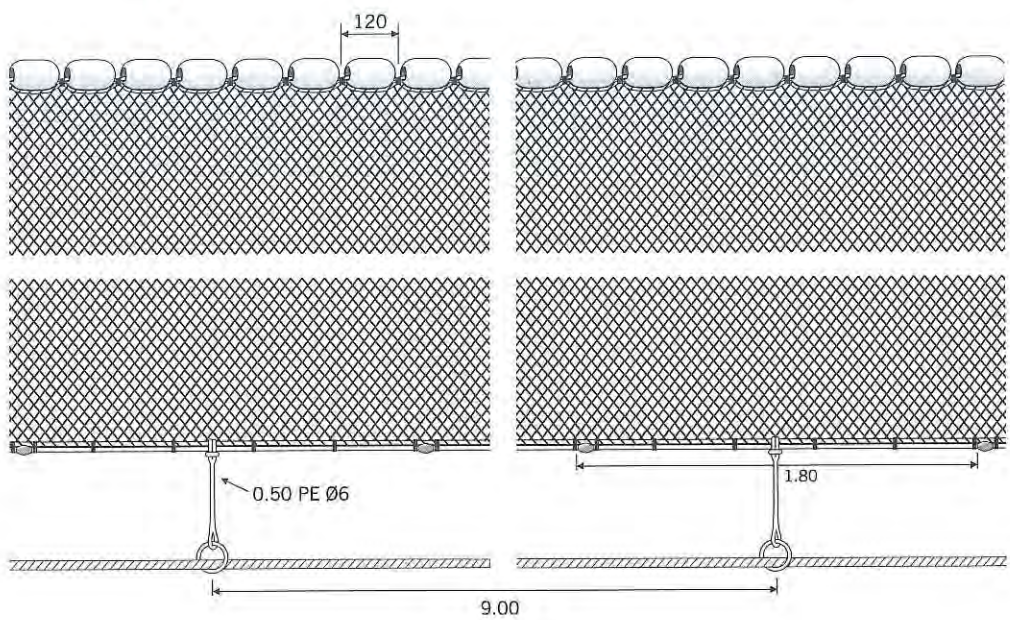
LOCATION
Badiang, Digos

Davao del Sur







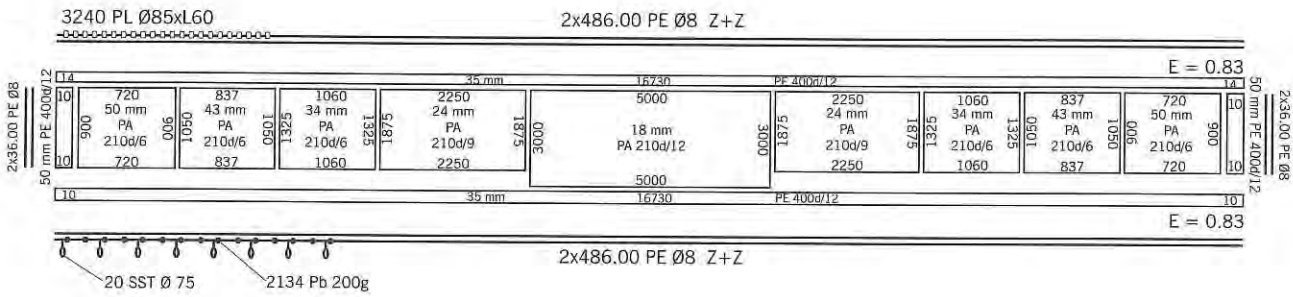


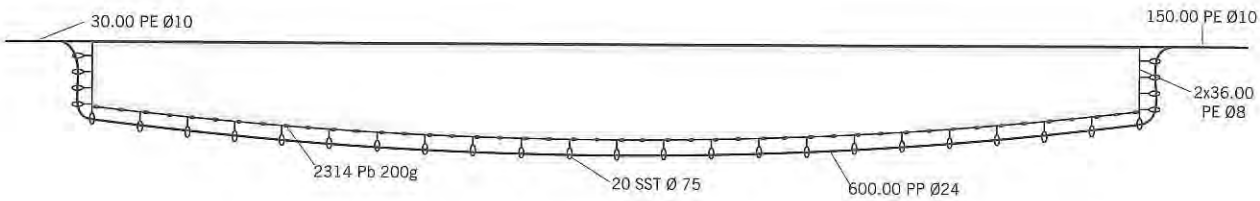
SURROUNDING NET
Baby Ring Net
Likom - Likom
Skipjack, Frigrate Mackerel,
Half Break Fiahes

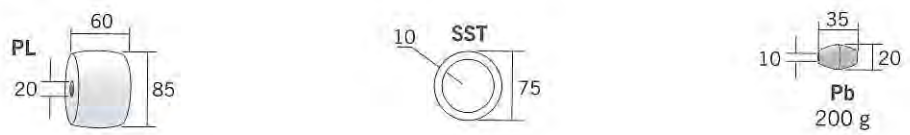
VESSEL
Loa : 10 m
GT : -
Hp : 80

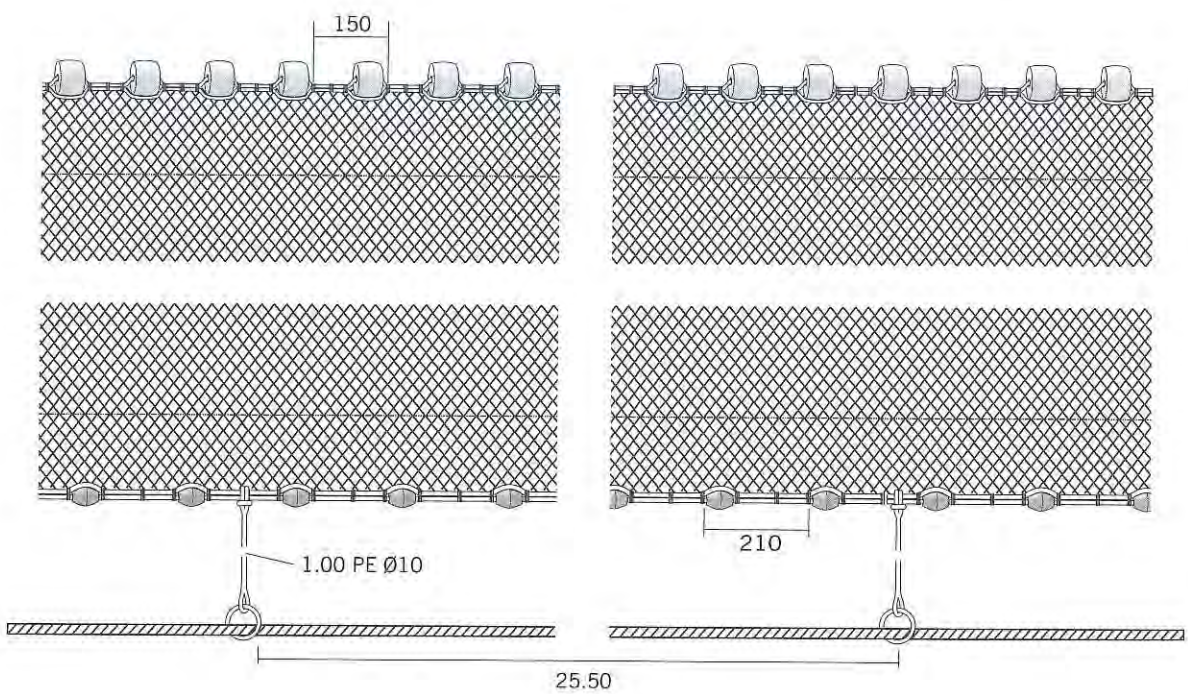
LOCATION
Mayacabac, Dauis

Bohol







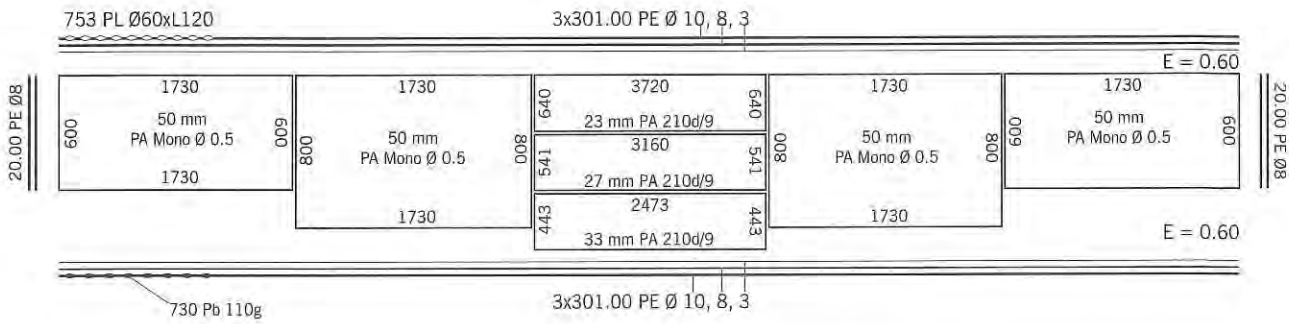


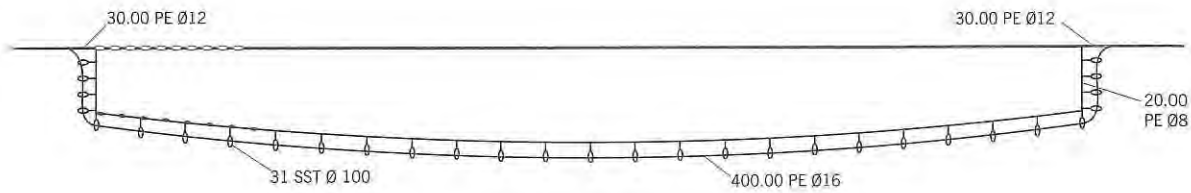
SURROUNDING NET
Purse Seine (Ring Net)
Kubkub,Pangnlony
Scad, Sardine, Mackerel

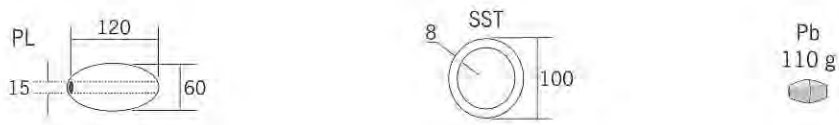
VESSEL
Loa : 13 m
GT : 2.6
Hp : 2x16

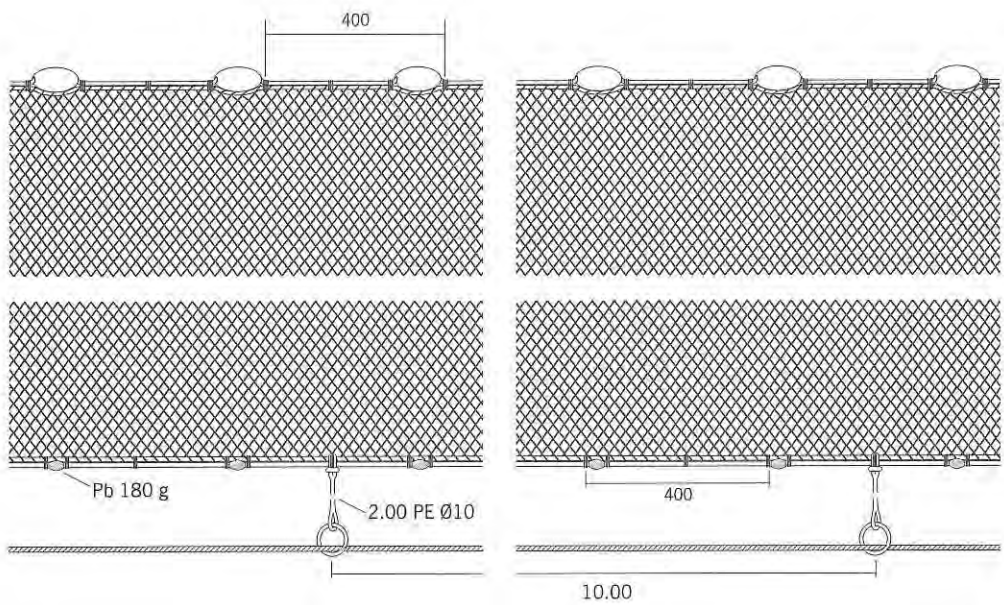
LOCATION
Davao City

Davao









SURROUNDING NET

Ring Net
(Basnig)
Fresh Water Herring,
Mullet, Tilapia

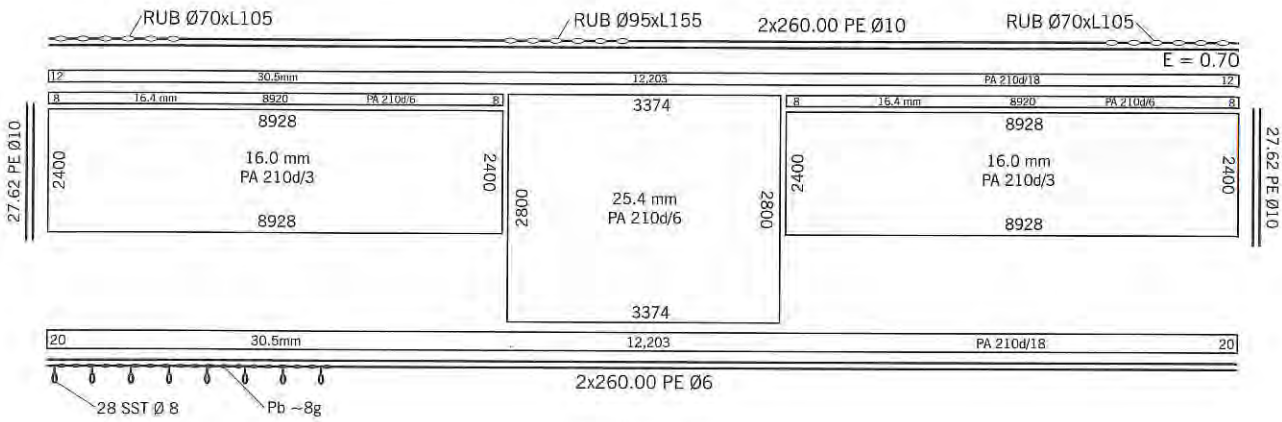
VESSEL

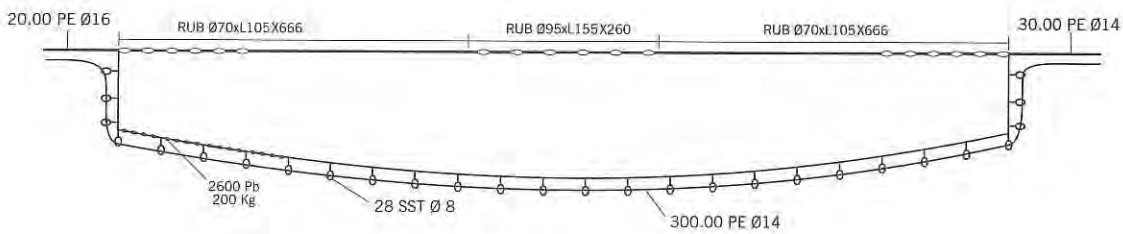
Loa : 12.00 m
GT : -
Hp : 120

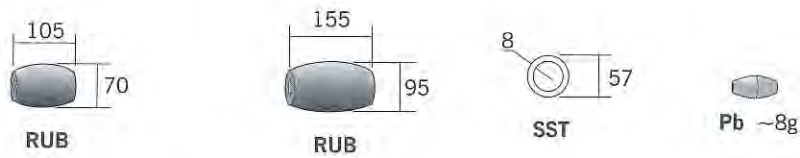
LOCATION

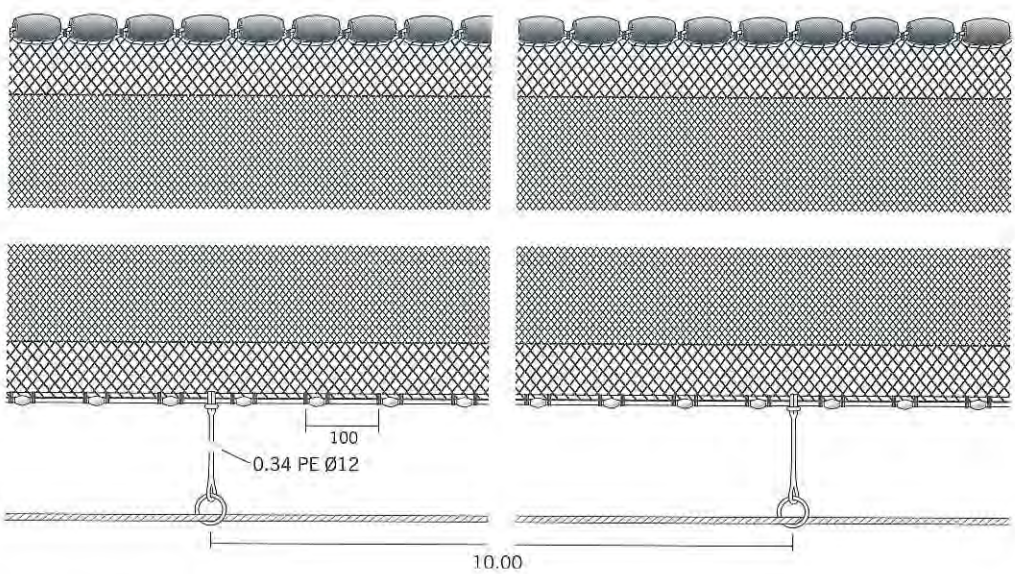
Talisay

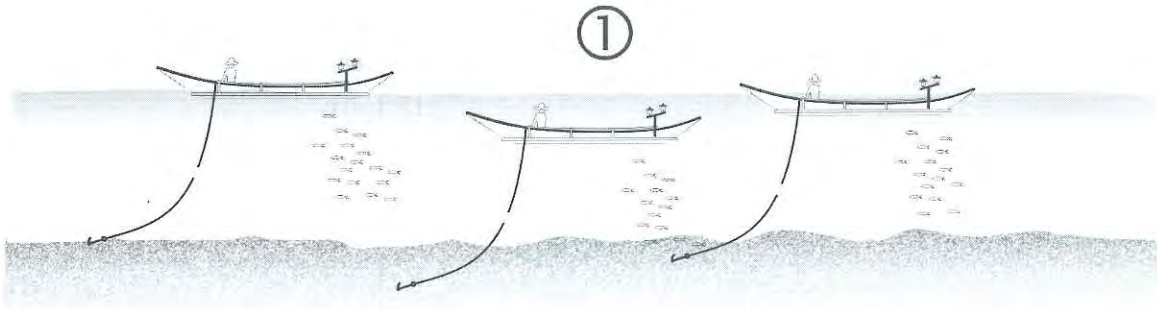
Batangas







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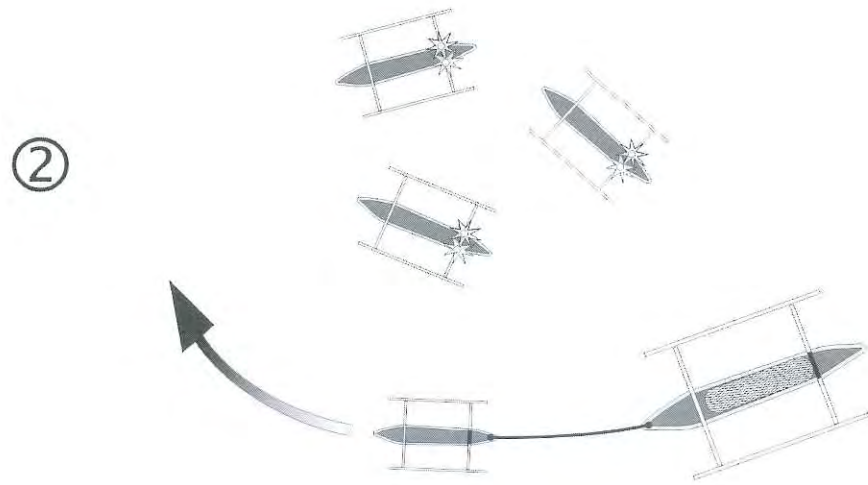
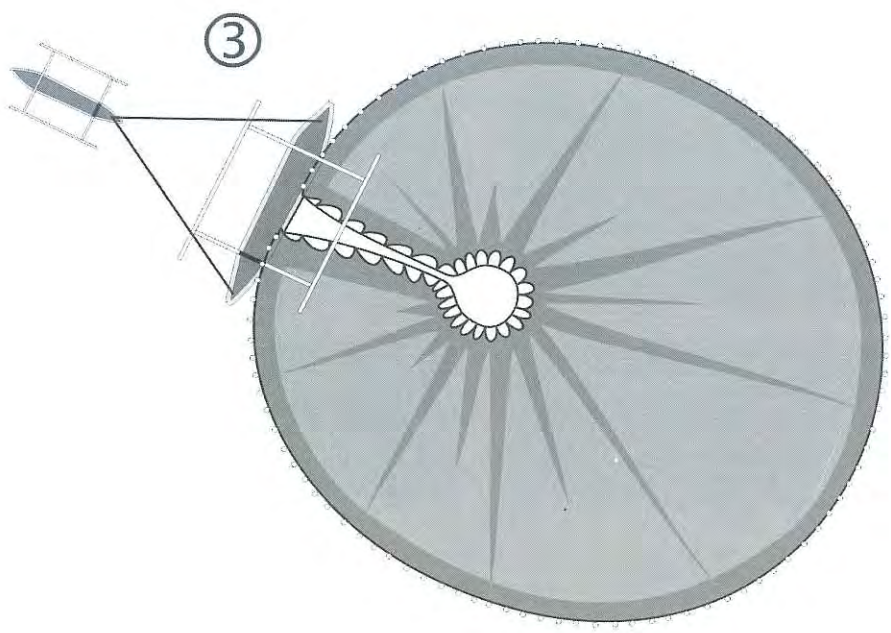

②

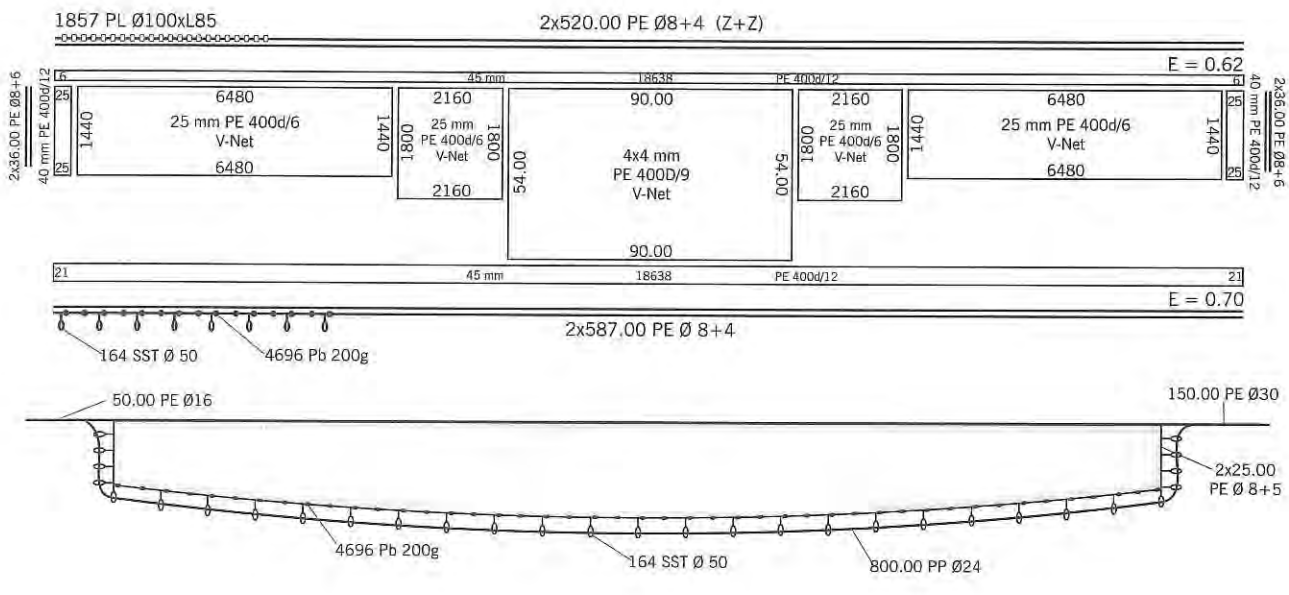

③

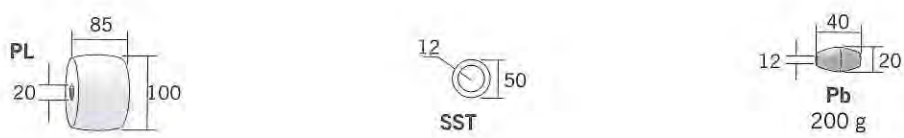
SURROUNDING NET
Baby Purse Seine (Ring Net)
Likom - Likom
Herring, Sardine,Mackerel, Anchovy

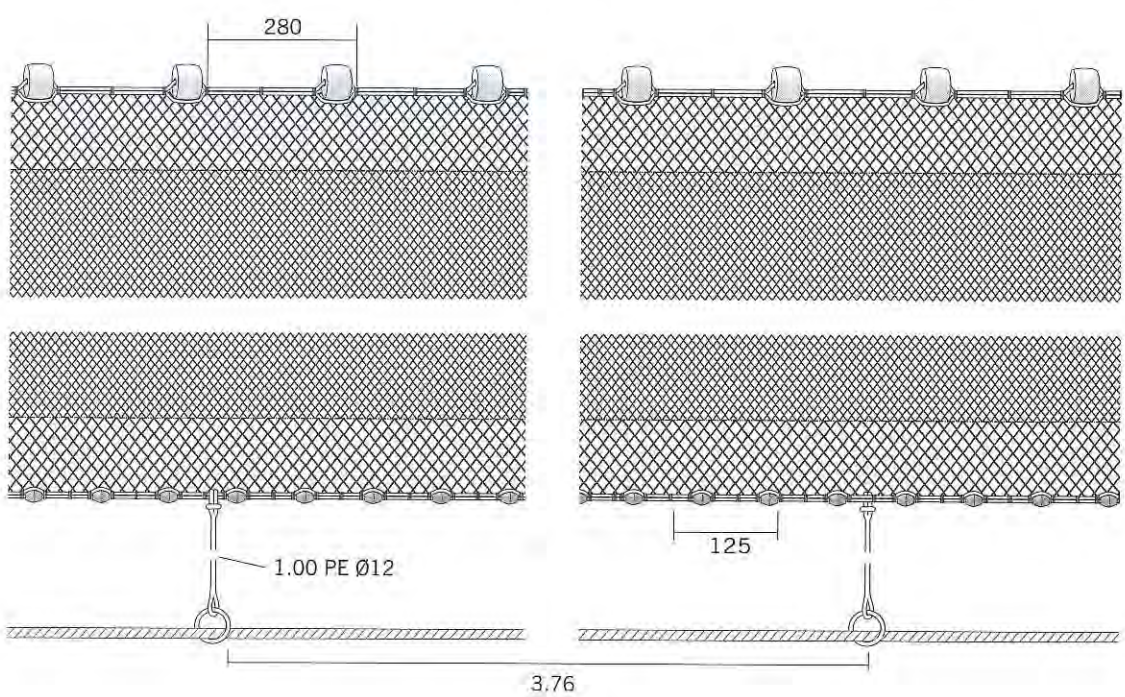
VESSEL
Loa : 16 m +8mx2
GT : 5
Hp : 90

LOCATION
Panacan, Narra

Palawan





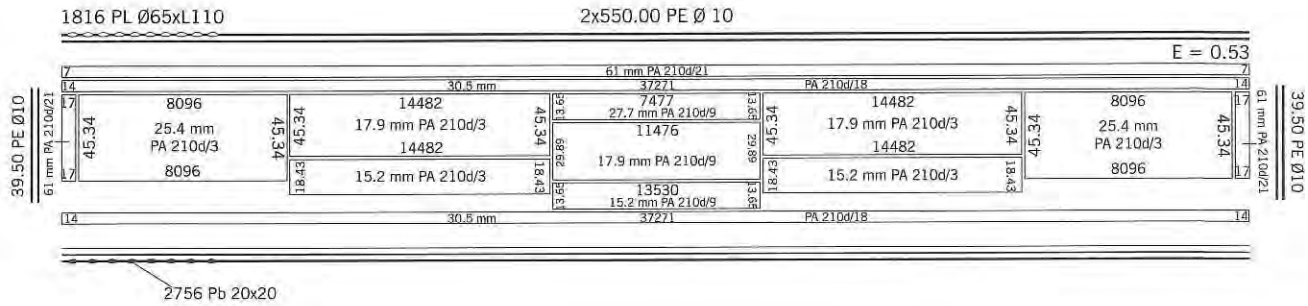


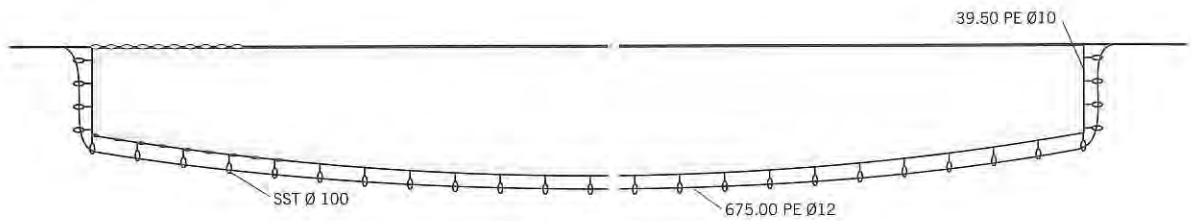
SURROUNDING NET
Purse Seine (Ring Net)
Likom, Kubkub
Tuna-Like Fishes, Herrings, Sardine, Anchovies

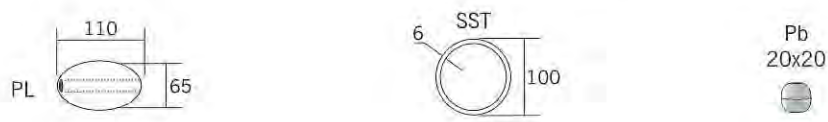
VESSEL
Loa : 18 m
GT : 10
Hp : 80

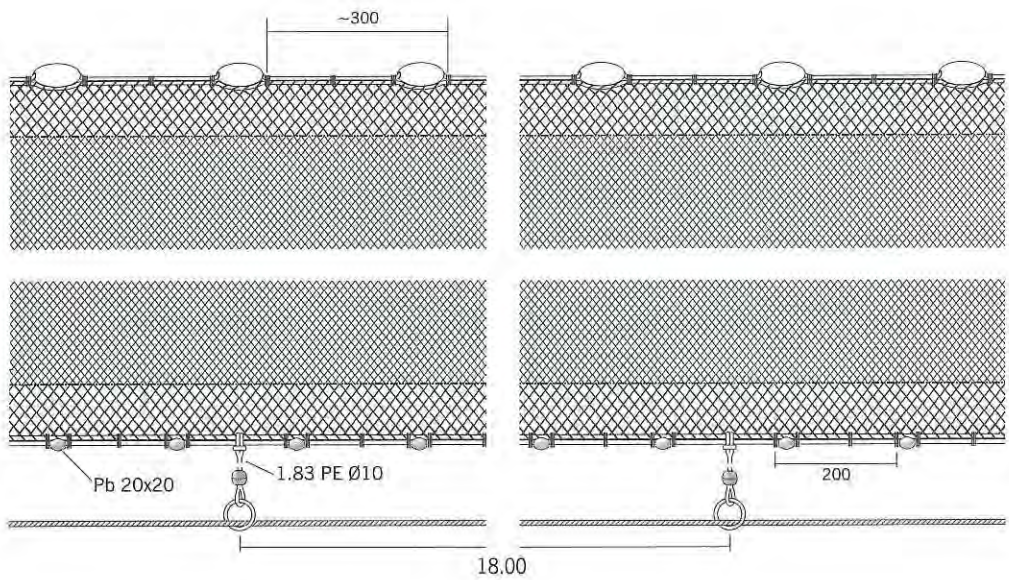
LOCATION
San Jose

Panay







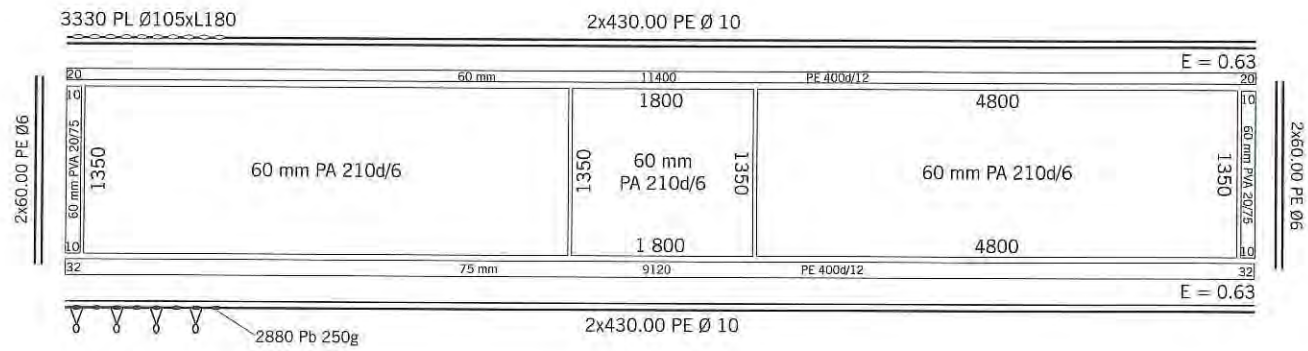


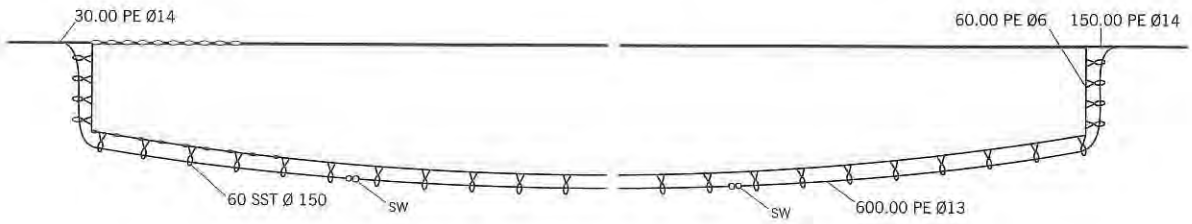
SURROUNDING NET
Ring Net (Modified-Encycling Gill Net)
Kub-kub
Indian Mackerel, Carangids, Skipjack

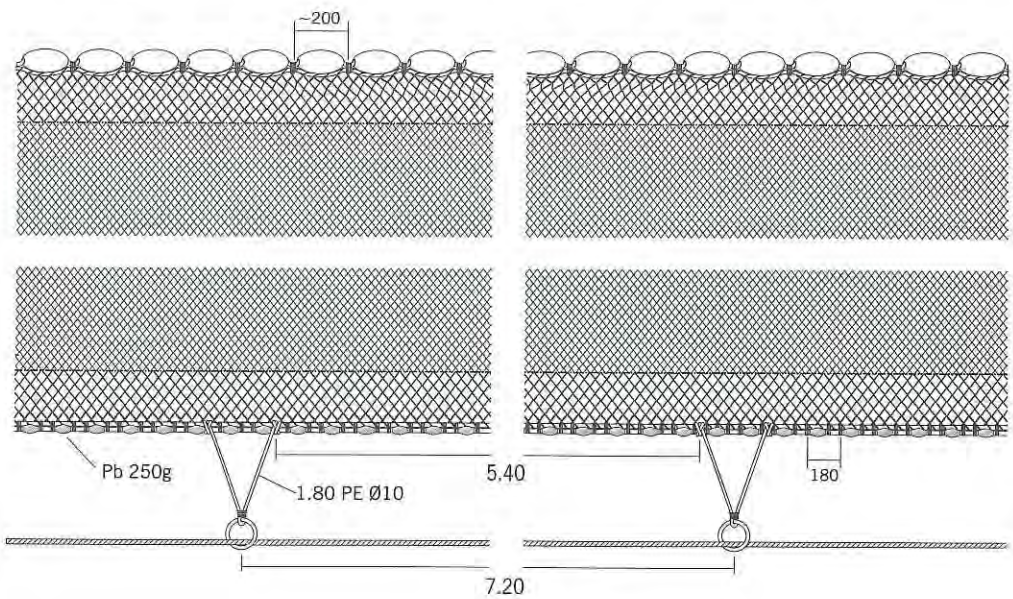
VESSEL
Loa : 25 m
GT : 30
Hp : 250

LOCATION
Suba-Bantayan

Cebu





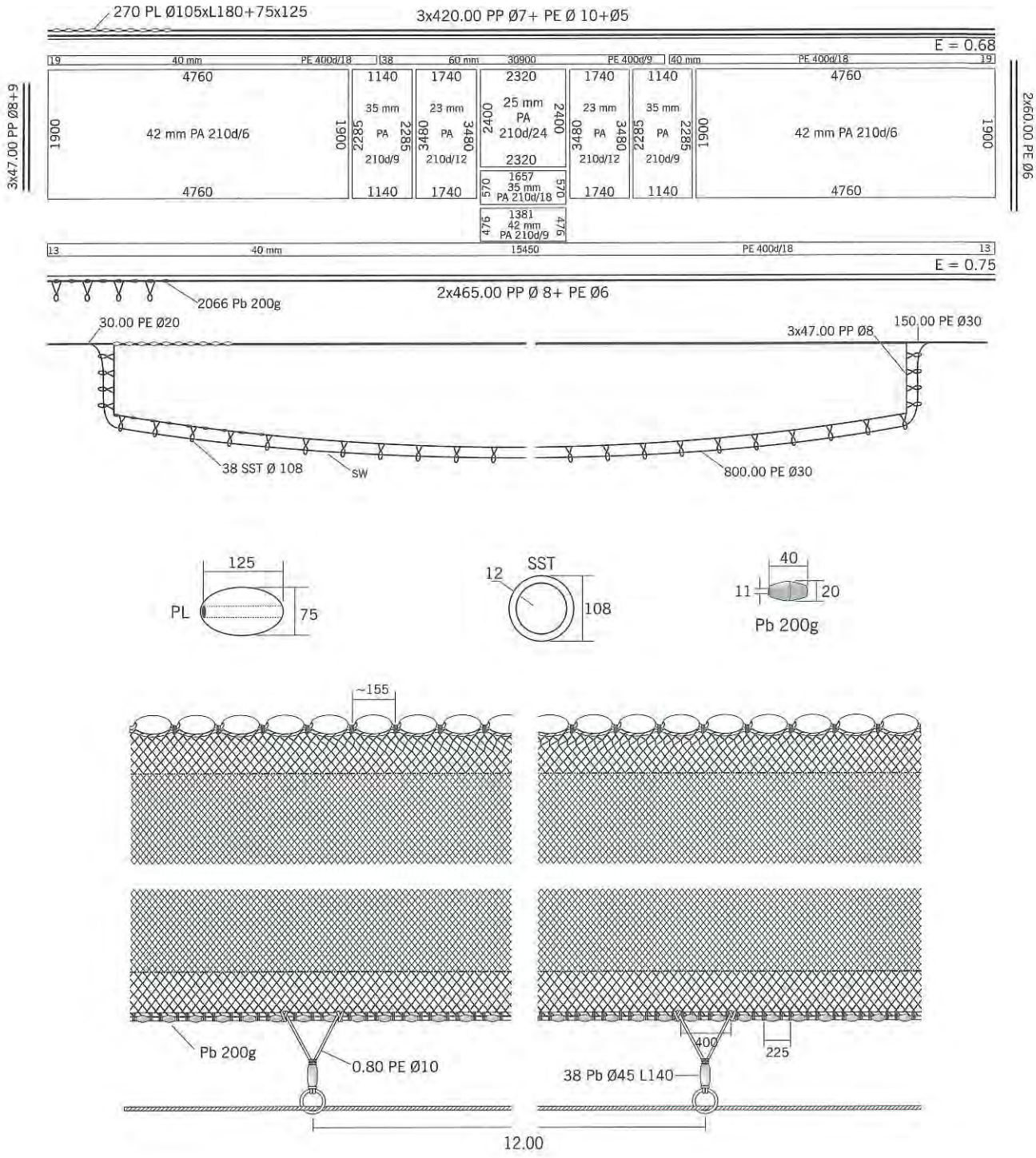


SURROUNDING NET
Baby Purse Seine (Ring Net)
Kubkub
Bonito, Mackere, Scad

VESSEL
Loa : 20 m
GT : 25
Hp : 90

LOCATION
Matalvis Port, Masinloc

Zambales



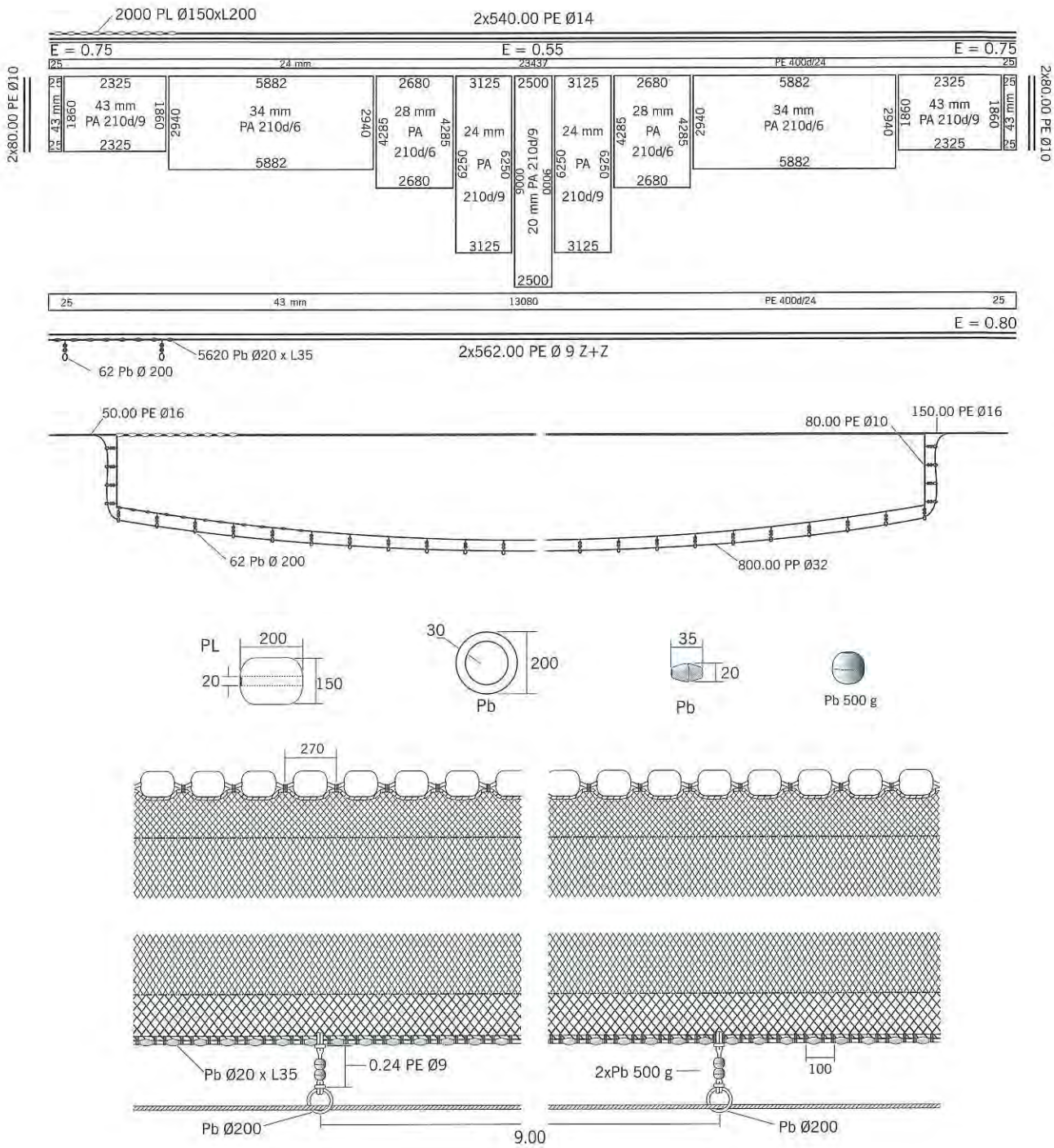

JUN JUN

SURROUNDING NET
Purse Seine (Ring Net)
Sinsoro or Kub-Kuban
Mackere,Bigeye Scad

VESSEL
Loa : 23+10 m
GT : 50
Hp : 180+6

LOCATION
Danao City

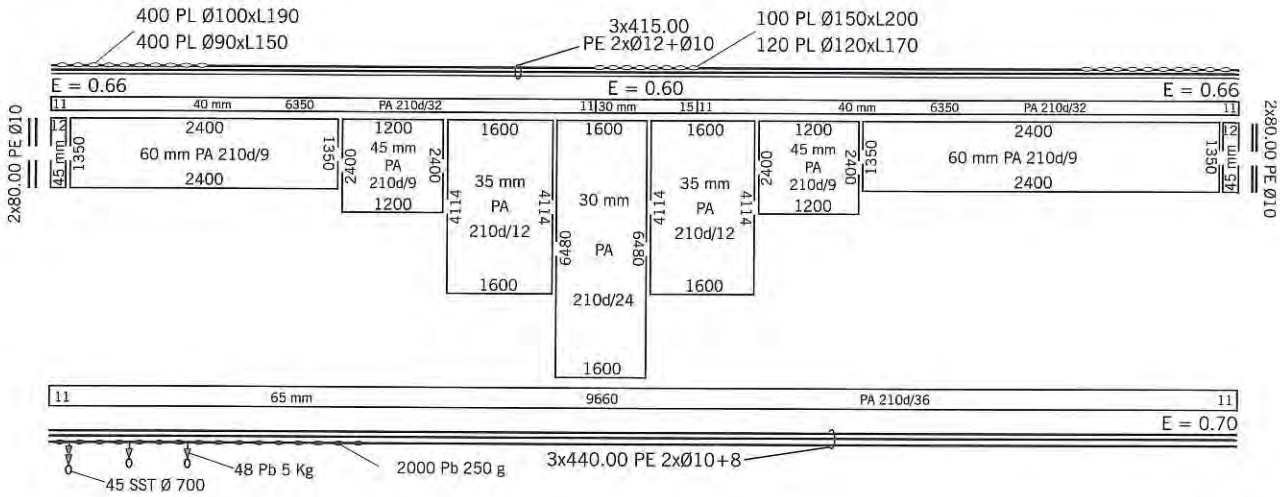
Cebu

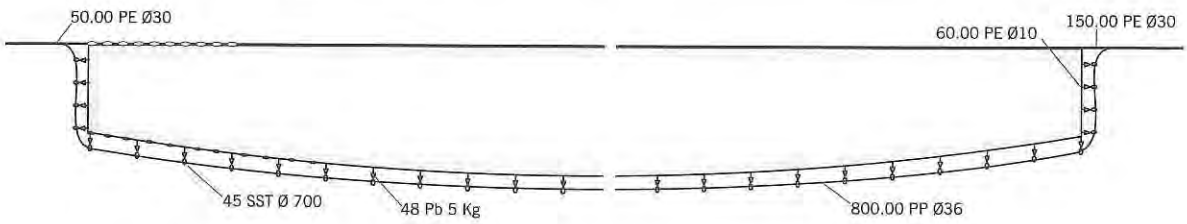


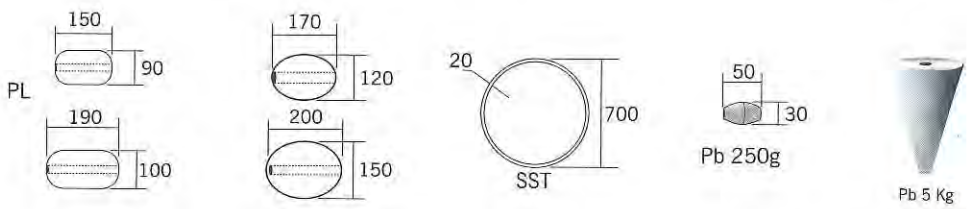
SURROUNDING NET
Purse Seine (Ring Net)
Pukot
Scad, Tuna, Mackerel, Sardine

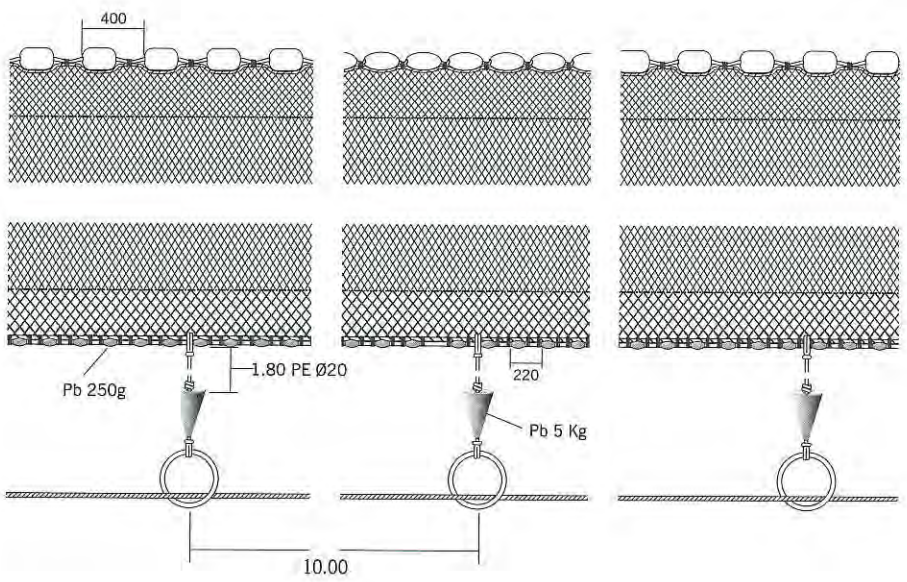
VESSEL
Loa : 24 m
GT : 70
Hp : 240

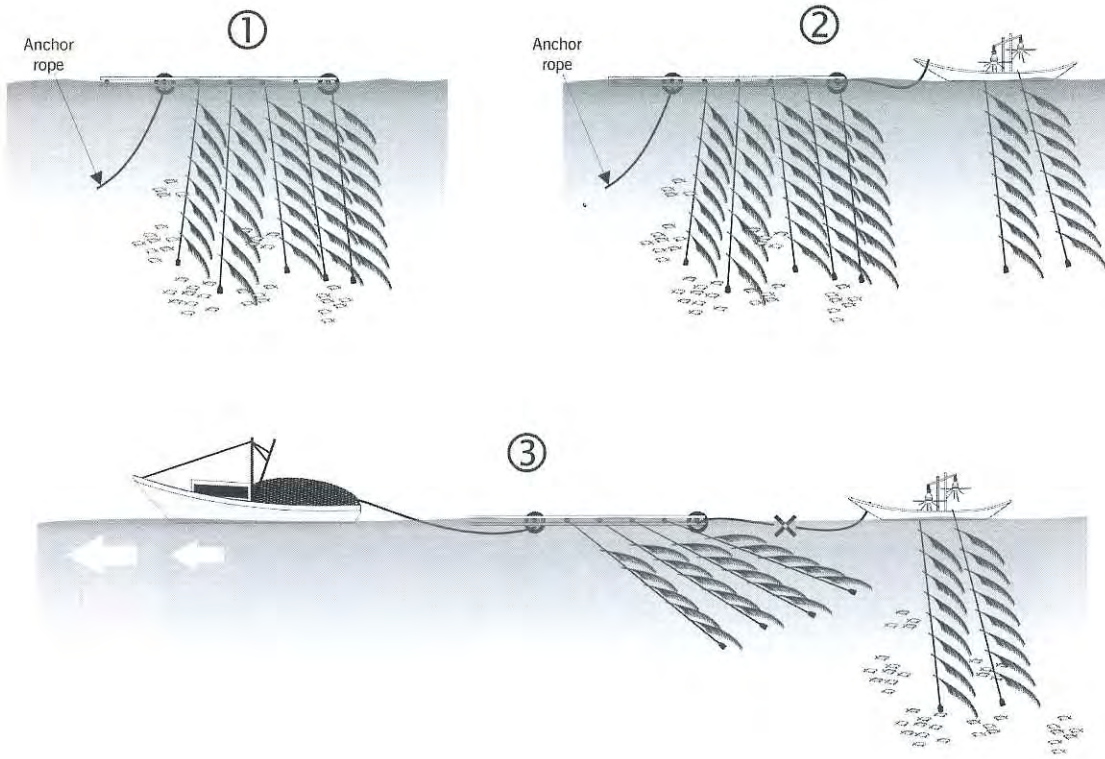
LOCATION
Calumpang
General Santos City
South Cotabato

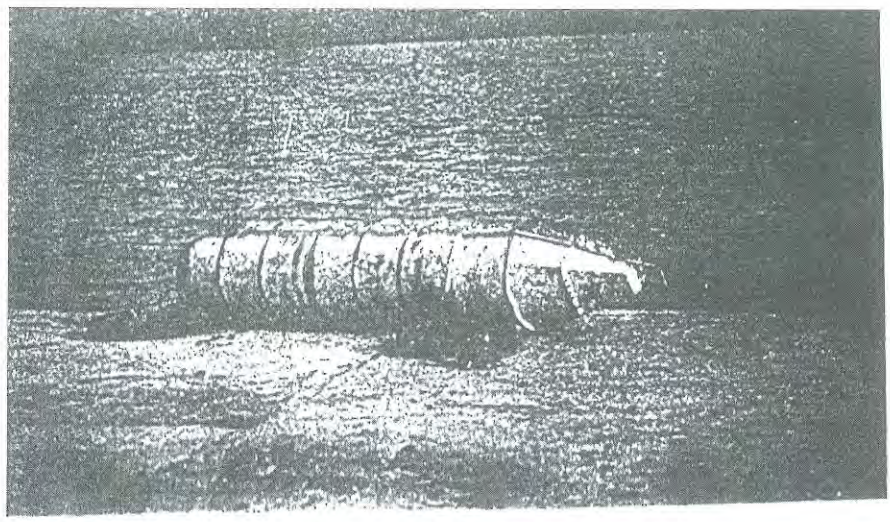


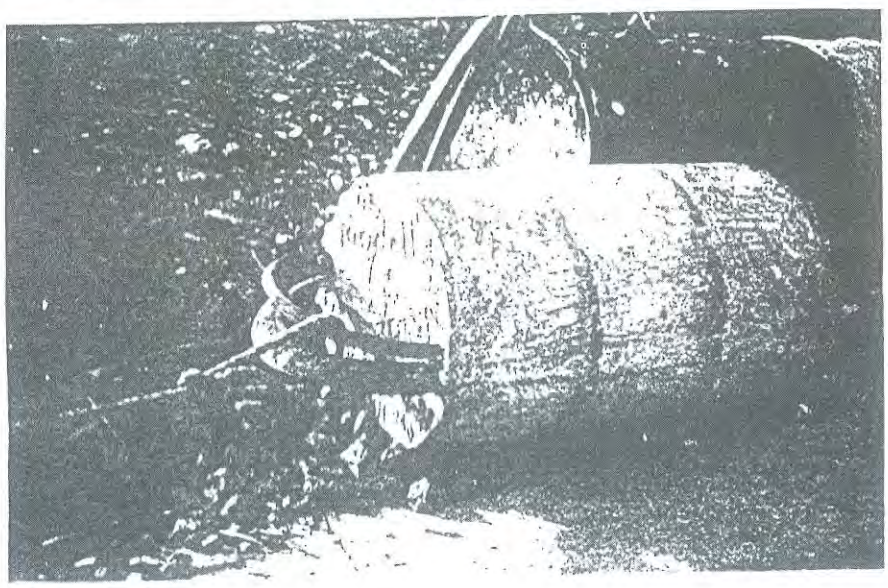


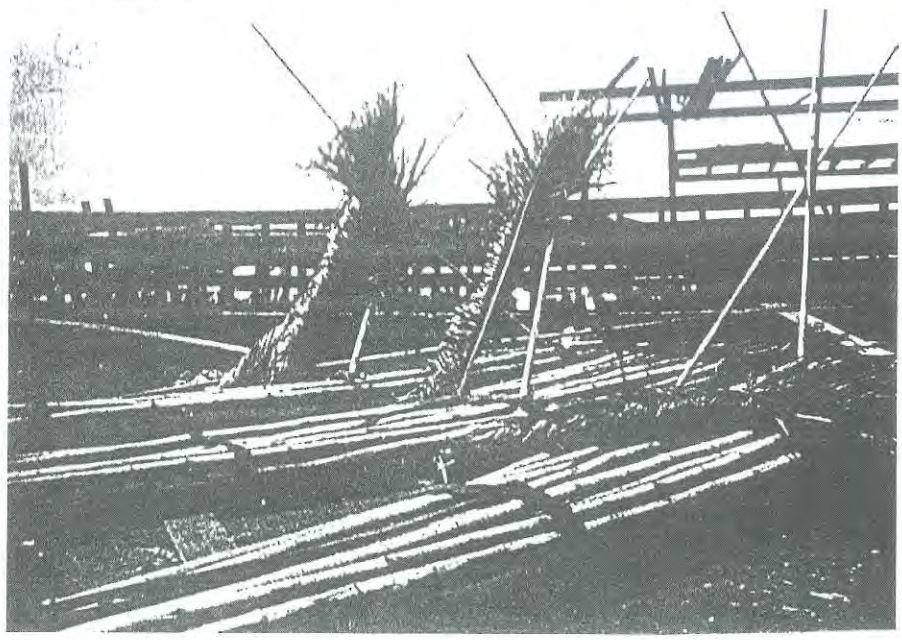





①
Anchor rope
②
Anchor rope
③
④
⑤
Tom weight 400 Kgs





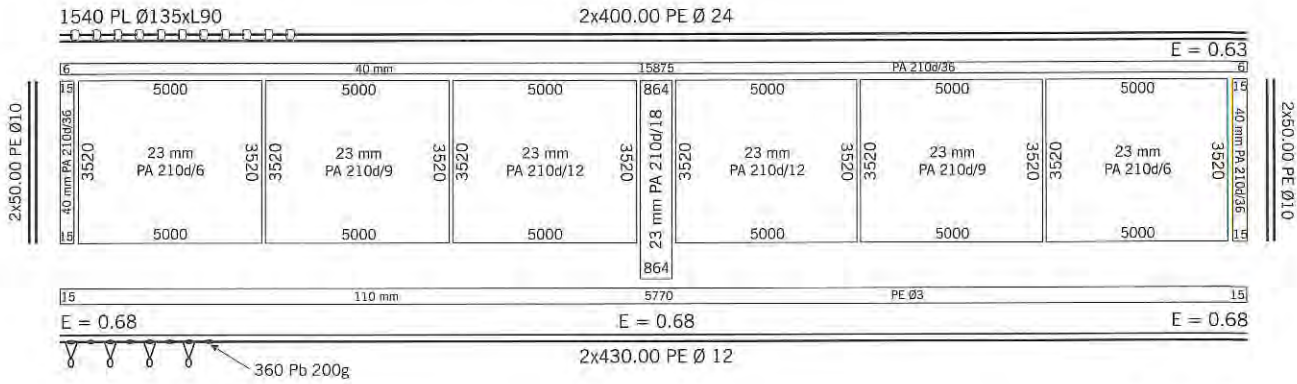


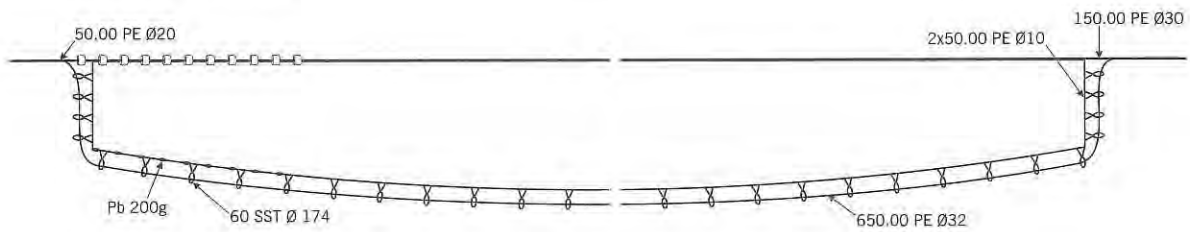
SURROUNDING NET
Baby Purse Seine (Ring Net)
Taksay
Mackerel, Sardine,Bonito

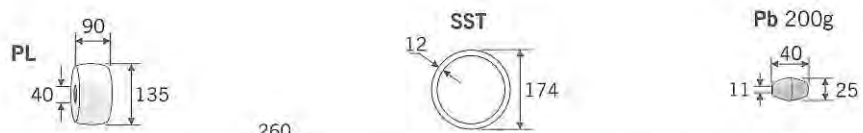
VESSEL
Loa : 24 m
GT : 40
Hp : 310

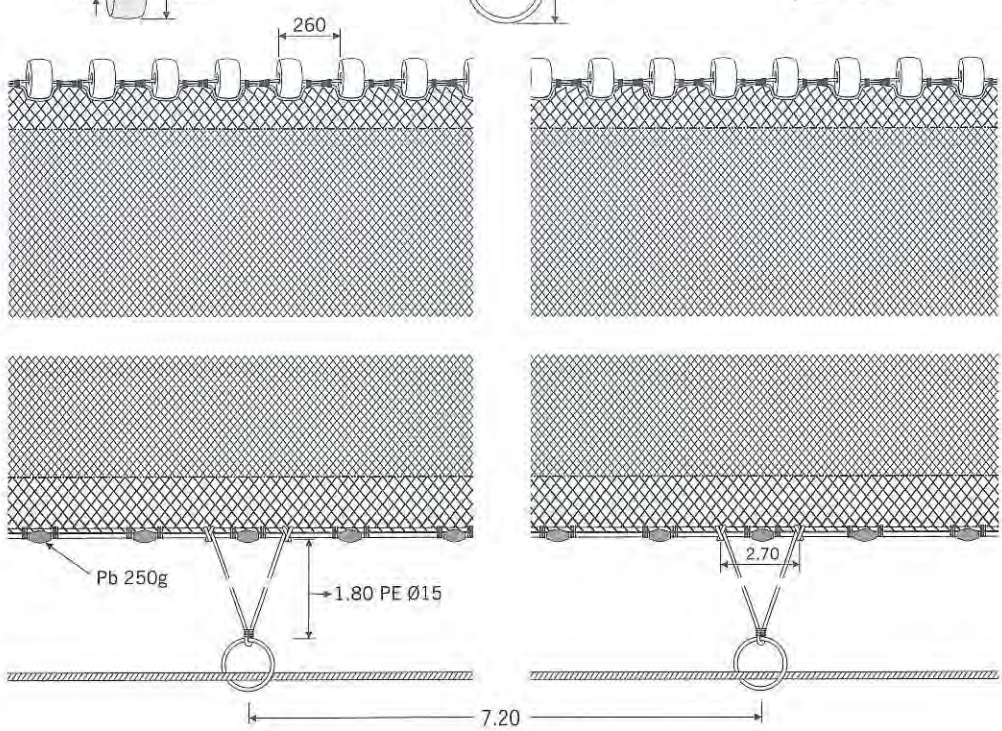
LOCATION
Samonte Park

Cavite City







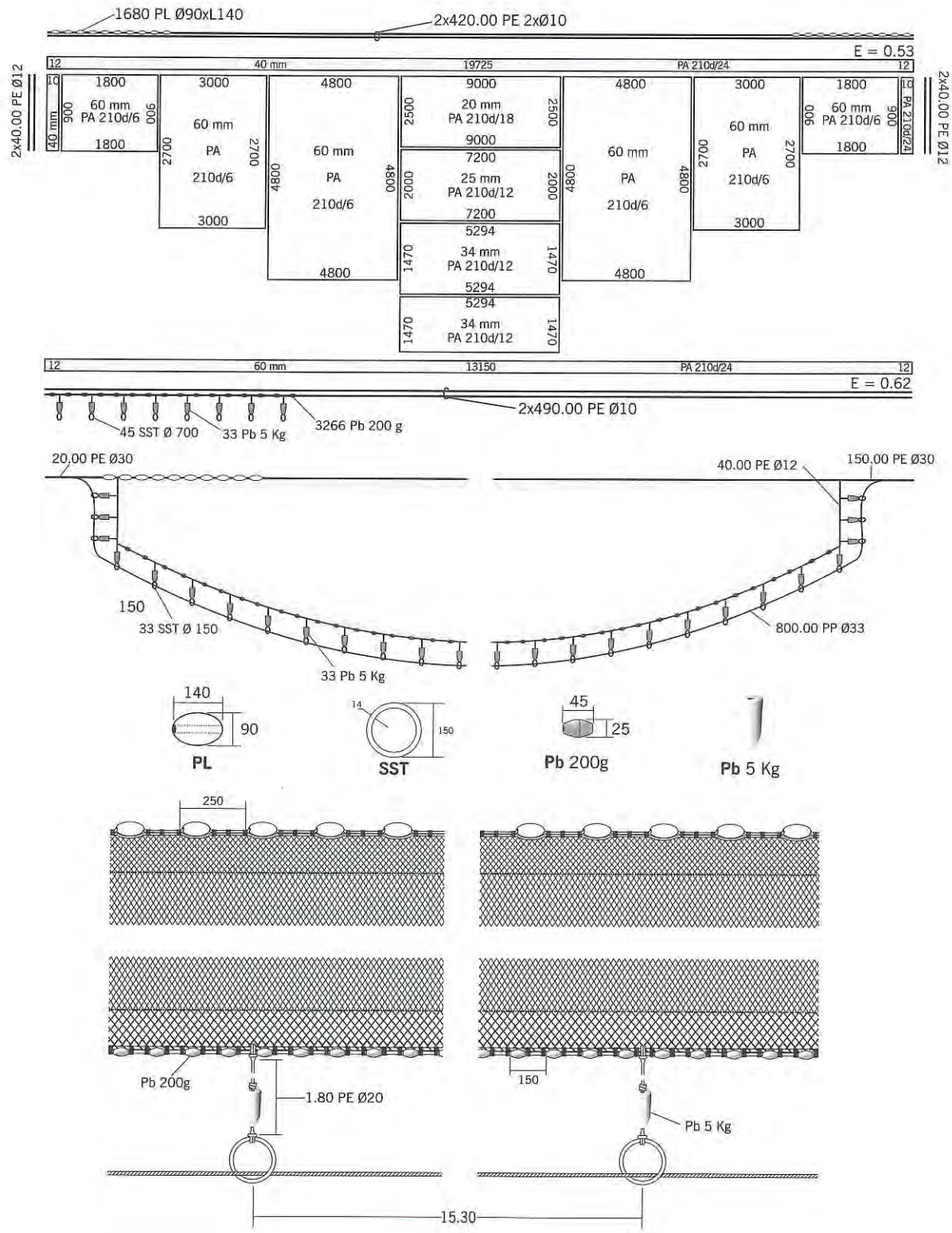


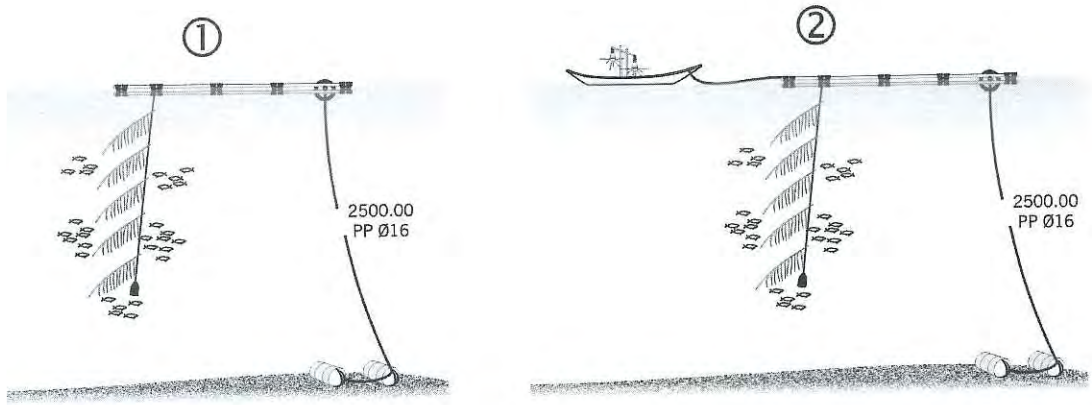
SURROUNDING NET
Purse Seine (Ring Net)
Likom-Likom
Scad, Mackerel, Frigrate Tuna

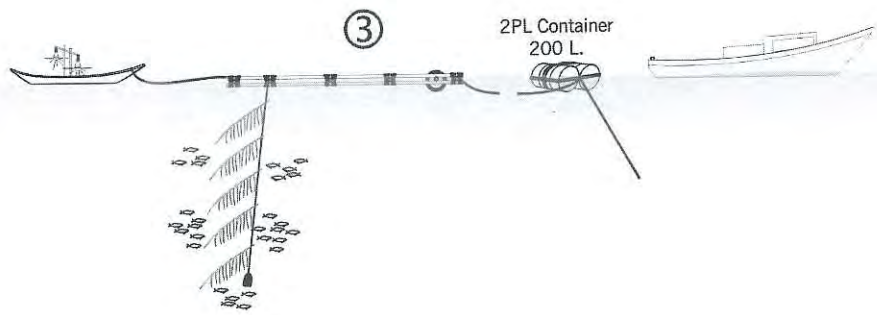
VESSEL
Loa : 24 m
GT : 30
Hp : 165

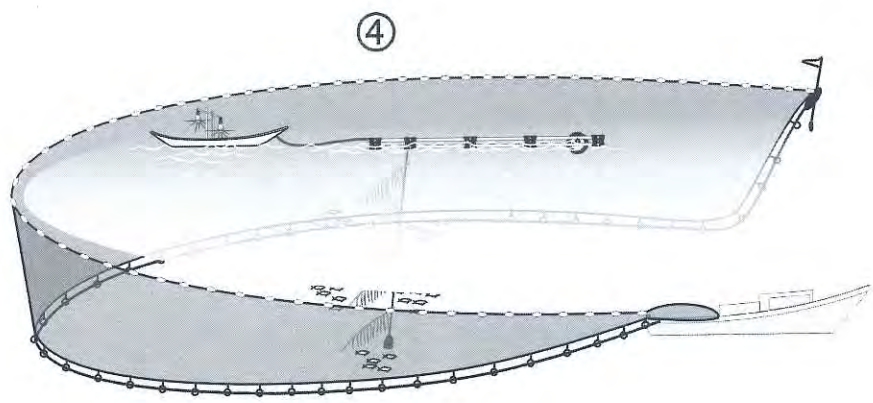
LOCATION
Daliao

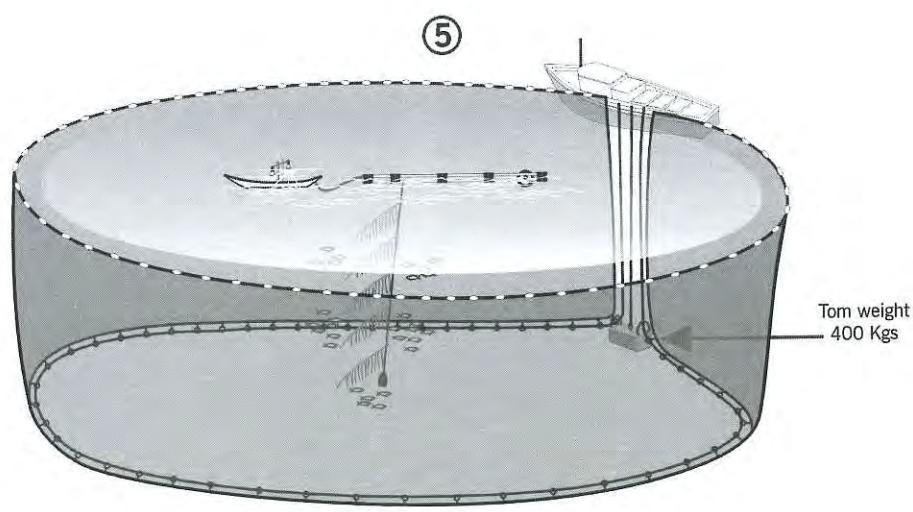
Davao City




①
2500.00
PP Ø16
②
2500.00
PP Ø16


③
2PL Container
200 L.


④

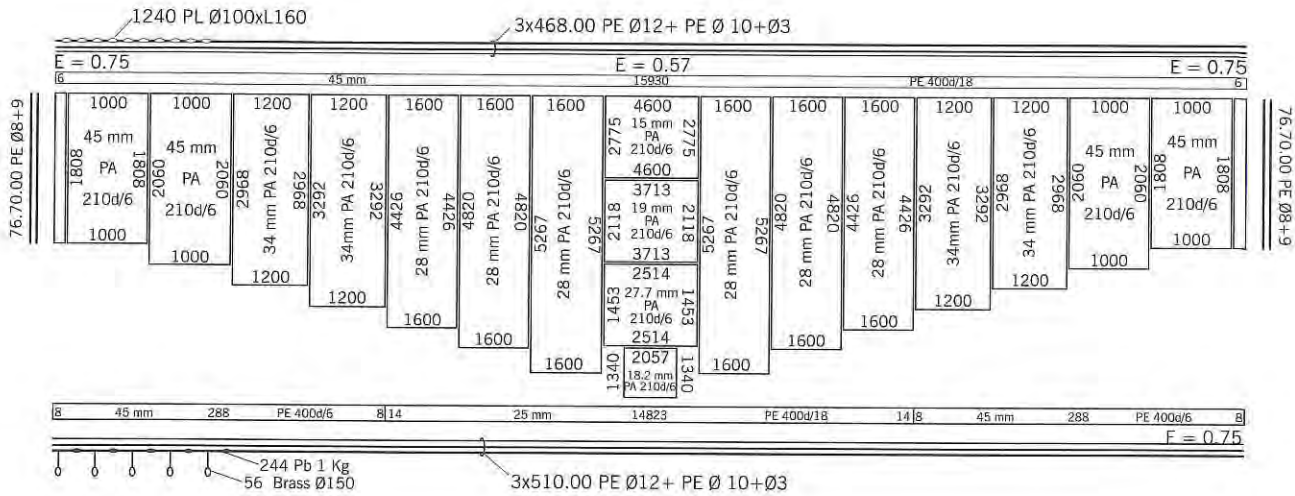

⑤
Tom weight
400 Kgs

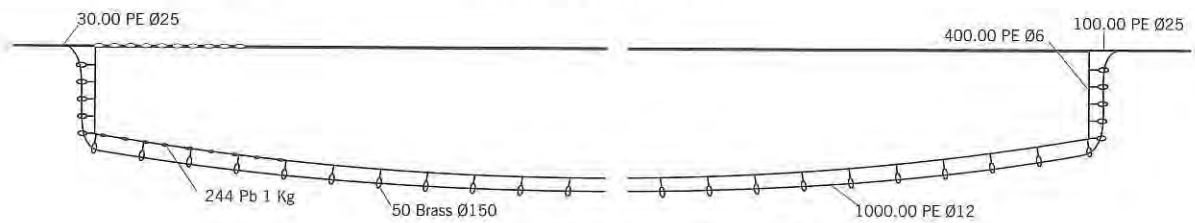
SURROUNDING NET
Purse Seine (Ring Net)
Kubkub or Likom-Likom
Tuna, Round-Scad, Mackerel
Sardine, Bigeye Scad

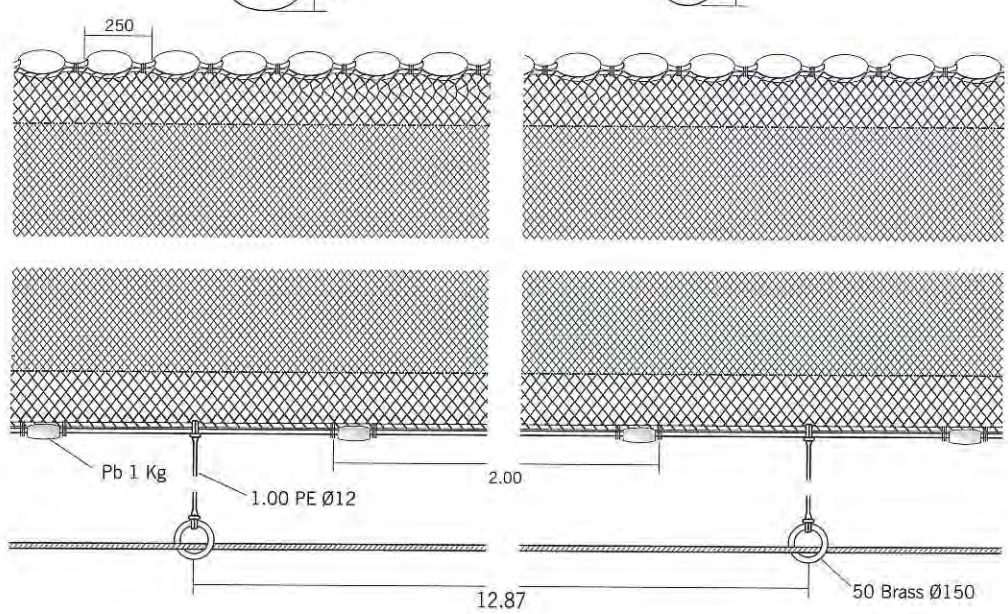
VESSEL
Loa : 22.25 m
GT : 25
Hp : 65

LOCATION
Daliao

Davao City







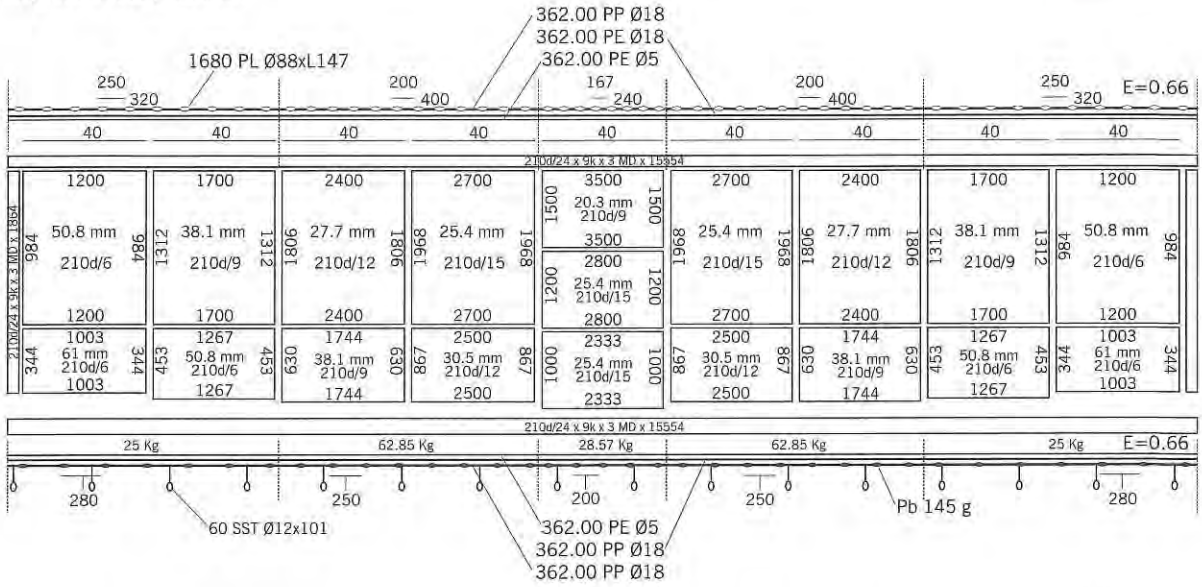
SURROUNDING NET
Purse Seine (Ring Net)

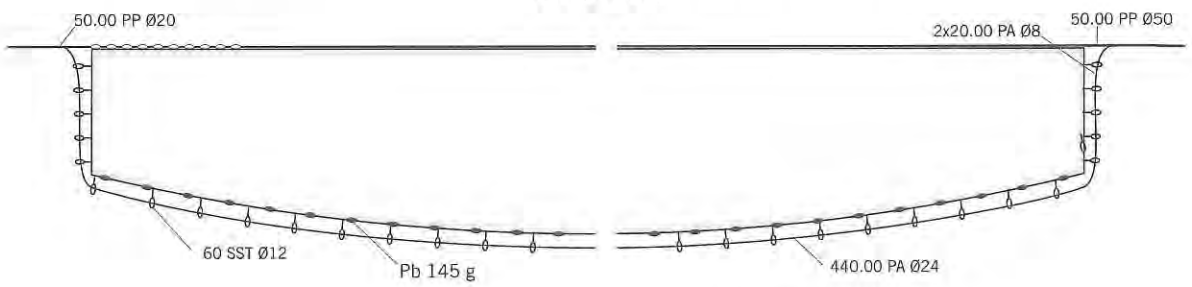
Skipjack, Yellow Fin Tuna,
Bonito, Round Scad, Mackerel

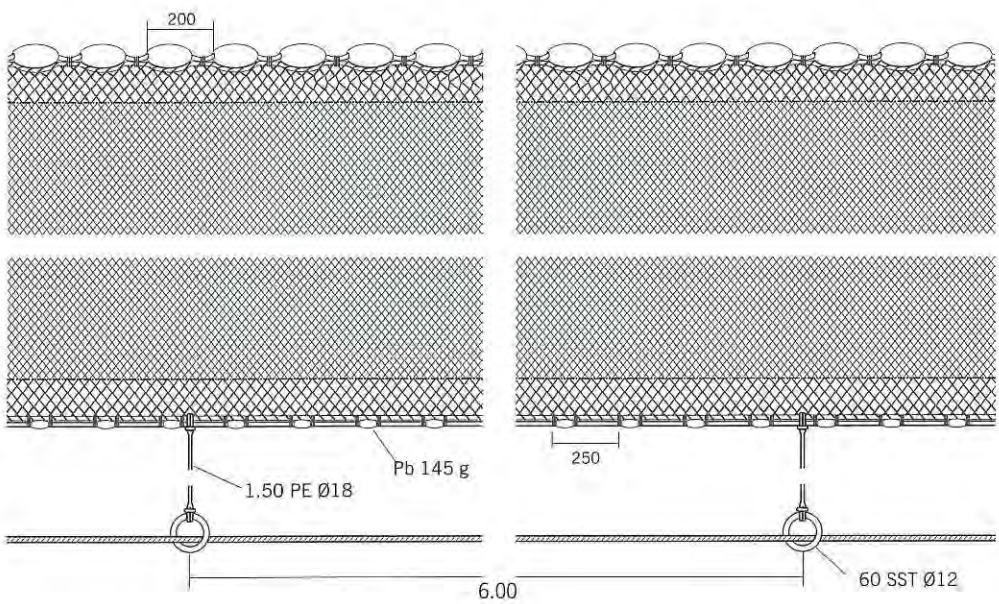
VESSEL
Loa : 25 m
GT : 31.75
Hp : 190

LOCATION
Masinloc

Zambales







SURROUNDING NET

Purse Seine
Pangulong
Bonito, Tuna, Frigrate Mackerel, Scad

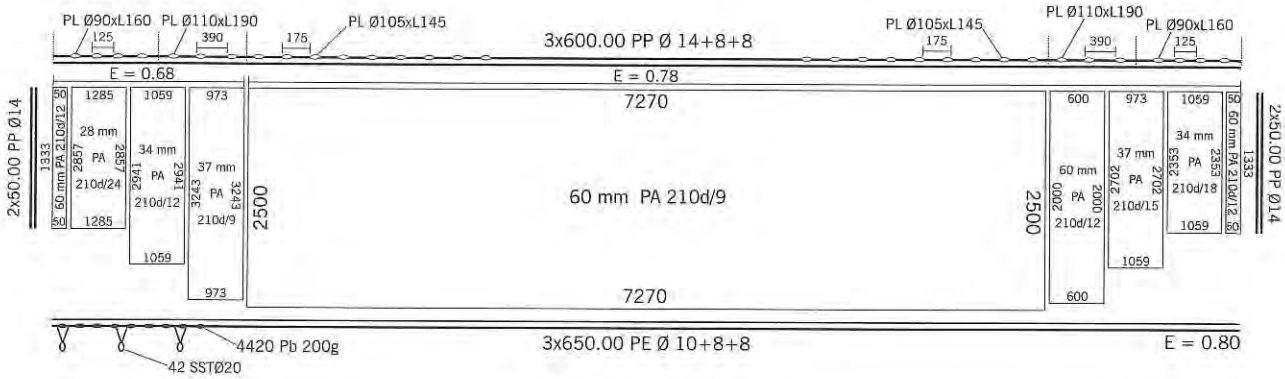
VESSEL

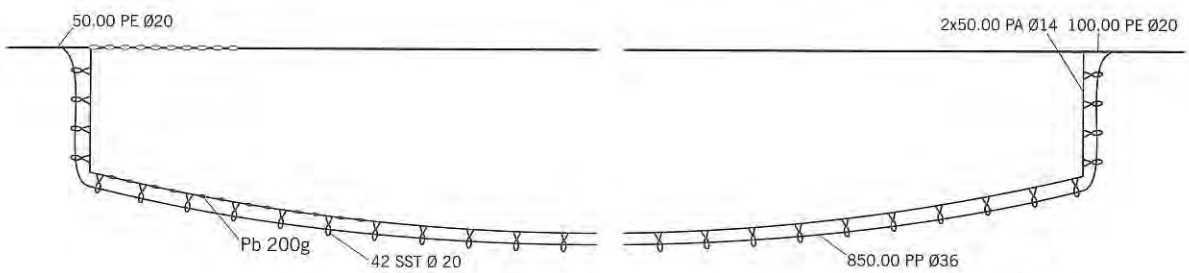
Loa : 24m, 10m x 2
GT : 30, 5 x 2
Hp : 120, 25 x 2

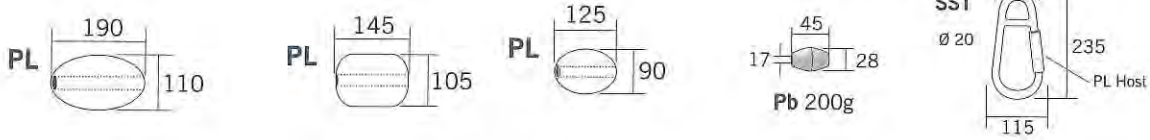
LOCATION

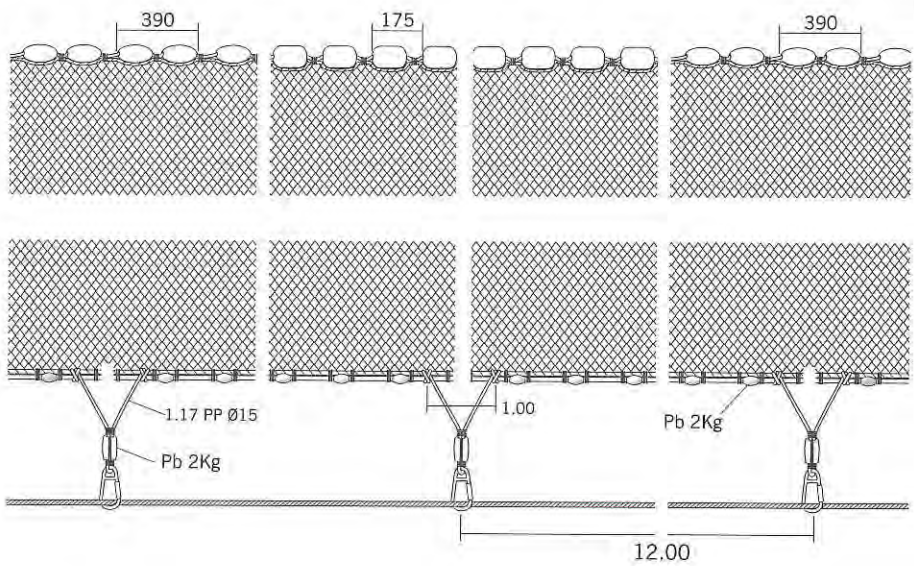
Matalvis Port, Masinioc

Zambales







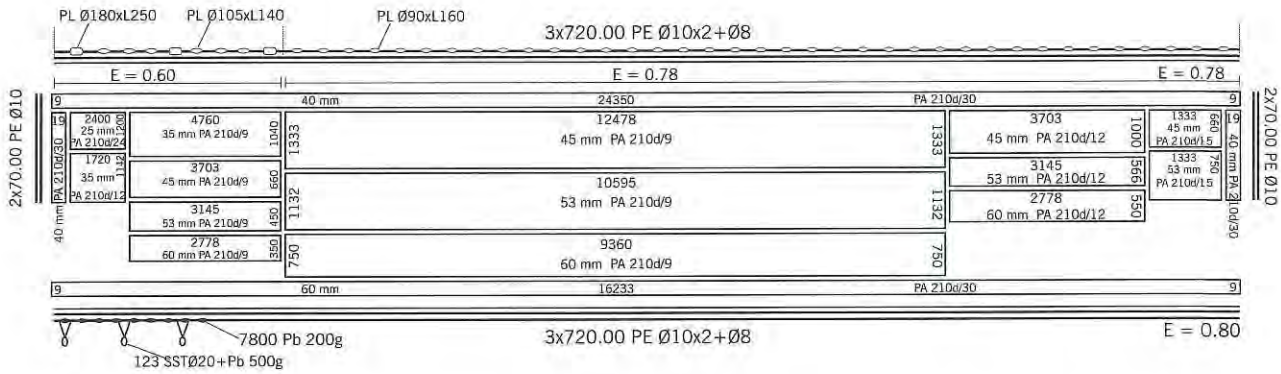


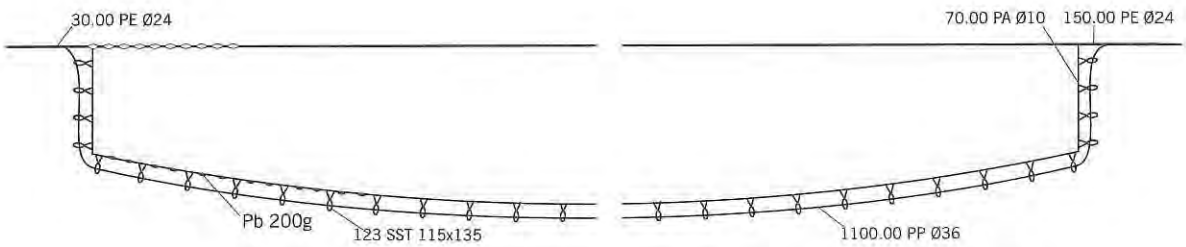
SURROUNDING NET
Purse Seine
Pangulong
Bonito, Mackerel, Scad

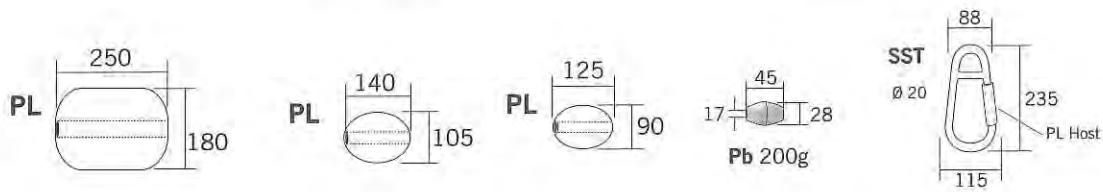
VESSEL
Loa : 25m, 10m x 2
GT : 30, 3 x 2
Hp : 120, 40 x 2

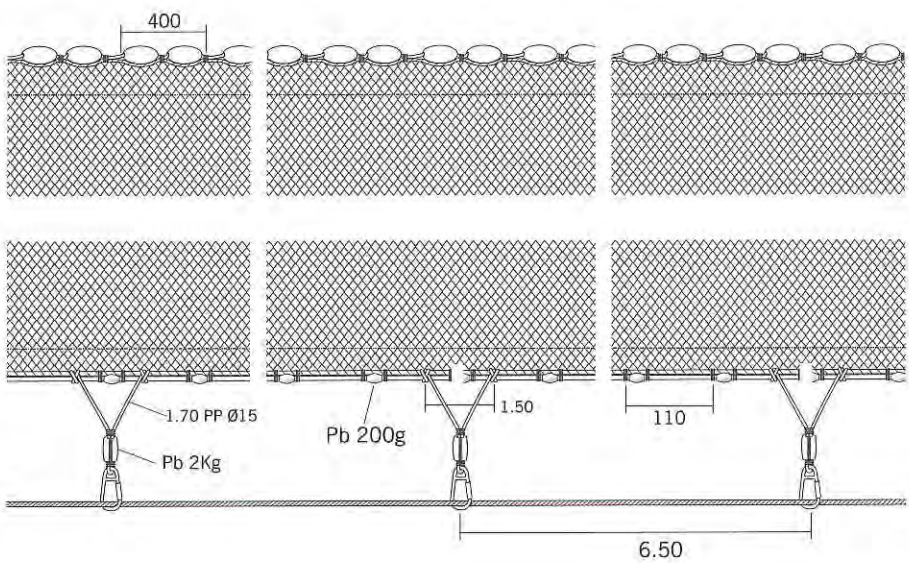
LOCATION
Matalvis Port, Masinioc

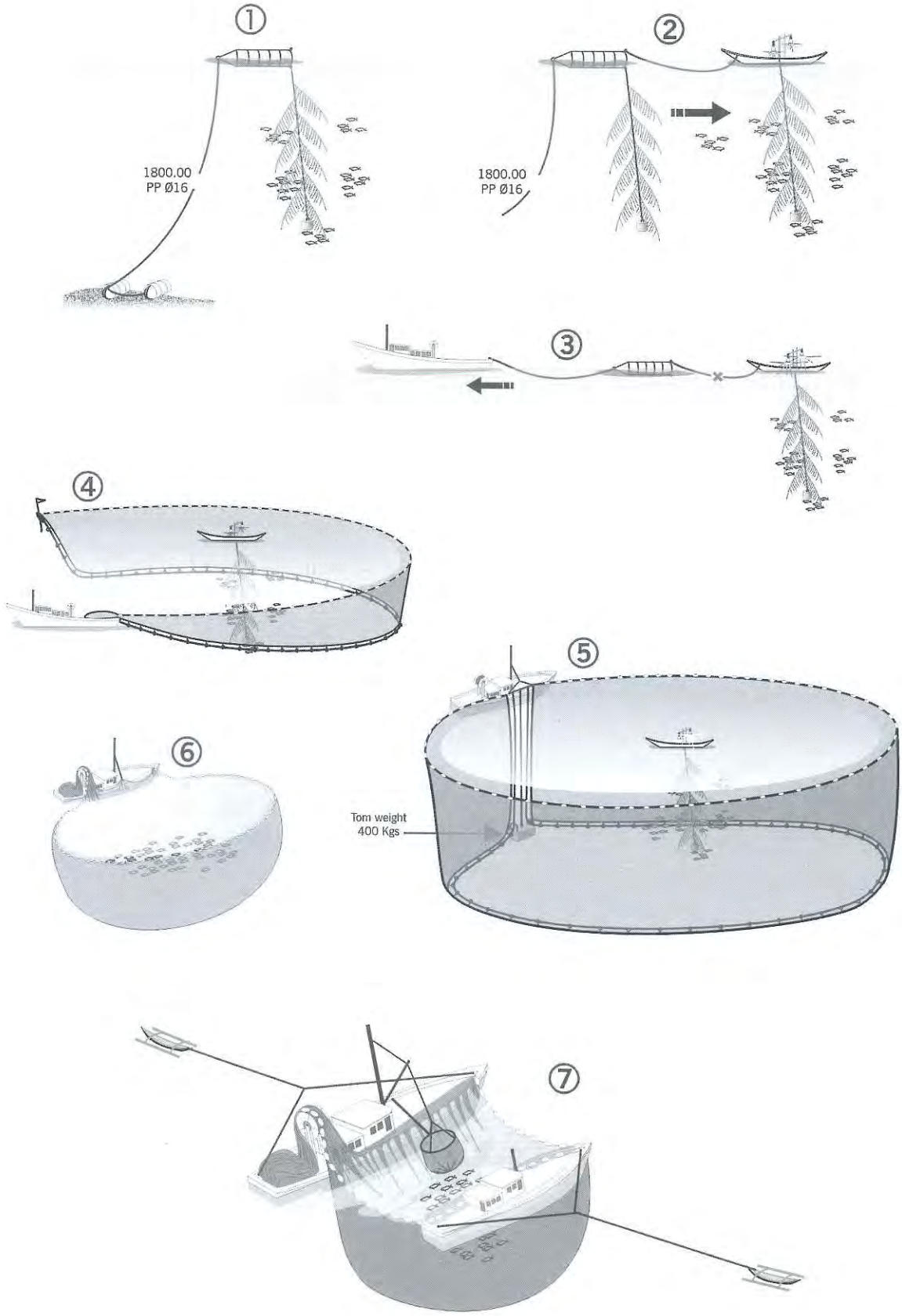
Zambales









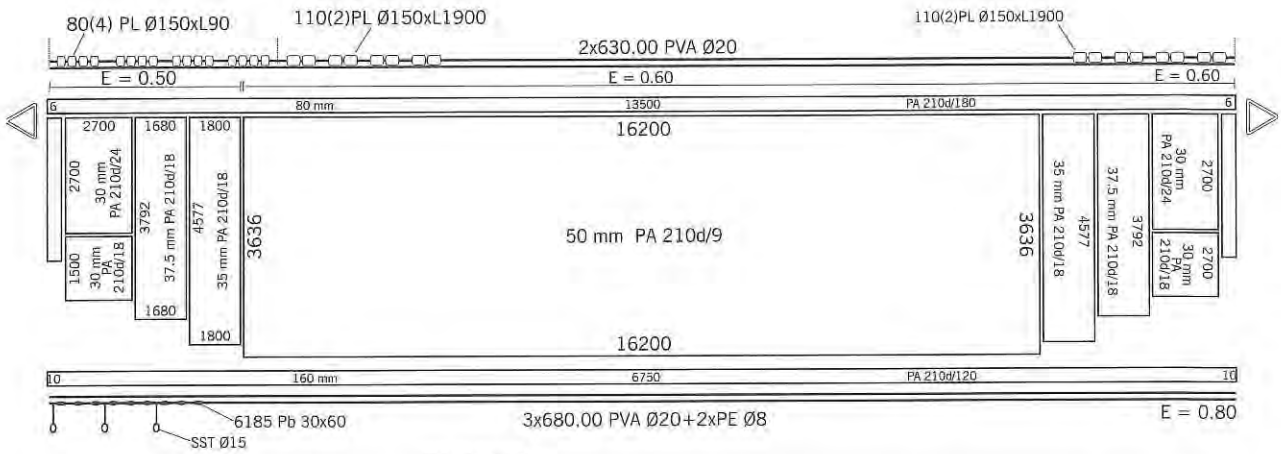

①
1800.00
PP Ø16
②
1800.00
PP Ø16
③
④
⑤
Tom weight
400 Kgs
⑥
⑦

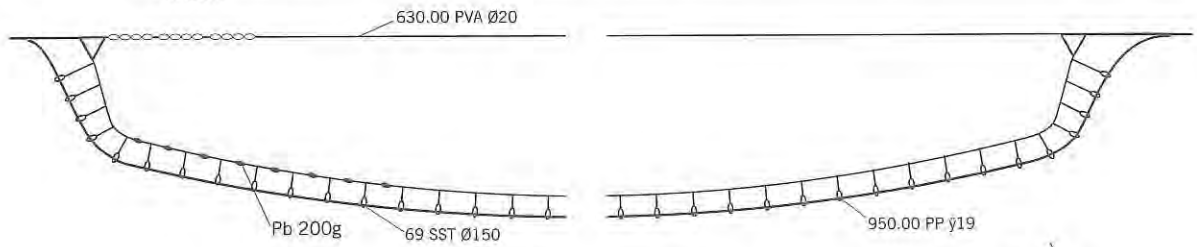
SURROUNDING NET
Purse Seine
Unay
Skipjack, Tuna, Mackerel, Scad

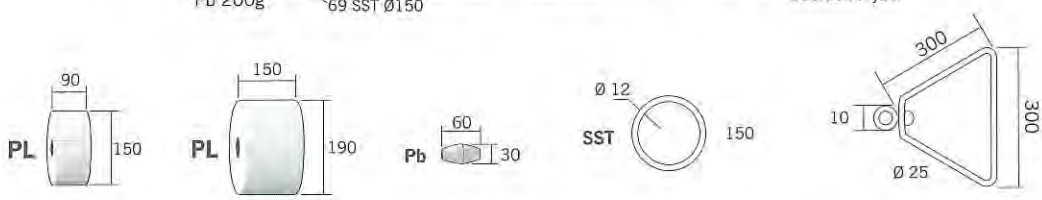
VESSEL
Loa : 26m, 12m x 2
GT : 69,
Hp : 250, 45 x 2

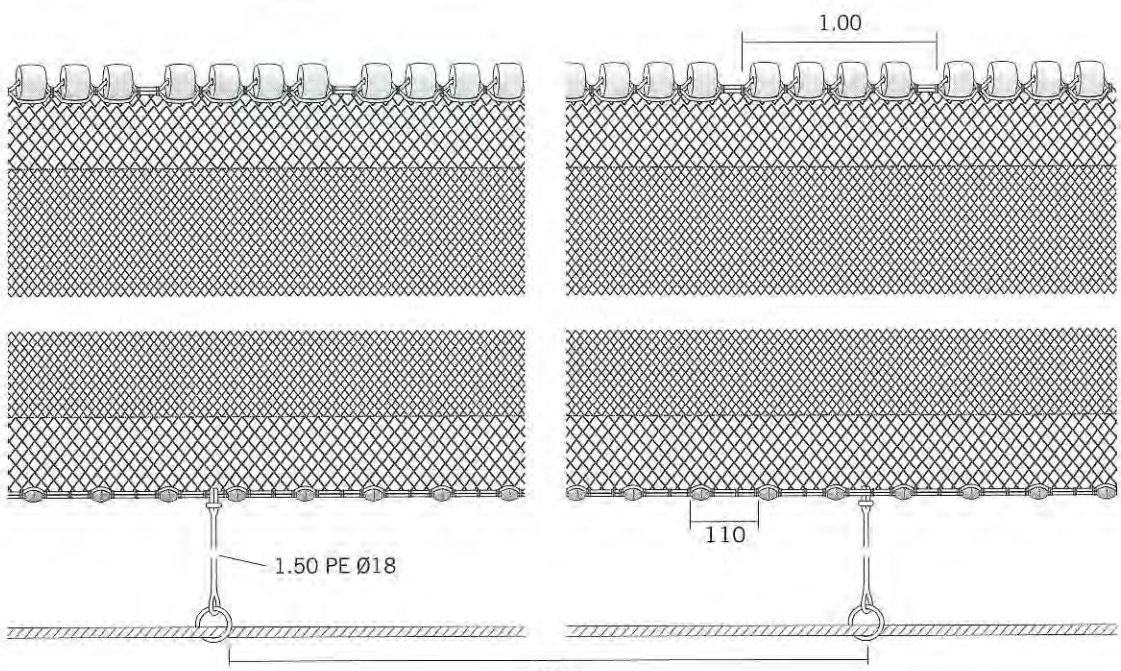
LOCATION
Calumpang

General Santos City







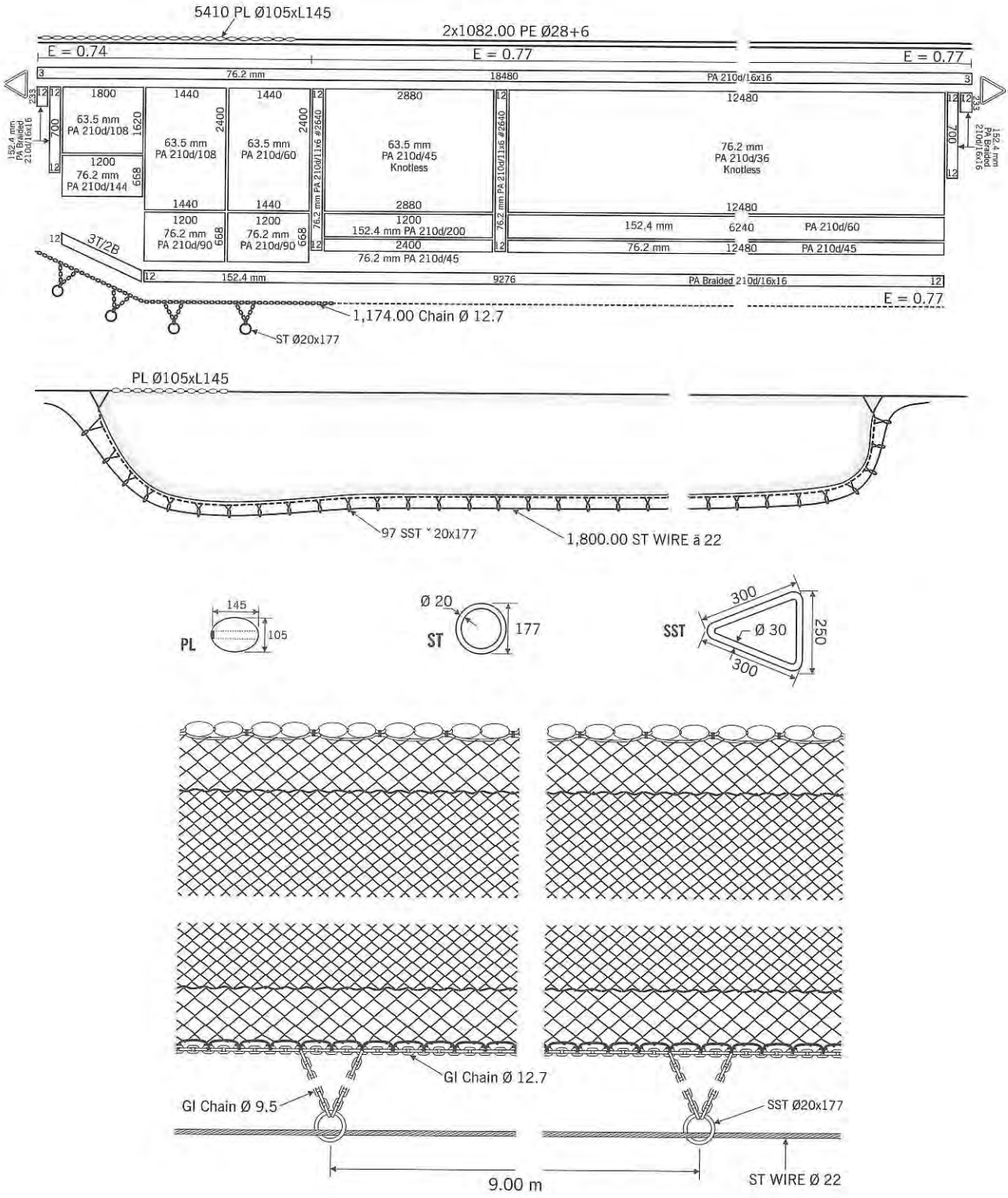


SURROUNDING NET
Tuna Purse Seine
Pangulong
Tuna and Tuna-Like Species

VESSEL
Loa : 36.89 m
GT : 450
Hp : 1,125

LOCATION
Navotas

Metro Manila

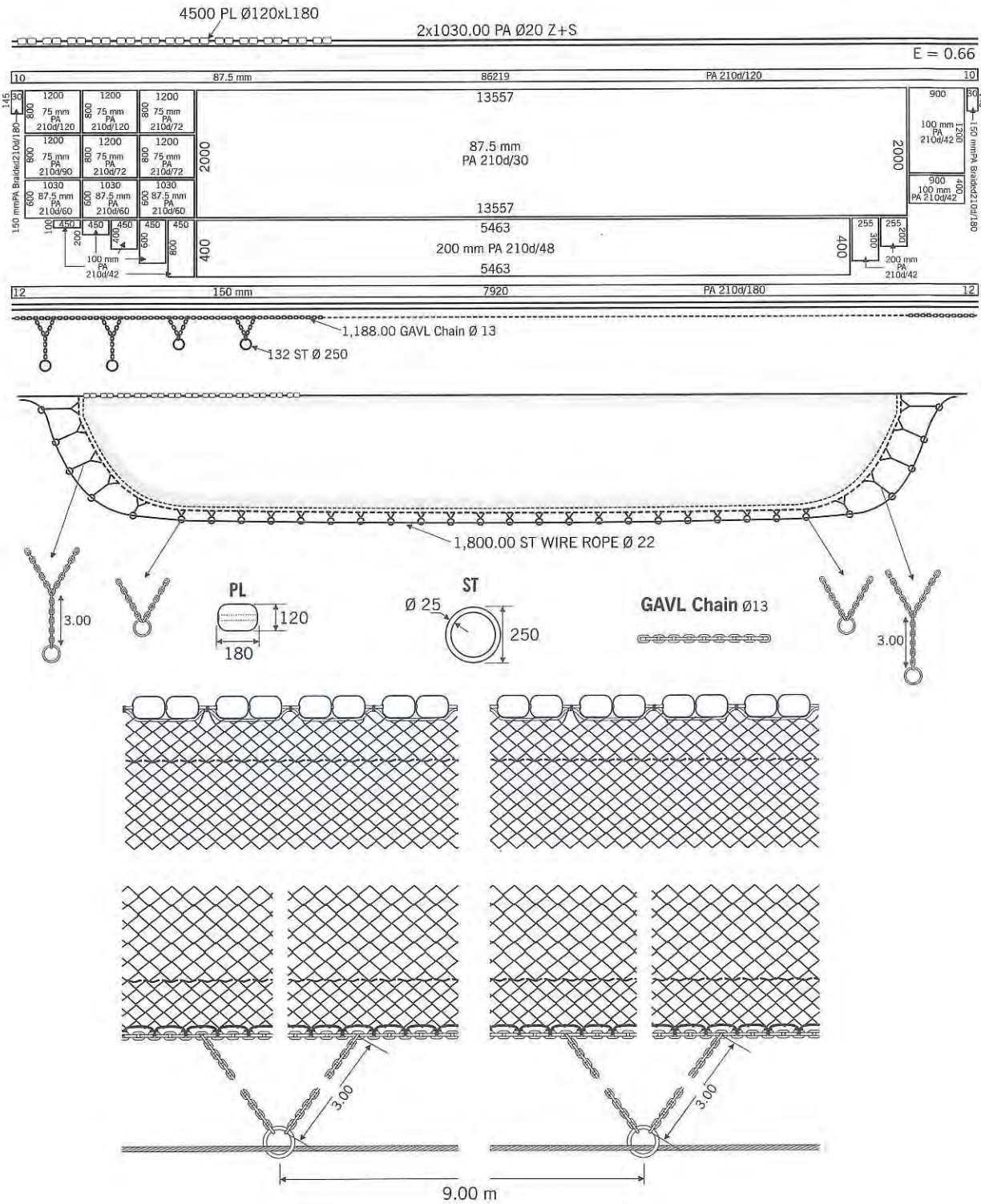


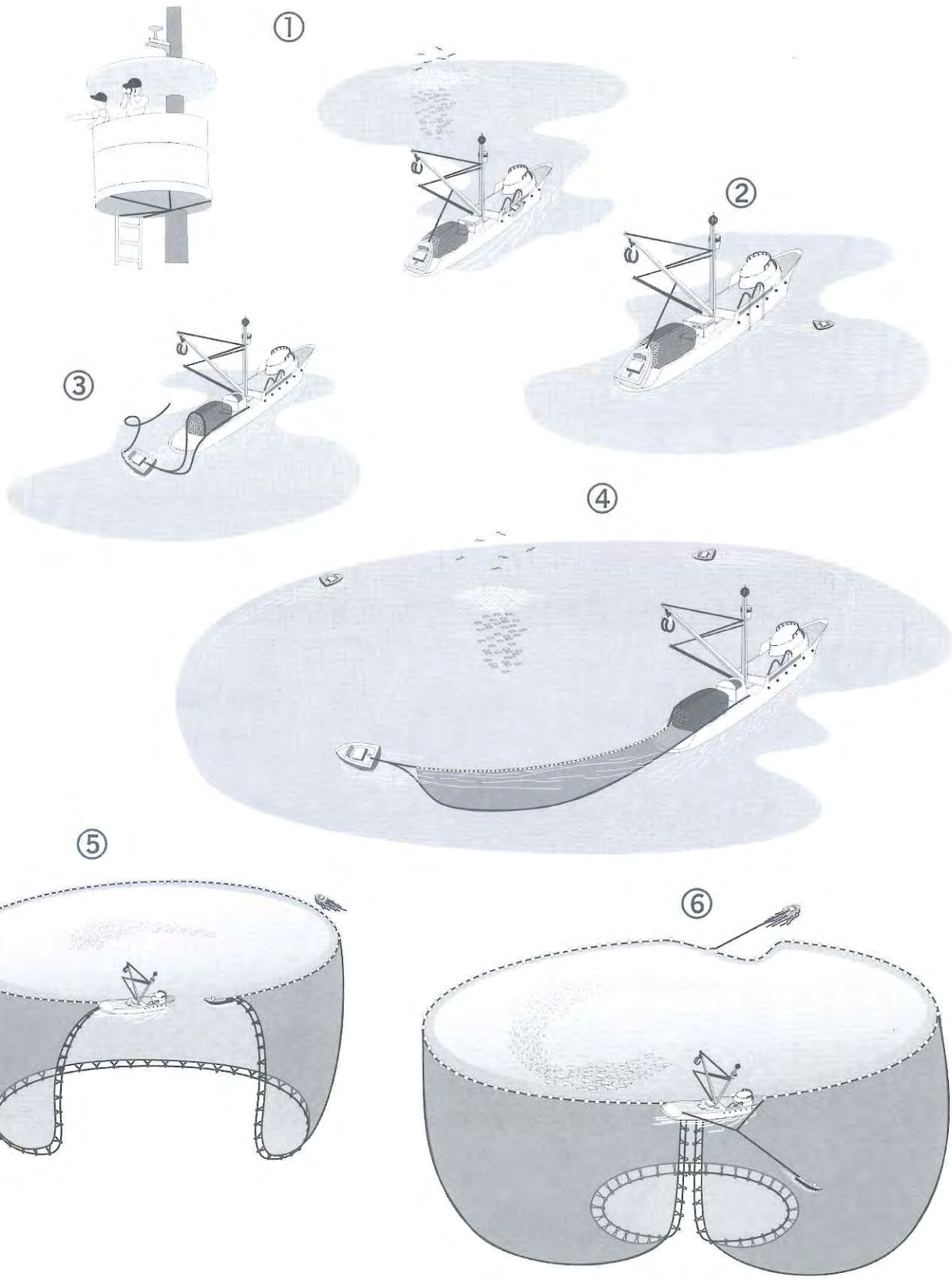
SURROUNDING NET
Tuna Purse Seine
Pangulong
Skipjack,Yellow Fin Tuna,Frigate Tuna

VESSEL
Loa : 30.00 m
GT : 300
Hp : 700

LOCATION
Navotas

Metro Manila




①
②
③
④
⑤
⑥

< Chapter 4 >

Seine Nets

Seine Net Fishing

Seine nets are used both by the municipal and commercial fishermen. There are two kinds of seine net namely: the beach seine and the Danish seine. The availability of sandy and gradually sloping beaches along the coastal areas of the country make beach seines one of the most common fishing gear being used by the fishermen. The Danish seine, on the other hand, evolved from the beach seine in 1950's when its operation was conducted on board a small dugout in deeper waters. The design and operation were further modified until the 1960's when it proliferated in the Central Visayas.

Seine net municipal production in 1995 was 51,877 mt. Beach seine and Danish seine contributed 77.3% and 22.7% respectively. In the commercial sector, the total production was 94,439 mt wherein the Danish seine contributed 98.8% as shown in **Table 16**.

The dominant species caught by the Danish seine are slipmouth, threadfin bream, goatfish, mackerel, crevalle and red bulls eye as shown in **Table 17**. The major species caught by commercial beach seine are anchovies, hairtail, sardines, hardtail and frigate tuna as shown in **Table 18**.

Fishing Gear and Methods

2.1 Beach Seine

In terms of net structure, beach seines are of two types; the beach seine with bag and the beach seine without a bag. The net with a bag resembles a trawl net with two wings, the body and the bag or cod-end. The beach seine without a bag has a specialized construction in the central part with more slack and smaller meshes.

The size of the beach seine depends on the depth of operation, number of fishermen involved, use of banca, availability of pull rope hauler(s) and target species. A majority of the

TABLE 16 PRODUCTION OF MUNICIPAL AND COMMERCIAL SEINE NETS 1994-1995, (METRIC TONS)

Seine Nets	1994		1995	
	Municipal	Commercial	Municipal	Commercial
Beach Seine	57,216	696	40,101	1,114
Danish Seine	17,146	74,509	11,776	93,325

Source : Fisheries Statistics 1995, BAS

TABLE 17 DOMINANT SPECIES CAUGHT BY COMMERCIAL DANISH SEINE, 1994 (METRIC TONS)

Species	Volume	Percentage to Total Danish Seine Production
Slipmouth	14,359	21.29
Threadfin bream	10,099	14.96
Goat fish	8,635	12.8
Indo-Pacific Mackerel	4,441	6.59
Crevalle	6,630	9.39
Roundscad	6,108	9.06
Red bulls eye	4,541	6.73
Squid	6,519	9.83
Lizard fish	4,519	6.7
Therapon, grunt	1,777	2.64

Source : Fisheries Statistics 1995, BAS

TABLE 18 DOMINANT SPECIES CAUGHT BY COMMERCIAL BEACH SEINE, 1994 (METRIC TONS)

Species	Volume	Percentage to Total Danish Seine Production
Acetes	529	49.12
Anchovies	280	26
Indian sardines	88	8.17
Crevalle	47	4.36
Hairtail	41	3.81
Moonfish	28	2
Hardtail	22	2.04
Slipmouth	19	1.76
Frimbrated sardines	16	1.49
Snapper	7	0.65

Source : Fisheries Statistics 1995, BAS

surveyed beach seines have lengths varying from 50 to 200 meters and depths of 2-10 meters. In some nets, the wing uses nylon multifilament 210d/2-210d/9 with a mesh size of 10 mm to 130 mm. The body uses net of 210d/4-6 with 20-35 mm. mesh size while the bag is also 210d/6 but has a finer mesh of 10 mm. Other nets use the Polyethylene B-net with 13 mm. mesh size as the main webbing or wing. The bag portion is sometimes long, but the majority range from 10 to 20 meters. The mesh sizes also vary. The milkfish fry net uses polyethylene net with a diameter of 0.1 mm. and mesh size of 1 mm. The headrope has a length of 10 meters and the net is dragged by two men along the shore.

In most of the beach seines, pull ropes are usually PE dia. 16mm with length of 100-400 meters. The triangular bridle is PE dia.12mm which is tied to the lower and upper end corners of the wing portion. Bamboo is also used instead of a rope bridle. The numbers of fishermen involved in beach seine operation range from 2-60 fishermen. In some coastal villages, pulling of the pull rope is done by a line hauler which is powered by a gasoline or diesel engine.

Setting operation also differs, depending on the depth of the water. In shallow water, fishermen just set the 1st pull rope, followed by the net and the 2nd pull rope around a school of fish. In deeper waters, the net is stacked in one banca which may be non-motorized and towed by a motorized banca. The banca tows the net boat while releasing the 1st pull rope, the net, is followed by the 2nd pull rope in encircling the fish school. During the pulling of the ropes some fishermen observe the net underwater and remove the ground rope from snagging coral stones to prevent damage to the net and to facilitate faster pulling of the ropes. Likewise, the pulling of ropes is done simultaneously with proper coordination among the fishermen.

2.2 Boat Seine

Boat seine refers to the modified Danish seine named "holbot-holbat", "liba-liba" in the local term. It is classified as a municipal type when using boats of less than 3 gt, and as a commercial type using boats of more than 3 gt. In shallow waters (10-30 meters deep), the net is operated by an outriggered banca 8-10 meters long and powered by a 110-16 hp engine. Two to four fishermen can operate the gear as the scaring ropes and the tom weight are manually hauled. For deeper waters (30-80 meters deep), the net is operated by a larger outriggered banca 11-15 meters long and powered by an 80-225 hp diesel engine. An improvised winch coupled to the main engine is used to pull the ropes and haul the net. There are 5 to 10 fishermen to operate this gear.

The net design and materials for the small-scale and large-scale Danish seine are similar. Only the size of the net, length of pull ropes and weight of tom weights vary. The method of operation is the same, with the bigger-scale using a winch to pull the ropes and heave the tom weight. Both nets have wings on both sides, the central body and the bag. The most commonly used netting is polyethylene 400d/6-12 and mesh sizes of 25 mm.-60 mm. The scaring rope is usually polypropylene or polyethylene with a diameter of 6 mm-15 mm. and a length of 200-1200 meters for each side. Sinkers and plastic strips are inserted at regular intervals in between the strands of the ropes. The stone or concrete tom weight with two rings, weighs from 50-400 kg. depending on the scale of operation.

The gear is set at the sea bottom to enclose a potential area with demersal and semi-pelagic fish. After determining the depth of the fishing ground and current direction, a buoy

marker is released. The banca moves in a semicircular direction while continuously paying out the left scaring rope, left wing, body, bag, right wing and the right scaring rope. On reaching the buoy marker, the end of the right scaring rope is secured. The ends of the left and right scaring ropes are passed through the twin ring tom weight assembly. The tom weight is then dropped into the water and the rings slide through the scare ropes until it reaches the bottom. Immediately, hauling of the ropes starts. This may be done manually or by a winch. As the net wings reach the tom weight, both are hauled until the catch is on deck for sorting. The gear is then arranged for the next operation.

Danish seine fishing is now widely used in bays, coves and gulfs. The simplicity of operation as well as larger-sized and more selective catches will lead to an increase in fishing effort and production in coastal areas.

SEINE NET

Seine Net
Kawag
Fry of Milkfish

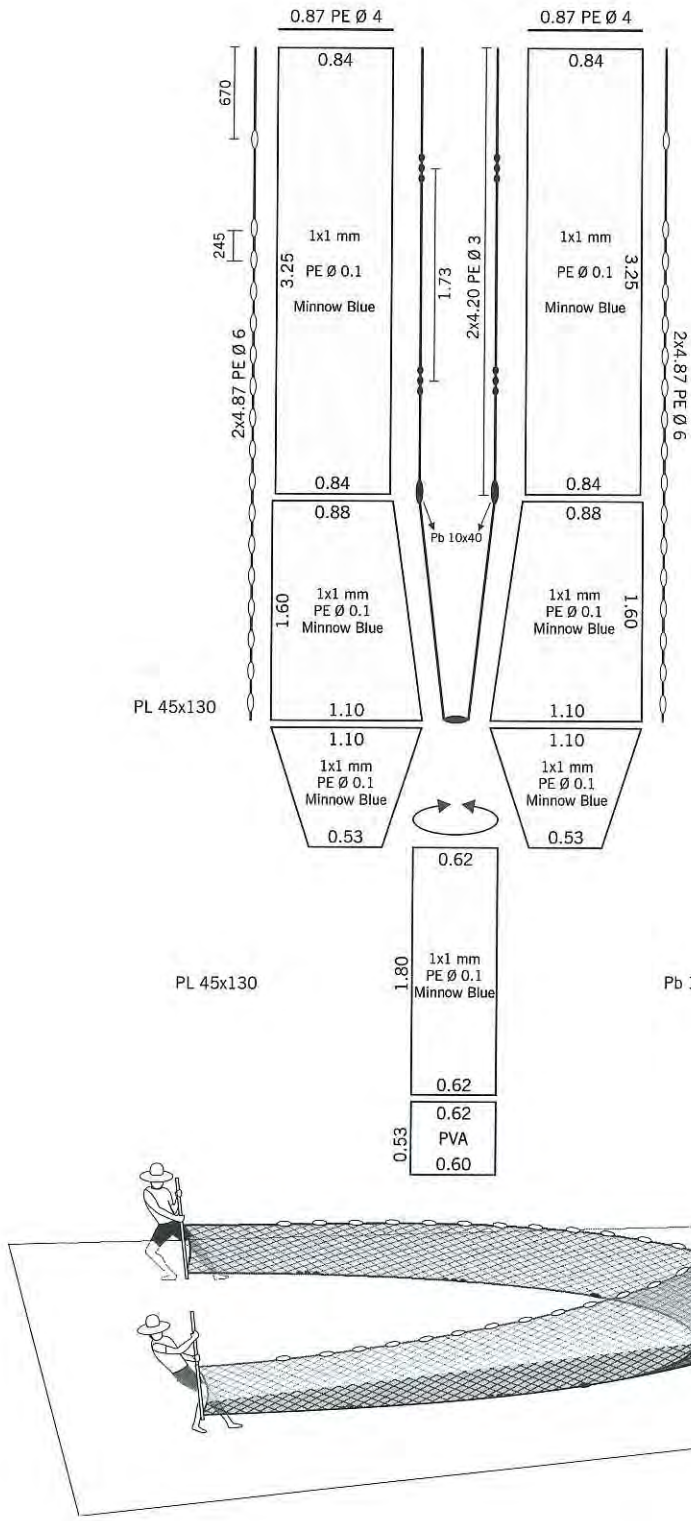
VESSEL

Loa : -
GT : -
Hp : -

LOCATION

Porac

Zambales



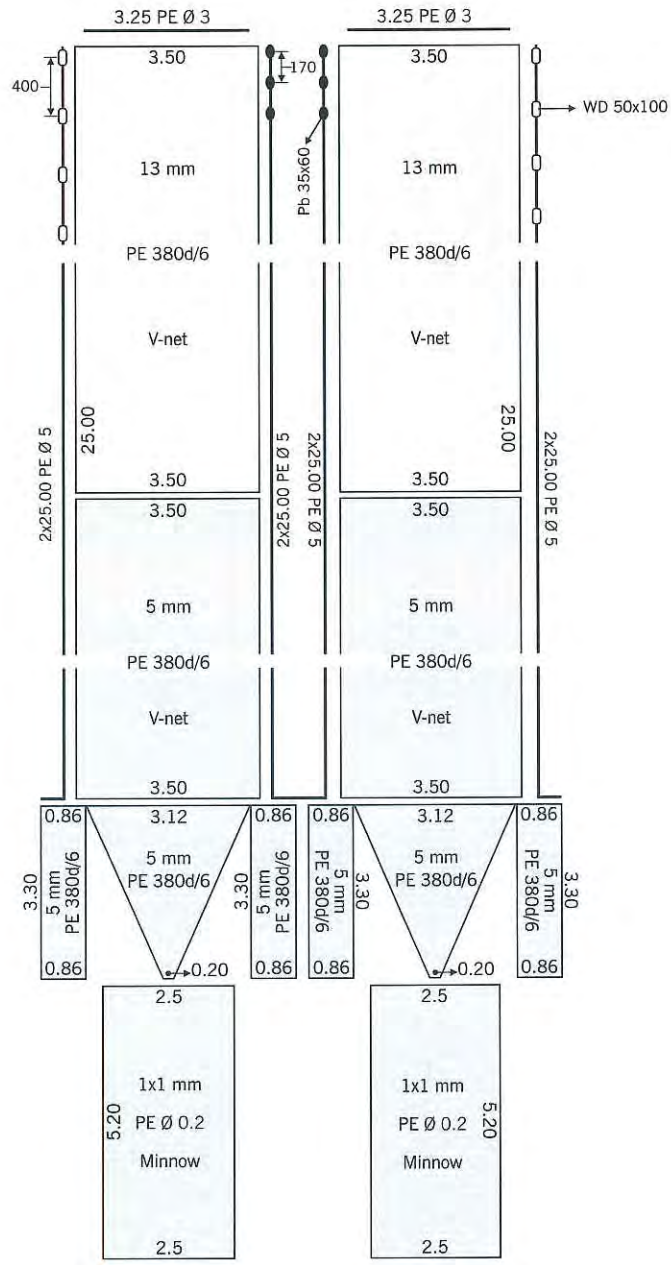
*** For Raining Season**
For Summer Season the Net will be bigger
Depth = 1.00
Length = 8.00

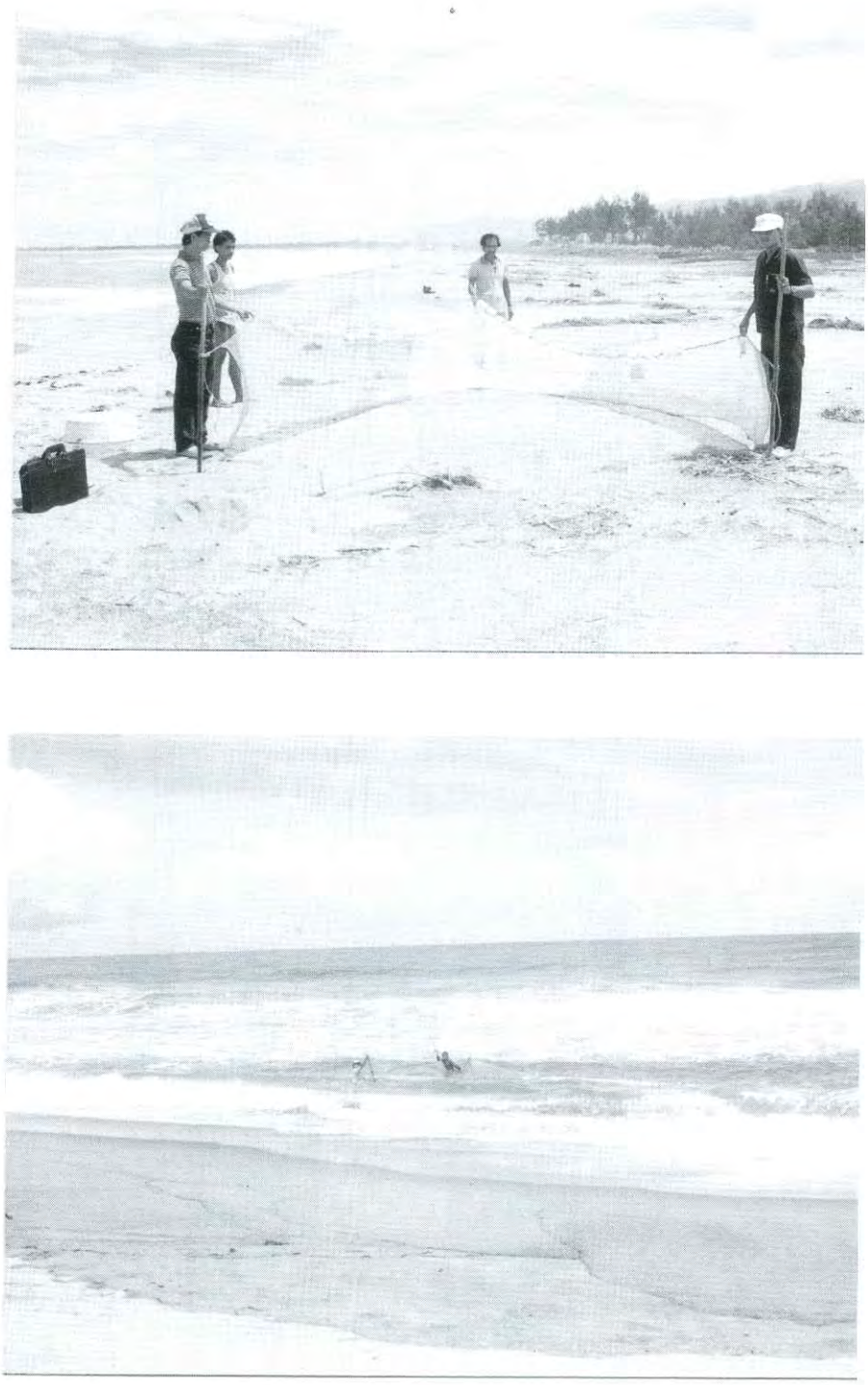
SEINE NET
Beach Seine
Daklis
Anchovy, Planktonic shrimp

VESSEL
Loa : Bamboo Raft
GT : -
Hp : -

LOCATION
Darigayos, Luna

La Union





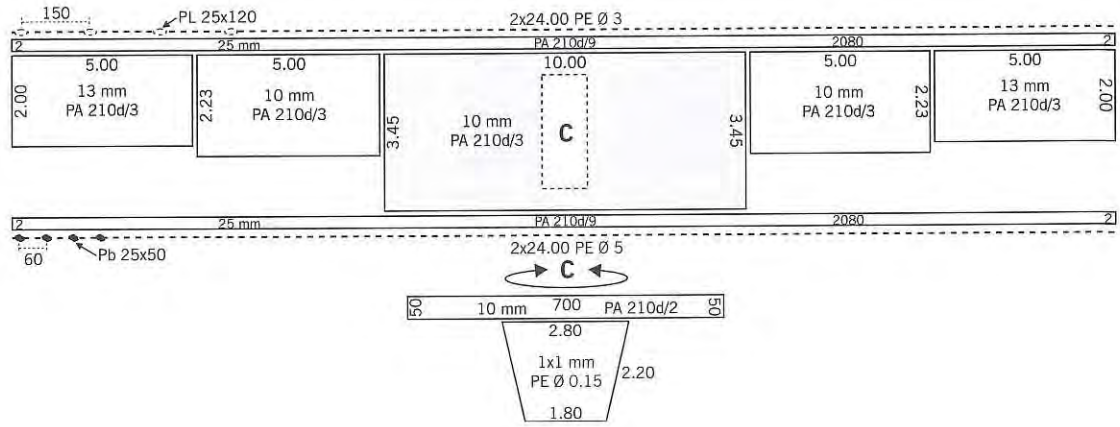
Beach seine fishing operations

SEINE NET
Beach Seine
Daklis
Anchovy, Small fishes

VESSEL
Loa : Bamboo Raft
GT : -
Hp : -

LOCATION
Gaang, Currimao

Ilocos Norte



SEINE NET

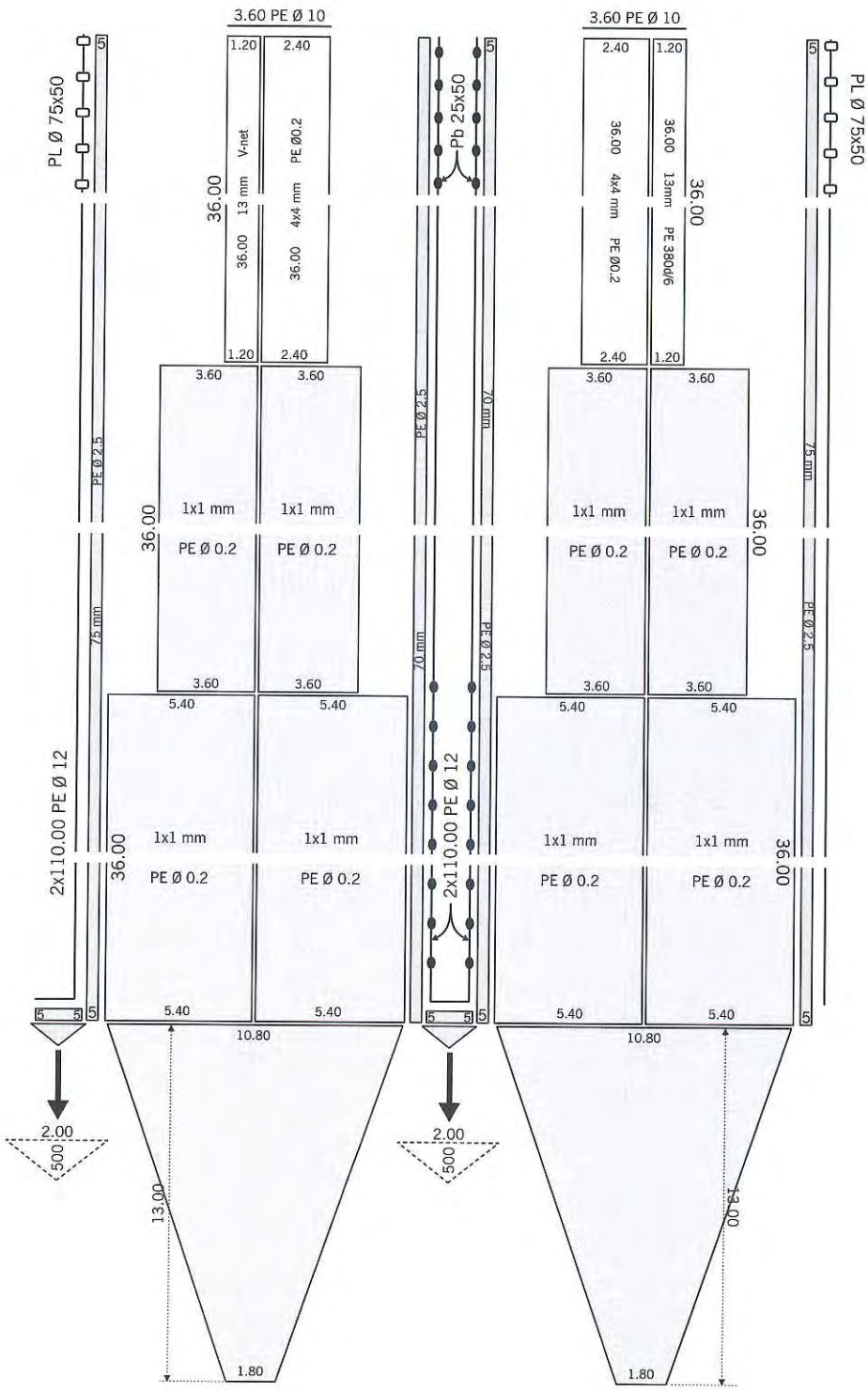
Beach Seine
Sahid
Anchovy, Planktonic shrimp, Sardine

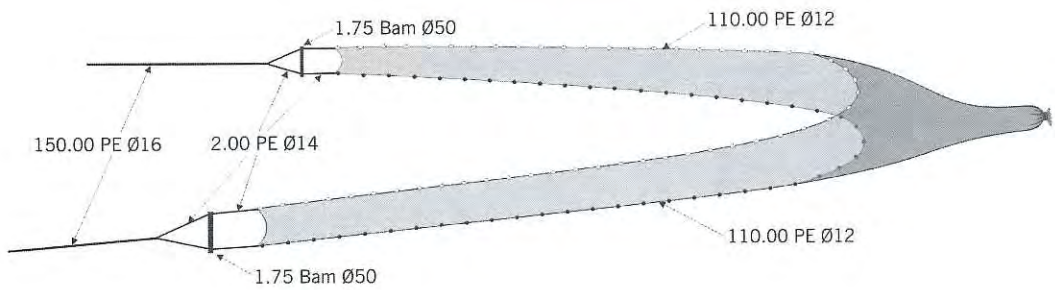
VESSEL

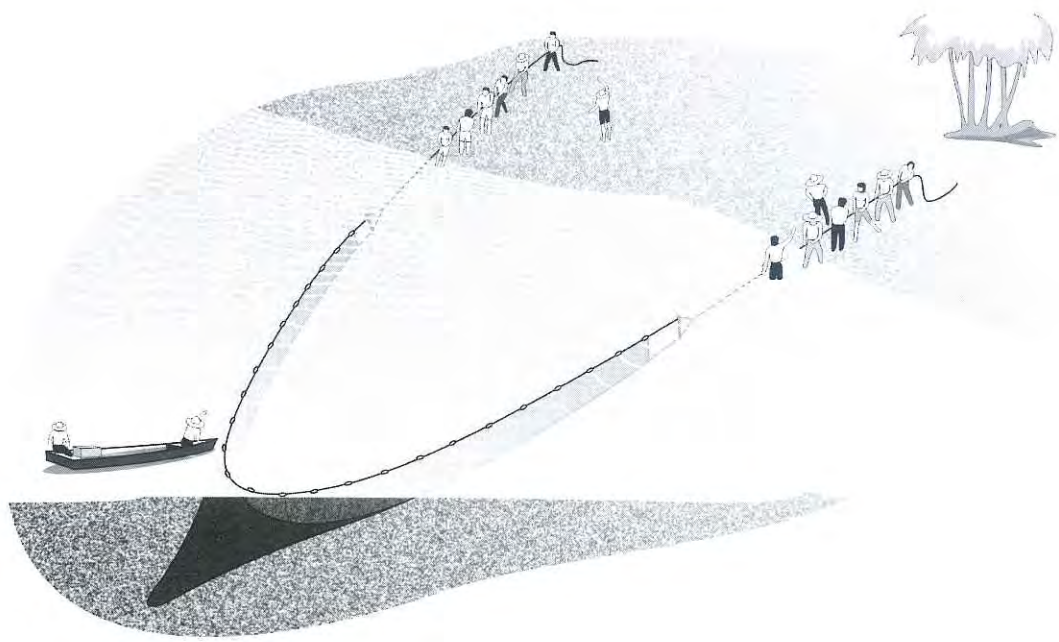
Loa : 8 m
GT : -
Hp : -

LOCATION

Brgy, Kirayan, Noric
Miagao
Iloilo




1.75 Bam Ø50
110.00 PE Ø12
150.00 PE Ø16
2.00 PE Ø14
110.00 PE Ø12
1.75 Bam Ø50

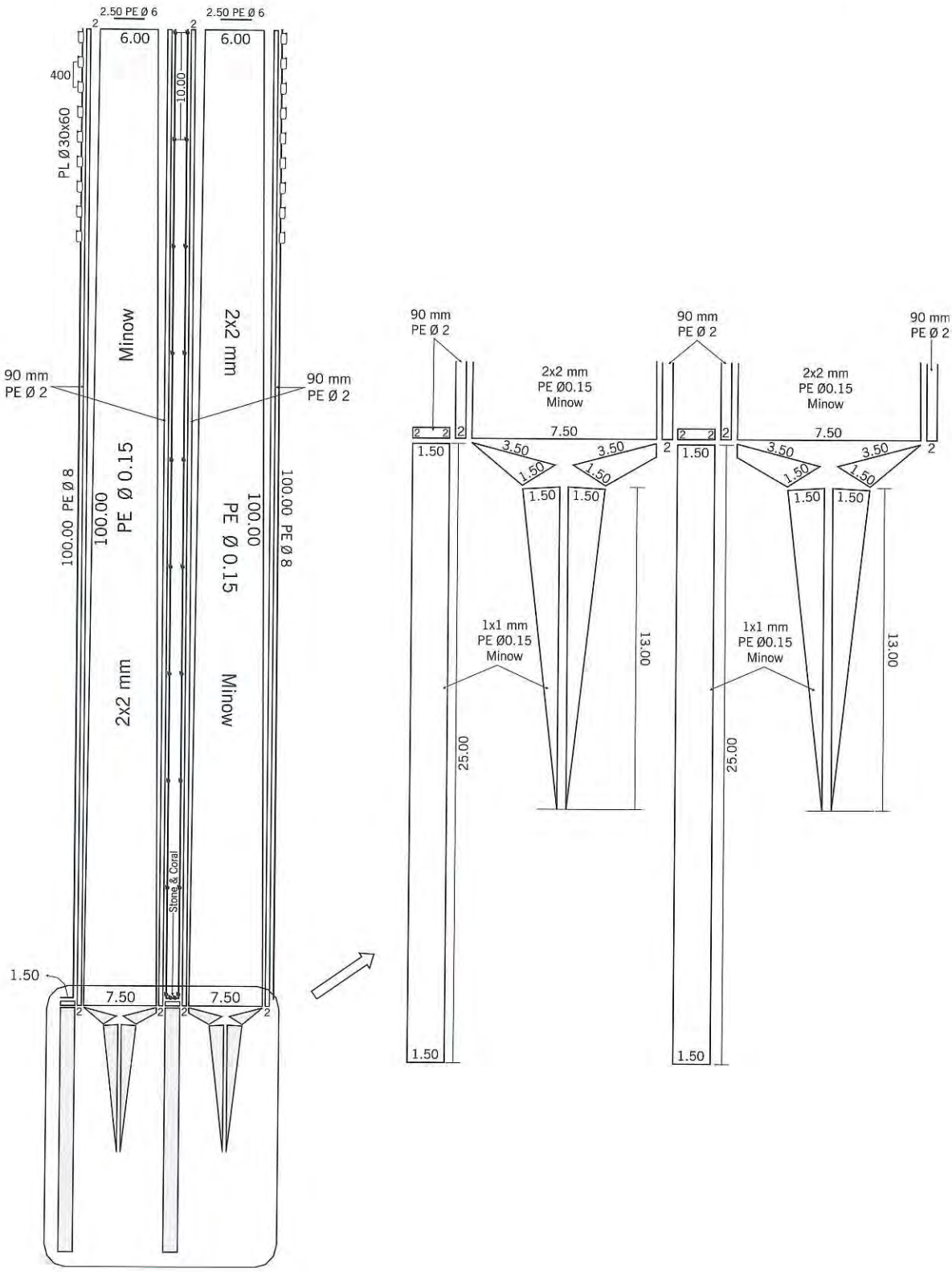


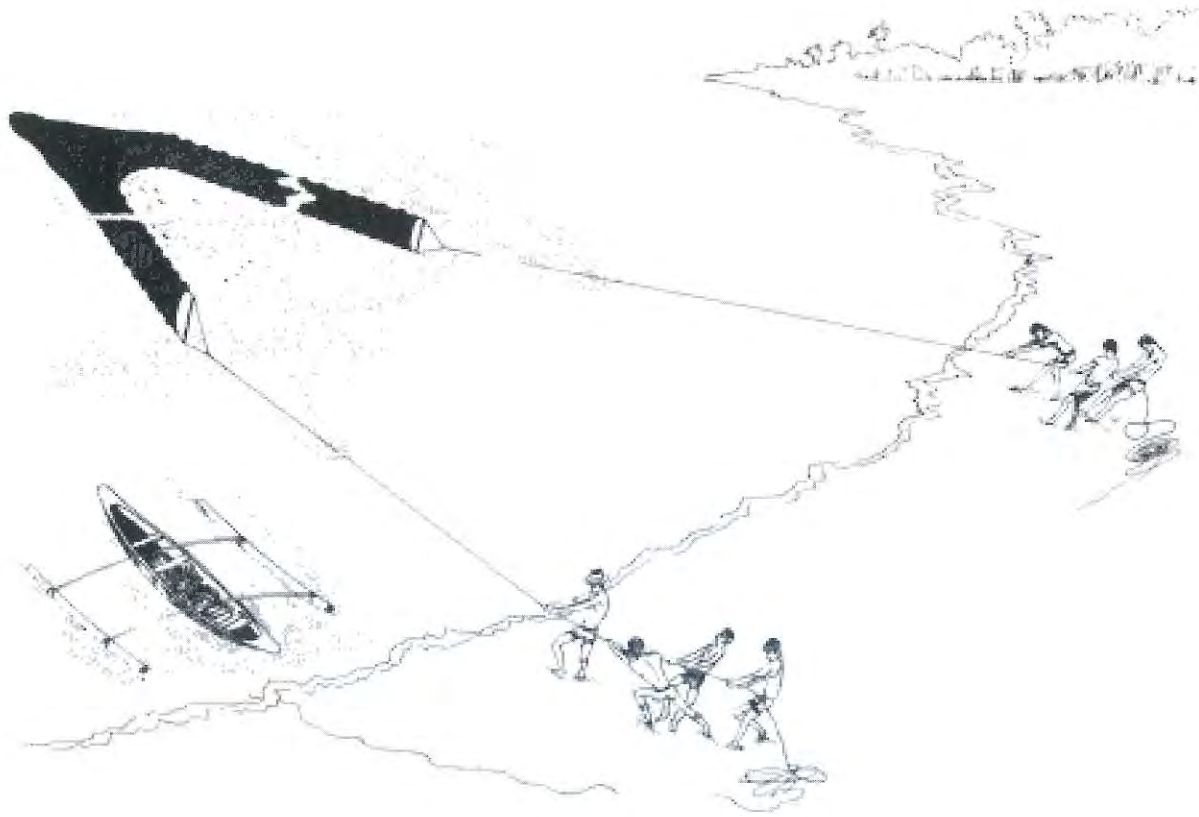
SEINE NET
Beach Seine
Baling
Anchovy, Planktonic shrimp,

VESSEL
Loa : 8 m
GT : -
Hp : -

LOCATION
Mualong, Loon

Bohol



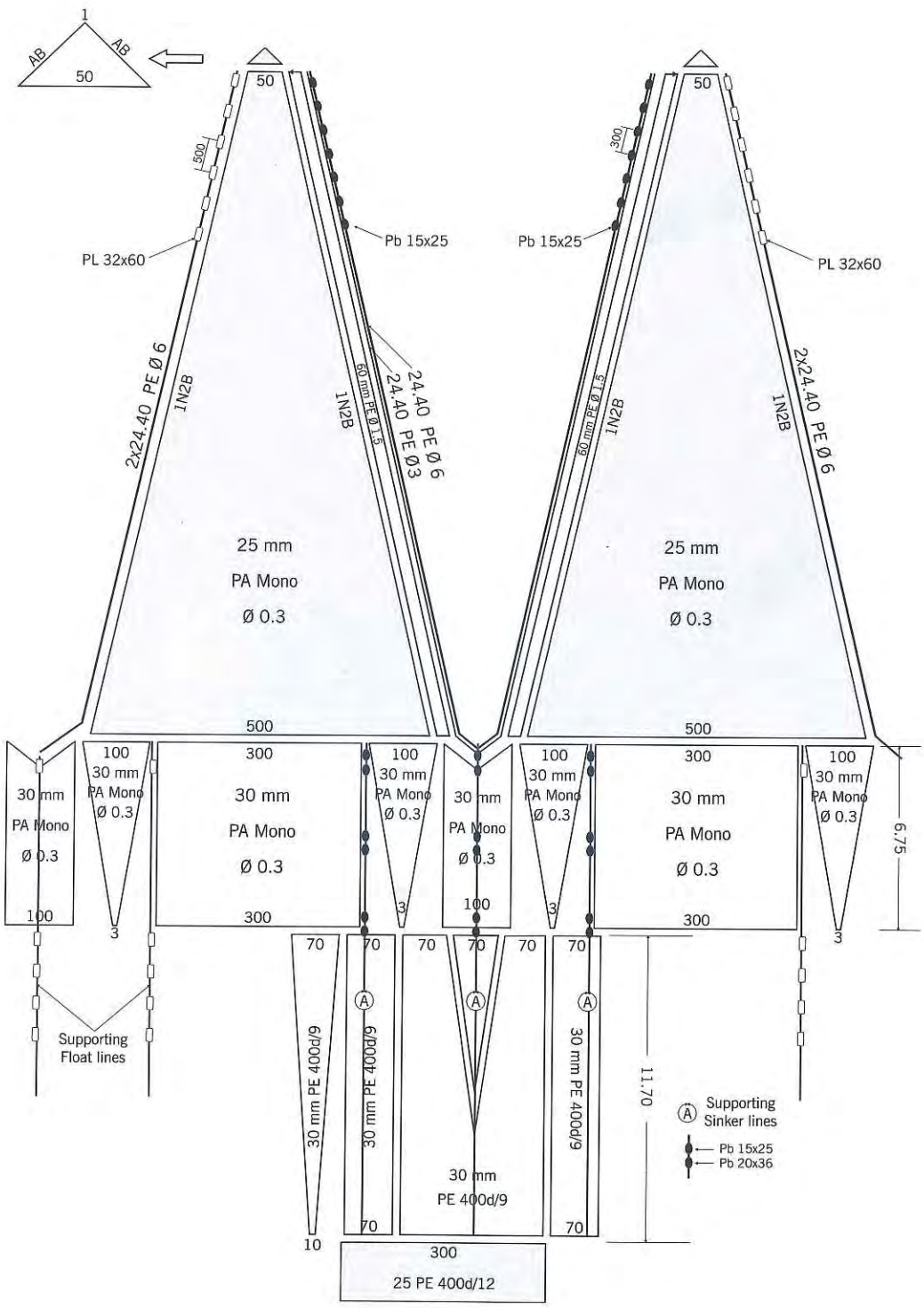


SEINE NET
Danish Seine
Holbot-Holbot
Demersal fishes

VESSEL
Loa : 6 m
GT : -
Hp : 10

LOCATION
Corto Bawod, Jetafe

Bohol

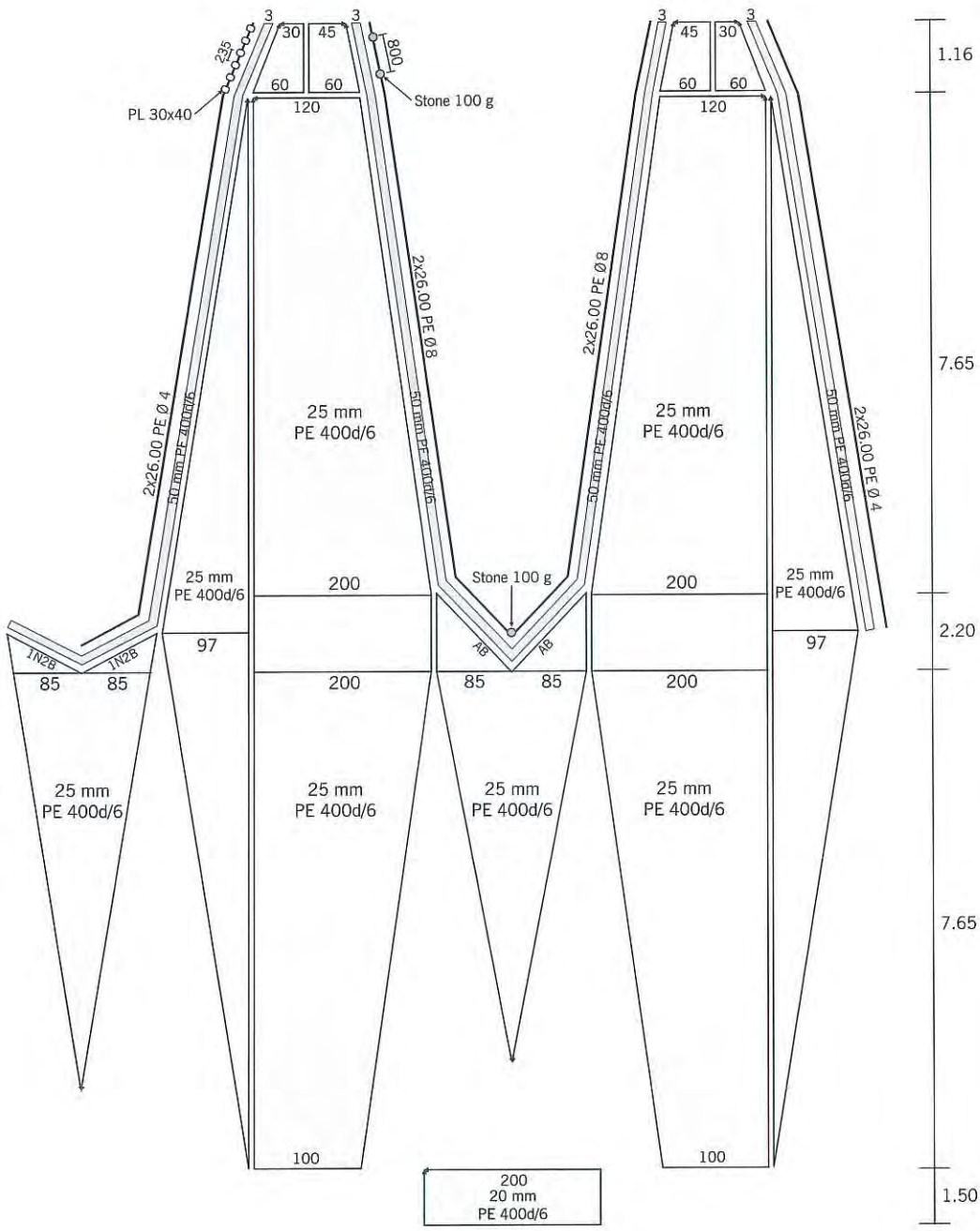


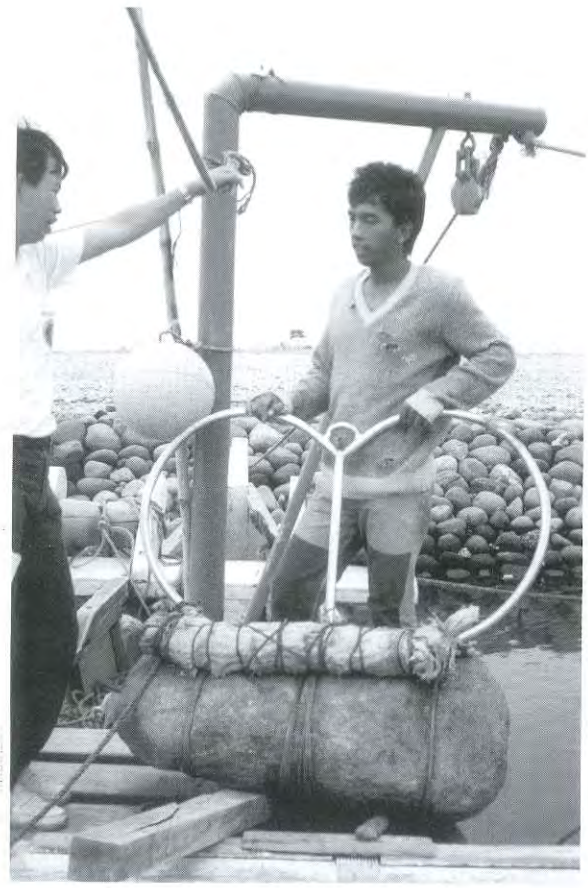
SEINE NET
Danish Seine
Holbot-Holbot
Demersal fishes

VESSEL
Loa : 8 m
GT : -
Hp : 16

LOCATION
Dalahican

Cavite City





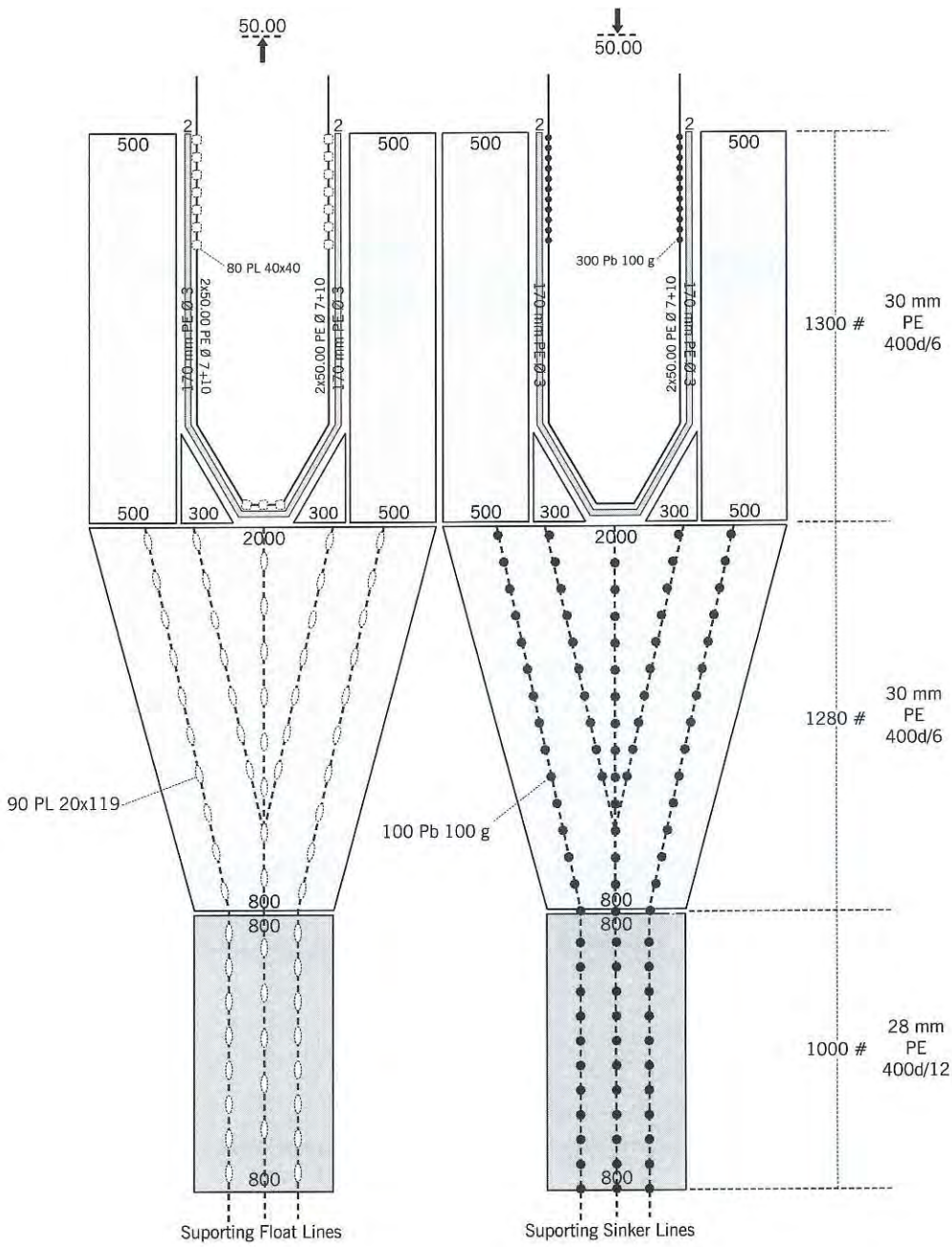
Tom weights in use

SEINE NET
Danish Seine
Holbot-Holbot
Demersal fishes

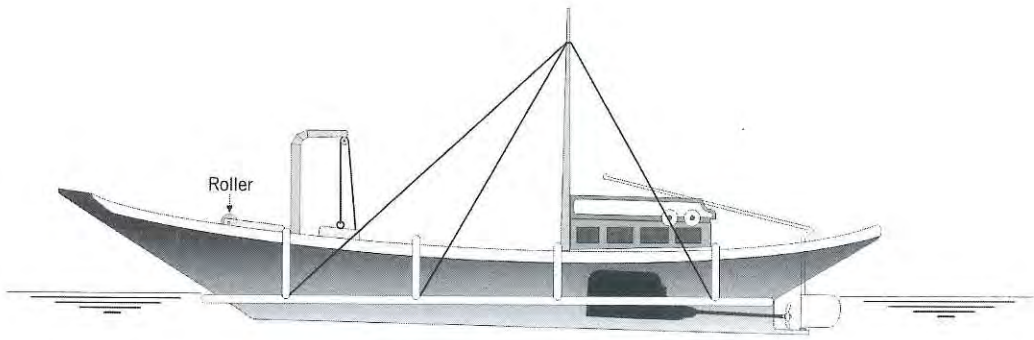
VESSEL
Loa : 15 m
GT : -
Hp : 80

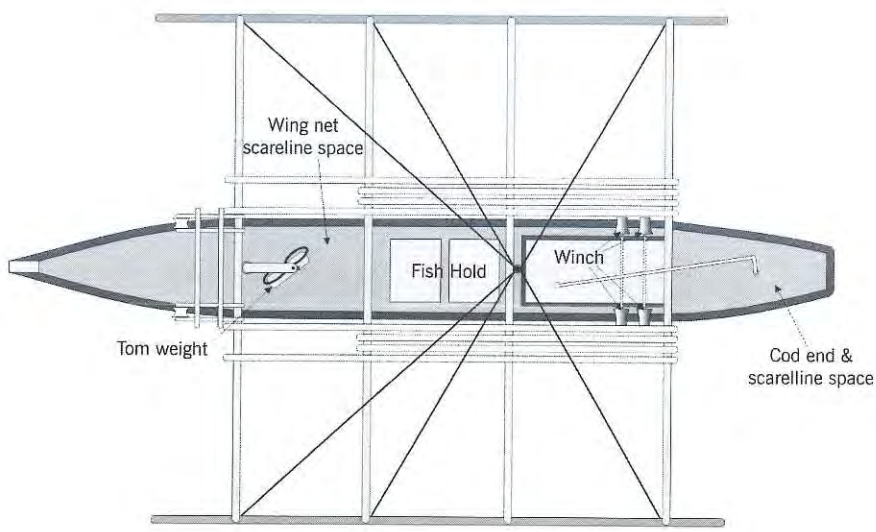
LOCATION
Bantayan, Madridejos

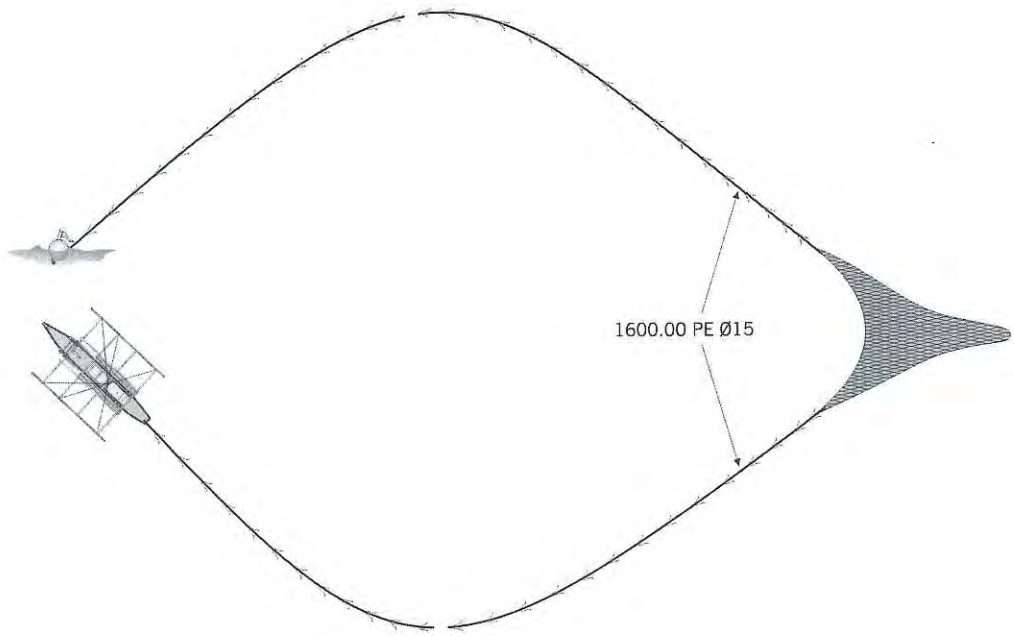
Cebu

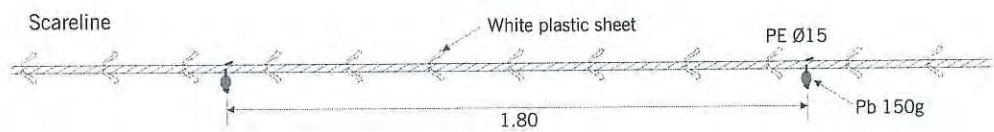


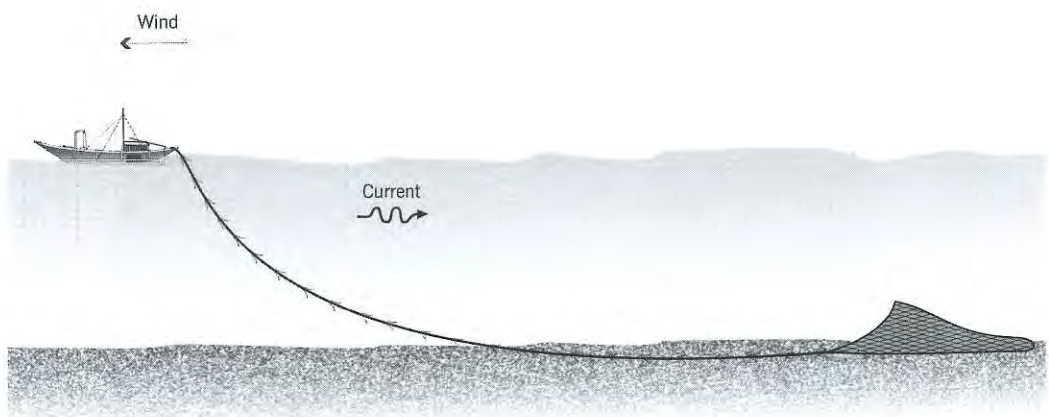
Philippines Danish Seiner (*Holbot-Holbot*)






1600.00 PE Ø15


Scareline
White plastic sheet
PE Ø15
Pb 150g
1.80

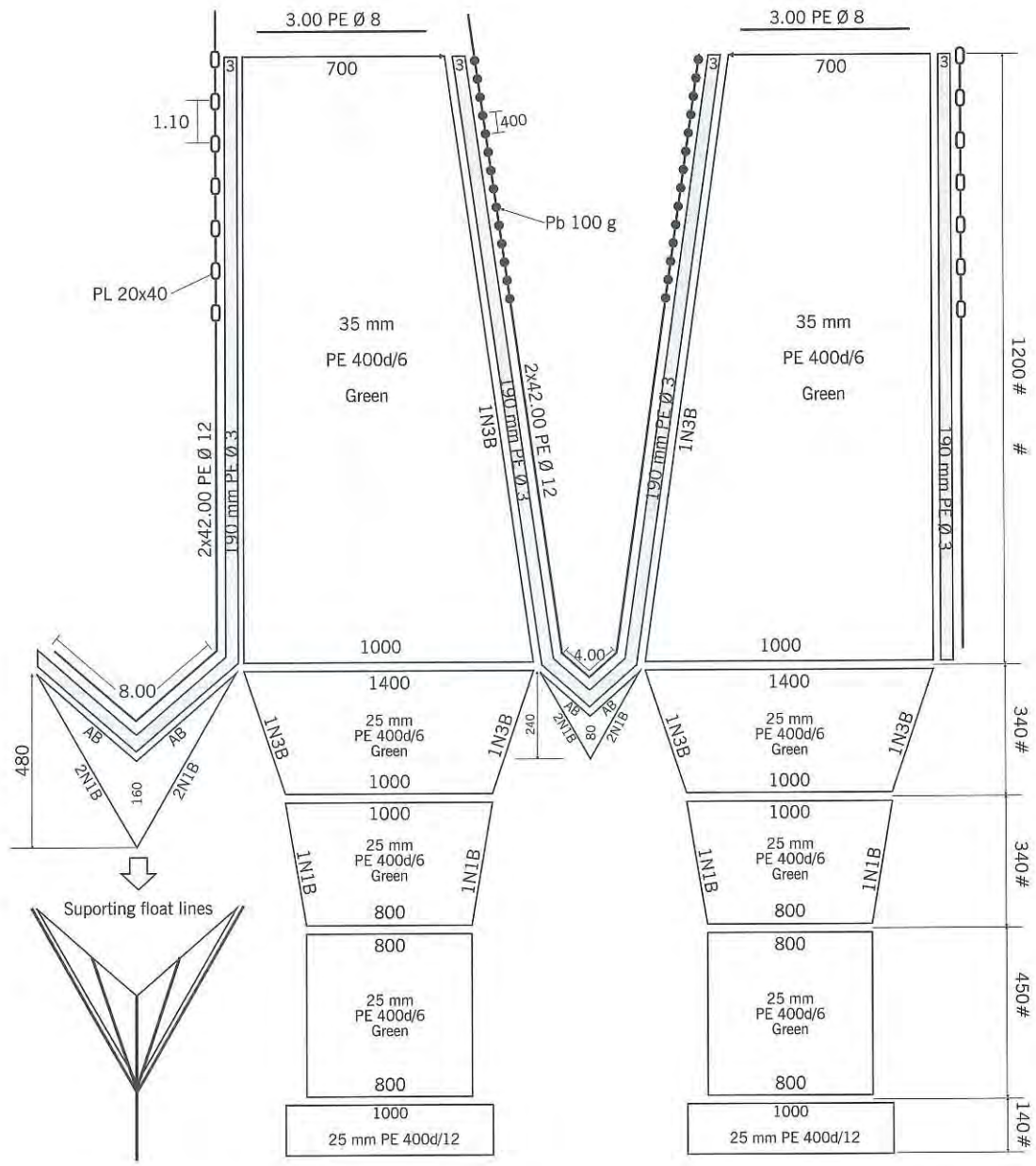

Wind
Current

SEINE NET
Danish Seine
Holbot-Holbot
Demersal fishes

VESSEL
Loa : 16 m
GT : -
Hp : 80

LOCATION
Patao, Bantayan

Cebu



SEINE NET

Danish Seine
Holbot-Holbot
Demersal fishes, Sea Bream,
Goat fish, Pony fish

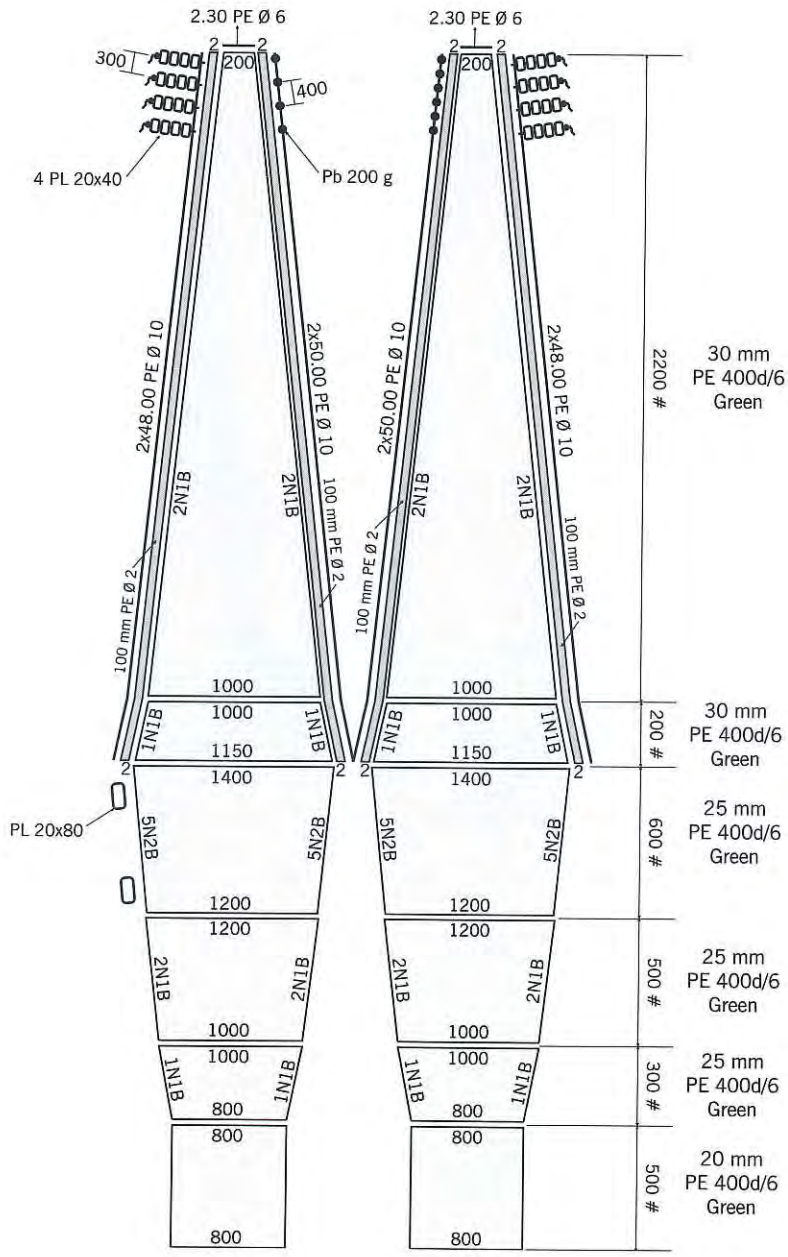
VESSEL

Loa : 20 m
GT : -
Hp : 240

LOCATION

Dalahican, Lucena

Quezon

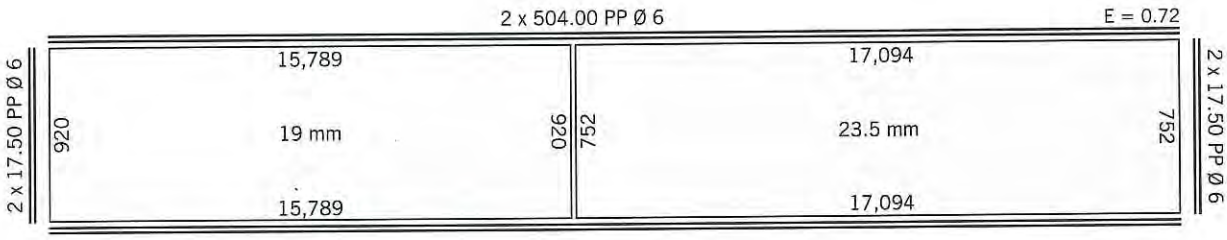


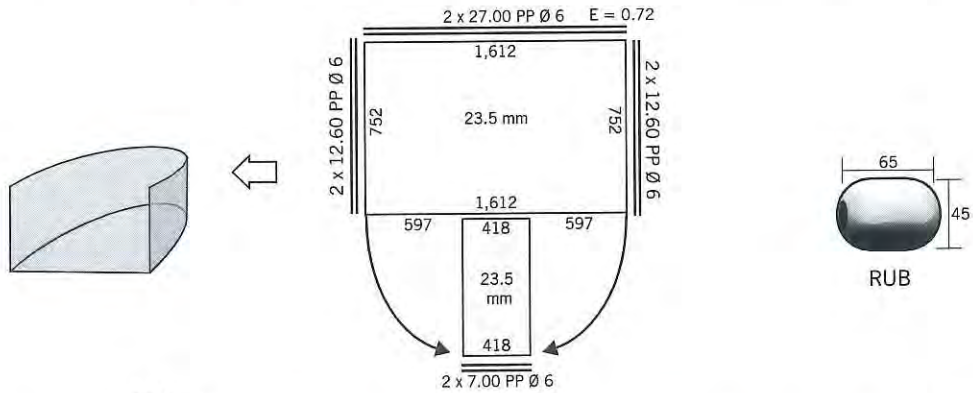
SEINE NET
Boat Seine
Pukot
Tilapia, Milk fish, Carp,
Goby, Fresh-water Catfish

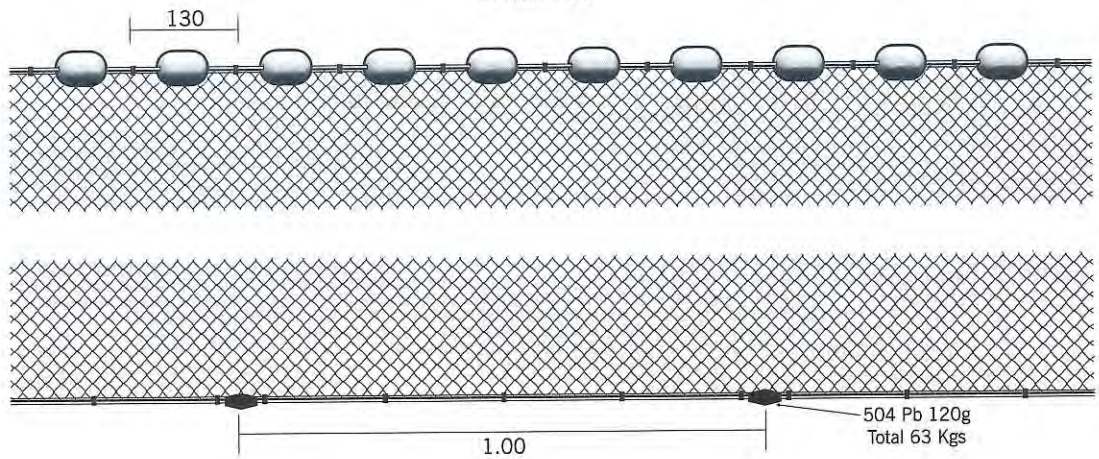
VESSEL
Loa : 9 m
GT : -
Hp : 10

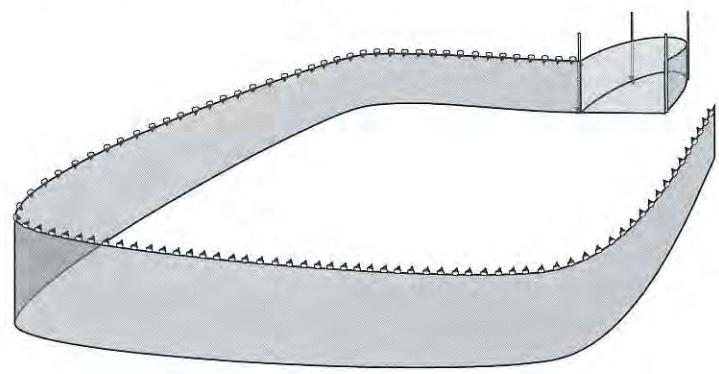
LOCATION
Calamba & Los Banos

Laguna









SEINE NET

Beach Seine
Sahid
Mullet, Slipmouth

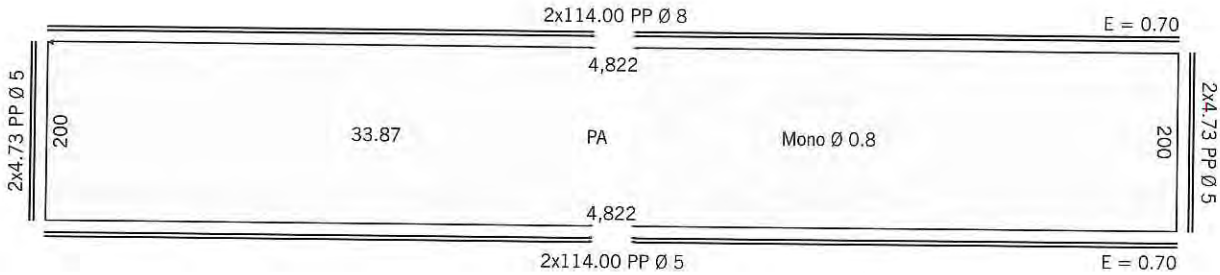
VESSEL

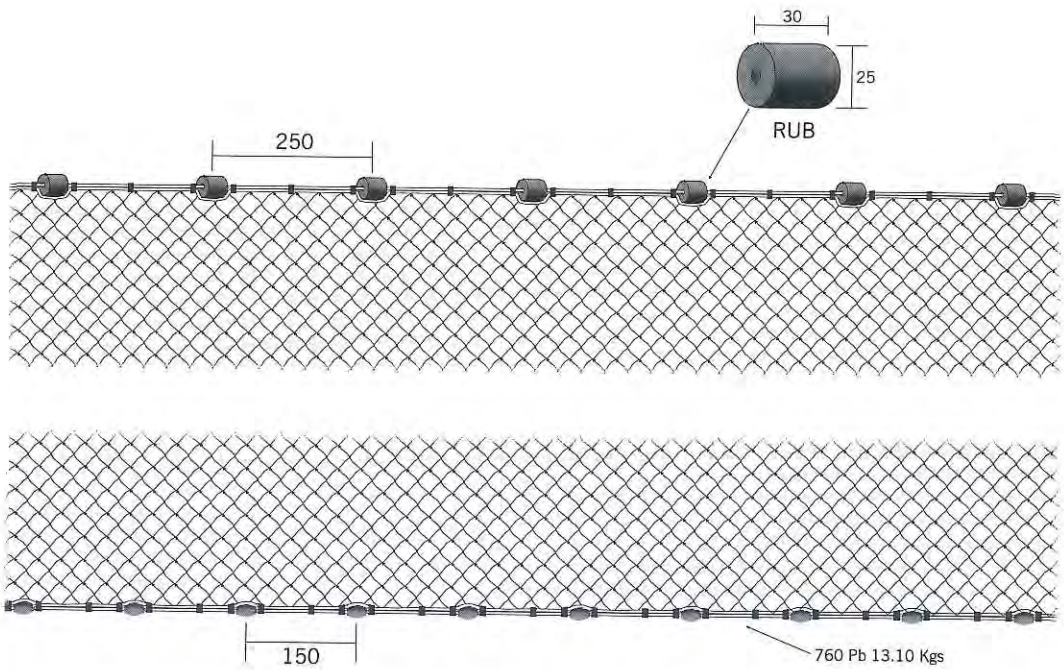
Loa : 7.41 m
GT : -
Hp : -

LOCATION

Cagayan, De Oro City

Misamis Oriental





< Chapter 5 >

Trawls

Trawl Fishing

Catching stocks of demersal fish in commercial quantities in the Philippines using trawls became popular after the liberation period (1945-1946). During the first three years of operation, fishermen were satisfied with the efficiency of the beam trawl. Subsequently, they used otter boards to replace the wooden beam to increase opening of their nets. The adoption of the otter trawl by the fishing industry resulted in many improvements in its design, construction and operation.

With the introduction of twin engines on trawlers in 1958, the trawling speed was increased to catch the fast swimming fish. Filipino fishermen continued to modify their trawl nets to have a higher vertical opening. In the latter part of 1966, the Norwegian type trawl was adopted by the industry.

During the early part of the 1970s, a German trawl net was tried in Manila Bay. This was the Hermann Engel type with mouth circumferences of 294 x 160 mm mesh, and 418 x 160 mm mesh. It was made of pure nylon twine. The boat used had a gross tonnage of 44.9 tons and was propelled by 2 x 225 Hp Gray Marine engines. Other vessels have 40 gross tonnages and are powered by 2 x 250 Hp Cummins engines.

The German, two-seam, high-opening trawl net was used by trawlers in Manila Bay and other trawl fishing grounds. This net increased the towing speed from 2.5 to 3.5 and 4 knots as wings and belly mesh sizes were bigger compared to the locally made net. The otter board measured 109 cm x 214 cm and weighed 90 kilos. In the fishing trials, the German trawl was more efficient catching 90.94 kg per hour while the locally made net was 32.48 kg. per hour.

With the expansion of fishing operations to rough grounds, plastic roller bobbins and oval boards were tried. The set of plastic bobbins was 38 m long consisting of different bobbin sizes, chain link, cable wire, iron discs (washers) and rubber discs. The bobbins were directly attached to the ground rope by way of the chain links. The oval boards with three-slit opening weighed 326 kg. each, rigged with fore and aft rigid brackets. The chain back strop is provided with the block roller where the Kelly's eye was also attached. Comparing the trawling speed of 3 knots with a rectangular board, the plastic bobbins and oval board registered a faster trawling speed of 3.5 to 3.7 knots. The oval board offers less resistance while the bobbins roll instead of plowing the bottom. The bobbin operations were considered successful in rough grounds with a harvest of big groupers and snappers.

With the desire of fishermen to catch the semi-pelagic fish, more modifications have been introduced into the trawling industry. Wings and bellies now use 2 m or more mesh sizes to increase height opening and towing speed.

Lately, in 1992, the bottom pair trawl was introduced by Chinese fishermen under a joint venture agreement. Each boat has a V-shaped steel-hull of 180.74 gross tonnage and is powered by three cummins diesel engines of 400 Hp. The trawling operation requires the synchronization of two vessels to pull the net. No trawl boards are used. The main species caught by bottom pair trawl during ten (10) days fishing operation in Northern Palawan is shown in **Table 19**.

Presently, the otter trawl is the most effective fishing gear for catching demersal species in muddy-sandy bottom conditions. Additionally, it contributes some pelagic species. It is used both by the municipal and commercial fishermen. In the commercial sector, it can be seen that slipmouth dominated the catch at 14,328 MT or 25.61% of the trawl production in 1995 (**Table 20**). Noteworthy for consideration is the dominance of pelagic species such as sardines, mackerels, scad and anchovies which indicate the present high mouth opening of the gear.

TABLE 19 FISHING OPERATION IN NORTHERN PALAWAN

Fish Species	Number of trays (20 kg. cap.)	Percentage
Hairtail	631	28.68
Red-Eyed Fish	405	18.41
Lizard Fish	272	12.36
Shark	135	6.15
Goatfish	120	5.45
Roundscad	120	5.45
Hardtail	115	5.23
Pompret	79	3.59
Cavallas (small)	72	3.27
Nemipterid	71	3.23
Assorted Big Fishes	66	3
Barracuda	51	2.32
Samot (small demersal fishes)	25	1.14
Squid	21	0.95
Others (parrot fish, big-eyed scad, cavalla big, snapper)	17	0.77
Total	2,200	100

TABLE 20 MAJOR SPECIES CAUGHT BY COMMERCIAL TRAWL, 1995 (METRIC TONS)

Species	Volume	Percentage to trawl commercial production
Slipmouth	14,328	25.61
Fimbriated sardines	6,334	11.32
Squid	3,773	6.74
Fusiliers	75	0.13
Roundscad	5,138	9.18
Anchovies	3,393	6.06
Threadfin breams	1,541	2.75
Goatfish	2,646	4.73
Indian Sardines	5,052	9.03
Hairtail	2,018	3.61
Croakers	2,592	4.63
Indo-Pacific Mackerel	1,963	3.51
Lizard fish	1,459	2.61
Acetes	942	1.68
Crevalle	1,545	2.76
Porgies	1,045	1.87
Barracuda	1,534	2.74
Glassfish	-	-
Big-eyed scad	571	1.02

Total trawl commercial production = 55,949 metric tons.
Source : Fisheries Statistics 1995, Bureau of Agricultural Statistics.

Fishing Gear and Methods

Trawl fishing in the Philippines can be grouped into three major categories:

- Otter Trawl
- Pair Trawl
- Beam Trawl

1. Otter Trawl

The otter trawl is classified into three types depending on the size of boat, namely; baby trawl (less than 3 GT), medium-sized trawl (3 GT -20 GT), and Launch type trawl (greater than 20 GT). All three types use otter boards to open the net mouth.

The baby trawl is operated by outriggered motorized bancas 7 to 10 m long, usually powered by 16 Hp gasoline engines. It is operated in municipal waters at depths from 5 m to 15 m. Target specie are shrimps, fish and other invertebrates. There are two net designs employed. The most common is the V-shaped net where cutting is mostly all bars and the length is about 13 m. The groundrope is usually longer by 1 m than the headrope. The common mesh size ranges from 20 to 30 mm. The wooden otter board measures 97 cm long x 33.5 cm wide. Operation is conducted by 2 to 3 fishermen. The second design resembles the two-seam trawl net for the medium and launch type trawls. The cutting rates for each panel vary with the combination of mesh-bar cutting. It has a length of 15 m and mesh sizes from 20 to 35 mm. The otter board is similar in size and shape to the board used by the shrimp baby trawl net. The groundrope is longer than the headrope by about 2-6 m.

The medium-sized trawl nets are also operated by outriggered bancas but they are bigger. The boat, or banca, is 10 to 13 m long and is powered by 80 to 225 Hp diesel engines. The main deck flooring is made of marine plywood. A platform is provided at the stern where setting and hauling of the net takes place. It has an after mast for tying the towing warp while dragging. Many designs are used by the fishermen. Some nets have no overhang while others have short wings. The net has a length range of 30 to 50 m and uses a combination of polyethylene netting in the wings and bellies while nylon multifilament and kuralon is used in the lower portions. The mesh sizes range from 203.2 mm in the wings to 19.05 mm in the bunt. The otter boards are rectangular and flat, made of wood but iron bars are placed on the lower side to add weight. Its length varies from 100-200 cm and is from 50-100 cm wide. Most of the medium-sized trawls are two-seam and the fish caught during daytime are slipmouths, hairtail, squid, and squilla. These trawl nets are mostly operated in Manila Bay. The Visayan Sea, the Samar Sea and Carigara Bay.

The launch-type trawl net is primarily used to capture demersal and semi-pelagic species. It is operated by wooden or steel-hulled boats with mechanical or hydraulic winches, niggerheads, booms, strapping blocks and trawl gallows. A majority of the boats are equipped with fish finders and the bigger sized-boats have radar. The boats are usually 14 to 30 m long, and are powered by one or two engines. Commonly used is the Izusu 120 to 180 Hp or 280 to 360 Hp

Cummins, Yanmar or Caterpillar engines. The material for the bigger-sized nets is polyethylene ranging from 400d/15 to 400d/48. Others use nylon material.

In the Lingayen gulf, trawlers operate their nets at depths from 50 to 80 m. The otter boards vary from 1.4 to 1.6 m long by 70-80 cm wide, wooden and are of a rectangular flat shape. The sweeplines have a length of 72 m and are attached to the upper and lower ends of the wings. The Damortis trawlers are powered by 120 Hp Izusu engines. Setting and hauling the net is done from the stern. The Niggerhead, or drums, located on both sides, facilitate the hauling of the net. Species caught are slipmouths, hairtail, caranx, goatfish and nemipterids.

In Manila Bay, trawlers operate near the Batanna and Corregidor coastal areas at depths from 30 to 60 m. These trawlers stay in the area for 3 to 5 days and are equipped with a capstan winch to haul the warps and for lifting the catch on board. Most vessels are comparatively larger than the medium-sized bancas and have engines ranging from 180 to 300 Hp. The two-seam type of net is used, with 160 mm –300 mm mesh sizes, using nylon twine of 210/33 to 210/72 and 24 mm mesh size. The otter boards which are made of rectangular wood measuring from 100-112 cm wide and 200-230 cm long. Their weights vary from 80 to 150 kg each. Major species in the area are rastrelliger, anchovy, hairtail, squid, slipmouth, and croaker.

In the Visayas area, trawlers are primarily used to catch demersal and semi-pelagic species. Most trawlers at Roxas City, Catbalogan, Carigara, Estancia and Cadiz are made of wood. Big steel-hulled trawlers are common at Iloilo and Bacolod Cities. The wooden vessels are equipped with fish finders and compasses and also stay at sea until the fish holds are full or their provisions are becoming low. The steel hulled trawlers stay longer at sea. Some fishing boats have accompanying fish carriers to take their catch to the market and to replenish provisions when they return. Most of the nets are two-seam type with sizes ranging from 1 to 2 m in the wing section and 30 to 40 mm in the cod-end. Setting and hauling the net is mechanized, so that 4 to 5 operations can be done in one day. Major species caught are nemipterids, hairtail, caranx, pompret, goatfish, lizardfish and other demersal species. Semi-pelagic fishes also contribute to trawler production.

2 Pair Trawls

Pair trawling is only being operated by a local company in a joint venture with a Chinese company. The steel-hulled vessels have a length of 30 m. and are of 180.74 GT. They are powered by three (3) Cummins 400 Hp diesels, and are equipped with echo sounders, radar, gyrocompass, single side band, GPS, LORAN, Weather Fax and other navigational and fishing equipment.

The trawling operation requires two boats of equal horsepower and size. The net is towed with equal lengths of the towing warps at depths of 70 to 82 m and speeds of 4 to 4.2 knots. The spread of the net is dependent on the correct distance between the boats. As no boards are used, the towing warps are connected directly to the sweeplines, or bridles, of each wing.

The net is hand-woven, part by part and joined to form the wings, upper and lower bellies and cod-end of the trawl. The headrope is made of 12.7 mm dia. plastic covered steel cable and polyethylene twine and serves as the hanging line where the floats are attached. There

are twenty-six (26) red plastic floats with a 2.5 cm hole dia. The center of the floatline has a blue plastic float of the same diameter as a marker. The footrope is made of steel cable also covered with plastic and 12.7 mm dia polyethylene twine. There are 280 lead sinkers weighing 1.5 kg. each.

The net can be shot from either one of the vessels. The other towing warp is taken by the boat which set the net. The warps from both vessels are then payed-out until the desired length has been reached. Trawling operation lasts from 2 to 4 hours. During hauling, the whole body and wings remain overboard while the hauling-in rope is heaved. The cod-end is brought on deck and the fish catch is released. The zipper of the cod-end is again closed for the next setting operations.

For bottom pair trawling, the most dominant species in Northern Palawan are hairtail, red-eyed fish, lizardfish, sharks and goatfish. However, long term operations would not be viable as the maintenance and operating expenses will be doubled compared to a single-boat bottom trawl.

3 Beam Trawl

Before World War II, Japanese beam trawlers numbering from 40 to 50 units were already operating the so-called "utase" in Manila Bay. However, the use of the beam trawl did not last long after the introduction of the otter trawl. By 1950, the otter trawl replaced the beam trawl.

The beam trawl is not used by the commercial fisheries sector. The limitation on the horizontal and vertical opening of the net made fishermen operate the beam trawl for a limited period only. Nowadays, only few areas are using it as the mouth opening is permanently fixed by bamboo or steel pipes.

The gear is operated in shallow sandy-muddy bottom waters by an outriggered motorized banca. Target species are shrimps, crabs, and small demersal fish.

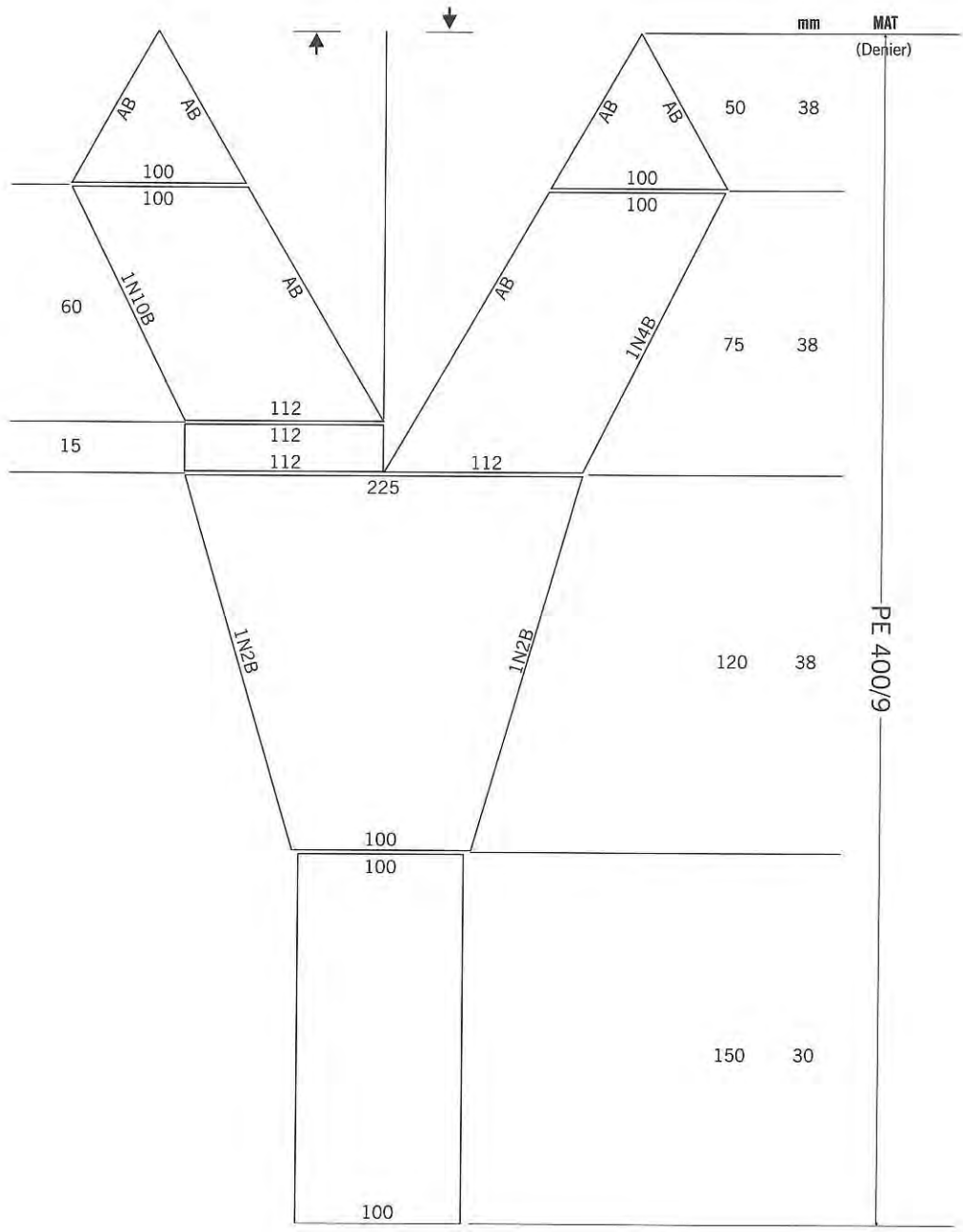
TRAWL
Shrimp Trawl

Shrimp, Small demersal species

VESSEL
Loa : 8 m
GT : -
Hp : 16

LOCATION
Nasugbu

Batangas

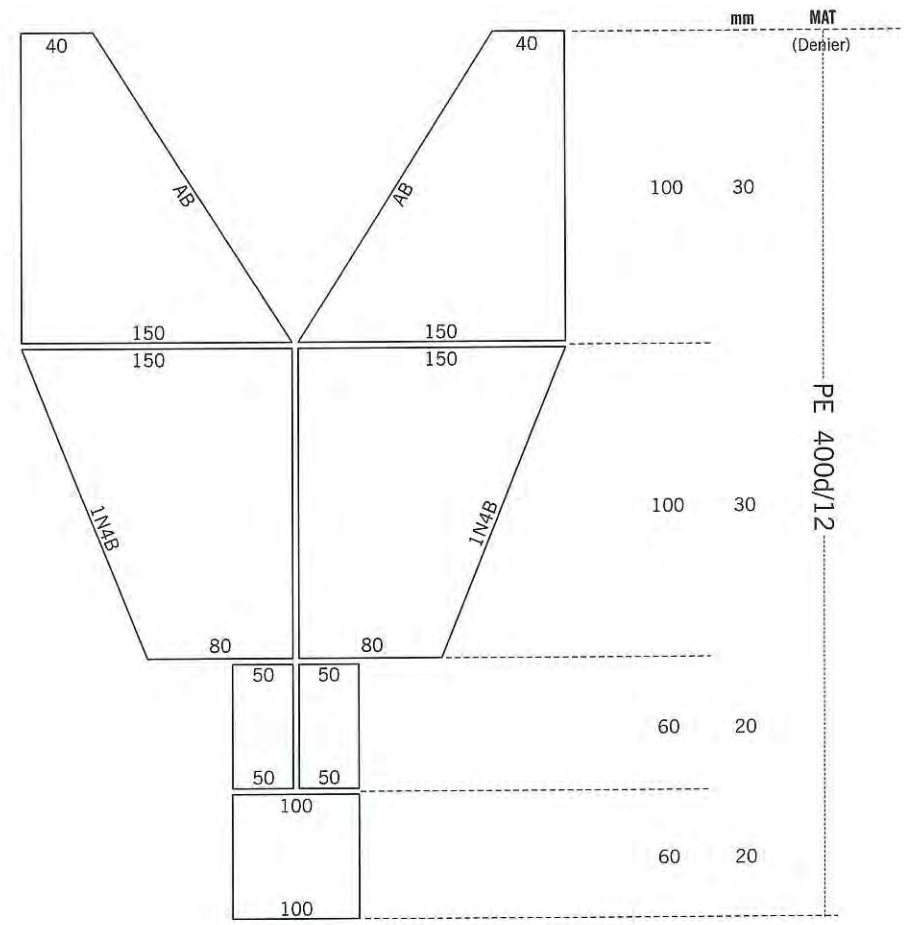


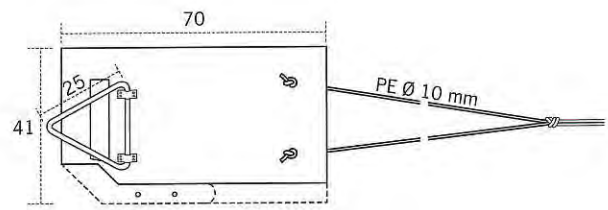
TRAWL
Baby Trawl

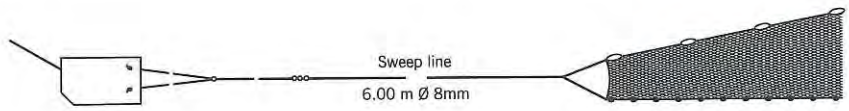
Fish, Shrimp

VESSEL
Loa : 6 m
GT : -
Hp : 16

LOCATION
Manalo, Puerto,
Princesa City
Palawan







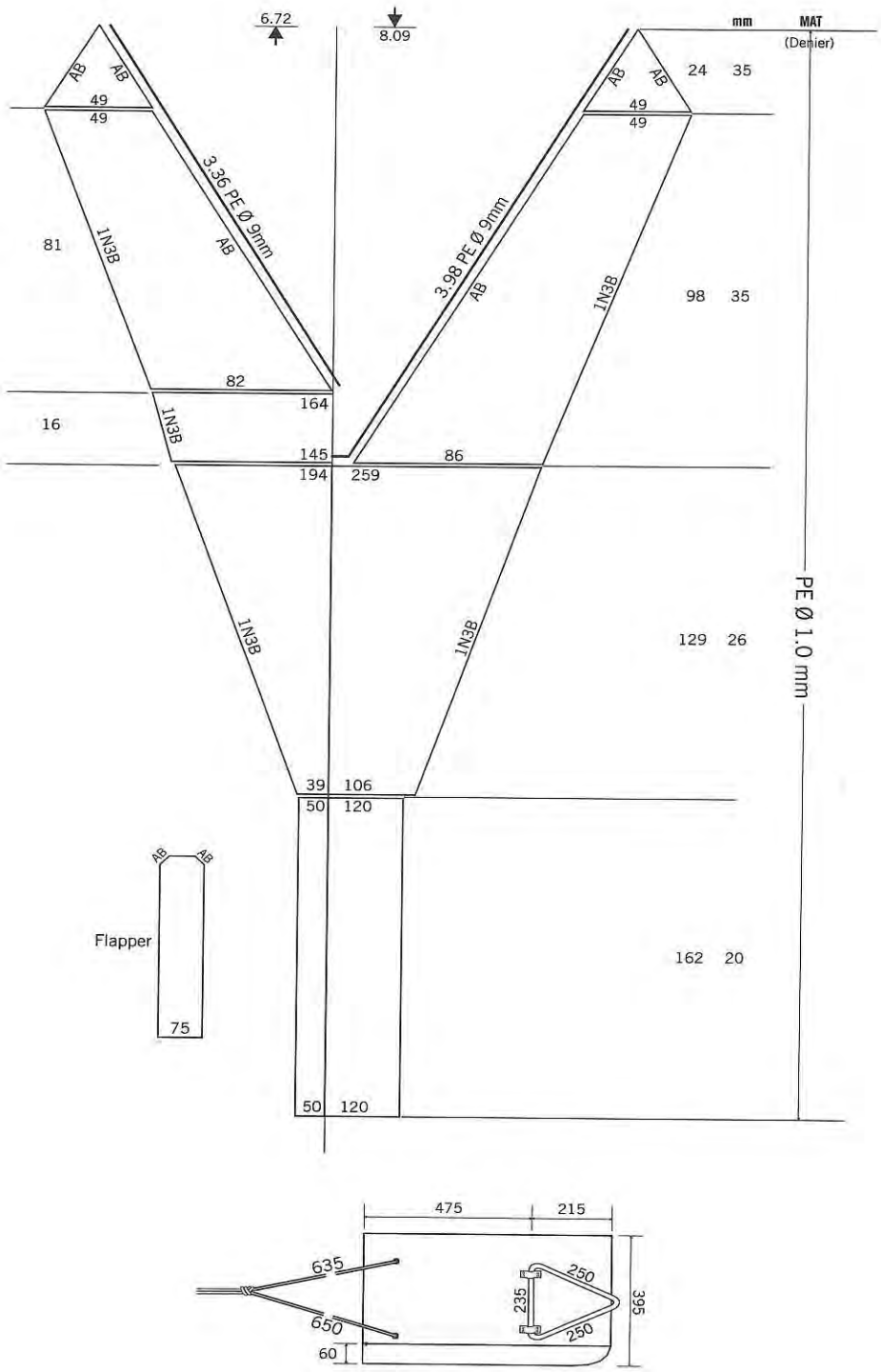
TRAWL
Shrimp Trawl

Shrimp, Small demersal species

VESSEL
Loa : 8 m
GT : -
Hp : 16

LOCATION
Nasugbu

Batangas

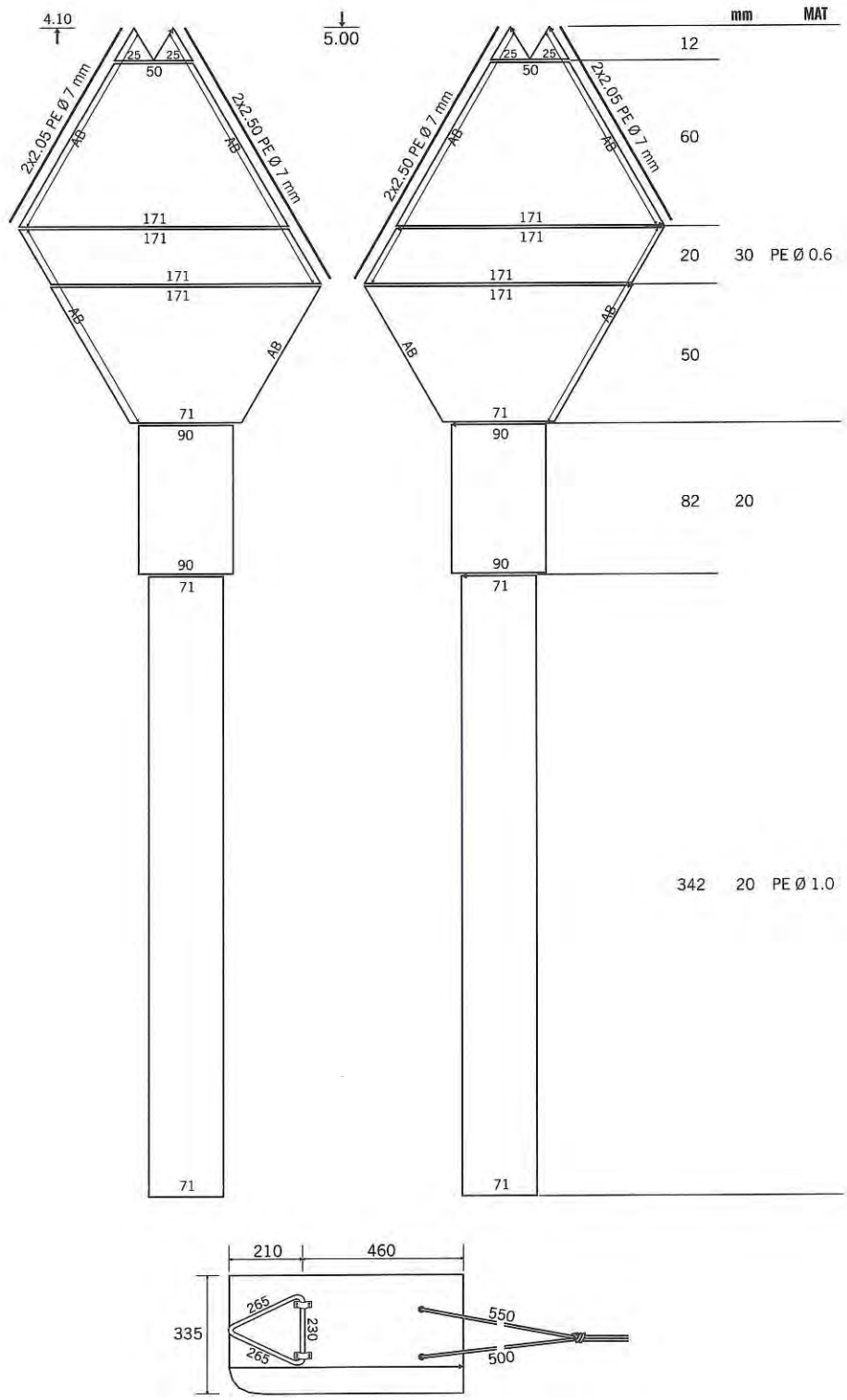


TRAWL
Baby Trawl
Galadgad
Shrimps, Small demersal fish

VESSEL
Loa : 8-10 m
Hp : 16
Crew : 2-3

LOCATION
Navotas

Metro Manila

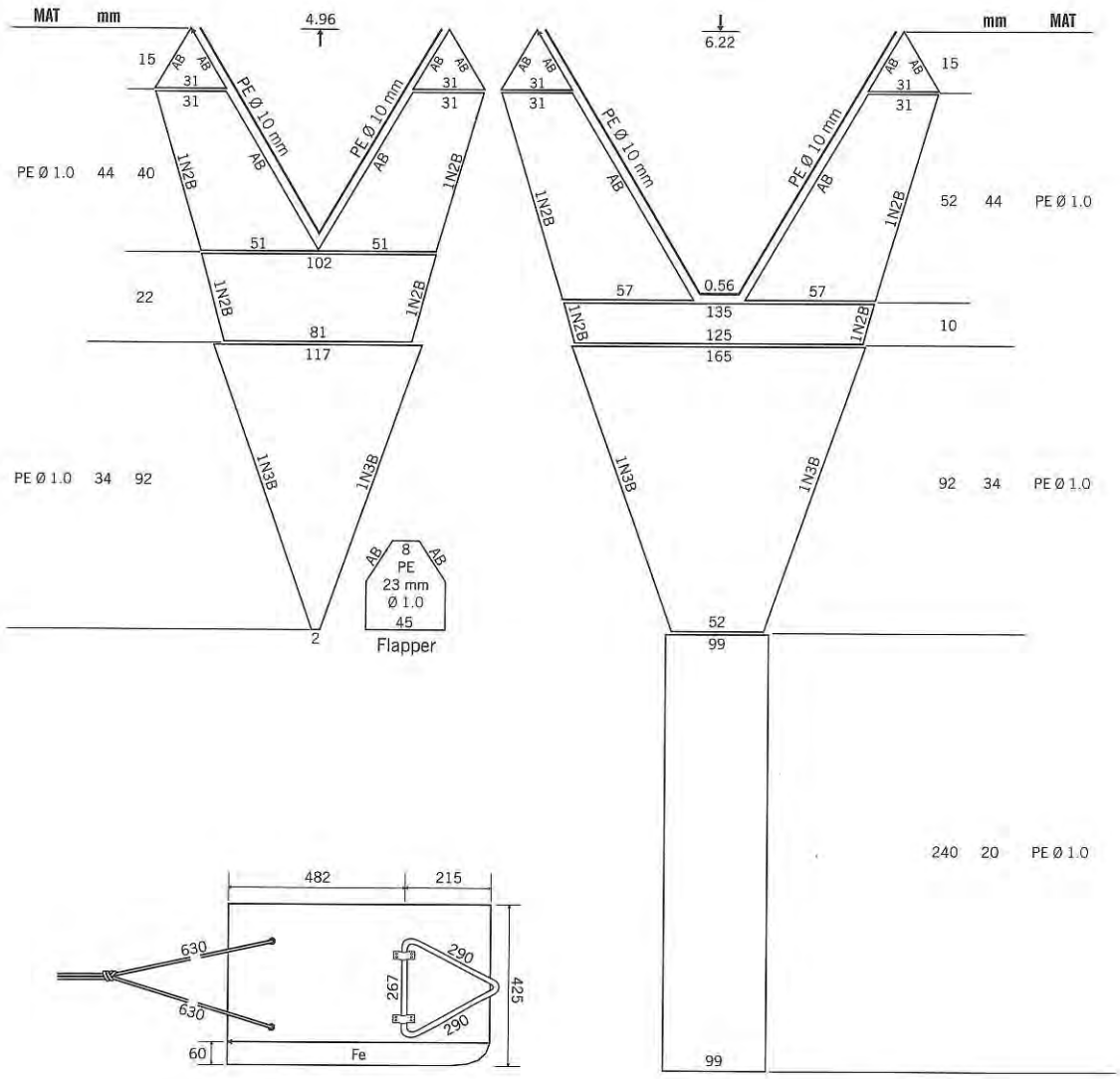


TRAWL
Baby Trawl
Galadgad
Shrimps, Demersal fishes

VESSEL
Loa : 8-10 m
Hp : 16
Crew : 2-3

LOCATION
Nosugbu

Batangas



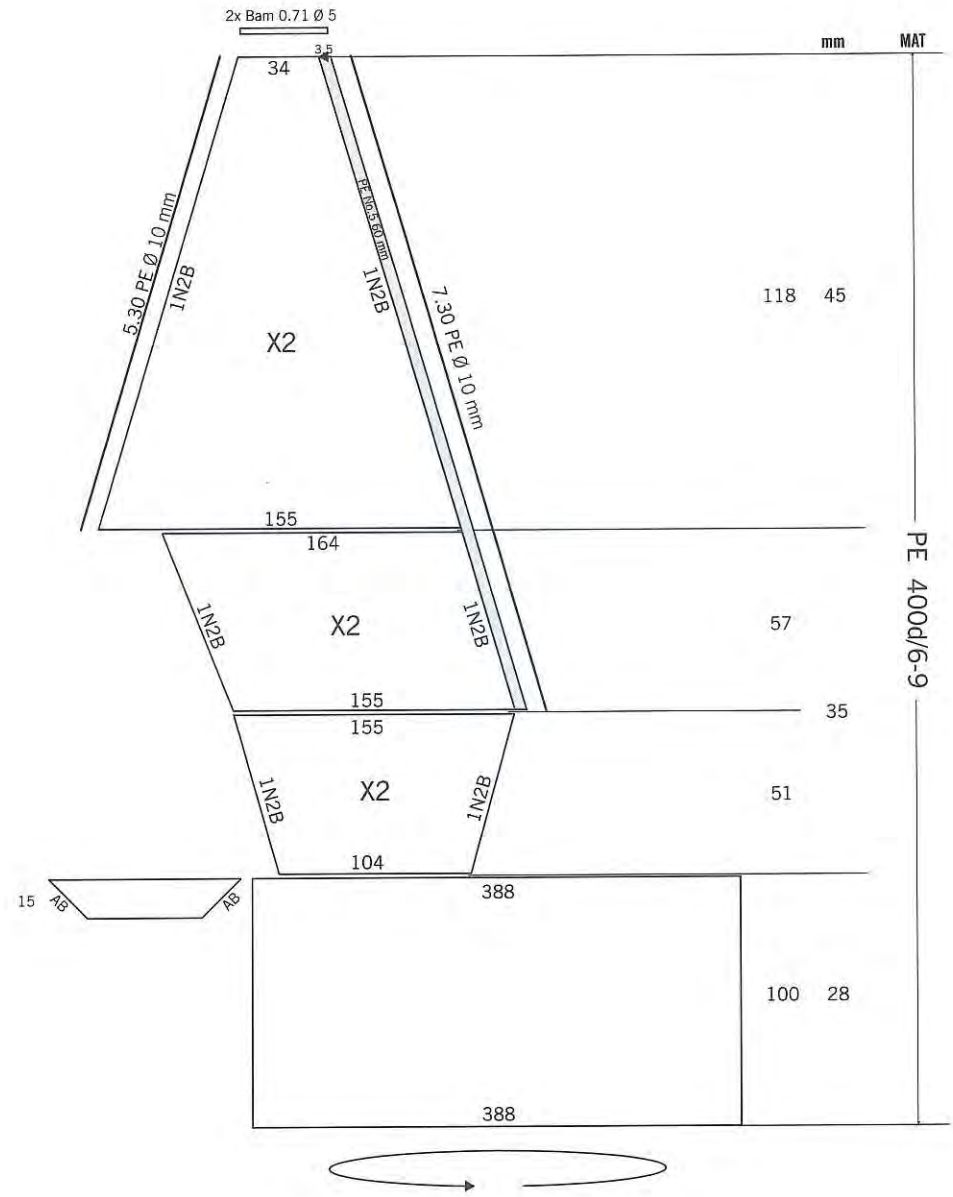
TRAWL
Otter trawl, Shrimp trawl

Shrimps, Octopus, Assorted fish

VESSEL
Loa : 13 m
GT : 2.95
Hp : 80

LOCATION
Lucena

Quezon



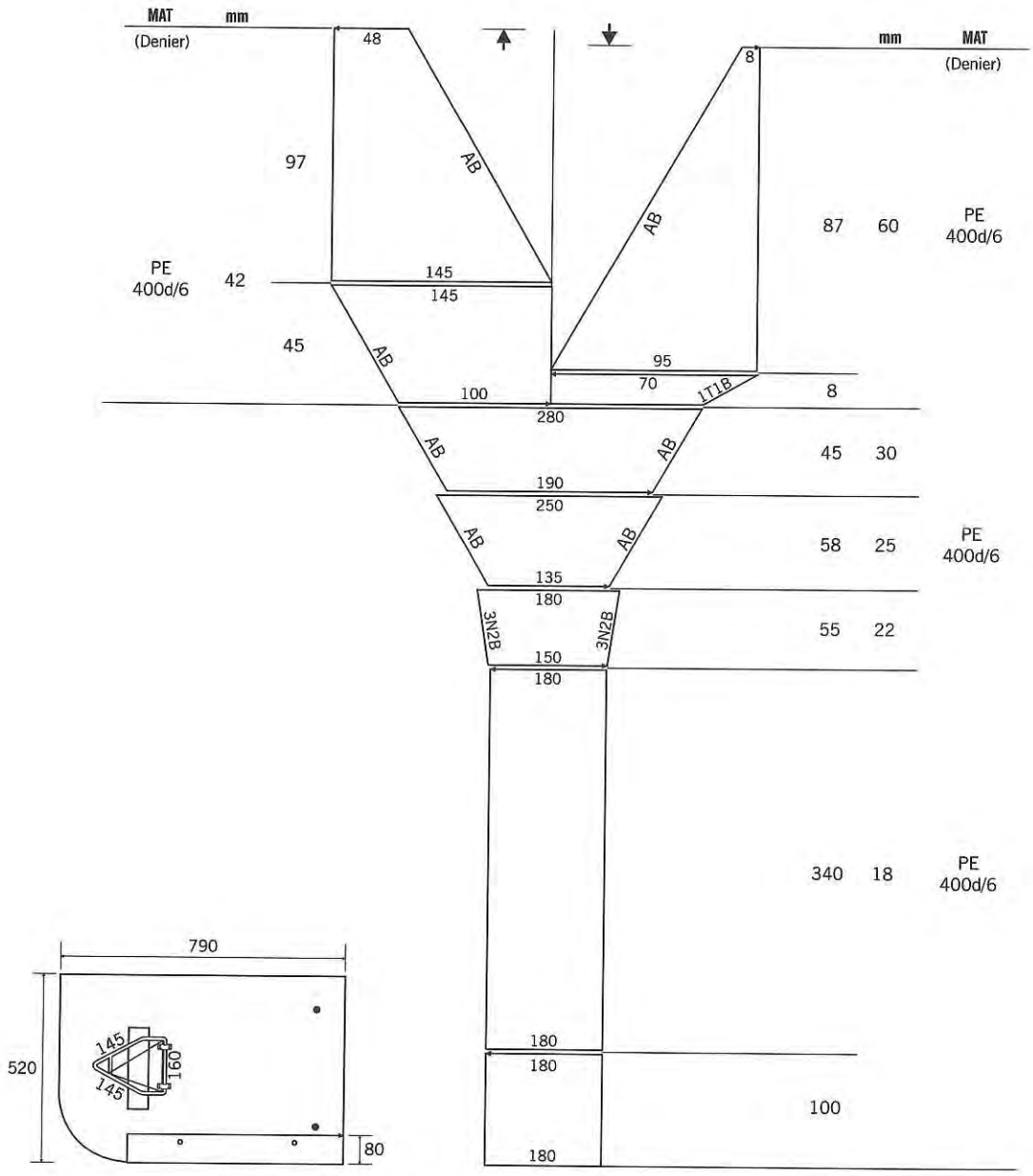
TRAWL
Otter Trawl, Baby trawl

Slipmouth, Squid,
Crab, Sea bream

VESSEL
Loa : 7-8 m
GT : -
Hp : 16

LOCATION
Masinloc

Zambales



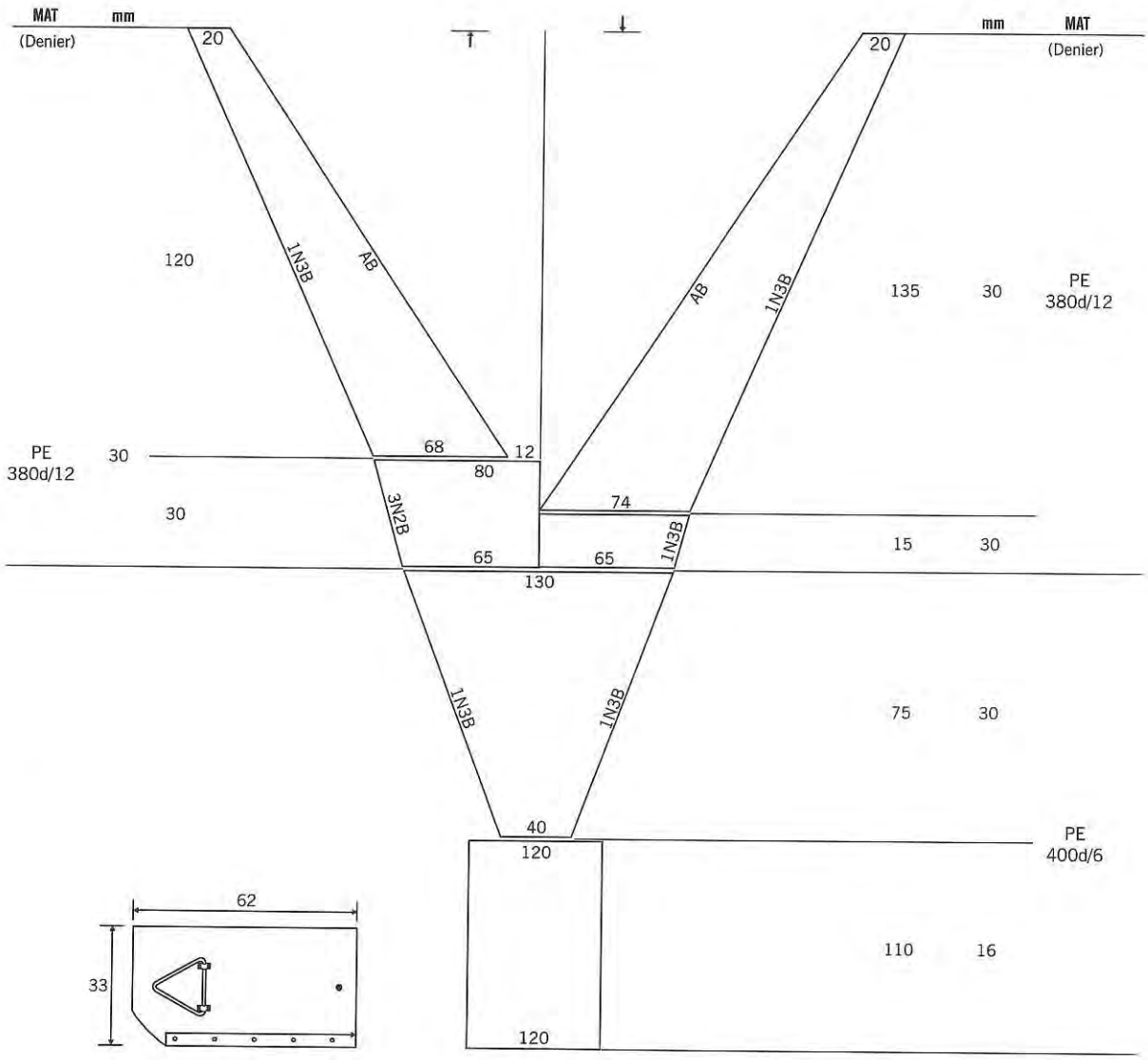
TRAWL
Otter Trawl
Karkar
Shrimps, Acetes,
Demersal fishes

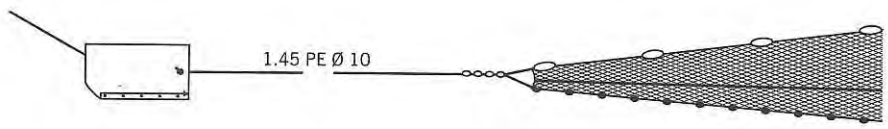
VESSEL
Loa : 8 m

Hp : 16

LOCATION
San Fabian

Pangasinan





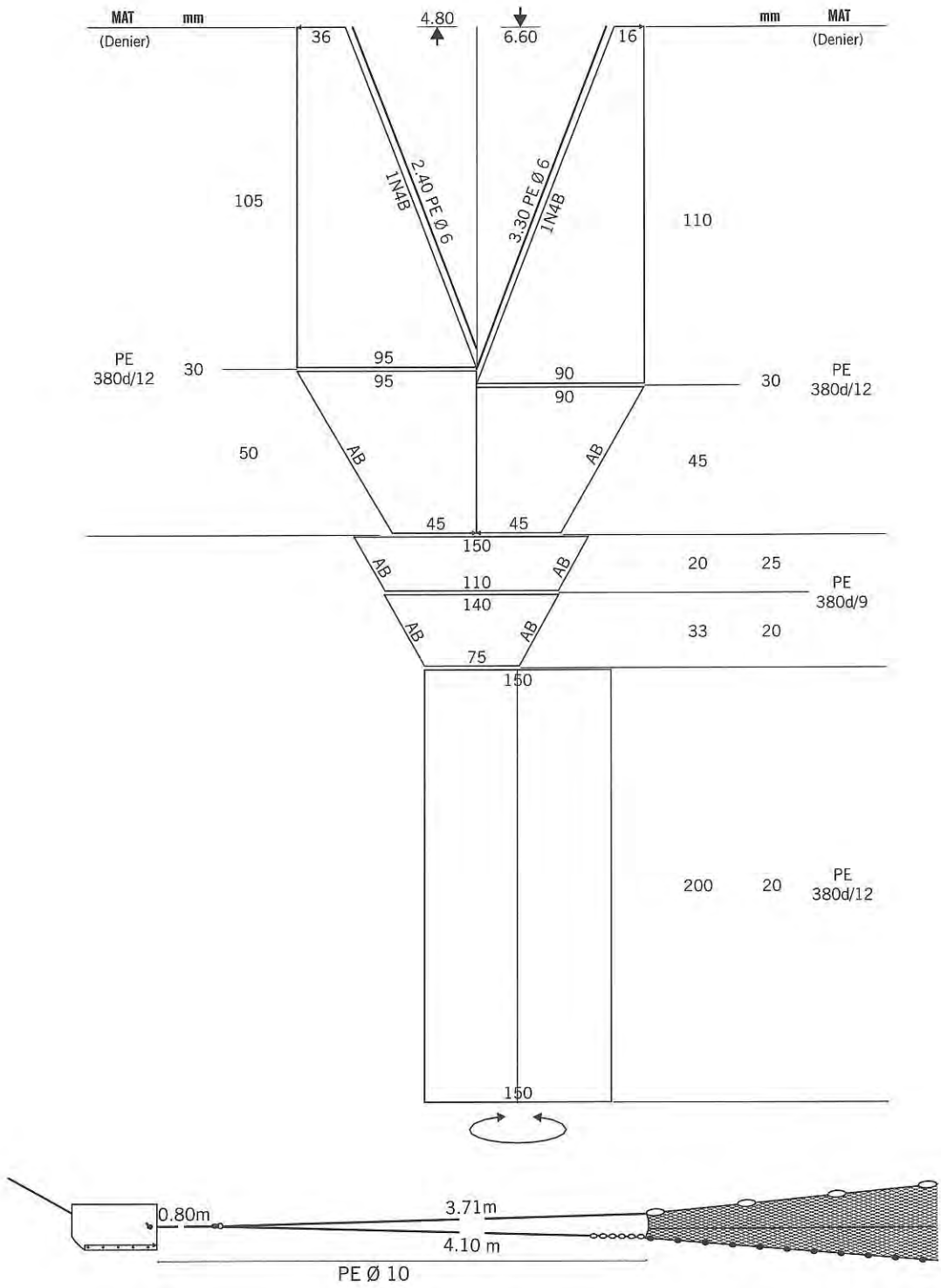
TRAWL
Otter trawl

Shrimp

VESSEL
Loa : 8 m
GT : -
Hp : 10

LOCATION
Sanjuan, Barotac Viejo

Iloilo



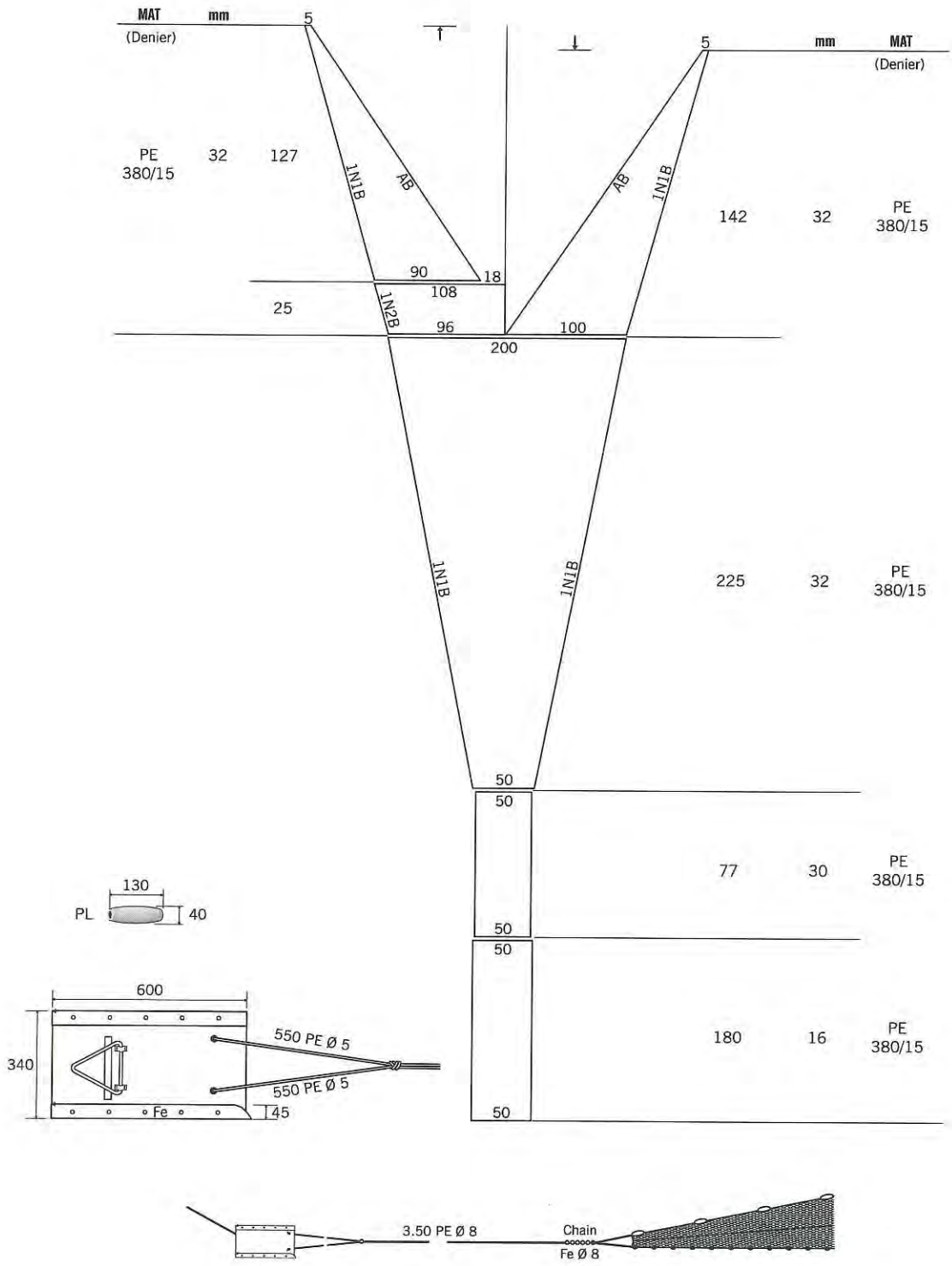
TRAWL
Otter Trawl
Karkar
Shrimps, Acetes,
Demersal fishes

VESSEL
Loa : 8 m

Hp : 16

LOCATION
San Fabian

Pangasinan



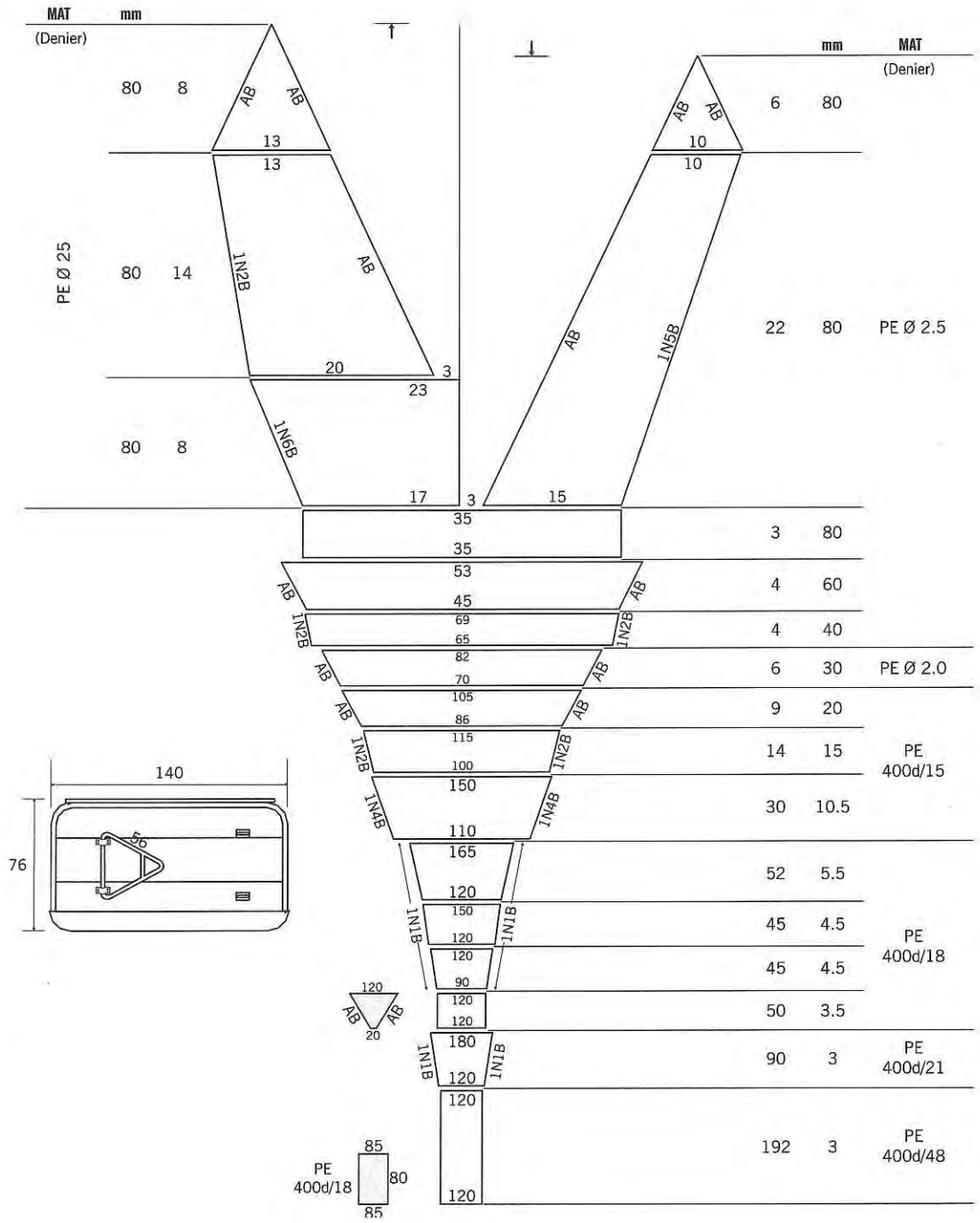
TRAWL
Otter Trawl
Galadgad
Hairtail, Goatfish, Nemipterid,
Caranx, Slipmouth, Squid

VESSEL
Loa : 15-18 m

Hp : 120
Izusu

LOCATION
Sto. Tomas

La Union



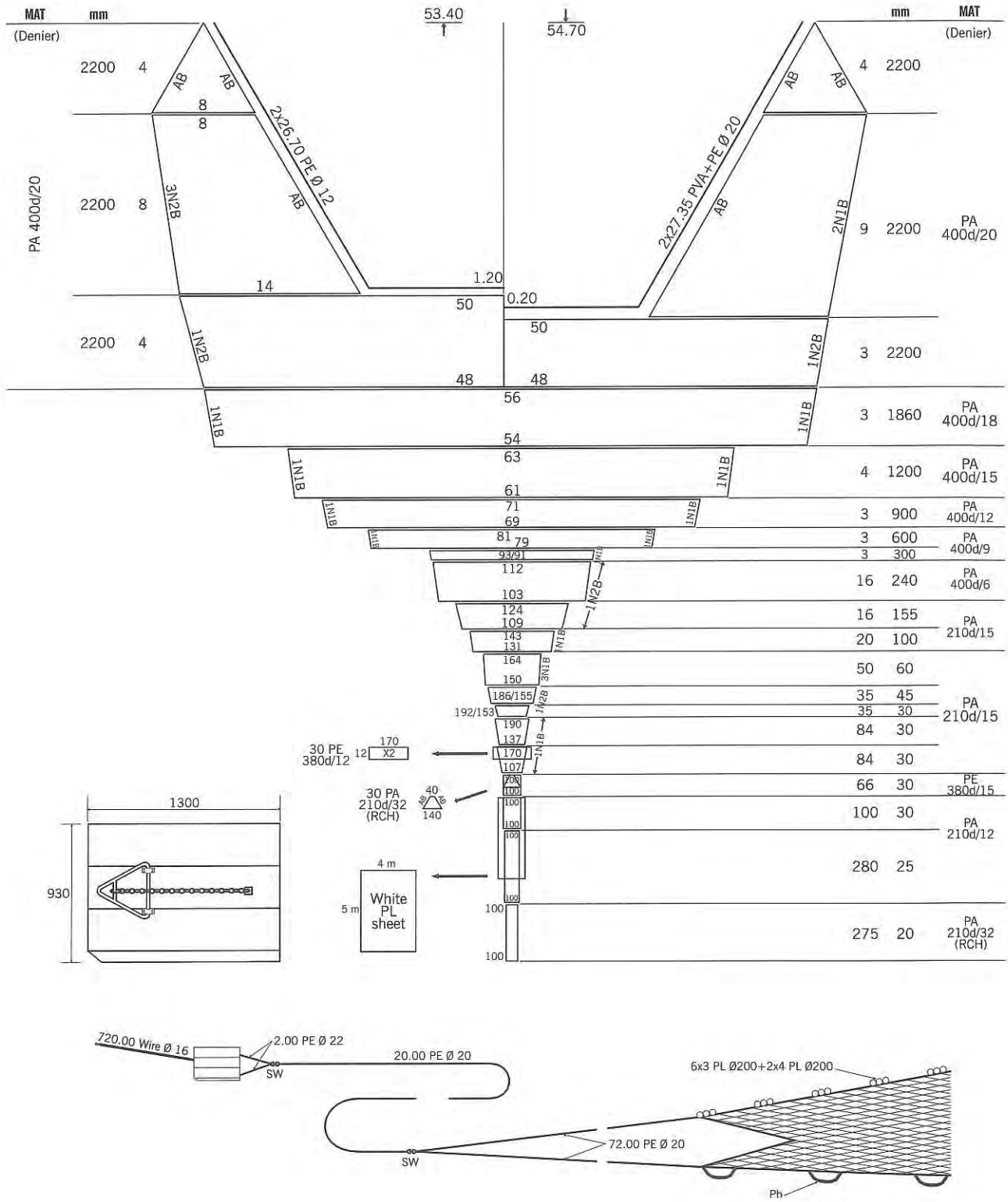
Trawl otter boards

TRAWL
Otter Trawl
Palupad
Scad, Herring, Mackerel, Sardine, Squid

VESSEL
Loa : 15 m
GT : 30
Hp : 350

LOCATION
Culasi, Roxas

Capiz



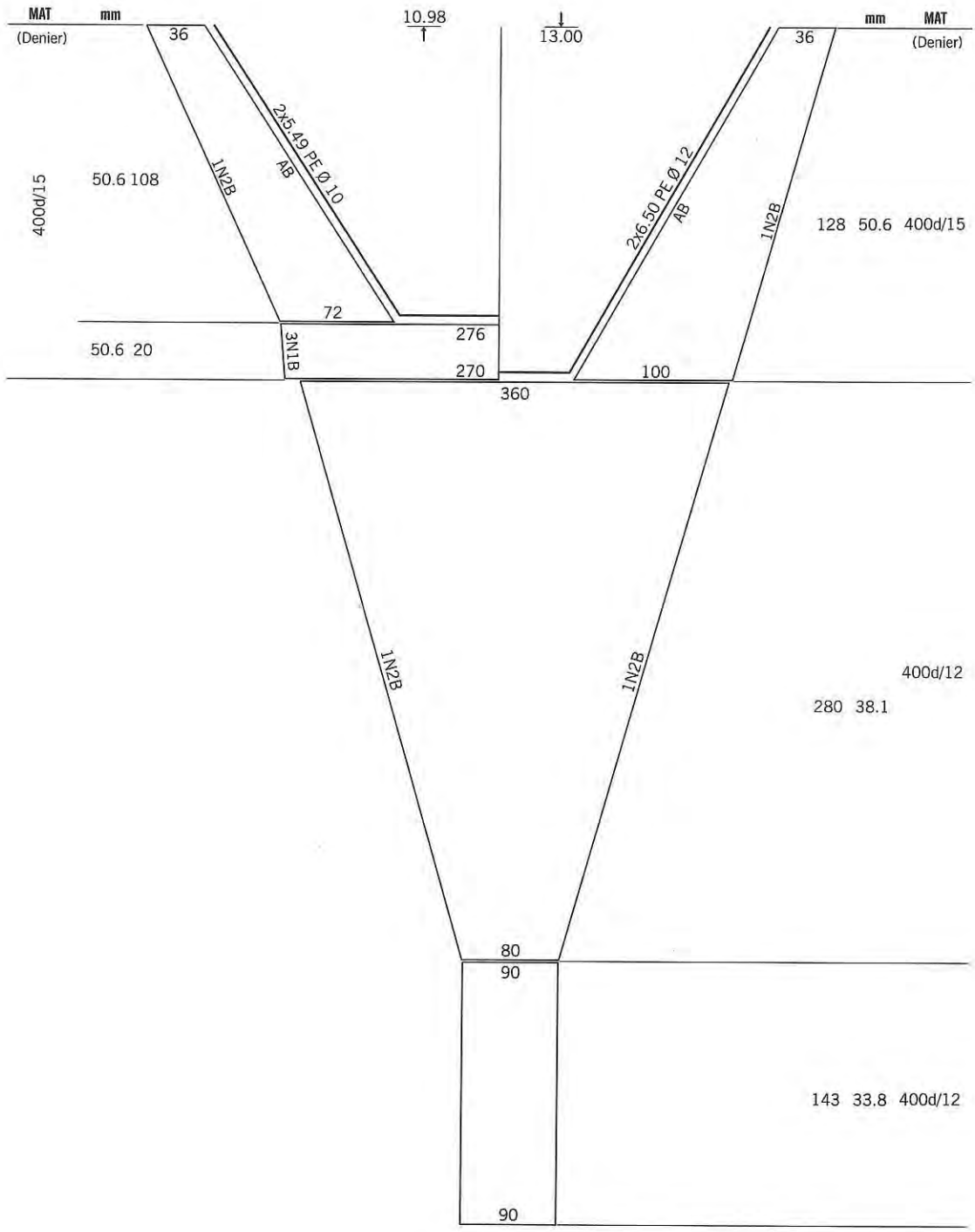
TRAWL
Bottom Otter
(Galadgad)
Shrimps, Nemipterid,
Slipmouth, Lizard fish

VESSEL
Loa : 10.00 m

Hp : 80

LOCATION
Tagkawayan

Quezon



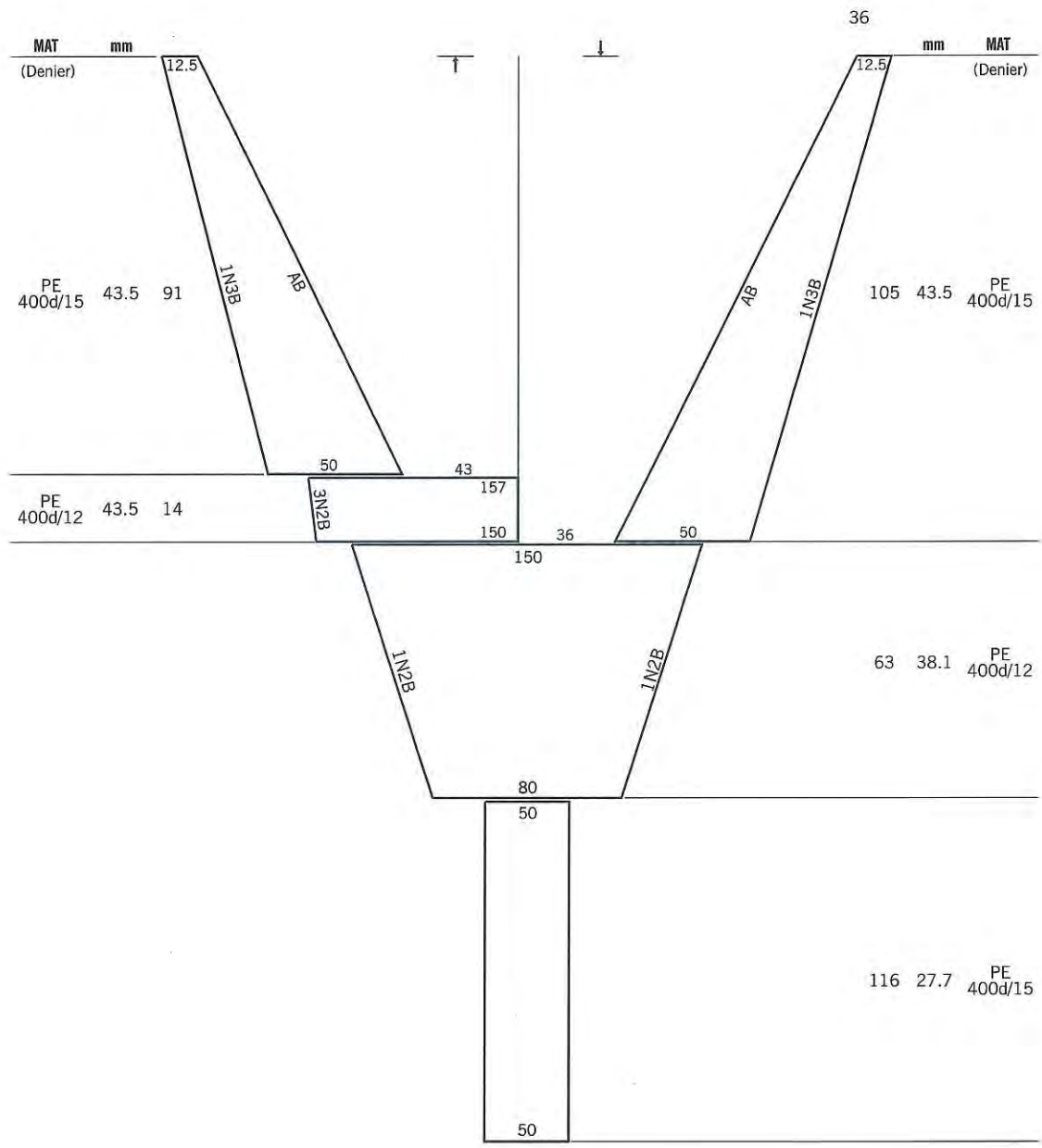
TRAWL
Bottom Otter
(Koto-Koto)
Shrimps, Nemipterid,
Blue swimming crab

VESSEL
Loa : 8.53 m

Hp : 60

LOCATION
Tagkawayan

Quezon

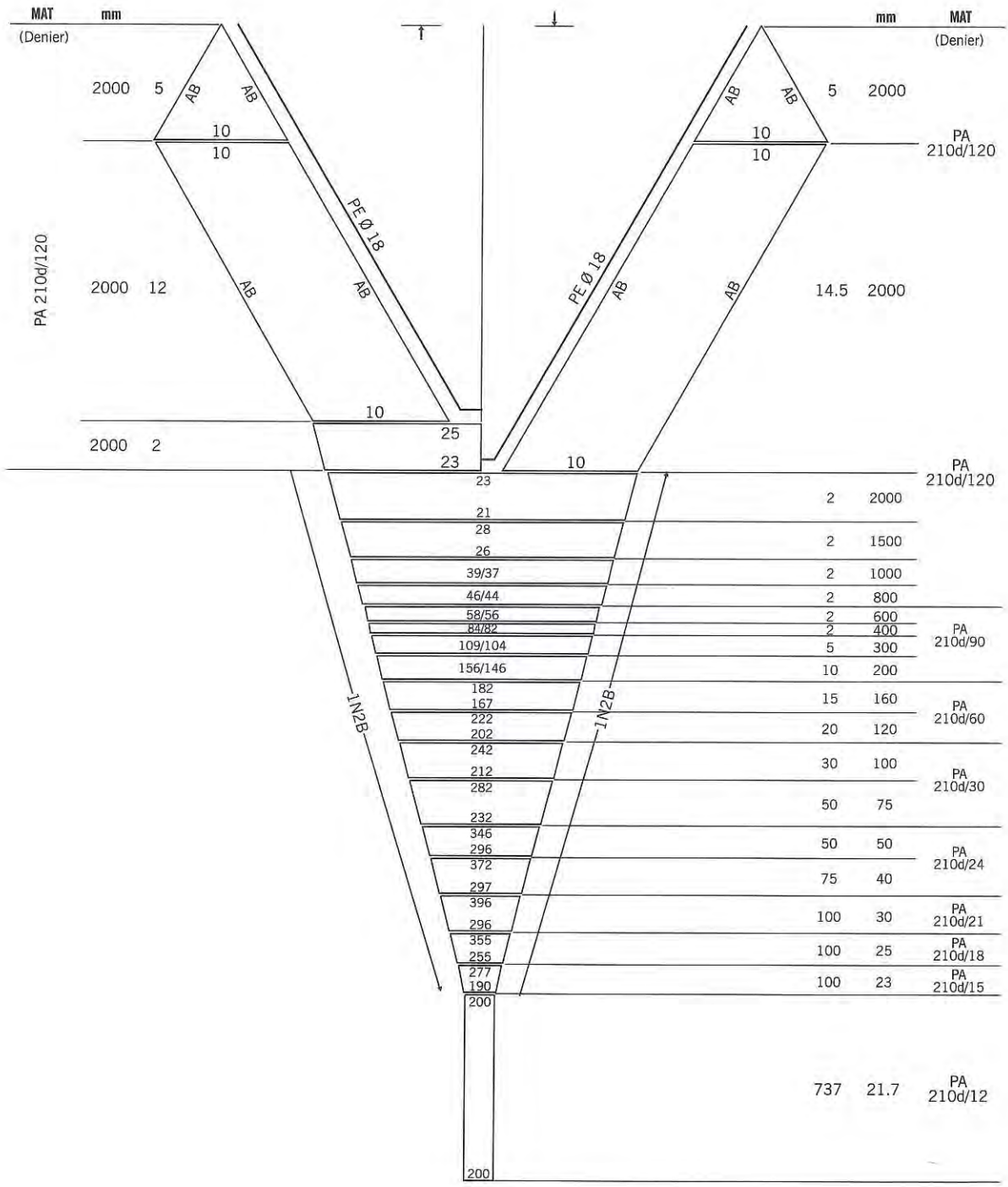


TRAWL
Bottom,Otter
Norway/Galadgad
Sardine, Striped mackerel,
Anchovy, Scad

VESSEL
Loa : 21.00 m
GT : -
Hp : 320

LOCATION
Guinayangan

Quezon



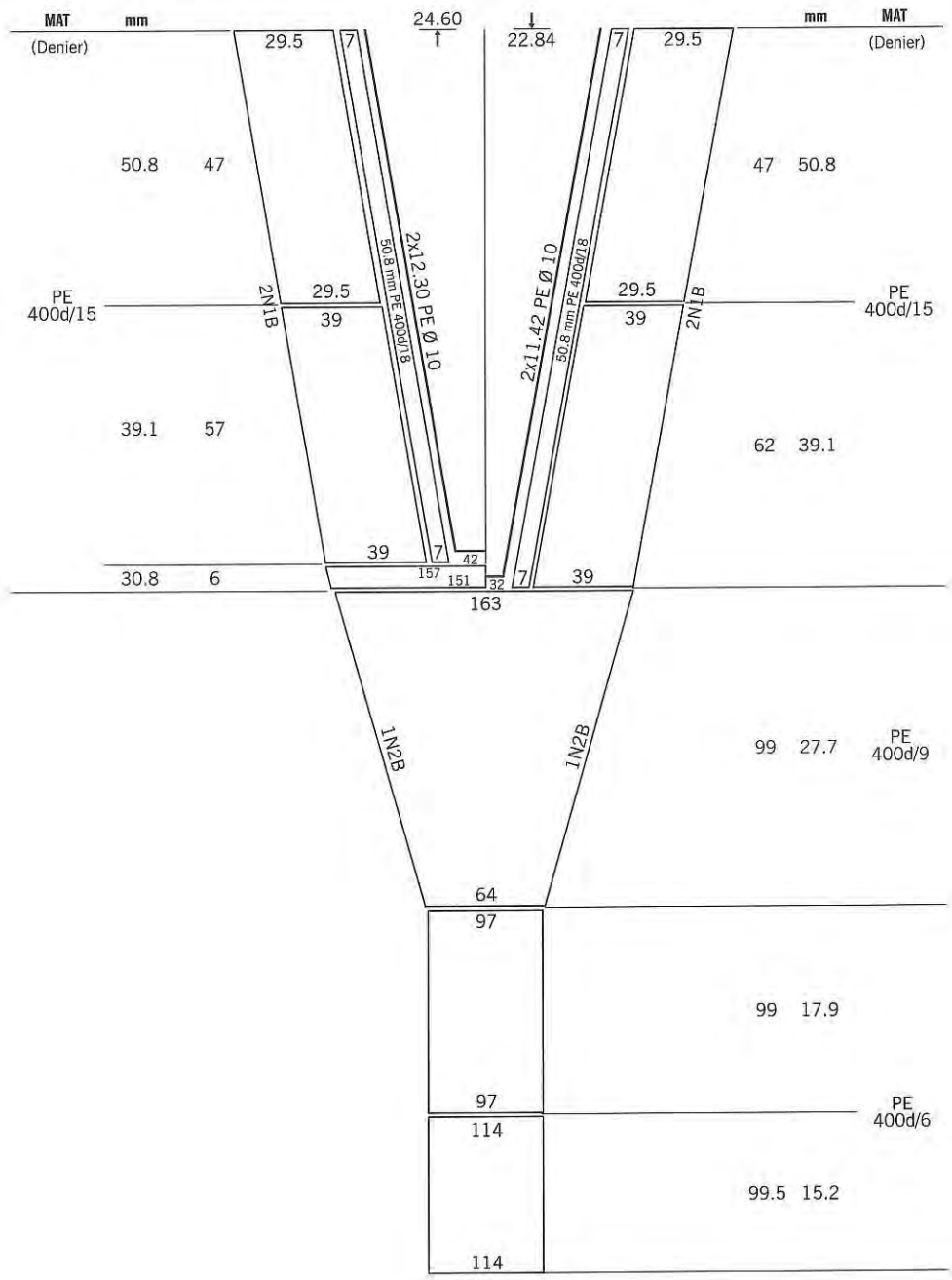
TRAWL
Bottom Otter
(Koto-Koto)
Shrimps, Slipmouth

VESSEL
Loa : 8.00 m

Hp : 10

LOCATION
Guinayangan

Quezon

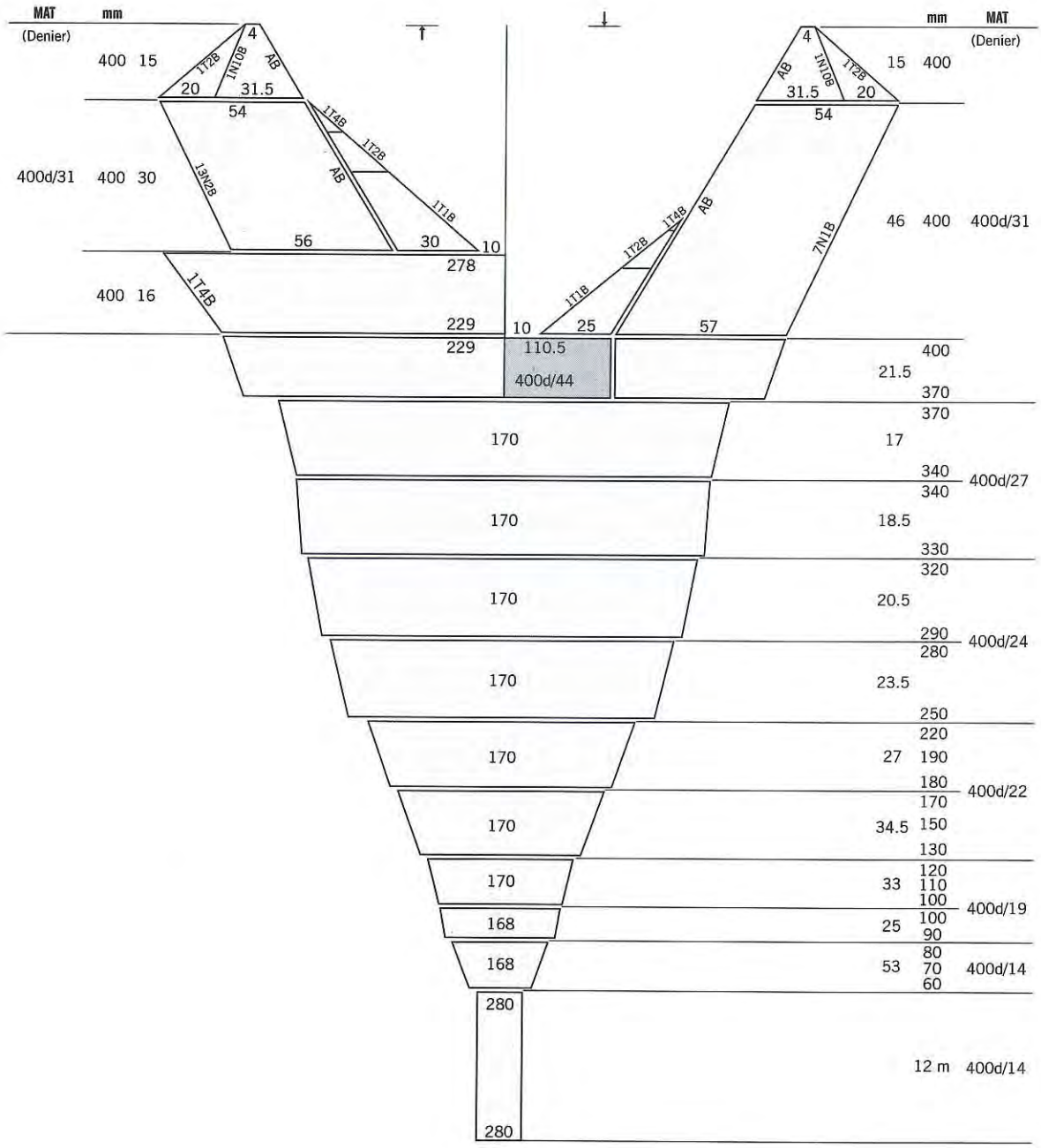


TRAWL
Bottom Pair Trawl
Paransela, Parelhas
Hairtail, Red-eyed fish,
Lizard fish, Goat fish

VESSEL
Loa : 30 m
GT : 180
Hp : 400x3

LOCATION
Navotas

Metro Manila



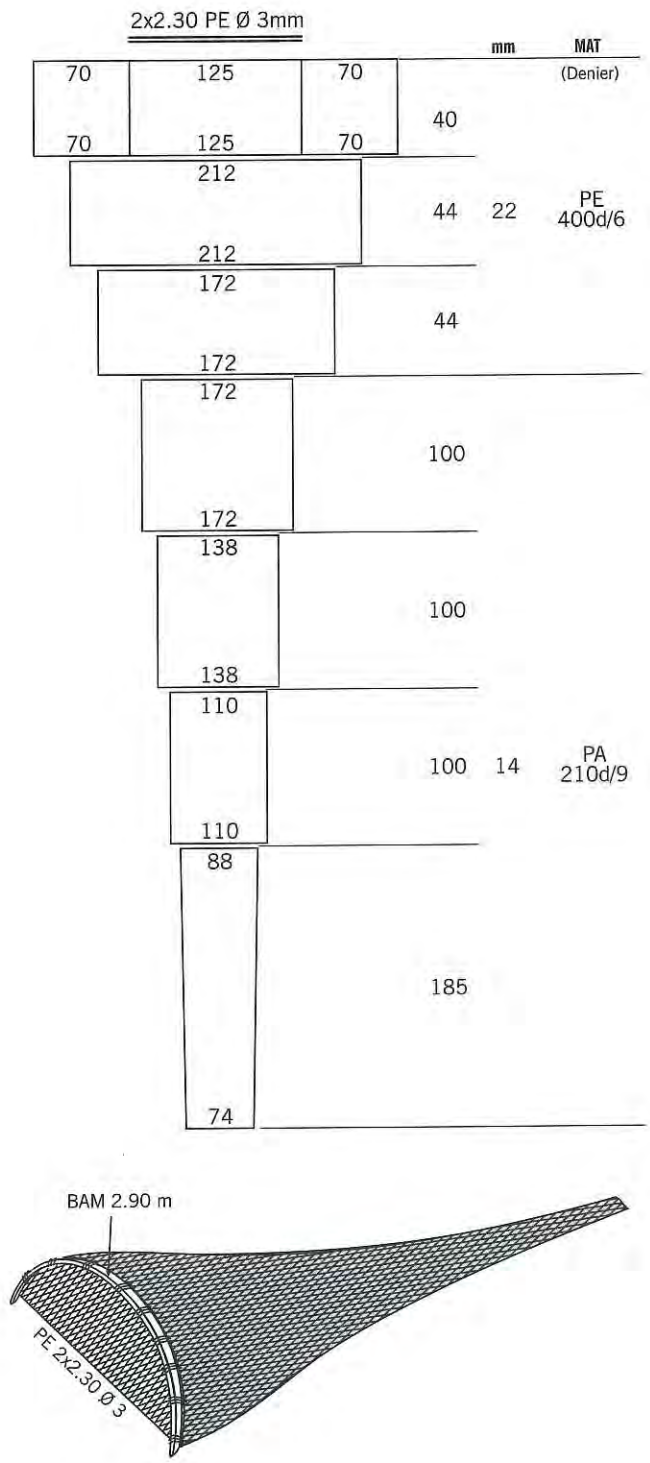
TRAWL
Beam trawl
Karkar
Slipmouth

VESSEL
Loa : 10 m

Hp : 16

LOCATION
Bauang

La Union



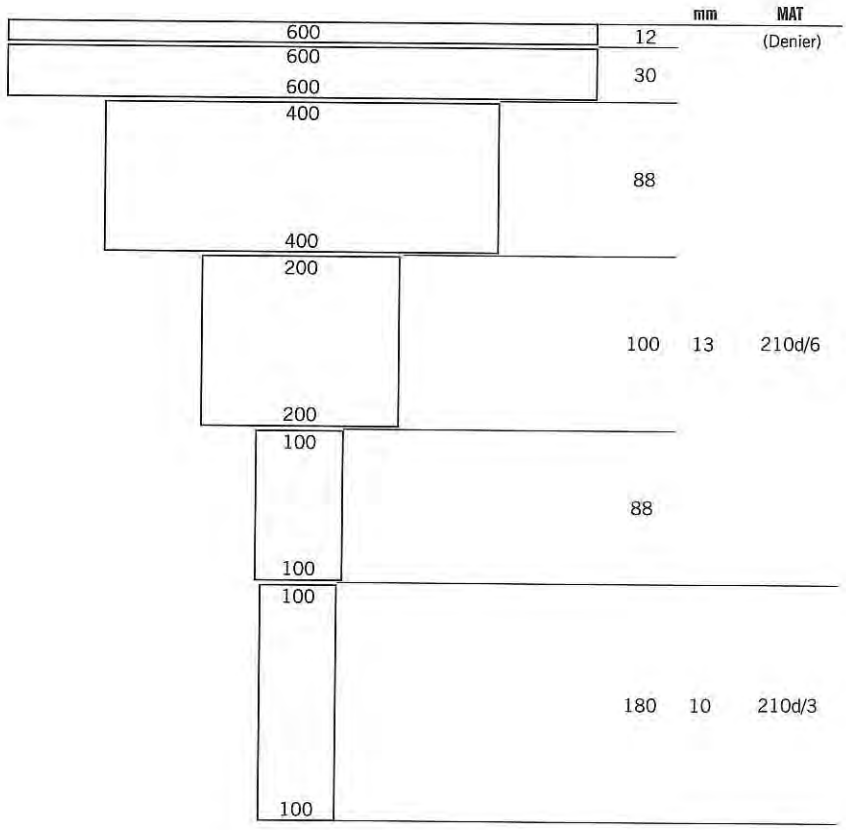
TRAWL
Beam trawl
Karkar
Small shrimp, Crab

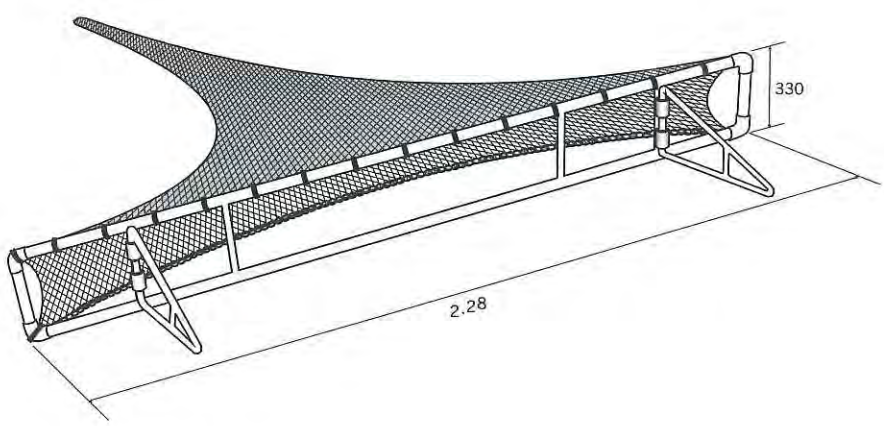
VESSEL
Loa : 7 m

Hp : 16

LOCATION
Pasuquin

Ilocos Norte





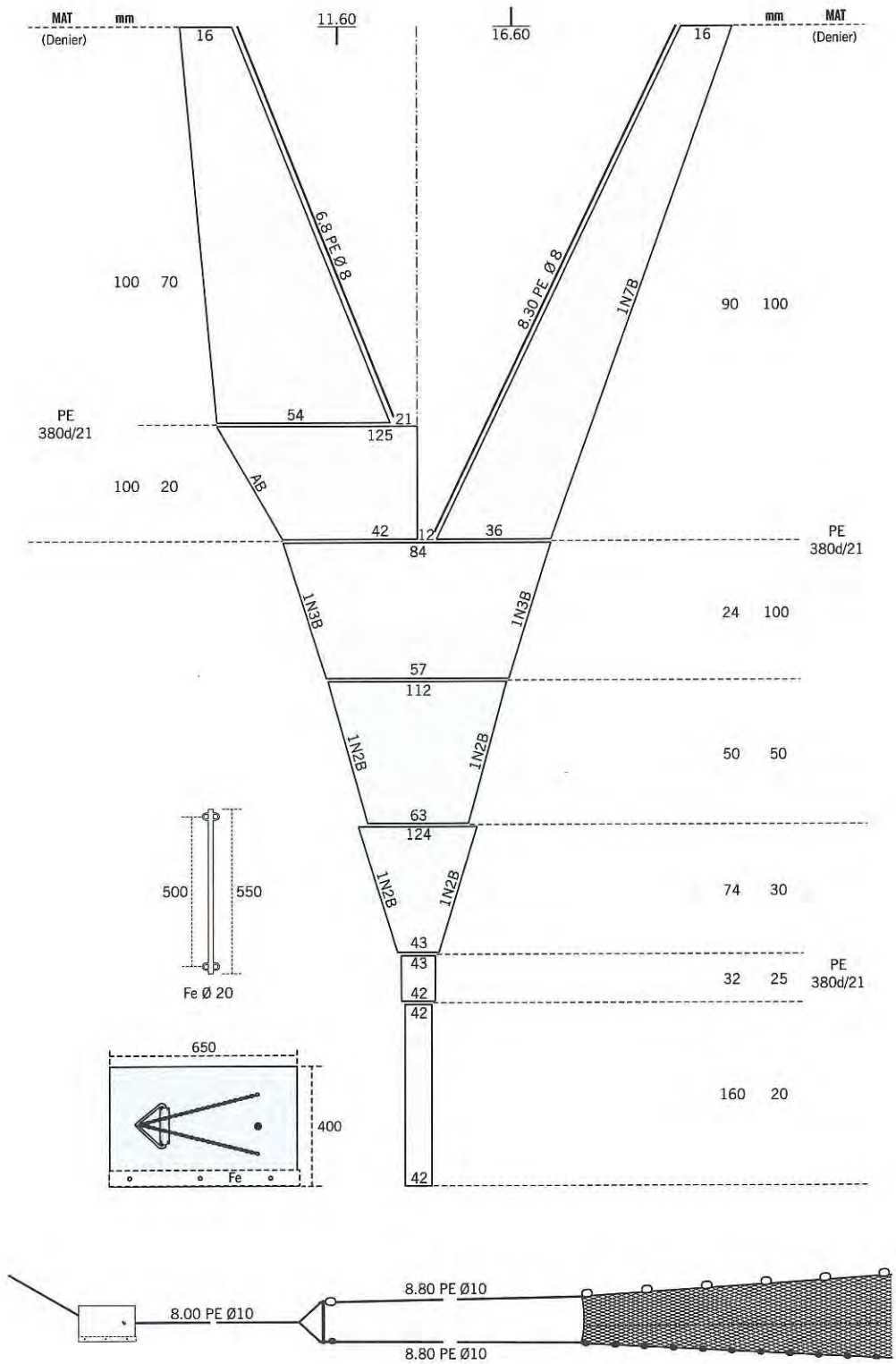
TRAWL
Otter Trawl

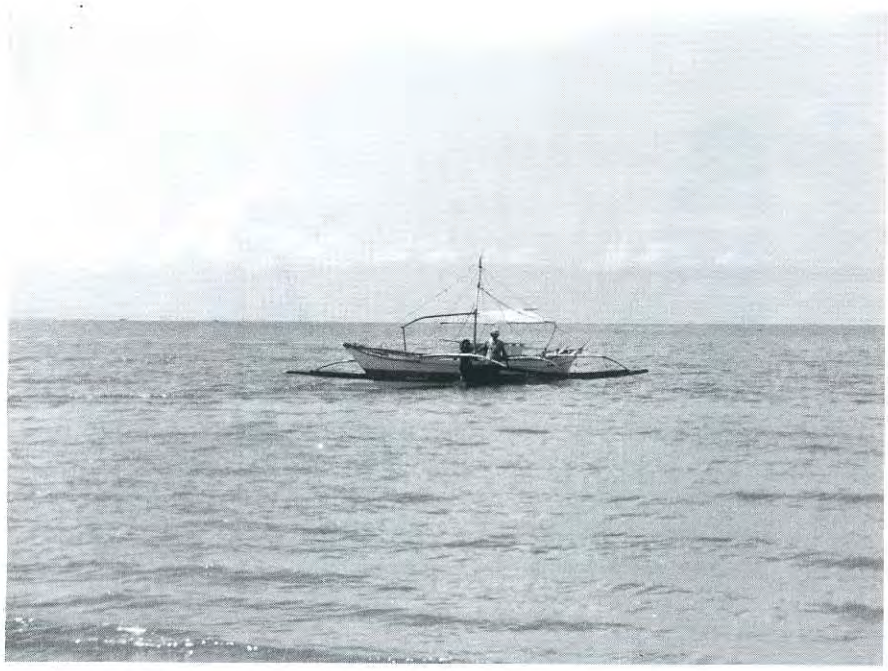
Squid, Fish

VESSEL
Loa : 8 m
GT : -
Hp : 16

LOCATION
San juan Barotac Viejo

Iloilo





< Chapter 6 >

Gillnets

Gill Net Fishing

Gill net is the most productive municipal fishing gear. In 1995, it contributed 258,021 MT or 32.9% of the municipal fishery production. However, it ranked only 7th in the commercial fishery sector by producing 10,297 MT or 1.11%

The simplicity in its design, construction, operation, and low investment cost makes the gill net the preferred gear for the small-scale fishermen. Their design usually conforms with the behavior and type of the targeted species including habitat and swimming layers. It is common to see variation in design from one place to another according to the available fishery resources.

Gill nets are classified in many ways depending on the type of species targeted, type of operations, and depth of the sea. In the country, we have anchovy gill net, mackerel gill net, crab gill net, tuna drift gill net, flying fish gill net, garfish gill net and gill nets for other species. They are also classified according to the depth of the water such as surface gill net, mid-water gill net and bottom gill net. Others are classified as encircling gill net as they surround a school of fish and the fishermen drives the fish by hitting the water surface with paddles. Gill nets are also used to block a school of fish and a scaring device or ropes with plastic strips will herd the school toward the net.

Fishing Gear and Methods

1. Surface Gill Net

This type of gill net captures the species that swim or live near the sea surface and are attracted by lights during night time. It also catches fish by driving the school toward a waiting net using a scareline. Surface gill nets are distributed in specific fishing grounds where pelagic fish are abundant.

Some of the common surface gill nets are used to catch anchovy, mackerel, sardine and garfish. The utilization of the gill net depends on the peak season of the species, and where operational techniques vary from each other. Anchovy gill nets are used during night time when the species is easily attracted by light.

The netting is made of Nylon multifilament 210d/2 with a 14.5 mm mesh size. While the petromax light is on, the net is lowered under the banca. The lights is then transferred from one side to the other of the banca, allowing the anchovies to be gilled by the net. The sardine/ mackerel gill nets have the same operation, but bigger mesh size of 30 mm and 42 mm are used.

The garfish surface gill net is also provided with a scareline to drive the fish towards the net where it is gilled in the process. The net is made of Nylon monofilament of 0.4 mm diameter with mesh sizes ranging from 40 mm to 45 mm The net is 3 m deep with a low hanging rate of 35%. The scareline is 400 m long, made of PE dia. 5 mm with plastic strips. The net is anchored first before the scareline is released into a semicircle and pulled towards the net. Another technique is the use of two fishermen who pull the scareline and guide the scared fish towards the net.

Both operations, however, depend on the number of available fishermen.

The behavior of flying fish in swimming near, or flying above, the sea surface led to the introduction of the flying fish surface gill net. The net is made of Nylon monofilament of 0.2 mm diameter with a mesh size of 30 mm It is set in an area where flying are abundant. It is particularly successful in Zambales and Bohol waters.

2. Drift Gill Net

The nomenclature of drift gill net depends on the targeted species. The common species are mackerel, flying fish, tuna and tuna-like, manta ray and other pelagic species. These fish species require different mesh and twine sizes as well as material to maximize catches.

For mackerel, flying fish, sardines and other small pelagic species the nets are made of Nylon monofilament of 0.20 mm to 0.40 mm diameter with mesh size from 25 mm to 90 mm The net consisting of several units is set in known areas of the target species. It drifts with the current for 3-6 hours and is then hauled manually. Another technique in setting is the drifting of the net with the banca where a light marker is placed at one end. Another innovation in Cagayan is a combination of drift gill net and hook and lines which are tied at the center of the net at regular intervals to maximize the catch. The method, however, has some problem whenever current and waves are strong and entangle the fishing gear.

For tuna species, the material is Nylon multifilament PA 210/12 to 210/18 in the main webbing whole iron rings and/or thicker multifilament nettings (210/30 to 210/36) are used as weights. The mesh size ranges from 50 mm to 90 mm There are 10 to 20 meshes of thicker netting acting as weights in the lower portion of the webbing. The net may be set or drifted with the current or tied to the banca during operations. Tuna drift gill nets are popular on the Ilocos Coast, in the Davao Gulf, the western waters of Batangas and the southern waters of Negros Oriental.

One peculiar type of drift gill net is used in the catching of the Manta ray in Jagna, Bohol. The net is made of polyethylene No. 4 (2 mm) with 650 mm mesh size. The net consists of different colors (green, yellow and black) with corresponding numbers of meshes. The depth of the net is around 30 m. It has 2.5 m long suspension lines, to enable the net to stay at mid-water depth. It also drifts with the current, when setting at day or night time. The species command a high price which encourages fishermen to locate good fishing grounds. Compared to the lower hanging rate of tuna and small pelagics nets, the hanging rate (0.85) of the Manta ray gill net is very high when the netting is almost fully stretched. An iron gaff hook is also ready for a big catch.

3. Bottom Gill Net

These are gill nets which target species living on or near the bottom of the sea. The major species are crabs, nimipterids, lizard fish, slipmouths, hairtail, snapper etc. Due to available

good bottom conditions on many fishing grounds, bottom gill nets are very popular.

The crab gill net is constructed to respond to the crawling behavior of the species. The net is made of Nylon monofilament of 0.20 mm diameter with a mesh size of 30 mm. The most peculiar feature is the limited number of meshes down which has only 60 meshes. It is set in shallow areas and checked very often to determine if there is a catch.

There are also bottom gill nets that catch species which migrate diurnally. It is converted to a surface gill net during night time since the fish are swimming, or feeding, at the surface. The net is constructed with Nylon monofilament of 0.25 mm diameter and a mesh size of 42 mm. It is set usually in sandy-muddy bottoms. Some nets use Nylon monofilament of 0.4 mm diameter with a bigger mesh size of 120 mm. The most common material for bottom gill nets is the Nylon monofilament of 0.20 mm to 0.40 mm diameter and mesh sizes from 30 mm to 150 mm.

4. Trammel Net

Trammel net is not popular among fishermen in the country. It maybe that the removal of the catch is difficult when it is impounded by the inner layer of the netting. To address this problem, several modifications are being tried by the fishermen. The target species is the garfish which is very hard to catch using a single layer gill net.

The original design of trammel net consists of three layers. The two outer layers have the same twine and mesh size, and number of vertical and horizontal meshes, the hanging rate is more stretched than the inner layer. The inner layer has a smaller mesh size, finer twine and more slack. When the fish enter the first layer, they pass through eventually hitting the inner layer which envelops their bodies. They pass again to the 3rd layer where they are impounded. Trapping in the inner layer net does not allow the fish any chance of escape.

Other design consists of three layers of net, with the same twine, but different mesh sizes and hanging rates from the first layer, which has a bigger mesh size, and the last layer with the smallest mesh. Fish that will not be caught by the first or 2nd layer will be caught by the last layer. This design results in gilling rather than impounding the fish. Commonly used netting is the Nylon monofilament PA of 0.30 mm to 0.40 mm diameter and mesh sized at 76.2 mm (1st Layer), 50.8 mm (2nd Layer) and 38.1 mm (3rd Layer).

The behavior of the targeted species and ingenuity of local fishermen to devise a method of catching the garfish led to another modification by the use of two layer webbing. The first layer has a mesh size of 6.09 cm while the second layer has a mesh size of 4.35 cm with the same twine size PA of 0.30 mm monofilament. The first layer is hung at 51% while the second layer is 47% (direct method). This net is used in the Davao Gulf for catching garfish and other pelagic species.

Fishing operation of the three (3) types is similar. The net is set on schools of garfish by taking into account the fish and current directions. The net is set against the current, or where the fish is heading, while the scareline drives them towards the net. This gill net is usually set

during daytime for garfish and at night time for other species.

5. Encircling Gill Net

This type of gill net is used for fish schools feeding or moving at the sea surface. Fishermen usually operate this net during the shoaling movement of scads, sardines and mackerel. It is set in shallow waters by encircling the schools. The net touches the sea bottom thus blocking the escape of the fish below the net.

Nylon monofilament of 0.25 mm and multifilament 210d/2 with varying mesh sizes from 28 mm to 40 mm are the materials most commonly used. The depth varies from 16 to 24 m. After encircling, the fish school are frightened by hitting the sea surface with paddles. The sound produced by the paddle will drive the fish towards the net where they are gilled.

Encircling gill nets are commonly found in the shallow coastal waters of Manila Bay, Palawan, Antique, Bohol, and Davao.

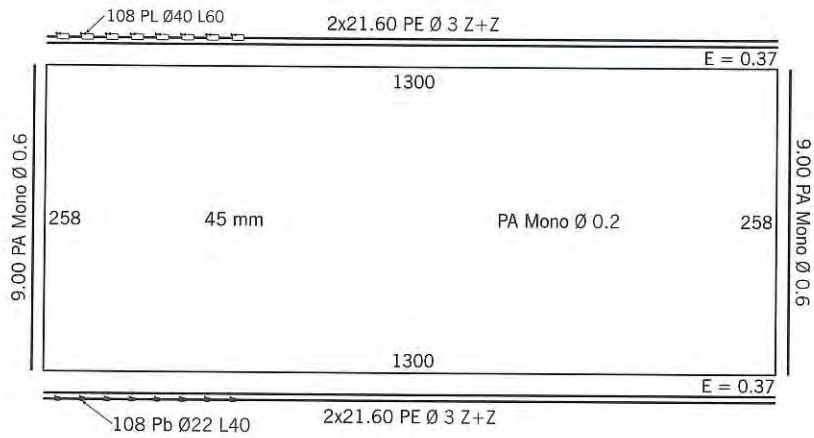
GILL NET
Surface gill net
Sapaw
Big-eye scad, Mackerel

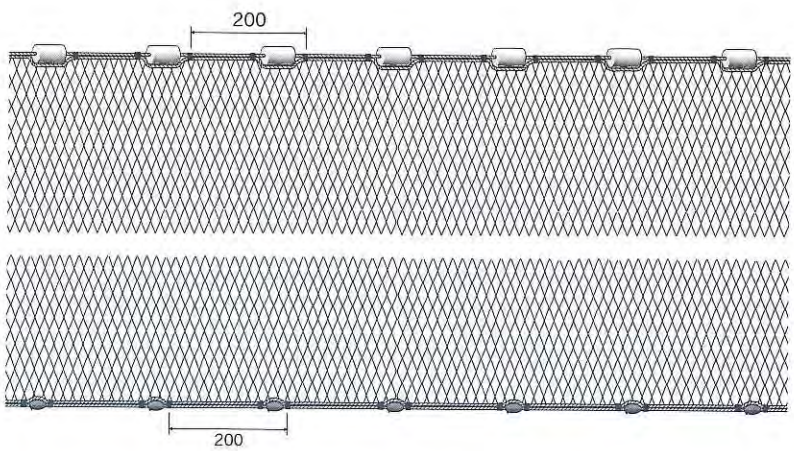
VESSEL
Loa : 8 m

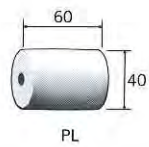
Hp : 10

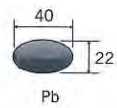
LOCATION
Talomo

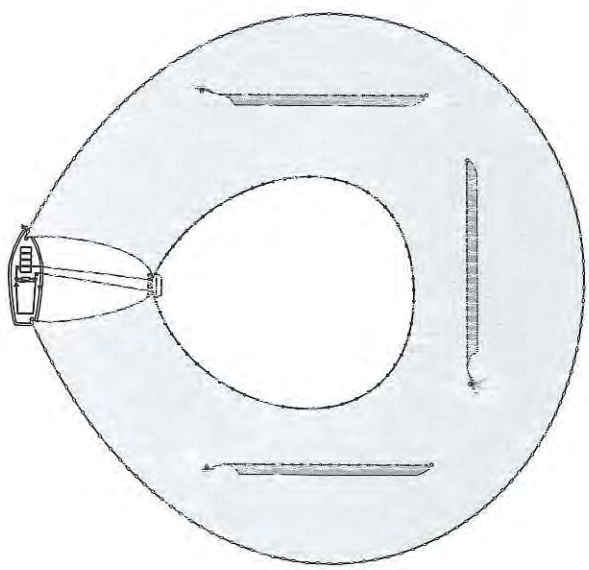
Davao











GILL NET
Surface drift net

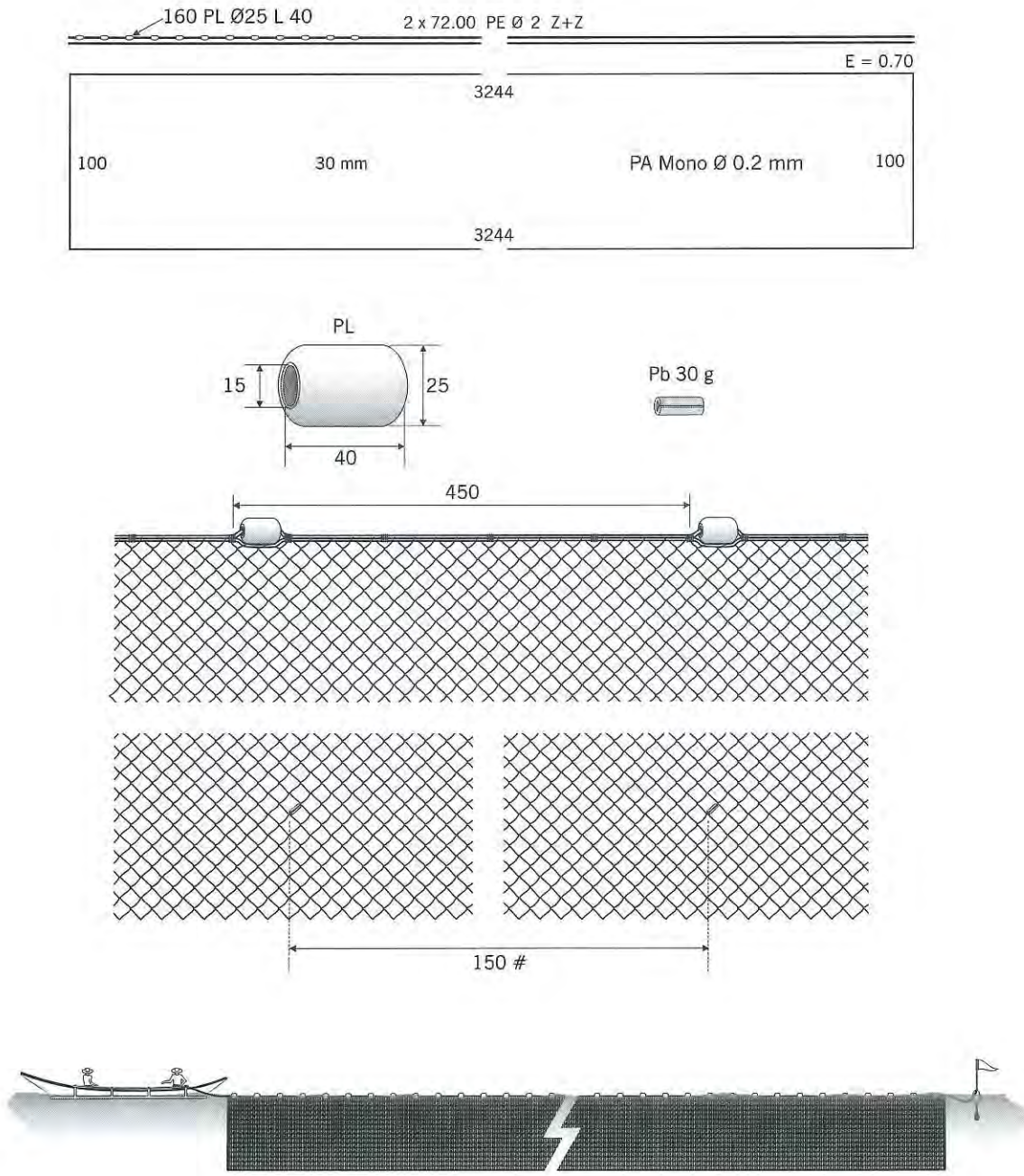
Flying fish, Frigate mackerel

VESSEL
Loa : 6 m

Hp : 10

LOCATION
Loay

Bohol



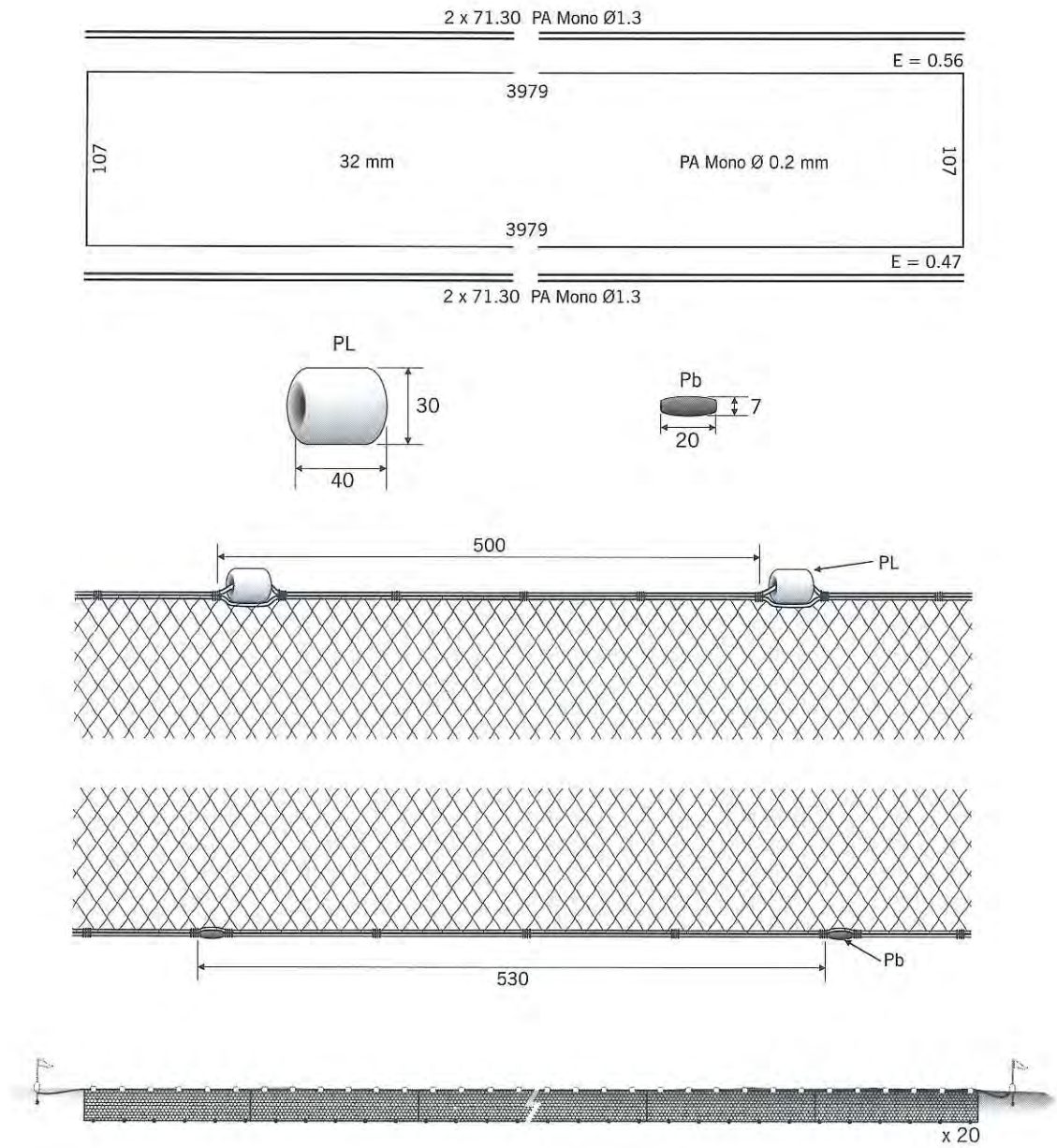
GILL NET
Surface drift net
Panteng pangbolador
Flying fish

VESSEL
Loa : 8 m

Hp : 16

LOCATION
Bangan, Botolan

Zambales



GILL NET
Set net

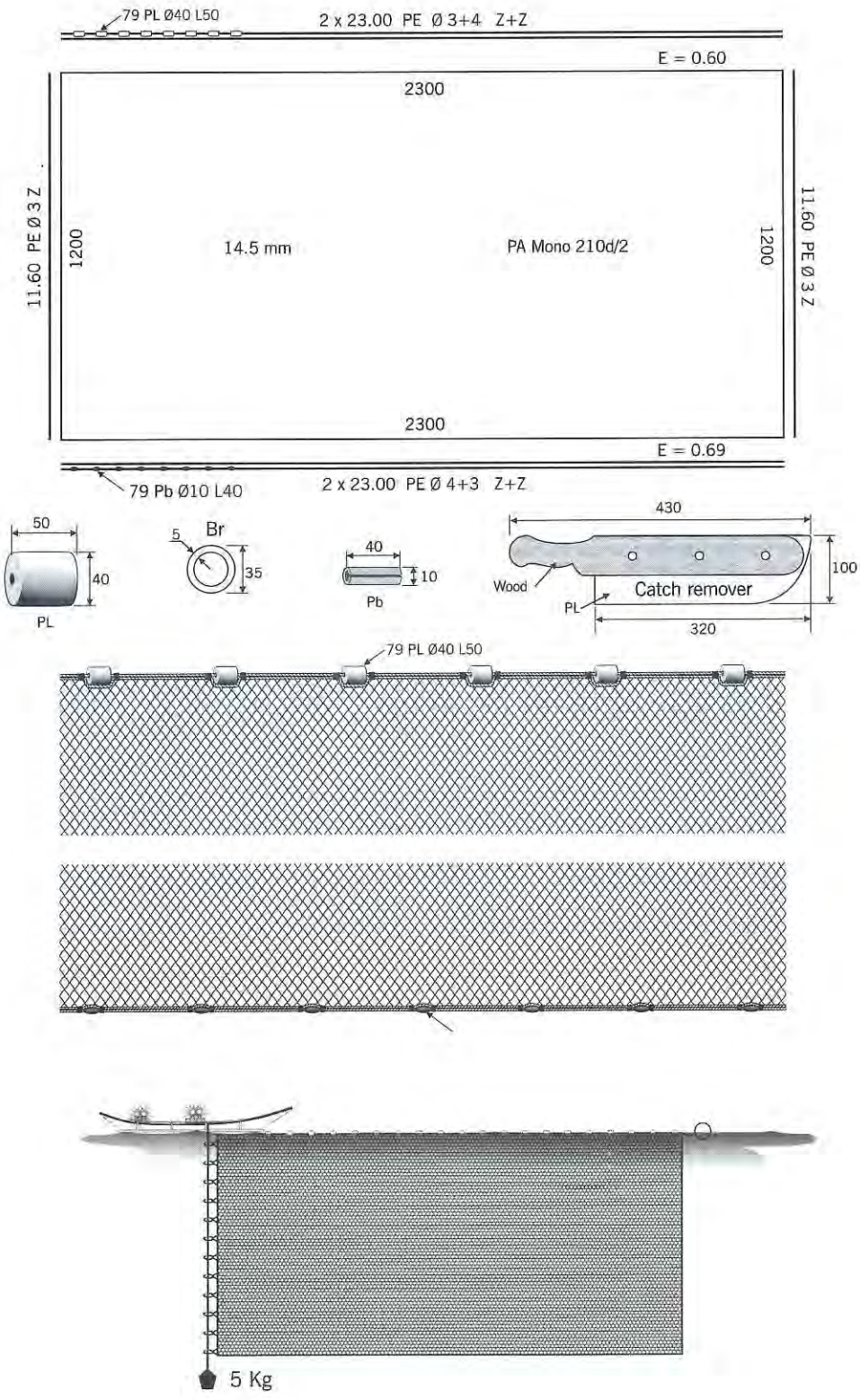
Anchovy

VESSEL
Loa : 8 m

Hp : 16

LOCATION
Amaya, Tanza

Cavite



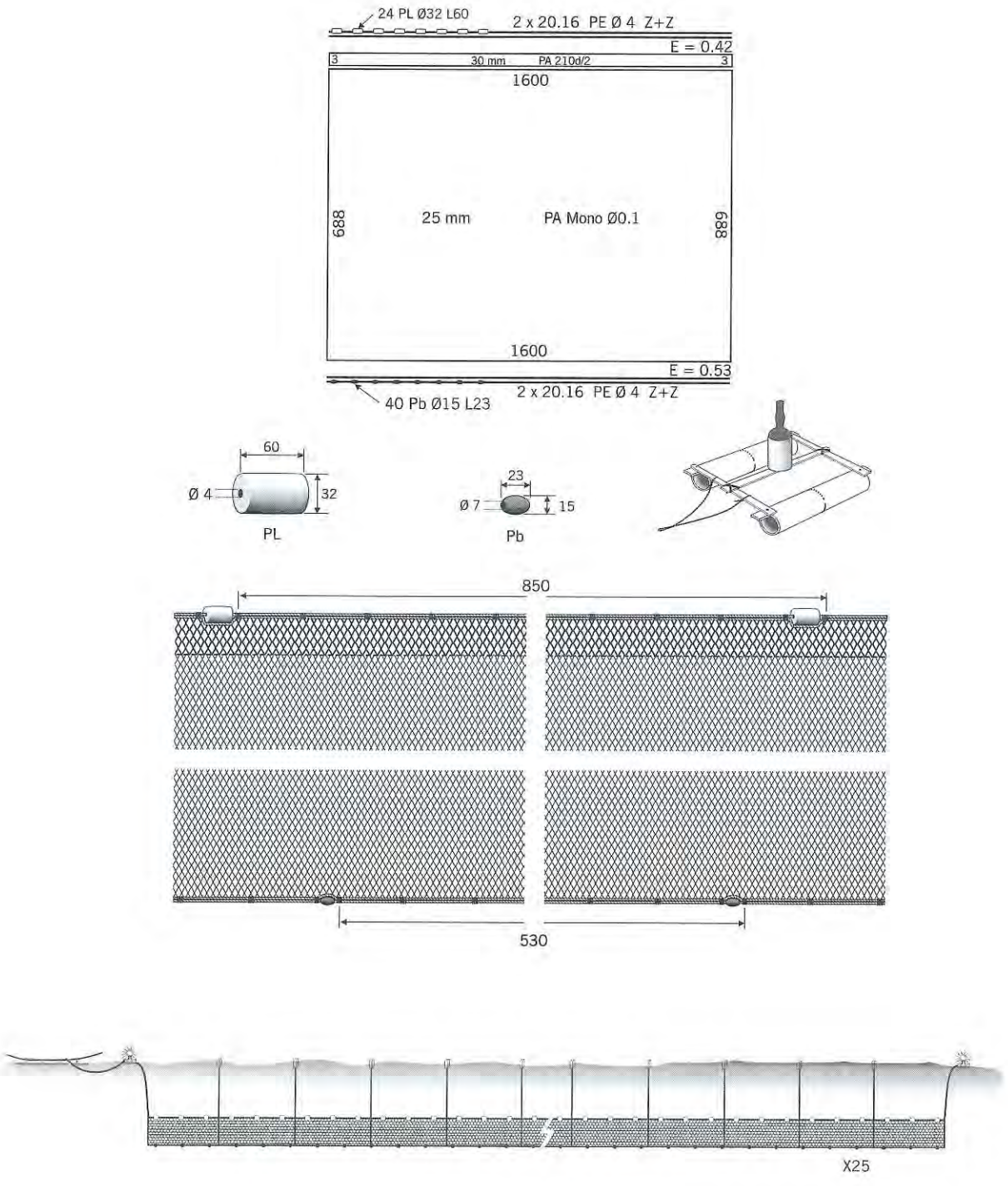
GILL NET
Drift net
Kurantay
Sardine

VESSEL
Loa : 10-15 m

Hp : 10-16

LOCATION
Patao, Kantayan Is.

Cebu



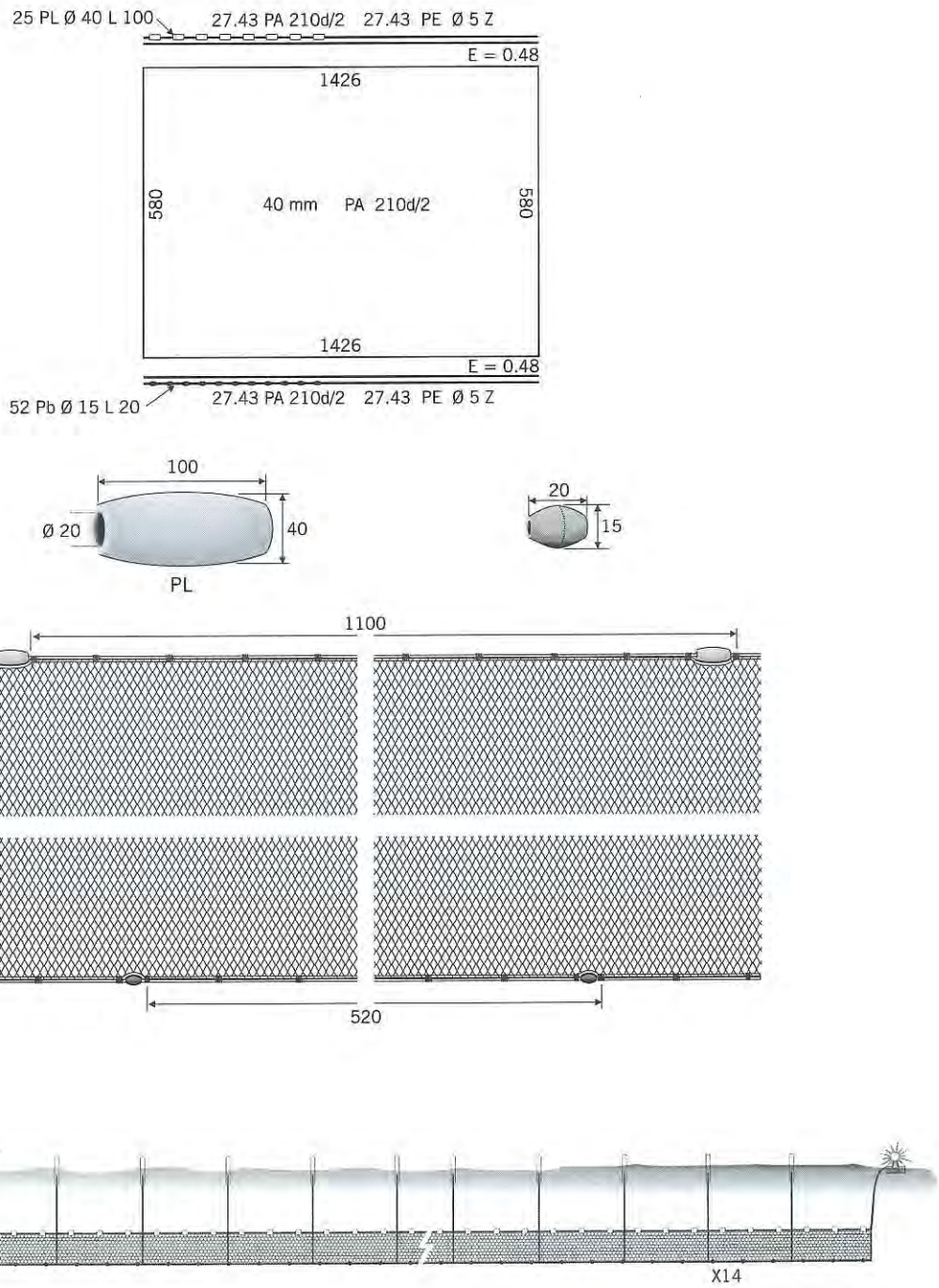
GILL NET
Drift net
Baby litting
Round scad, Mackerel

VESSEL
Loa : 8 m

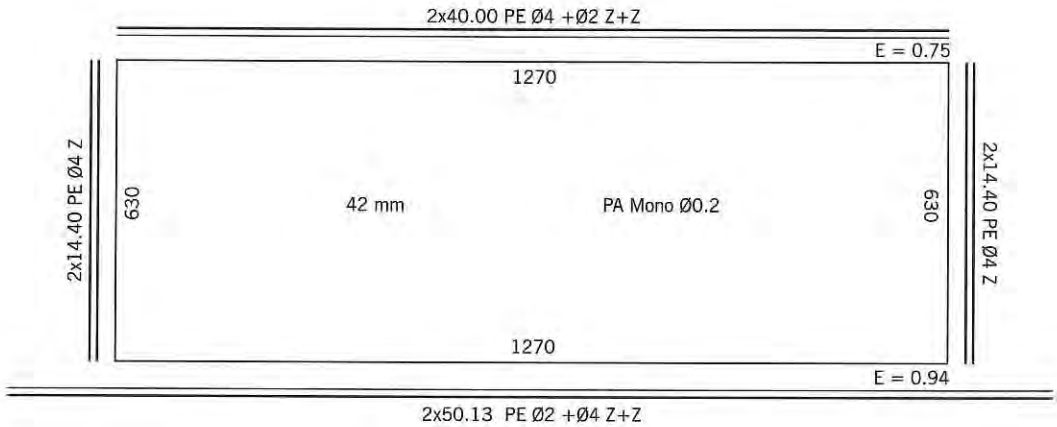
Hp : 16

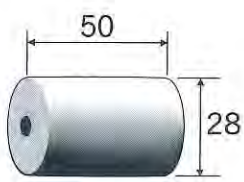
LOCATION
Puro Pingit, Magsingal

Ilocos Sur



GILL NET	VESSEL	LOCATION
Driftt net	Loa : 8 m	Amaya, Tanza
Mackerel	Hp : 16	Cavite





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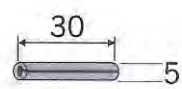

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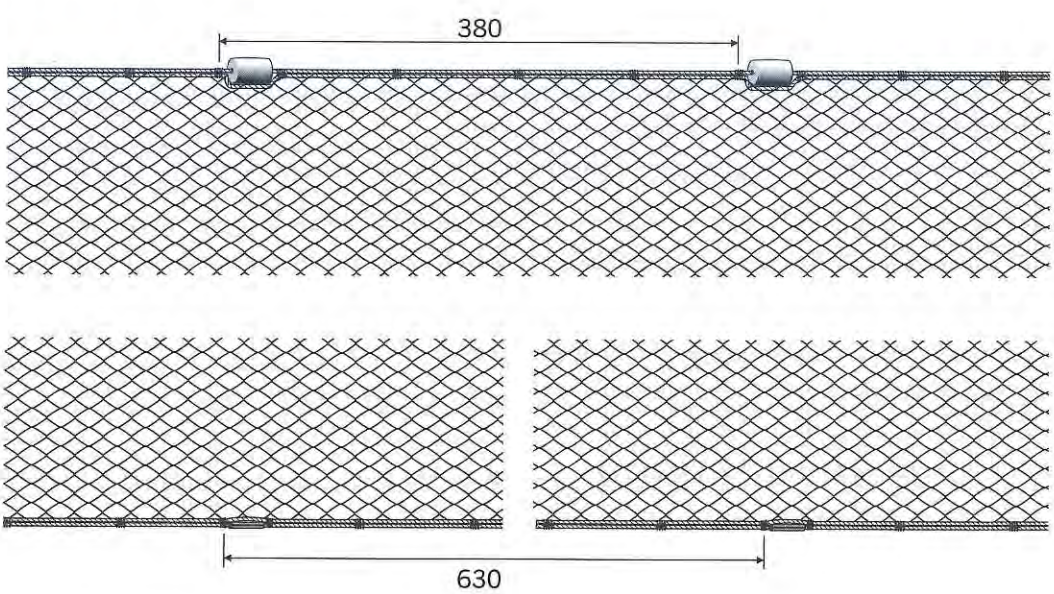


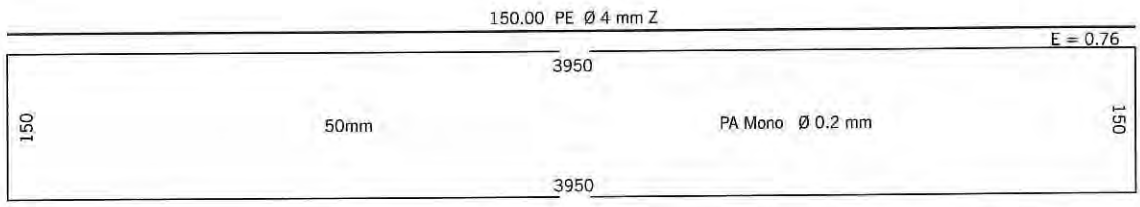
GILL NET
Driftt net
Panteng paanod
Mackerel

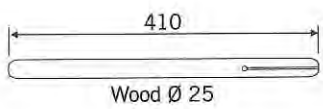
VESSEL
Loa : 8-10 m

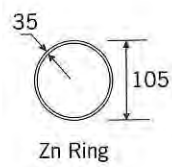
Hp : 16

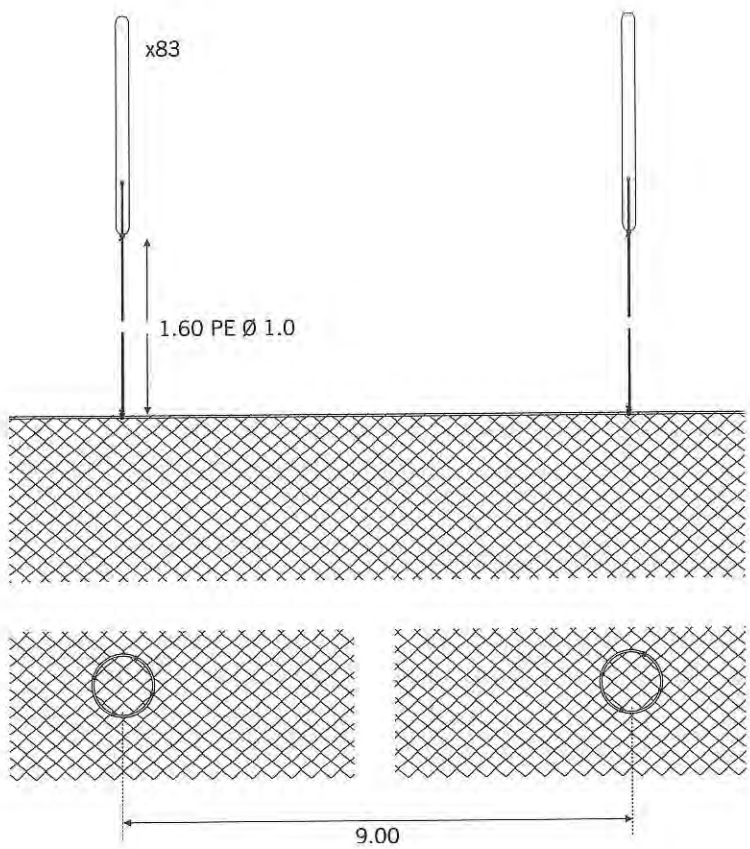
LOCATION
Naic

Cavite









GILL NET
Surface drift net

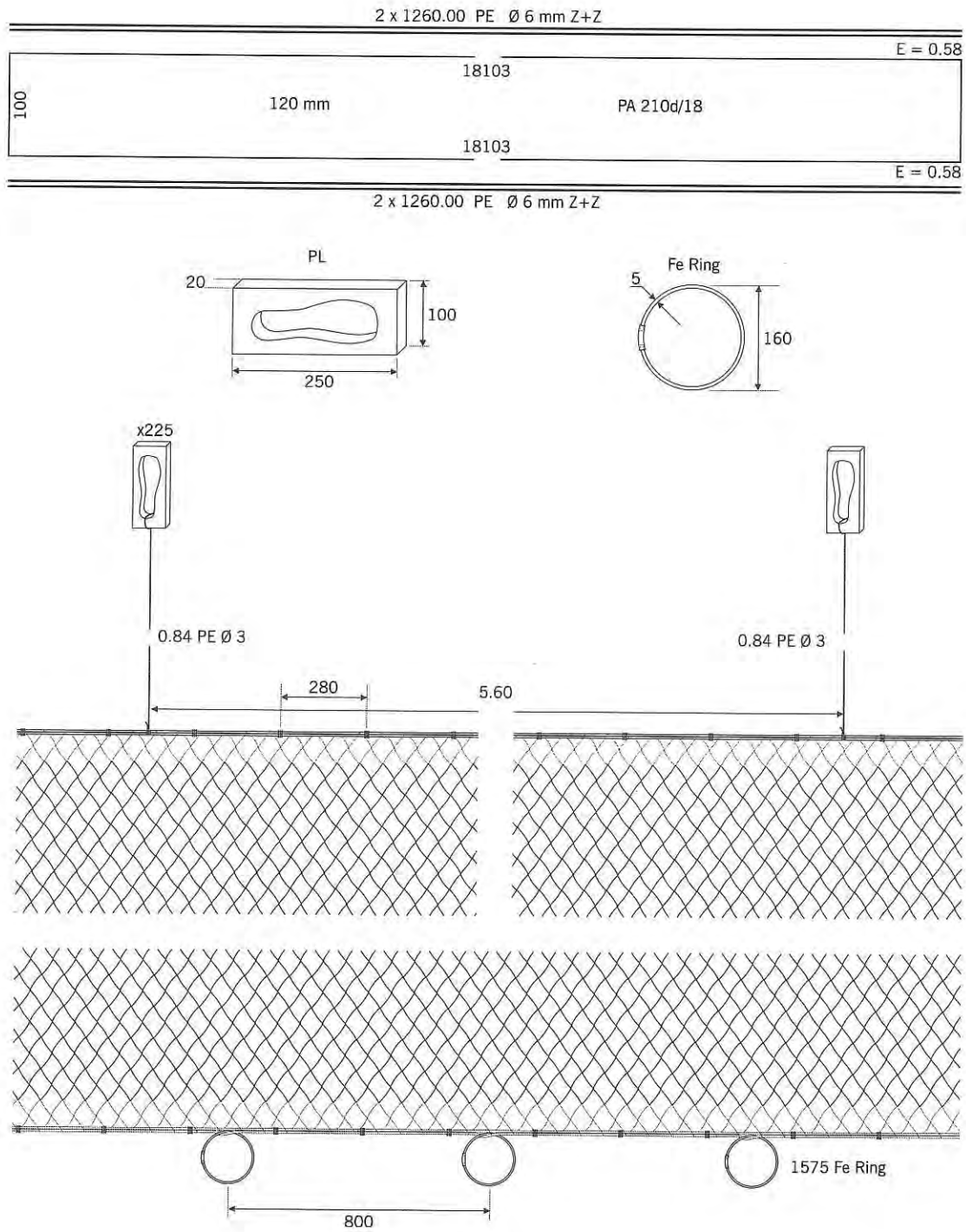
Skipjack

VESSEL
Loa : 6 m

Hp : 10

LOCATION
Madridejos/Bantayan

Cebu



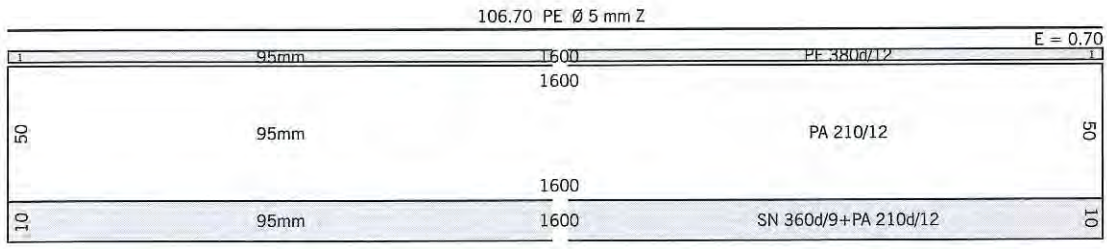
GILL NET
Drift net
Panteng pangalabaw
Spanish Mackerel, Tuna

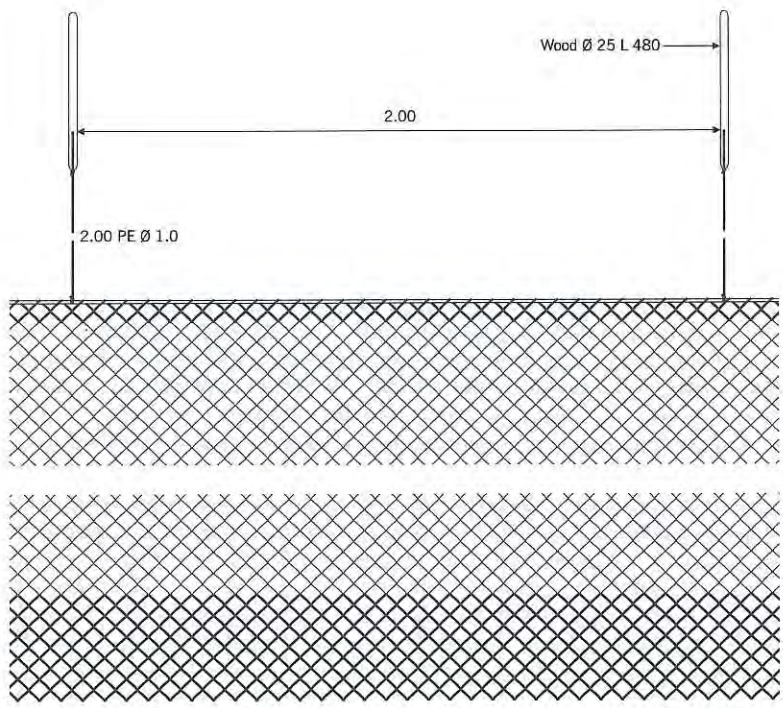
VESSEL
Loa : 8 m

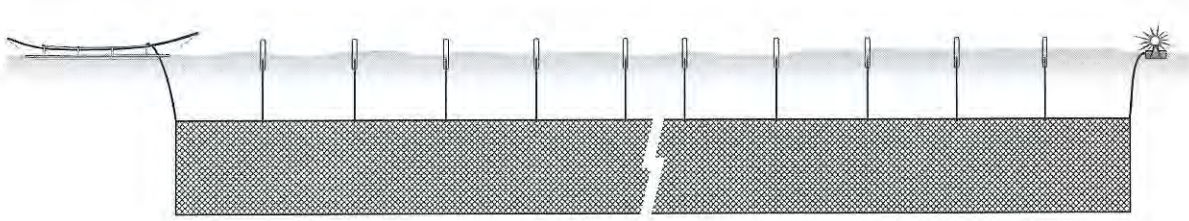
Hp : 16

LOCATION
Naic

Cavite







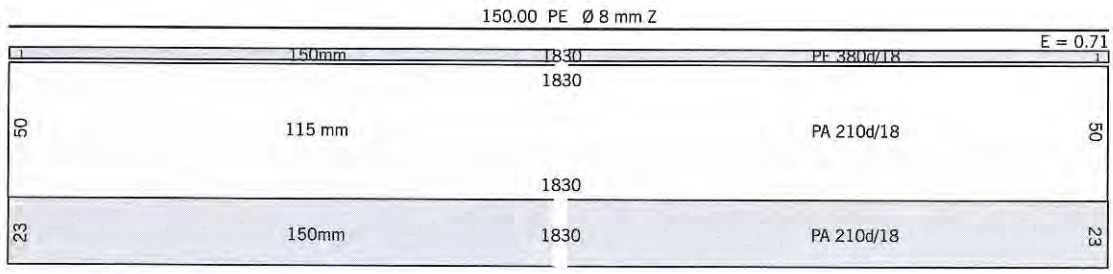
GILL NET
Drift net
Liting
Tuna, Shark, Spanish Mackerel, etc.

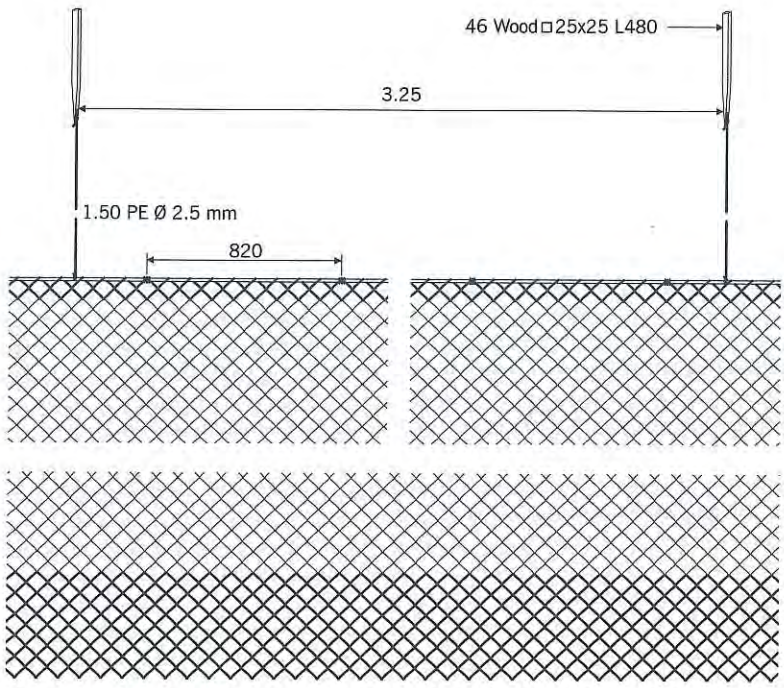
VESSEL
Loa : 9 m

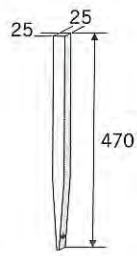
Hp : 16

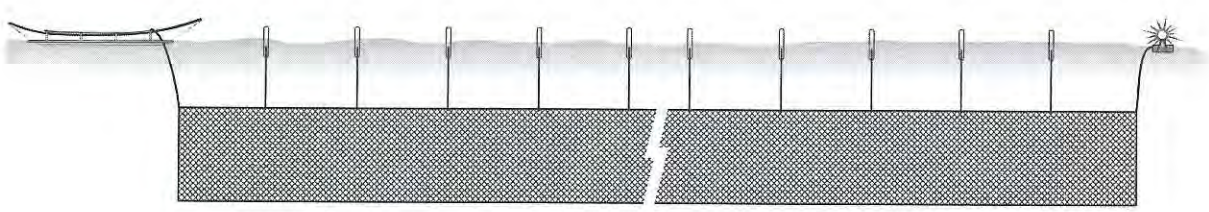
LOCATION
Darapidap, Candon

Ilocos sur









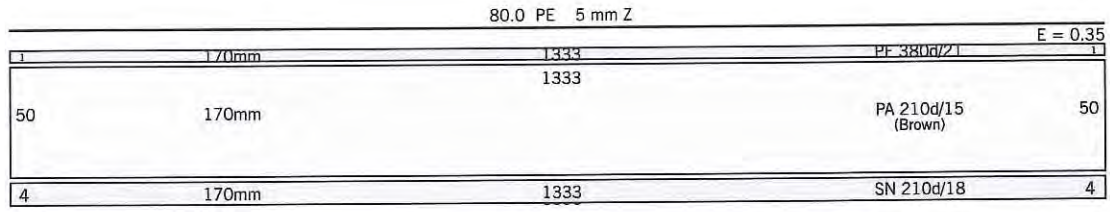
GILL NET
Drift net
Liting
Skipjack, Yellowfin tuna, Mackerel

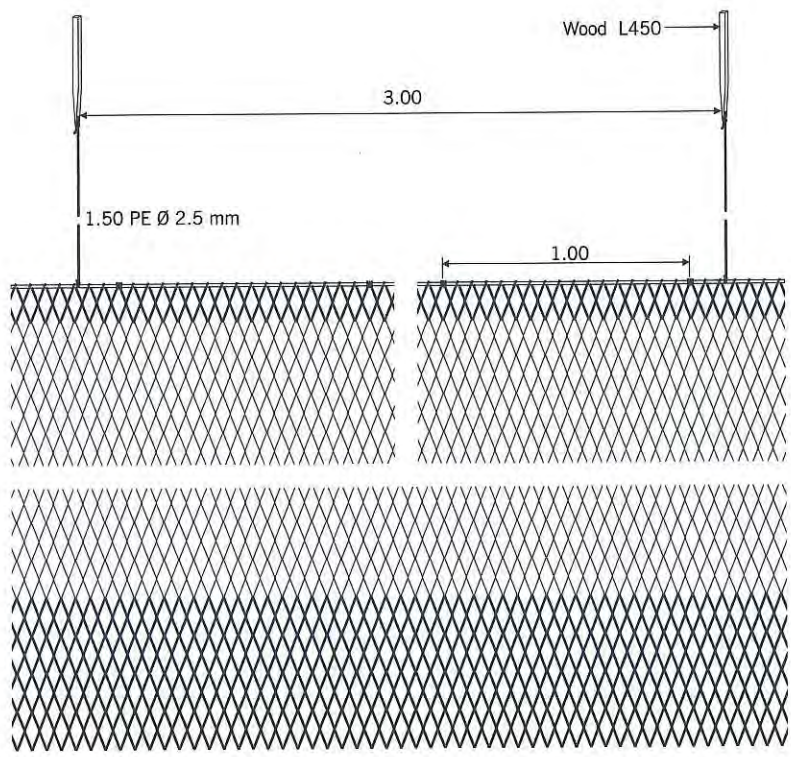
VESSEL
Loa : 10 m

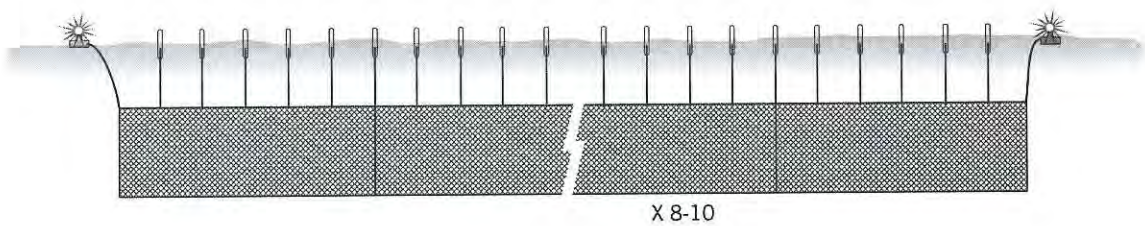
Hp : 16

LOCATION
Darapidap, Candon

Ilocos sur







X 8-10

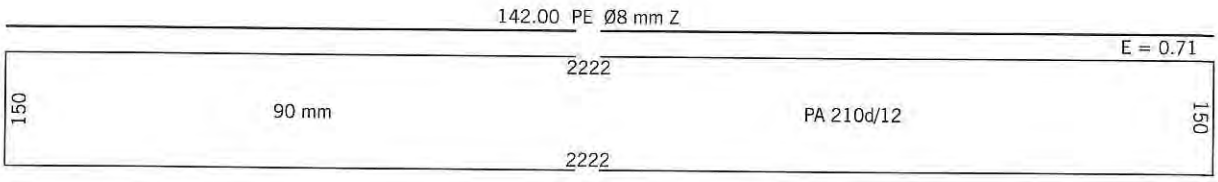
GILL NET
Drift net
Paanod
Tuna

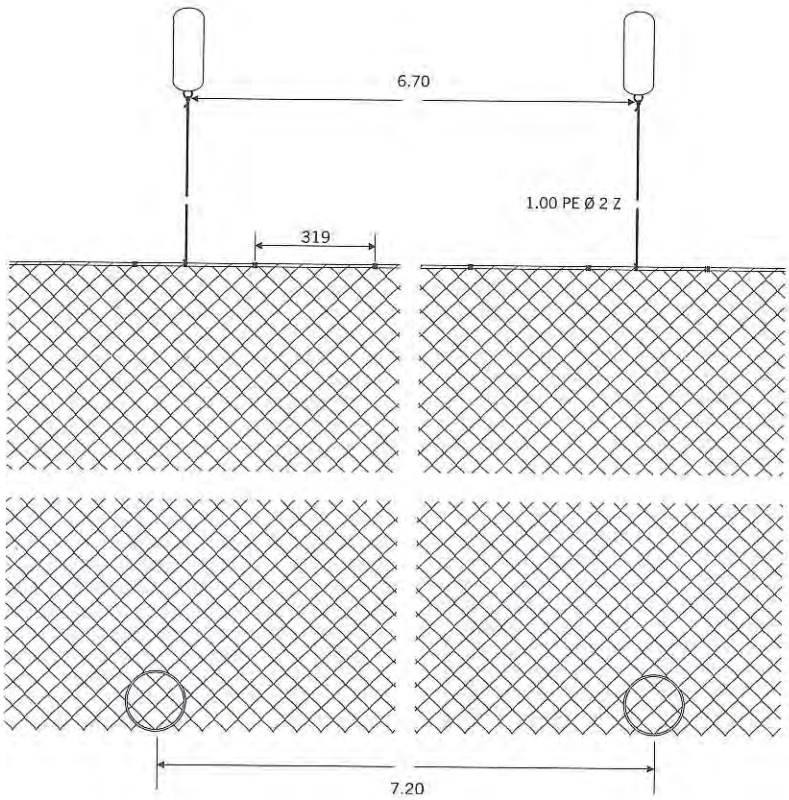
VESSEL
Loa : 14 m

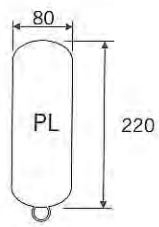
Hp : 60

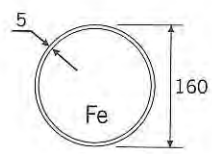
LOCATION
Polo, New Washington

Aklan









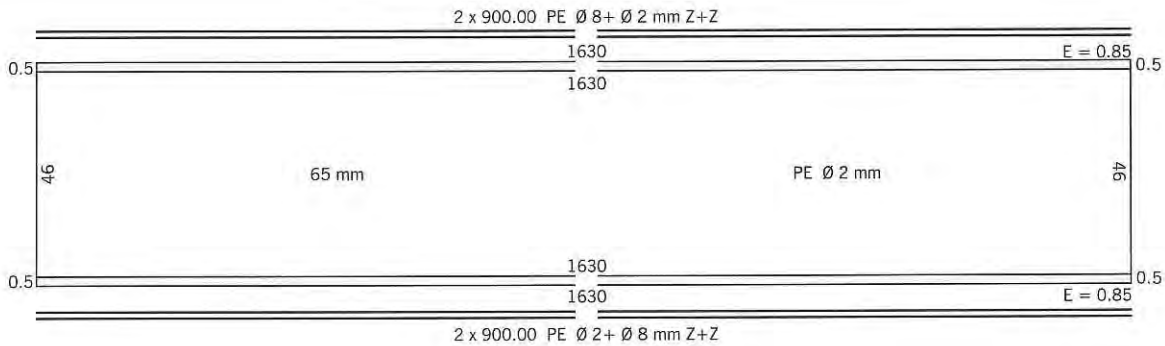
GILL NET
Drift net
Panamaw
Manta ray, Shark

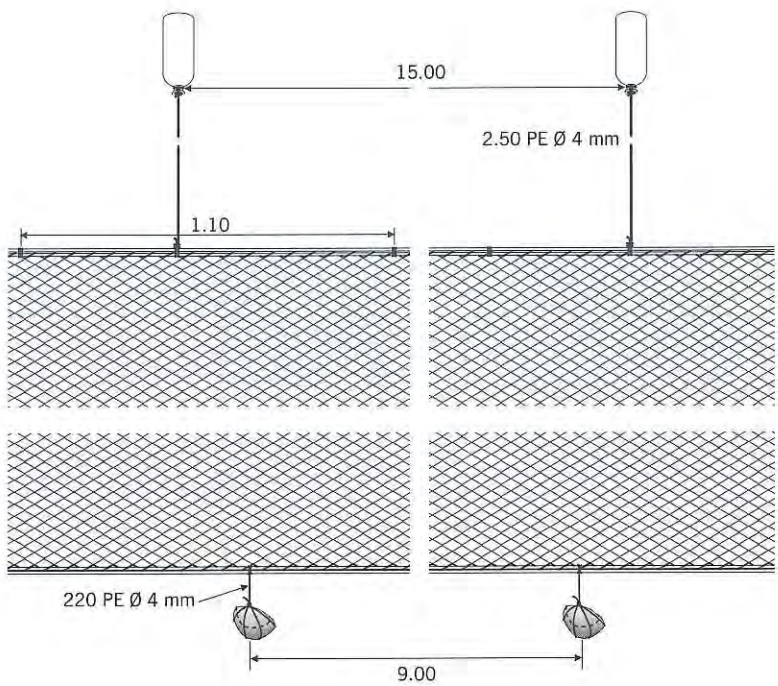
VESSEL
Loa : 9 m

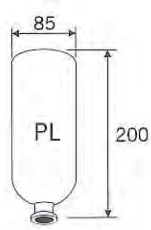
Hp : 10

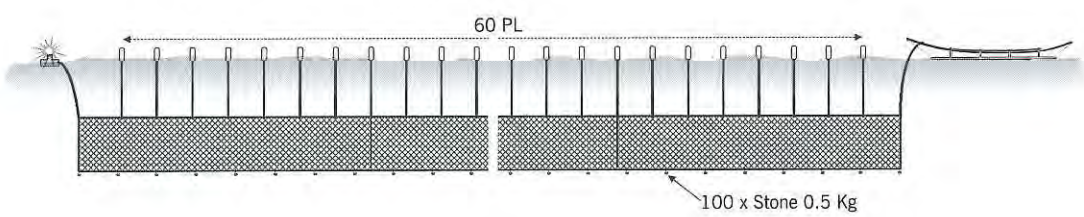
LOCATION
Jagna

Bohol









GILL NET

Drift net with hook and line
Ponking Iguong bonwit
Flying fish, Spanish mackerel
Leather jacket, Blue marlin

VESSEL

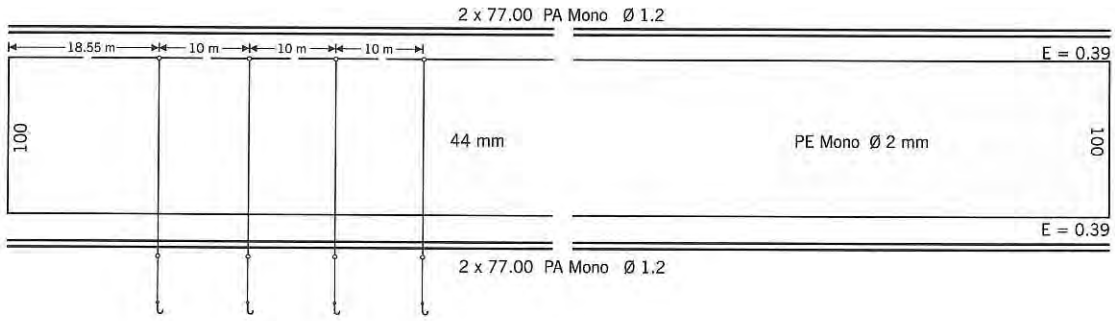
Loa : 8.5 m

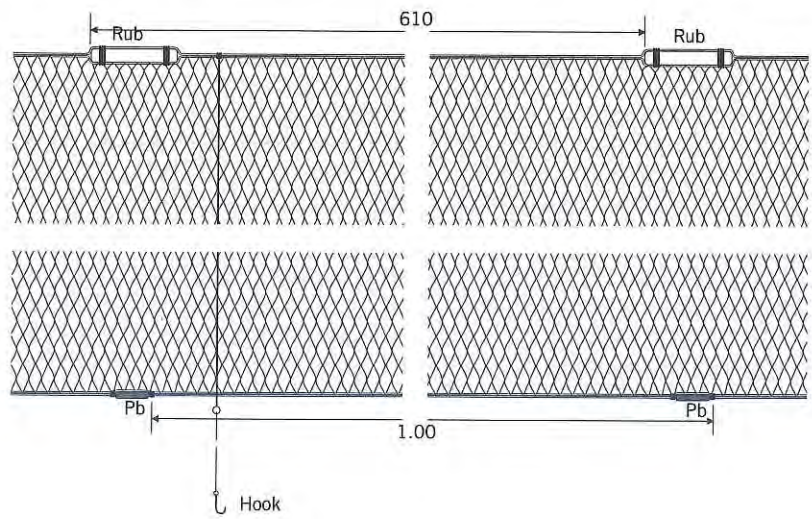
Hp : 10

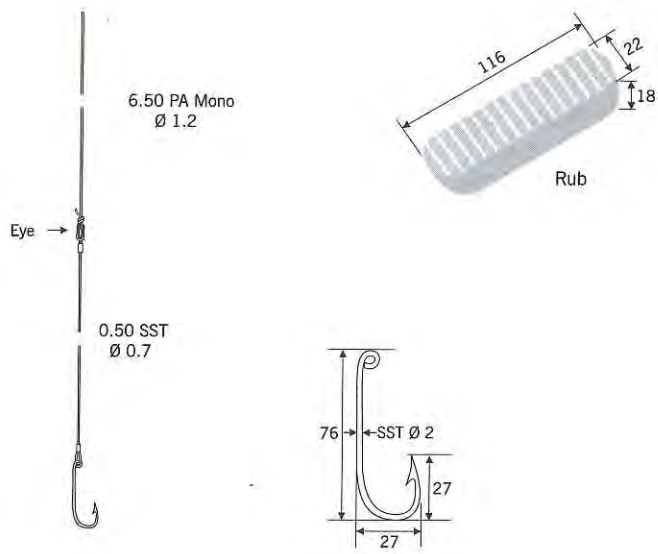
LOCATION

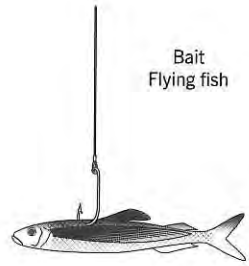
Virac

Catanduanes









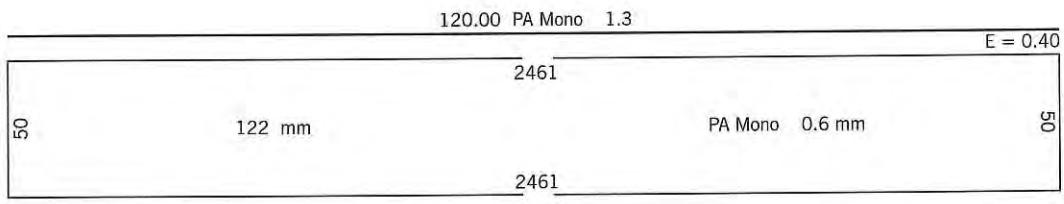
GILL NET
Drift net
Palutaw
Spanish mackerel, Skipjack
Milkfish

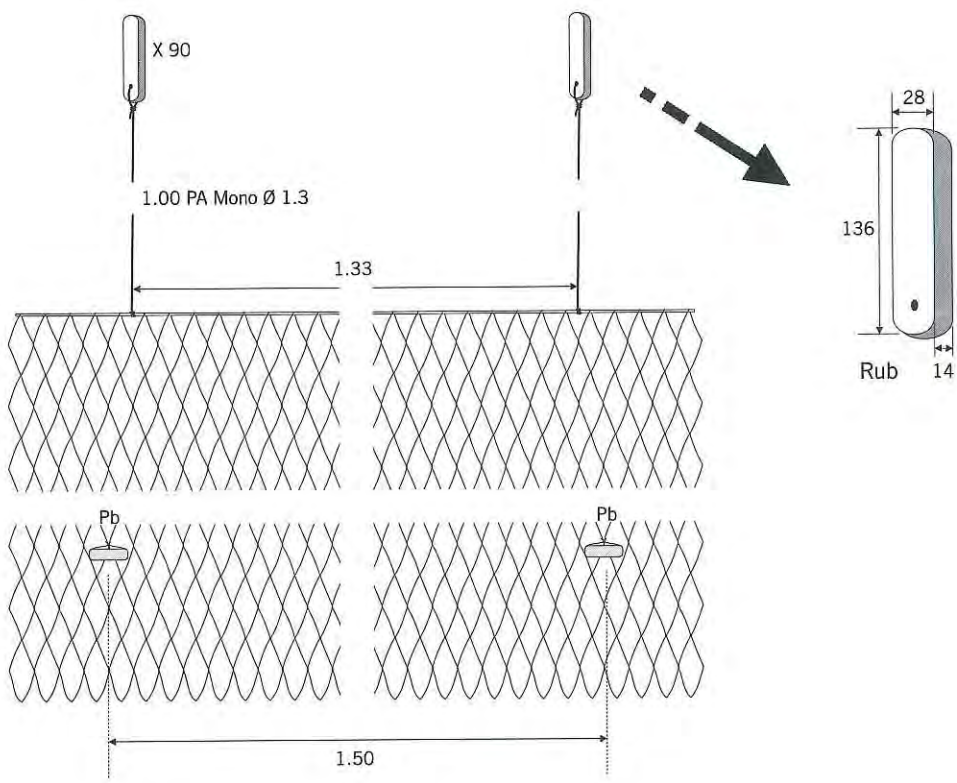
VESSEL
Loa : 5.48 m

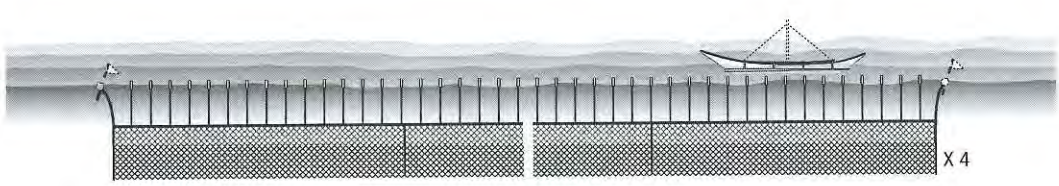
Hp :

LOCATION
Capoocan

Leyte





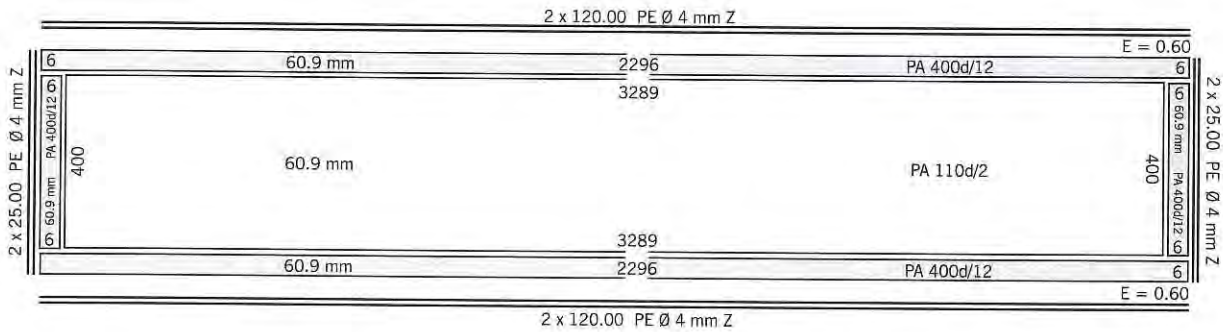


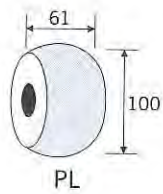
GILL NET
Drift net
Bulitsihan
Stripped mackerel,
Short-bodied mackerel

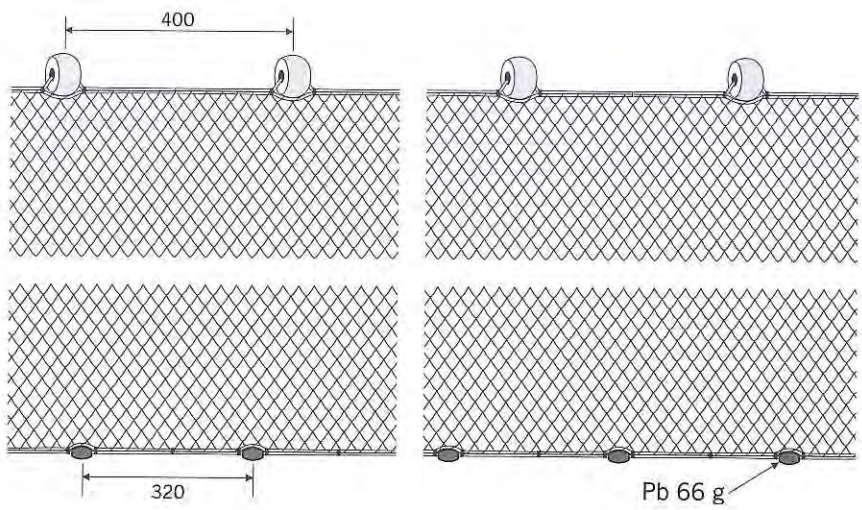
VESSEL
Loa : 10.67 m

Hp : 16

LOCATION
San Isidro
Calbayog City
Samar







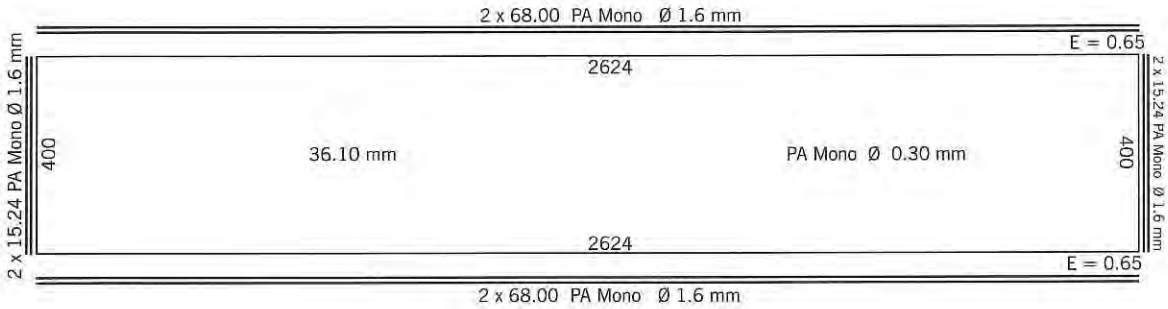
GILL NET
Surface gillnet
Pang-nocos
Squid

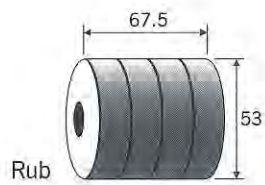
VESSEL
Loa : 9.75 m

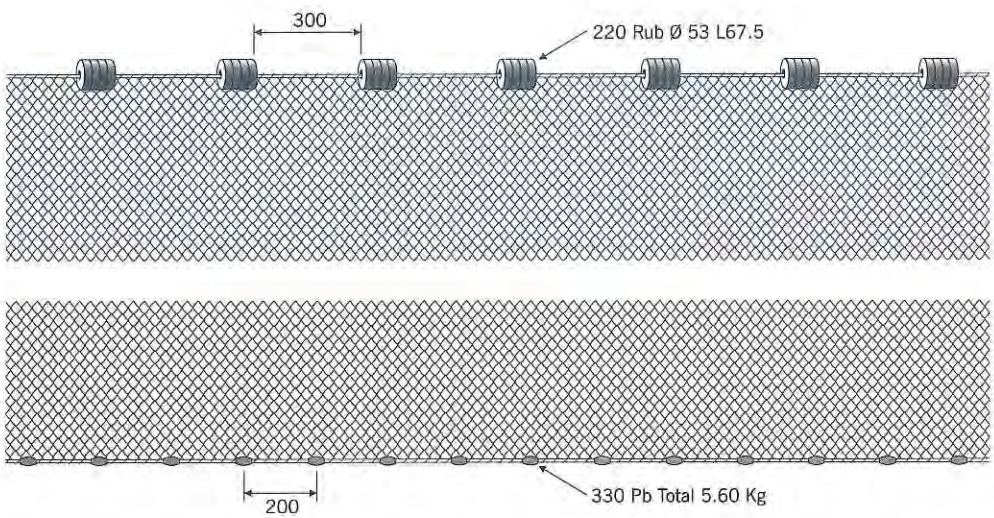
Hp : 16

LOCATION
Tinambacan

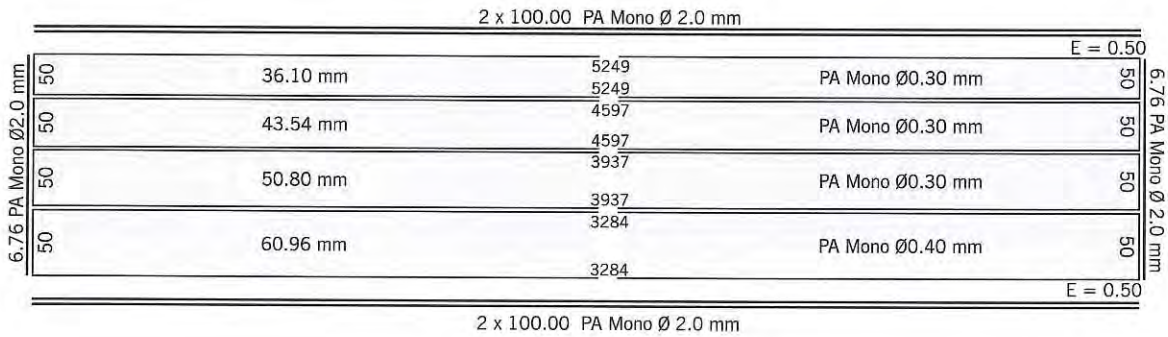
Samar

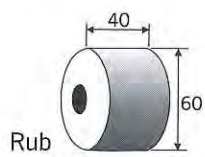


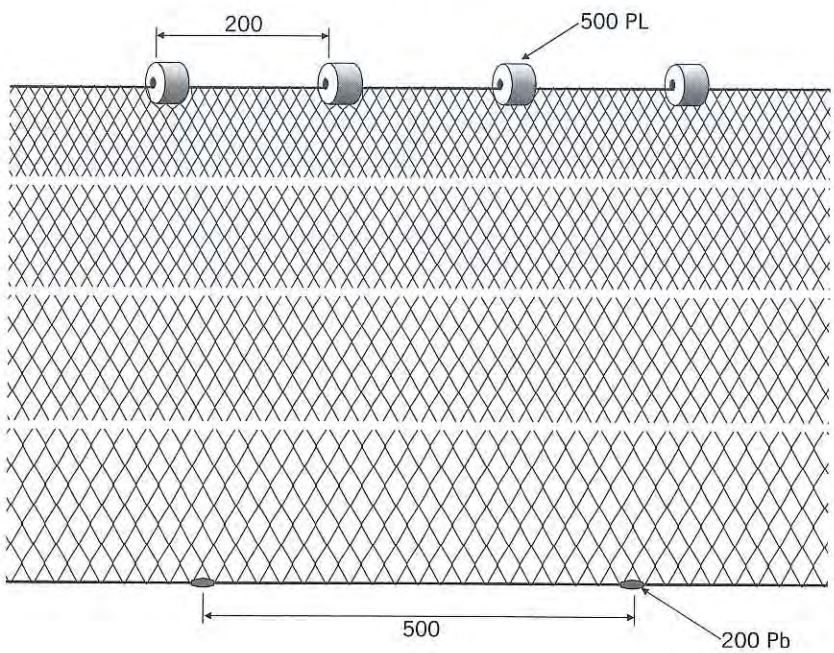




GILL NET	VESSEL	LOCATION
Driftnet	Loa : 9.75 m	Boac
Jumper		
Striped meckerel	Hp : 10	Marinduque







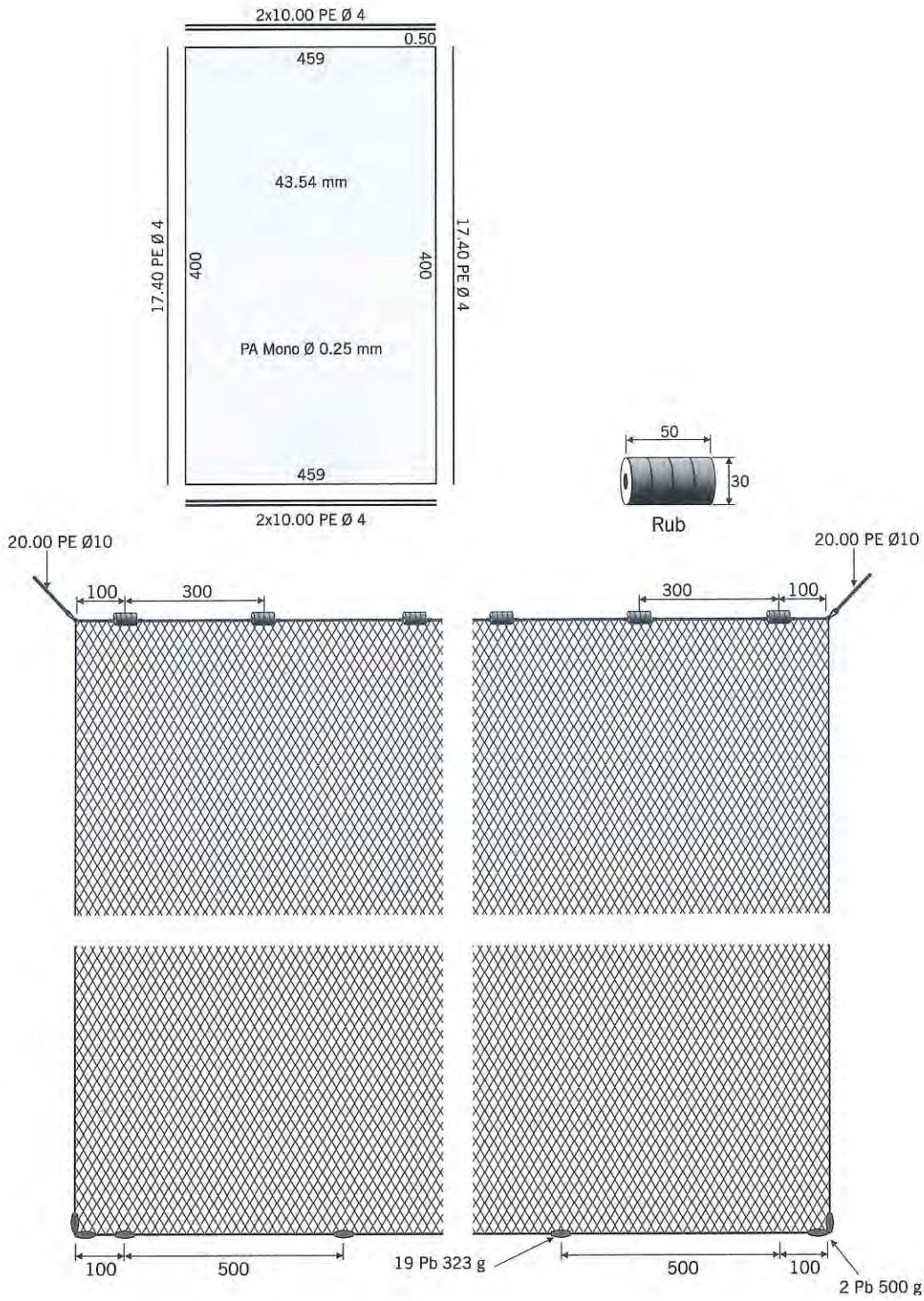
GILL NET
Driftnet
Palabay
Round scad,
Big-eyed scad

VESSEL
Loa : 8.22 m

Hp : 16

LOCATION
Malapatan

Sarangani



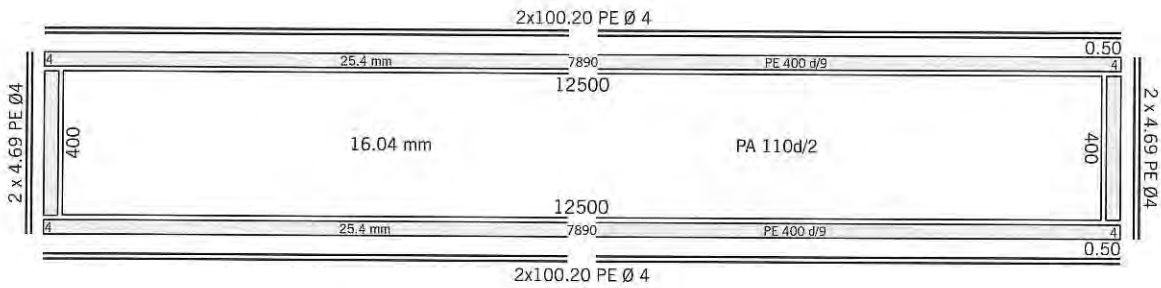
GILL NET
Mid-water gill net
Largarete
Long-jawed anchovy

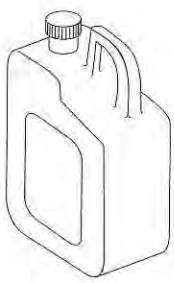
VESSEL
Loa : 7.50 m

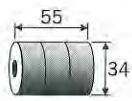
Hp : -

LOCATION
Culaba

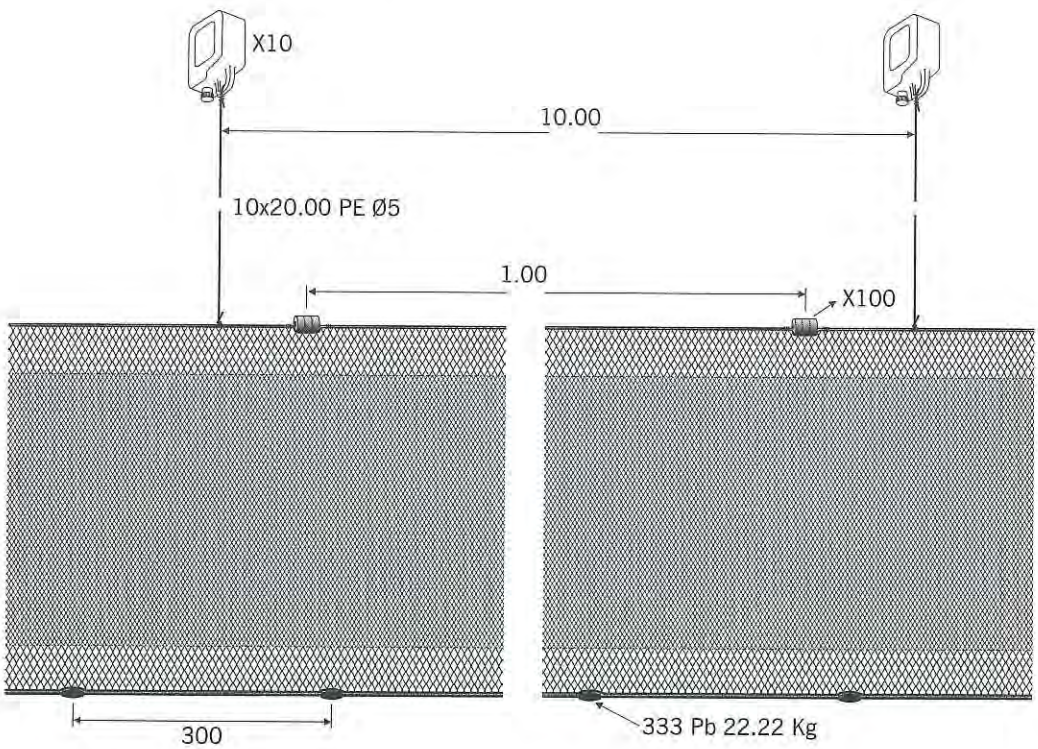
Leyte



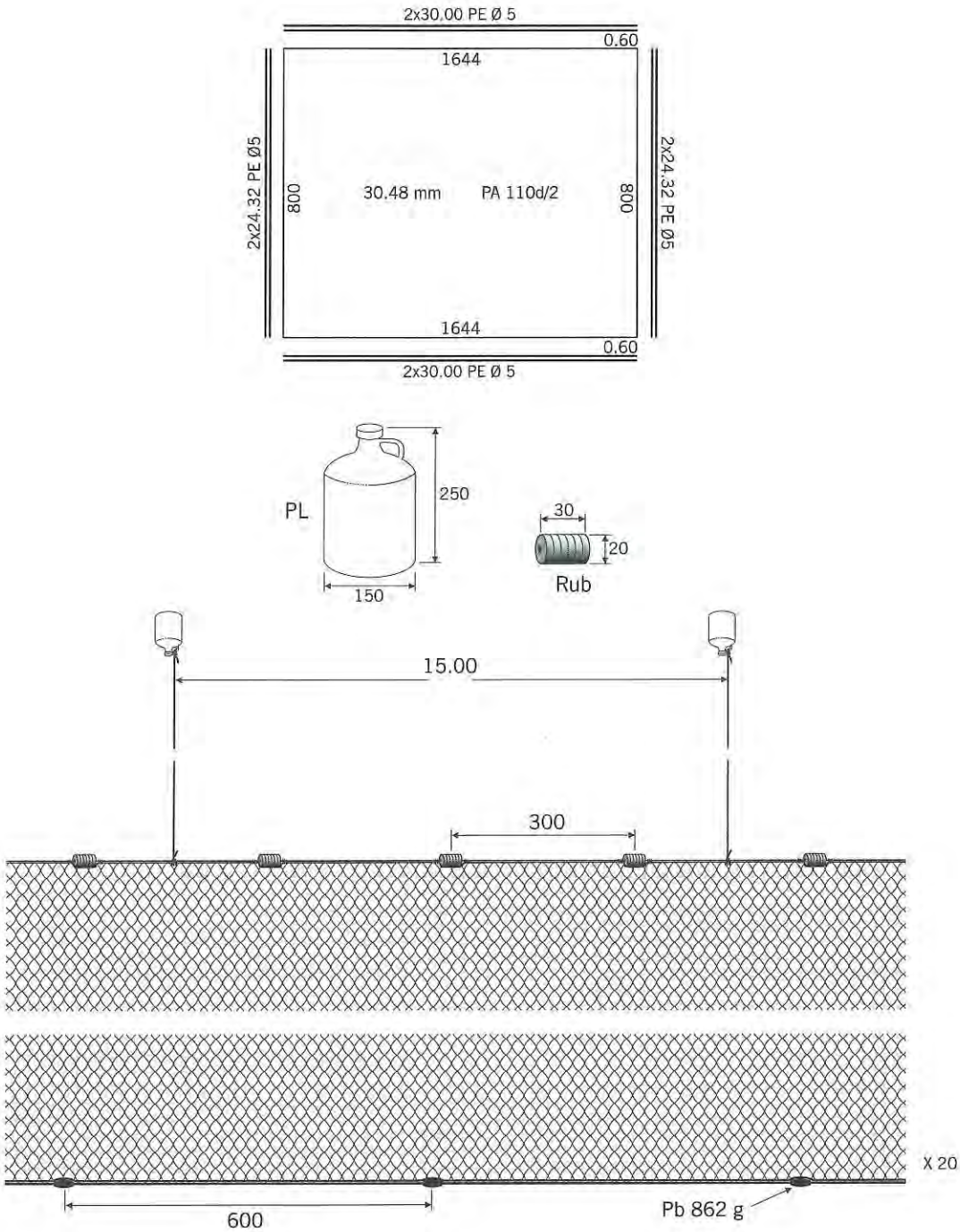




Rub



GILL NET	VESSEL	LOCATION
Mid-water gill net	Loa : 7.50 m	Culaba
Largarete		
Long-jawed anchovy	Hp : -	Leyte



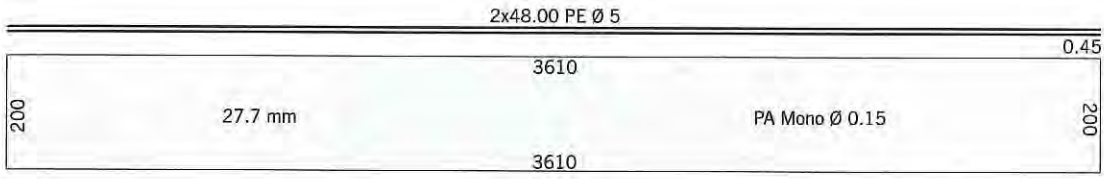
GILL NET
Drift net
Panting pantawilis
Fresh-water herring

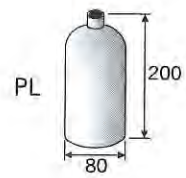
VESSEL
Loa : 10.00 m

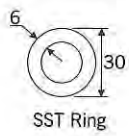
Hp : 16

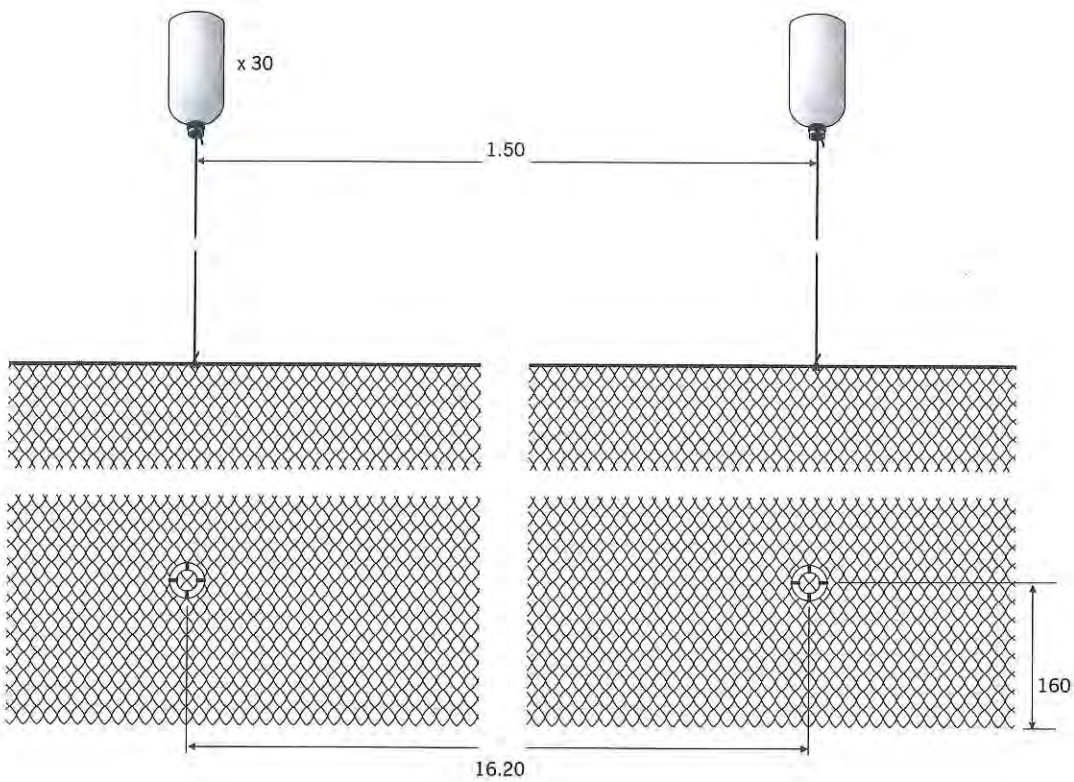
LOCATION
Taal

Batangas









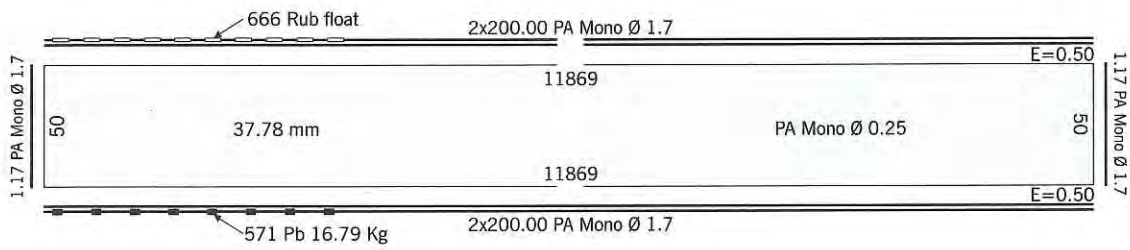
GILL NET
Surface drift net
Pang- bulador
Flying fish

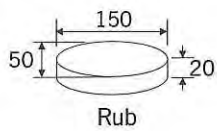
VESSEL
Loa : 9.75 m

Hp : 16

LOCATION
Santa cruz

Marinduque





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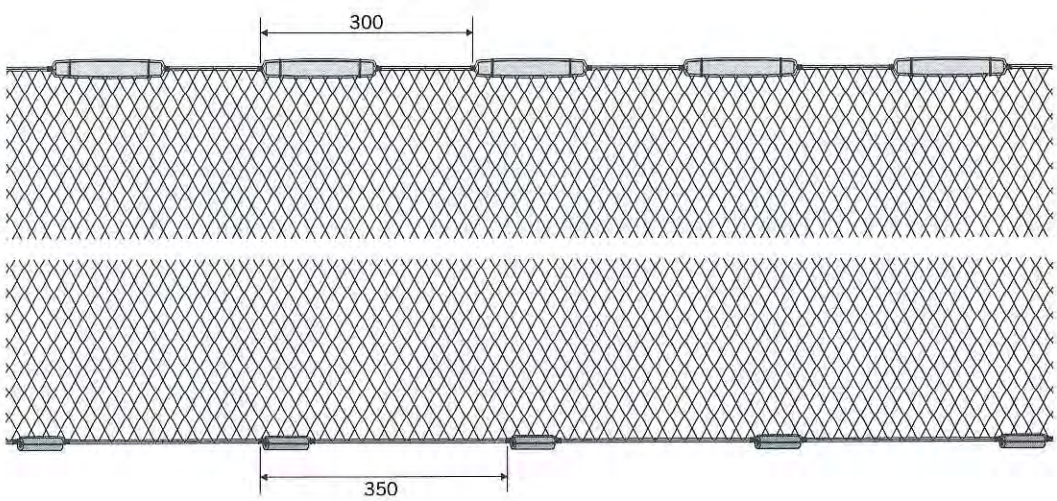


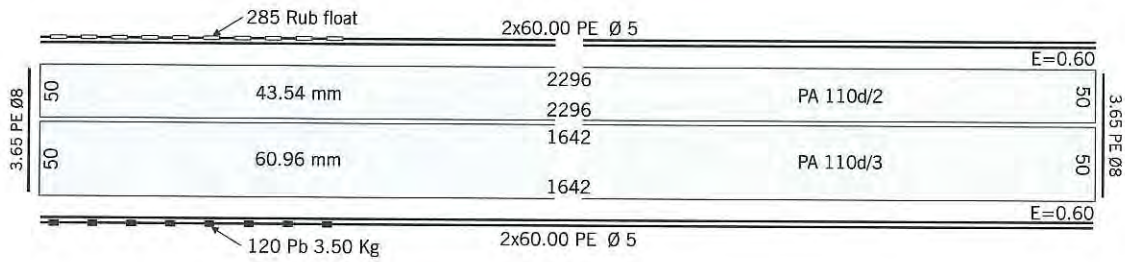
GILL NET
Drift net
Pa-anod
Skipjack, Striped mackerel

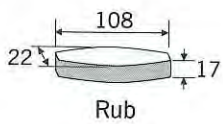
VESSEL
Loa : 9.20 m

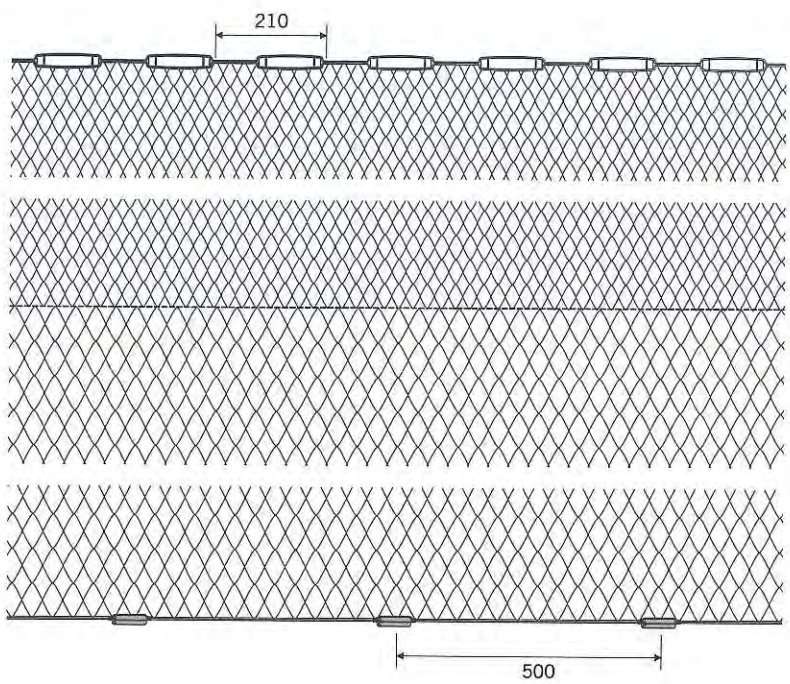
Hp : 16

LOCATION
Dimasaiang

Masbate







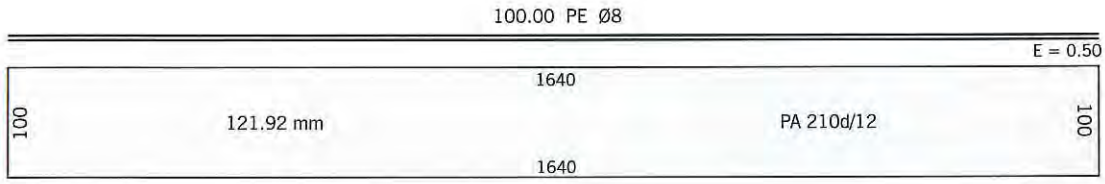
GILL NET
Drift net
Pamo
Skipjack, Caranx sp,
Spanish mackerel

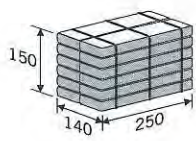
VESSEL
Loa : 9.50 m

Hp : 16

LOCATION
Palo

Leyte





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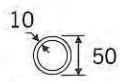
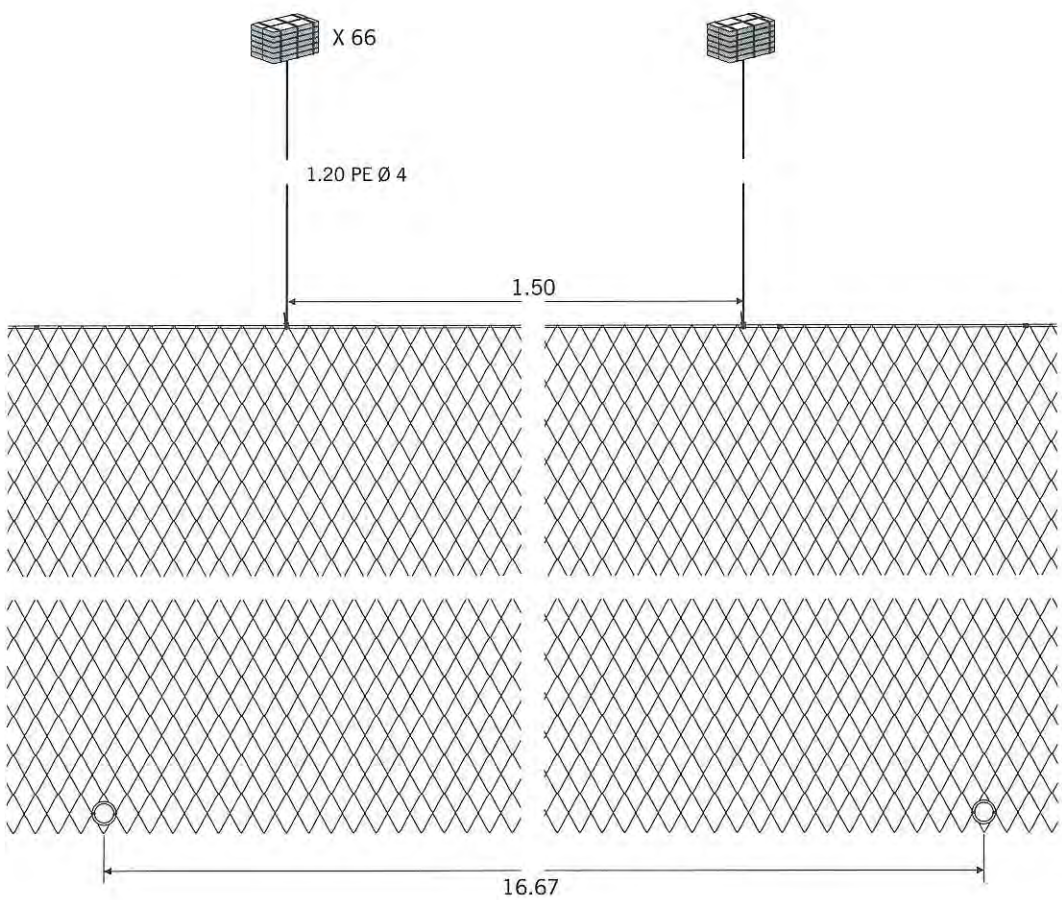


SST Ring



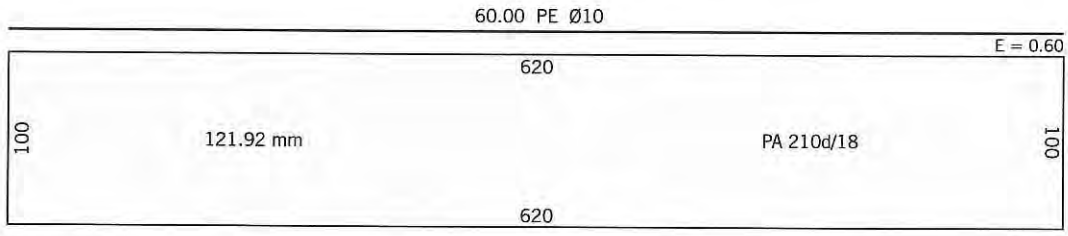
GILL NET
Tuna drift gill net
Pamo
Skipjack, Blue marlin, Spanish mackerel

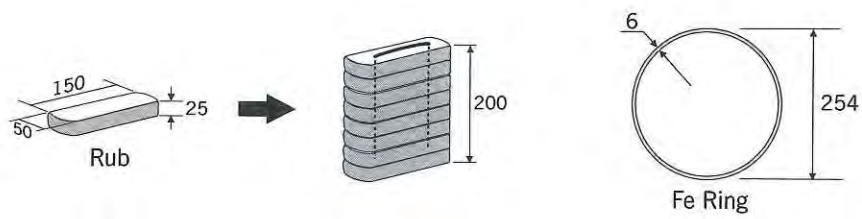
VESSEL
Loa : 13.71 m

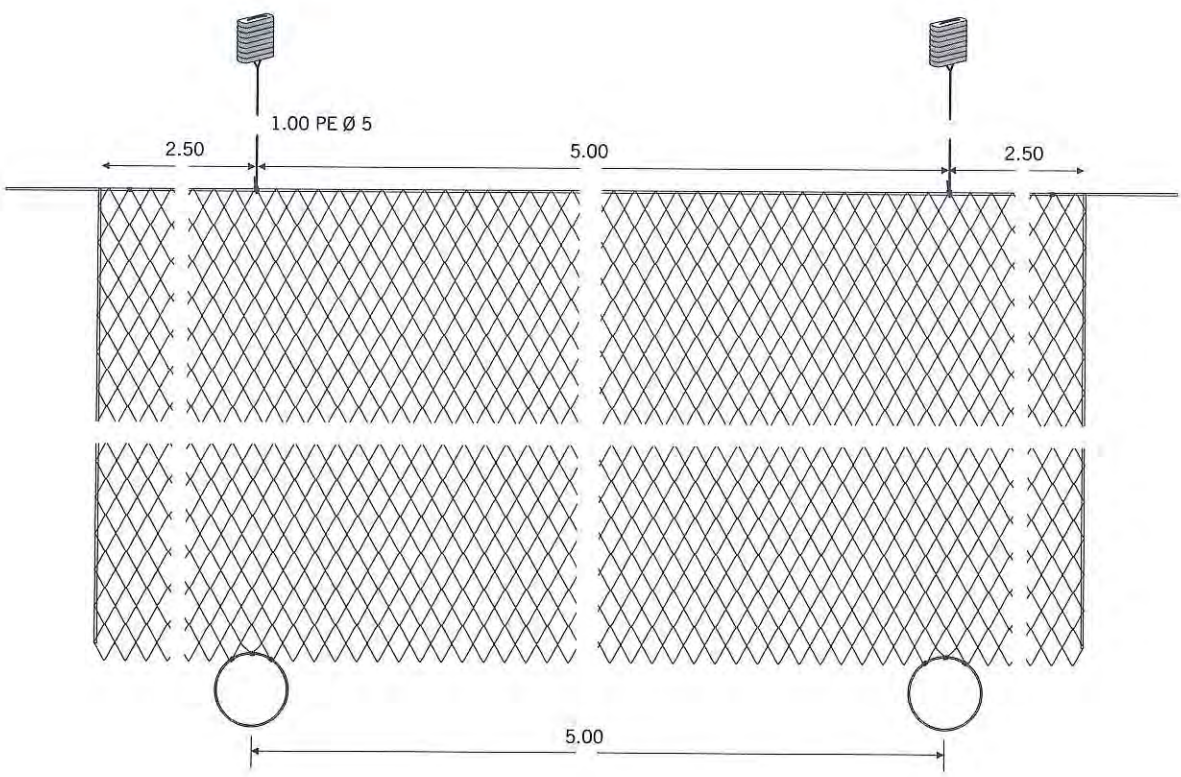
Hp : 80

LOCATION
Malangas

Zamboanga Del Sur







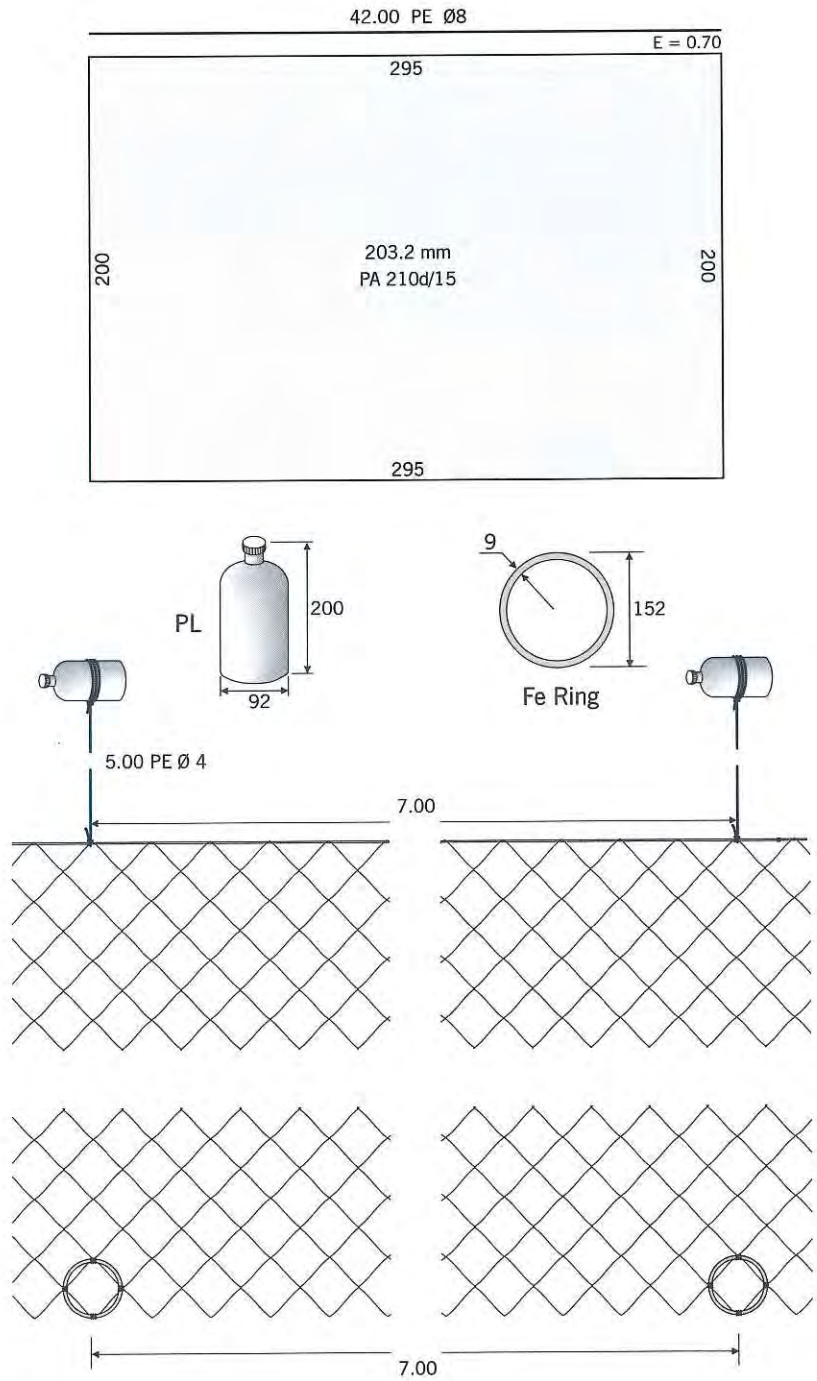
GILL NET
Tuna drift gill net
Pamarlles
Blue marlin,Barracuda
Spanish mackerel

VESSEL
Loa : 8.50 m

Hp : 16

LOCATION
Maco

Davao Del Norte



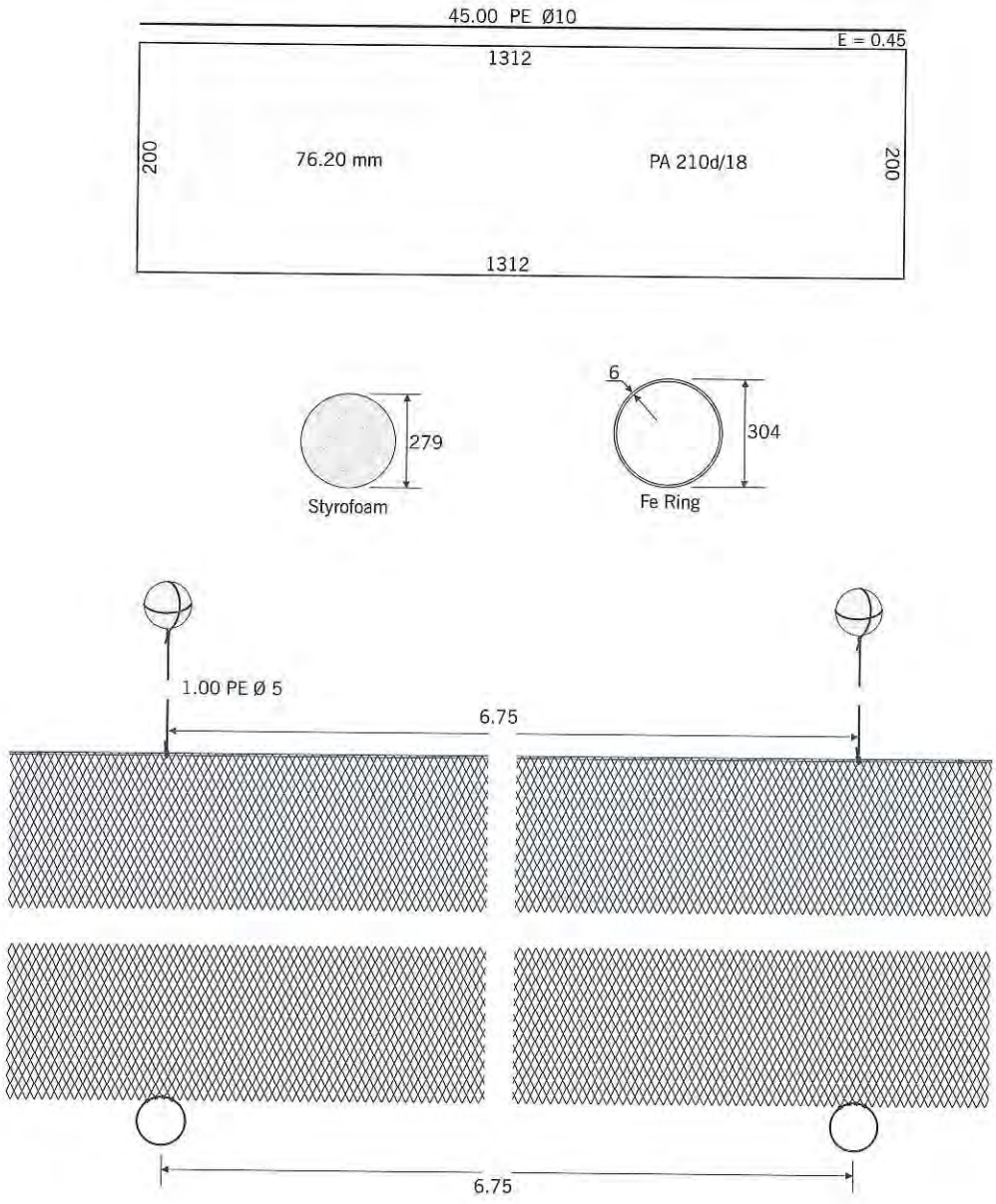
GILL NET
Tuna drift gill net
Pamo
Skipjack, Spanish mackerel, Barracuda, Bonito

VESSEL
Loa : 12.19 m

Hp : 16

LOCATION
Sangali

Zamboanga City



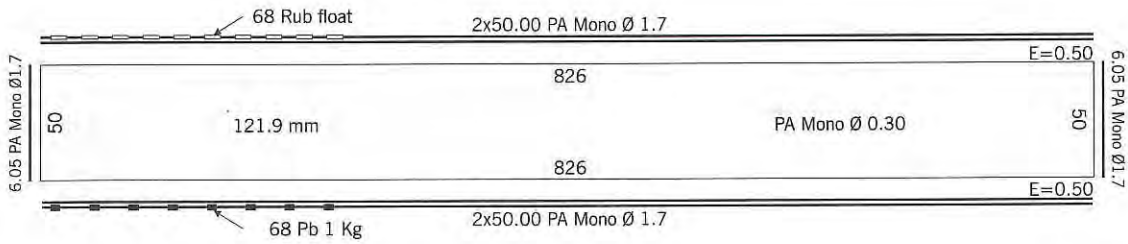
GILL NET
Drift net
Sigay
Black-finned mullet

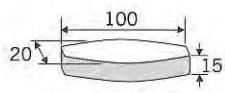
VESSEL
Loa : 7.20 m

Hp : 16

LOCATION
Aparri

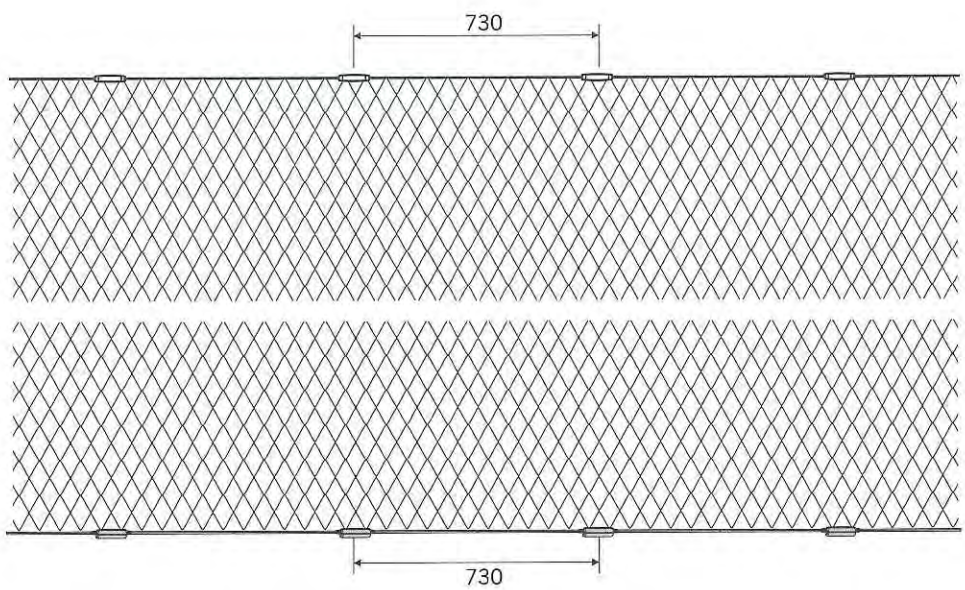
Cagayan





Rub

Pb 15 g



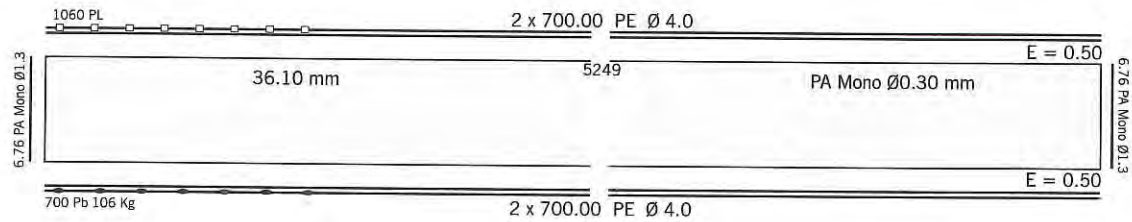
GILL NET
Drif tnet
Panking palutang
Halfpeak, Deep-bodied herring, Striped barracuda

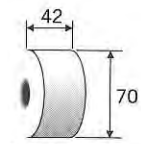
VESSEL
Loa : 11 m

Hp : -

LOCATION
Boto

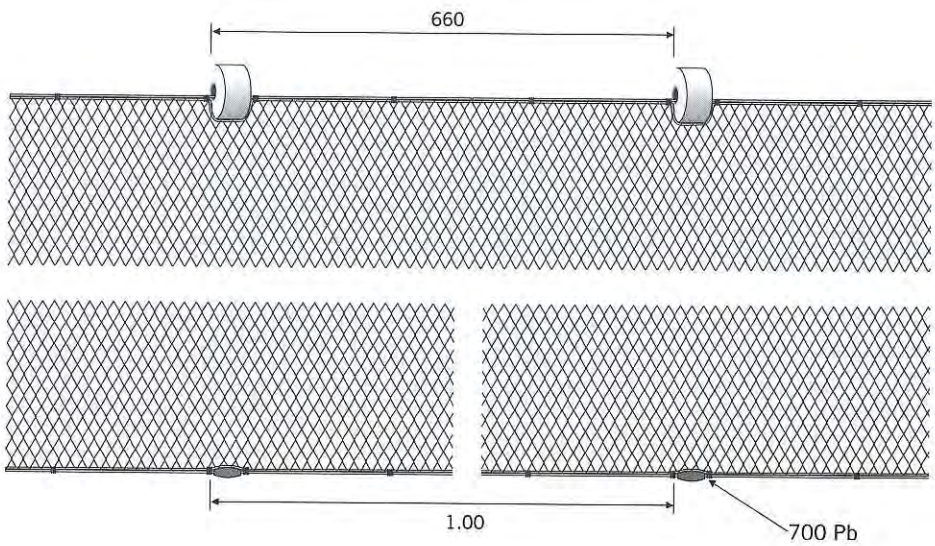
Catanduanes





Plastic float

Pb 151 g



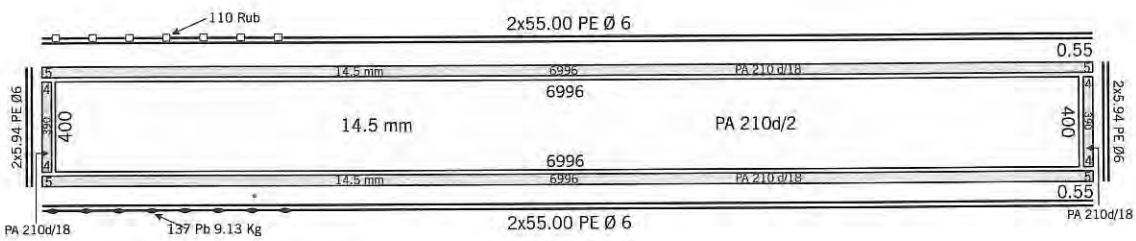
GILL NET
Drift net
Patalang
Long-jawed anchovy

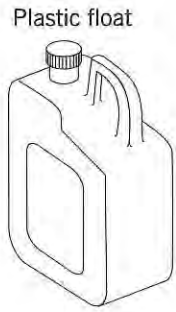
VESSEL
Loa : 7.50 m

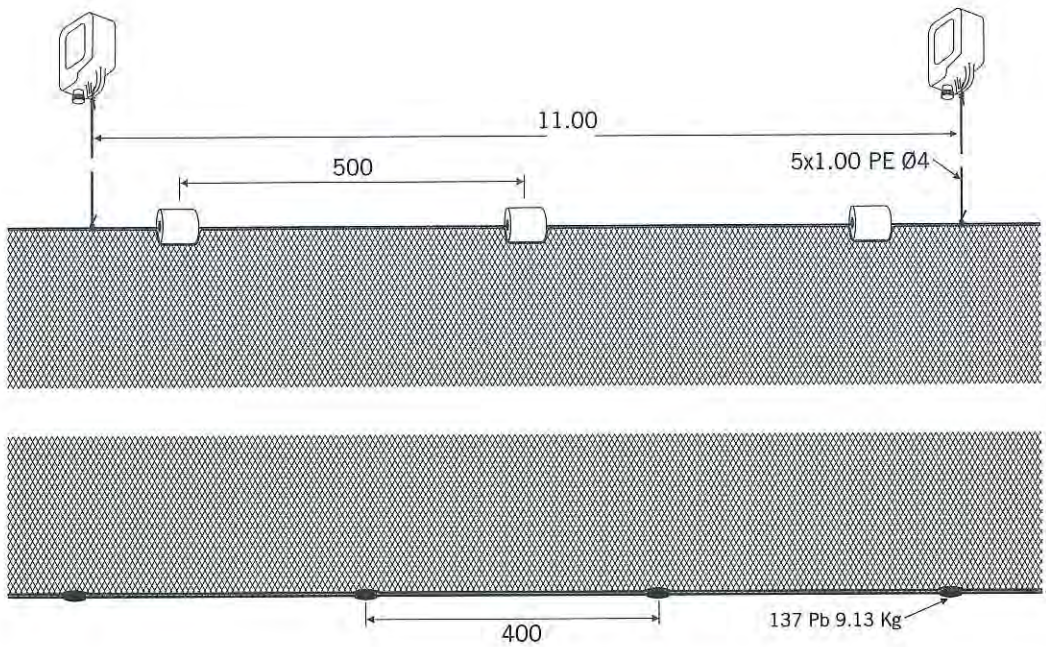
Hp : -

LOCATION
Culaba

Leyte







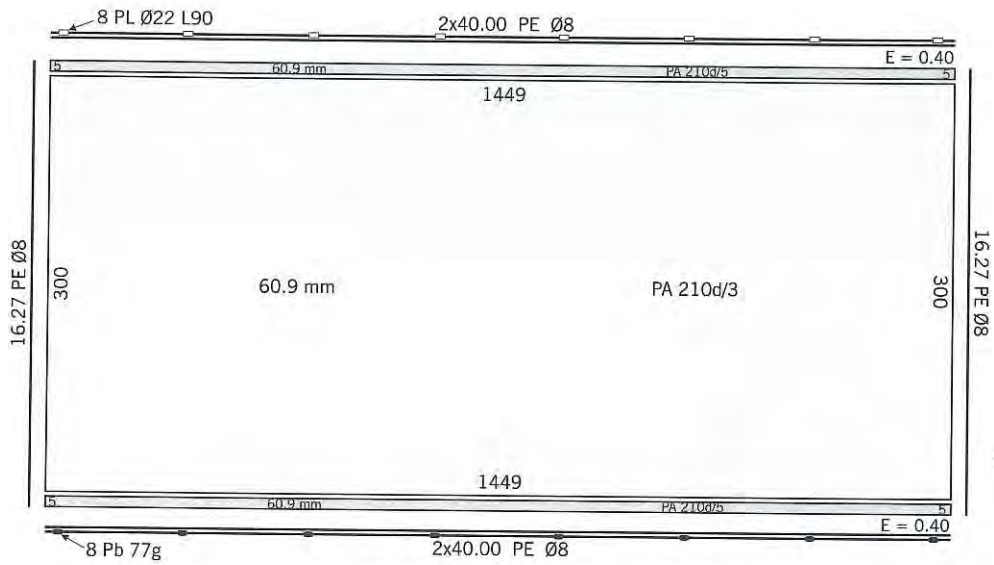
GILL NET
Drift net
Barangay
Sadine, Indian mackerel, Yellowstripe scad

VESSEL
Loa : 12.00 m

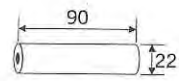
Hp : 12

LOCATION
Pasacao

Camarines Sur

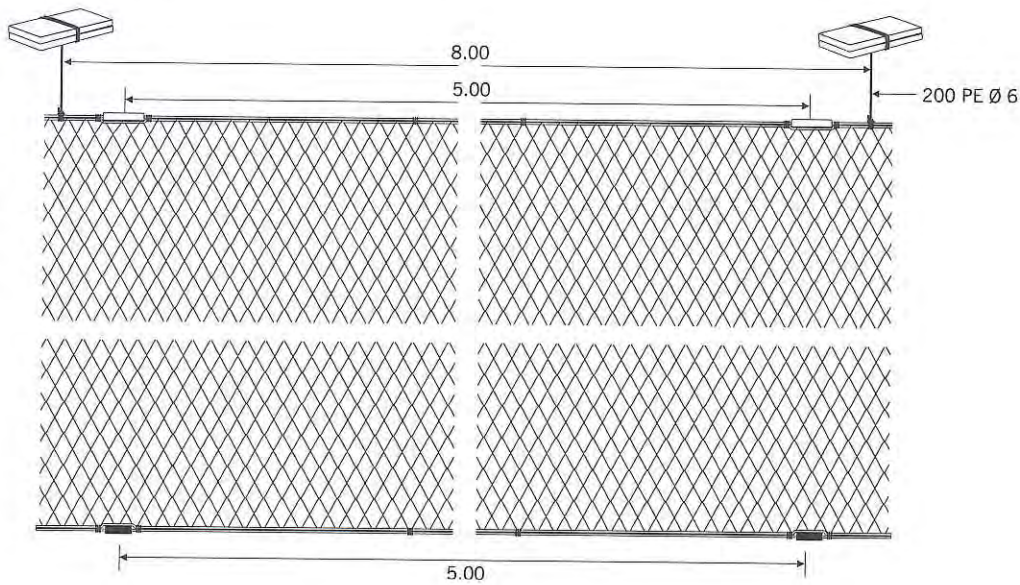


Styrofoam T27 W25



PL

Pb 77 g



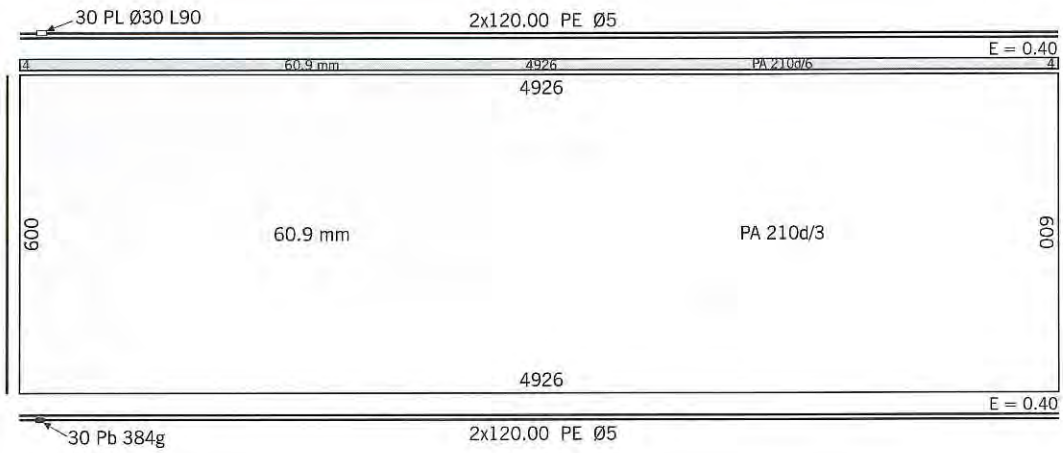
GILL NET
Drift net
Barangay
Strippe mackerel,
Short-bodied mackerel,
Big-eyed scad

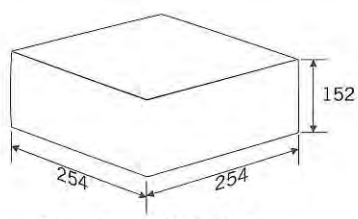
VESSEL
Loa : 9.75 m

Hp : 16

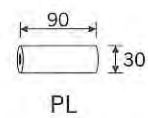
LOCATION
San Pascual

Mosbate



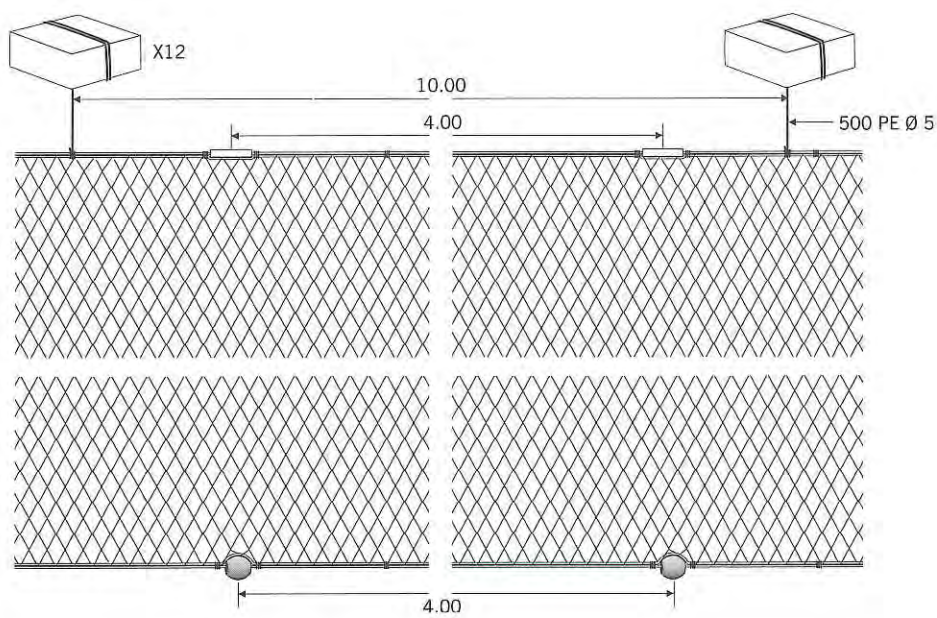


Styrofoam T27 W25



PL

Pb 394 g



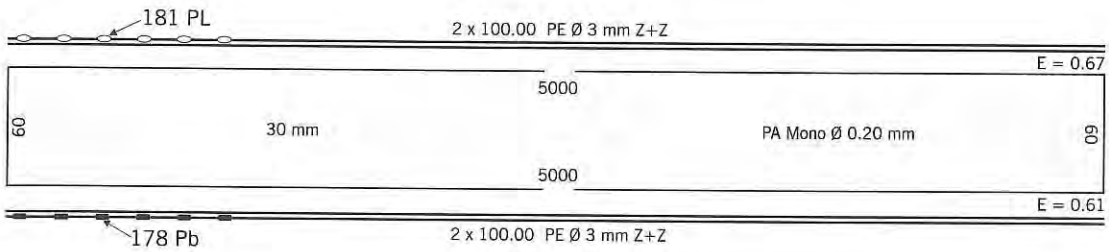
GILL NET
Bottom set net
Panteng pang-alimasag
Crab

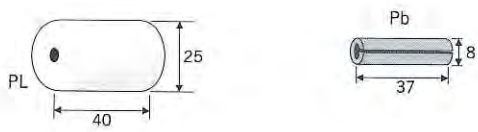
VESSEL
Loa : 8 m

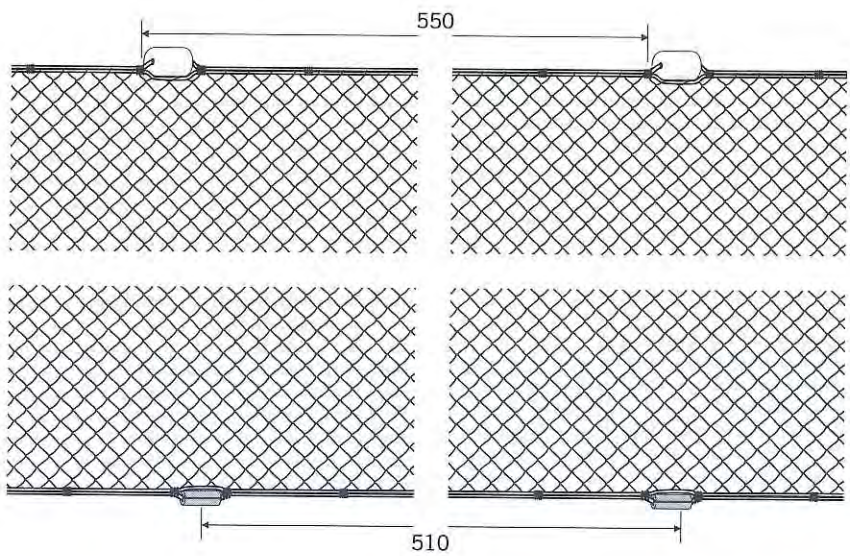
Hp : 16

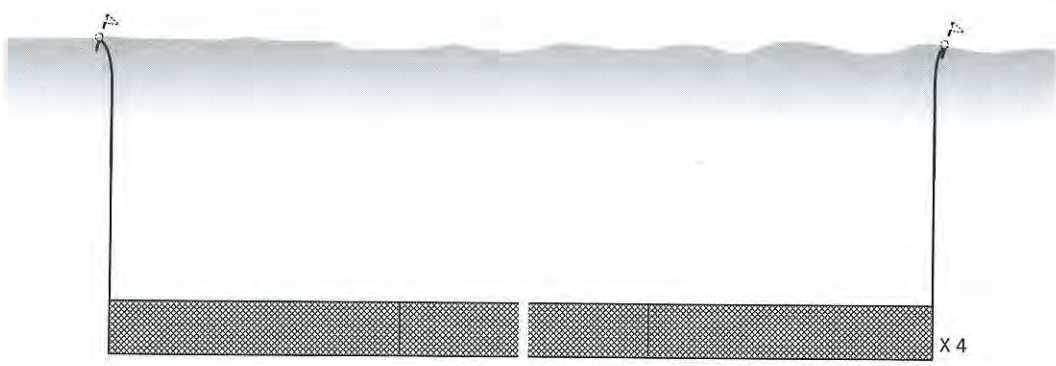
LOCATION
Amaya, Tanza

Cavite









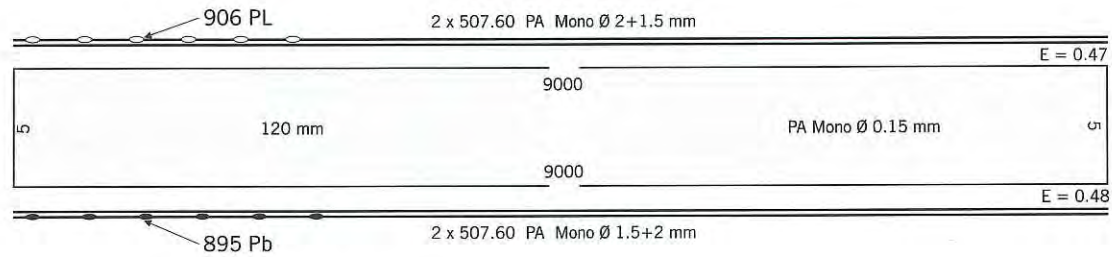
GILL NET
Bottom set net
Pukot pangasag
Crab

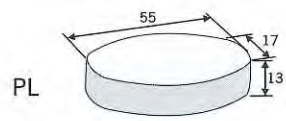
VESSEL
Loa : 5 m

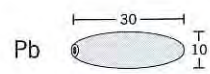
Hp : -

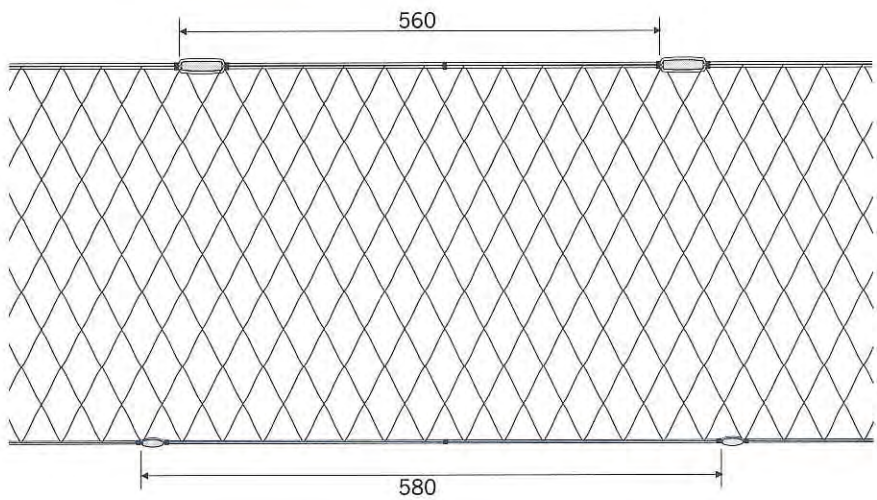
LOCATION
Suba, Bantayan Is.

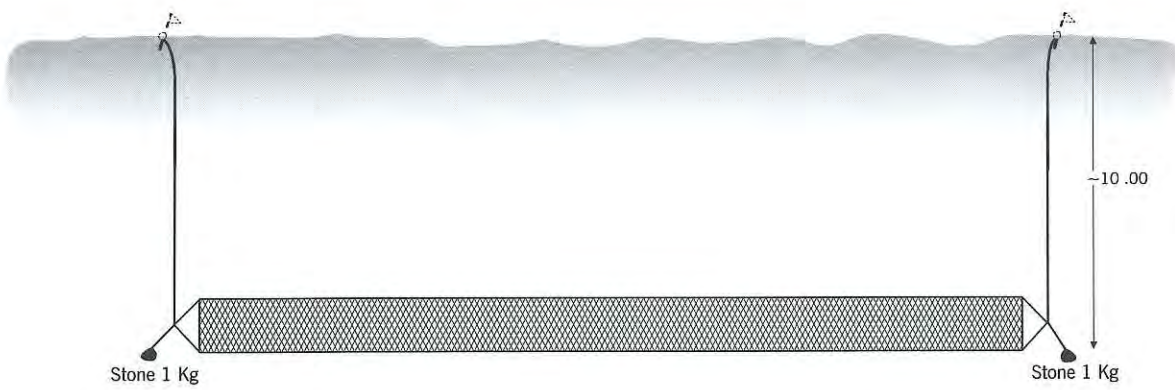
Cebu











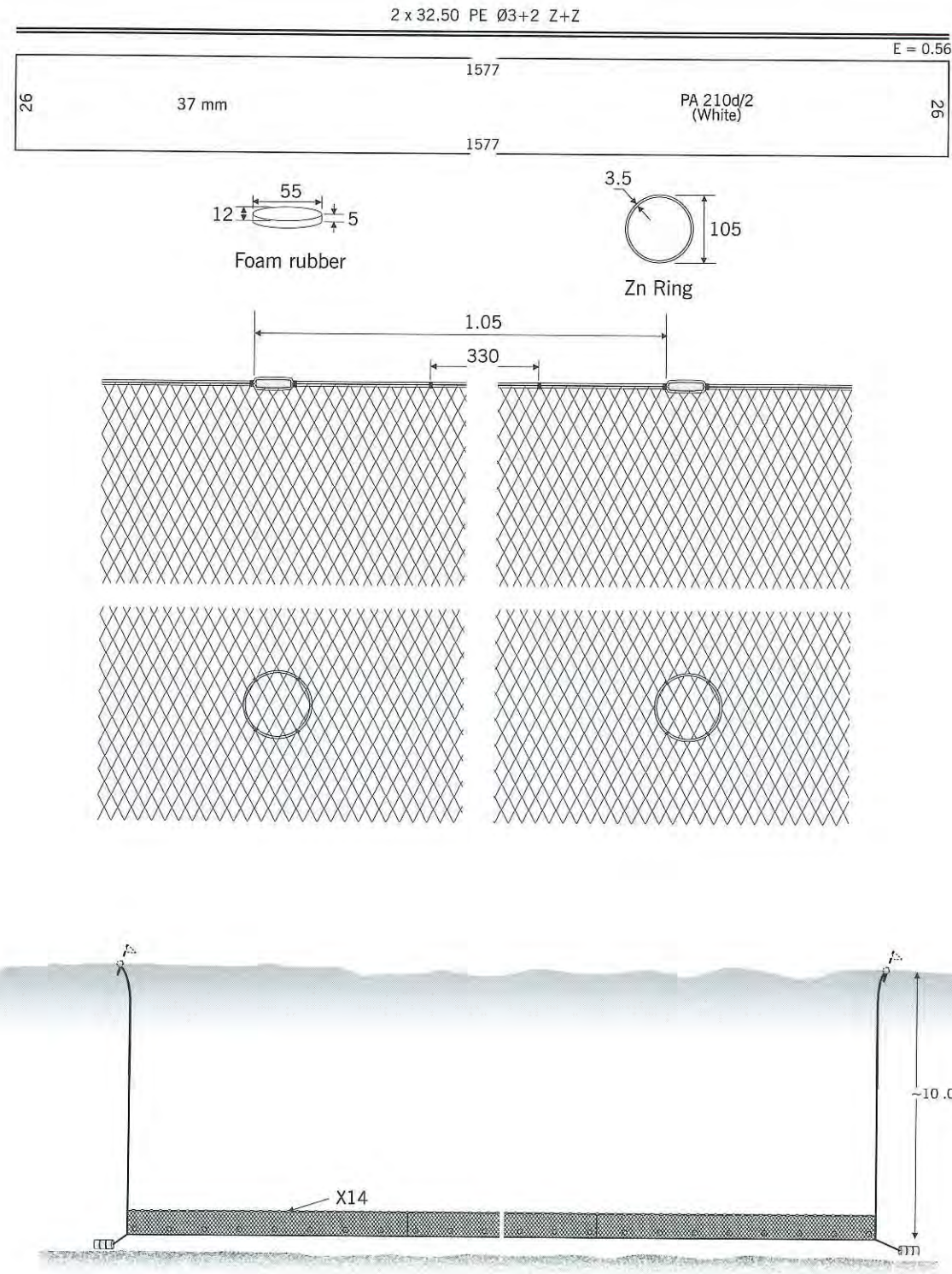
GILL NET
Bottom set net
Pentang pang-alimasag
Crab

VESSEL
Loa : 8 m

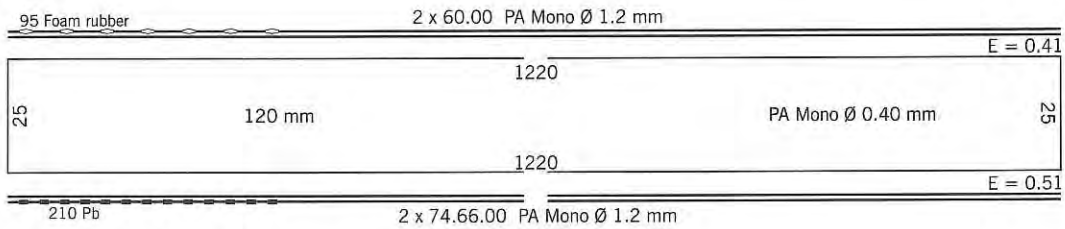
Hp : 16

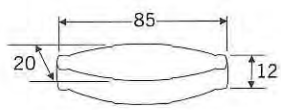
LOCATION
Amaya, Tanza

Cavite

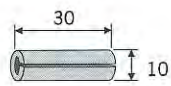


GILL NET	VESSEL	LOCATION
Bottom set net	Loa : 8 m	Naic.
Snapper, Sea bream, etc.	Hp : 16	Cavite

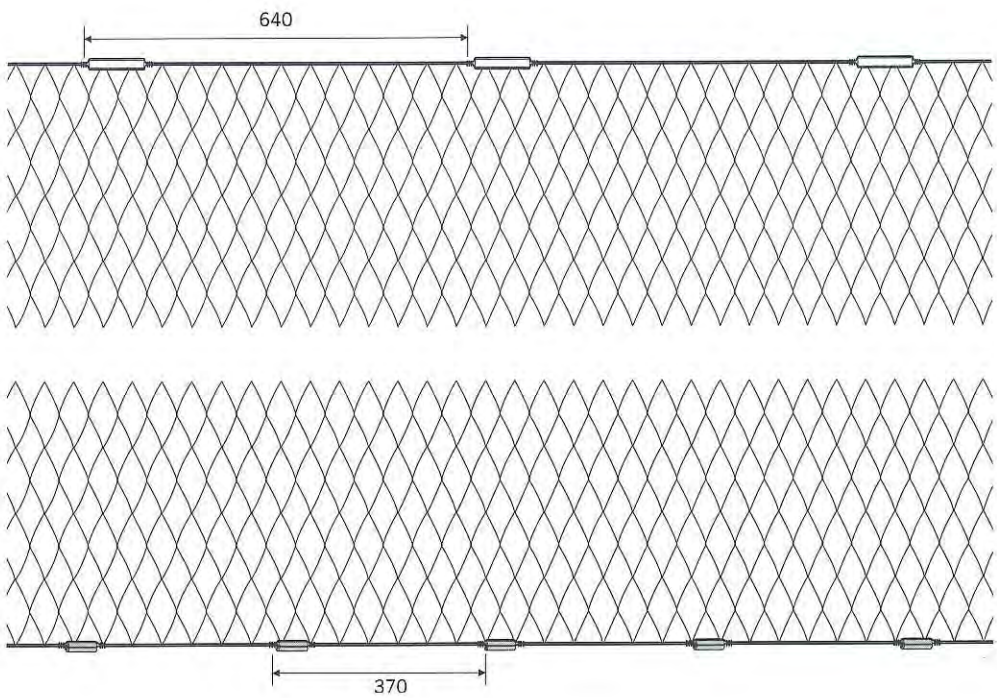




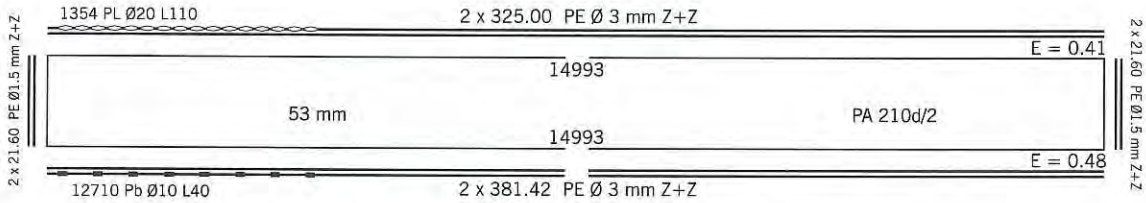
Foam rubber

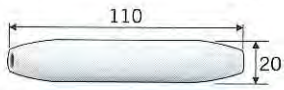


Pb

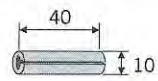


GILL NET	VESSEL	LOCATION
Bottom set net, Drift net	Loa : 8 m	Pasuquin
Long tom, Round scad, etc.	Hp : 10	Ilocos Norte

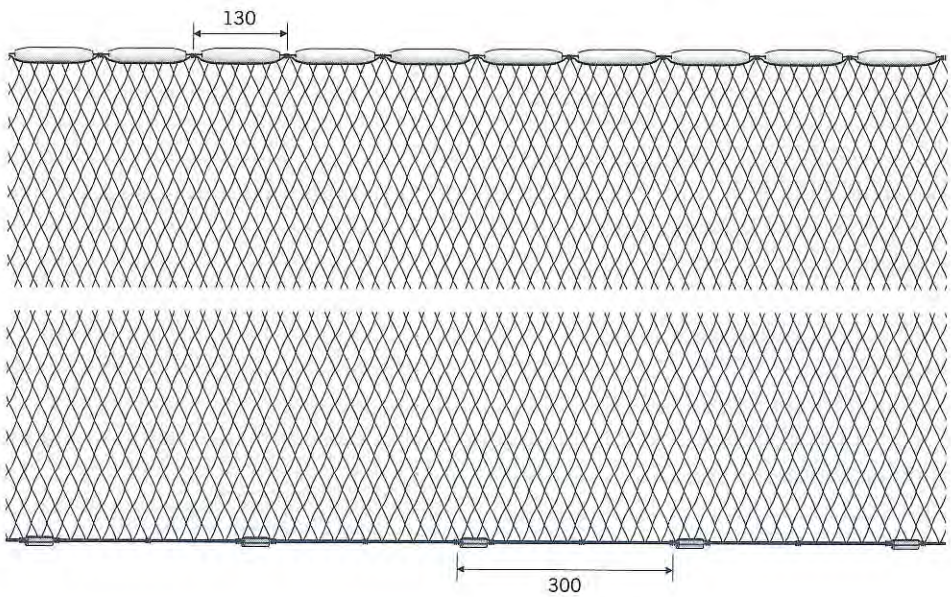




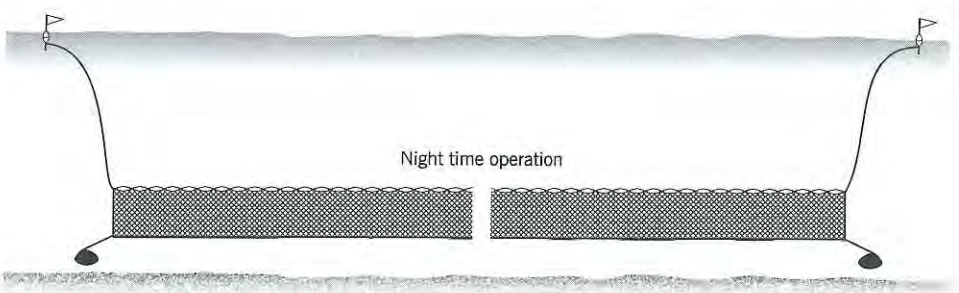
PL



Pb



Day time operation



Night time operation

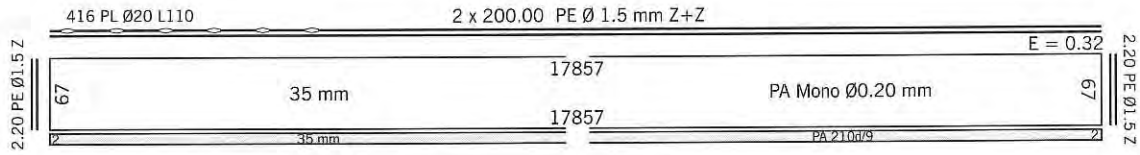
GILL NET
Bottom set net
Sigay
Demersal fishes

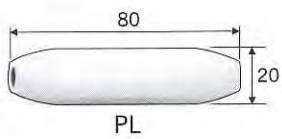
VESSEL
Loa : 8 m

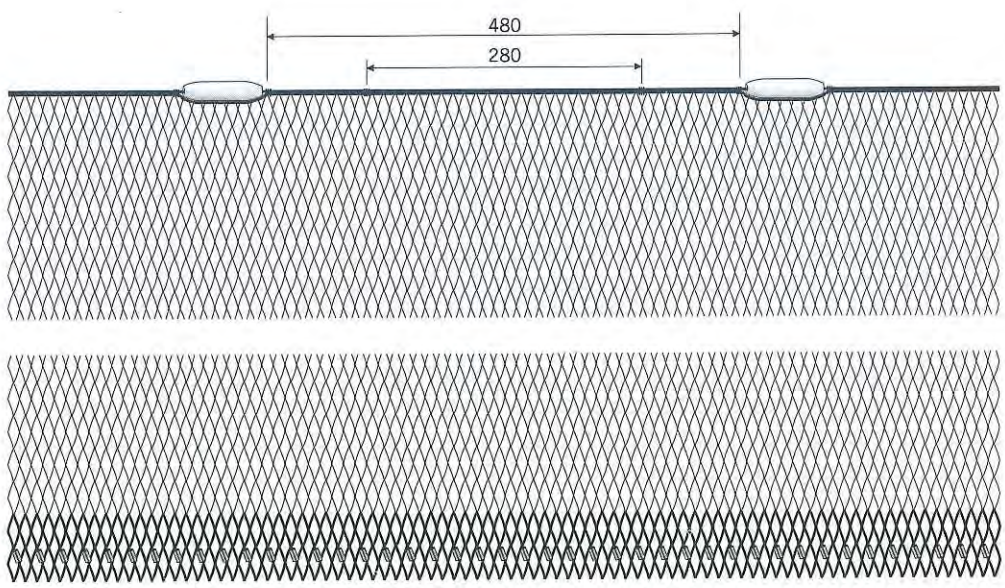
Hp : 10

LOCATION
Bolinao

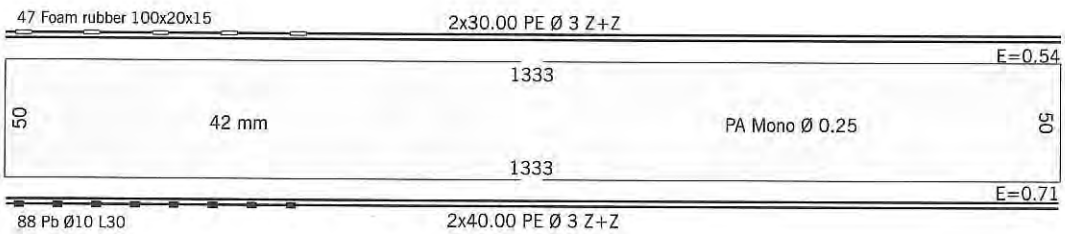
Pangasinan

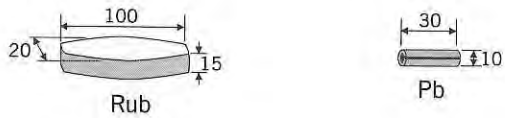


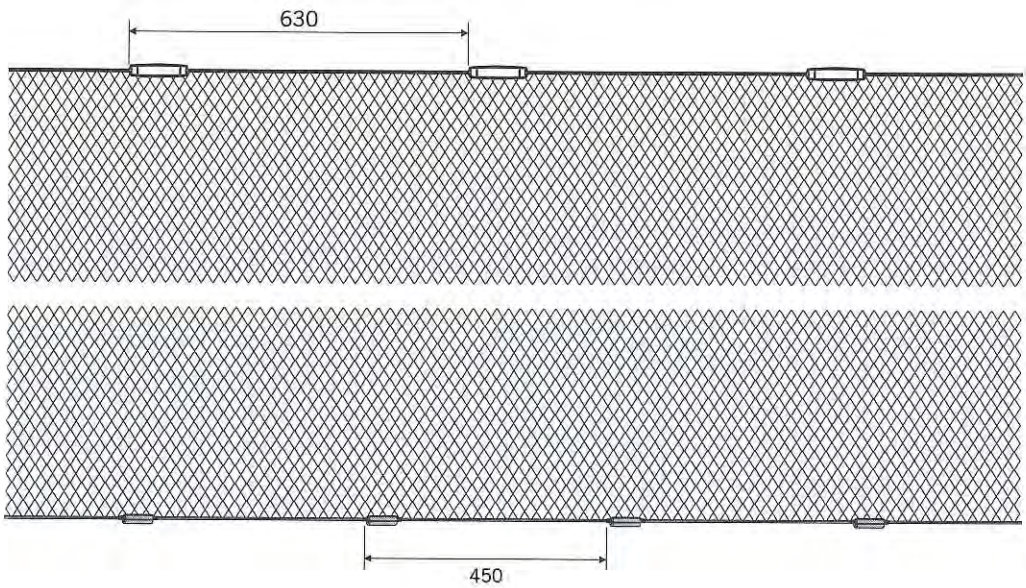


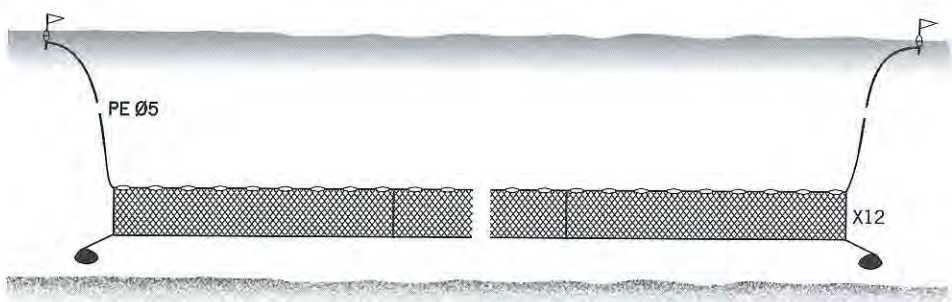


GILL NET	VESSEL	LOCATION
Bottom set net	Loa : 8 m	Samonte, Cavite City
Round scad	Hp : 16	Cavite









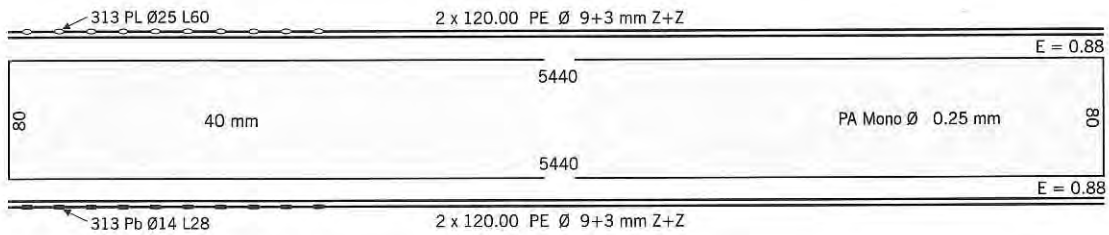
GILL NET
Bottom set net
Palunod
Trevally,Dorab,Wolf herring

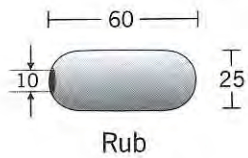
VESSEL
Loa : 8 m

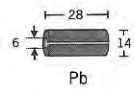
Hp : 10

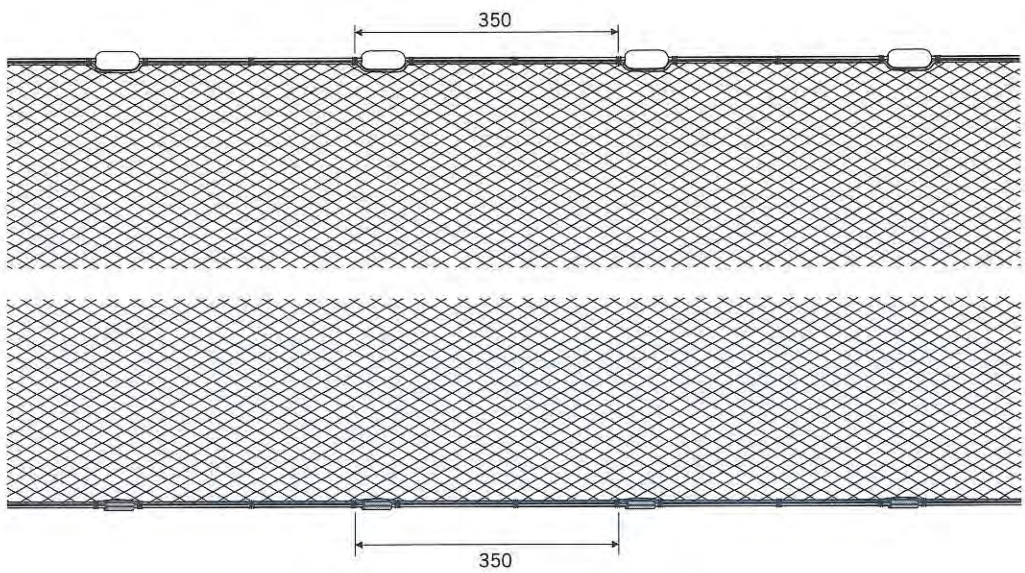
LOCATION
Bantayan Is.

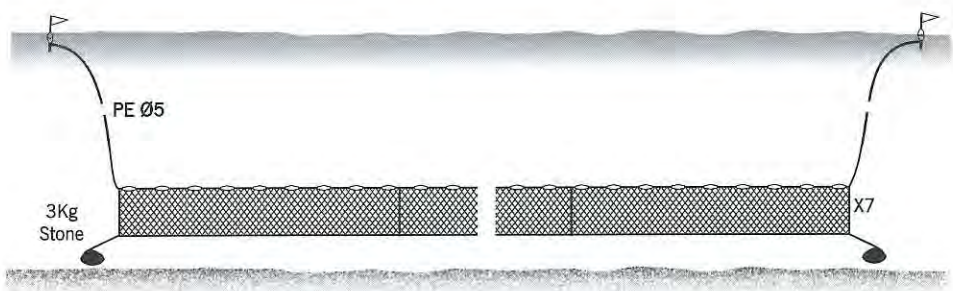
Cebu











GILL NET
Bottom set net

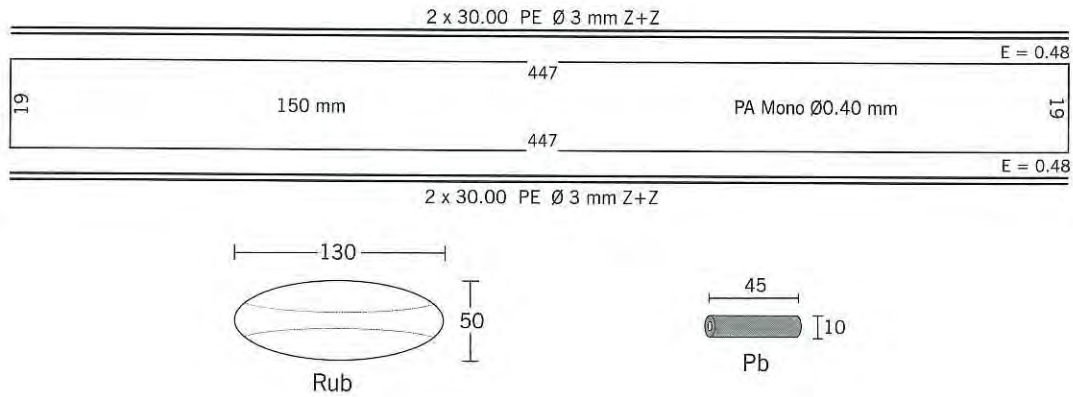
Sting ray, Shark

VESSEL
Loa : 8 m

Hp : 10

LOCATION
Puerto Princesa City

Palawan



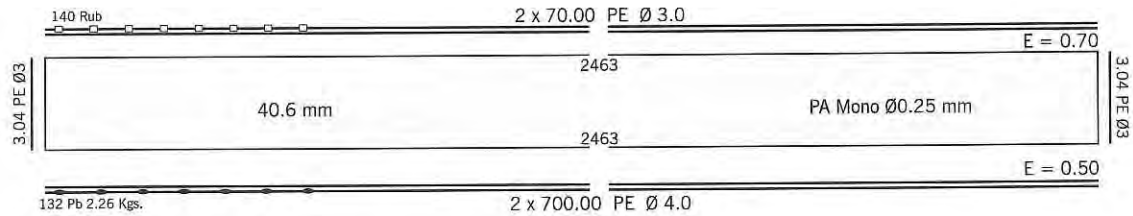
GILL NET
Bottom set
Pamasayan
White shrimp

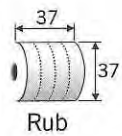
VESSEL
Loa : 6.09 m

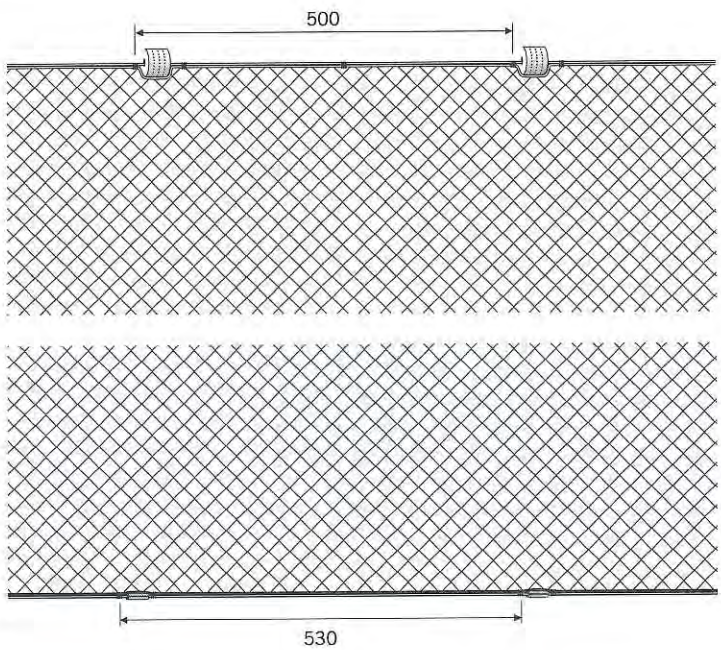
Hp : -

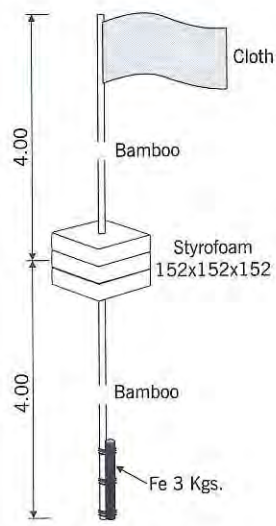
LOCATION
Catbalogan

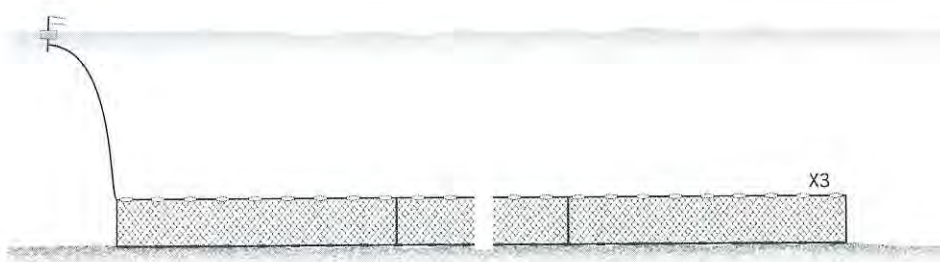
Samar









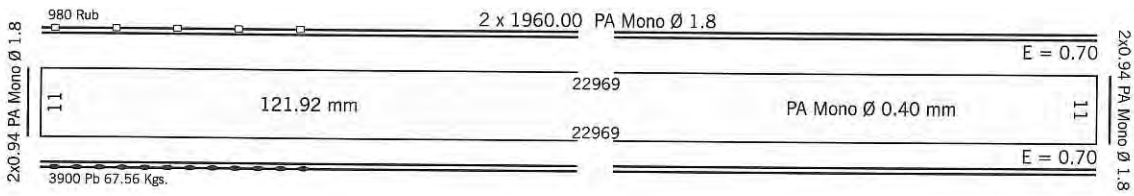


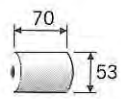
GILL NET
Bottom set gill net
Pangosay
Blue swimming crab

VESSEL
Loa : 10.97 m

Hp : 80

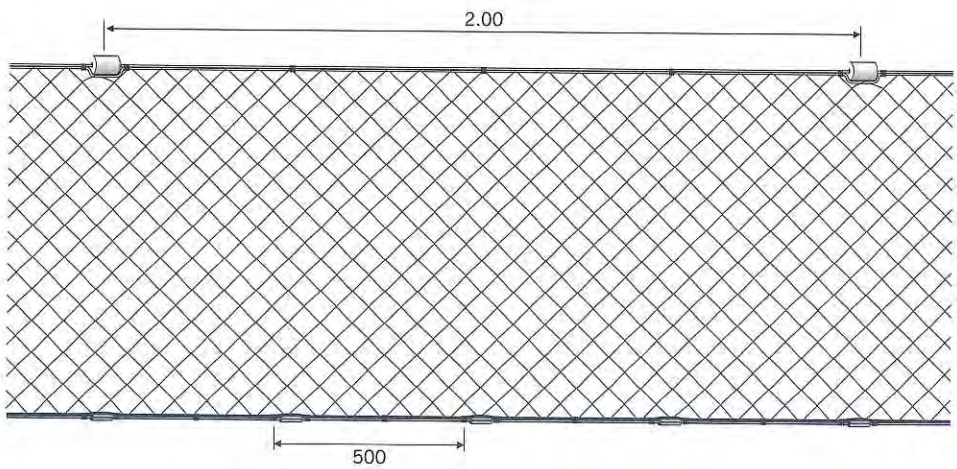
LOCATION
Tallsay City, Silay City and Hinigaran
Negros Occidental

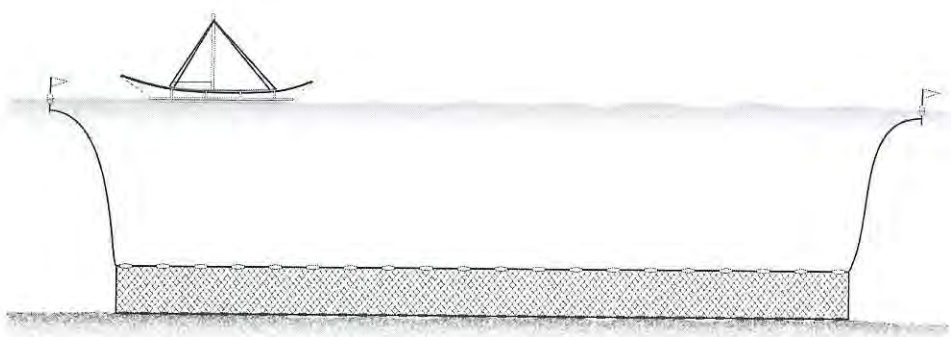




Rub


Pb~17.3 g





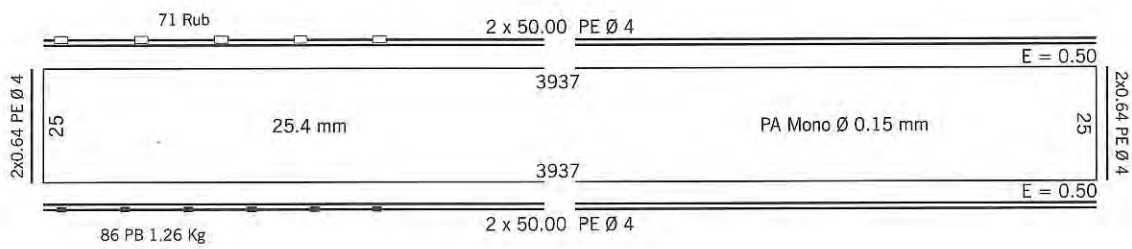
GILL NET
Bottom set net
Pang-biya
Goby

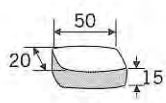
VESSEL
Loa : 7 m

Hp : 9

LOCATION
Naujan Lake

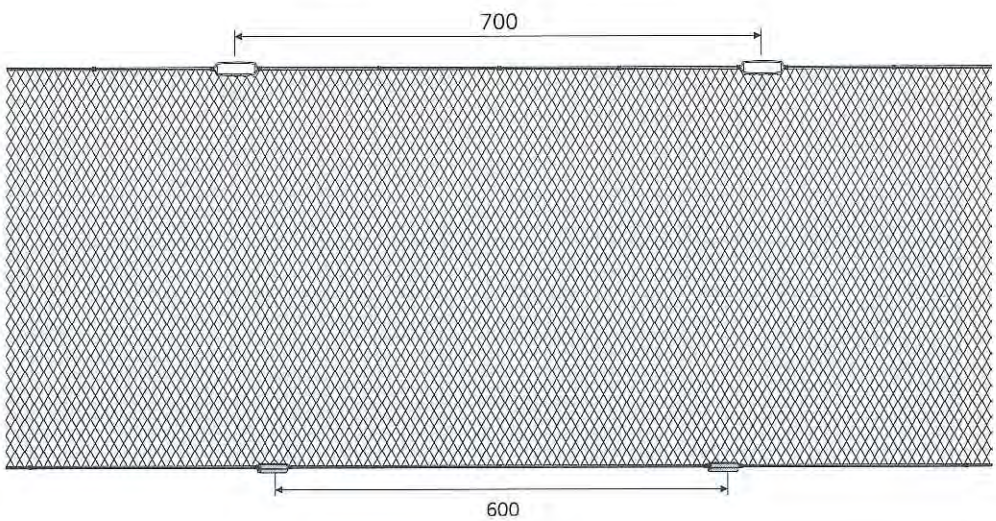
Mindoro

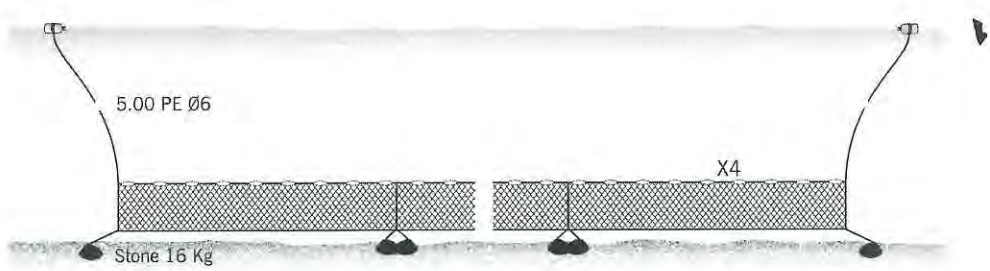




Rub

Pb~15.2 g





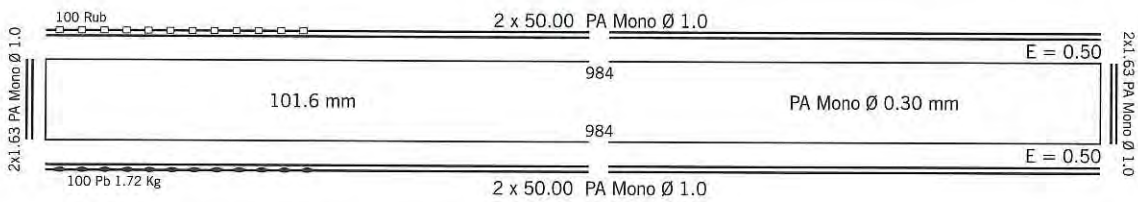
GILL NET
Bottom set gill net
Pamagi
Ray, Blue swimming crab

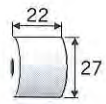
VESSEL
Loa : 5.48 m

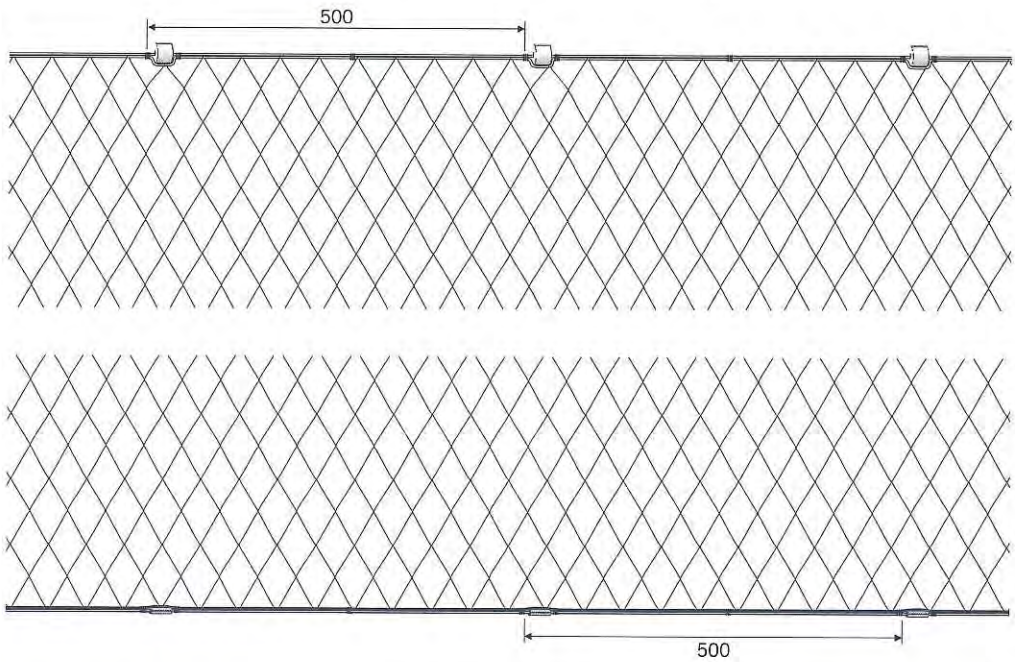
Hp : -

LOCATION
Tinambacan

Samar







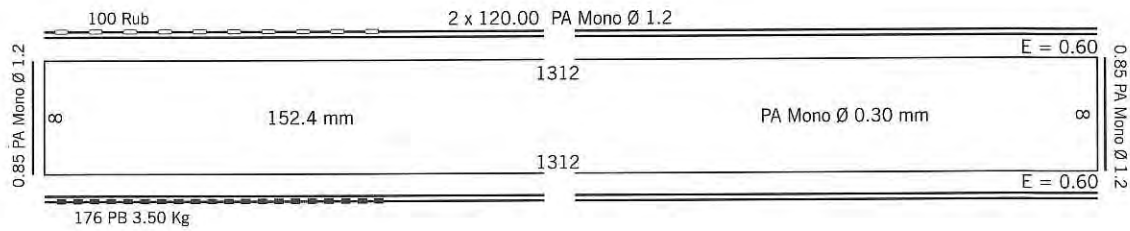
GILL NET
Bottom set net
Pang-lambay
Blue swimming crab

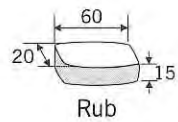
VESSEL
Loa : 4.26 m

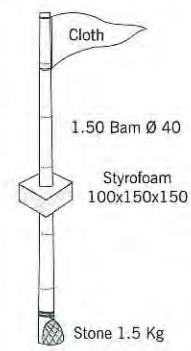
Hp : -

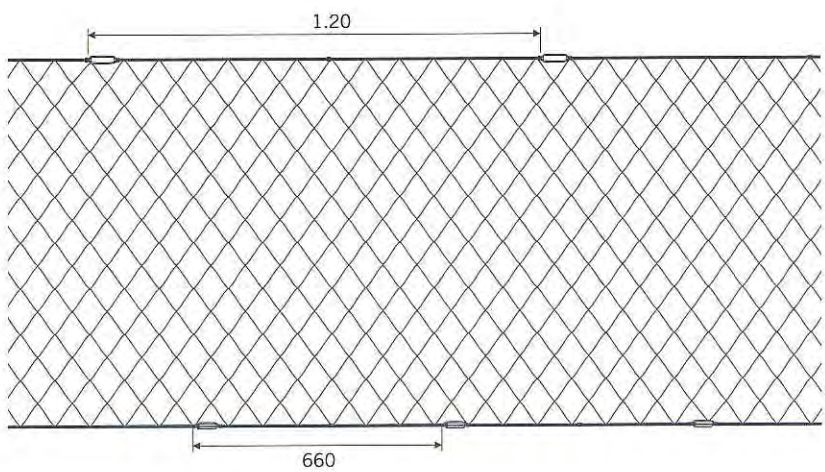
LOCATION
Placer

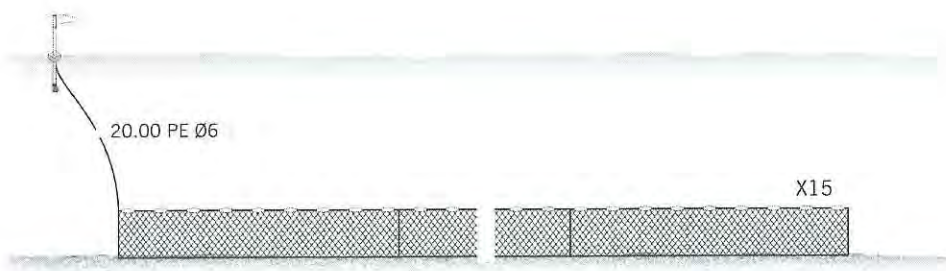
Masbate











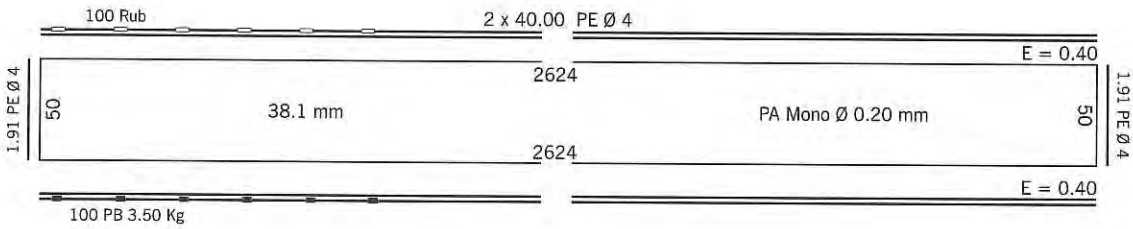
GILL NET
Bottom set net
Panti-panghipon
White shrimp, Prawn

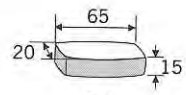
VESSEL
Loa : 7.31 m

Hp : 10

LOCATION
Lucena City

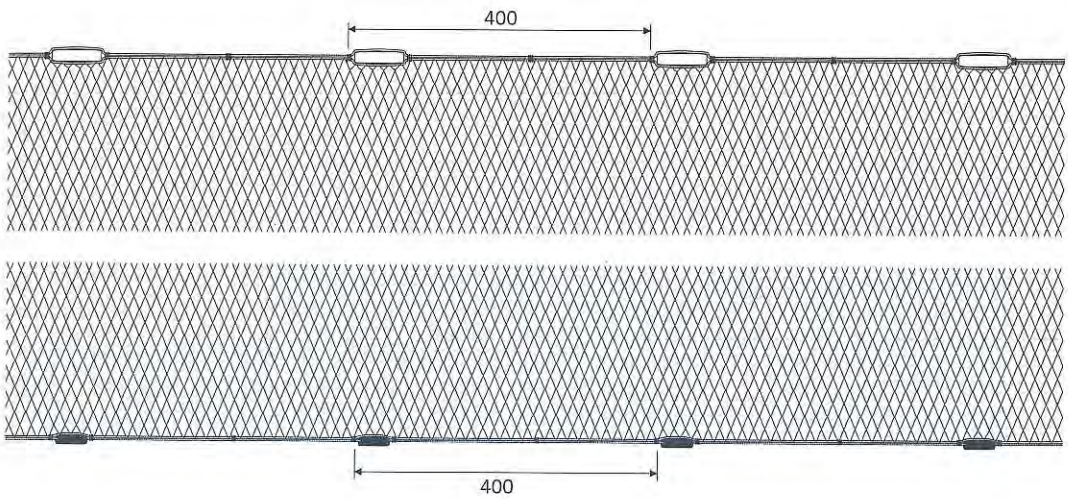
Quezon

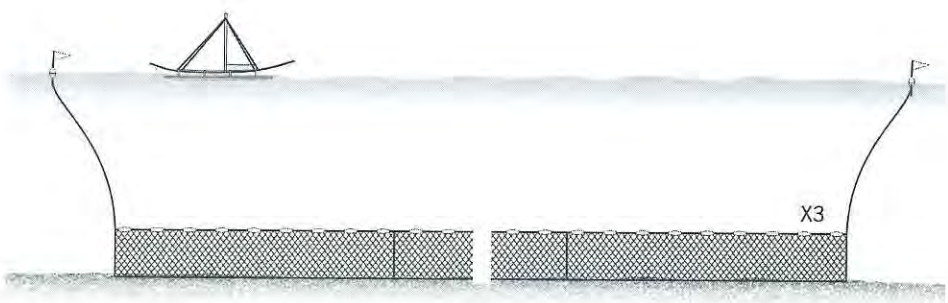




Rub

Pb 15 g





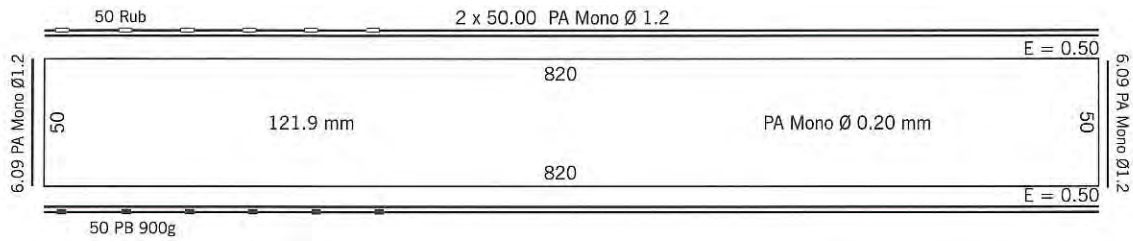
GILL NET
Bottom set net
Pukot
Tilapia, Carp

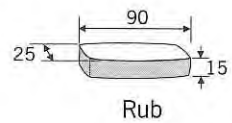
VESSEL
Loa : 6.50 m

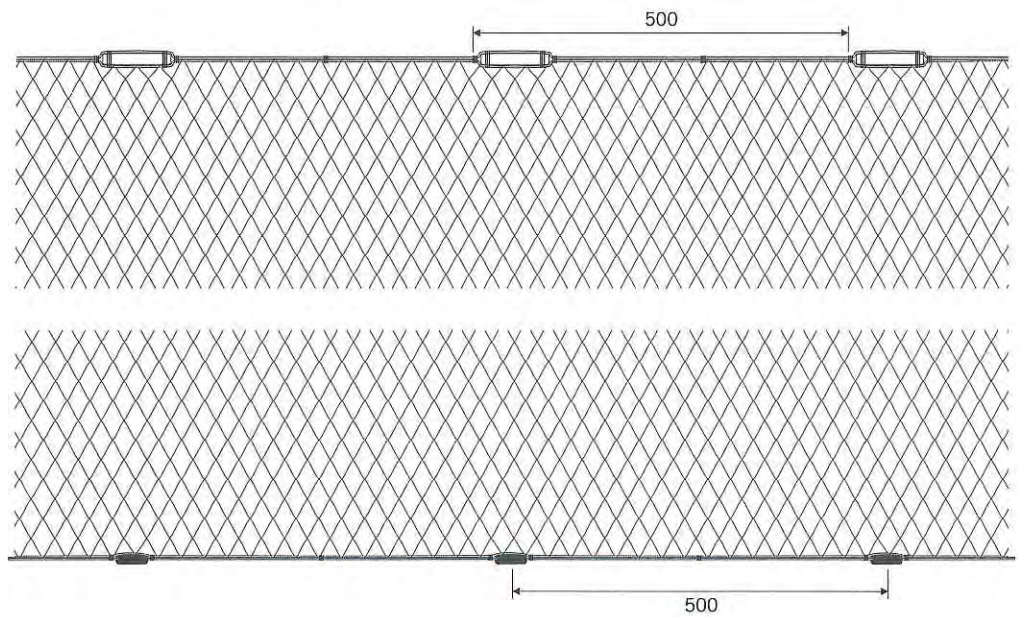
Hp : 10

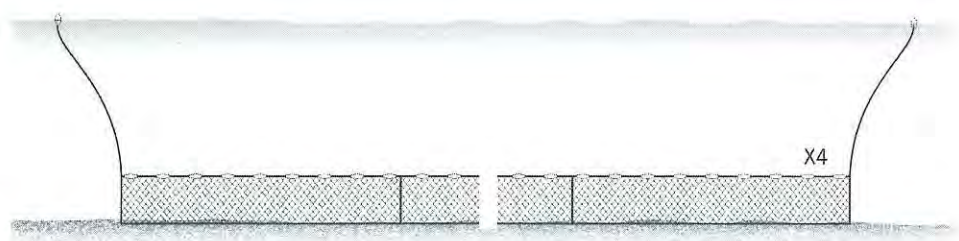
LOCATION
Buhi and Bato

Camarines Sur

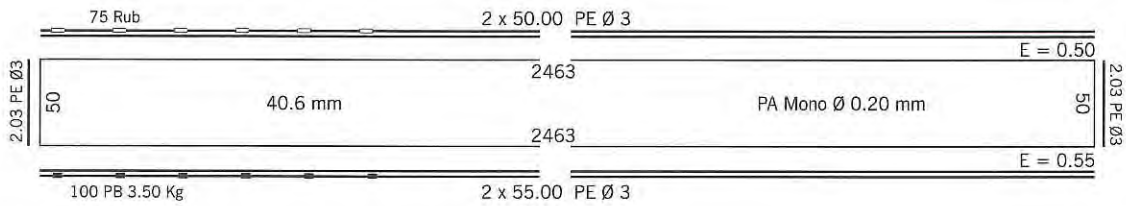


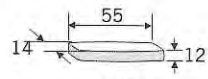






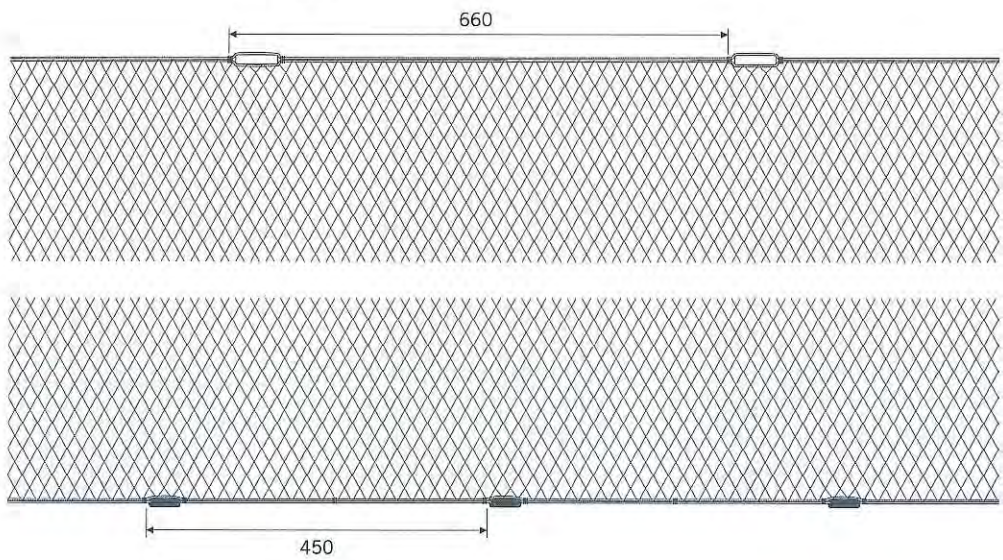
GILL NET	VESSEL	LOCATION
Bottom set net	Loa : 7.92 m	Sorsogon
Idos-Idos		
Shrimp, Prawn	Hp : 16	Sorsogon

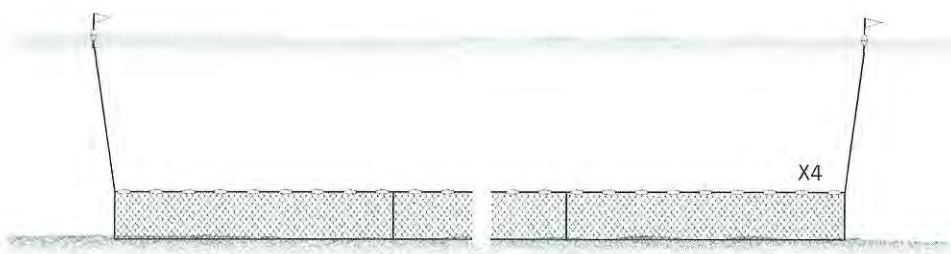




Rub

Pb 17.2 g





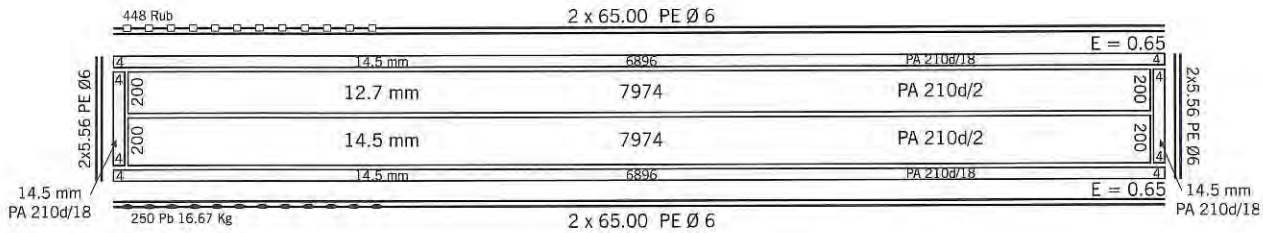
GILL NET
Bottom set net
Patalang
Long-jawed anchovy

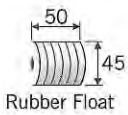
VESSEL
Loa : 4.87 m

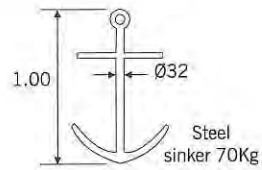
Hp : 5

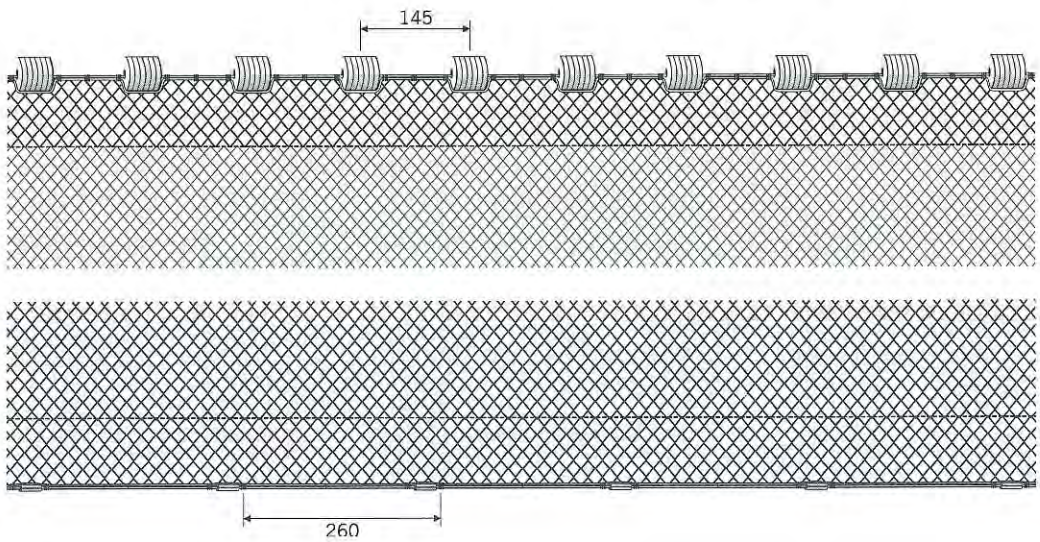
LOCATION
Batuan

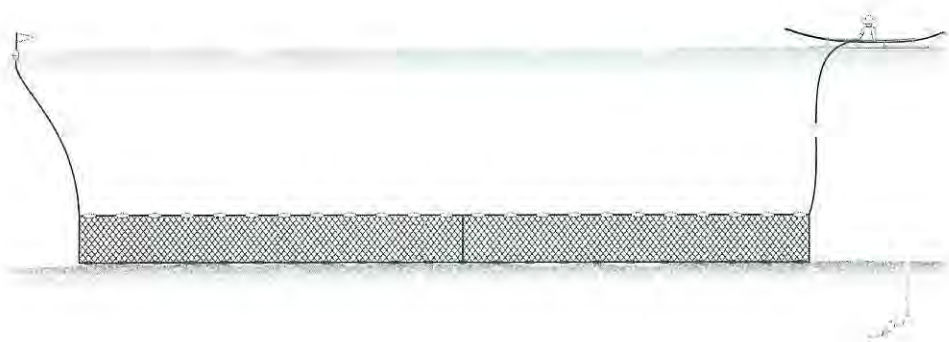
Masbate











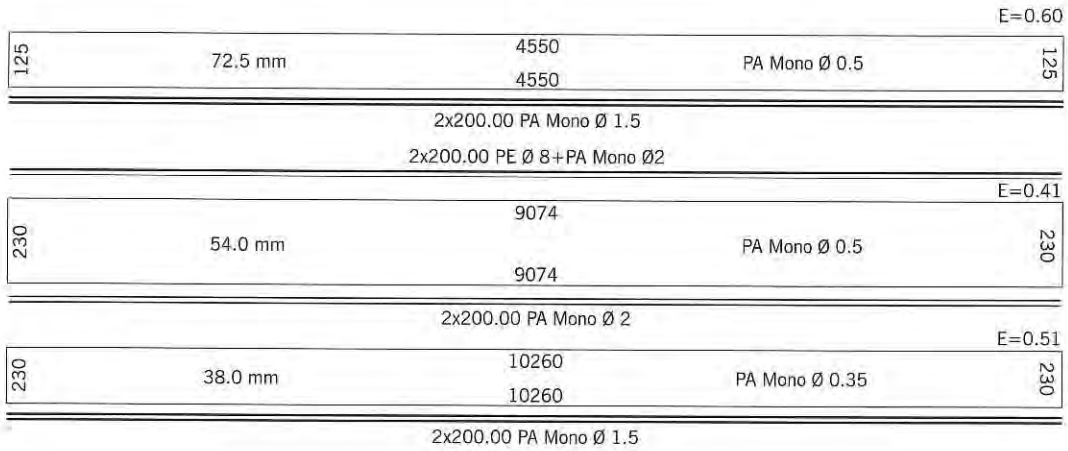
GILL NET
Trammel net with scareline
Pukot Pamalo-suluwasid
Garfish, halfbeak fish

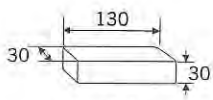
VESSEL
Loa : 10 m

Hp : 16

LOCATION
Nailon, Bogo

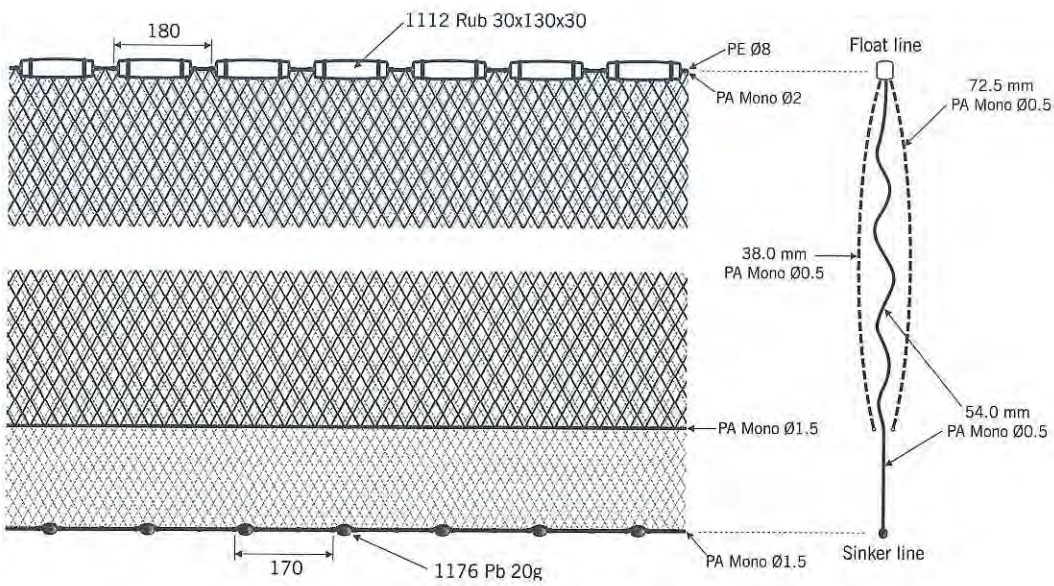
Cebu





Rub

Pb 20 g



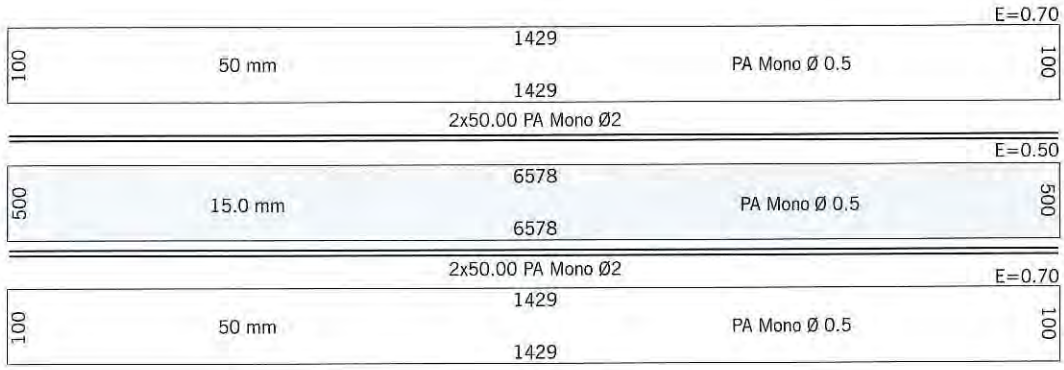
GILL NET
Trammel net with scareline
Transmaliyo
Garfish, Other pelagic species

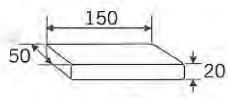
VESSEL
Loa : 10 m

Hp : 16

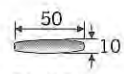
LOCATION
Bogo

Cebu

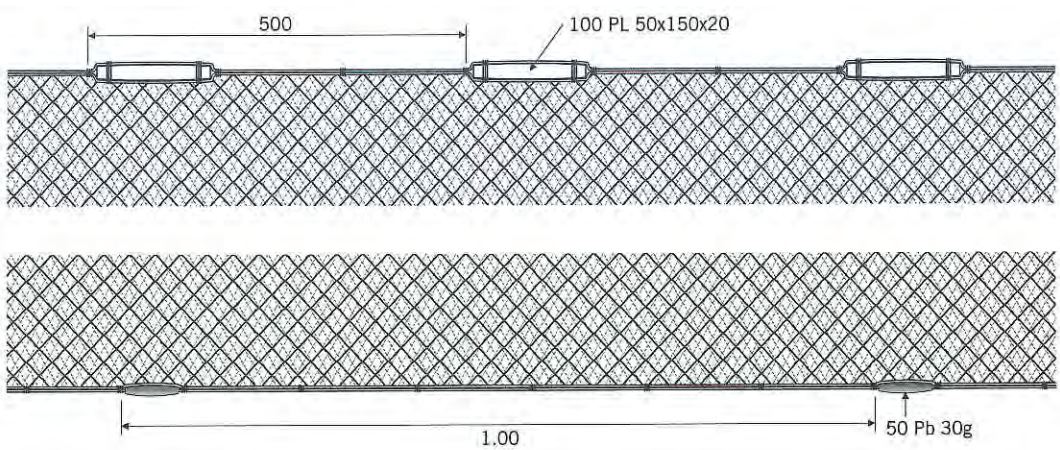




Rub



Pb 30 g



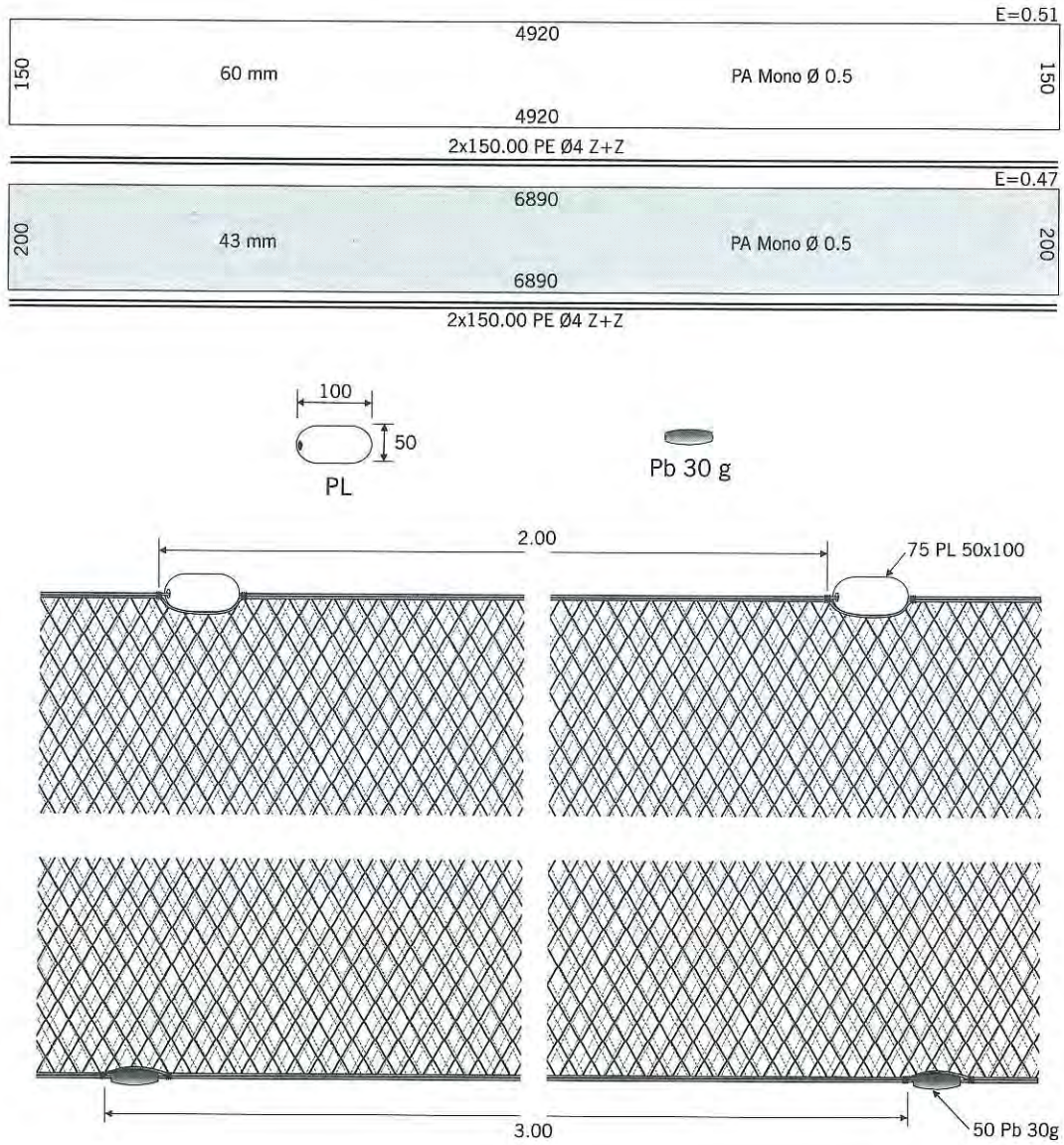
GILL NET
Trammel net with scareline
Transmaliyo
Garfish, Other pelagic species

VESSEL
Loa : 10 m

Hp : 16

LOCATION
Santa Cruz

Davao del Sur



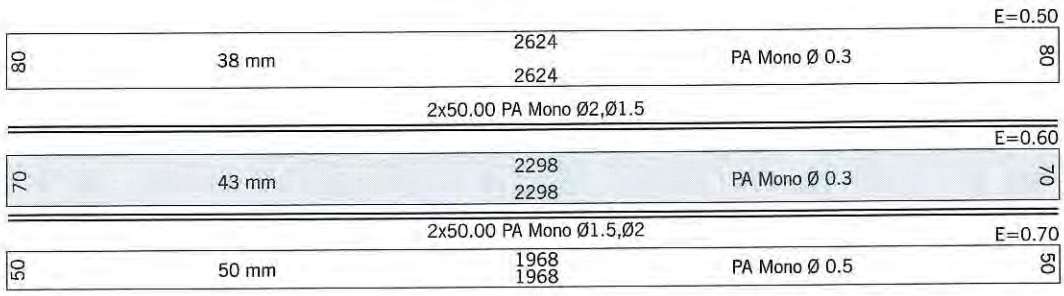
GILL NET
Trammel net with scareline
Transmaliyo
Garfish, Other pelagic species

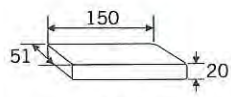
VESSEL
Loa : 10 m

Hp : 16

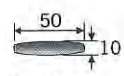
LOCATION
Bogo

Cebu

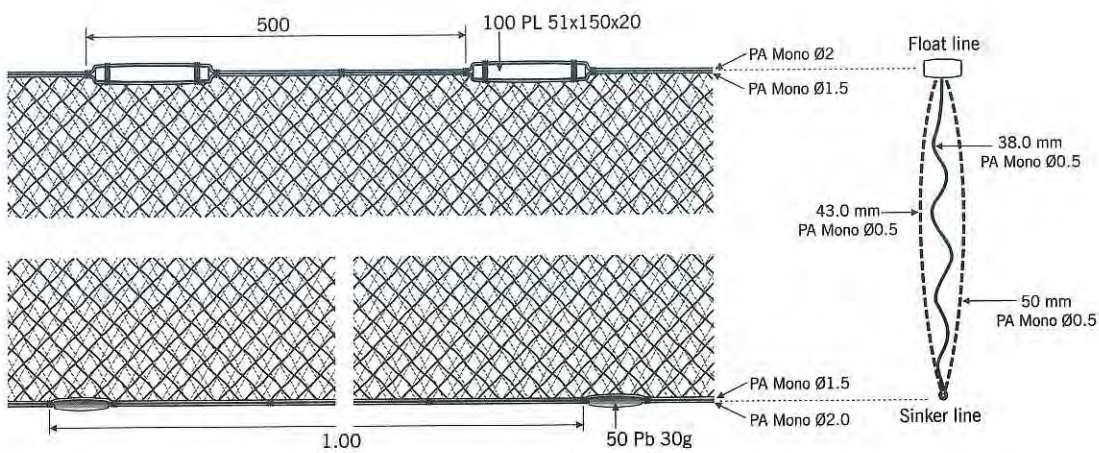




Rub



Pb 30 g



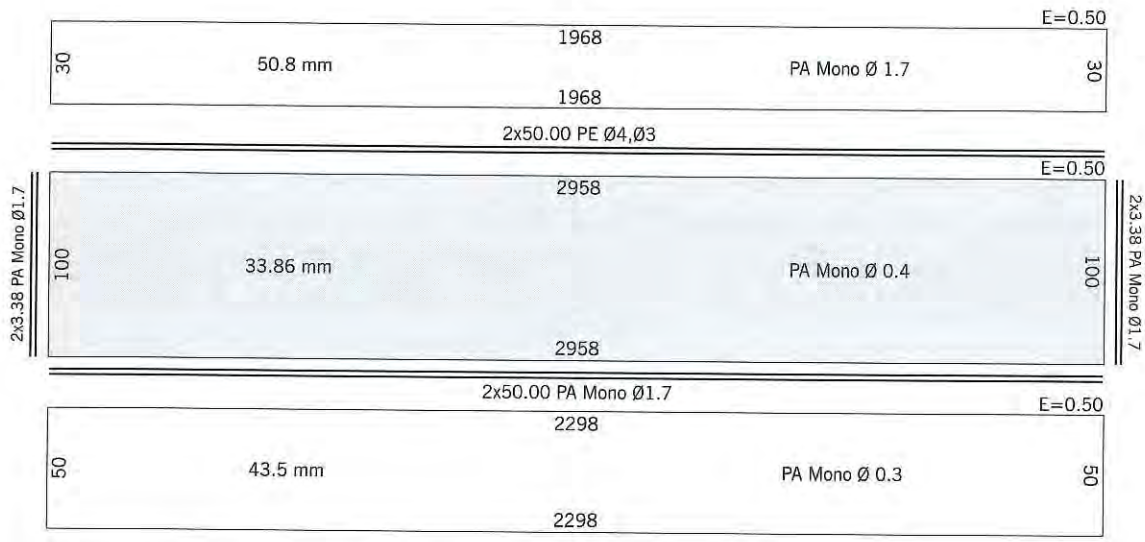
GILL NET
Trammel, bottom set
Paradual
Garfish

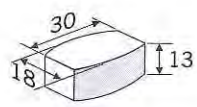
VESSEL
Loa : 8.53 m

Hp : 10

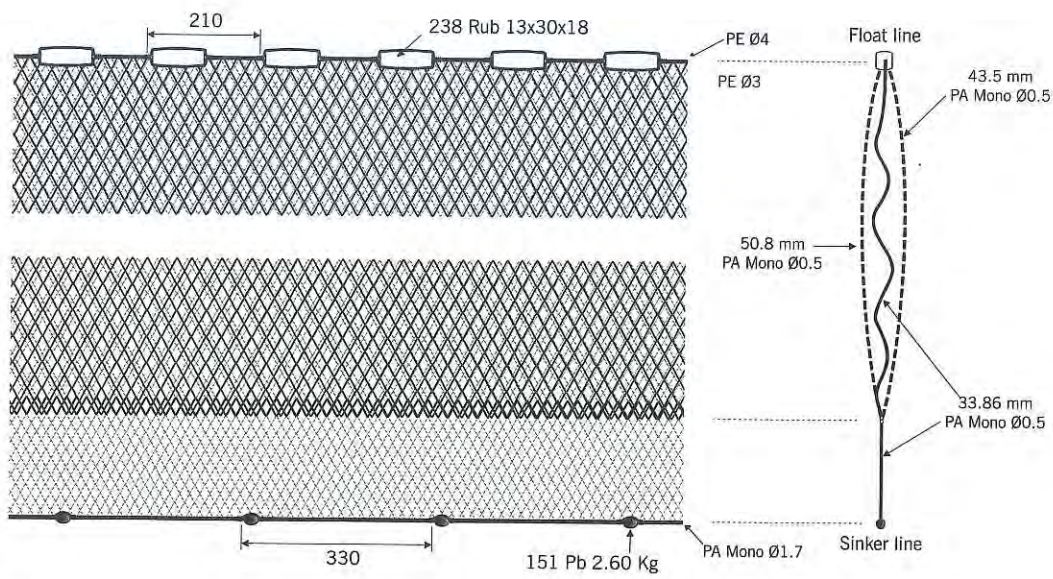
LOCATION
San Pascual

Masbate





Pb 17.2g



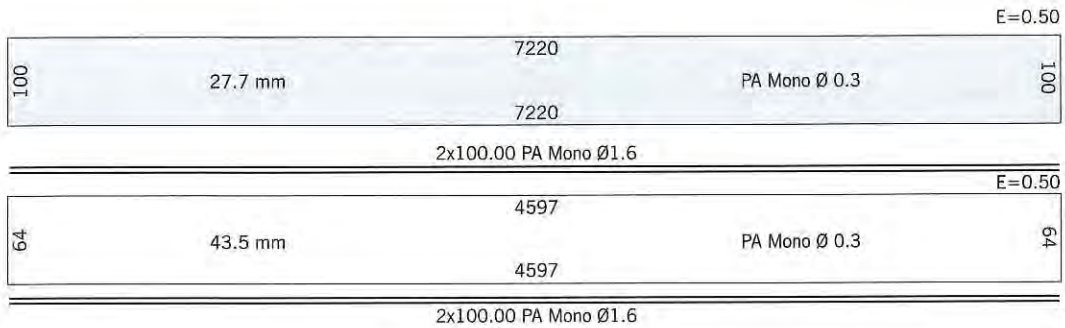
GILL NET
Trammel, Drift net
2 Ply/ Pangbugiw
Spotted halfbeak

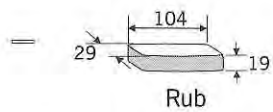
VESSEL
Loa : 8.22 m

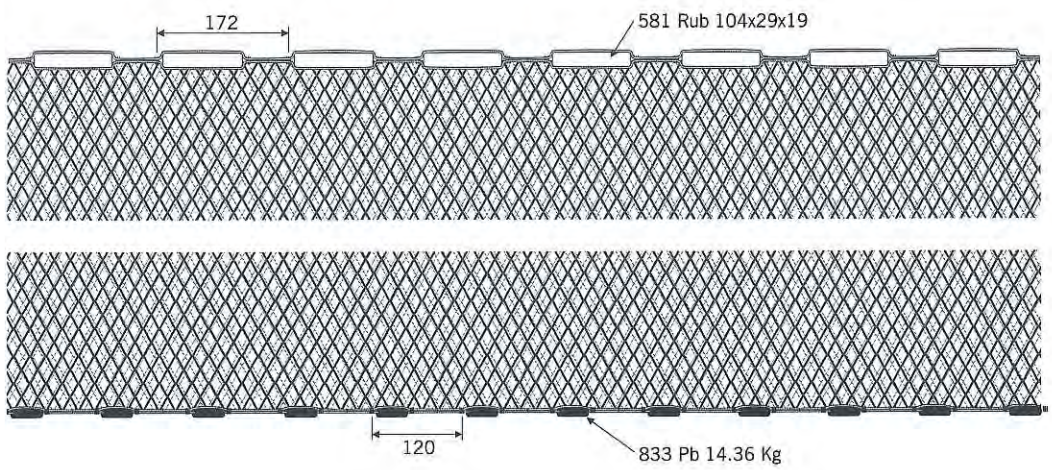
Hp : 10

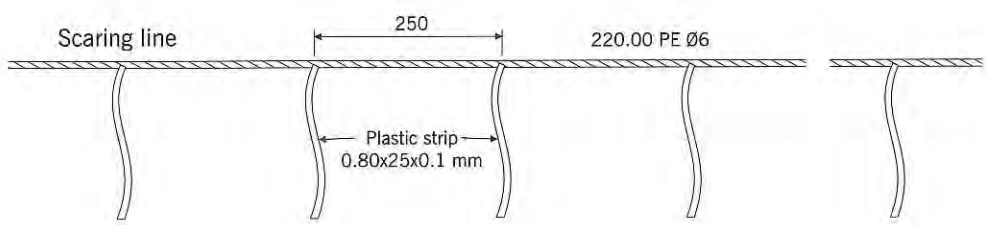
LOCATION
Matnog

Sorsogon







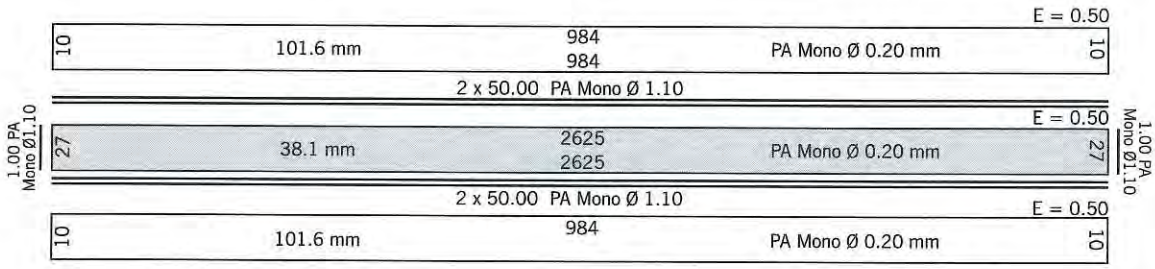


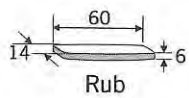
GILL NET
Trammel,Bottom set
3Ply/Pangking lubog
Slipmouth, Grouper

VESSEL
Loa : 4.87 m

Hp : -

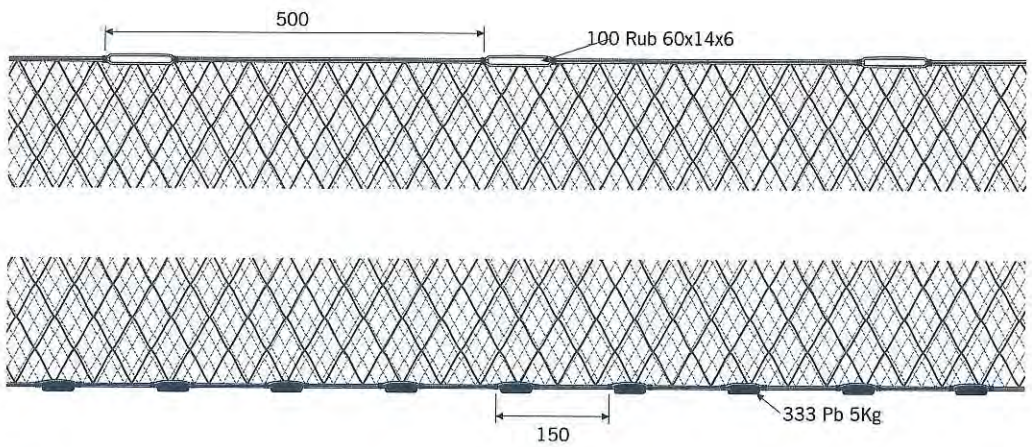
LOCATION
Bocon, Gubat
Prieto Diaz
Sorsogon





Rub


Pb 15 g



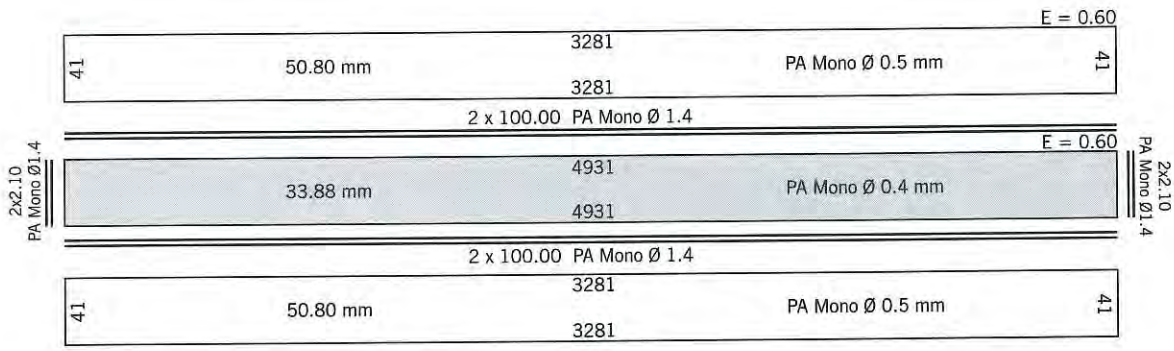
GILL NET
Trammel net
Pamalu
Garfish

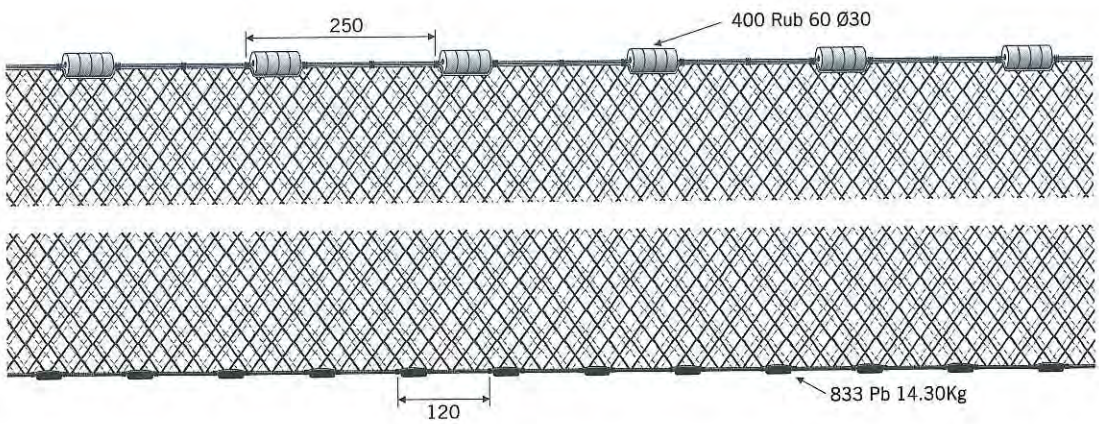
VESSEL
Loa : 9.14 m

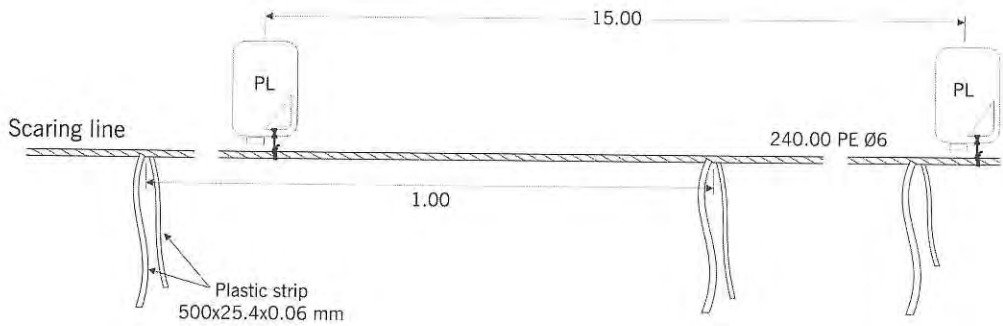
Hp : 16

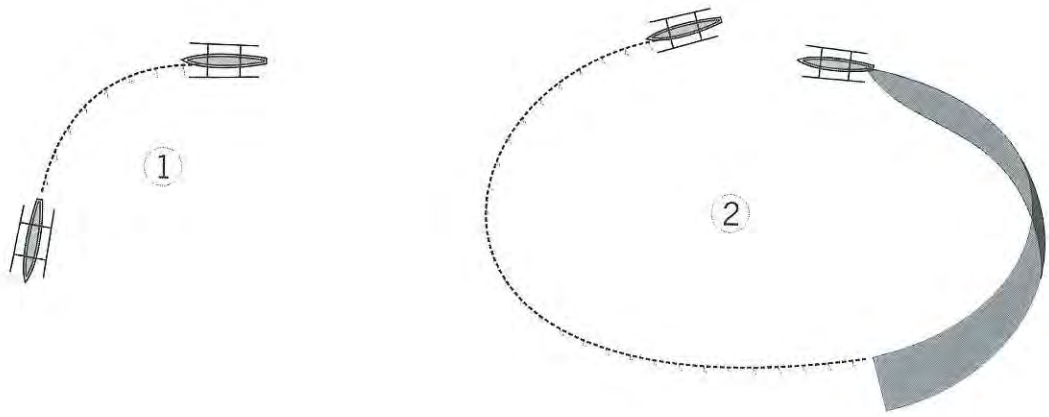
LOCATION
Cagayan de Oro City

Misamis Oriental






15.00
PL
PL
Scaring line
240.00 PE Ø6
1.00
Plastic strip
500x25.4x0.06 mm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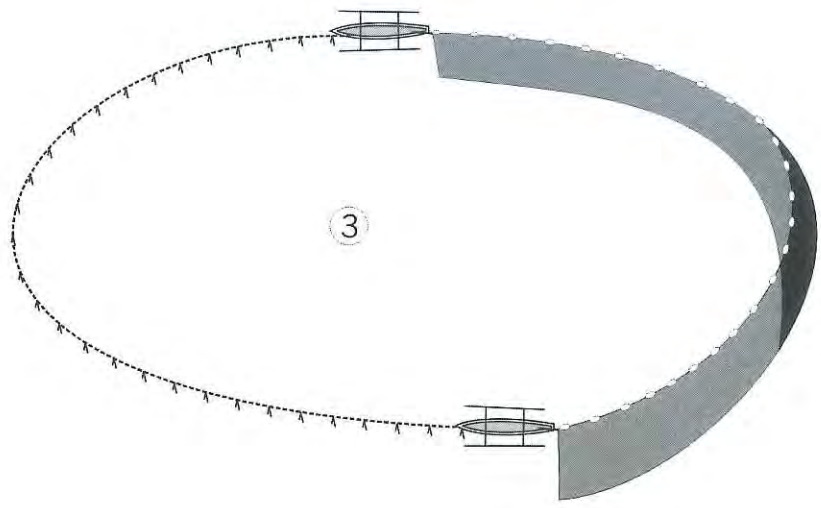
2


3

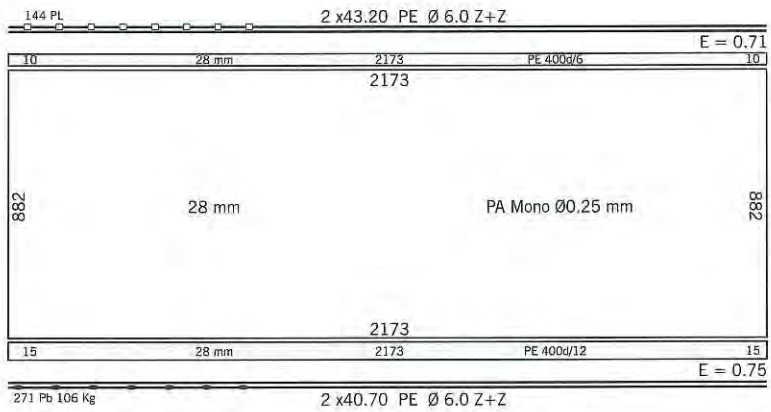
GILL NET
Encircling
Panglikon
Sardine,
other small pelagics

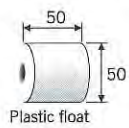
VESSEL
Loa : 10 m

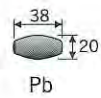
Hp : 16

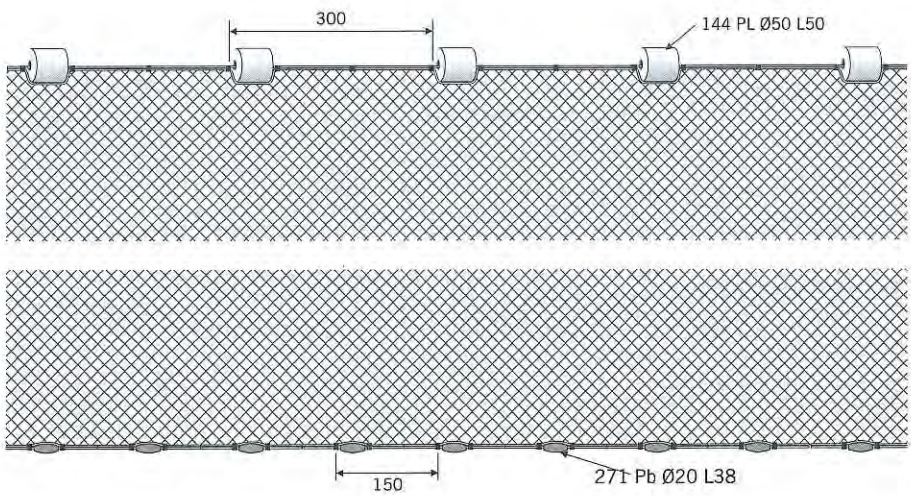
LOCATION
Panacan

Palawan









GILL NET
Encircling

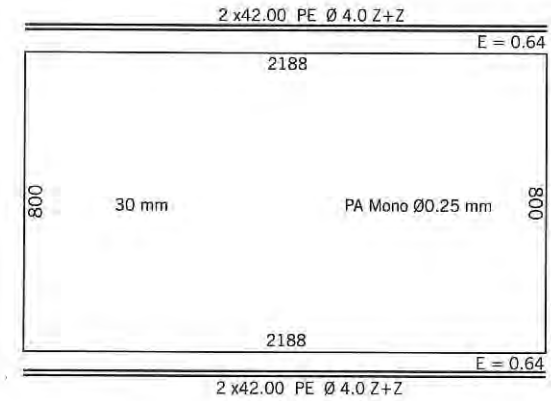
Sardine, others

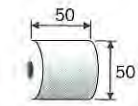
VESSEL
Loa : 6 m

Hp : 10

LOCATION
Bugasong

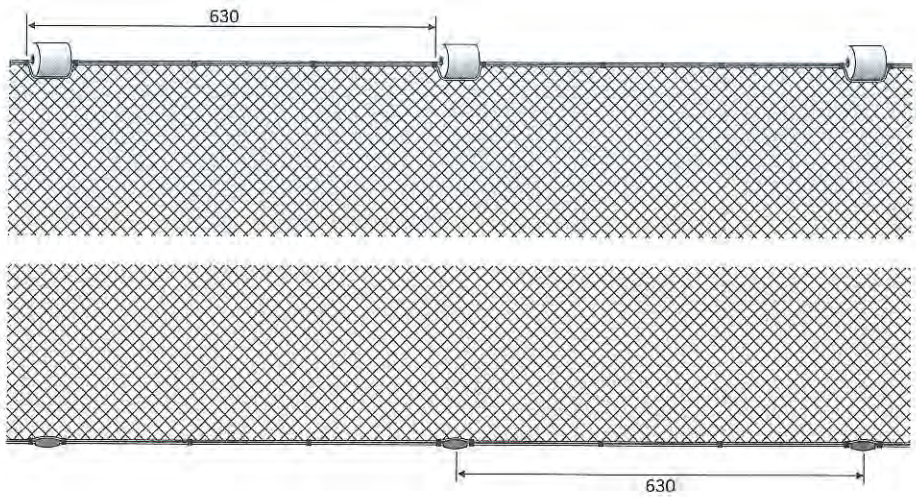
Antique, Panay





Plastic float

Pb



GILL NET
Encircling net

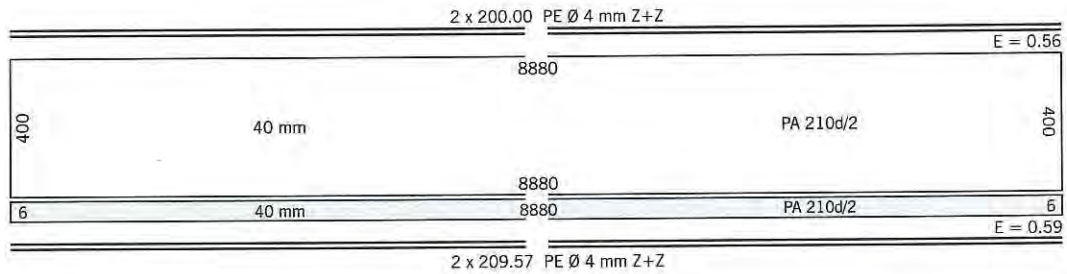
Milk fish, Round scad, Mackerel

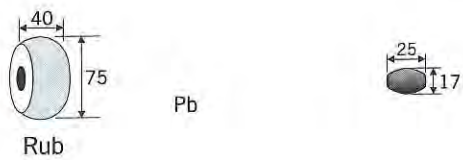
VESSEL
Loa : 12 m

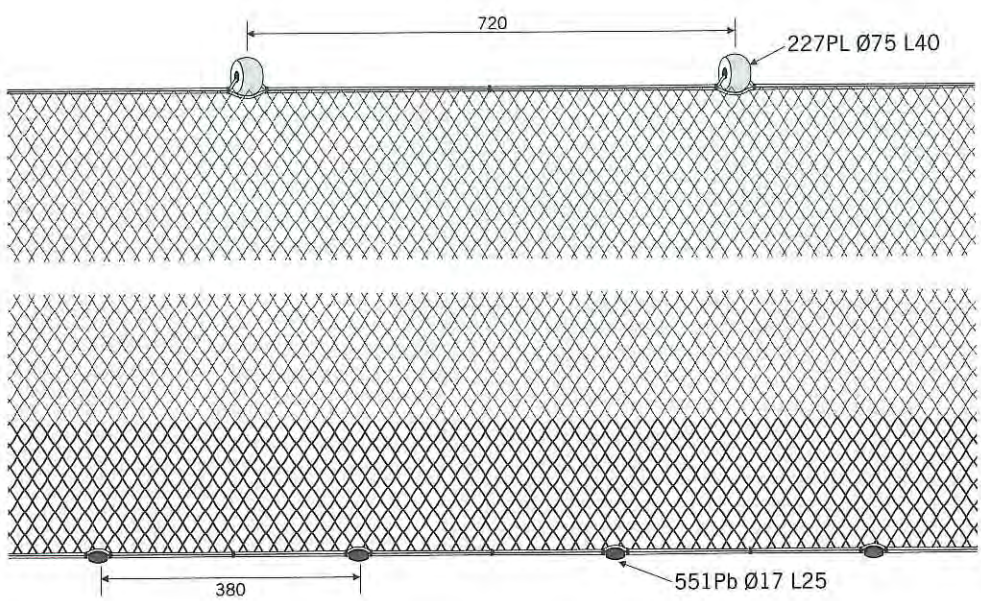
Hp : 18

LOCATION
Bagumbayan, Navotas

Metro Manila







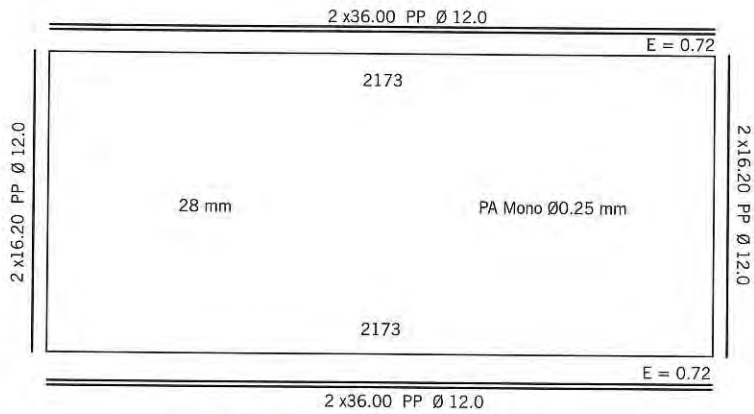
GILL NET
Encircling
Takibo
Tilapia, Mudfish, Goby,
Fresh-water catfish

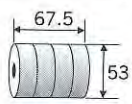
VESSEL
Loa : 7 m

Hp : 10

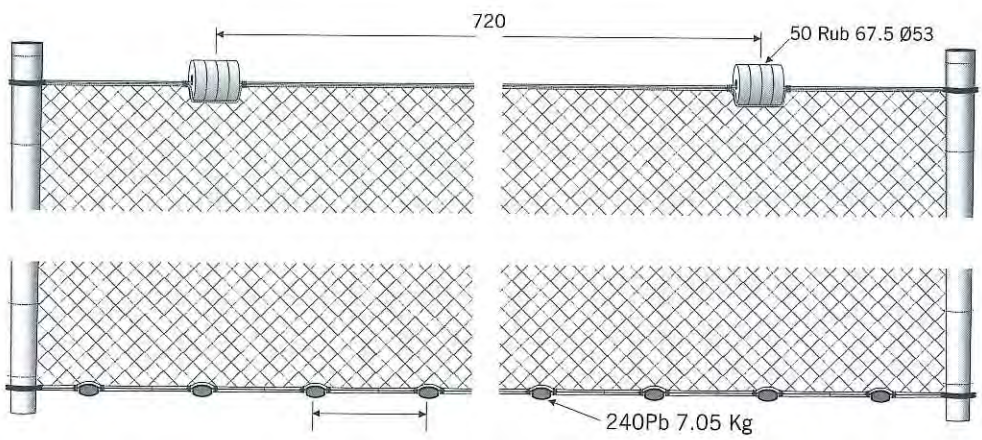
LOCATION
Santa cruz

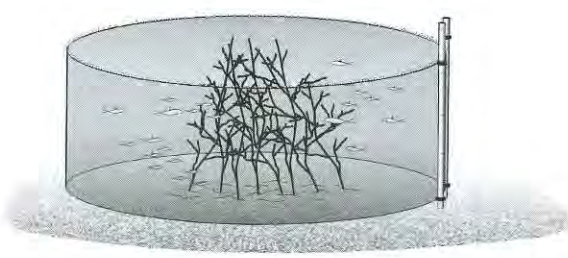
Laguna



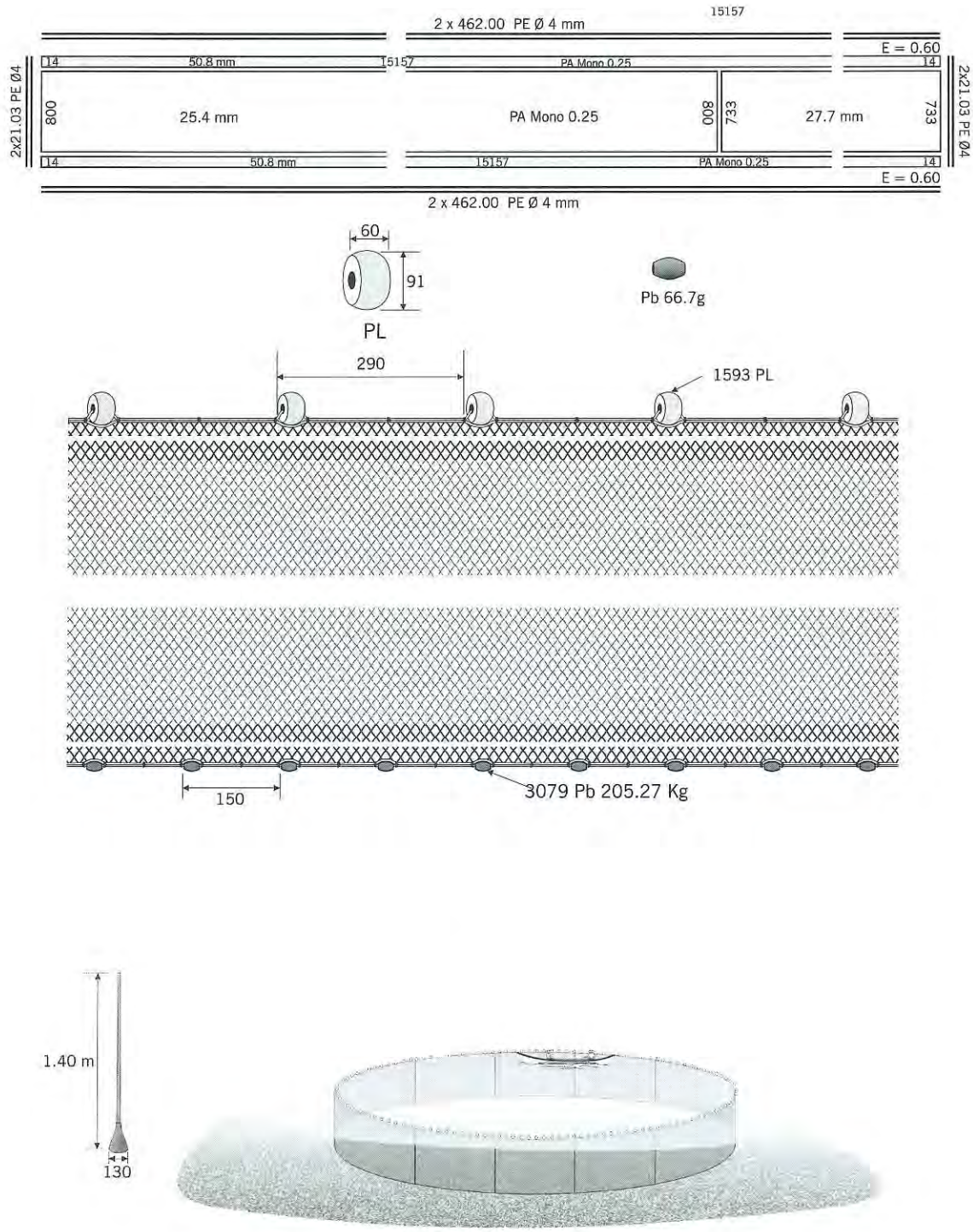


Pb 29.4 g

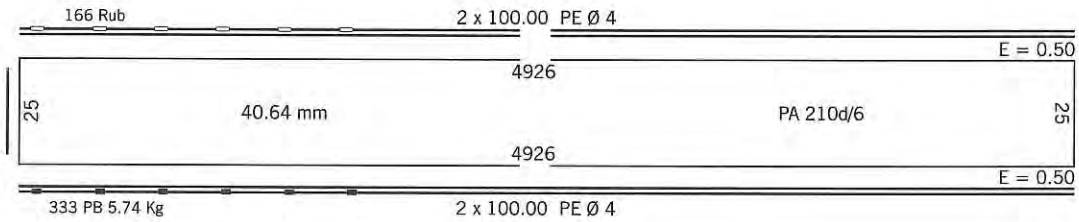


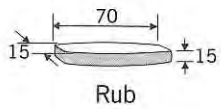


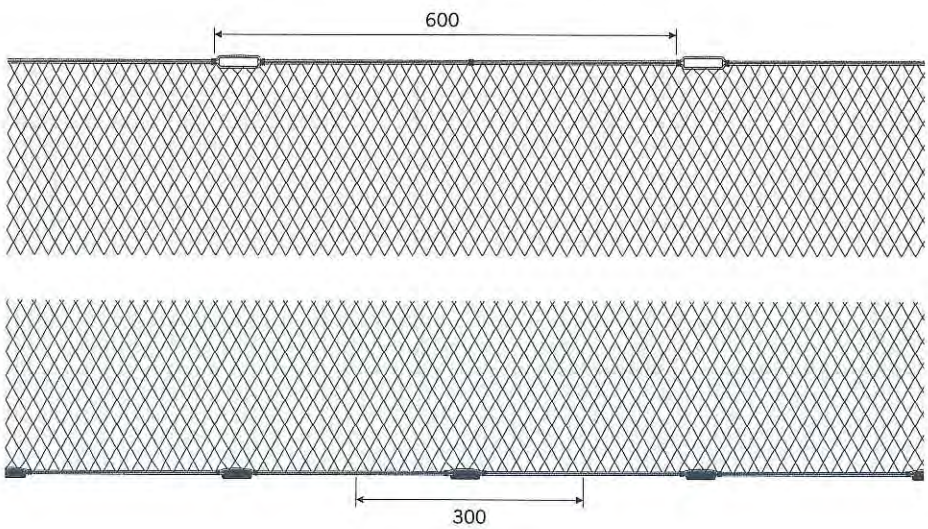
GILL NET	VESSEL	LOCATION
Encircling net	Loa : 12 m	Mansalay
Pantapulok		
Herring, scad,	Hp : 16	Mindoro

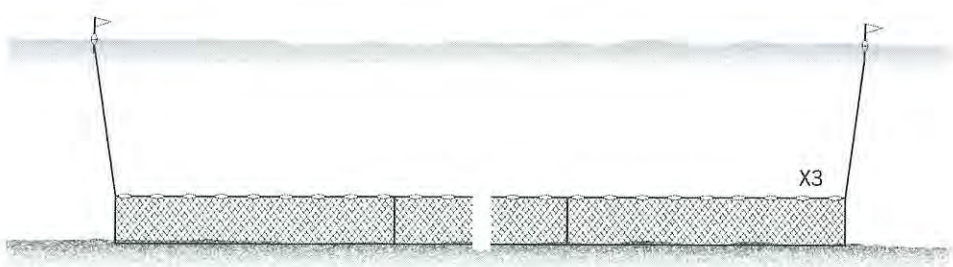


GILL NET	VESSEL	LOCATION
Bottom set net	Loa : 7.50 m	Sanjose
Panting Panugpo		
Shrimp, Prawn	Hp : 10	Mindoro









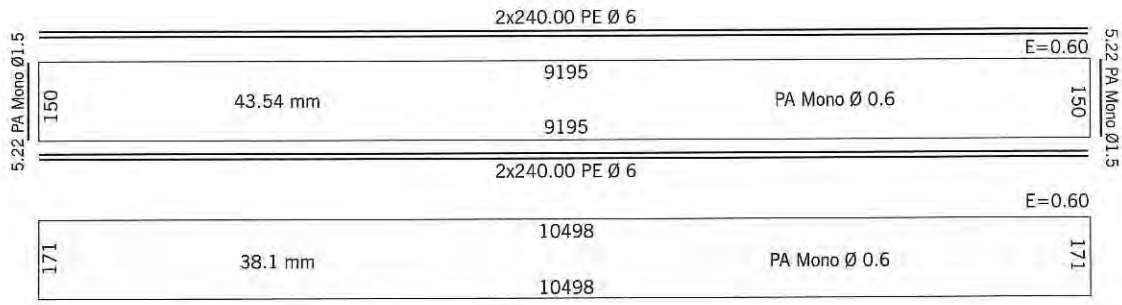
GILL NET
Trammel net with scareline
Haba
Gar fish, Halhbeak fish

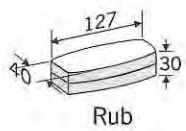
VESSEL
Loa : 7.92 m

Hp : 8

LOCATION
Gasan

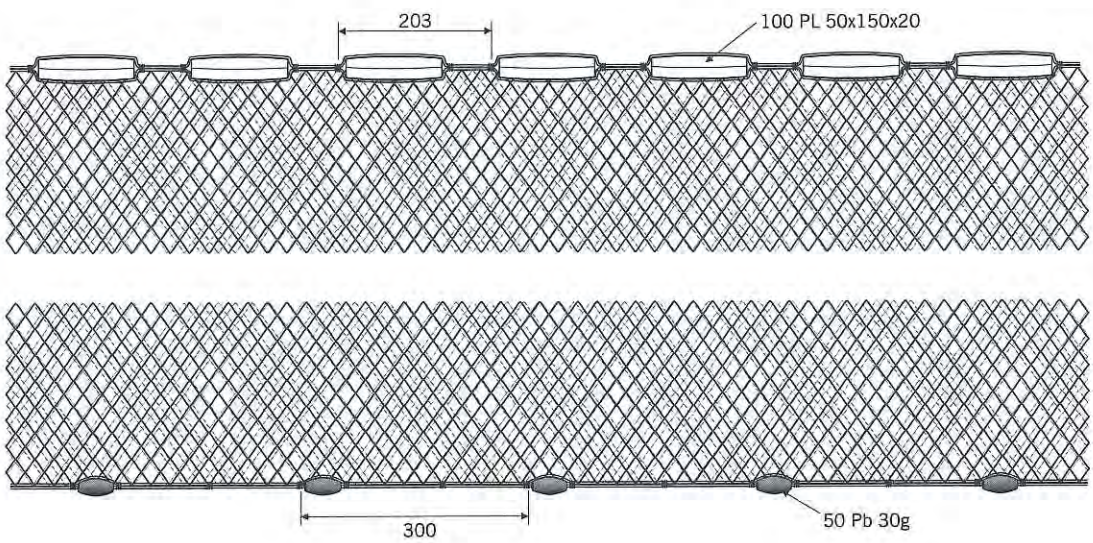
Marinduque

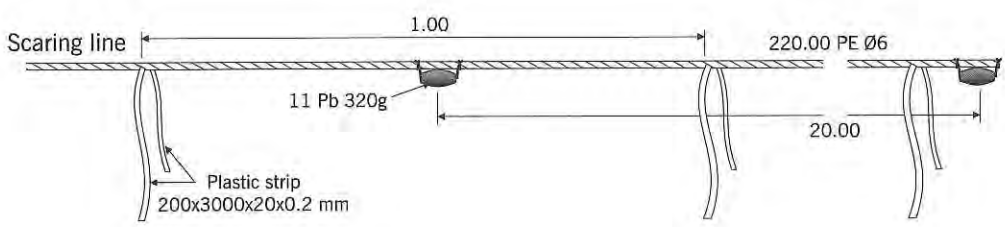




Rub


Pb 30g





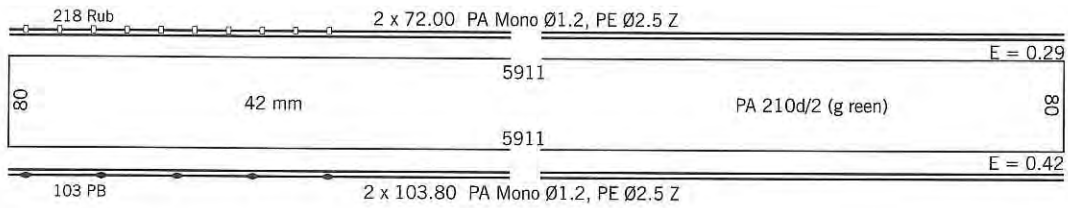
GILL NET
Gill net with scareline
Pariaris
Long tom, garfish

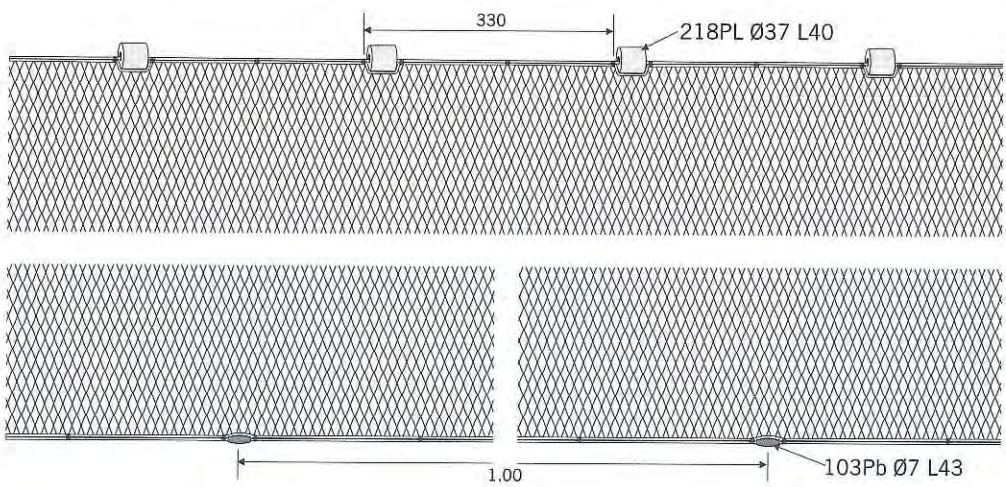
VESSEL
Loa : 8 m

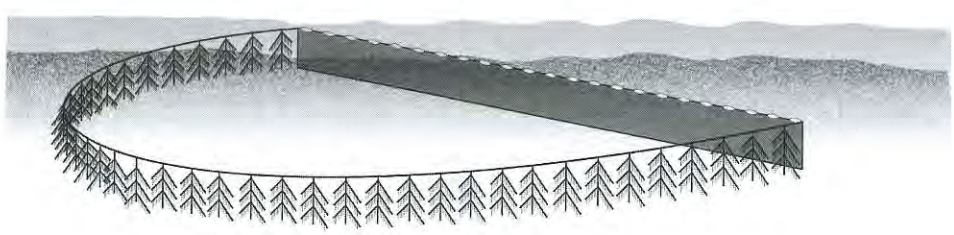
Hp : 10

LOCATION
Puro Pingit, Magsingal

Ilocos Sur







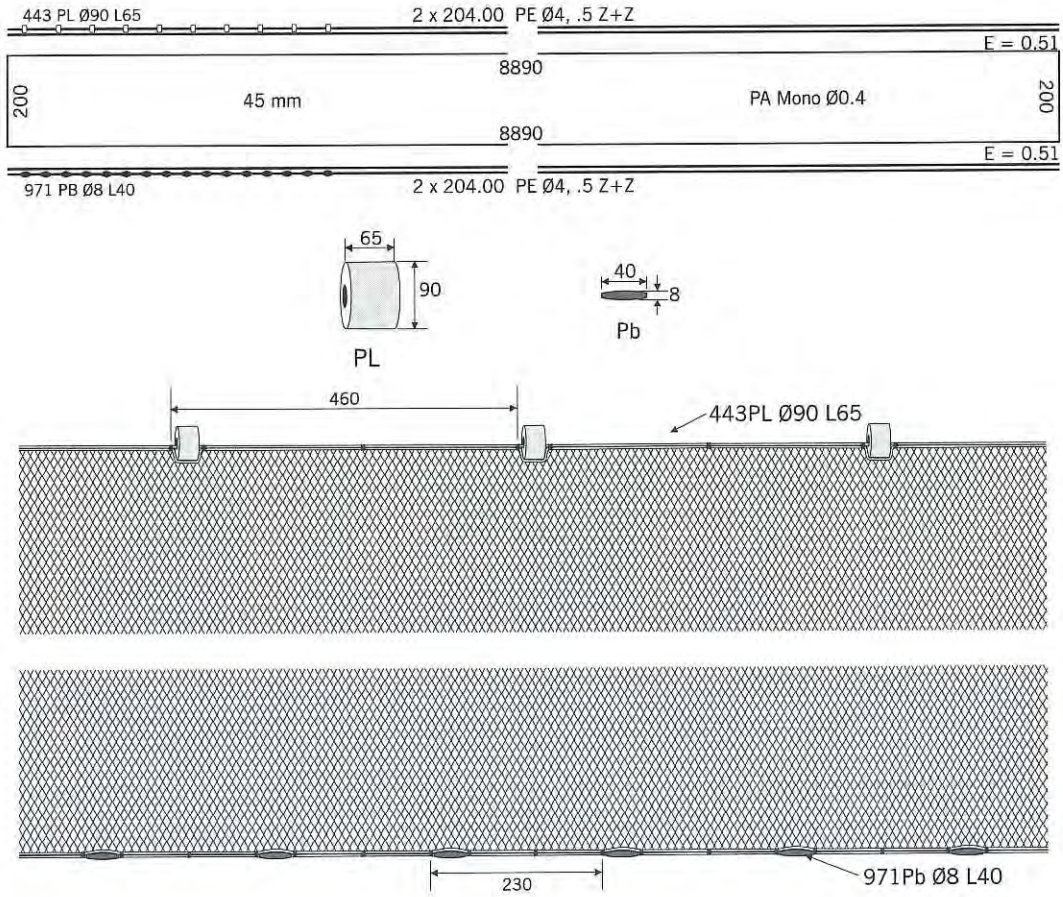
GILL NET
Gill net with scareline
Pariaria
Garfish

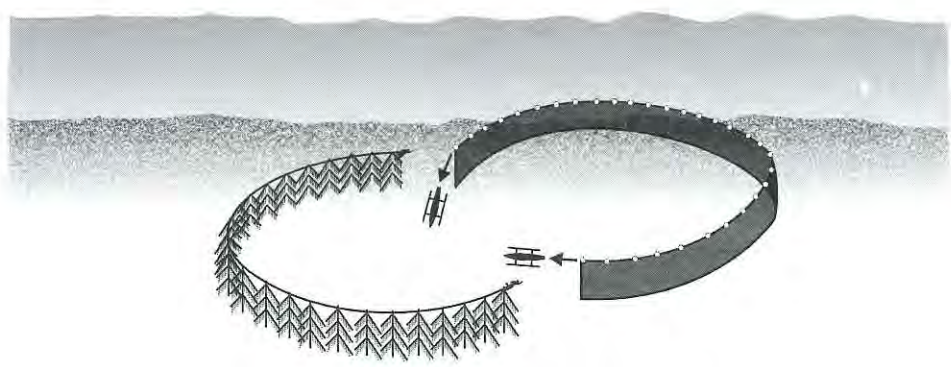
VESSEL
Loa : 8 m

Hp : 16

LOCATION
Arnedo, Bolinao

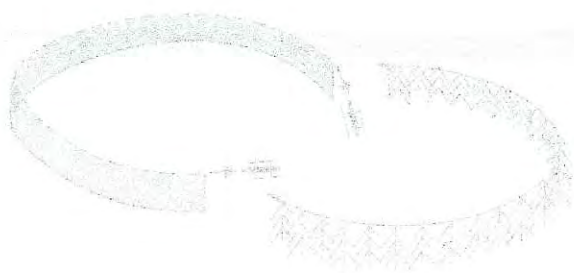
Pangasinan





< Chapter 7 >

Scoop Nets



Scoop Net Fishing

The Scoop net refers to a fishing gear consisting of a net and one to two poles to keep the net open. It is either pushed forward in shallow water by one or two fishermen, or in deeper waters by an engine driven boat which may be a municipal boat (less than 3 GT) or commercial boat (more than 3 GT). Both types of net are better known as push nets.

According to the 1993 to 1995 fishery statistics, the annual production of the push net in the municipal sector fluctuated abruptly while the commercial sector increased as shown in **Table 21**.

TABLE 21 PRODUCTION OF PUSHNET, 1993-1995 (METRIC TONS)

1993		1994		1995	
Municipal	Commercial	Municipal	Commercial	Municipal	Commercial
7,347	6,843	6,491	7,285	9,549	8,655

Source : Fisheries Statistics, 1993-1995. BAS

The dominant species caught by the pushnet in the commercial sector is shown in **Table 22**.

TABLE 22 DOMINANT SPECIES CAUGHT BY PUSHNET, 1995 (METRIC TONS)

Species	Volume
Acetes	3,930
White Shrimps	2,144
Endeavor Prawn	807
Mullet	308
Anchovies	253
Fimbriated Sardines	43

Source : Fisheries Statistics, 1995. BAS

Fishing Gear and Methods

1. Man-Push Net

This type of push net is a triangularly framed collapsible net being operated by one or more fishermen at 0.5-1.5 m depth along the coastal areas or in rivers. The capture of fish is effected by the forward pushing of the net by the fisherman. From time to time, he raises the net

to pickup the catch.

The net is mostly constructed from fine twine with a mesh size of nylon multifilament 210d/2-210d/4 and polyethylene minnow net 400d/6. The length of the net is 1.7-5.0 m while the groundrope is 1.25-4.0 m. The poles are either made of bamboo or mangrove wood. It is 1.8-4.0 m long with a diameter of 3-5 cm. The ends of the poles are provided with gliders or shoes to prevent the poles from sticking the bottom.

During operations, there are two ways of attaching the floatline to the poles. The floatline is either tied wholly to the poles or it is provided with loops at regular intervals which are reeved to the poles. A tickler chain is sometimes placed in front of the groundrope to stimulate shrimps to jump into the net during pushing.

2. Boat-Push Net

This type of push net is operated by a motorized boat in deeper waters. It is classified according to the species caught such as anchovies, shrimps and other fish. The net has three distinct parts; the upper part, the lower part, and the cod-end or bag. The groundrope which has a length of 5.3-25 m is provided with chain or rope weighted with lead sinkers. The ends of the groundrope are fastened to the poles which hold the net. The headrope hangs along the length of the poles.

The poles are either bamboo or wooden electric poles, 6-25 m long and 5-30 cm. diameter, depending on the size of gear and boat. The anterior portion which is provided with gliders or shoes 27 cm-40 cm. long and 4.8 cm. wide for small poles and 2 m long by 70 cm wide for bigger wooden poles are common. The tip of the shoe holder is loosely bolted to the metal base to allow the shoes glide and move freely.

The material commonly used for the net may be either nylon PA 210d/2, 7.5 mm mesh size and polyethylene 380d/9 minnow net for acetes. Others use 400d/6-24, and 380d/6-18; 3 mm-55 mm mesh size from the bag to the upper and lower portions for anchovy and shrimp. The length of the groundrope ranges from 5-25 m while the net is 6-33 m long. In some a groundrope, or tickler chain is provided to stimulate the jumping of shrimps into the net.

Push net fishing is operated either in the day time or at night depending on the occurrence of anchovies and acetes. For small boats, the fisherman uses a 1.5 m bamboo pole to search and locate shrimp schools at the surface while the push net is moved forward. To bring the catch on board, a PP 4 mm diameter retrieving line is placed around the cod-end so that the boat can continuously operate. One or two parallel poles with a line or rope are also used to adjust the depth of the triangular framed pole while the net is operation. In bigger boats, setting and hauling of the wooden posts is done by a double pulley or small power block hung at the forward beam of the outrigger. The cod end is hauled by means of a rope attached, emptied, and lowered again for the next setting operation.

3. Scoop Net

The scoop net is both a gear and an accessory to fishing. The handle, 0.5-2.0 m long is made of bamboo or wooden pole 2-5 cm diameter. The circular frame which is made of stainless steel or galvanized wire of 5 mm – 6 mm diameter holds the net which resembles a purse. The mouth opening of the frame is 28-45 cm diameter. The net has a circumference of about 264-450 cm and a depth of 45 cm – 120 cm. It is mostly made of nylon multifilament 210d/2 or mononylon PA 0.50 mm and 9-30 mm meshsize.

The gear is used to scoop attracted fish by light during night time. In most cases, it is used to pickup the catch from a liftnet, fish shelter, terminal pound of a fish corral or on small line fishing gears. It is operated both during day and night time. A big scoop net is also used in purse seining for bringing the catch into the main deck or direct to the fish hold.

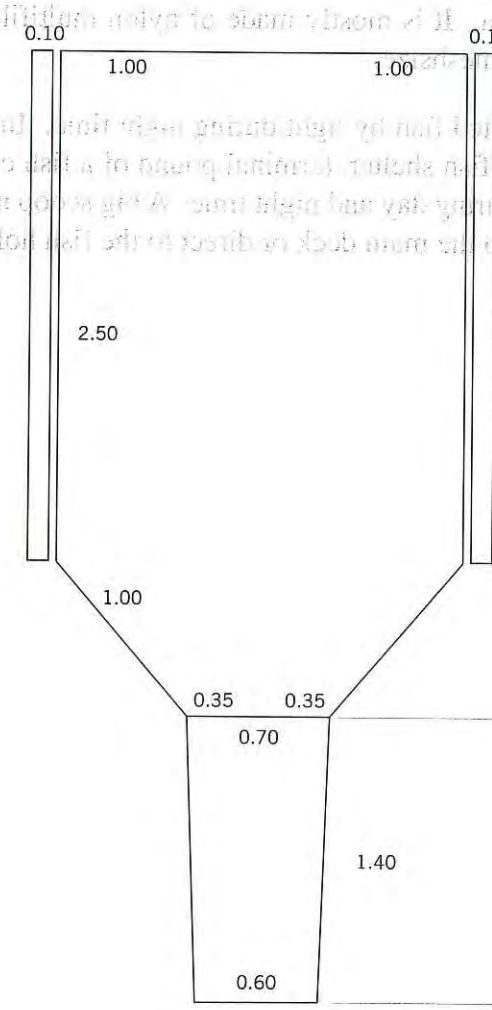
SCOOP NETS
Man-push net
Sudsod
Shrimp

VESSEL
Loa : -

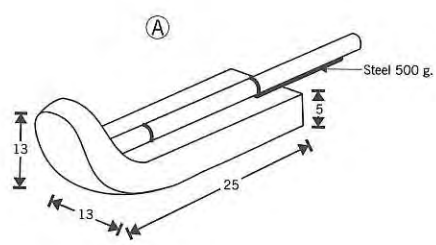
Hp : -

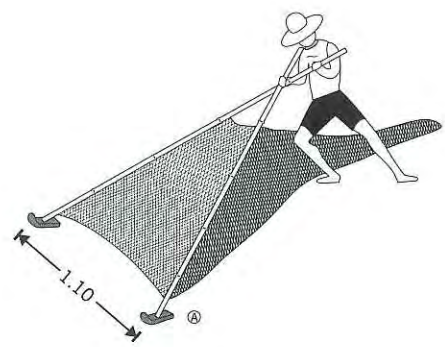
LOCATION
Ondol , Inabanga

Bohol



	mm	MAT
	10	PE 400 d/6 Knotless
1.40	2	PE 400 d/6

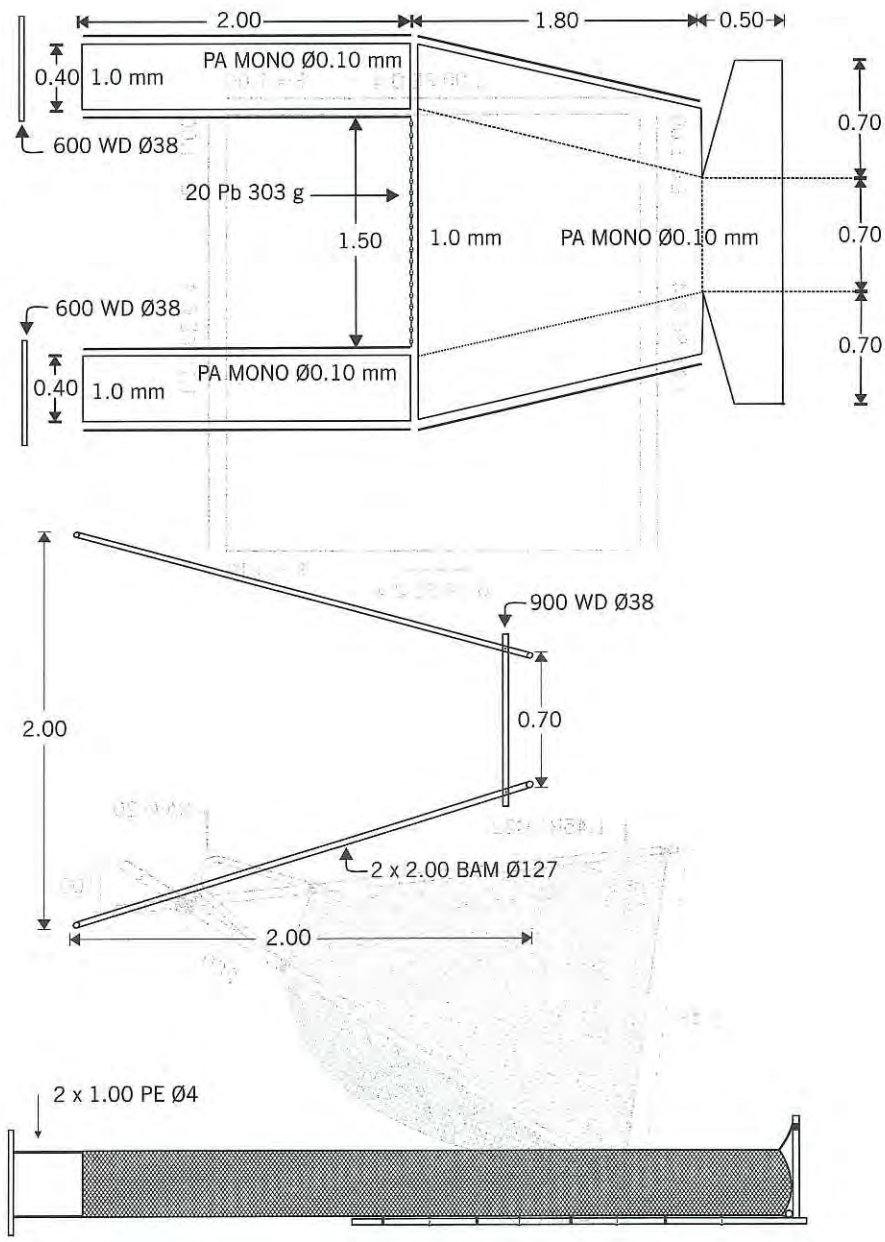




SCOOP NETS
Man-push net
Sudsod
Milkfish fry

VESSEL
Loa : -
Hp : -

LOCATION
Tiwi
Albay



SIDE VIEW

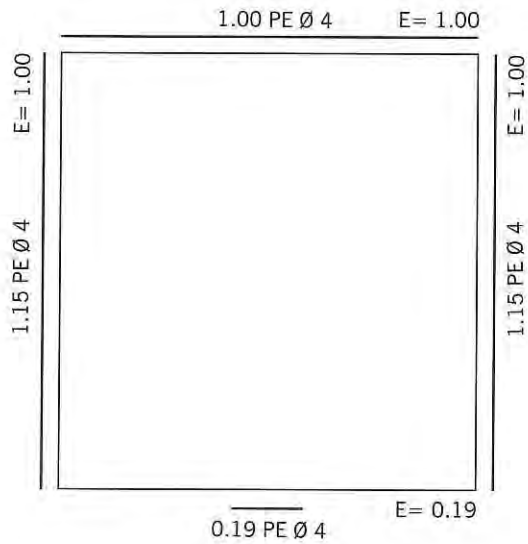
SCOOP NET
Man-push net
Sad-yap
Acetes

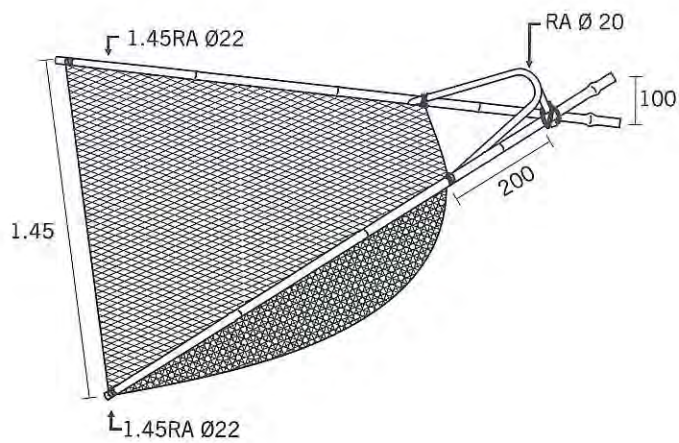
BOAT
LOA : -

hp : -

LOCATION
General Santos City

South Cotabato





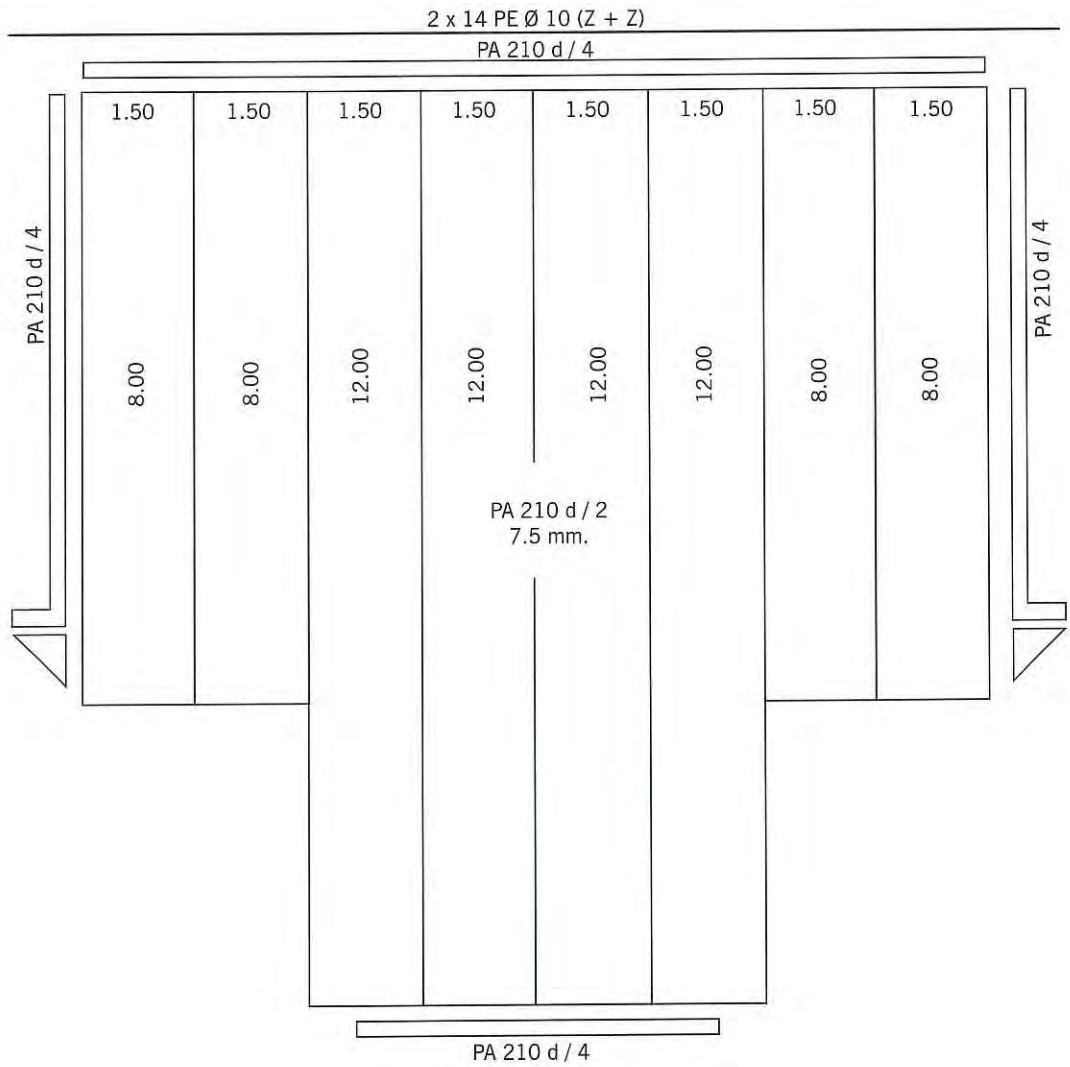
SCOOP NET
Boat-push net
Dalungkit
Planktonic shrimp, Anchovies

BOAT
LOA : 8 m.

hp : 16

LOCATION
Tanza

Cavite



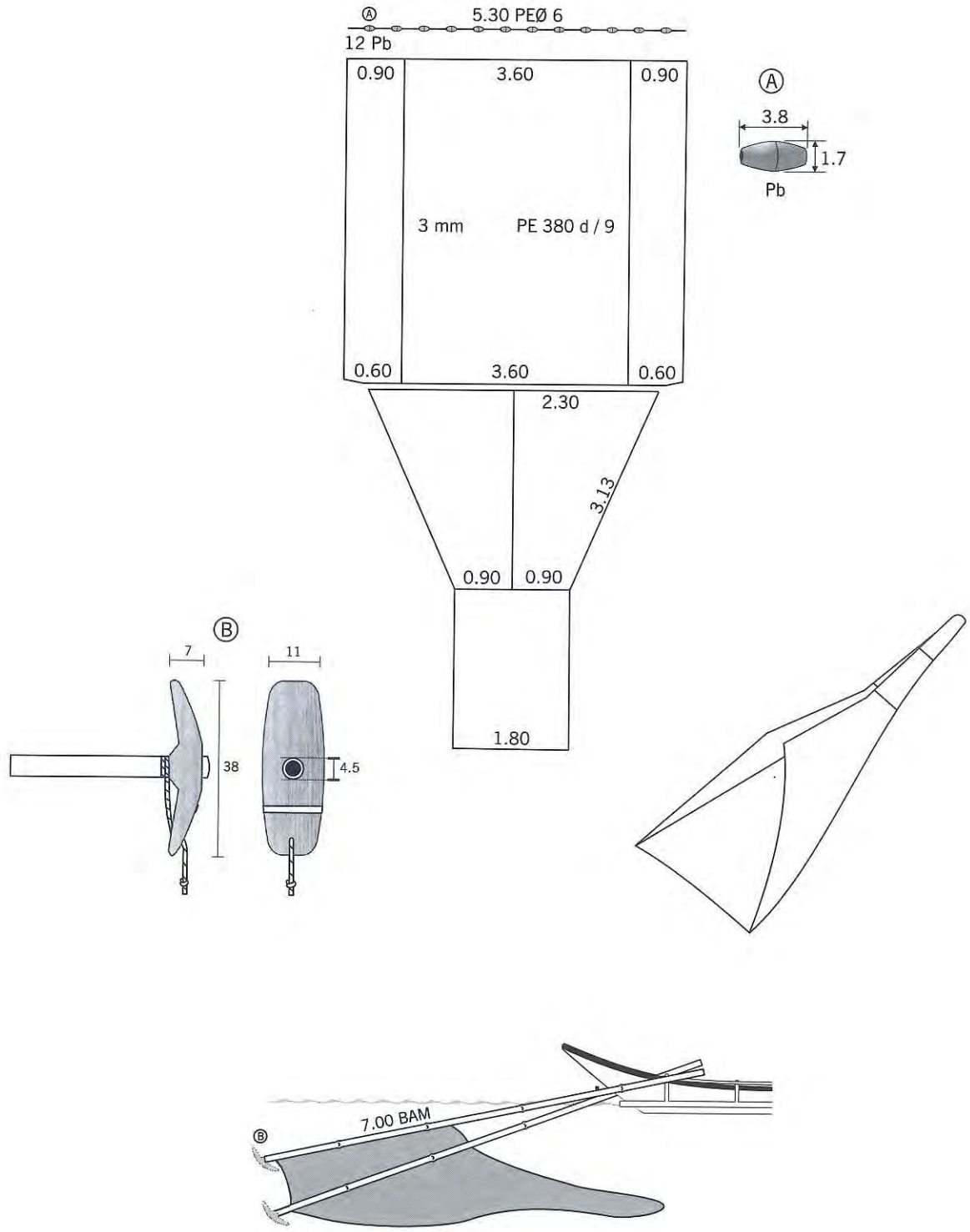
SCOOP NET
Boat-push net
Songkit
Small shrimps

BOAT
LOA : 8 m.

hp : 16

LOCATION
Barotac Viejo

Iloilo



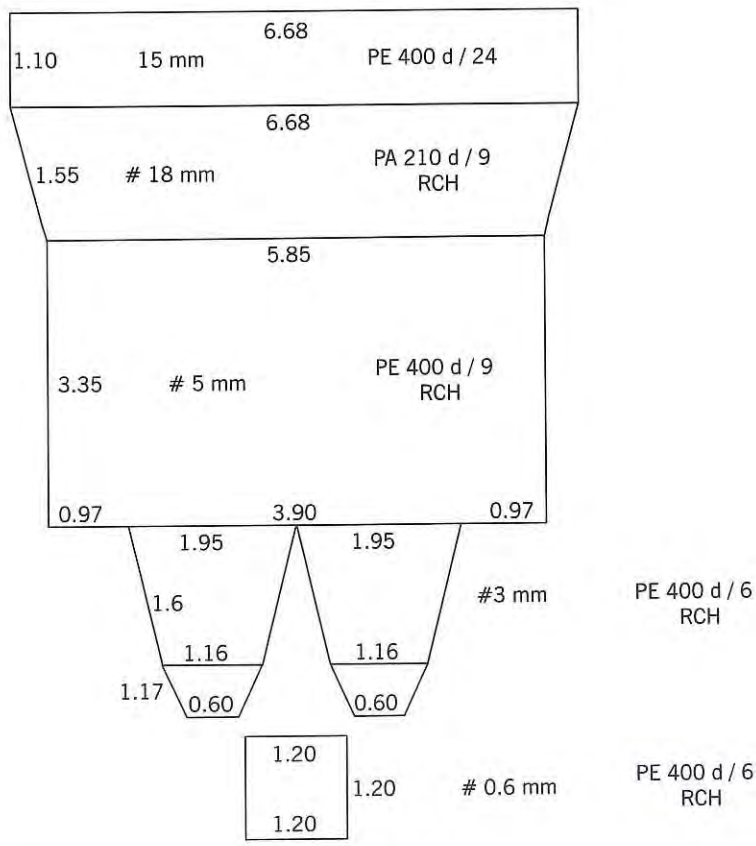
SCOOP NET
Boat-push net
Sagudsod
Anchovy , shrimps

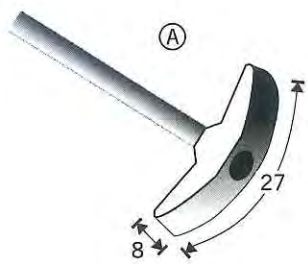
BOAT
LOA : 7 m.

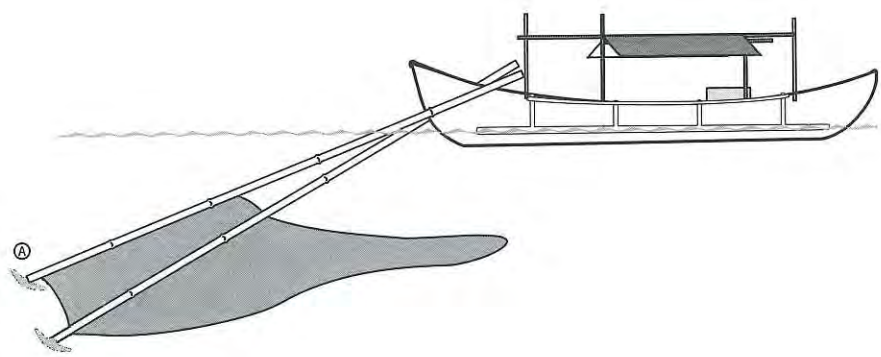
hp : 16

LOCATION
Mabilo , Kalibo

Aklan







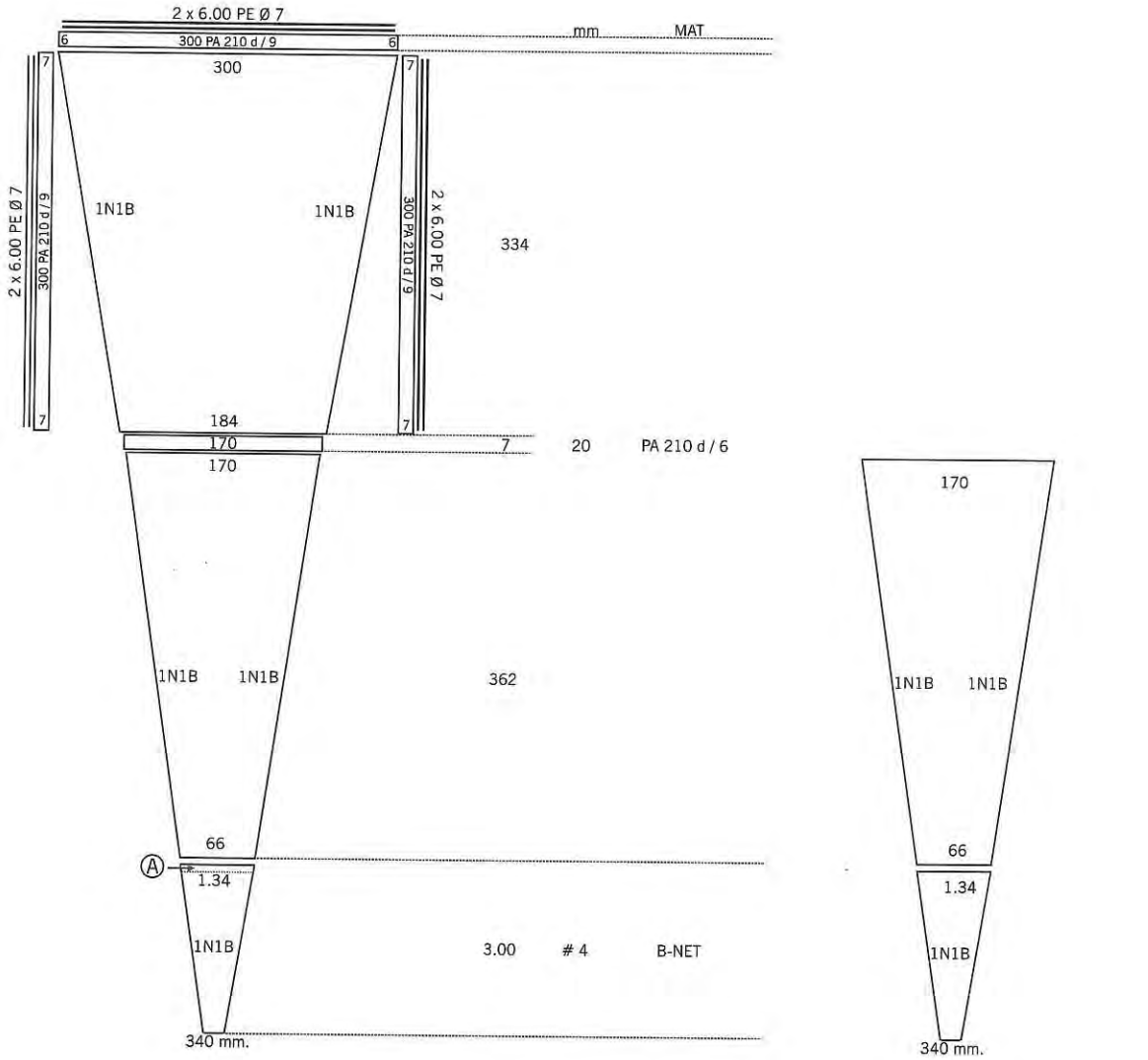
SCOOP NET
Boat-push net
(Suro)
Fresh-water herring,
Silvery theraponid

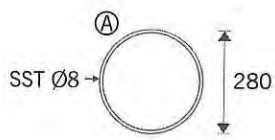
BOAT
LOA : 14 m.

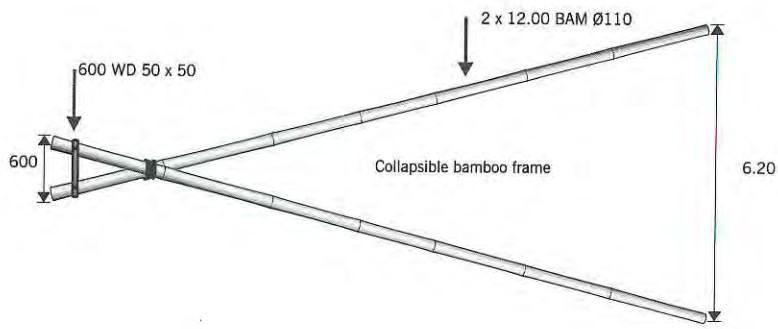
hp : 120

LOCATION
Taal

Batangas







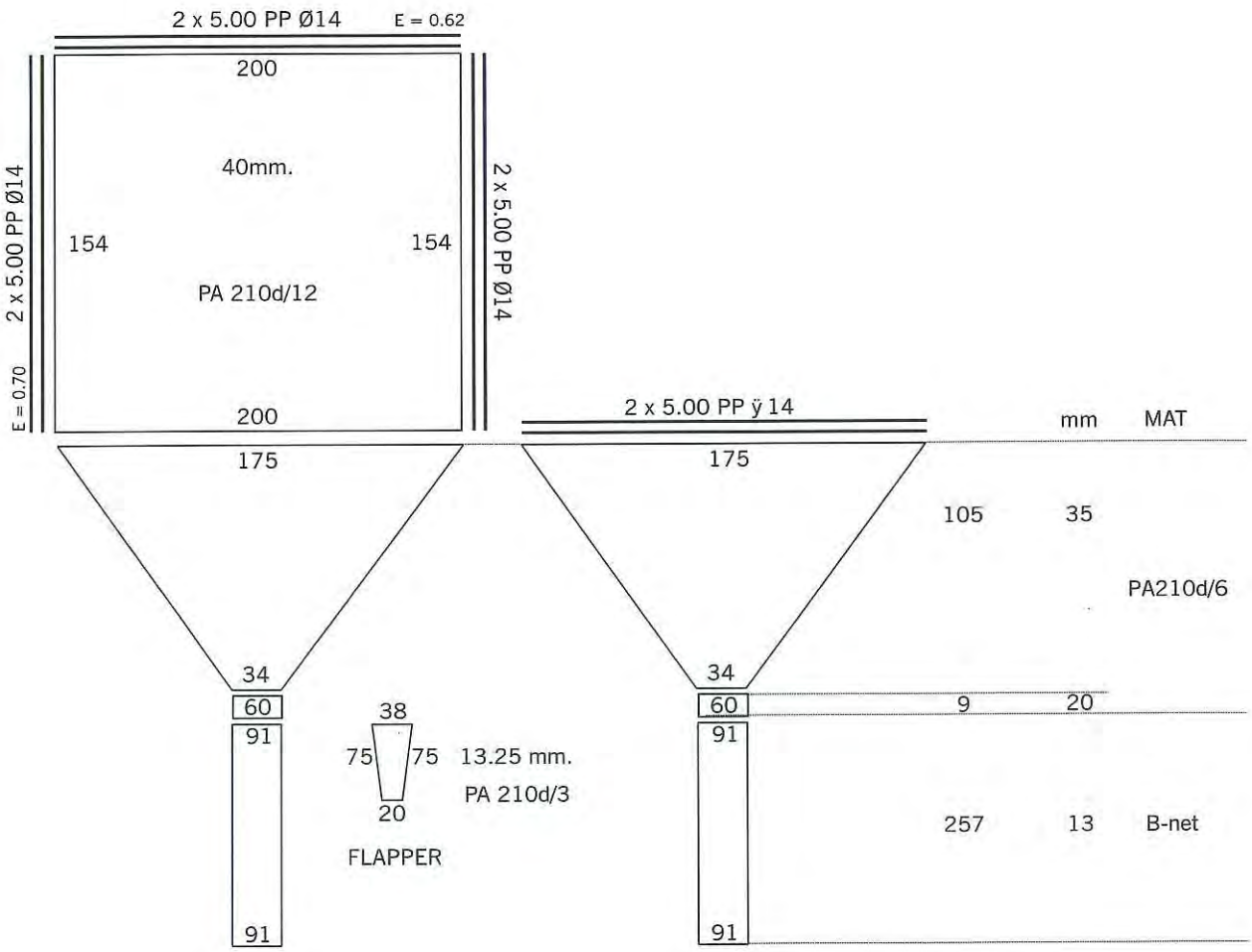
SCOOP NET
Boat-push net
(Suro / sudsod)
Goby, Tilapia, Milk fish,
Silvery, Theraponid

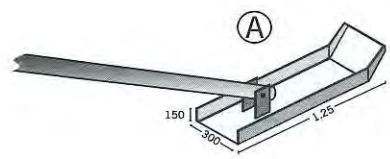
BOAT
LOA : 14 m.

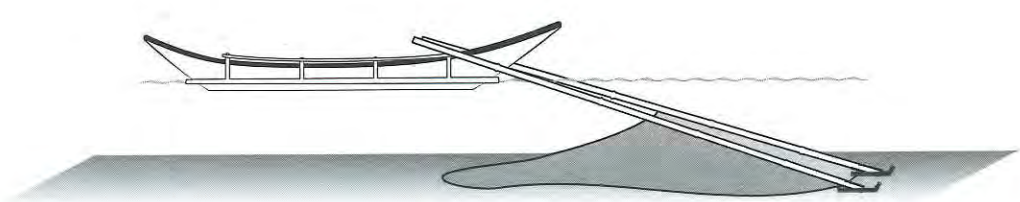
hp : 80

LOCATION
Calamba & Los Banos

Laguna





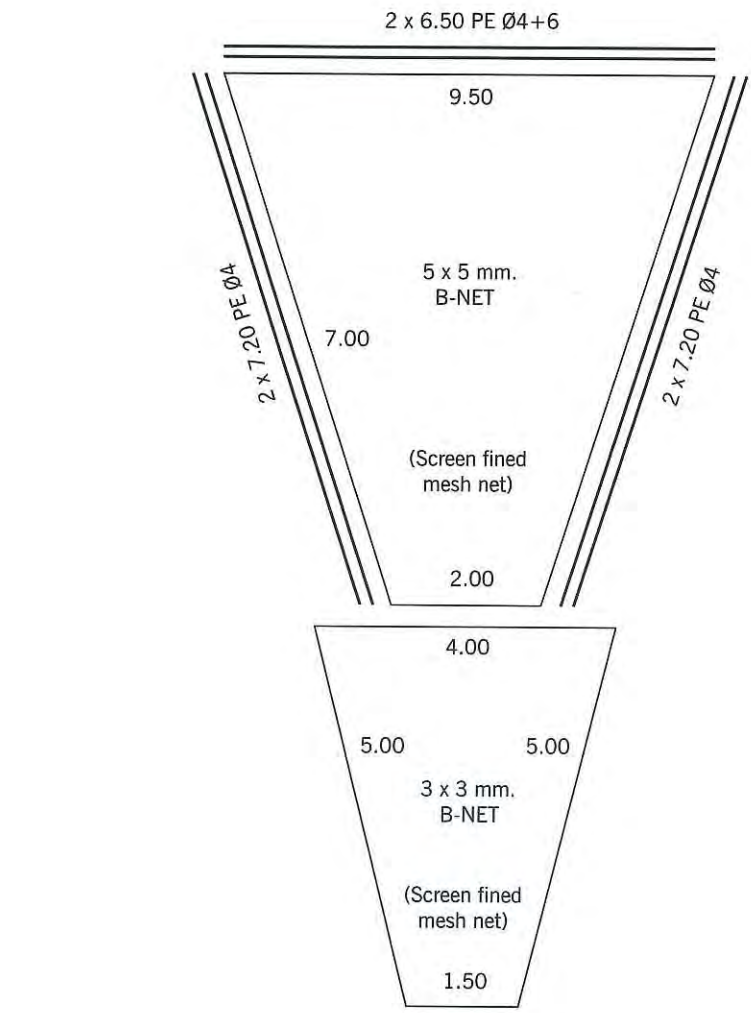


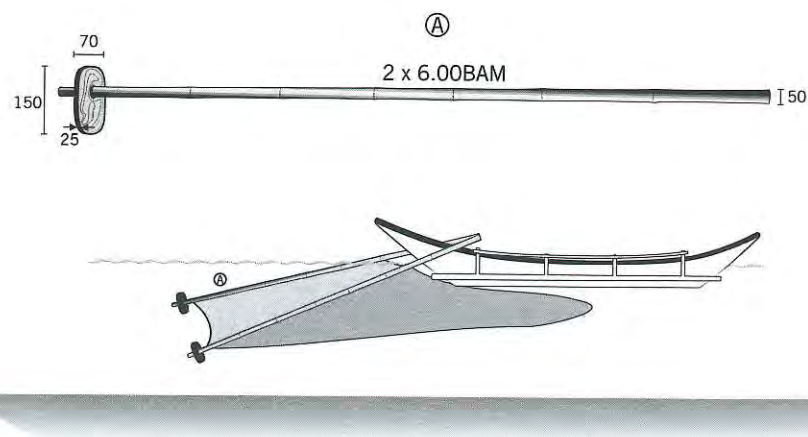
SCOOP NET
Boat-push net
(Sod-sod
Acetes

BOAT
LOA : 8.50 m.

hp : 16

LOCATION
Maco
Davao Del Norte
Bunawan
Davao City





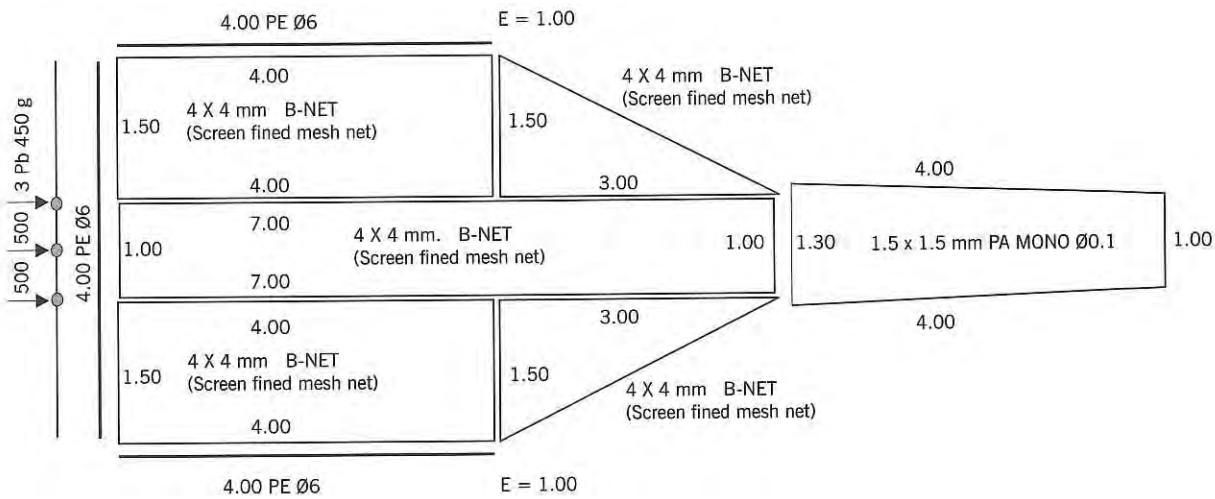
SCOOP NET
Boat-push net
(Sod-sod)
Acetes

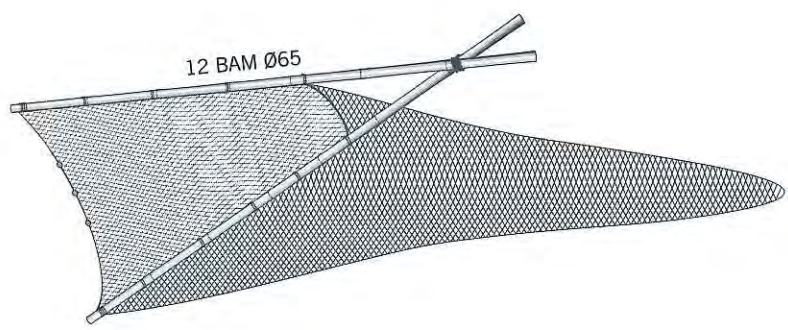
BOAT
LOA : 7.92 m.

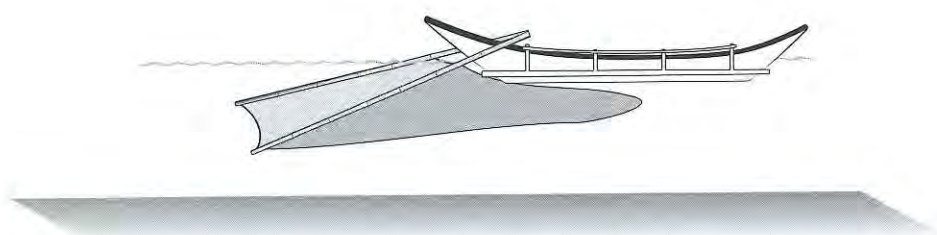
hp :

LOCATION
Malapatan

Sarangani







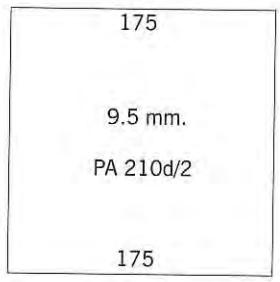
SCOOP NET
Scoop
Sigpaw
Shrimps

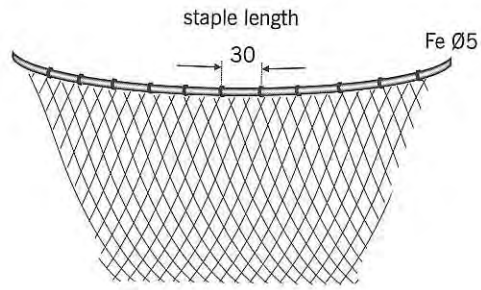
BOAT
LOA : 8 m.

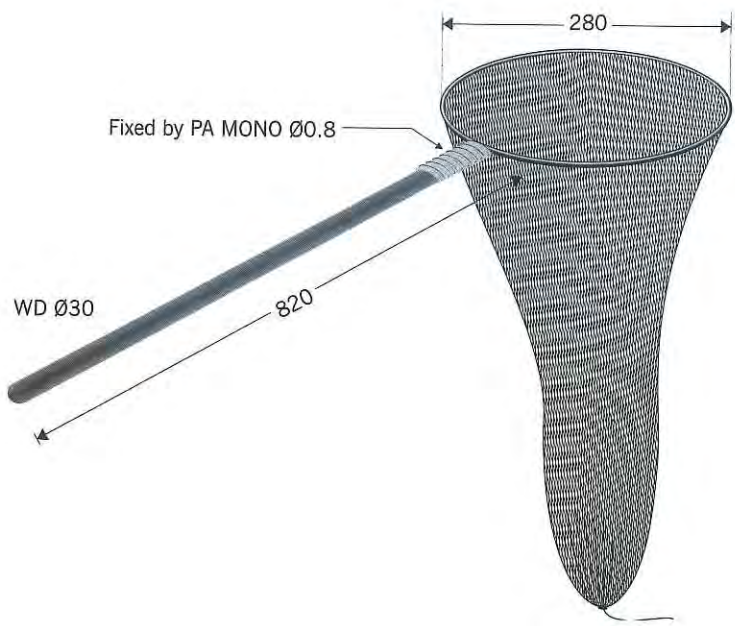
hp : 16

LOCATION
Pasuquin, Currimao

Ilocos Norte







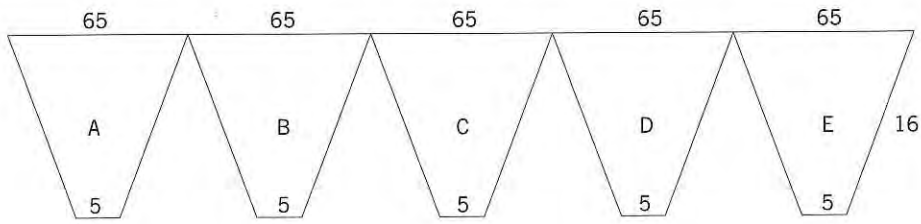
SCOOP NET
Scoop
Tigpaw
Squid, small fishes

BOAT
LOA : 7 - 9 m.

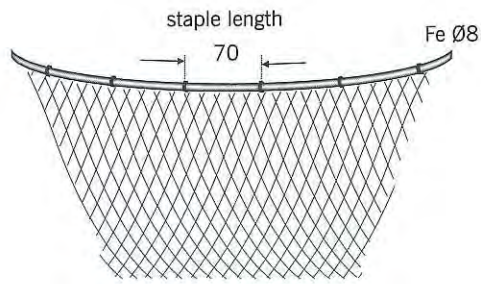
hp : 10 - 16

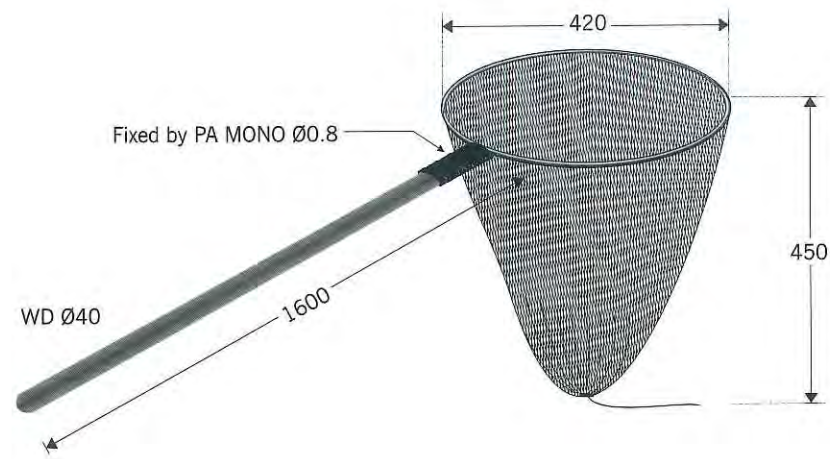
LOCATION
Estancia

Iloilo

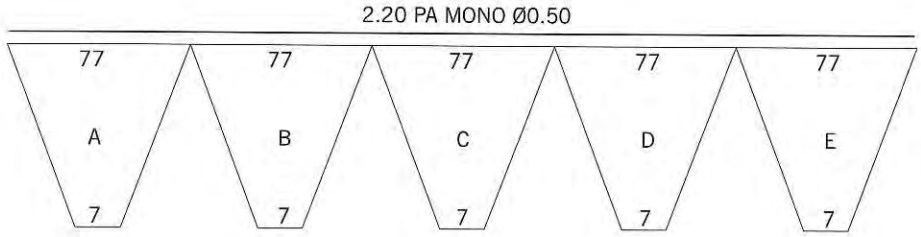


mm	MAT
27.7	PA MONO

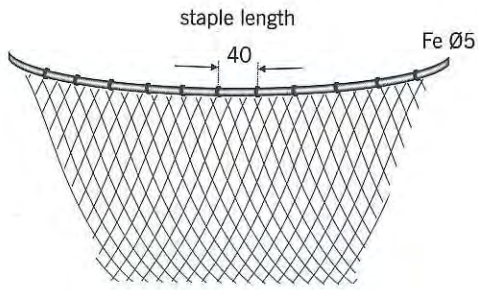


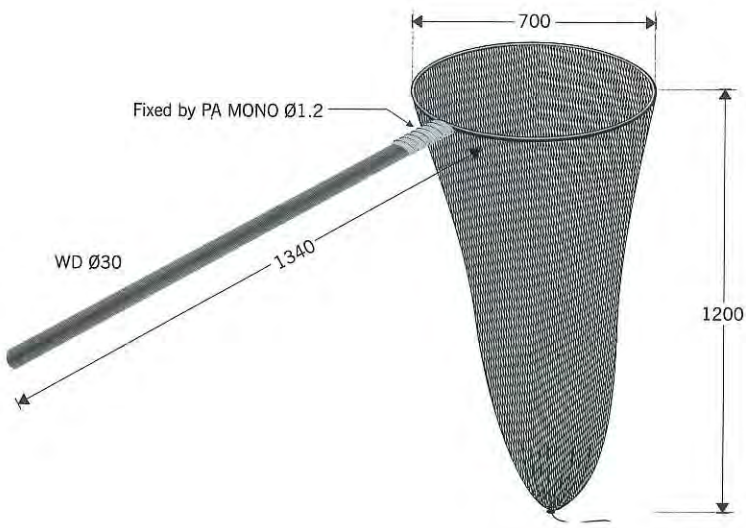


SCOOP NET	BOAT	LOCATION
Scoop	LOA : 8 m.	Pasuquin, Currimao
Sigpaw		
Squid, small fishes	hp : 16	Ilocos Norte



	mm	MAT
105	12.7	PE 250d/6





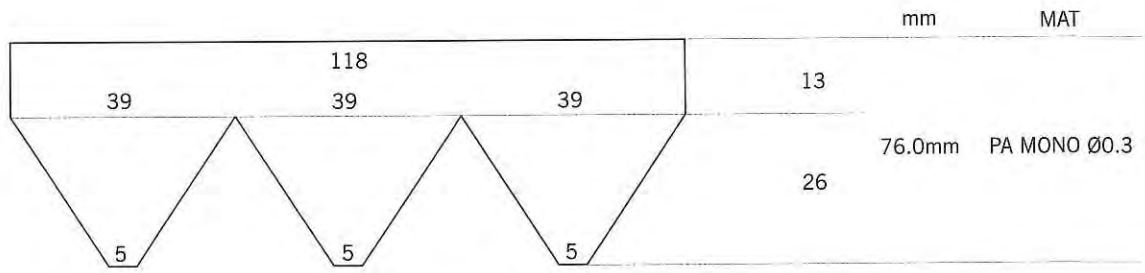
SCOOP NET
Scoop net
(Sarap)
Tilapia, Carp

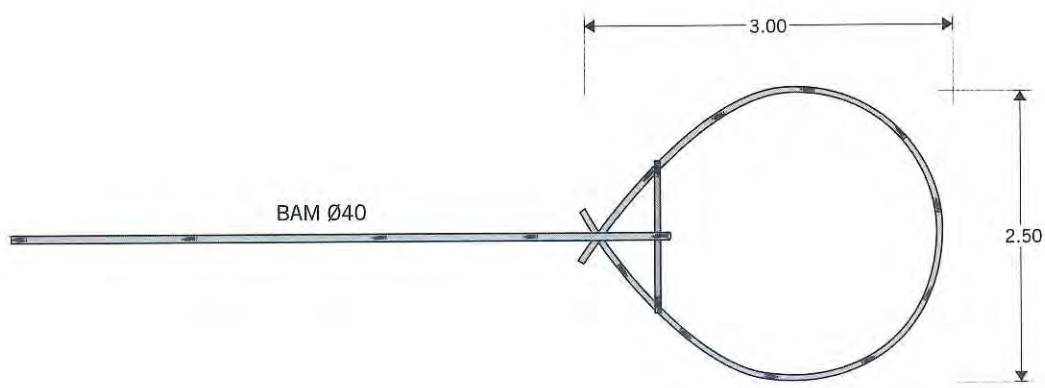
BOAT
LOA : 7.92 m.

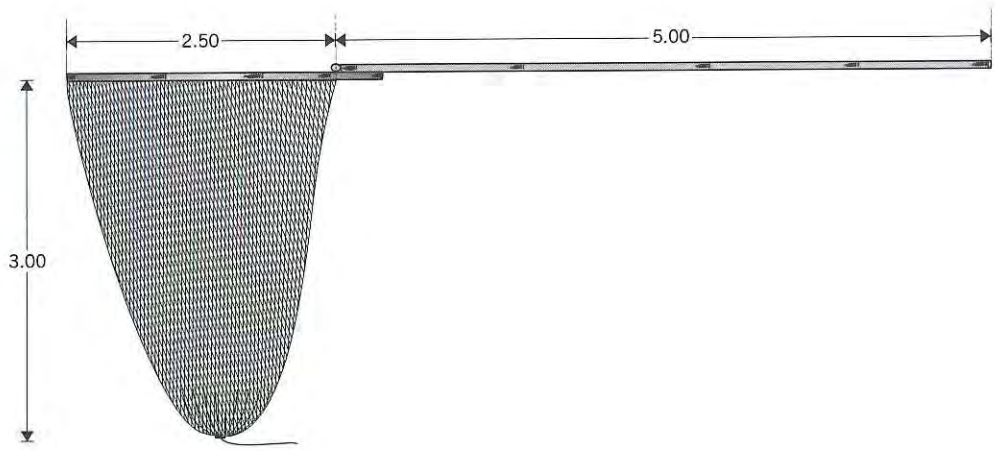
hp : 8

LOCATION
Bato

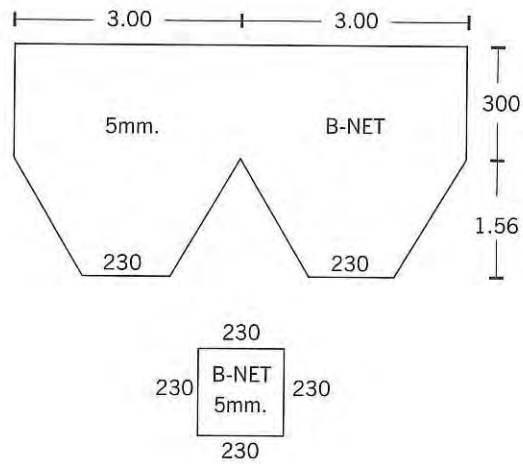
Camarines Sur

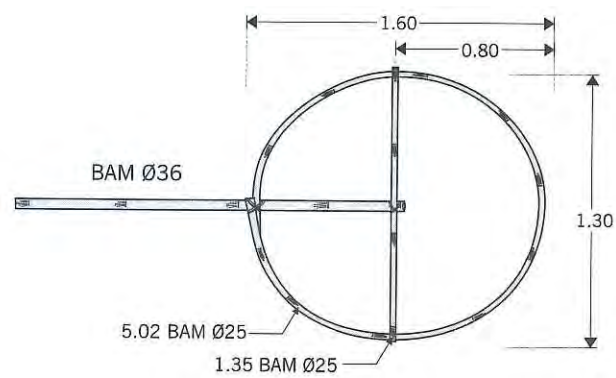


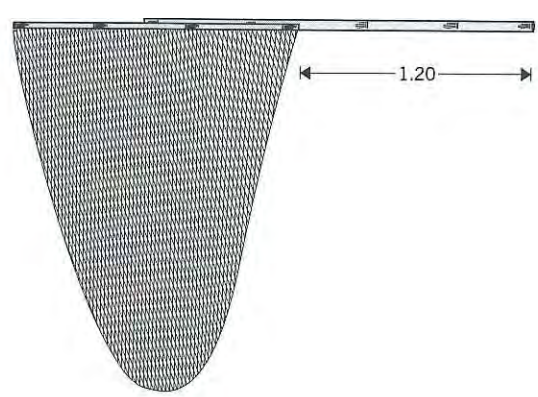




SCOOP NET	BOAT	LOCATION
Scoop net *(Salap)* Shrimp, Tilapia, Goby	LOA : 7.00 m. hp : 10	Pakil Laguna







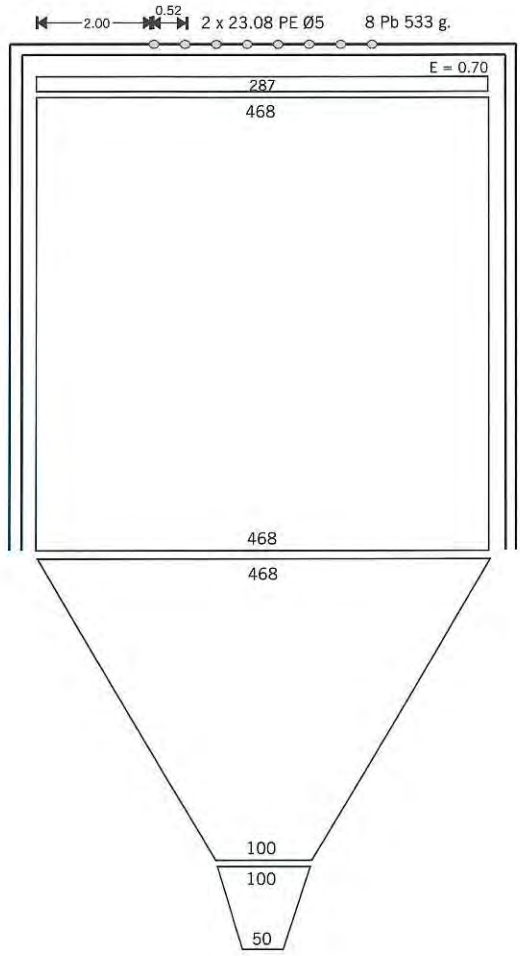
SCOOP NET
Skimming net
(Sapyaw)
Yellow striped crevalle,
Round scad

BOAT
LOA : 12.19 m.

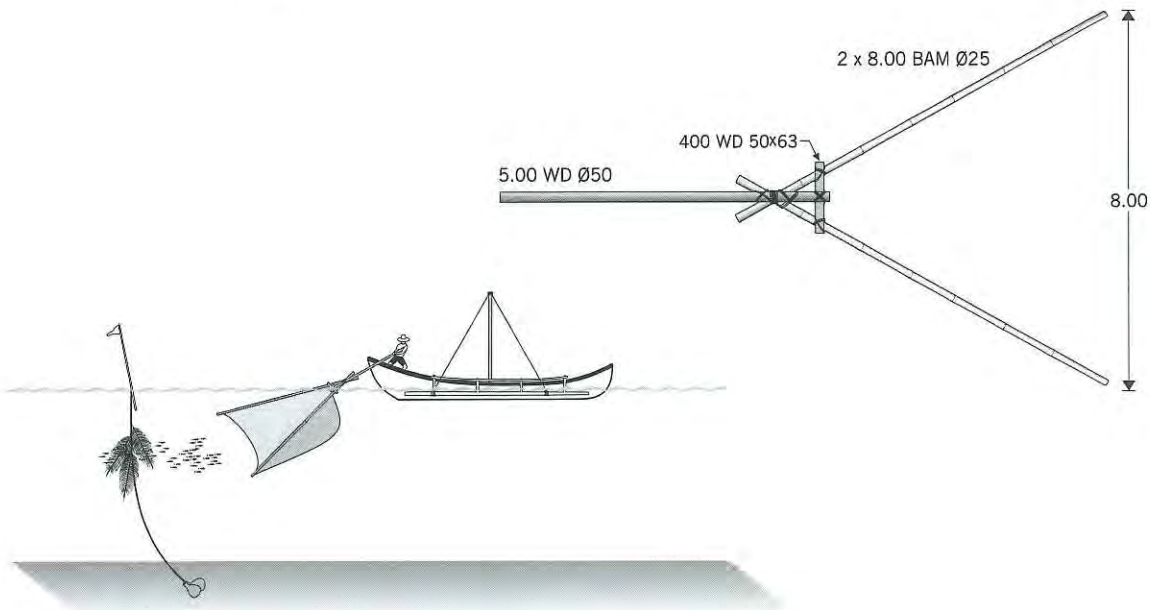
hp : 80

LOCATION
Panganiban

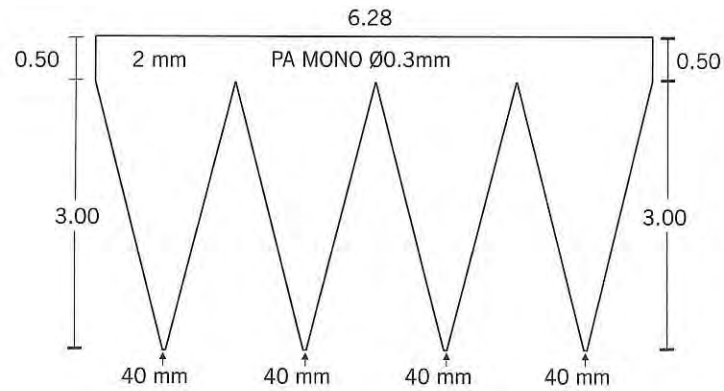
Camarines Norte

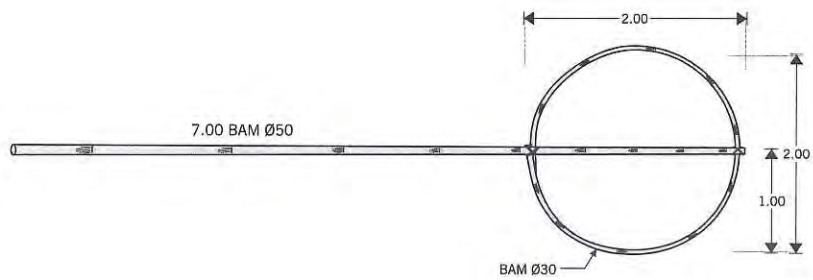


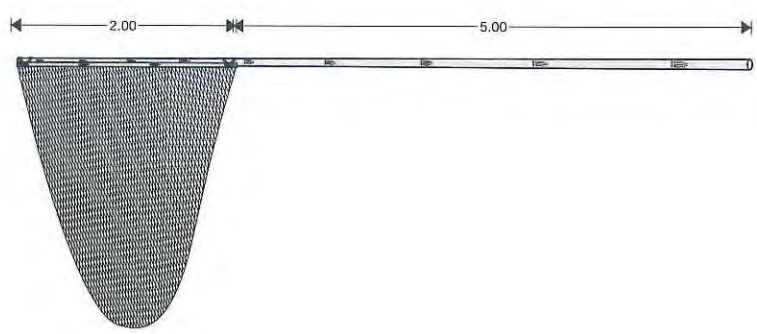
	mm	MAT
5	38.1	PA MONO Ø 0.6
468		
	23.4	PA MONO Ø 0.4
311		
85	23.4	PA MONO Ø 0.5

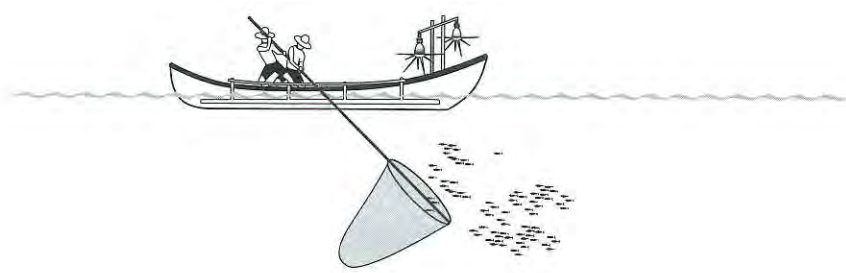


SCOOP NET	BOAT	LOCATION
Scoop net *(Agahid)* Anchovy	LOA : 9.75 m. hp : 10	Matnog Sorsogon









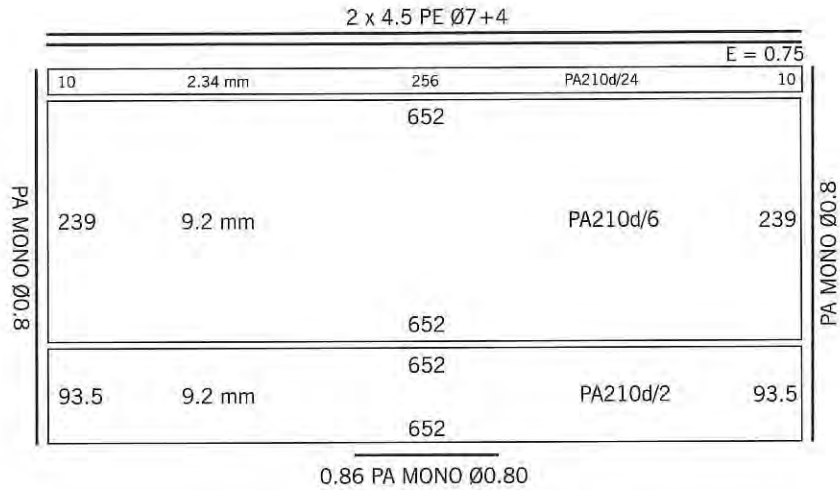
SCOOP NET
Scoop net
(Sakag)
Shrimp, Carp

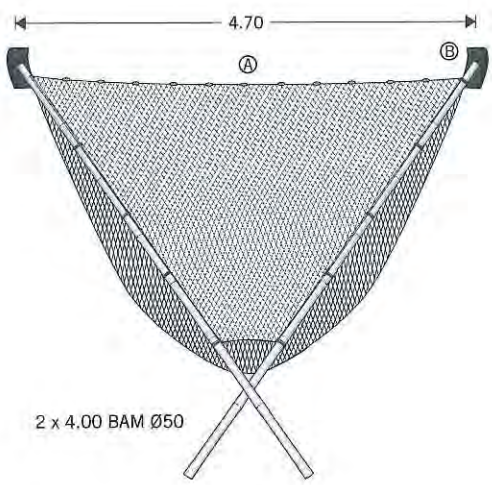
BOAT
LOA : -

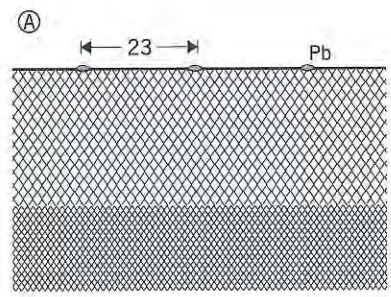
hp : -

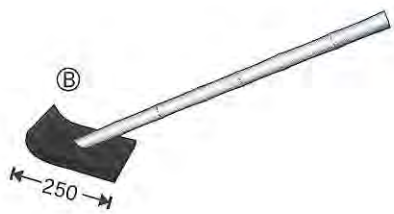
LOCATION
Tabaco

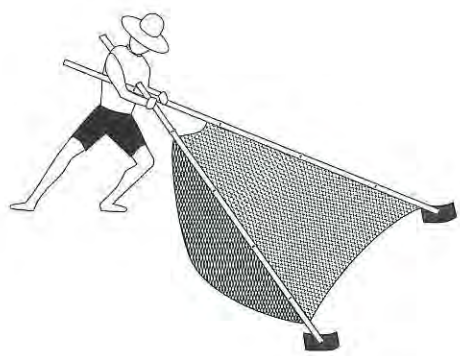
Albay











References

Bureau of Fisheries and Aquatic Resources. Fisheries Newsletter Volume XII, No. 1, January-March 1983

Bureau of Fisheries and Aquatic Resources. Fisheries Newsletter Volume XIII, January 1984-June 1985

Bureau of Fisheries and Aquatic Resources. Fisheries Newsletter Volume XIV, July 1985-June 1986

Bureau of Fisheries and Aquatic Resources. Fisheries Newsletter Volume XV, July-December 1986

Bureau of Fisheries and Aquatic Resources. The Philippines Journal of Fisheries, Volume XI, January-December 1973

Bureau of Fisheries and Aquatic Resources. The Philippines Journal of Fisheries, Volume XII, January-June 1976

Bureau of Fisheries and Aquatic Resources. Tuna Fisheries Development Training Program, Volume I and II, 4 April-15 May 1988

Bureau of Agricultural Statistics, Fisheries Statistics, 1985-1994

Nedelec, C. Definition and Classification of Fishing Gear Categories. FAO Fisheries Technical Paper No. 222, SEAFDEC, June 1986

Southeast Asian Fisheries Development Center. Fishing Gear and Methods in Southeast Asia. Volume I – Thailand, 1986, 329 pp. Volume II – Malaysia, 1989, 338 pp. Training Department, Samutprakan, Thailand

Southeast Asian Fisheries Development Center, 1994. Fishery Statistical Bulletin for the South China Sea Area, 1992. SEAFDEC Secretariat, Bangkok, 159 pp.