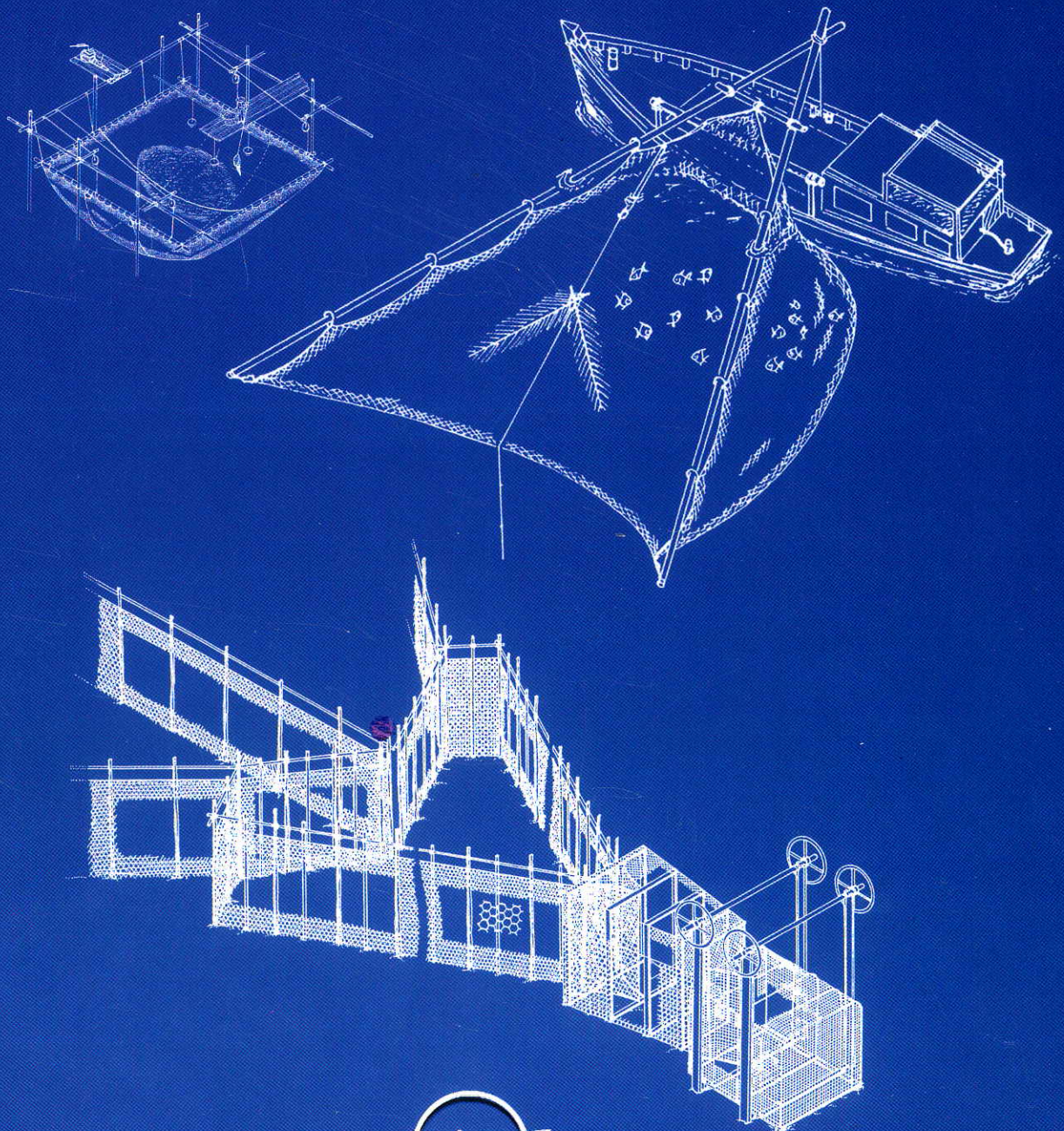


**FISHING GEAR AND METHODS
IN SOUTHEAST ASIA :
II . MALAYSIA**



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:
II. MALAYSIA**

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PREFACE

In the development of the fisheries industry throughout the world the quality of the gear used is one of the most important factors. In Southeast Asia, however, the introduction of foreign or modern fishing gear may not be appropriate, either because of its high cost or its possible adverse effects on the environment.

The modification of traditional gear, to improve the value of the catch, is therefore highly recommended. To do this, a detailed study on the types and styles of available gear must first be undertaken.

Since 1970s, the Southeast Asian Fisheries Development Center (SEAFDEC) through the Training Department has initiated a systematic study on the fishing gear and methods employed by fishermen in the region. The first edition for Thailand (Volume 1), Malaysia (Volume 2), Philippines (Volume 3) and Vietnam (Volume 4) have been published in 1986, 1989, 1995 and 2002 respectively. Whilst, the fifth volume covering Indonesia is in the preparation.

The Fishing Gear and Methods in Southeast Asia: II, has first been published for more than a decade (i.e. 1989). The work described in the report was the result of a team effort by members of the SEAFDEC Training Department. The team had made three survey trips to cover as many fishing villages as possible throughout Peninsular Malaysia and East Malaysia. What appear was therefore a compilation of data, information and schematic drawings of existing fishing gear and methods. The boundaries of the study area shown on the charts that appear in the report have been drawn according to technical requirements. It contained descriptions of 247 marine fishing gears employed in the marine fisheries of Malaysia.

This revised version updates the data and information that were recorded for more than a decade ago which are almost out of date. However, the schematic drawing of fishing gear and methods from the original volume are maintained, with a minimum amendment and also with additional of 9 new designs, make it comprises of 256 descriptions of the fishing gears.

With its long coastline of over 4,400 kilometers, Malaysia is undoubtedly rich in marine species. Malaysia has also increased her waters four fold with the establishment of 200 nautical miles zone or EEZ. The development of the fishing gears and methods used are therefore essential to increase the harvest from the untapped stocks of the South China Sea, and to encourage maintenance and preservation of established fishing grounds. It is hoped that this monograph would serve as a useful reference to those who are concerned with the fisheries industry in Malaysia.

On behalf of SEAFDEC, I would like to offer my sincere thanks to the Department of Fisheries Malaysia for the cooperation given and congratulation to the team that involved in the production of this fruitful monograph.



Panu Tavarutmaneegul
Secretary-General
and
Chief of the Training Department

ACKNOWLEDGEMENTS

The authors wish to express our special thank to the Department of Fisheries, Malaysia for the cooperation and technical support. We are grateful to many persons who helped us to collect data, particularly to Mr. Ahmad Hazizi Aziz, Mr. Henry O. Luhah and many district fisheries officers. Without them, this project would not have been possible. Our thanks are also due to Mr. Cheah Eng Kean of Kuala Lumpur and Mr. Teo Chee Kwang of Sarawak who gave many valuable and useful comments.

We also wish to express our sincere thanks to Dr. Veravat Hongskul and Dr. Thiraphan Bhukaswan (the former Secretary-Generals of SEAFDEC) for extending financial support for the survey and the publication of first edition of our work. And also to Mr Panu Tavarutmaneegul, the present Secretary-General, who approved financial support for our work to be revised and republished, we are heartfelt gratitude.

We thank Mr. Narong Ruangsivakul for his assistance in the preparation of drawings. We also wish to thank Mrs. Hild Glattbach editorial officer of the SEAFDEC Training Department, who edited the descriptions in the first edition and to Mr Rosidi Ali of SEAFDEC/MFRDMD for his willingness to revise our work.

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<Chapter 1 >

AN INTRODUCTION TO MARINE
FISHING IN MALAYSIA

1.1 Introduction

Marine capture fishery is the major contributor to the Malaysian fish production. At present, the fishery contributes more than 80 % of the nation's fish production, amounts about 1.3 million tones. The fishery as a whole is classified into inshore and deep-sea fisheries. The inshore fishery covers fishing activities in waters within 30 nautical miles from shore, using vessels less than 70 GRT. Whilst the deep-sea fishery covers fishing by vessels of 70 GRT and above, operating in waters beyond 30 nautical miles from shore to EEZ limit. There are four fishing areas in Malaysia i.e. off west coast of Peninsular Malaysia, off east coast of Peninsular Malaysia, off Sarawak and off Sabah-Labuan.

1.2 The Fishing Vessel

The majority of fishing vessels in Malaysia operate in the inshore areas. Table 1.1 shows the number of licensed fishing vessel in year 2000 by tonnage class. In the year 2000, 31531 units of vessel have been licensed, of which about 98% were the inshore one (< 70 GRT). Inshore areas, especially off the Peninsular Malaysia, the resources have been exploited to the maximum level. Steps have taken to reduce gradually the fishing efforts in the areas. New licenses for fishing vessels have been only issued to the deep-sea fishing sector. At present, 601 units of deep sea fishing vessel have licensed. It is expected that the number of vessel for deep-sea fishery will continuously grow in the future, and will contribute more to the nation's fish production.

Table 1.1: Number of Licensed Fishing Vessel In Malaysia for the Years 1991 to 2000

Years	Number of Licensed Vessels		
	Less Than 70 GRT	70 GRT & Above	Total
1991	32212	689	32901
1992	32095	455	32550
1993	30963	612	31575
1994	30821	582	31403
1995	34334	572	34906
1996	33168	424	33592
1997	32156	516	32672
1998	31658	1188	32846
1999	33515	536	34051
2000	30869	662	31531

1.3 The Fishermen

The marine fishing industry has offered direct employment to about 81994 fishermen, working on the licensed fishing vessel (based on 2000's statistic). The Malaysian marine capture fishery has actually suffered shortage of skill manpower for the last decade. This has slightly affected the government policy to develop the deep-sea fishing. At present, the involvement of foreign worker in this sector is considered crucial to accelerate its development. In 2000, there were 15166 approved foreign fishermen to work on licensed fishing vessels in Malaysia. The foreign crews were mainly Thais, Indonesians and Filipinos. Measures have been taken especially through training and extension, to increase the number of skilled manpower among the local.

1.4 The Fishing Gear

Table 1.2 listed the type of fishing gears licensed for the year 2000 in four main fishing areas in Malaysia i.e. off west coast of Peninsular Malaysia, off east coast of Peninsular Malaysia, off Sarawak and off Sabah-Labuan. A total of 24722 units of fishing gears have been licensed. In overall, gill net was the largest number of gear licensed in 2000, followed by trawls, hook-and-line, traps and surrounding net.

Normally each fishing vessel is licensed to operate one fishing gear. However, some fishing gears required more than a vessel to be operated. On the other hand, there are also conditions where licensed fishing vessels have been issued more than one fishing gear's licenses. Thus, the number of fishing gears licensed unlikely to be similar to the number of licensed fishing vessel.

Table 1.2: Number of licensed fishing gear in Malaysia for 2000

Type of Fishing	West Coast of Peninsular Malaysia	East Coast of Peninsular Malaysia	Sarawak	Sabah-Labuan	Total
Surrounding net	311	554	22	199	1086
Seine net	396	7	0	12	415
Trawl net	3183	922	628	1339	6072
Lift net	22	69	0	171	262
Gill net	7787	2360	1432	1198	12777
Trap	517	270	305	230	1322
Hook and line	283	1235	140	522	2180
Scoop net	4	0	22	8	34
Others	324	52	0	198	574
Total	12827	5469	2549	3877	24722

1.5 The Catch Production

Table 1.3 lists the landings of Malaysian marine fishing and its wholesale values from years 1991 to 2000. The production from the marine capture fishery in general has been continuously inclined in term of quantity and value. This would be the results of practicing sustainable management in inshore areas and promoting the

development of deep-sea fishing by Malaysian government. However at present, the inshore fishery remained the major source of fish landings, contributing more than 80% of the production.

West coast of Peninsular Malaysia has contributed about 41.6% of the total marine production, followed by the east coast of Peninsular Malaysia 31.0% and the rest were from Sarawak (10.5%) and Sabah-Labuan (16.9%).

Production by gears show that trawls and purse seiners were the major contributors, landed about 56% and 20% of the total landing respectively, followed by gillnet (10%) and hook-and-lines (4%), traps (3%) and the others traditional fishing gears contributed the rest.

Table 1.3: Landings and Wholesale Values Of Marine Fish In Malaysia From Years 1991 to 2000

Years	Landings (metric tone)	Wholesale Values (RM Million)
1991	911933	1852.93
1992	1023516	2379.96
1993	1047350	2378.61
1994	1065585	2584.29
1995	1108436	2710.90
1996	1126689	3322.15
1997	1168973	3673.23
1998	1215206	3817.21
1999	1248402	4143.27
2000	1285696	4399.23

In term of types of catch, the five main edible fish were Indian mackerel (8%), prawns (8%); round scad (7%), neratic tuna (6%) and squid (5%). Although it is not significant in term of weight, prawn is important to the Malaysian fishery because of the high market value. The value of prawn is accounting for about 24.4% of the total wholesale value.

1.6 The Future Prospects

Malaysia has waters that are rich with marine living resources. With proper planning and management, the country could increase the fish production to fulfill the local demand and for export. To achieve this, the government of Malaysia has set up the national policy for the fisheries industry with the following objectives:

- i. to ensure adequate supply of fish to meet domestic demand for fresh fish as well as for the processing industries,
- ii. to capitalize on export markets for value added fish products, and
- iii. to conserve and sustain the utilization and management of fisheries resources

The biggest challenge faced by the marine fishery is to sustain the inshore resources, which has been heavily exploited in some of the areas. The adopted management measures such as licensing, zone restrictions, mesh size and banning of destructive fishing need to be consistently enforced. In addition, responsible fishing practices should be promoted.

Development of deep-sea sector could substitute significantly to the national fish production. At the moment, the contribution of deep-sea fishing is very nominal. The development could be promoted through introducing of fishing vessels with modern and intermediate technology and also, by modification of the existing fishing vessels, to improve catch efficiency and onboard handling. Similarly, the introduction of industrial fish catching technology, to increase production and thereby reduce imports, should be taken into consideration. Continual development will enable the harvesting of hitherto unexplored fish stocks in the South China Sea.

Research and studies should be encouraged, especially in the areas of data collection and further development of fishing grounds, and provisions should be made for their overall maintenance and preservation.

<Chapter 2>
EXPLANATORY NOTES
AND
APPENDICES

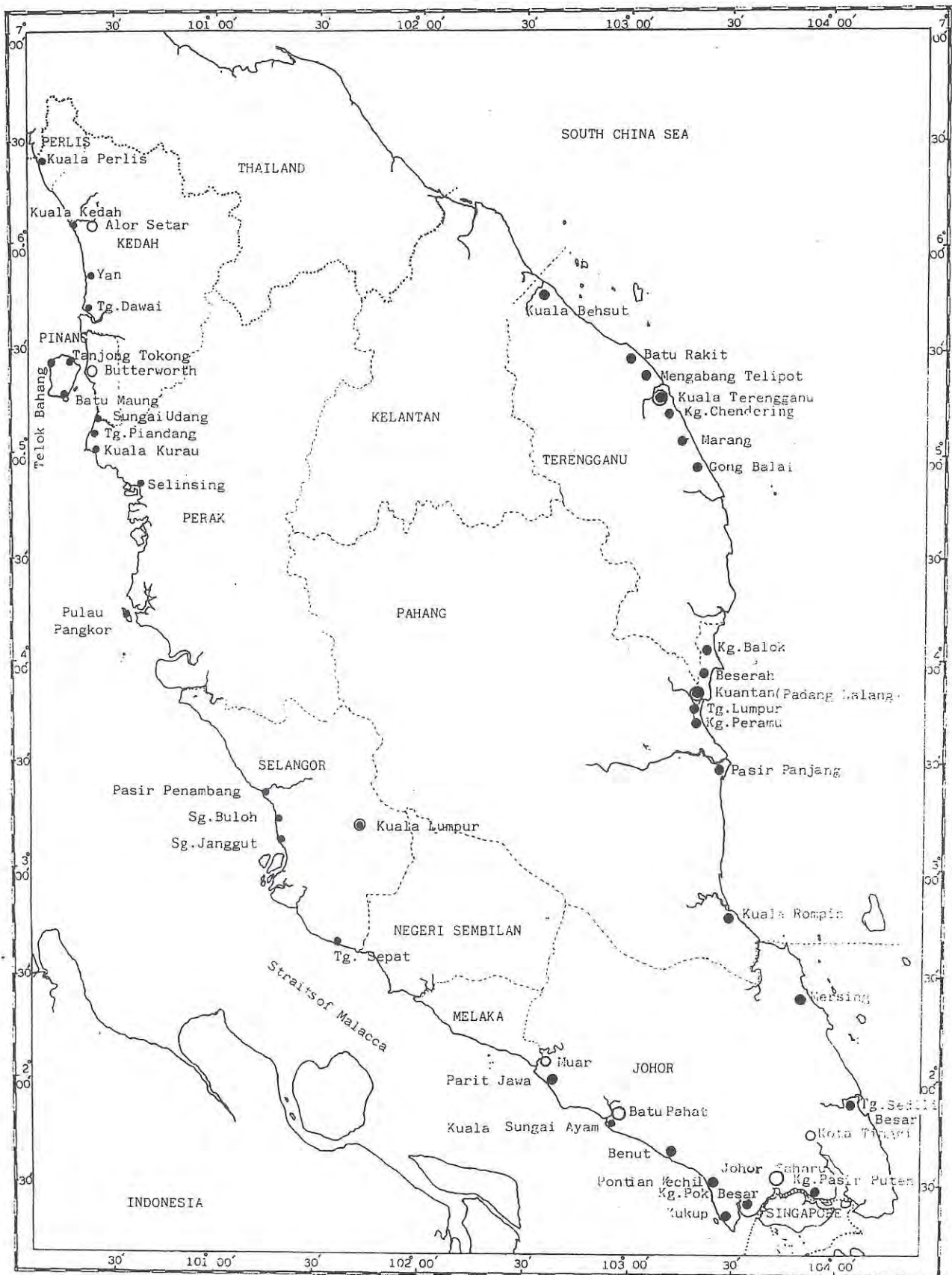


Figure 2.1 Location (●) where the surveys of the fishing gear and methods used were carried out. The name of states are written in the capital letters.

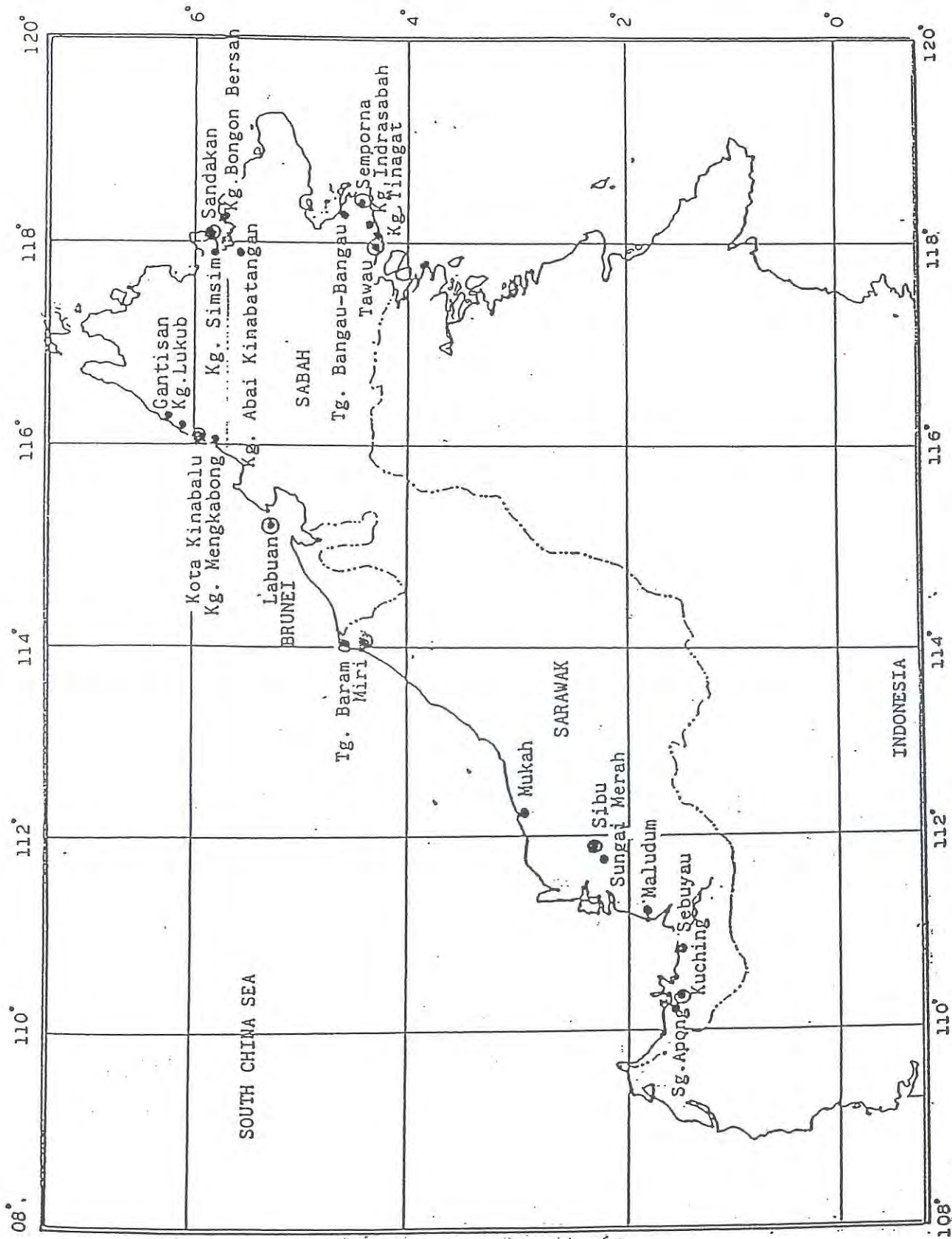


Figure 2.2 Location (●) where the surveys of fishing gear and method were carried out.

2.1 Introduction

This volume revises the report of survey on Marine Fishing Gear and Methods, conducted in Malaysia between March 1986 and March 1987. The survey was conducted using the same methods as in the first volume (Thailand). Survey sites are shown in figures 2.1 and 2.2.

The data, also collected by the same method as in the first volume, are shown in Table 2.1. There are additional of 9 new data. Background information on the current status of different fisheries was based on data contained in the Annual Fisheries Statistic 2000 published by the Department of Fisheries Malaysia.

In this volume, the classification of fishing gear for this region is presented with a description of each group. This was based on the system adopted in "Definition and Classification of Fishing Gear Categories" by C. Nedelec, FAO Fisheries Technical Paper No. 222. The mode of presentation is summarized below.

2.2 Illustrations

1) The horizontal length of surrounding nets, purse seines and gill nets is drawn according to the length of the float-line, 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. The width of netting panels or sections of trawl gear is drawn according to half the stretched netting, and the depth or length according to the fully stretched netting. Some gears are shown by schematic or partly perspective of overall sketches, with dimensions indicated where applicable.

2) General outline drawings, such as 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 meters (m) and milli-meters (mm). The units are not indicated but can easily be recognized, as follows:

Meter: Length of footropes, headlines, float-lines etc., used with two decimals (e.g., 5.25, 90.20).

Millimeter: Mesh size (stretched), diameters of ropes, floats, etc. used without a 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 abbreviations listed in Appendix 1.

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

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

8) The number of meshes in a straight row along the edges indicates 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 a practical range of taper ratios is given in Appendix 2, together with a diagram of different cutting rates.

10) The term *hanging ratio* (E) designates the ration 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 construction of gear or manner of use, this is indicated in the title and opposite the drawing by Roman numerals (I, II,..) Where these variants refer to only one component part of gear, other possible ways of making this part are shown with the abbreviation ALT.













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

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

Table 2.1: Numbers of fishing gear designs which had been collected

Fishing gear State	Surrounding net	Seine net	Trawl	Lift net	Falling gear	Gill net	Traps	Hooks and Lines	Scoop net	Drive-in net	Dredges	Miscellaneous	Total
TERENGGANU	4	3	2	4	3	12	1	6	3	-	-	-	38
PAHANG	1	1	3	3	-	5	3	12	-	-	-	-	28
SELANGOR	-	-	1	-	-	5	3	2	-	-	2	-	13
PERAK	4	-	5	1	-	5	2	6	-	1	-	-	24
PENANG	2	1	2	-	-	7	2	1	1	-	-	-	16
JOHOR	4	2	2	3	4	14	9	9	2	1	2	-	52
KEDAH	2	2	3	-	1	1	4	-	-	-	-	-	13
PERLIS	1	-	1	1	-	-	1	-	-	-	1	-	5
SARAWAK	1	-	4	4	-	6	1	6	1	-	-	-	23
SABAH	8	-	2	3	-	6	8	14	1	-	-	2	44
TOTAL	27	9	25	18	8	61	34	56	8	2	5	2	256

Abbreviations and symbols used in illustrations

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

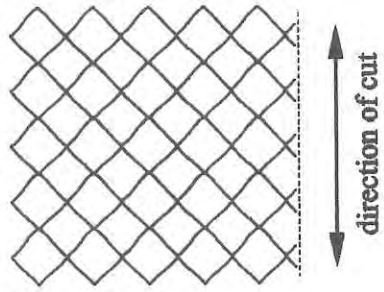
Common cutting rates and taper ratios

Number of meshes lost (or gained)

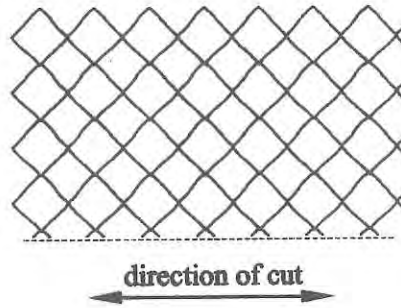
	1	2	3	4	5	6	7	8	9	10
1	AB	1T2B	1T1B	3T2B	2T1B	5T2B	3T1B	7T2B	4T1B	9T2B
2	1N2B	AB	1T4B	1T2B	3T4B	1T1B	5T4B	3T2B	7T4B	2T1B
3	1N1B	1N4B	AB	1T6B	1T3B	1T2B	2T3B	6T6B	1T1B	7T6B
4	3N2B	1N2B	1N6B	AB	1T8B	1T4B	3T8B	1T2B	5T8B	3T4B
5	2N1B	3N4B	1N3B	1N8B	AB	1T10B	1T5B	3T10B	2T5B	1T2B
6	5N2B	1N1B	1N2B	1N4B	1N10B	AB	1T12B	1T6B	1T4B	1T3B
7	3N1B	5N4B	2N3B	3N8B	1N5B	1N12B	AB	1T14B	1T7B	3T14B
8	7N2B	3N2B	5N6B	1N2B	3N10B	1N6B	1N14B	AB	1T16B	1T8B
9	4N1B	7N4B	1N1B	5N8B	2N5B	1N4B	1N7B	1N16B	AB	1T18B
10	9N2B	2N1B	7N6B	3N4B	1N2B	1N3B	3N14B	1N8B	1N18B	AB
11	5N1B	9N4B	4N3B	7N8B	3N5B	5N12B	2N7B	3N16B	1N9B	1N20B
12	11N2B	5N2B	3N2B	1N1B	7N10B	1N2B	5N14B	1N4B	1N6B	1N10B
13	6N1B	11N4B	5N3B	9N8B	4N5B	7N12B	3N7B	5N16B	2N9B	3N20B
14	13N2B	3N1B	11N6B	5N4B	9N10B	2N3B	1N2B	3N8B	5N18B	1N5B
15	7N1B	13N4B	2N1B	11N8B	1N1B	3N4B	4N7B	7N16B	1N3B	1N4B
16	15N2B	7N2B	13N6B	3N2B	11N10B	5N6B	9N14B	1N2B	7N18B	3N10B
17	8N1B	15N4B	7N3B	13N8B	6N5B	11N12B	5N7B	9N16B	4N9B	7N20B
18	17N2B	4N1B	5N2B	7N4B	13N10B	1N1B	11N14B	5N8B	1N2B	2N5B
19	9N1B	17N4B	8N3B	15N8B	7N5B	13N12B	6N7B	11N16B	5N9B	9N20B

(Source: FAO catalogue of small-scale Fishing Gear, 1975)

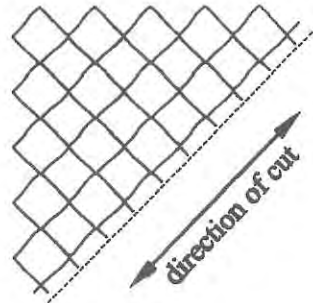
N(normal) cut. The cut is the perpendicular to the general course of the yarn in knotted netting



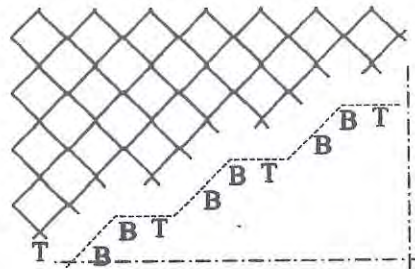
T(transversal) cut. The cut is the parallel to the general direction of the yarn in knotted netting



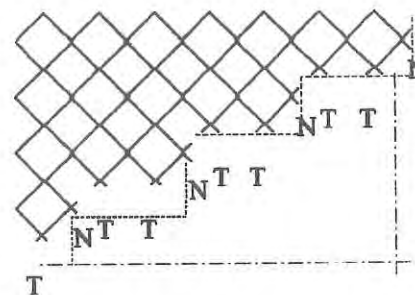
B(bar) cut. The cut is the parallel to a line of sequential mesh bars



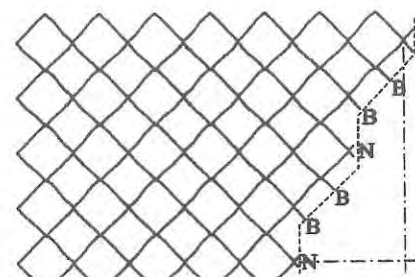
Cutting rate 1T2B



Cutting rate 1N2T



Cutting rate 1N2B



FISHING GEAR CLASSIFICATION

	<u>Group or Type of Gear</u>	<u>Local name</u>
1	SURROUNDING NETS	
1.1	With purse line (purse seine)	<i>Pukat-Pukat Jerut</i>
1.1.1	One boat purse seine	<i>Pukat Jerut Satu Bot</i>
1.1.1.1	Luring purse seine (light)	<i>Pukat-Jerut Lampu</i>
1.1.1.2	Luring purse seine (shelter)	<i>Pukat-Jerut Tuas</i>
1.1.1.3	Ordinary purse seine	<i>Pukat-Jerut Malam</i>
1.1.1.4	Anchovy purse seine	<i>Pukat-Jerut-Bilis</i>
1.1.2	Two boat purse seine	
1.1.2.1	Chinese purse seine	<i>Pukat-Jerut-Batu</i>
1.2	Without purse line	
1.2.1	Lampara	-
1.2.2	Surrounding net	<i>Pukat-Gangang</i>
2	SEINE NETS	<i>Pukat-Pukat Tarik</i>
2.1	Beach seine	<i>Pukat-Tarik Pantai</i>
2.2	Boat seine	
2.2.1	One boat seine	
2.2.1.1	Danish seine	<i>Pukat-Kisa, Pukat-Jawa, Pukat Kenka Satu Bot</i>
2.2.2	Two boat seine	-
3	TRAWL	<i>Pukat-Tunda</i>
3.1	Mid water trawl	<i>Pukat Tunda Pertengahan Air</i>
3.1.1	Mid water otter trawl	-
3.1.2	Mid water pair trawl	-
3.2	Bottom trawl	
3.2.1	Otter trawl	
3.2.1.1	Double rigger otter trawl	<i>Pukat Tunda</i>
3.2.1.2	Ordinary otter trawl	<i>Pukat Tunda</i>
3.2.1.3	Otter boom trawl	<i>Pukat Tunda</i>
3.2.1.4	Pair trawl	<i>Pukat-Tunda Beregu Pukat Kenka Dua Bot</i>
3.2.2	Beam trawl	
3.2.2.1	Single rigger beam trawl	<i>Pukat Tarik Semuan</i>
3.2.2.2	Double rigger beam trawl	-
4	LIFT NETS	<i>Pukat-Pukat-Tangkal</i>
4.1	Boat (or raft) liftnet	
4.1.1	With stick-held	
4.1.1.1	Stick-held dip net	<i>Pukat-Panau</i>
4.1.1.2	Stick-held lift net	-

4.1.2	Without stick-held	
4.1.2.1	Two boat lift net	<i>Pukat-Sudu</i>
4.1.2.2	Four boat lift net	<i>Pukat-Tangkul</i>
4.2	Stationary lift net	
4.2.1	Stake lift net	<i>Kelong</i>
4.2.2	Platform lift net	<i>Jermal, Bangang</i>
4.3	Portable lift net	
4.3.1	Crab's lift net	<i>Bintuh Ketam</i>
4.3.2	Lobster's lift net	<i>Bintuh Udang Karang</i>
4.3.3	Fish's lift net	<i>Pukat Ikan Barat-barat</i>
5	FALLING GEAR	
5.1	Portable cast net	
5.1.1	With pocket	<i>Jala</i>
5.1.2	Without pocket	<i>Jala Sotong</i>
5.2	Stick-held net	
5.2.1	Stick-held cast net	<i>Pukat-Sotong</i>
5.2.2	Stick-held box net	-
6	GILL NETS	<i>Pukat-Pukat Hanyut</i>
6.1	Surface gill net	<i>Pukat-Pukat Hanyut</i>
6.2	Drift gill net	<i>Pukat-Pukat Hanyut</i>
		<i>Pukat Bolos</i>
6.3	Bottom gill net	<i>Pukat-Tenggelam</i>
		<i>Pukat Pekap</i>
6.4	Trammel net	<i>Pukat-hanyut-tiga lapis</i>
6.5	Encircling gill net	<i>Pukat-Dalam</i>
7	TRAPS	
7.1	Stationary traps	
7.1.1	Fyke net	<i>Ambai, Gombang, Tugu</i>
7.1.2	Stake trap	<i>Kelong, Belat</i>
7.1.3	Set net (stationary net)	-
7.2	Semi-stationary traps	
7.2.1	Stow net	<i>Pompang, Gombang, Paka</i>
7.2.2	Barrier net	<i>Pukat-Cekam, Kabat</i>
7.3	Portable traps (pots)	<i>Bubu-Bubu</i>
8	HOOK AND LINE	<i>Pancing</i>
8.1	Pole and line	<i>Pancing Berjoran</i>
8.2	Baited Handlines	<i>Pancing, Ladong</i>
8.3	Lured Handlines	<i>Apolo</i>
8.4	Squid Jigging	<i>Candat Sotong</i>
8.5	Dropped Line	<i>Rawai Tegak Hanyut</i>
8.6	Long line	<i>Rawai</i>

8.6.1	Baited longline	
8.6.1.1	Drifting longline	<i>Rawai</i>
8.6.1.2	Bottom horizontal longline	<i>Rawai Dasar</i>
8.6.1.3	Bottom vertical longline	<i>Rawai Tegak</i>
8.6.2	Unbaited longline	<i>Rawai Tak Berumpan</i>
8.7	Trolling line	<i>Mengeret, Mengolok</i>
9.	SCOOP NETS	
9.1	Push net	
9.1.1	Portable push net	<i>Sungkur</i>
9.1.2	Boat push net	<i>Pukat-Surung</i>
9.2	Scoop	<i>Penyauk</i>
9	DRIVE-IN-NET	
9.1	Muro ami	<i>Pukat Muro</i>
9.2	Encircling gill net type	<i>Pukat Dalam</i>
9.3	Scoop type	<i>Tangguk</i>
10	DREDGES	
10.1	Boat dredges	<i>Tangguk-Tunda, Tangguk</i>
	<i>Kerang</i>	
10.2	Hand dredges	<i>Sauk-Tangan</i>
11	MISCELLANEOUS	
11.1	Hand hook	<i>kail tangan</i>
11.2	Spear, harpoon	<i>Serampang</i>
11.3	Gaff	<i>Pencangkok</i>
11.4	Others	<i>Lain-lain</i>

2.3 Groups of fishing gear and description

2.3.1 Surrounding net

A net roughly rectangular in shape and without a distinct bag is set vertically in water; totally surrounding and below the school of fish, generally of pelagic nature. It is subdivided into three major types: One boat purse seine; Two boats purse seine; and Surrounding net without purse line.

2.3.2 Seine net

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

2.3.3 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, mid-water trawl is included herein.

Trawl is also divided into three major types : Otter trawl; Pair trawl; and Beam trawl.

2.3.4 Lift net

A sheet of net, usually square, but may sometimes be conical, is stretched either 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 lying above it.

2.3.5 Falling gear

The gear is usually a cone shaped net or other material, which is dropped to cover aquatic animals and enclose them. Generally are hand-operated in shallow waters, but some are operated from a boat; for example, the stick-held cast net.

2.3.6 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 transversely to the path of migrating fish. Fish, trying to make their way through the net wall are entangled in meshes. A catching mechanism which is more or less similar to the gill net, the trammel net with three wall nets, is included herein. Although in this case the migrating fish are entangled between two layers of net, and not in the mesh, and a combination of different type of nets are used.

2.3.7 Trap

Gears that are set or stationed in the water for a certain period, regardless of the kind of material used for their construction. The fish 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.

2.3.8 Hooks and lines

This gear generally consists of line(s) and hook(s), to which edible or artificial baits are attached to attract fish or other aquatic animals. Non-baited hooks or a jig can also be used.

2.3.9 Scoop net

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

2.3.10 Drive-in-net

A bag net with two wings, scoop net and net wall with a coconut leaf fence are usually set in water against the current. From two to one hundred fishermen with their frightening ropes drive the fish to enter the bag net and/or scoop net. A lift net is used to catch fish which are encircling the net wall.

2.3.11 Dredges

An iron or net basket with hard rectangular frame at the opening. This gear is dragged 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 run out.

2.3.12 Miscellaneous

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

<Chapter 3>

SURROUNDING NET FISHING

3.1 Introduction

The surrounding net has long been in use in this region, and has been developed over time by fishermen themselves. At present, surrounding net is the fifth larger gear used in Malaysia and the second largest contributor of fishery production in the country. Most of surrounding nets in Malaysia are targeting small pelagic fish. The anchovy purse-seiners are only available in Peninsular Malaysia. There are also some bonito purse seines on the east coast of Peninsular Malaysia such as those found in Kuala Besut, Kuantan and Mersing. Two catching techniques are applied i.e. luring and searching techniques. Fish shelter called "unjang" and light are used in lured fishing. Whilst for searching, echo-sounders and SONAR, as well as the naked eyes are applied.

Table 3.1 Numbers of licensed vessels, fishermen and licensed gears involved in Surrounding net fishery in Malaysia and its production for the year 2000

AREAS	Number of Licensed Vessel	Number of Fishermen	Number of Licensed Gear	Production (m. tones)
West Coast of Peninsular Malaysia	311	6649	311	55223
East Coast of Peninsular Malaysia	354	8227	554	160760
Sarawak	22	359	22	3739
Sabah-Labuan	174*	1333	199	56721
TOTAL	819	16568	1086	276443

Note: * some of the vessels in Sabah would probably miss-recorded.

The numbers of fishing vessel, fishermen and licensed gears involved in surrounding nets fishery in Malaysia for the year 2000 and its production are as shown in Table 3.1. The gear is dominant in the Peninsular Malaysia especially in the east coast.

The types of fish caught by purse seiner in 2000 are as shown in Table 3.2. The major species were round scad, tuna, Indian mackerel, and selar scad, anchovies and sardines.

Table 3.2 The main species caught by purse seine in 2000

Type of Fish	West Coast of Peninsular Malaysia	East Coast of Peninsular Malaysia	Sarawak	Sabah-Labuan	Total
Indian mackerel	16034	7679	722	8051	32486
Round scad	4115	60882	112	10093	75202
Selar scad	3062	9841	68	3320	31070
Anchovies	10625	3921	0	26	14572
Sardine	2430	13942	1052	11490	28914
Tuna	9857	23354	341	14851	48403
Yellow striped trevally	1707	28940	409	14	31070
Others	7393	12201	1035	8876	14726
Total	55223	160760	3739	56721	276443

The surrounding nets of Malaysia can be classified into two groups as follows:-

- i. Surrounding net without purse line
- ii. Surrounding net with purse line (Purse seine), consisting of:
 - Two boat purse seine
 - Mini purse seine
 - Anchovy purse seine
 - Luring purse seine
 - Ordinary purse seine
 - One boat purse seine with a skiff

Most of the surrounding nets in Malaysia are constructed with a purse line. Only one sample of surrounding net without purse line was observed. The gear is known as "Pukat Gangang" was surveyed at Tawau, Sabah. Pakat Gangang is a small net, operated with small fish shelters in coastal water or in the river mouth area.

3.2 Fishing Gear and Methods

3.2.1 Surrounding net without purse line

Only one sample was taken by the survey. The net construction is very simple, like a gill net, with float and sinker lines of the same hanging ratio ($E = 0.86$). The net is polyethylene 380d/9, mesh size is 35 mm., depth is 300 meshes, and length is 40 meters.

Its operation requires 2-4 fishermen. The net is stretched over a shelter, which is constructed from many branches of trees and kept in place for a period of time (5-10 days). All the branches are then removed from under the net and the trapped fish collected. Most of the catch consisted of grouper, sea bass and rabbit fish.

3.2.2 Surrounding net with purse line (Purse seine)

There are many kinds of purse seine in Malaysia, but no data has been collected to show the different types. Most of the designs are simple and of the same style as those in Thailand. The net is a rectangular piece of nylon, with a mesh size depending on the target species (7.8 mm.-100 mm.). The purse line is of polyvinyl chloride ropes (Kuralon). Two purse line construction were found: (1) Similar to the Thai purse seine; and (2) two ropes jointed at the center by two swivels at 6-15 meters interval. Purse rings are made of lead, brass and stainless-steel, and the bridle rope was

longer than that of the Thai purse seine (10-80 cm.), a lead sinker is attached to the bridle rope. Electronic equipment such as RADAR, GPS, SONAR and echo-sounder, and deck machinery such as power block, are becoming popular in Malaysian purse seining fishing, especially in the west coast of Peninsular Malaysia. Also, many anchovy purse seiners had been installed with boiling facilities on board for dry-anchovy processing.

Fishing methods by Malaysian and Thai purse seiners were similar. Some differences were noted in steps taken and techniques used such as; hauling the purse line through a davit on the side of the boat; hauling net by power block; and using a tom-weight in mini purse seine. Malaysian purse seiners were classified according to fishing methods and target species, into the following six groups:

- i. Two boat purse seine. There were two samples in this group: (1) The fishing operation is carried out by two rowing-boats, as the Chinese purse seine in Thailand; and (2) two inboard-engined boats were used.
- ii. The mini purse seine, a small rectangular net of simple construction, was operated from a small out-board engined fishing boat using a tom-weight.
- iii. Anchovy purse seine, a very popular purse seine in Malaysia, is more advanced and used modern equipment such as an echo-sounder and power block.
- iv. Luring purse seine. This method uses a light-raft and fish shelter, called "unjang"
- v. Ordinary purse seine. This type includes the bonito purse seine and the fish are either detected by eye or by using modern equipment; echo-sounder, SONAR, but without using any luring method.
- vi. One boat purse seine (with a skiff).

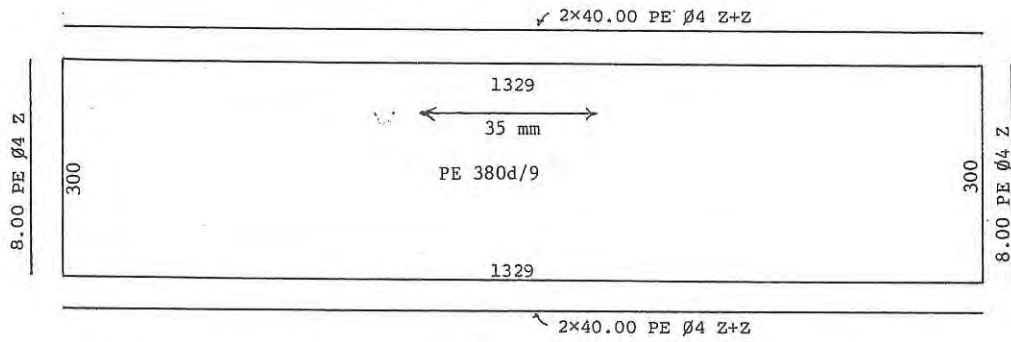
SURROUNDING NET
 Surrounding net
Pukat-Gangang
 Grouper, Sea bass, Rabbit fish

VESSEL
 Loa 5 m
 hp 15 OM

LOCATION
 Kg. Indrasabah
 Tawah
 Sabah

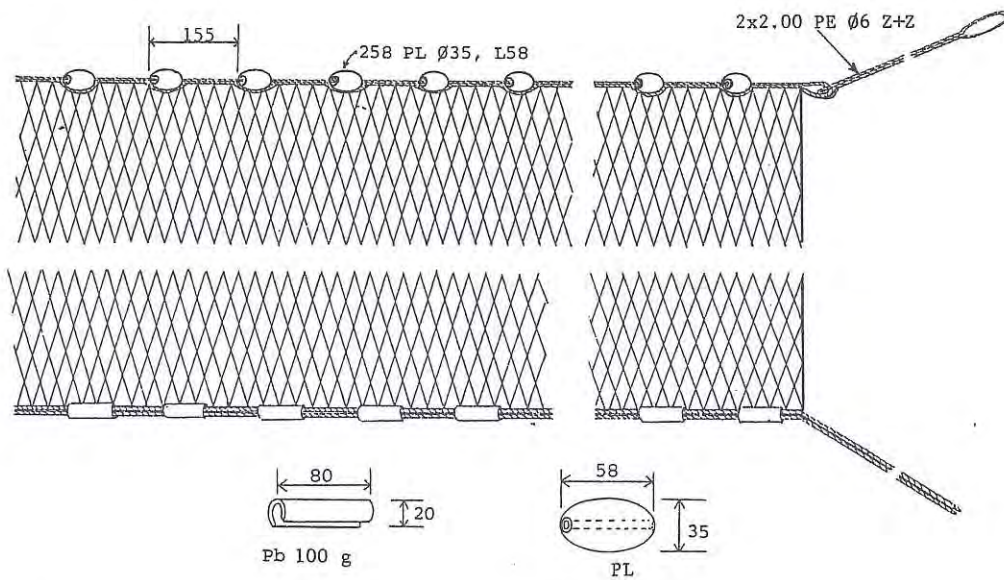
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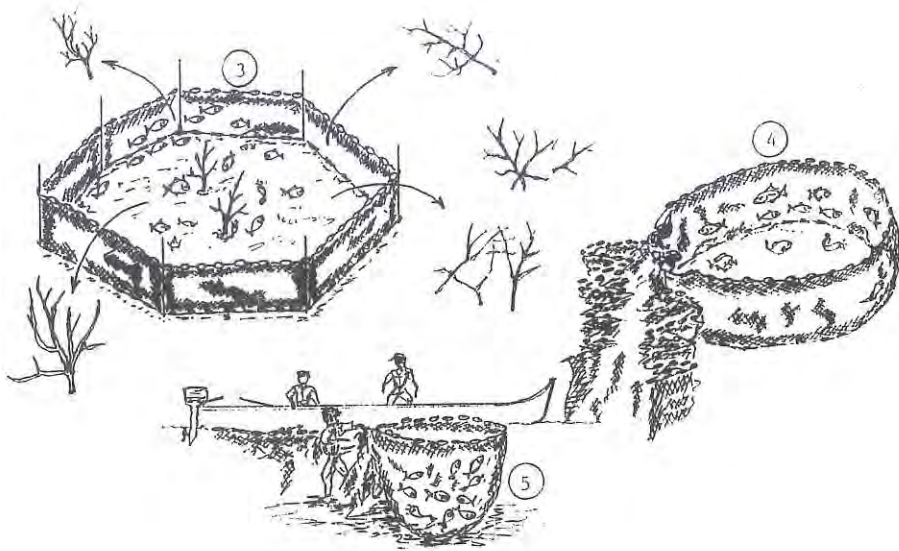
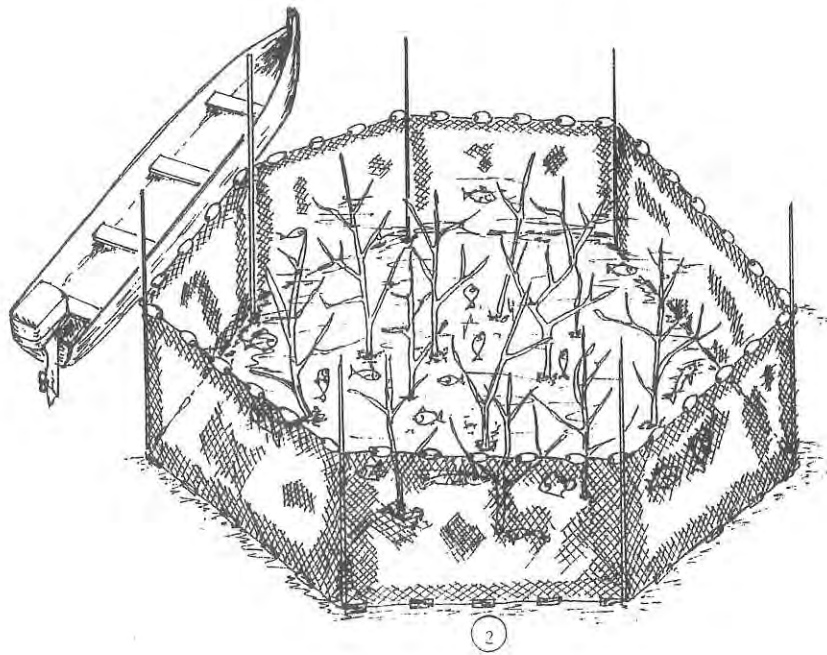
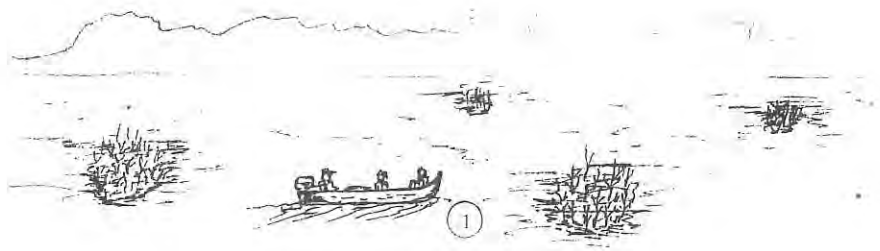
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E = 0.86

E = 0.86





SURROUNDING NET
 Two boats purse seine
Pukat - Jerhut - Kecil
 Mullet, Mackerel

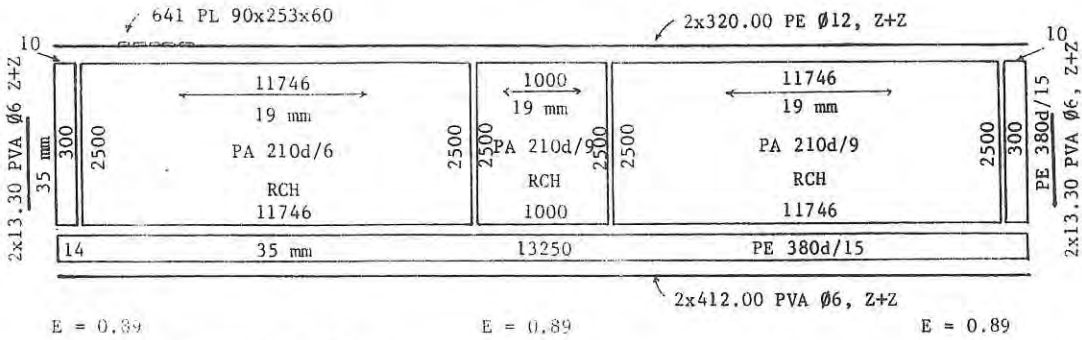
VESSEL
 Loa 2x13 m
 GT 2x5
 hp 120

LOCATION
 Tg. Piandang
 Perak

E = 0.69

E = 0.69

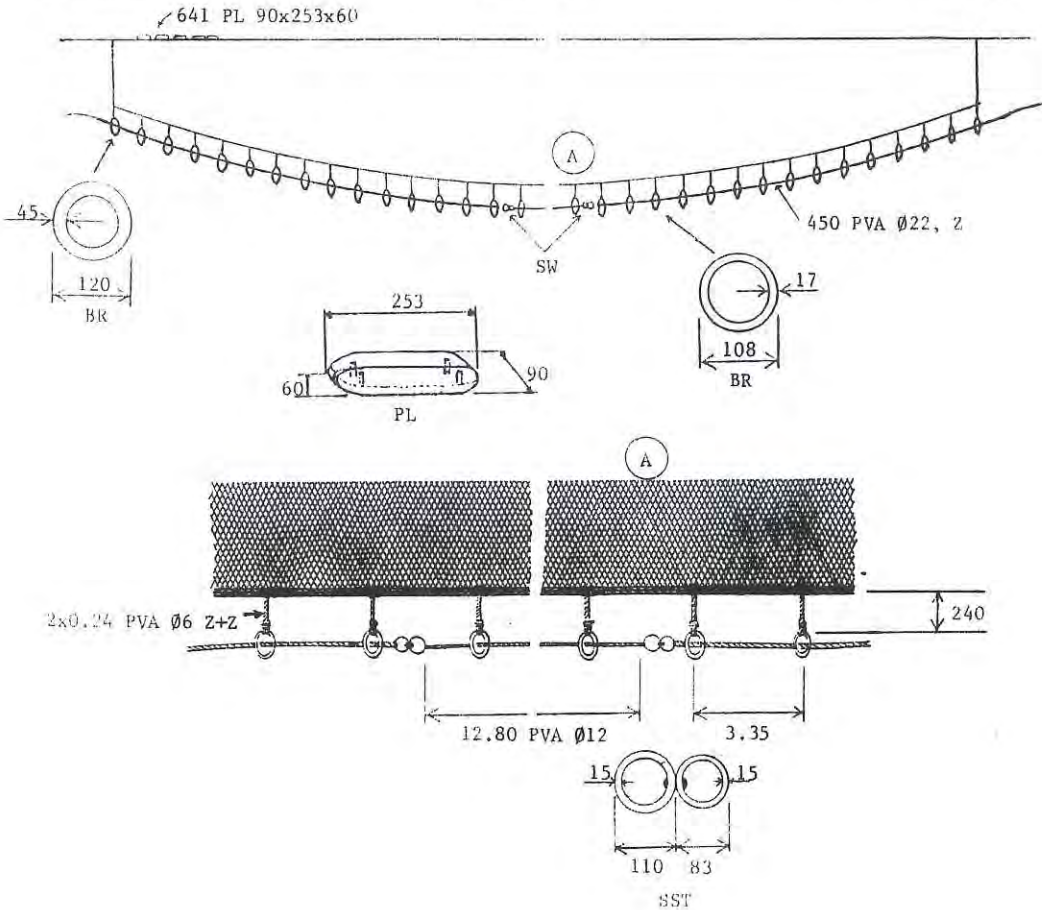
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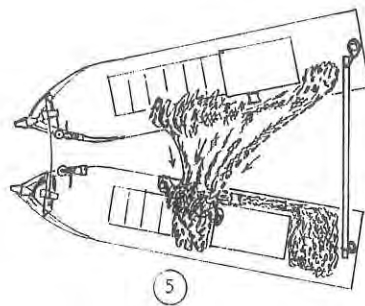
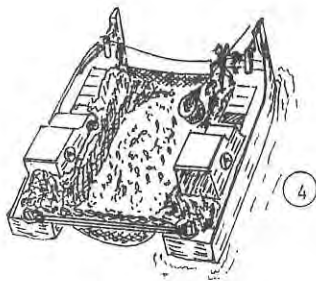
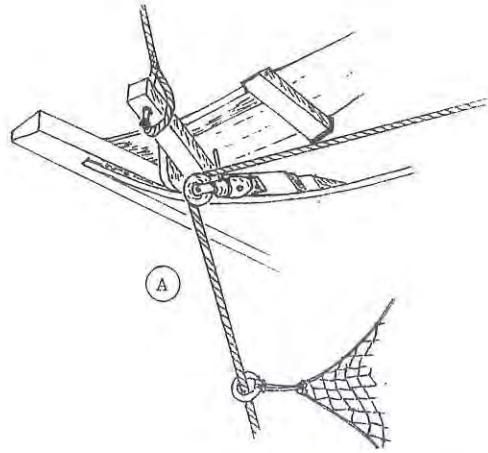
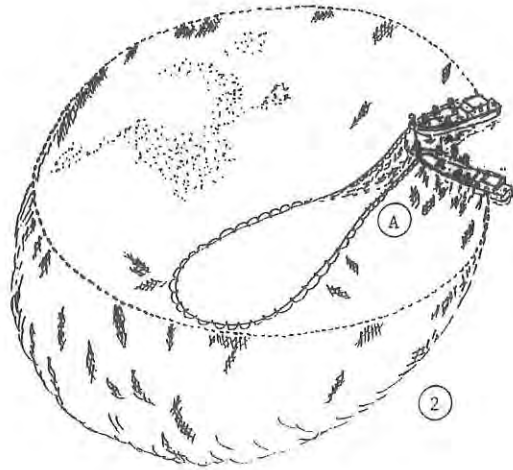
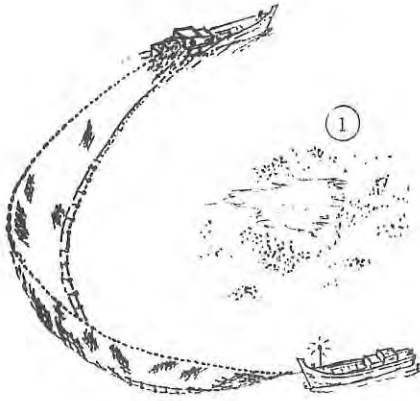


E = 0.89

E = 0.89

E = 0.89





SURROUNDING NET

VESSEL

LOCATION

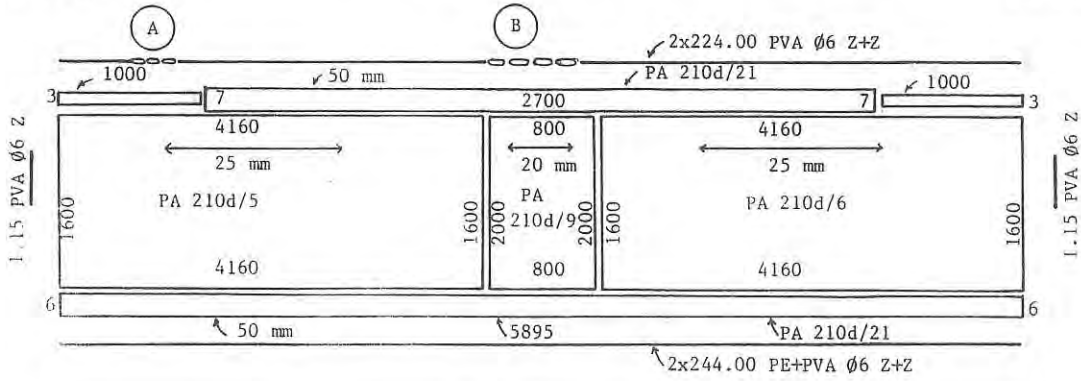
Two Boats Boat Seine, Chinese P.S. Loa 17 m. + 2 x 5 m, 3 m
 Fukat-Jerat-Batu GT 50 -
 Trevally, Cavalla, Mackerel hp 175 -

Mersing
 Johor

E = 0.76

E = 0.76

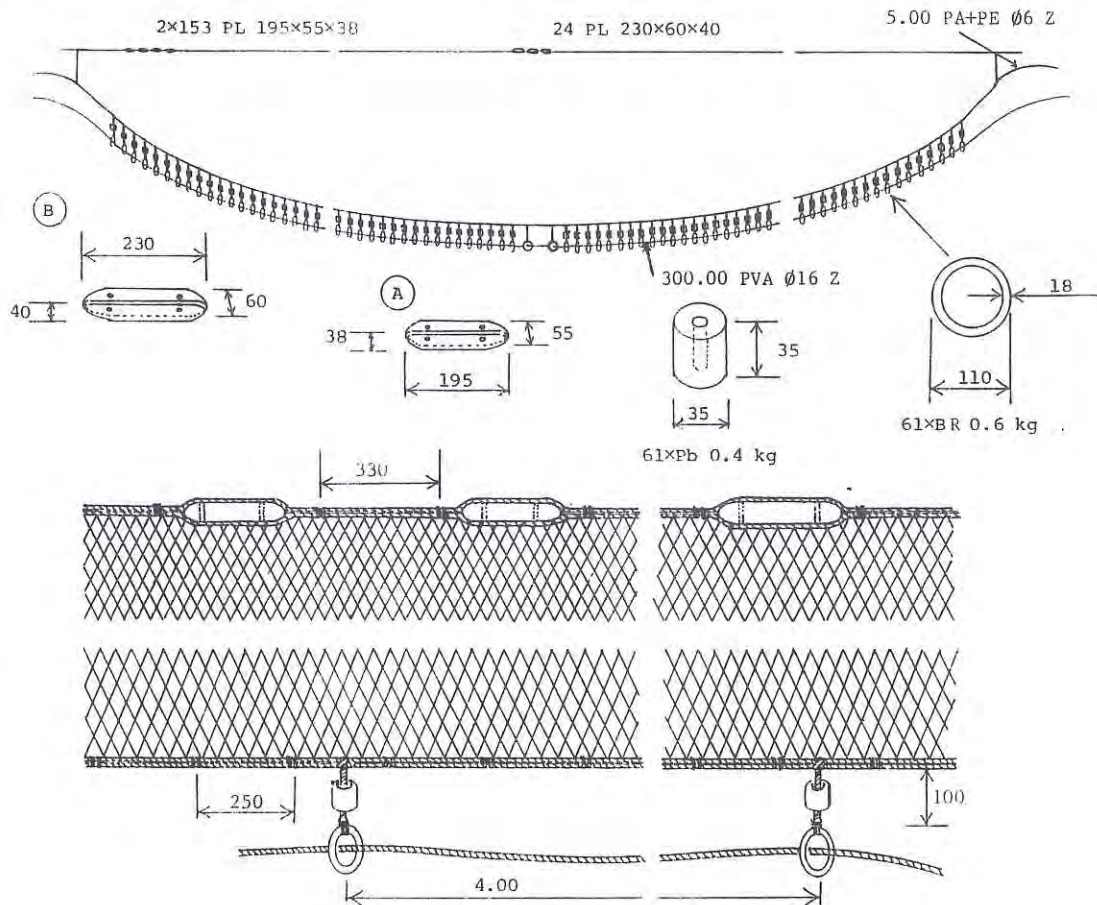
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E = 0.83



SURROUNDING NET

VESSEL

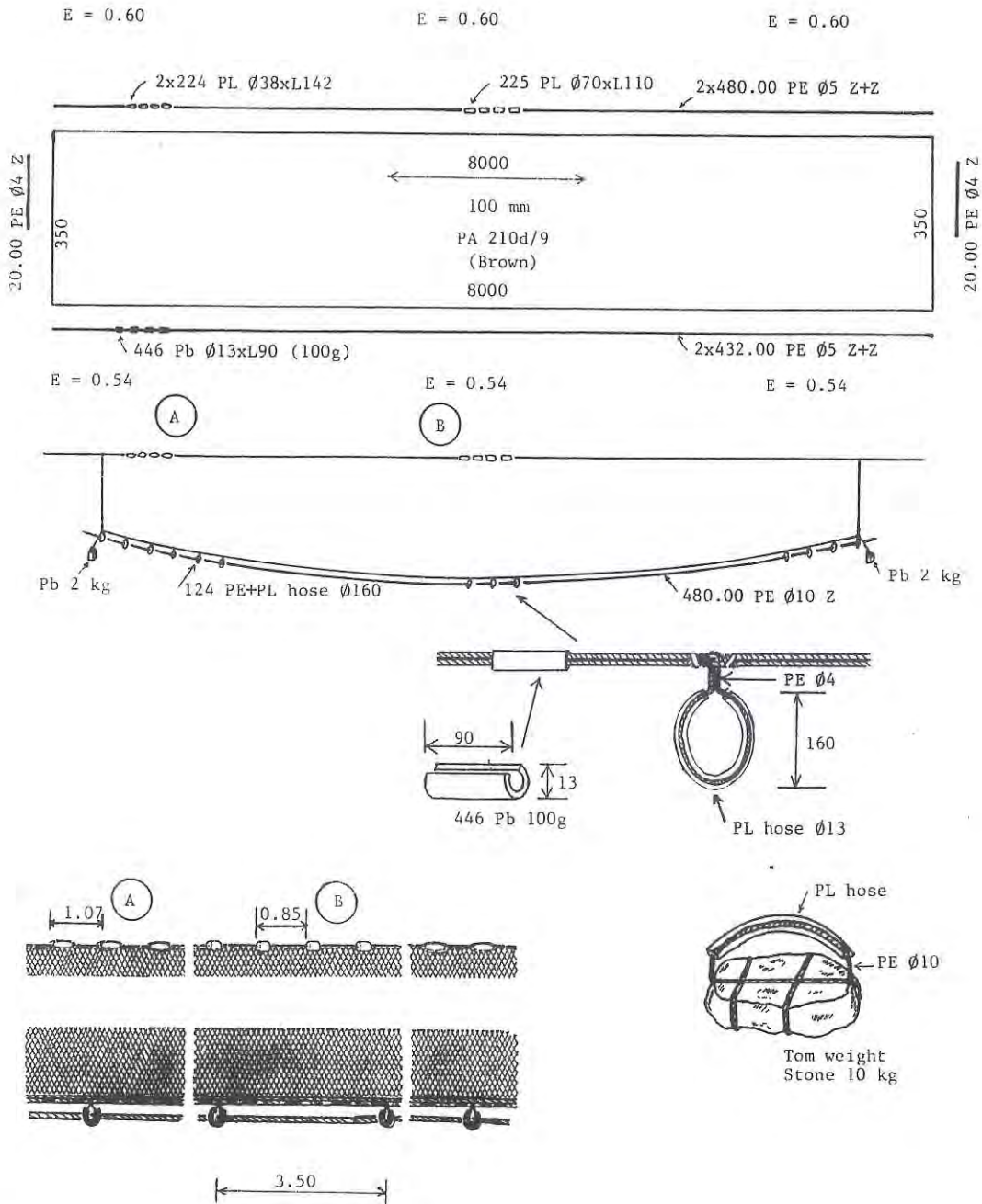
LOCATION

Mini Purse Seine
Pukat Keliling

Loa 8 m
hp 30 OM

Gantisan
Sabah

Bonito, Black Pomfret, Trevally



SURROUNDING NET

VESSEL

LOCATION

Mini Purse Seine

Loa 8 m

Gantisan

Pukat Keliling

hp 45 OM

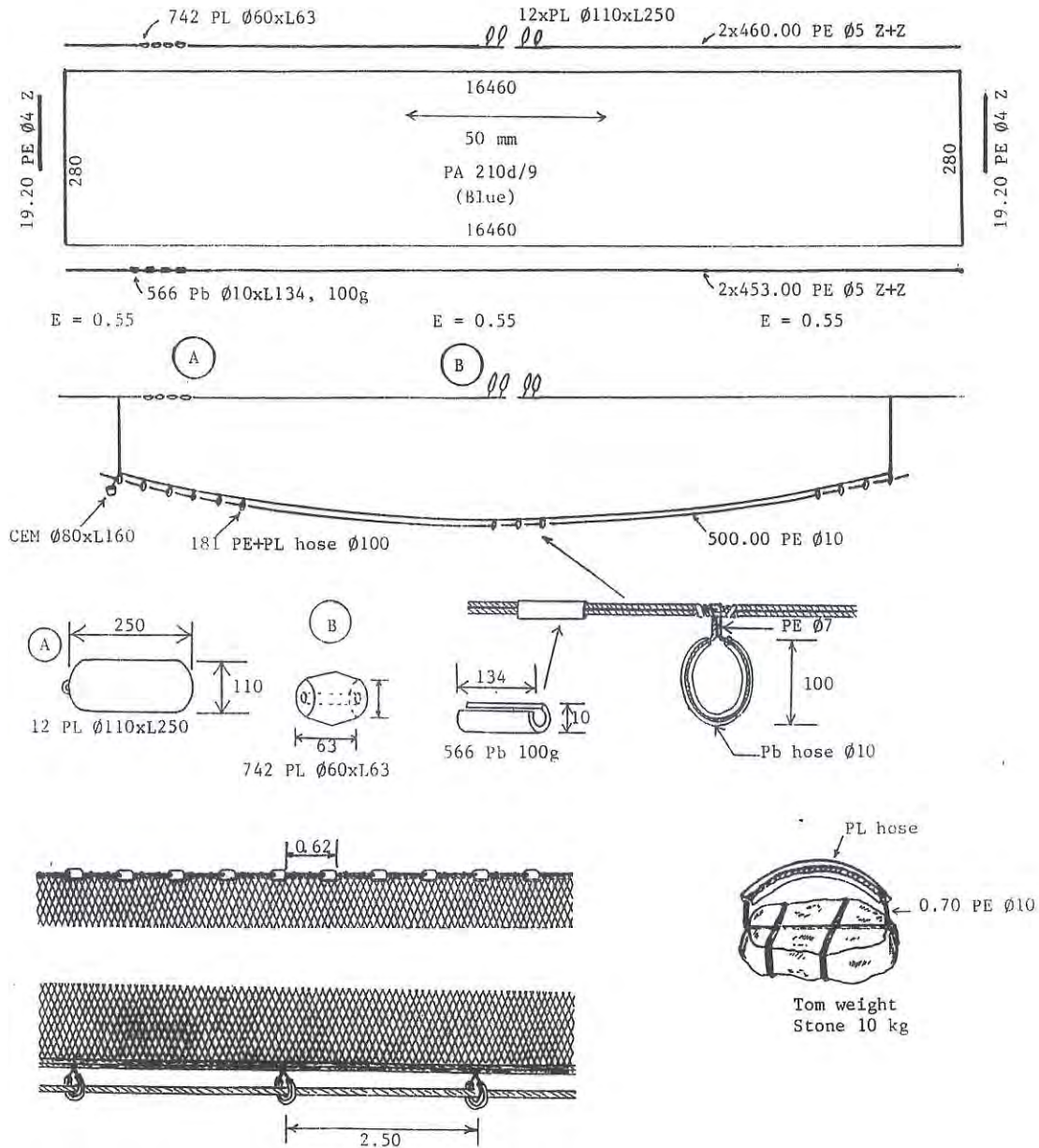
Sabah

Bonito, Black pomfret, Trevally

E = 0.56

E = 0.56

E = 0.56



SURROUNDING NET
 Mini Purse Seine
Pukat Keliling
 Bonito, Black pomfret

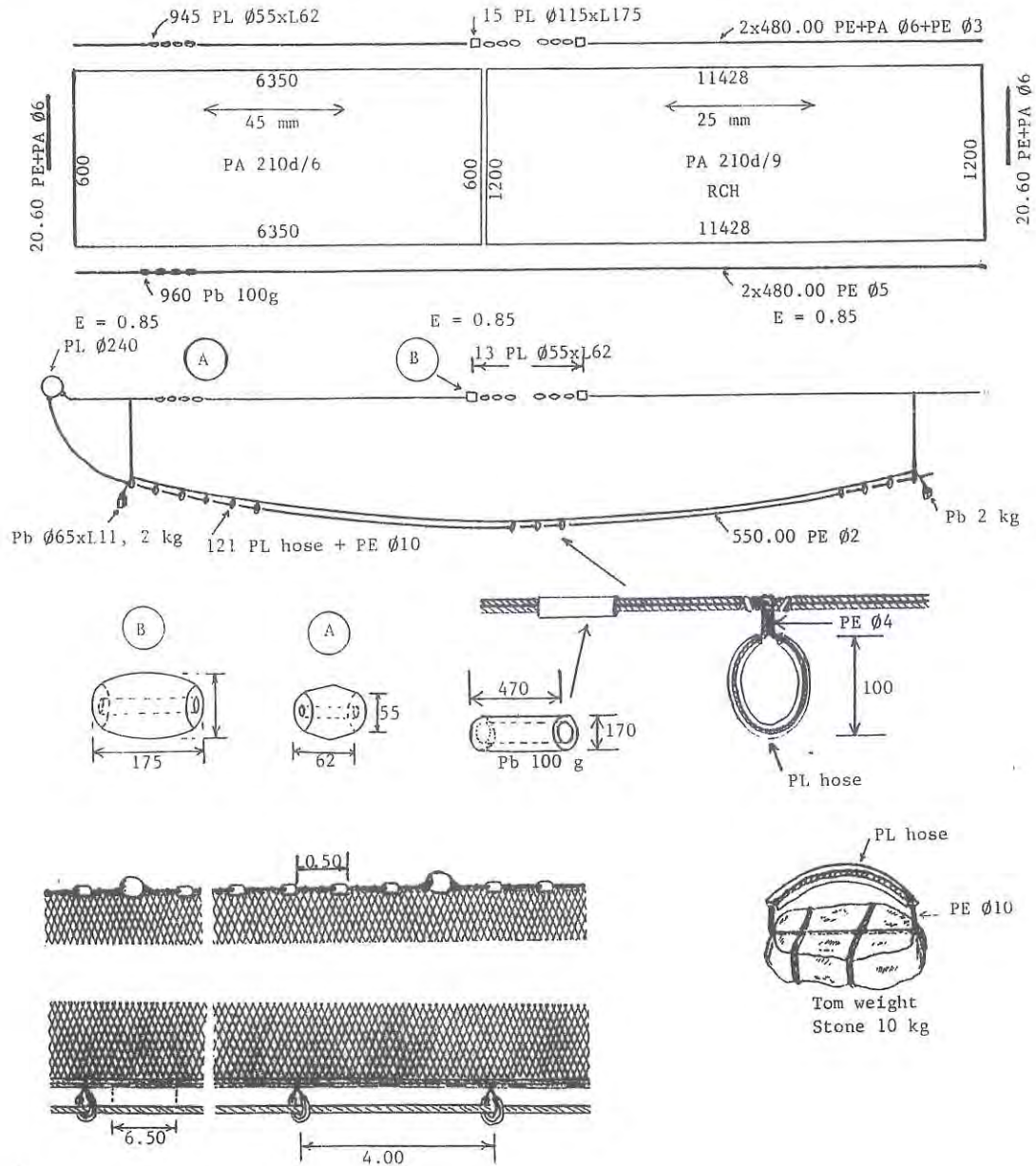
VESSEL
 Loa 12 m
 hp 30 OM

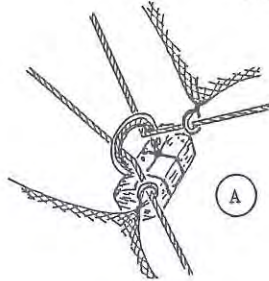
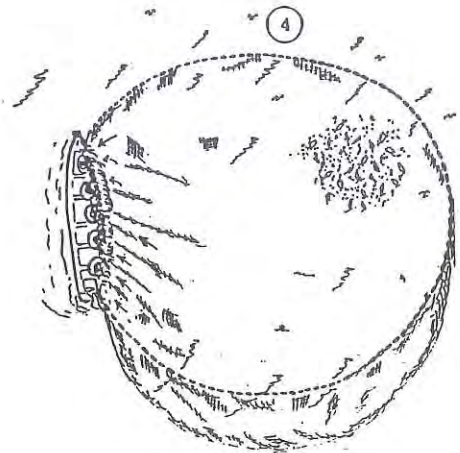
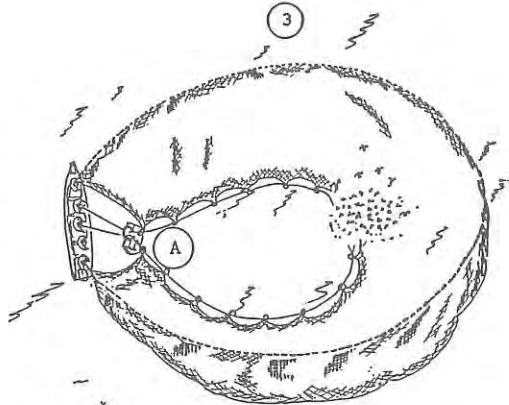
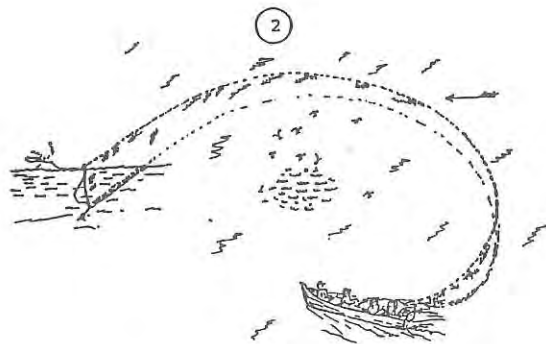
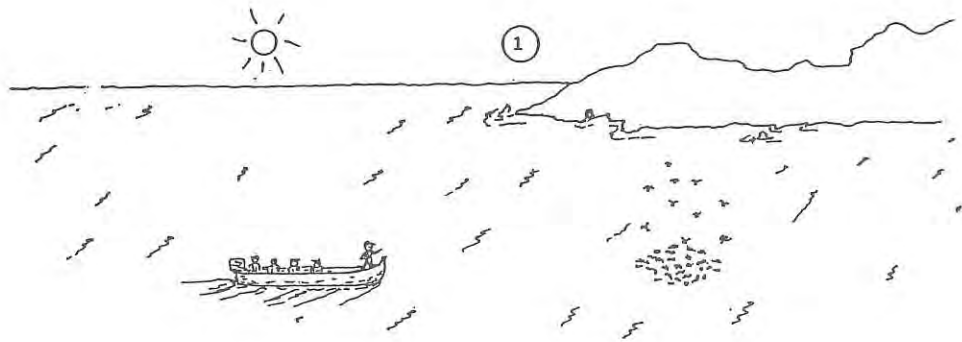
LOCATION
 Kg. Lujuk
 Kota Kinabaru
 Sabah

E = 0.85

E = 0.85

E = 0.85





SURROUNDING

Anchovy Purse Seine
Pukat-Jerut-Bilis
 Anchovy, *Sparteroides*

VESSEL

Loa 16.70 m
 hp 84

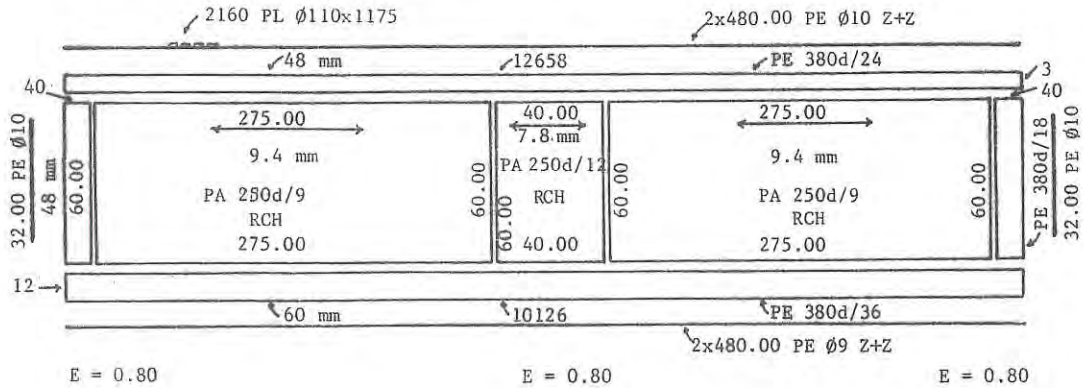
LOCATION

Kuala Behsut
Terengganu

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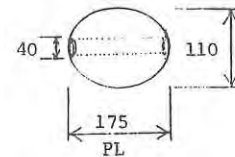
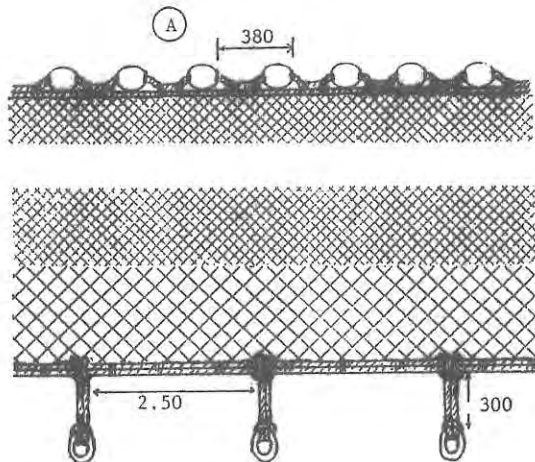
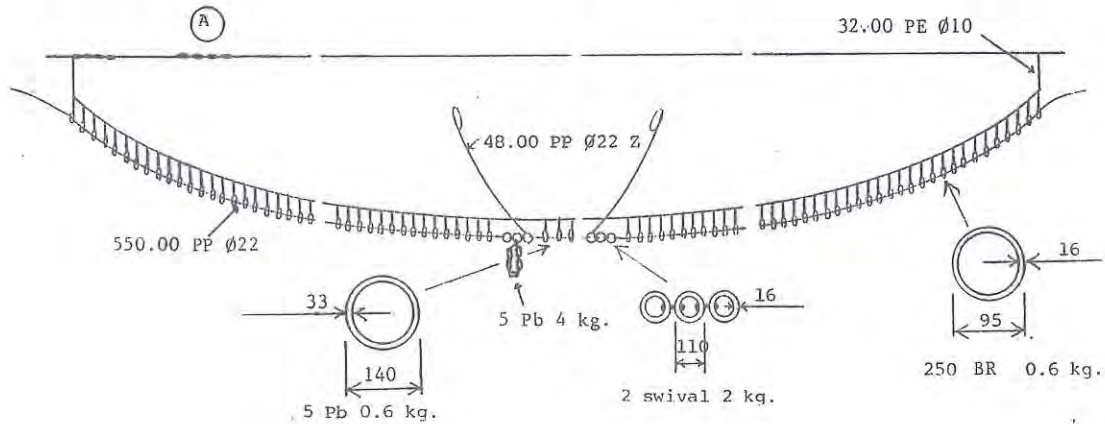
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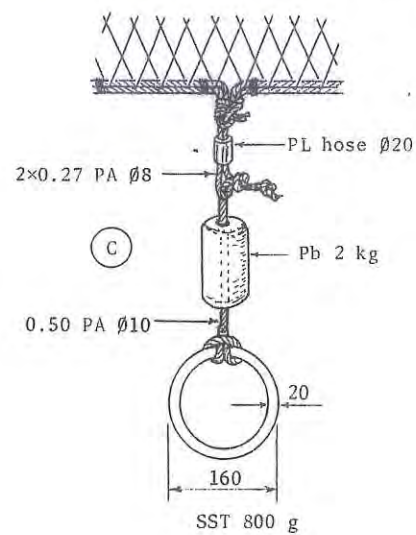
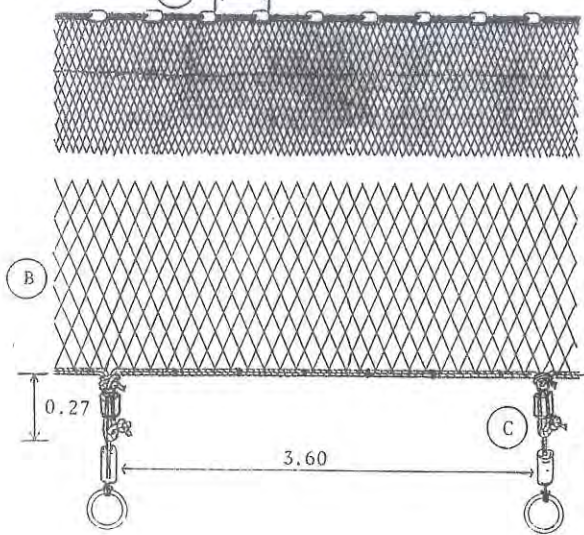
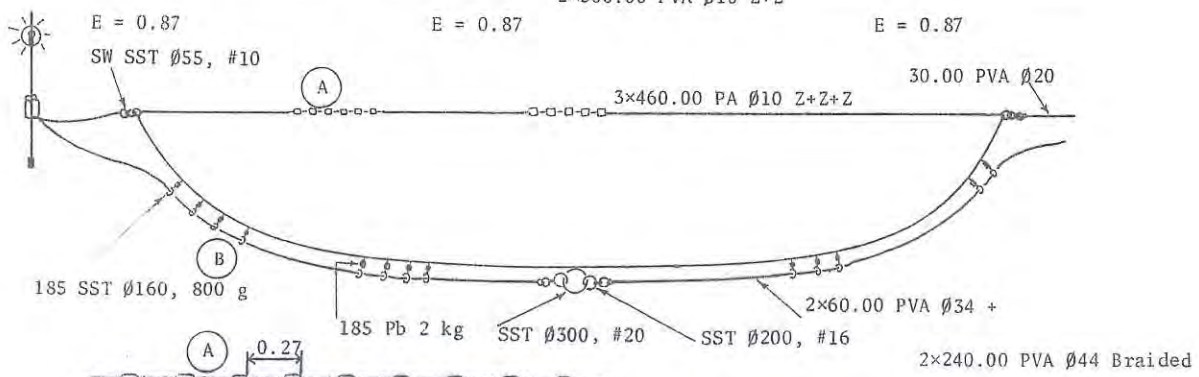
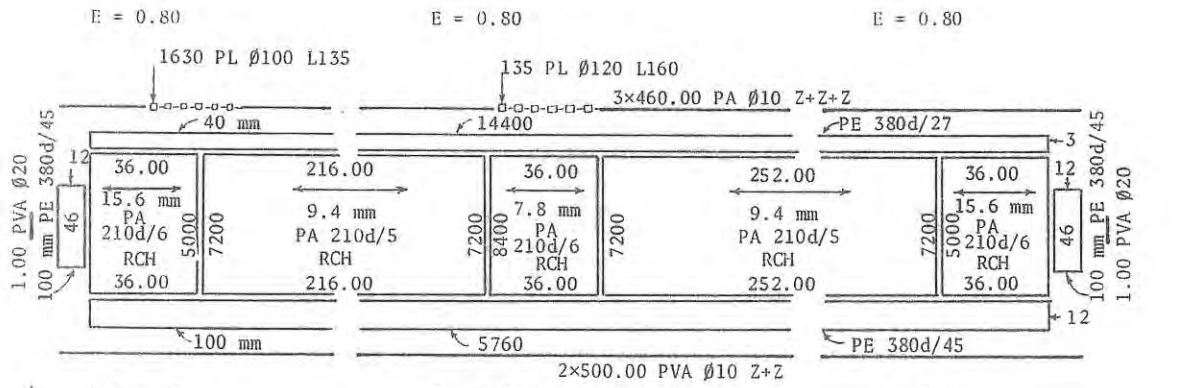
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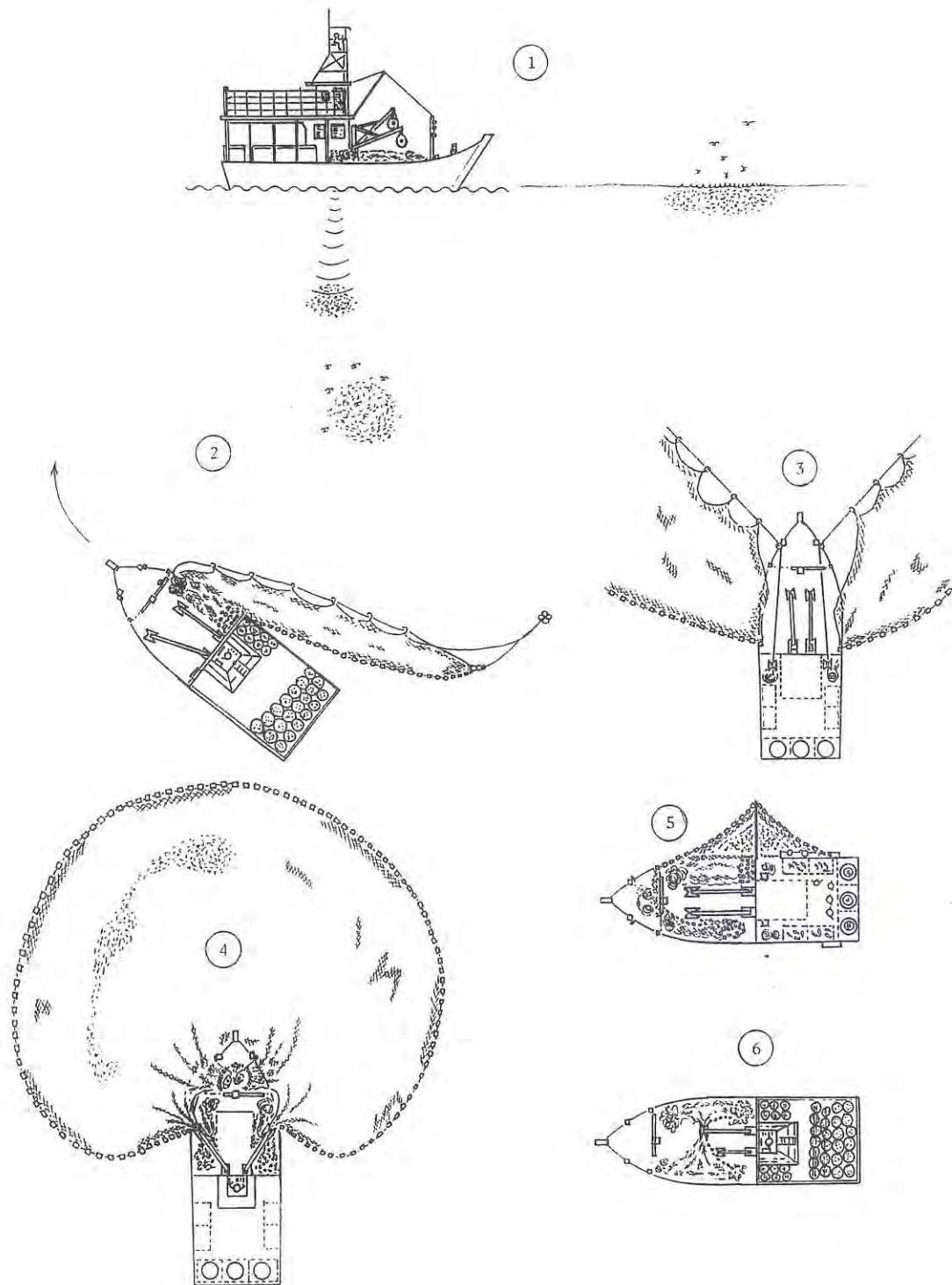


SURROUNDING NET
 Anchovy Purse Seine
Pukat Jemut Bilis
 Anchovy

VESSEL
 Loa 22 m
 GT 69
 hp 350
 AG 2x2 tons Power blocks
 3-Cooking stoves

LOCATION
 Pulau Pangkor
 Perak





SURROUNDING NET
 Anchovy Purse Seine
Pukat-Jerut-Bilis
 Anchovy, *Sparteroides*

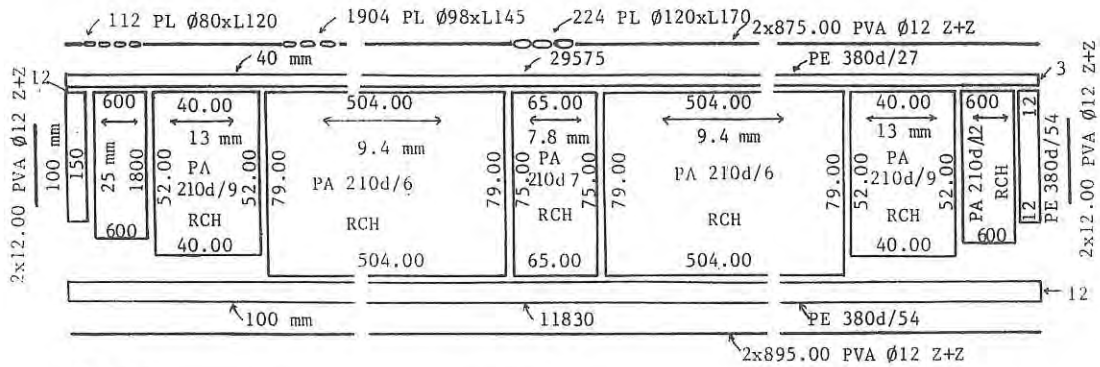
VESSEL
 Loa 25.2 m
 GT 130
 hp 335

LOCATION
 Tg. Dawai
 Kedah

E = 0.74

E = 0.74

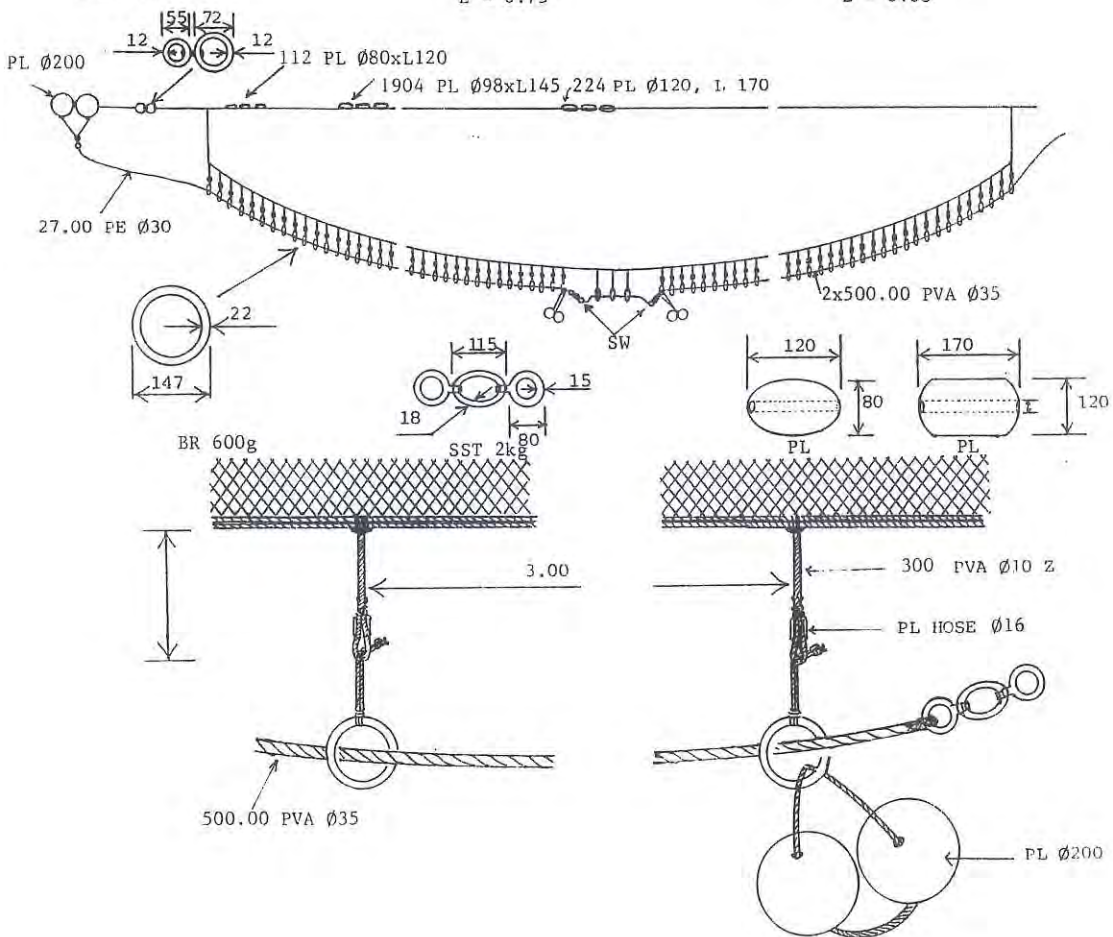
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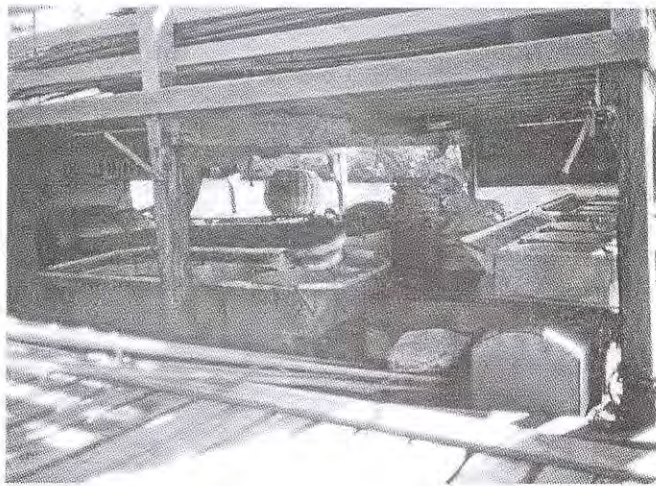


E = 0.83

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E = 0.83





SURROUNDING NET

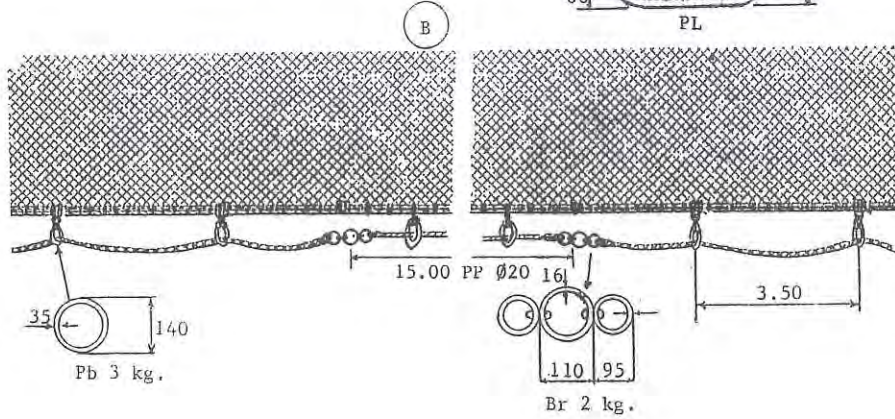
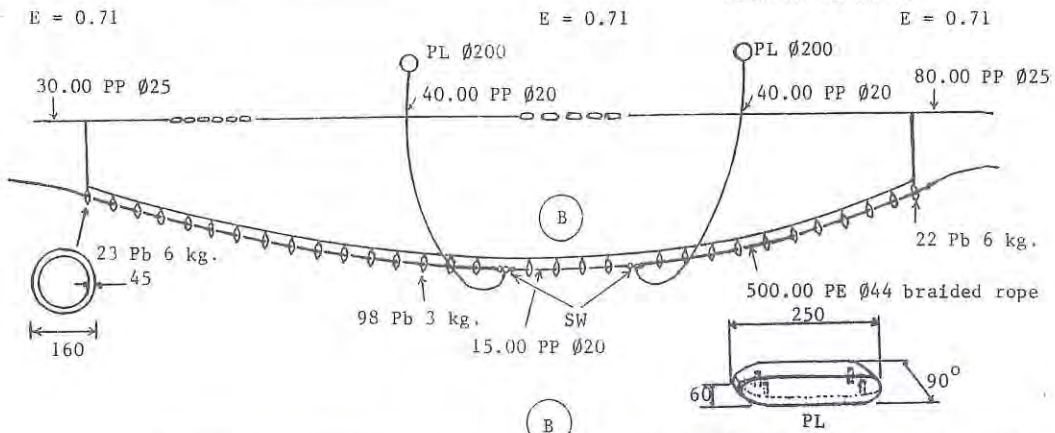
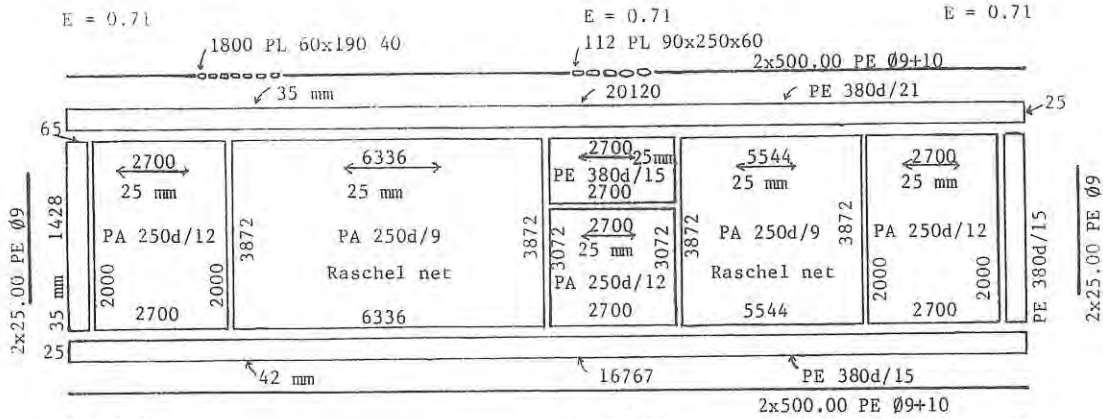
Luring Purse Seine
 Pukat - Jerut - Ikan
 Sardine, Mackerel,
 Scad, Herring

VESSEL

Loa 25 m
 GT 84
 hp 240
 EG 9 KVA

LOCATION

Kuala Behsut
Terengganu





SURROUNDING NET

VESSEL

LOCATION

Luring Purse Seine

Loa 19.50 m

Kuantan

Pukat-Jerut-Pan

GT 50

Pahang

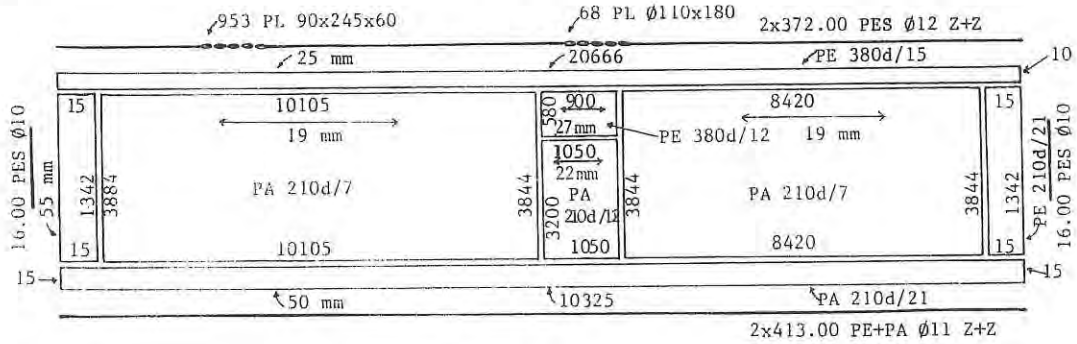
Sardine, Bonito, Sead

hp 275

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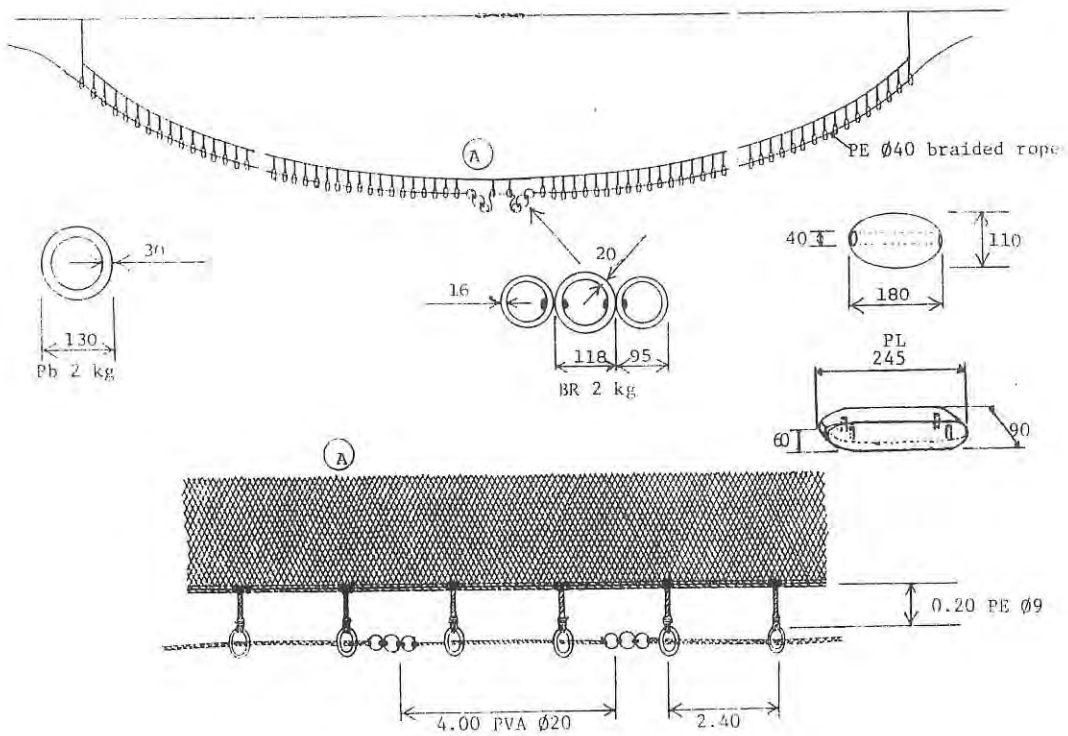
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E = 0.80

E = 0.80

E = 0.72



SURROUNDING NET

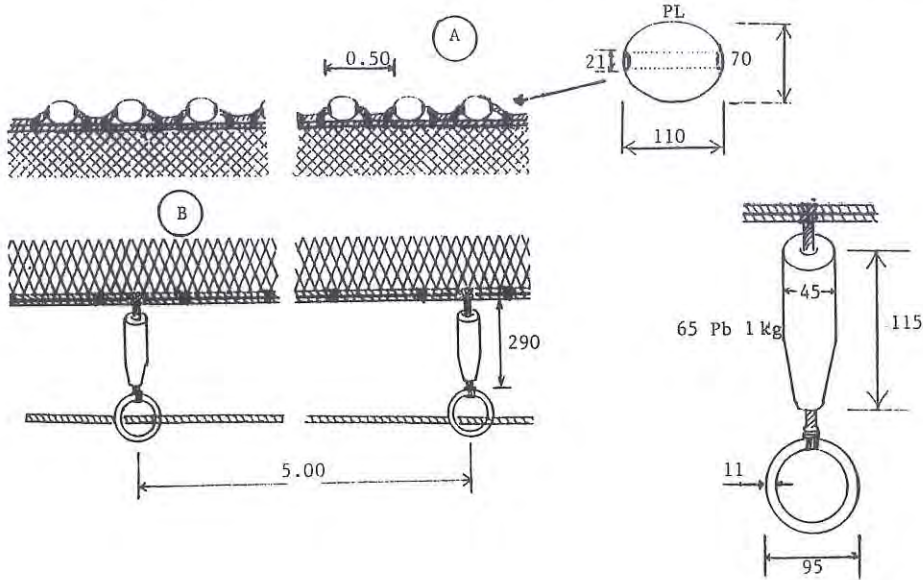
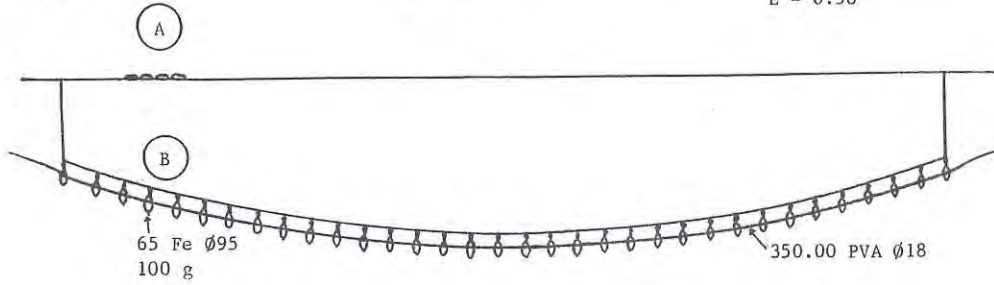
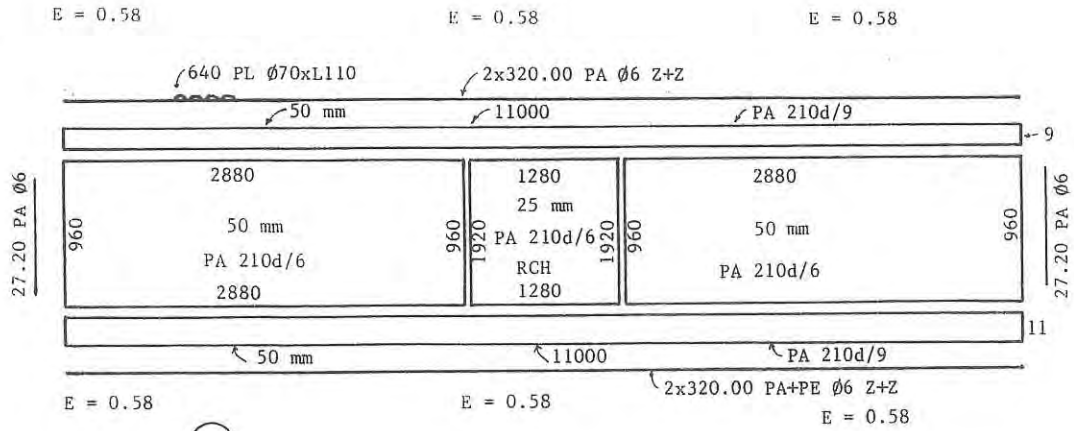
Luring Purse Seine
 Pukat-Dalam
 Black-pomfret, Hard tail scad

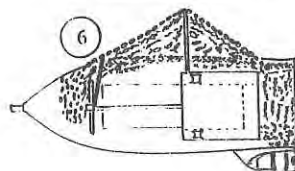
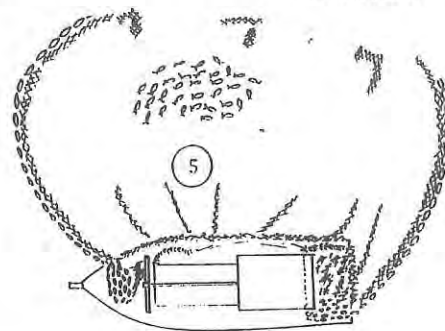
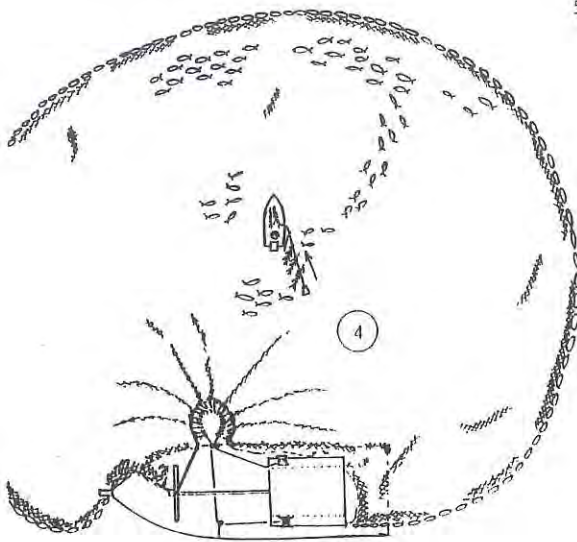
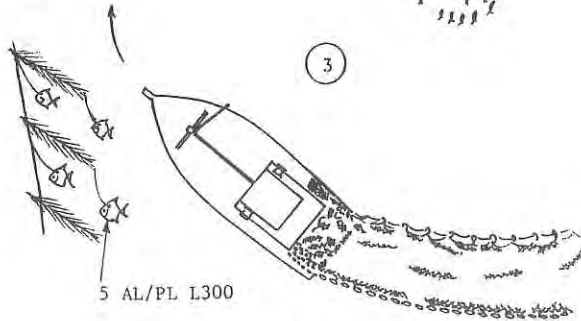
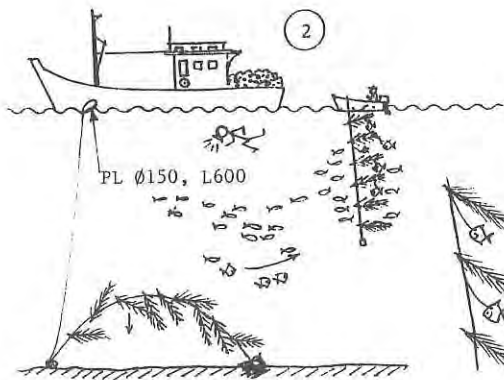
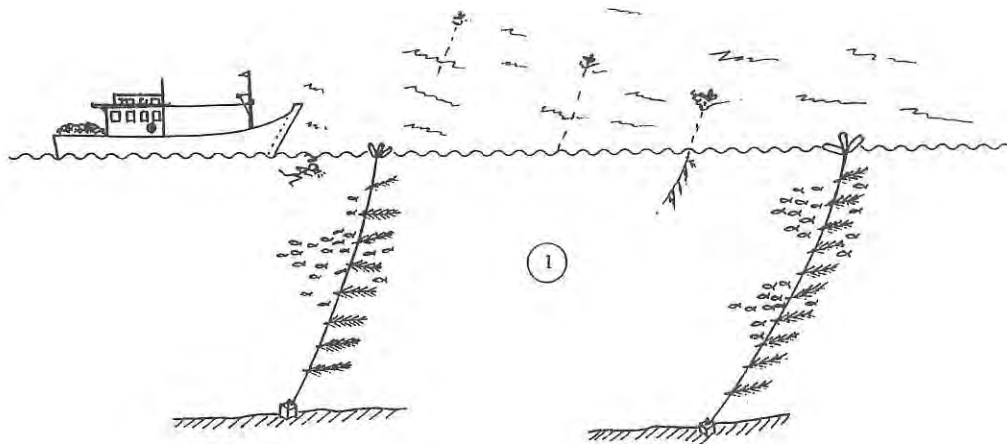
VELLEL

Loa 15 m
 Gt 14
 hp 37

LOCATION

Mersing Kanan
 Johor





SURROUNDING NET

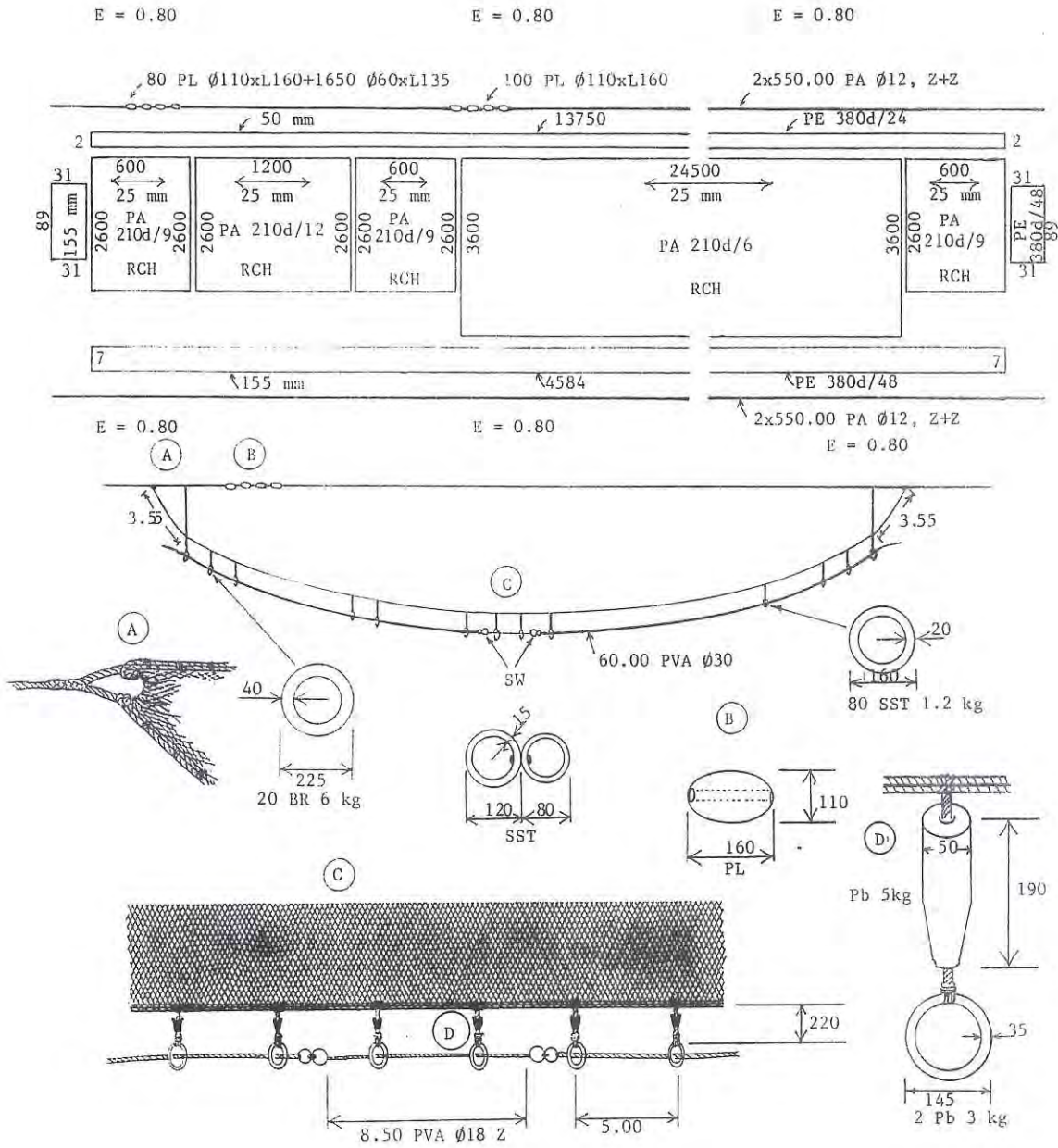
Luring Purse Seine
 Pukat-Jerut-Turis
 Scad, Mackerel, Black Pomfret

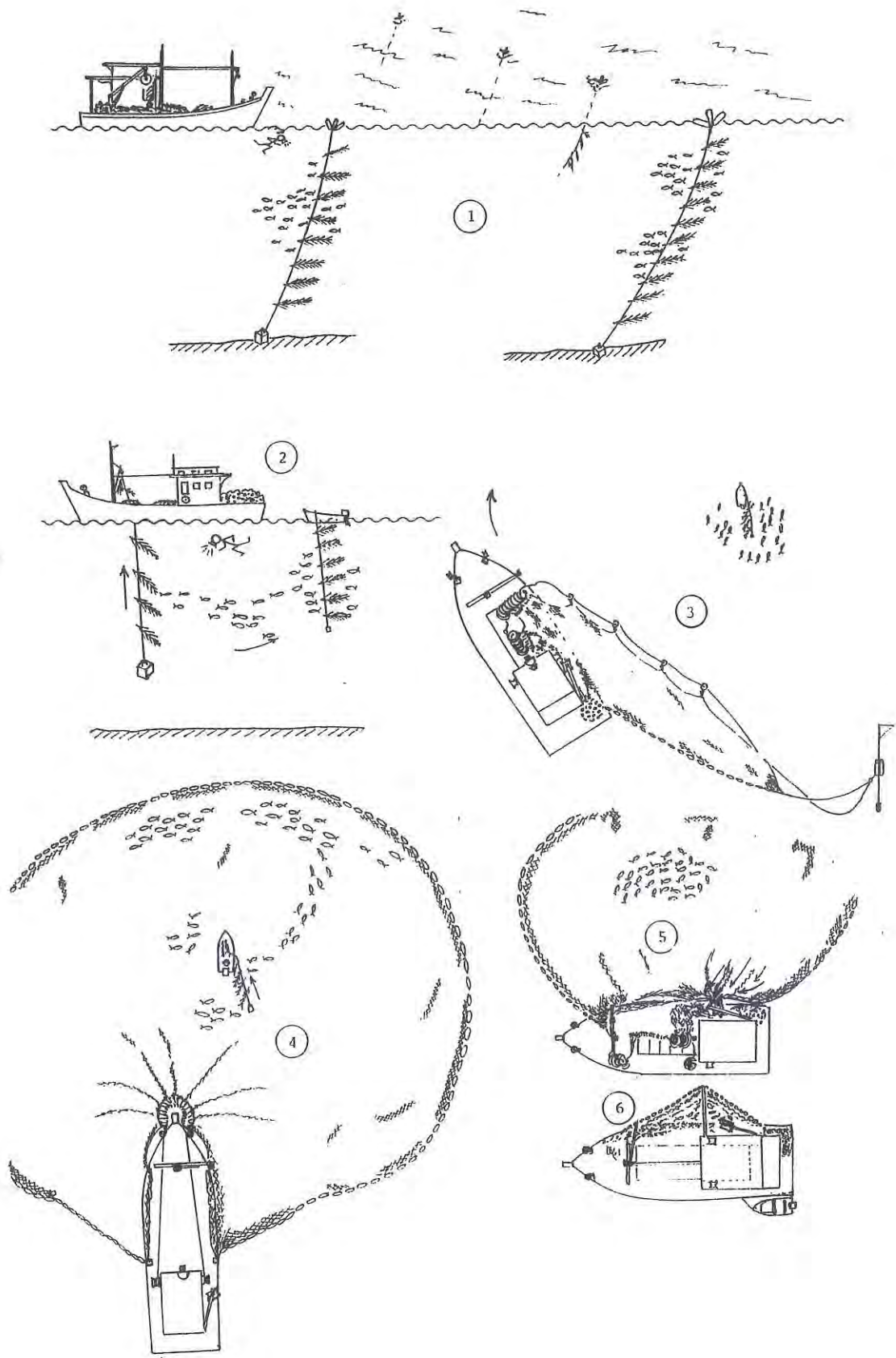
VESSEL

Loa 19.80 m
 GT 40
 hp 190 Power block

LOCATION

Kuching
 Sarawak





SURROUNDING NET

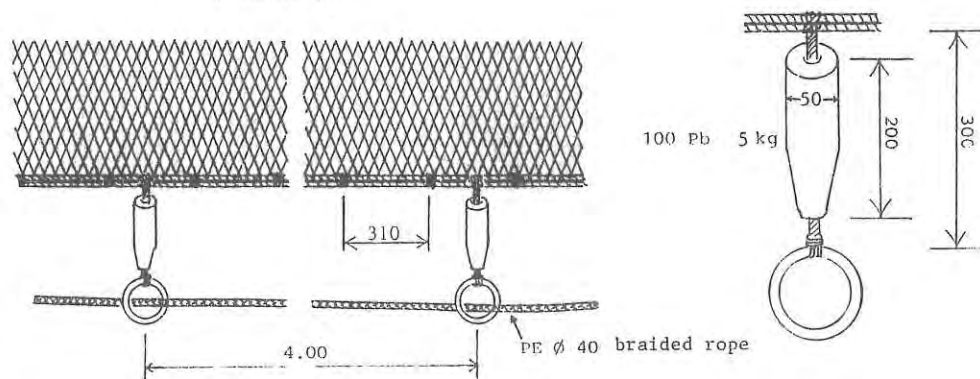
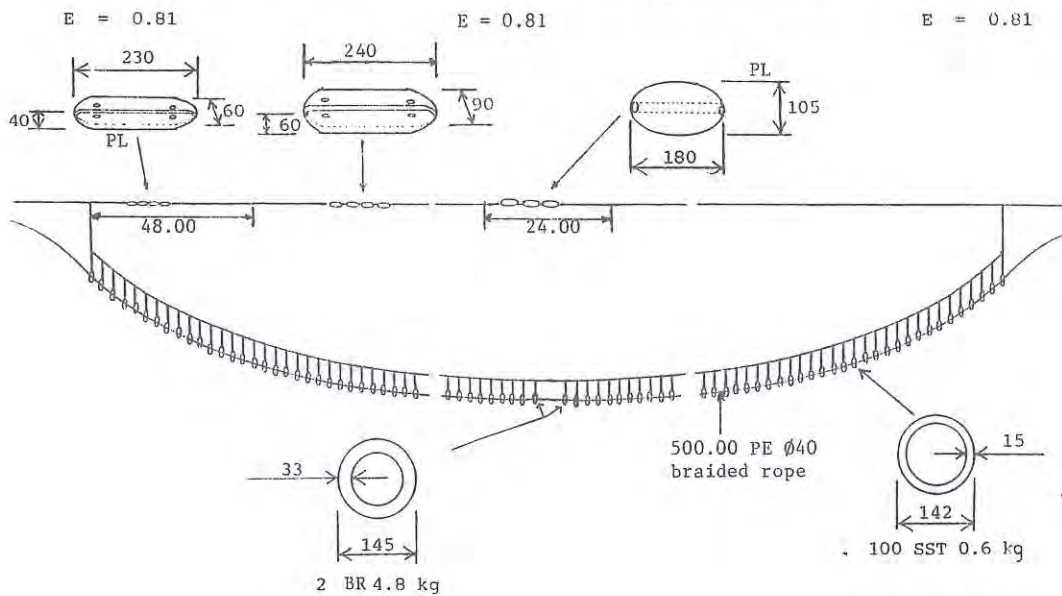
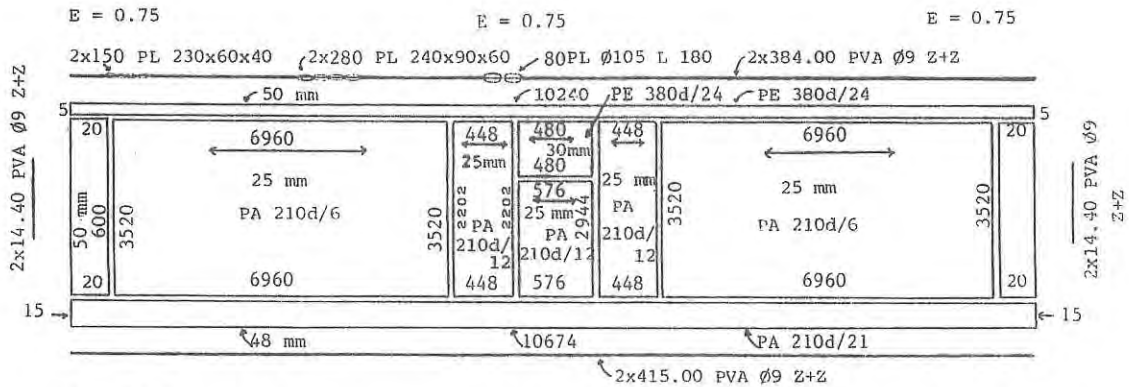
VESSEL

LOCATION

Luring Purse Seine
 Pukat-Jerut-Ikan
 Scad, Mackerel, Bonito

Loa 19.66
 GT 63.7
 hp 180

Mersing
 Johor



SURROUNDING NET

Luring Purse Seine

Pukat Bawal

Black Pomfret

VESSEL

Loa 23 m

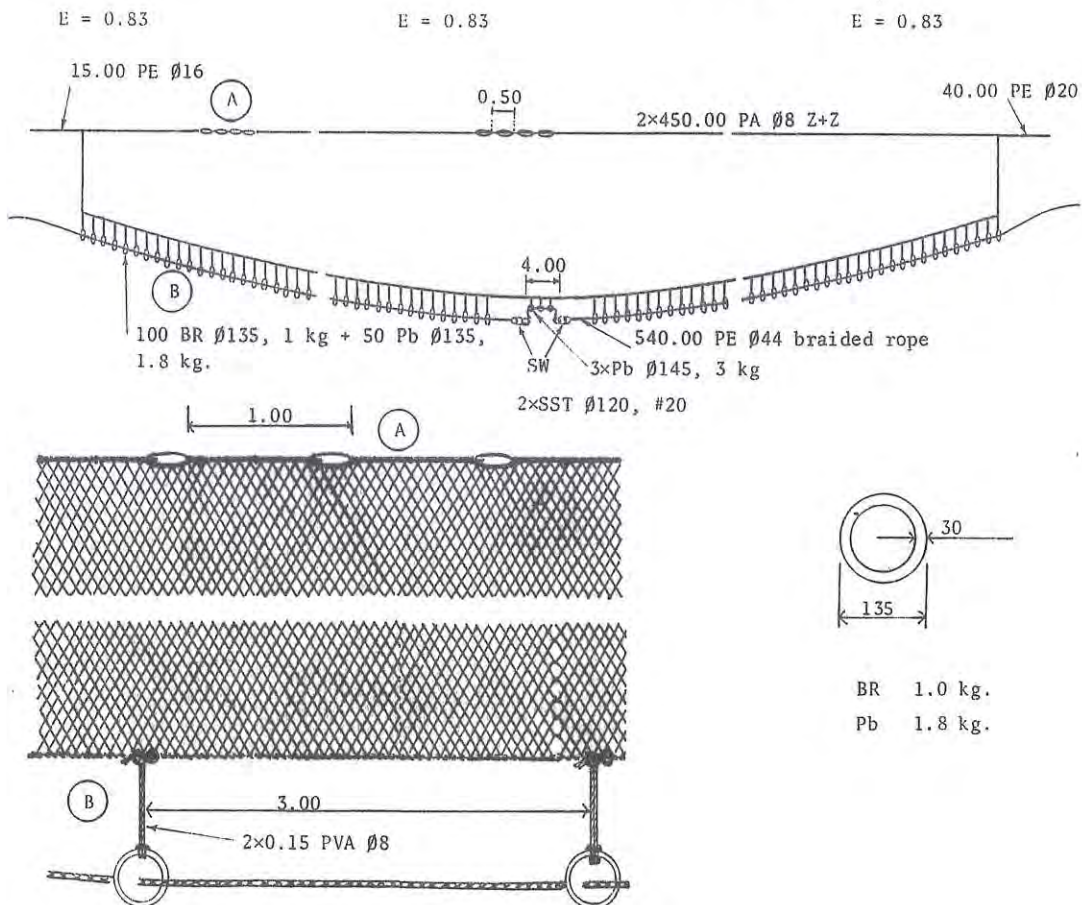
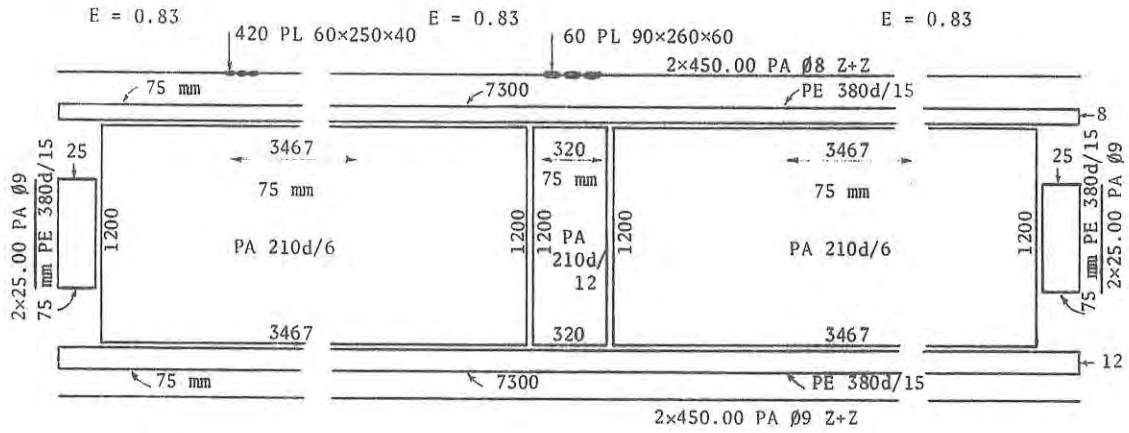
GT 30

hp 180

LOCATION

Telok Bahang

Pinang



BR 1.0 kg.

Pb 1.8 kg.

SURROUNDING NET

Luring Purse Seine

Pukat Jerut Ikan

Indian mackerel, Bonito, Trevally hp 185

Pomfret

VESSEL

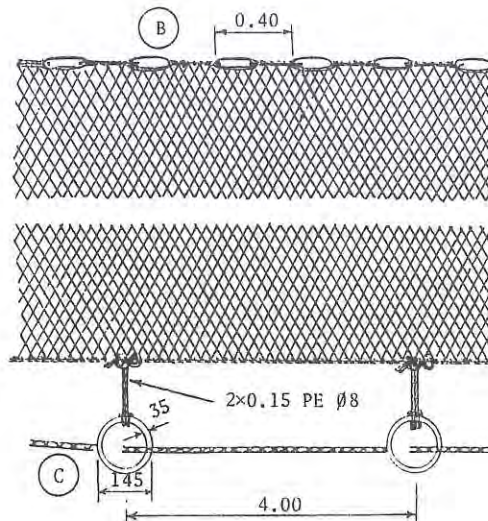
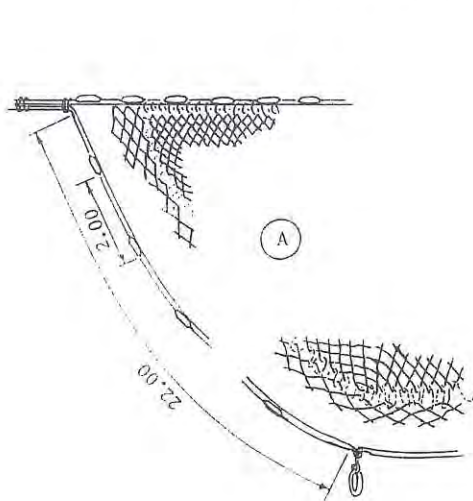
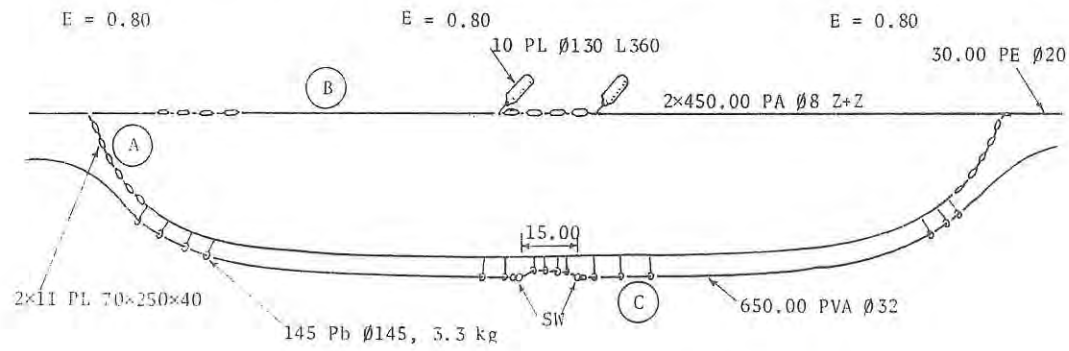
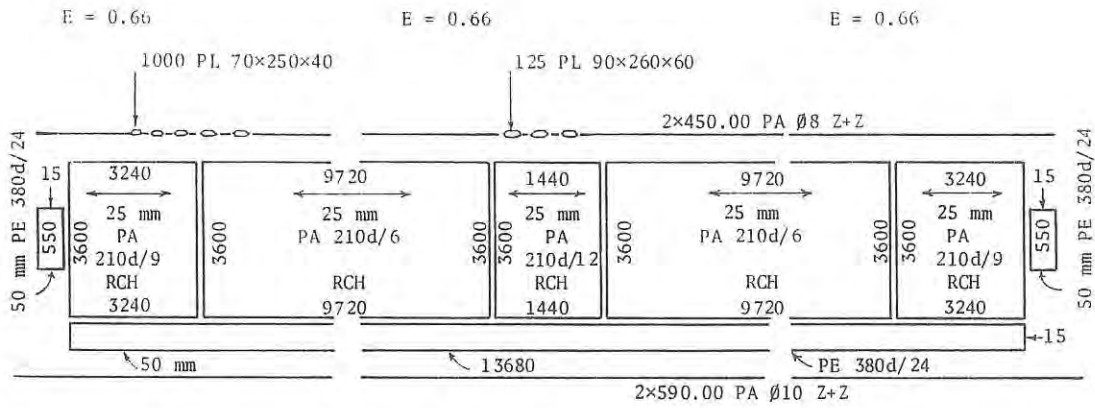
Loa 23 m

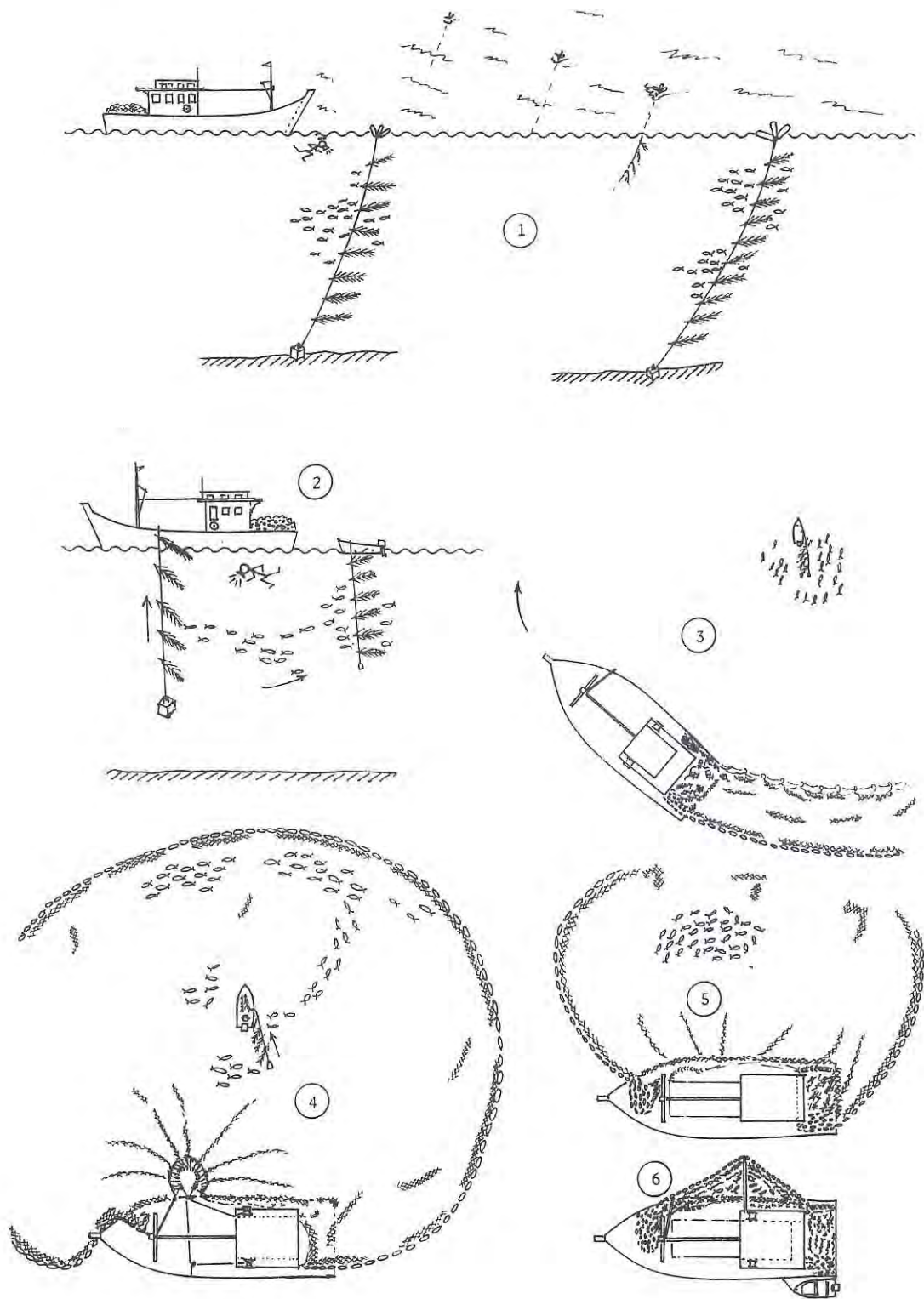
GT 55

LOCATION

Sungai Udang

Pinang





SURROUNDING NET

VESSEL

LOCATION

Purse Seine

Loa 16 m + 2 x 5 m

Semporna

Pukat-jerut

GT 8 -

Sabah

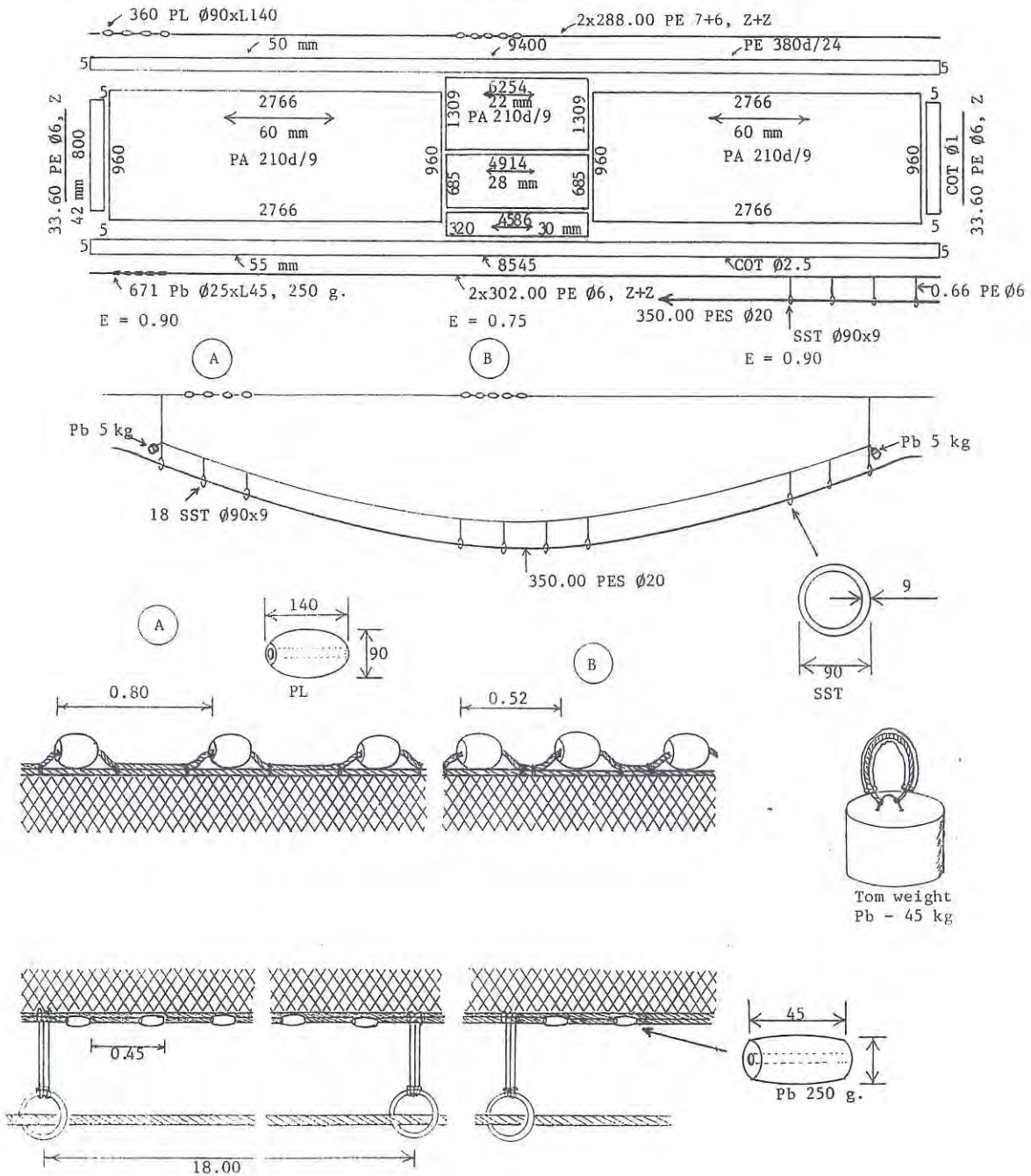
Mackerel, Scad, Spanish mackerel, Sardine

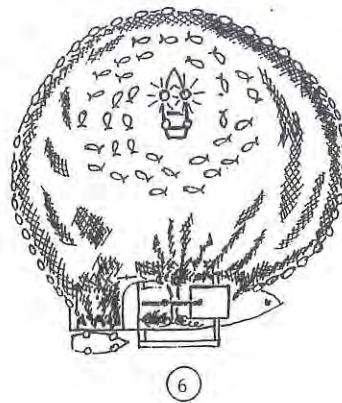
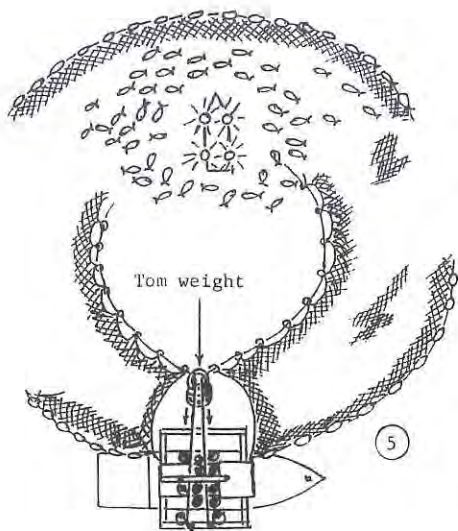
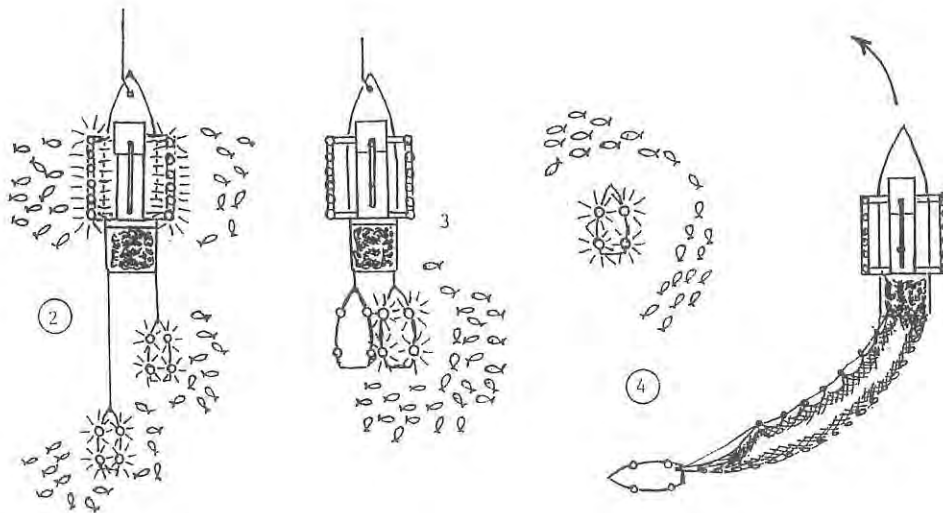
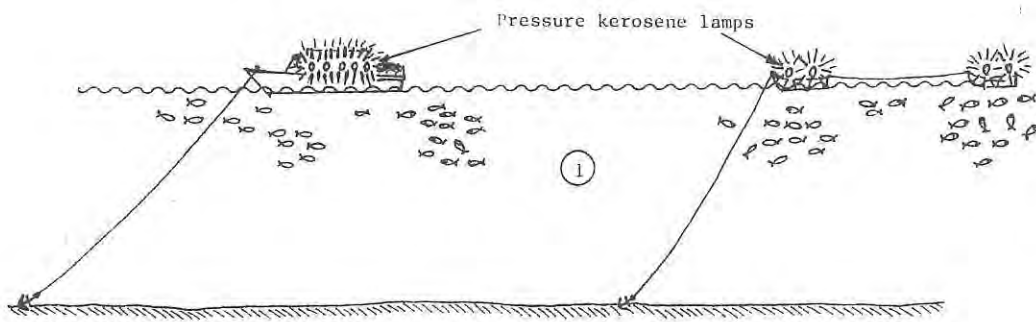
hp 120 -

E = 0.66

E = 0.50

E = 0.66





SURROUNDING NET

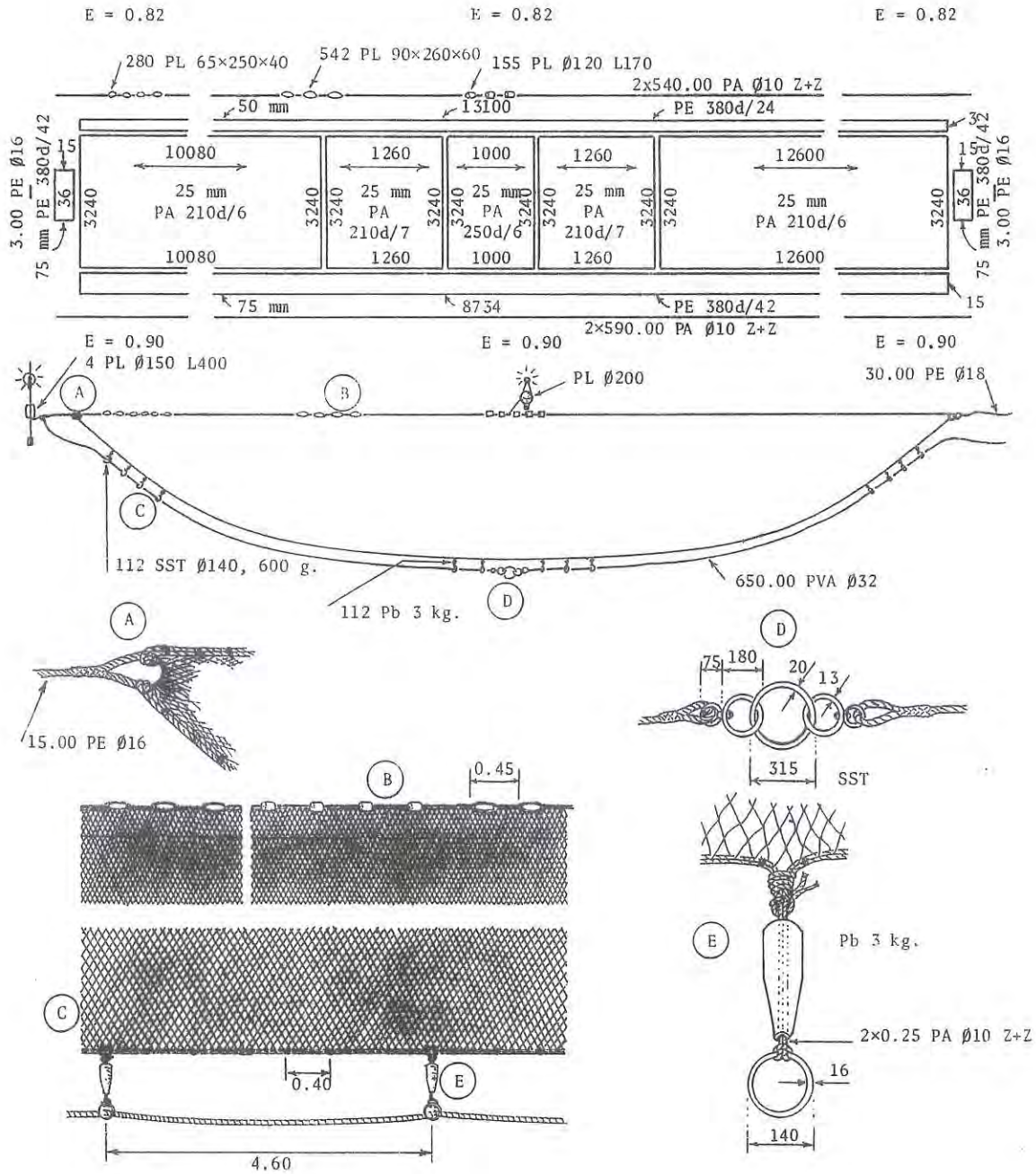
Purse seine
 Pukat Jerut-Lampu
 Indian mackerel, Hardtail scad,
 Bonito

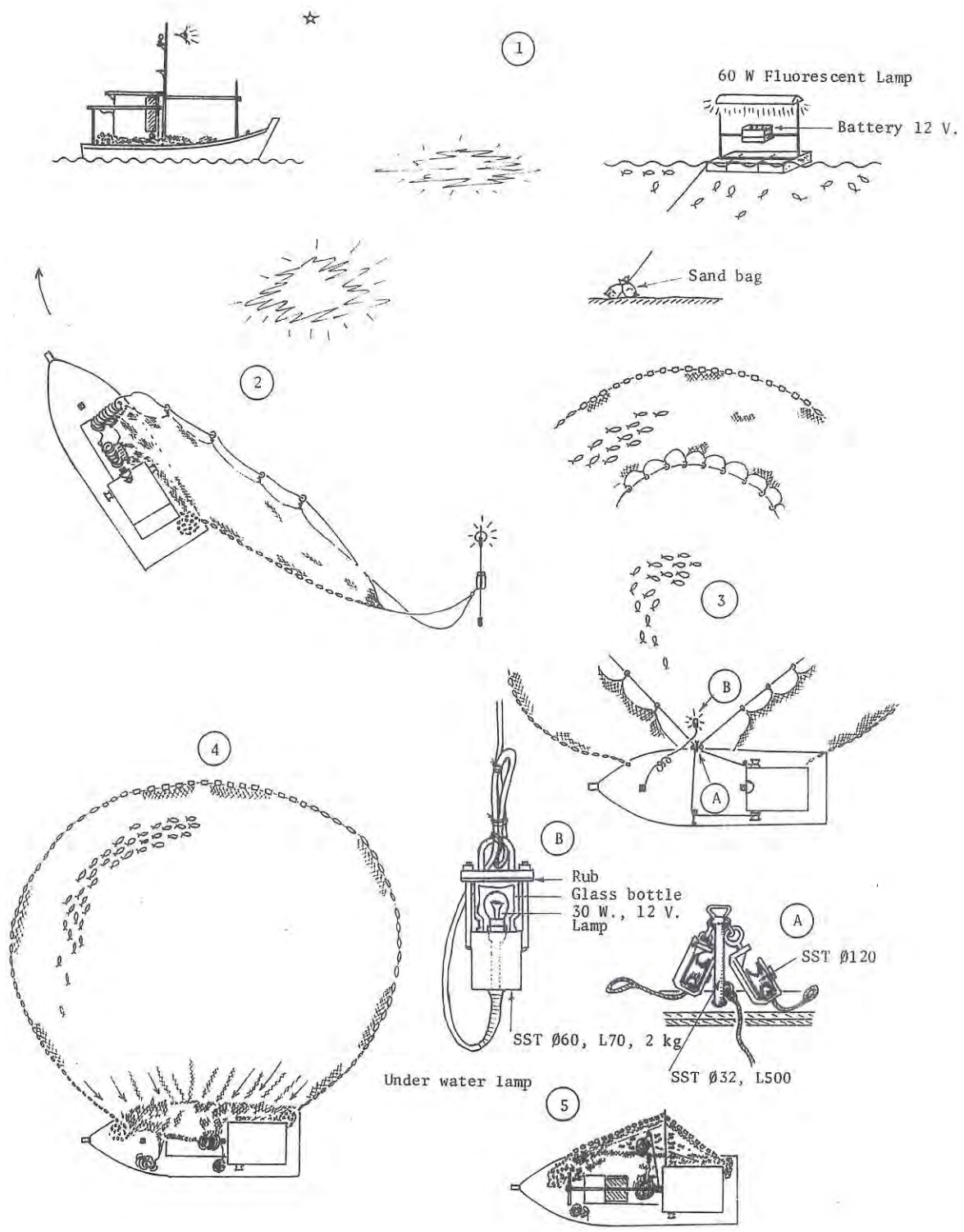
VESSEL

Loa 18.9 m
 GT 60.8
 hp 195

LOCATION

Pulau Pangkor
 Perak





SURROUNDING NET

Purse seine

Pukat-Jerut-Ikan

Mackerel, Scad, Trevally

VESSEL

Loa 15.33 m

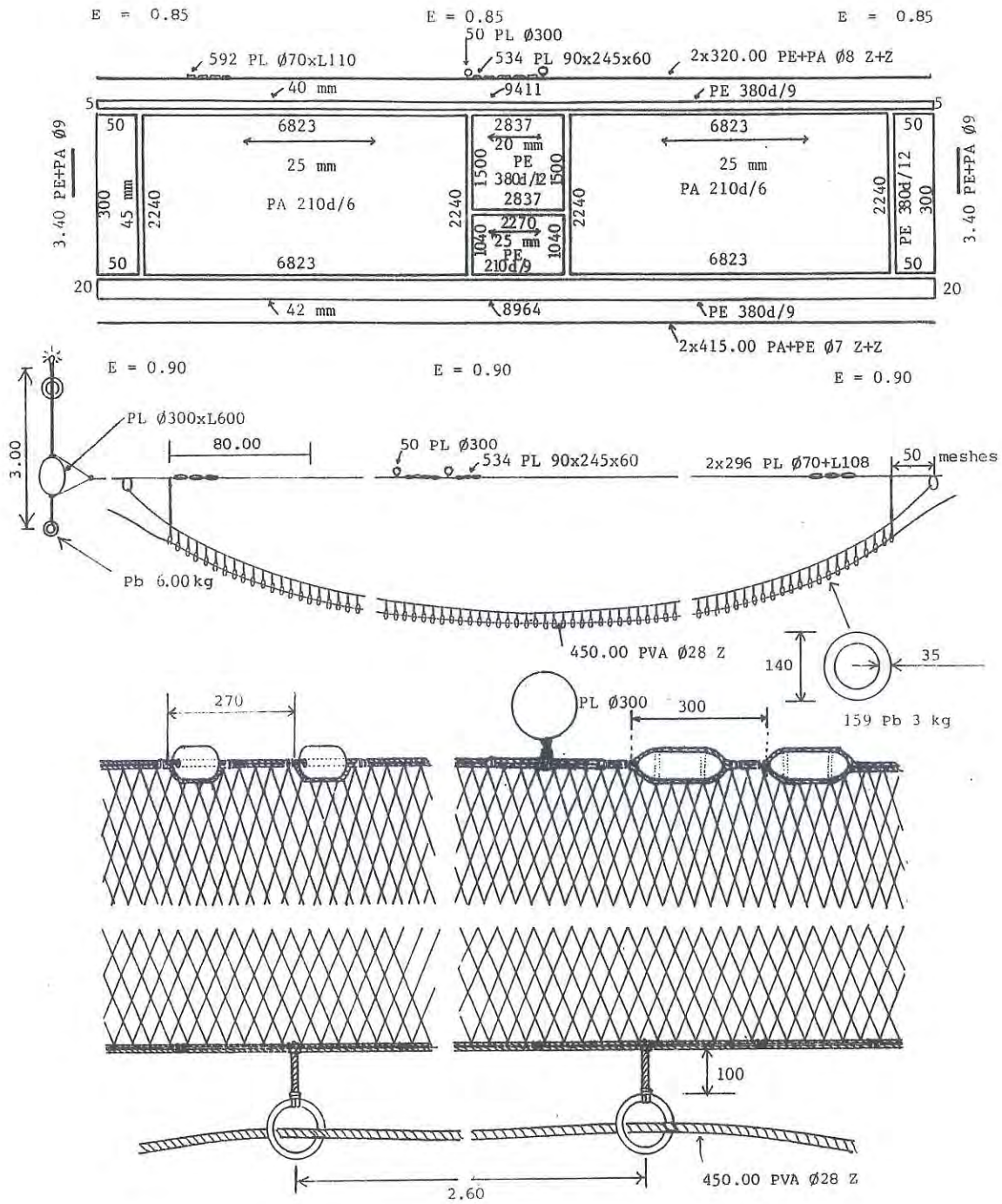
Gt 22.2

hp 33

LOCATION

Kg. Sedili

Johor





SURROUNDING NET

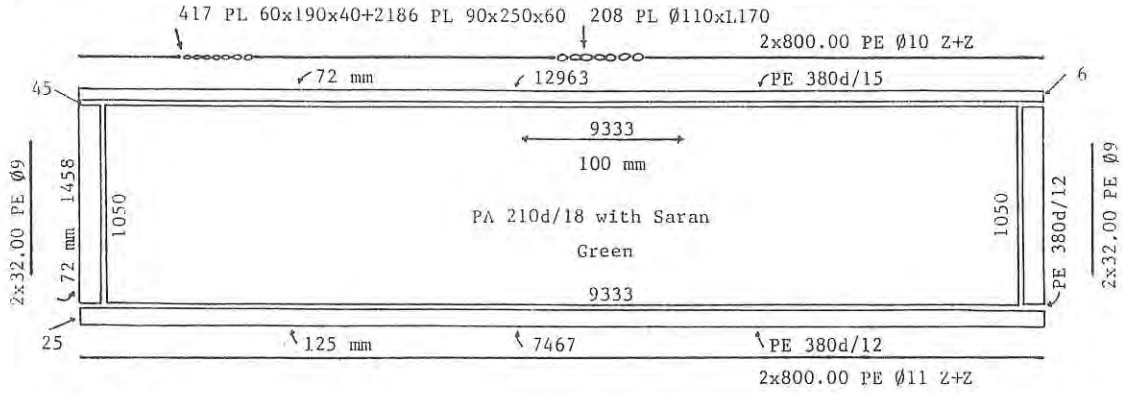
Bonito purse seine
 Pukat - Jerut - Aya
 Eastern little tuna, Long tail tuna,
 Cavalla

VESSEL

Loa 25 m
 GT 84
 hp 240
 EG 9 KVA, LL 4x1.5 KW Mercury lamp

LOCATION

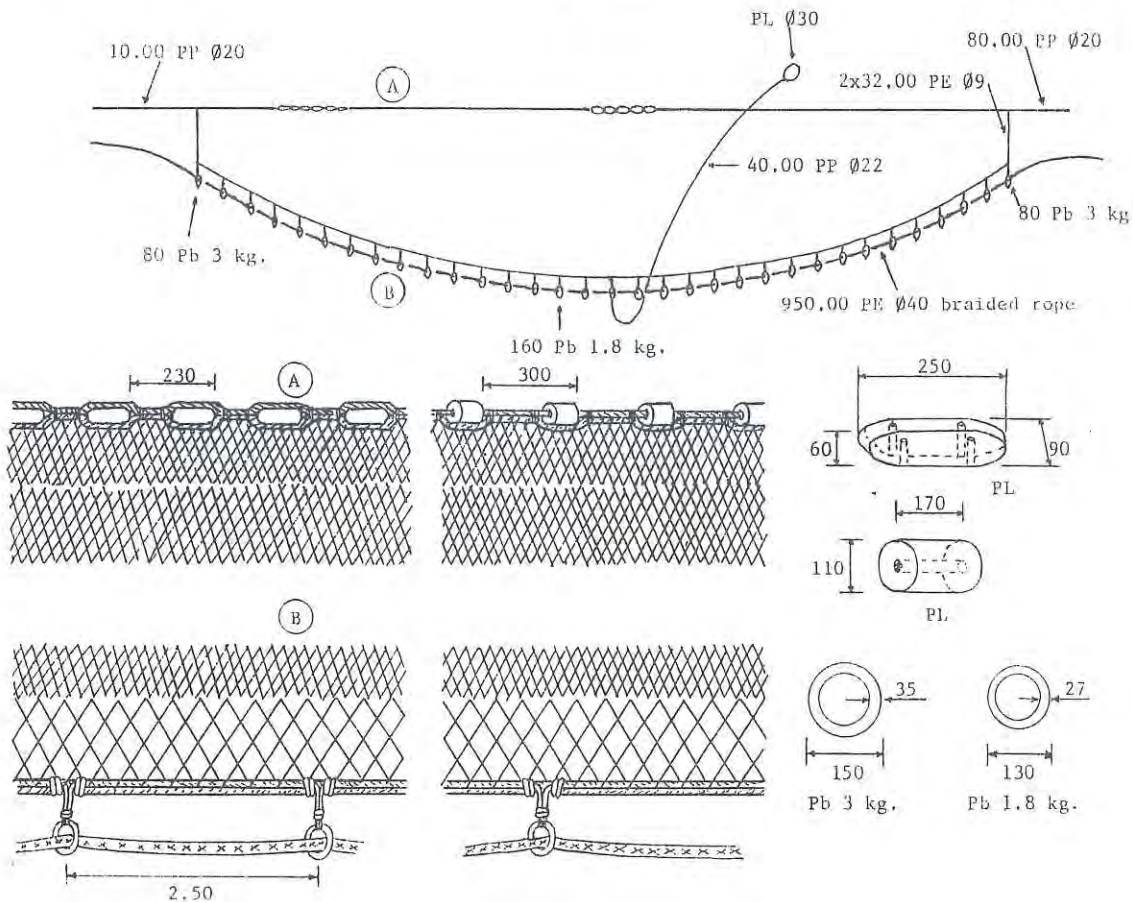
Kuala Behsut
Terengganu

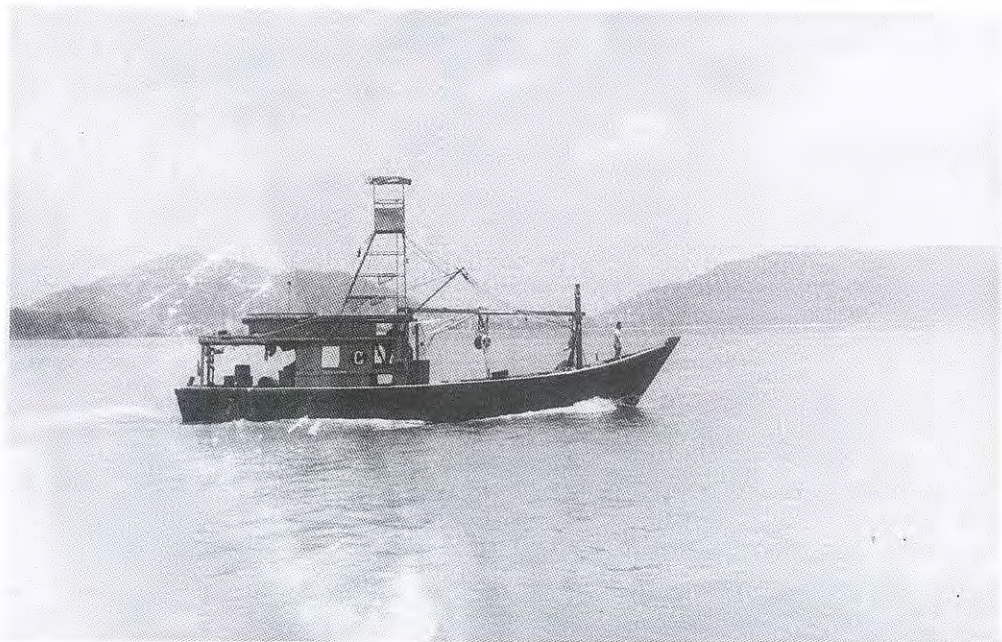


E = 0.86

E = 0.86

E = 0.86



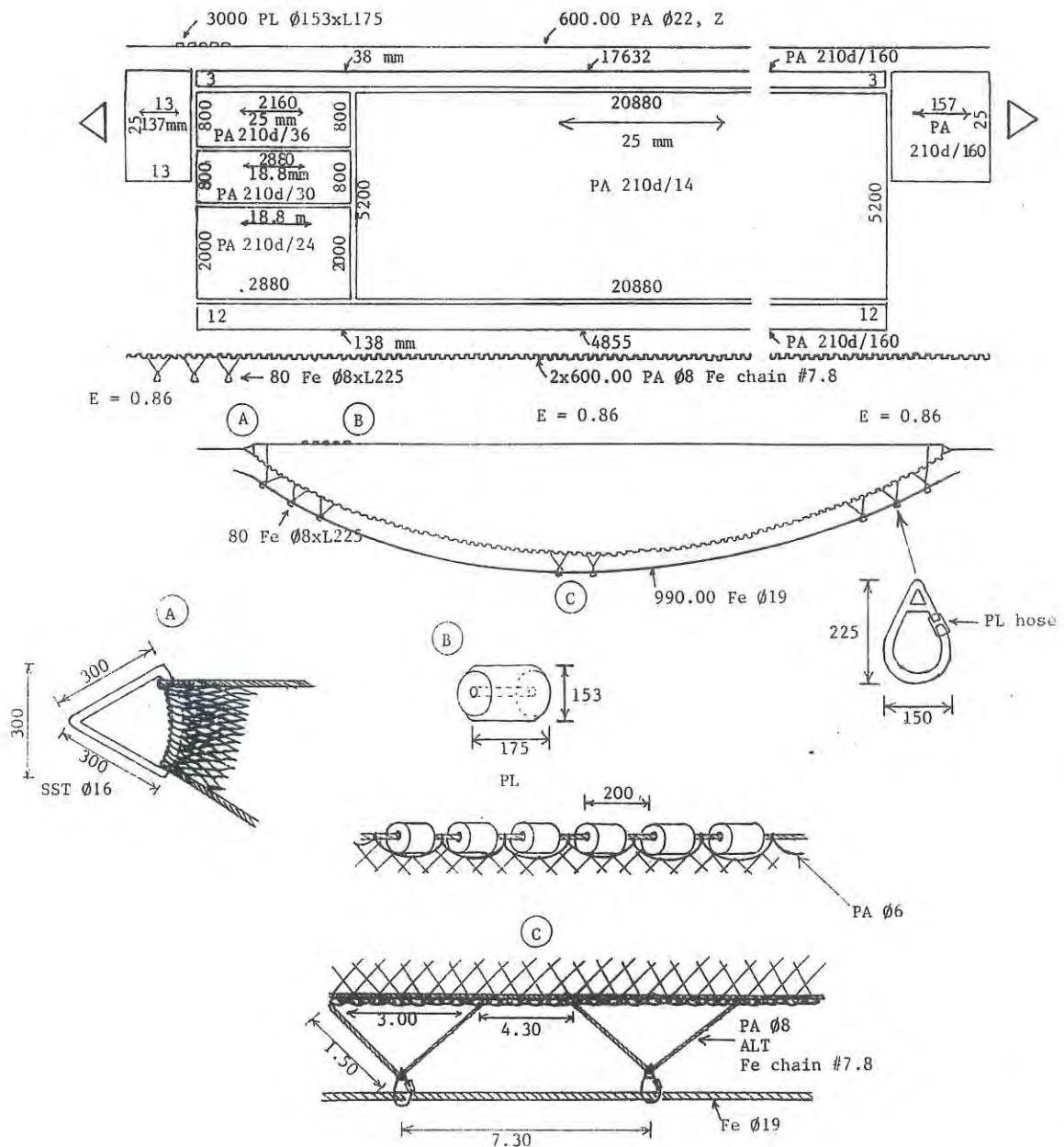


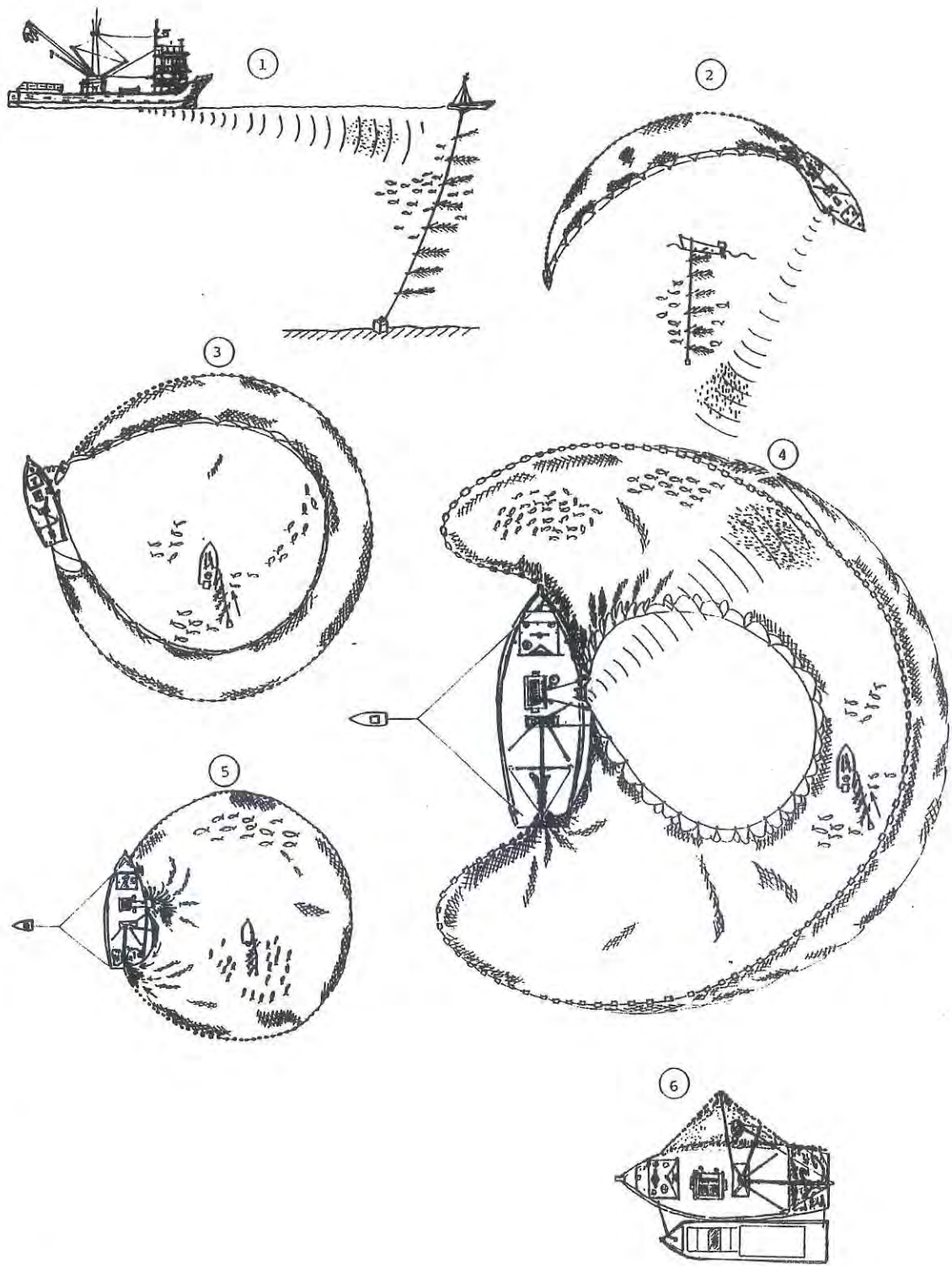
SURROUNDING NET	VESSEL	LOCATION
One boat purse seine with a skiff	Loa 30.60 m	Semporna
-	GT 126.5	Sabah
Mackerel, Scad, Bonito, Tuna	hp 1200 Power block Purse winch	

E = 0.86

E = 0.86

E = 0.86





<Chapter 4>

SEINE NET FISHING

4.1 Introduction

Seine net in Malaysia is classified as small-scale fishing, and is becoming less popular in this country. This traditional fishing gear has long been in used. Table 4.1 shows the number of licensed vessel, fishermen and licensed gear involved in seine net in Malaysia and its production for the year 2000. It was only 415 units of licensed gear in 2000 and the production was only 29206 m. tones. The gear was only dominant mainly in the west coast of Peninsular Malaysia.

Table 4.1 Numbers of licensed vessels, fishermen and licensed gears involved in Seine net fishery in Malaysia and its production for the year 2000

AREAS	Number of Licensed Vessel	Number of Fishermen	Number of Licensed Gear	Production (m. tones)
West Coast of Peninsular Malaysia	86	1790	396	28109
East Coast of Peninsular Malaysia	0	163	7	0
Sarawak	0	0	0	0
Sabah-Labuan	56	201	12	1097
TOTAL	191	21514	415	29206

The gear can be divided into two main groups (1) beach seine and (2) boat seine. During the survey, beach seines were found throughout the country, especially on the east coast of Peninsular Malaysia. The gear is called "*Pukat-Tarik Pantai*". The target species was anchovy. Whilst the boat seine nets was popular in the west coast of Peninsular Malaysia, and are used mainly to catch shrimp. The gears are known as "*Pukat-Kisa, Pukat-Senyoh and Pukat Kenka Satu Bot*". The boat seine was also observed in Sarawak to catch black pomfret, using a fish shelter. The gear was called the "*Pukat-Jawa*".

4.2 Fishing Gear and Methods

4.2.1 Beach seine

Two different designs of beach seine net were surveyed, and their construction method was found to be almost the same as the net employed by Thai fishermen. The method of operation was also the same in both countries, and anchovy was the main target species in Malaysia.

4.3.2 Boat seine

There were two different designs of the net used: (1) a simply designed net, like a beach seine, was operated for shrimp and similar demersal fish, mostly located on west coast of Peninsular Malaysia (*Pukat-Kisa, Pukat Senyoh and Pukat Kenka Satu Bot*) and (2) like a trawl net composed of two long wings with a narrow tip becoming wider at the center of the net. A large mesh size nylon net was used for the wings. This seine net is operated with a fish-shelter for pelagic species; black pomfret and others. This type of net is found in northern part of Sarawak (Miri) and Labuan, and is well known under the local name as "*Pukat-Jawa*"

SEINE NET

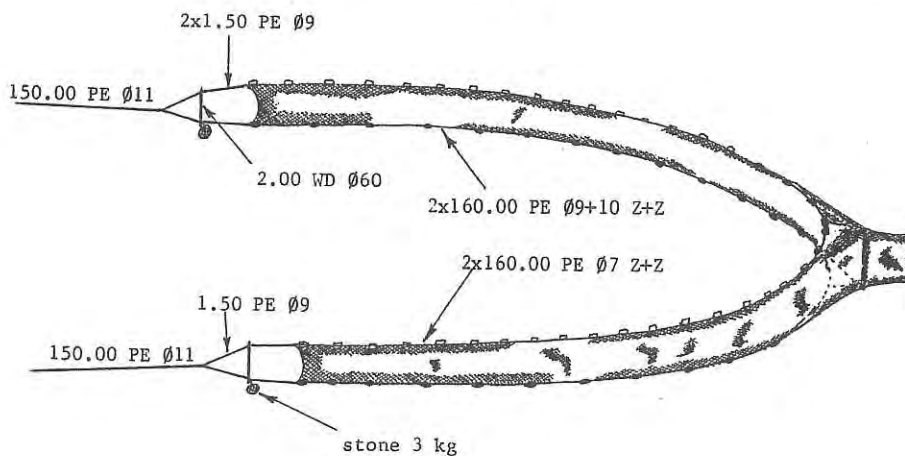
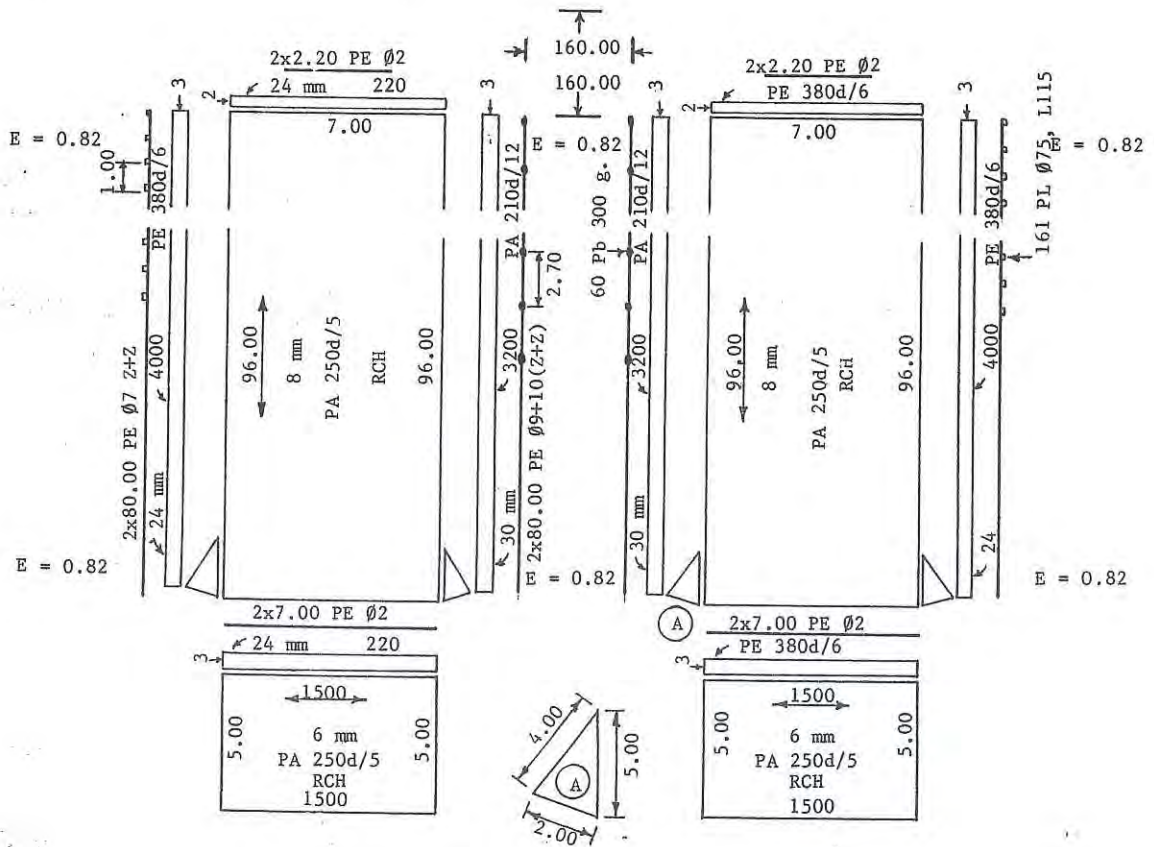
Beach seine
 Pukat - Tarik - Ikan Bering
 Anchovy, Planktonic shrimp

VESSEL

Loa 5 m
 hp 20 OM

LOCATION

Kual Behsut
 Terengganu



SEINE NET

Beach seine

1000-1000

Shrimp, Mullet, Grouper

VESSEL

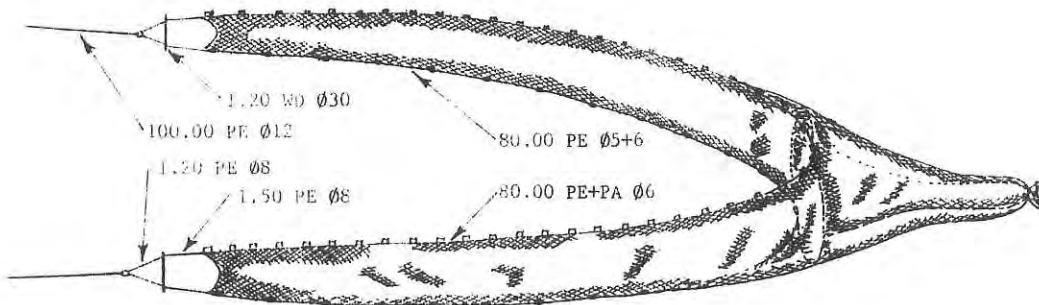
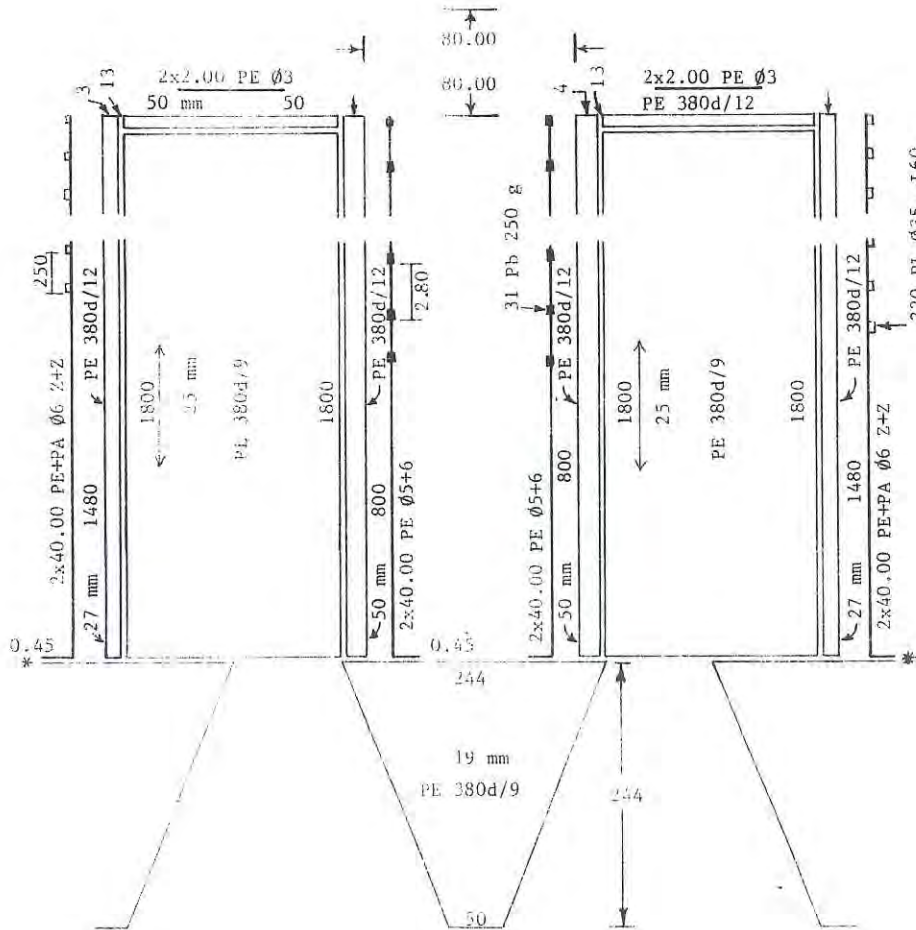
Lea 3 m

hp 8.0M

LOCATION

Kg. Pok Besar

Johor

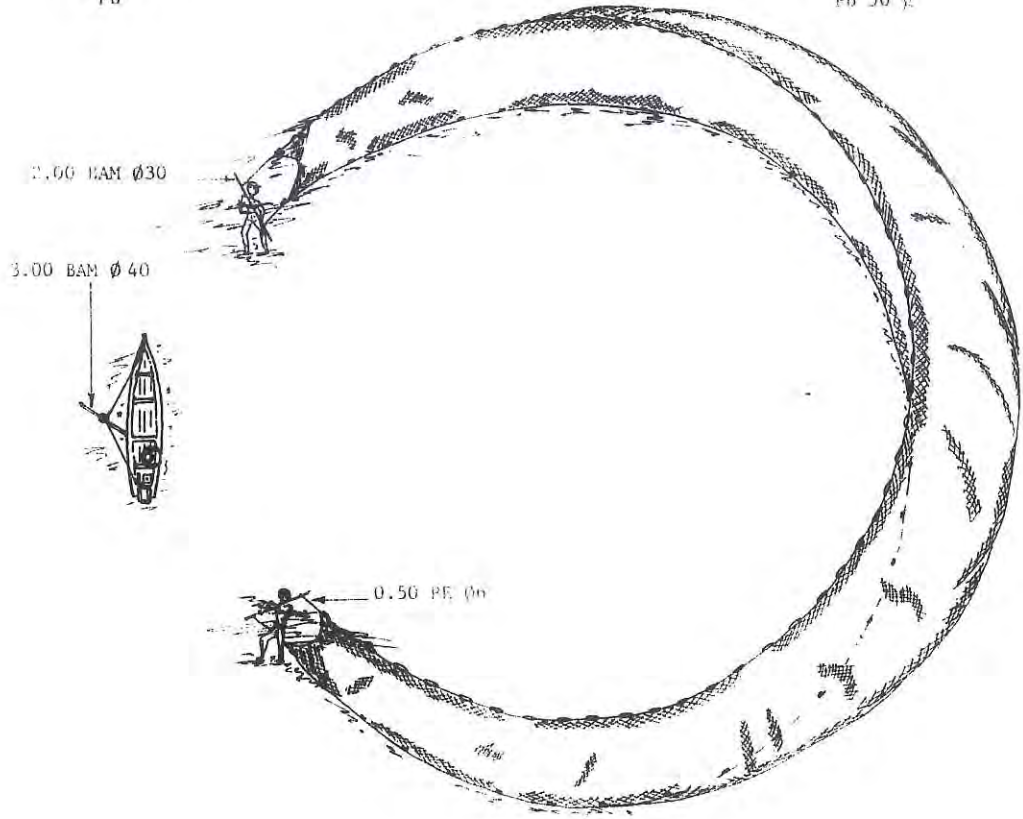
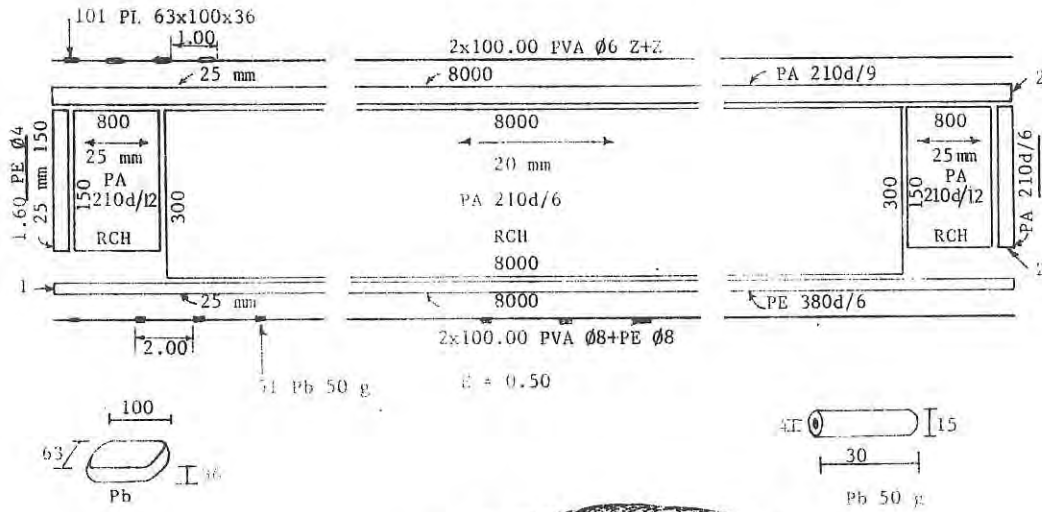


SEINE NET
 Shrimp seine
 Paket Bonyoh
 Shrimp, Prawn

VESSEL
 Los 5 m
 hp 12 OM

LOCATION
 Yan
 Kedah

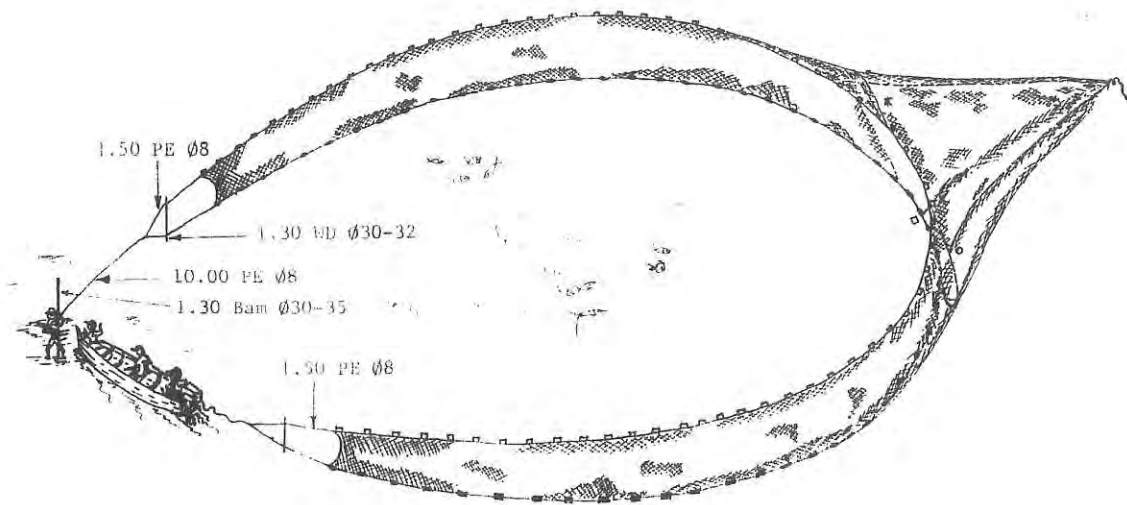
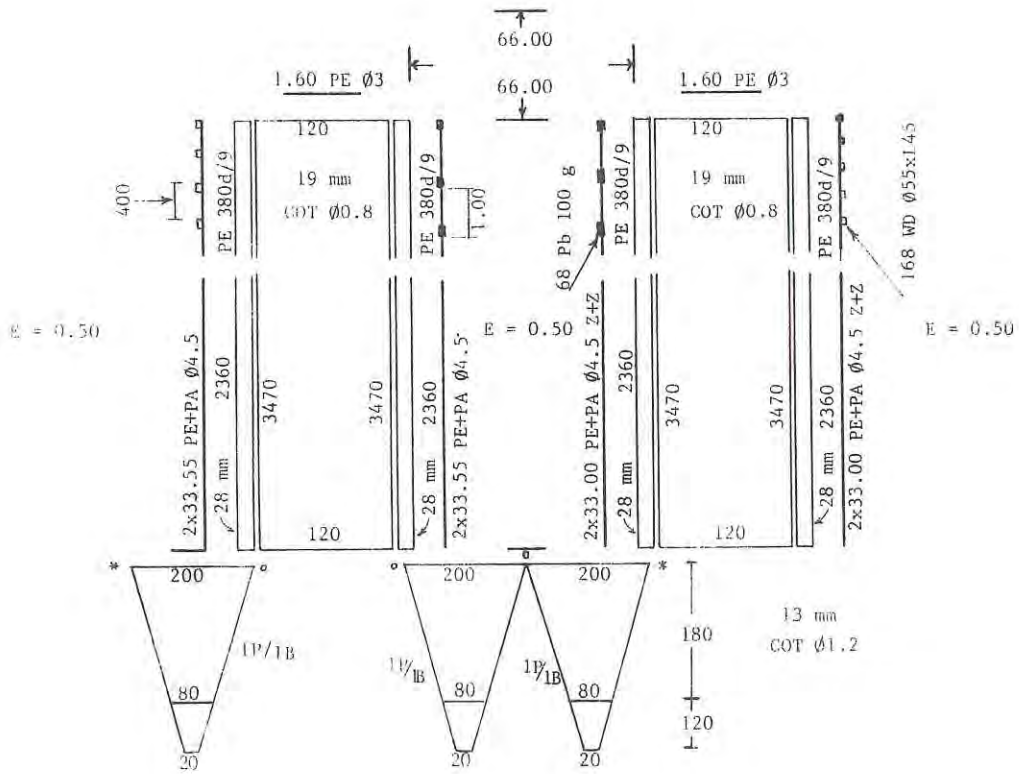
$\beta = 0.50$

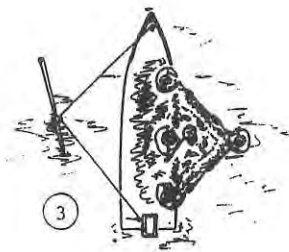
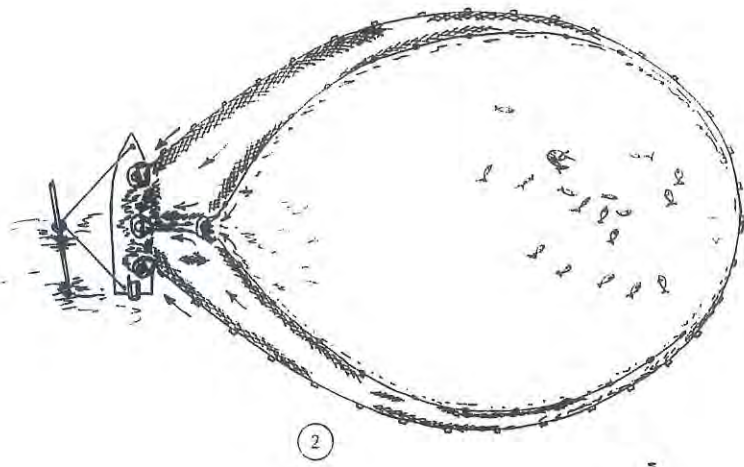
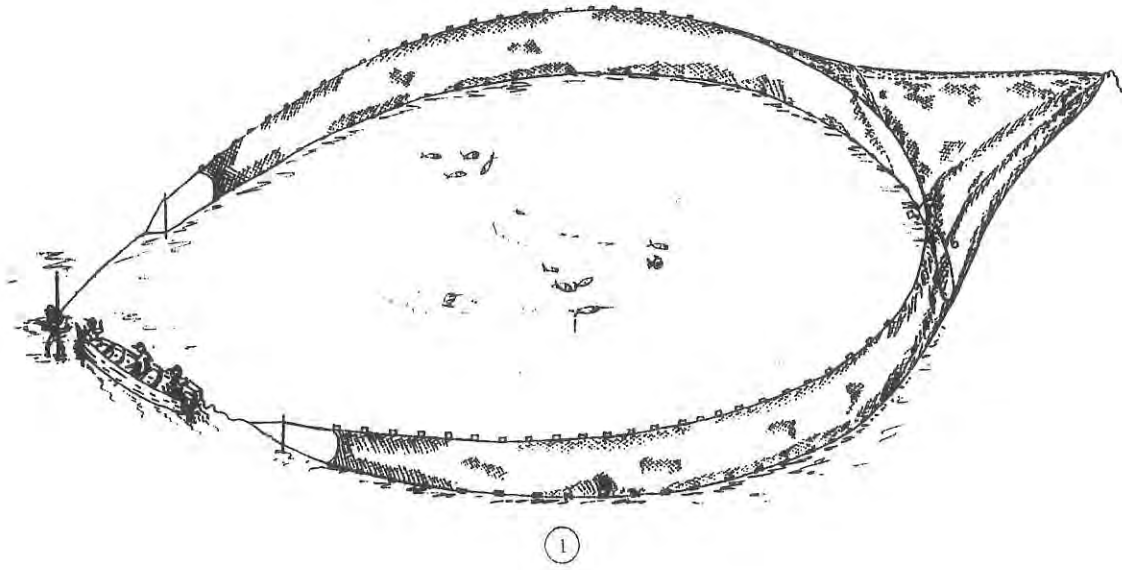


SEINE NET
 Boat Seine
Bukat Kisa
 Shrimp, Misc. fishes

VESSEL
 Lou 5 m
 hp 15 OM

LOCATION
 Pontian Kechil
Johor





SEINE NET

Boat Seine

Pukat Kisa

Engraulid, white pomfret, Shrimp

VESSEL

Loa 11 m

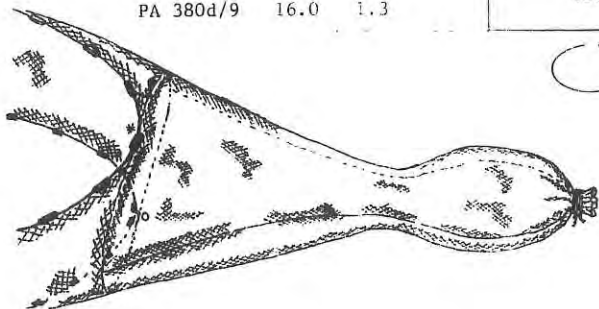
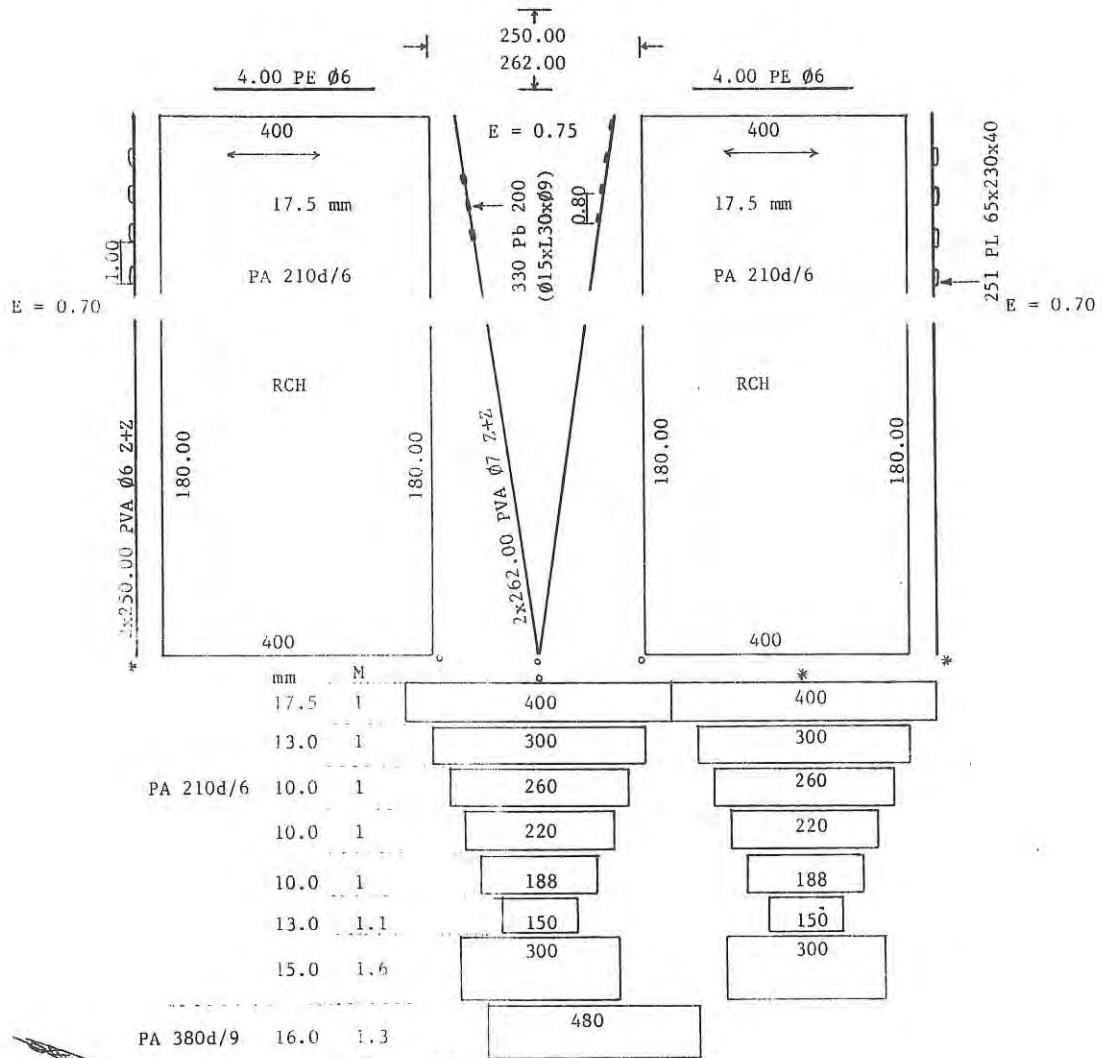
GT 5

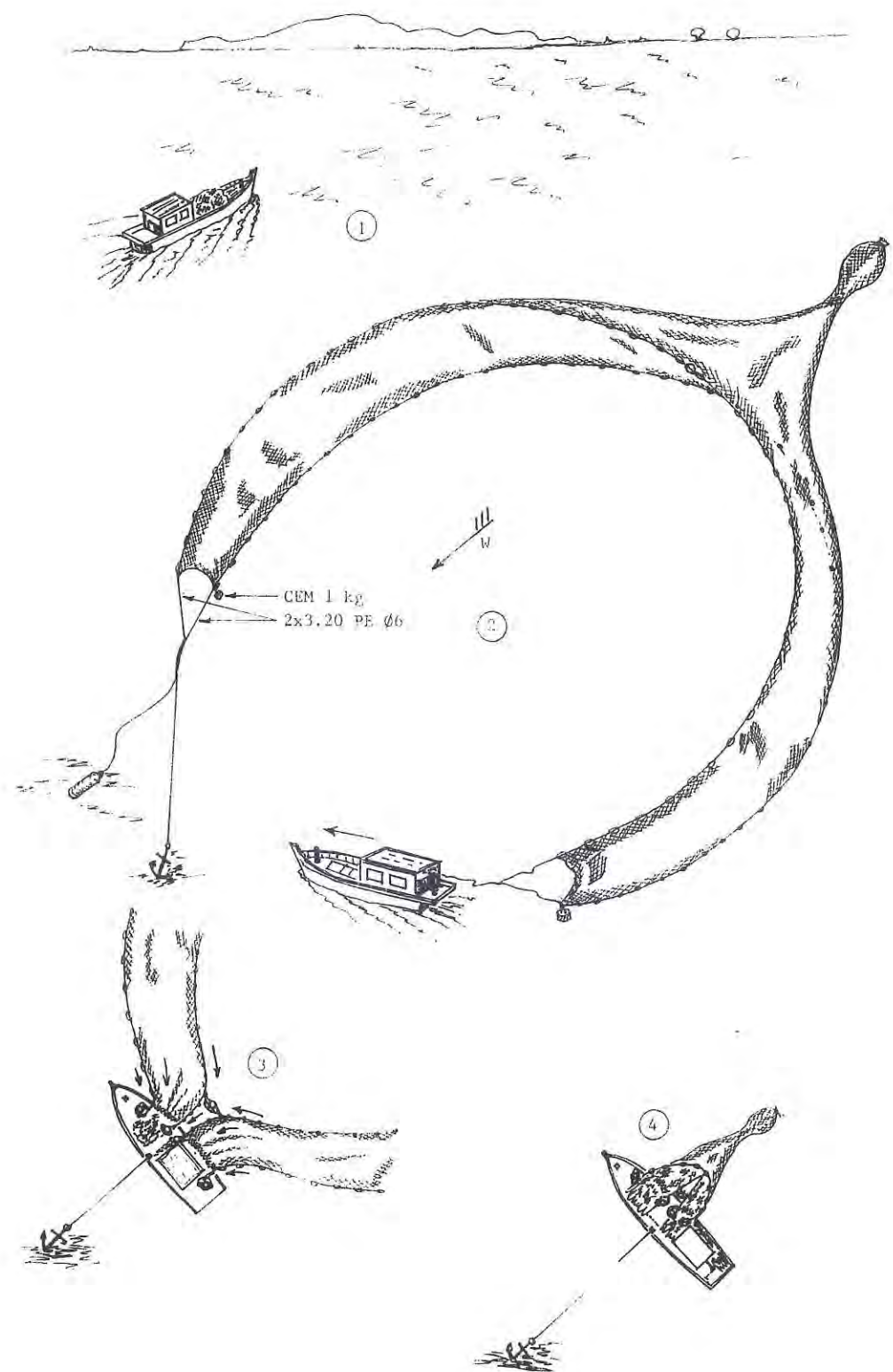
hp 22

LOCATION

Kuala Kedah

Kedah

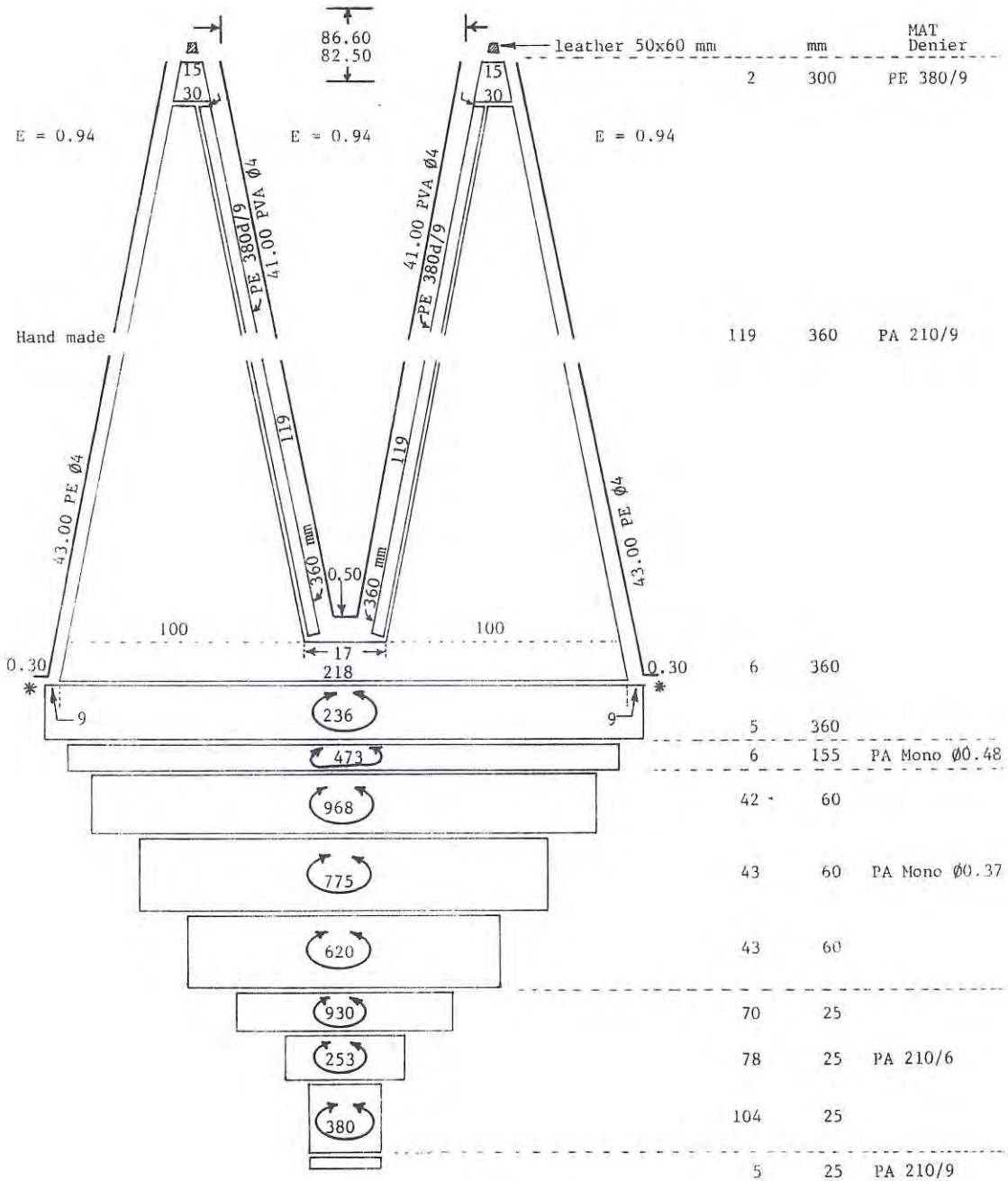




SEINE NET
 Boat Seine
Pukat-Jawa
 Black pomfret, Hardtail Scad

VESSEL
 Loa 8 m
 hp 40+55 OM

LOCATION
 Tanjong Baram
 Miri
Sarawak







<Chapter 5>

TRAWL FISHING

5.1 Introduction

Trawl has been introduced in Malaysia since 1960's. This gear is very effective and popular with the fishermen. At present, trawl net is the second largest gear used in Malaysia, and the largest contributor of fishery production in the country. The number of gears and vessels licensed, the fishermen involved and the catch of trawl gear in the year 2000 is shown in table 5.1. Trawl fishing in Malaysia can be grouped into four major categories:

- i. Bottom beam trawl
- ii. Bottom otter trawl
- iii. Bottom double rigging trawl
- iv. Bottom pair trawl

Table 5.1 Numbers of licensed vessels, fishermen and licensed gears involved in Trawls fishery in Malaysia and its production for the year 2000

AREAS	Number of Licensed Vessel	Number of Fishermen	Number of Licensed Gear	Production (m. tones)
West Coast of Peninsular Malaysia	3183	9685	3183	336118
East Coast of Peninsular Malaysia	922	4200	922	187886
Sarawak	628	4607	628	93297
Sabah-Labuan	1426	5147	1339	93078
TOTAL	6159	23639	6072	710379

5.2 Fishing Gear and Methods

5.2.1 Bottom beam trawl

Only one sample was obtained from Miri in Sarawak, a small-scale trawl, operated by an out-board engined fishing boat. Target species was shrimp.

5.2.2 Bottom otter trawl

Generally, in Malaysia, trawlers are referred to as otter trawlers. The otter trawl is also known as Pukat Harimau (Tiger Net). The otter trawl can be subdivided into three kinds; fish trawl, shrimp trawl, and brine shrimp trawl.

The fish trawl is made of big mesh size of PE net for the wing. The mesh size ranges from 6 to 40 cm at the wing, and reducing gradually toward the codend, to about 3 cm.

The shrimp trawl and brine shrimp trawl are small-scale operations, the mesh size is around 4 cm at the wing, and the codend is made of 2.5 cm polyethylene or the smallest mesh of nylon for brine shrimp.

5.2.3 Bottom double rigging trawl

This kind of trawl is popular in the Sarawak area for catching shrimp. This fishing gear is similar to the bottom otter trawl, but there are two sets of net which are towed by out-riggers. The otter boards are connected to the net by a short bridle for easy hauling. Because the two nets are operated at the same time, the trawler has to be big enough. Each net has 25 meters of head rope, and the mesh size was 37 millimeters on the body, 30 millimeters at the cod end. There were many double riggers located in Sibuluan, Sarawak.

5.2.4 Pair trawl

This gear, and its operation, has been modified from the two boat seine by fishermen in Tanjung Piandang. Previously this fishing gear had been classified as boat seine, but by modifying its fishing operation to where the net is towed by two powerful boats for from 1-2 hours, it must now be considered a pair trawl.

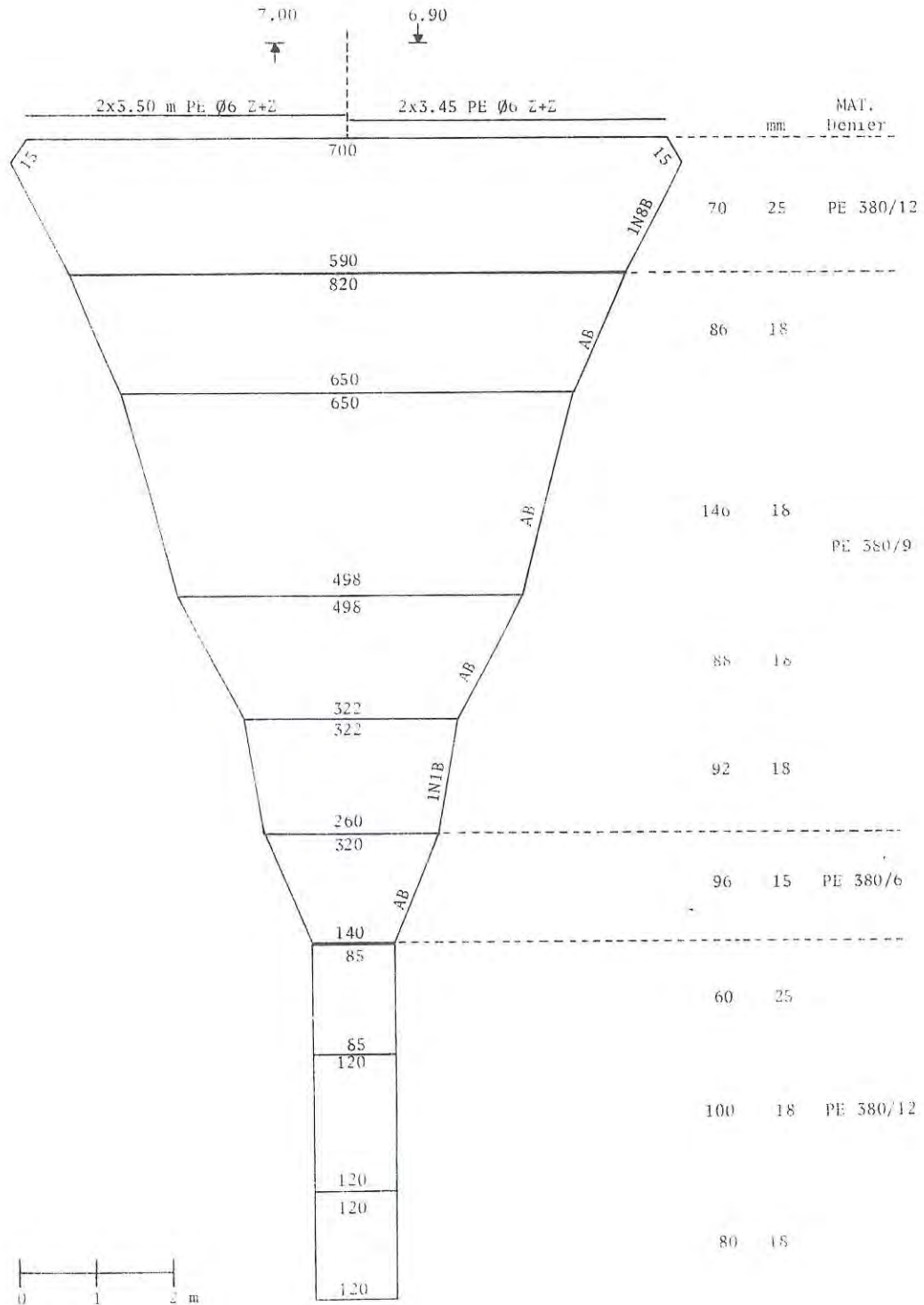
The net is composed of two long wings of about 40 meters, and a ground rope and head rope of the same length. The length of net body with the codend is about half of length of wing. There are two kinds of net, with same construction but different mesh size, depending on the target species (25-30 m.m. mesh size for prawn and 30-75 m.m. mesh size for demersal fish, squid and cuttle fish).

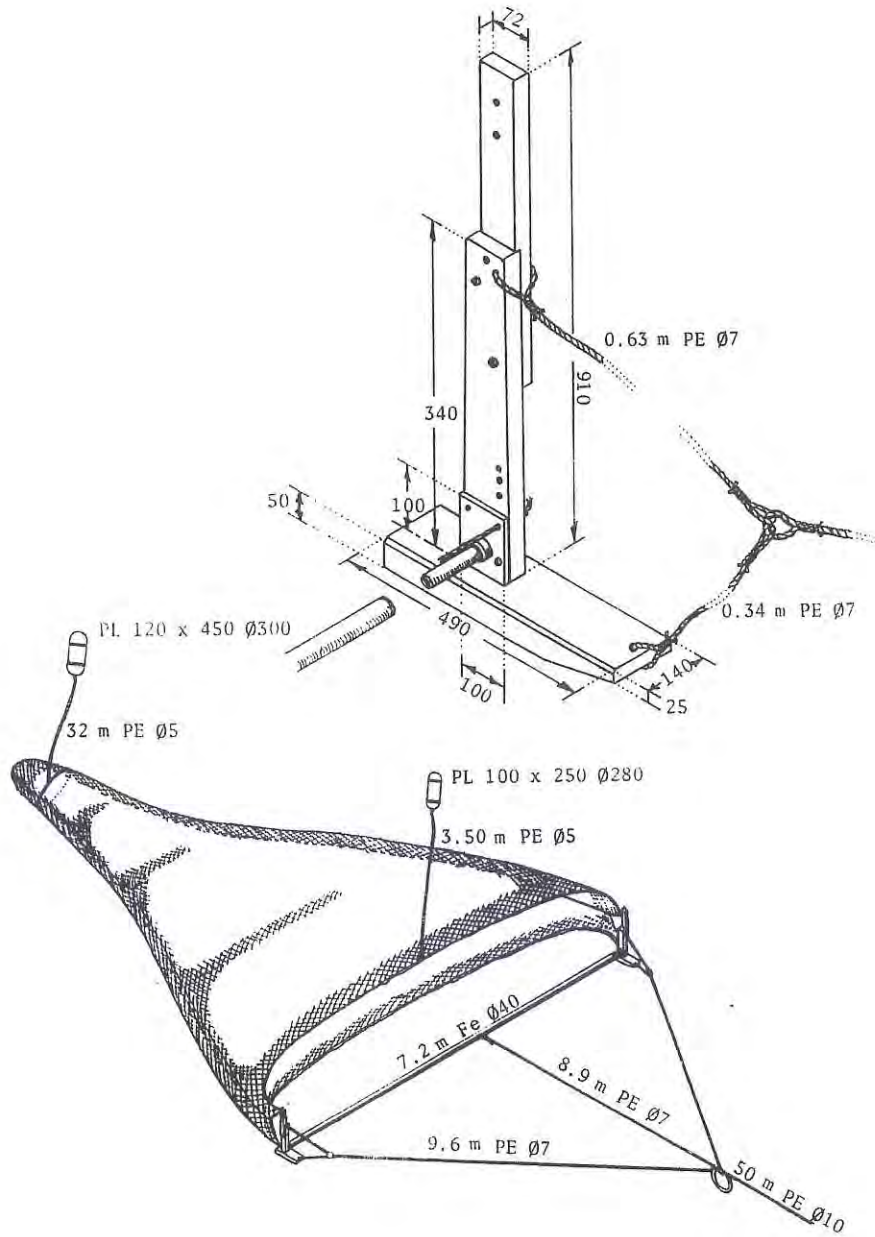
The gear is called "*Pukat Kenka*", and is famous only in area from Tanjung Piandang in Perak to Sungai-Udang in Penang.

TRAWL
Beam trawl
Shrimp

VESSEL
Loa 8 m
hp 40

LOCATION
Tg. Baram, Miri
Sarawak

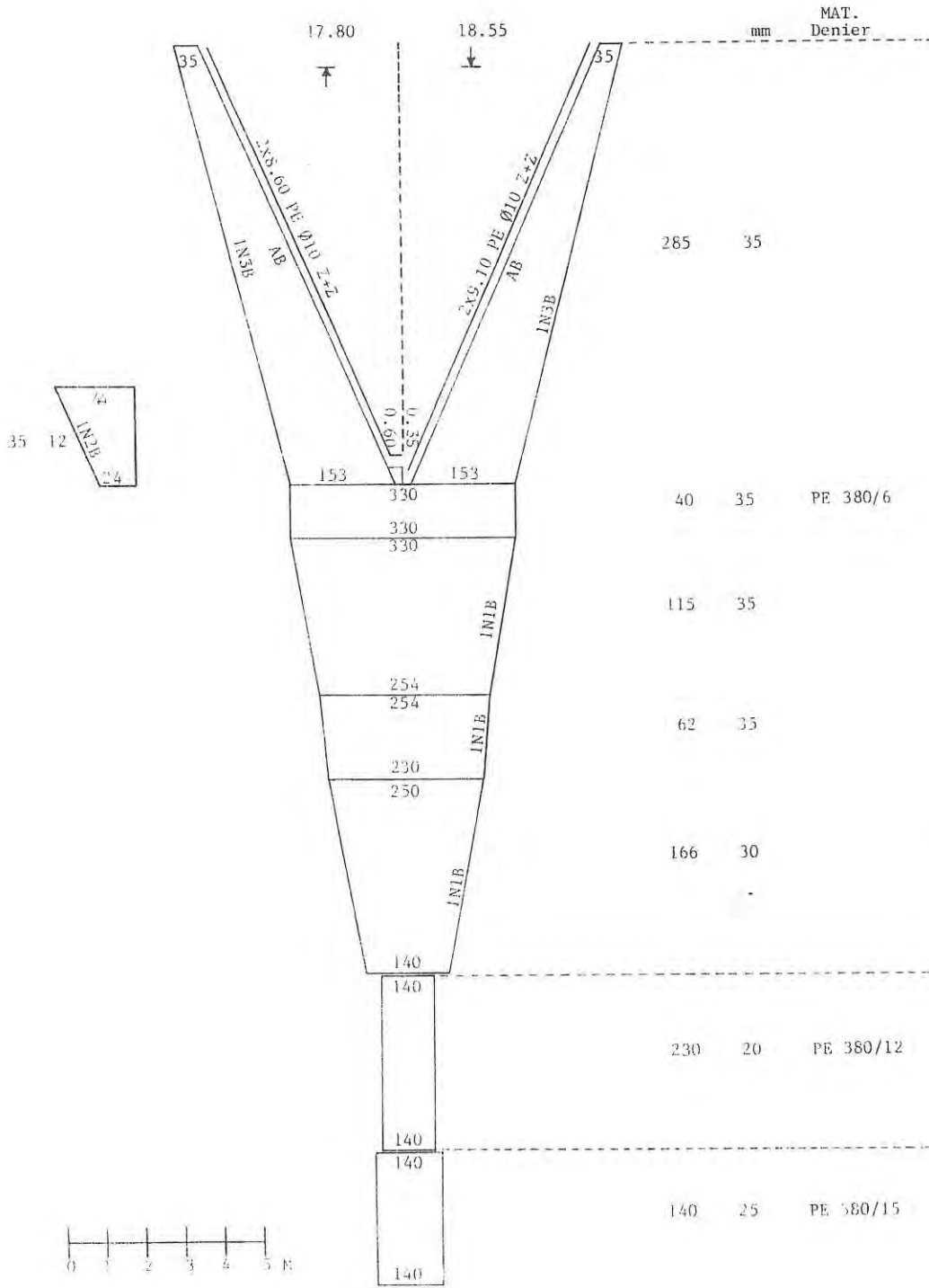


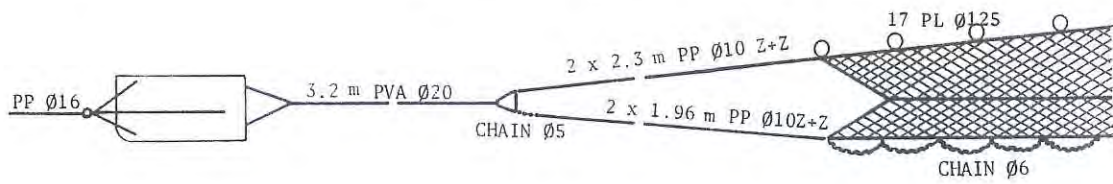
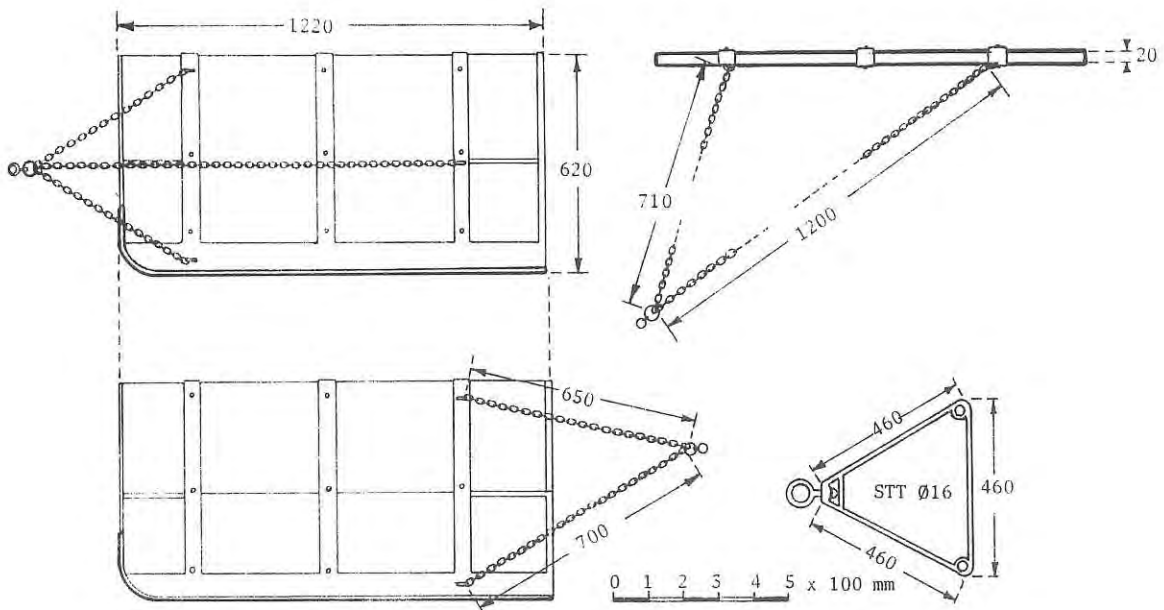


TRAWL
 Bottom, otter
 Shrimp

VESSEL
 Load 10.5 m
 hp 24

LOCATION
 Kuala Perlis
Perlis

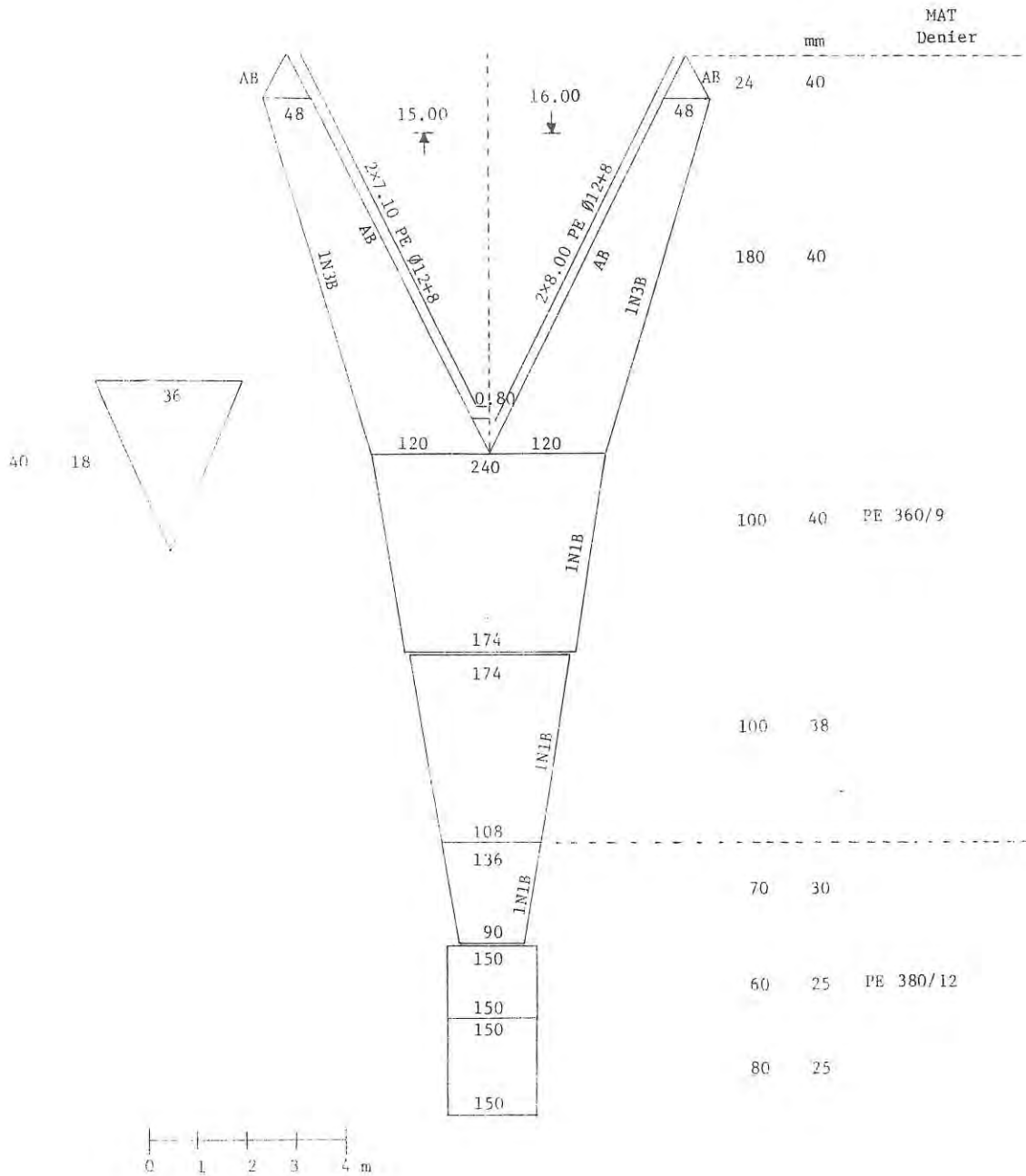




TRAWL
 Bottom, otter
 Shrimp

VESSEL
 Loa 12.5 m
 hp 33

LOCATION
 Kg. Chendering
 Terengganu



TRAWL

VESSEL

LOCATION

Bottom, otter

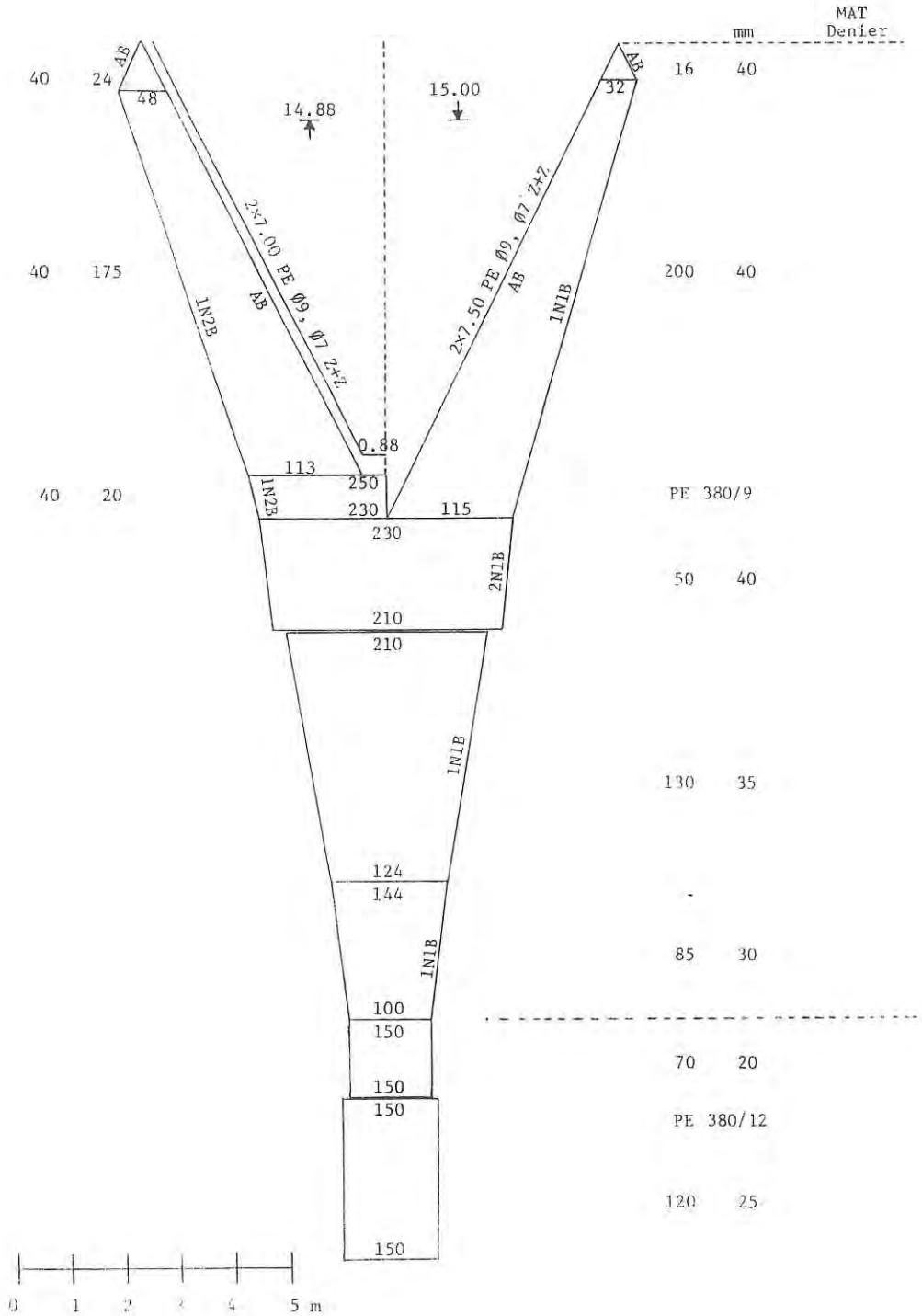
Loa 11.7 m

Mengabang Telipot

Demersal fishes, Prawn

hp 36

Terengganu



TRAWL

VESSEL

LOCATION

Bottom, otter

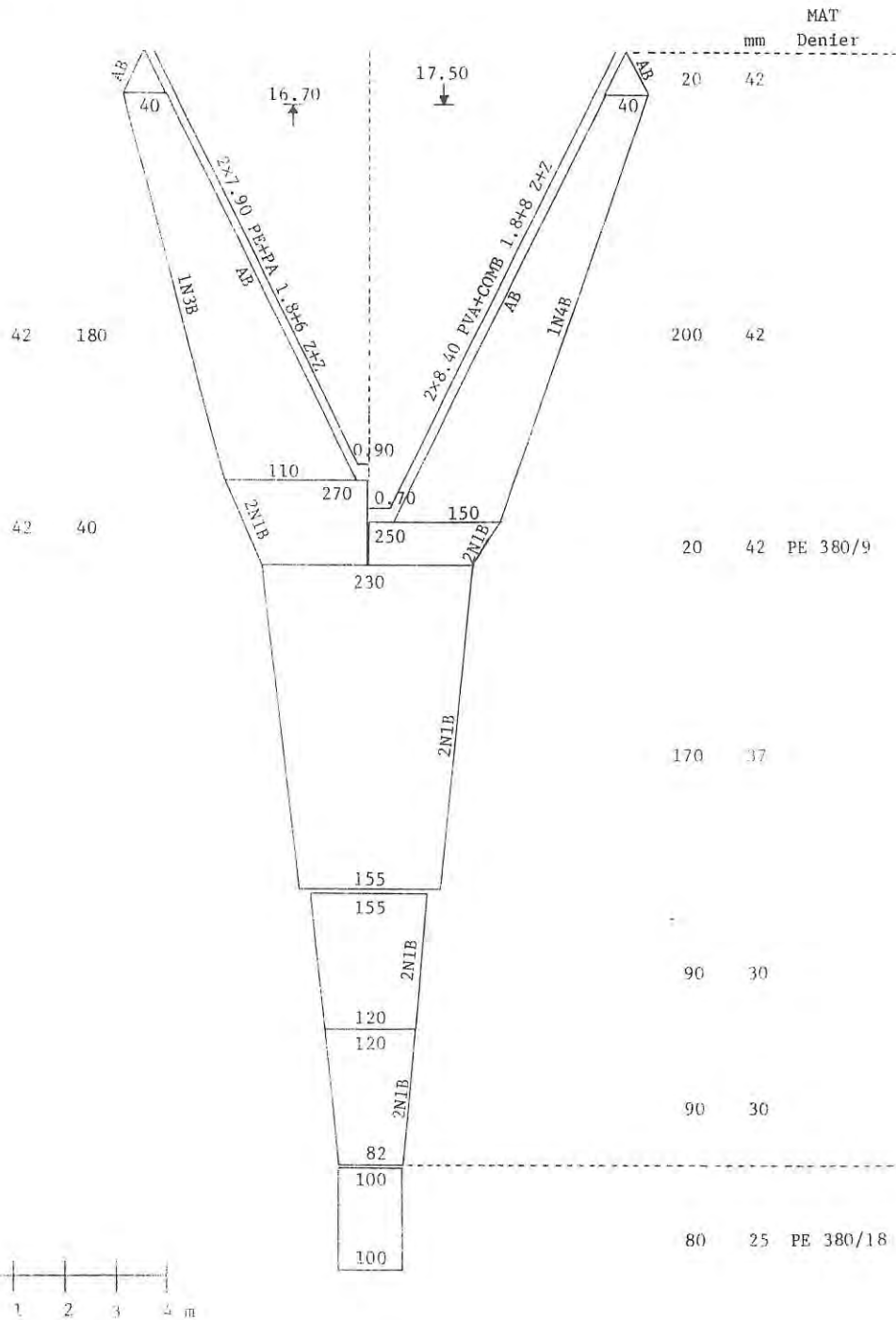
Loa 12.6 m

Kuala Rompin

Prawn, Demersal fishes

hp 33

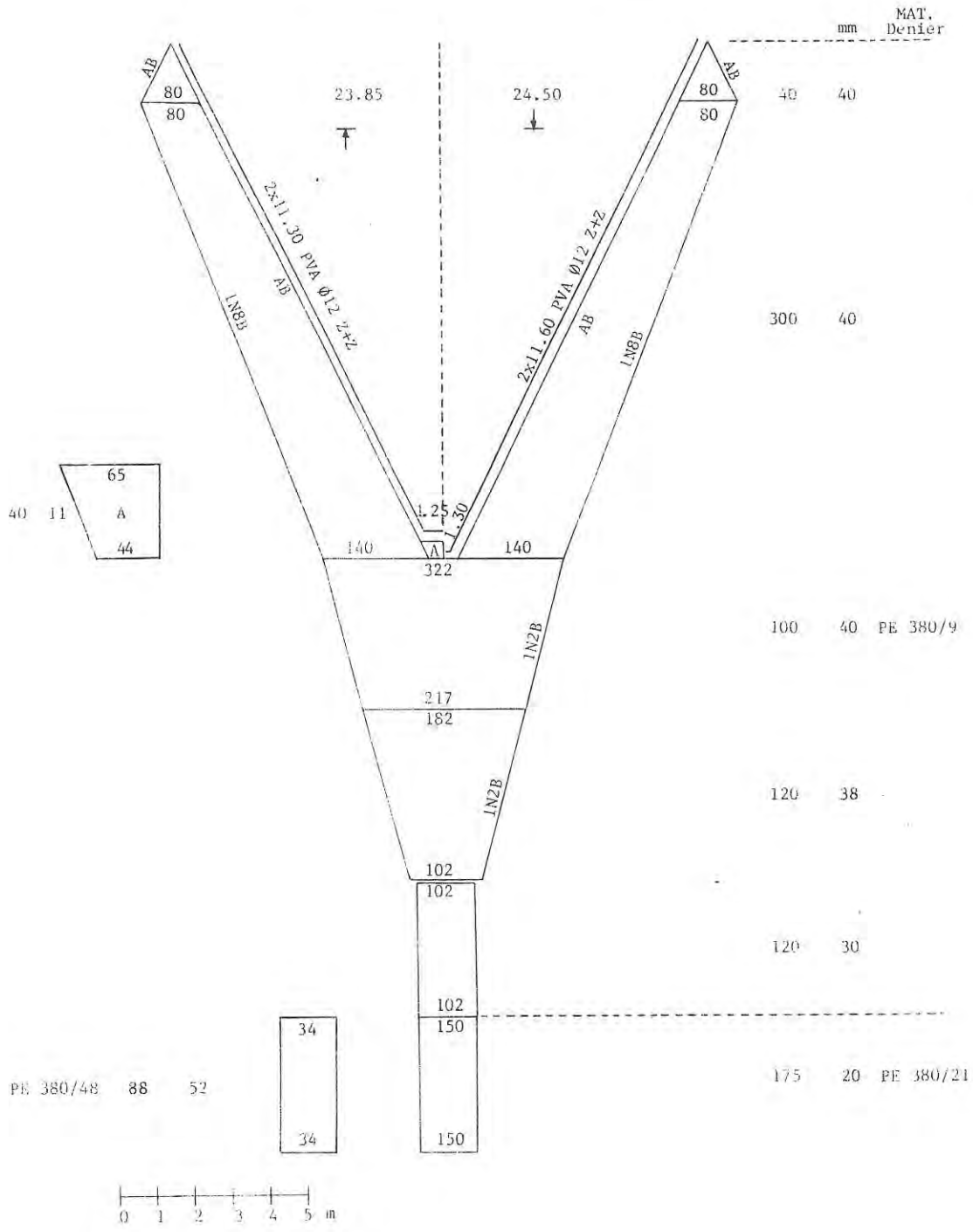
Pahang

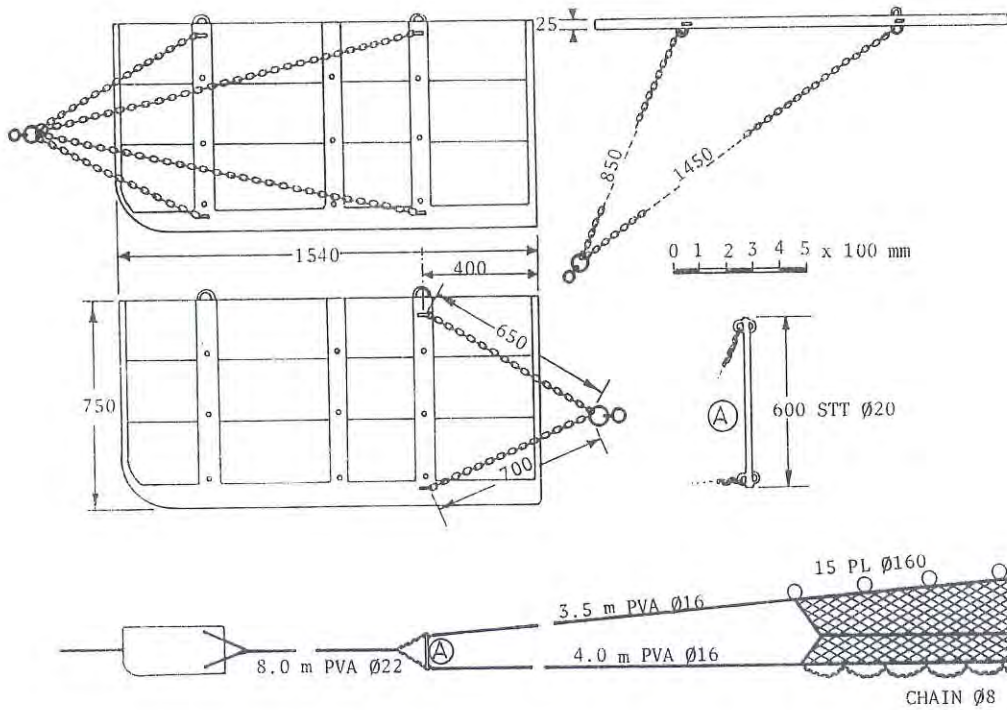


TRAWL
Bottom, otter
Shrimp

VESSEL
Lea 13 m
hp 140

LOCATION
Kuala Kedah
Kedah

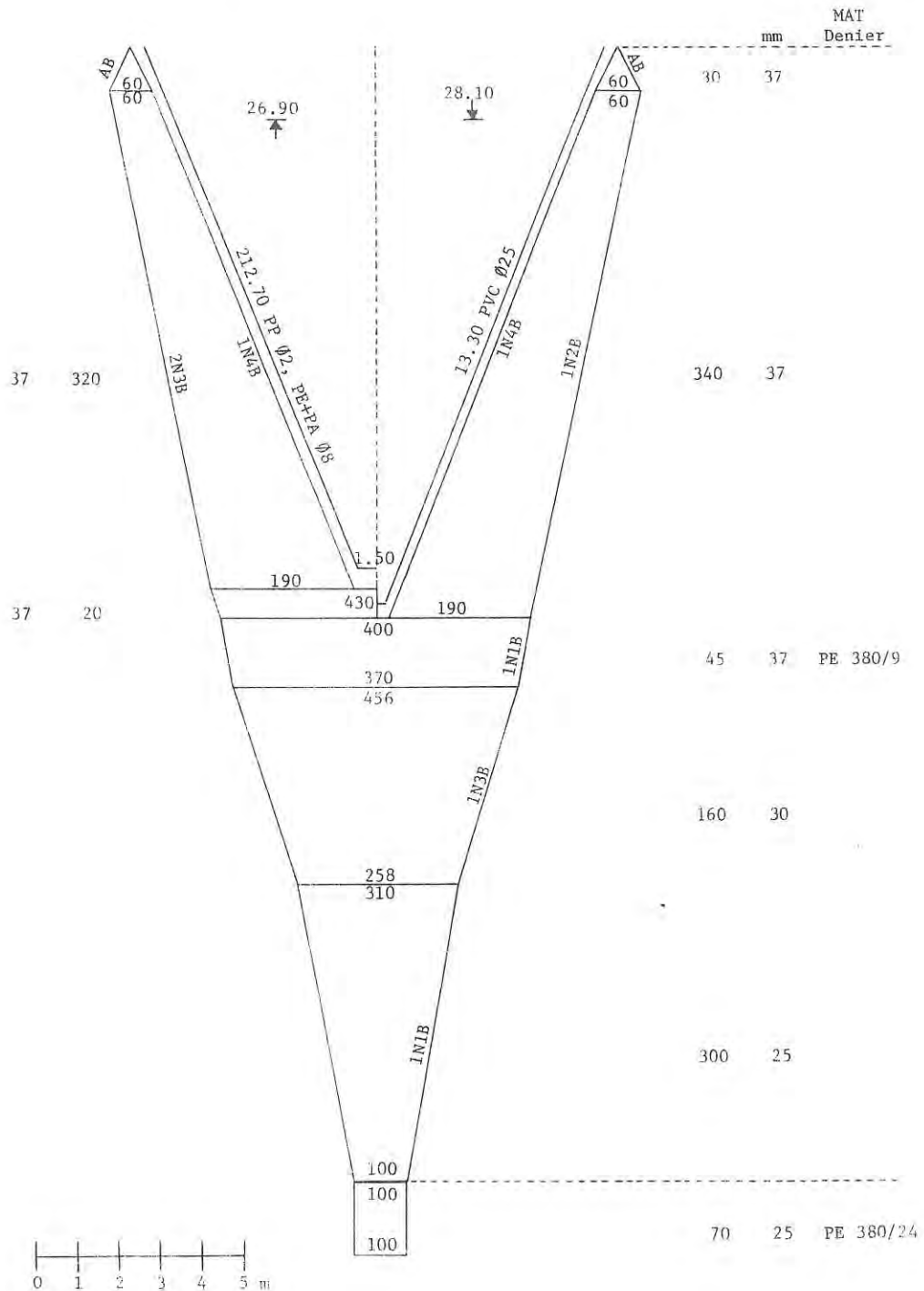




TRAWL
Bottom, otter
Shrimp

VESSEL
Loa 18 m
hp 180

LOCATION
Pontian Kechil
Johor



TRAWL

Bottom, otter

Shrimp

VESSEL

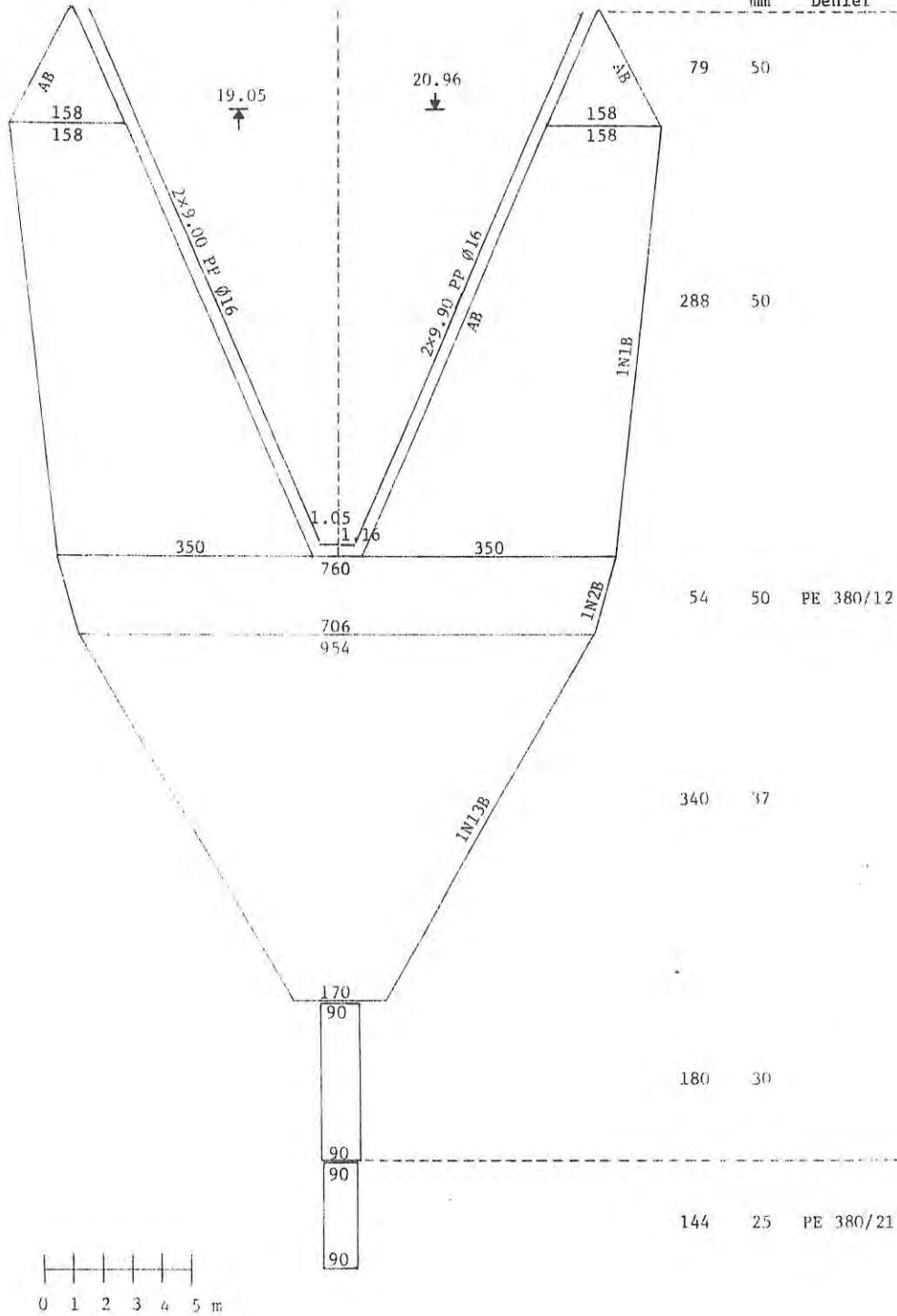
Loa 18 m

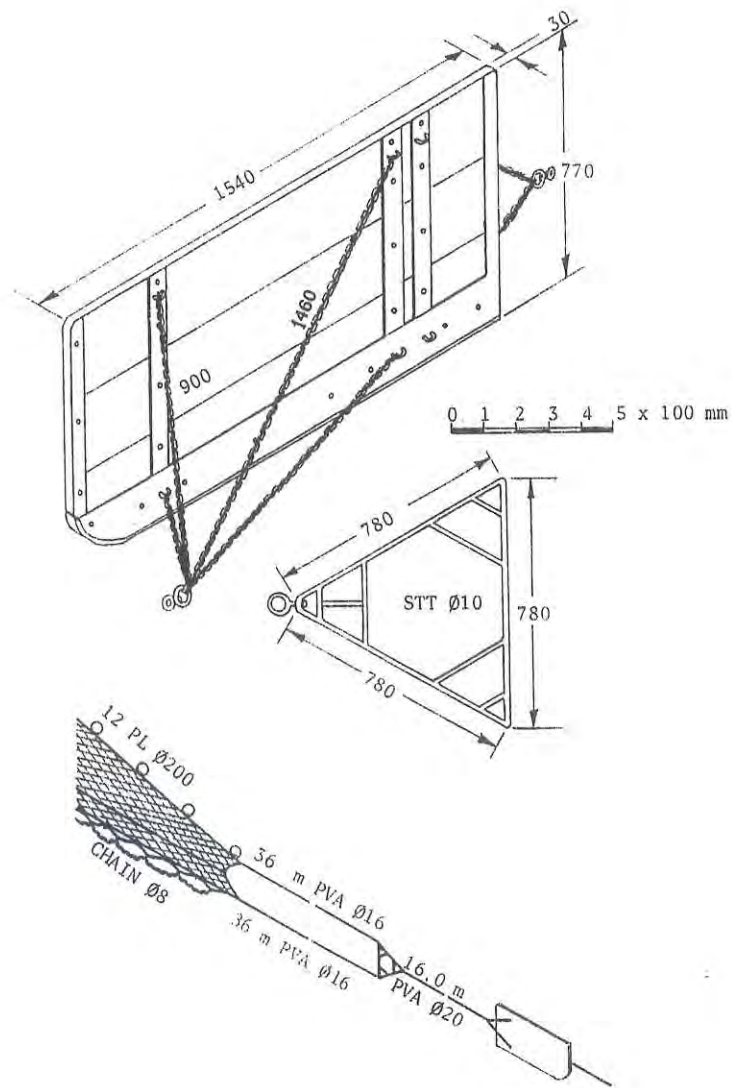
hp 180

LOCATION

Telok Bahang

Pinaug

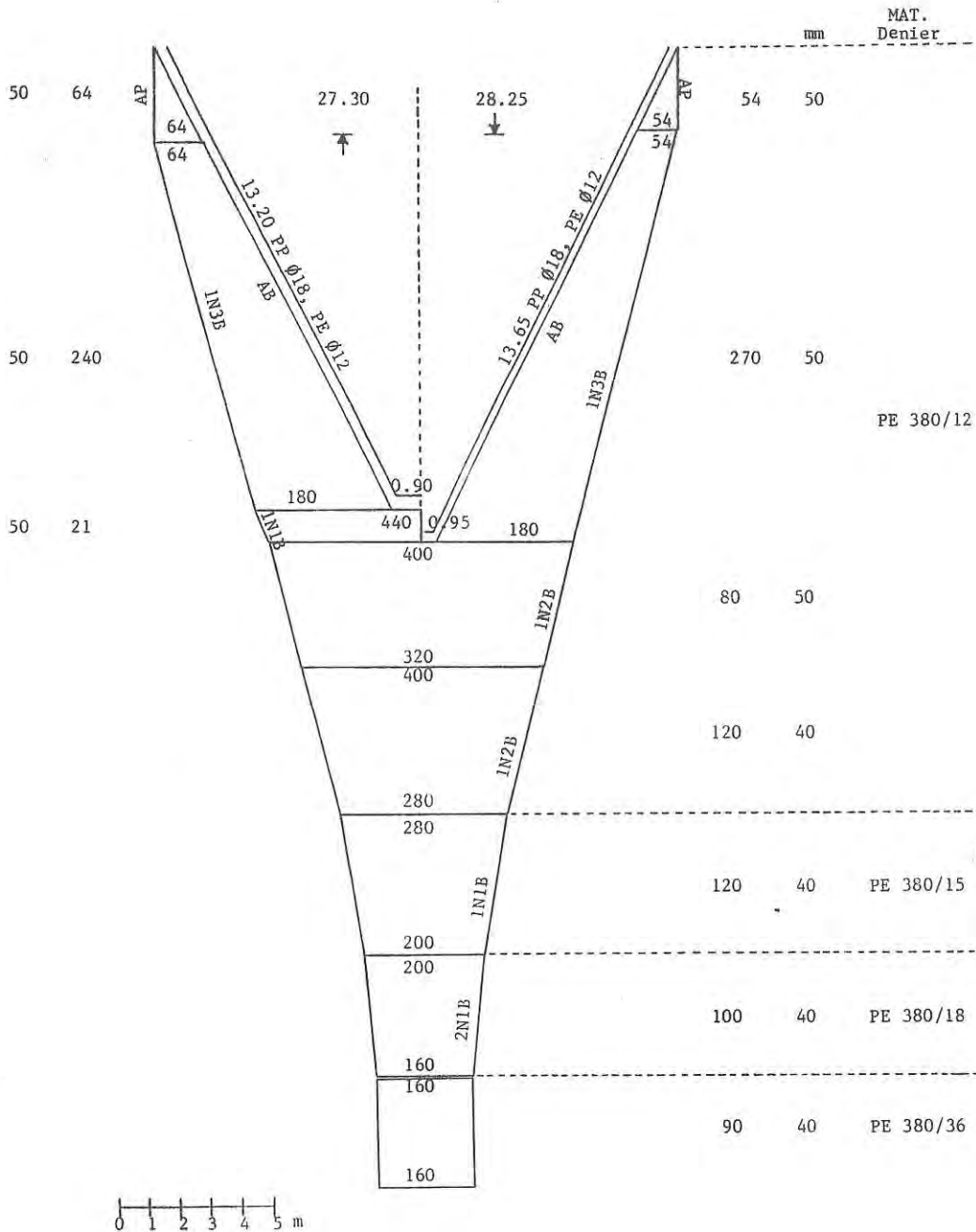


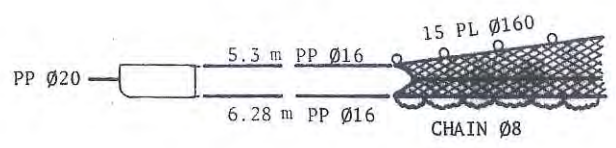
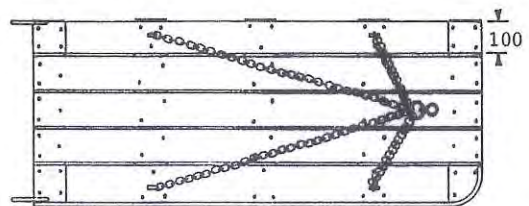
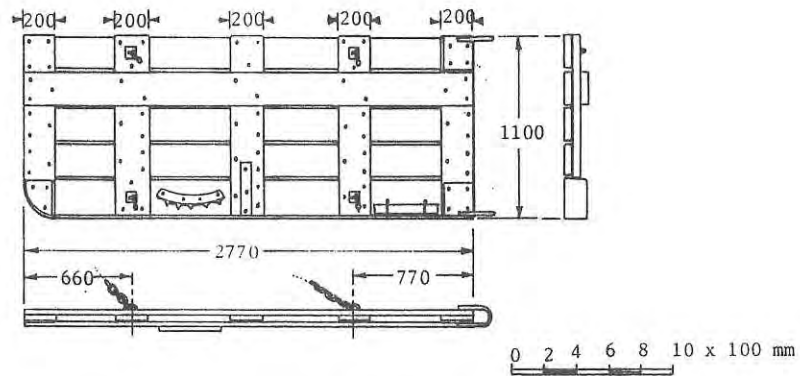


TRAWL
Bottom, otter
Shrimp

VESSEL
Loa 18 m
hp 190

LOCATION
Kota Kinabalu
Sabah





TRAWL

Bottom, otter
Pukat-runda lalat

Shrimp

VESSEL

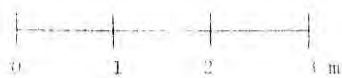
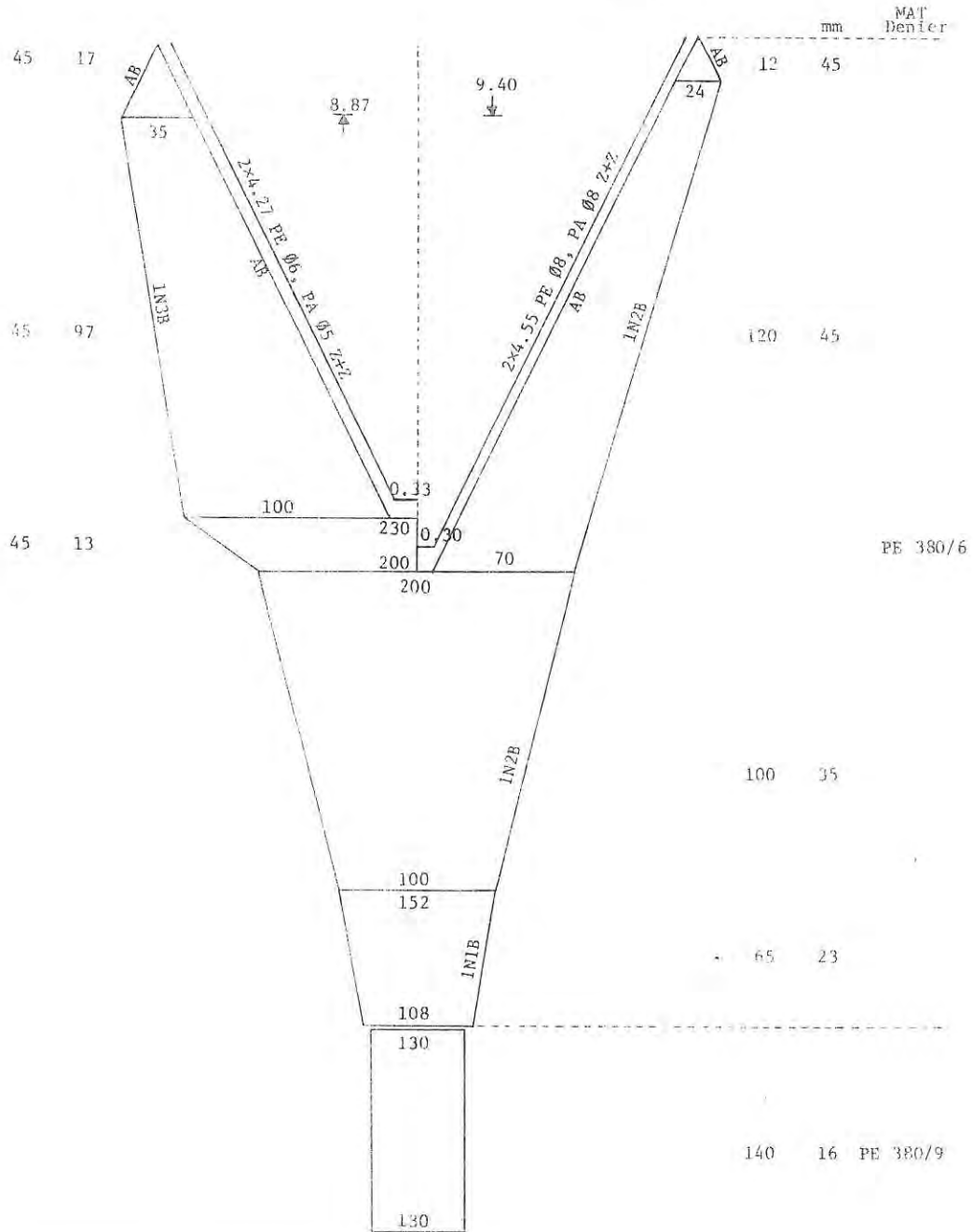
Loa 7 m

hp 6

LOCATION

Kg. Peramu, Kuantan

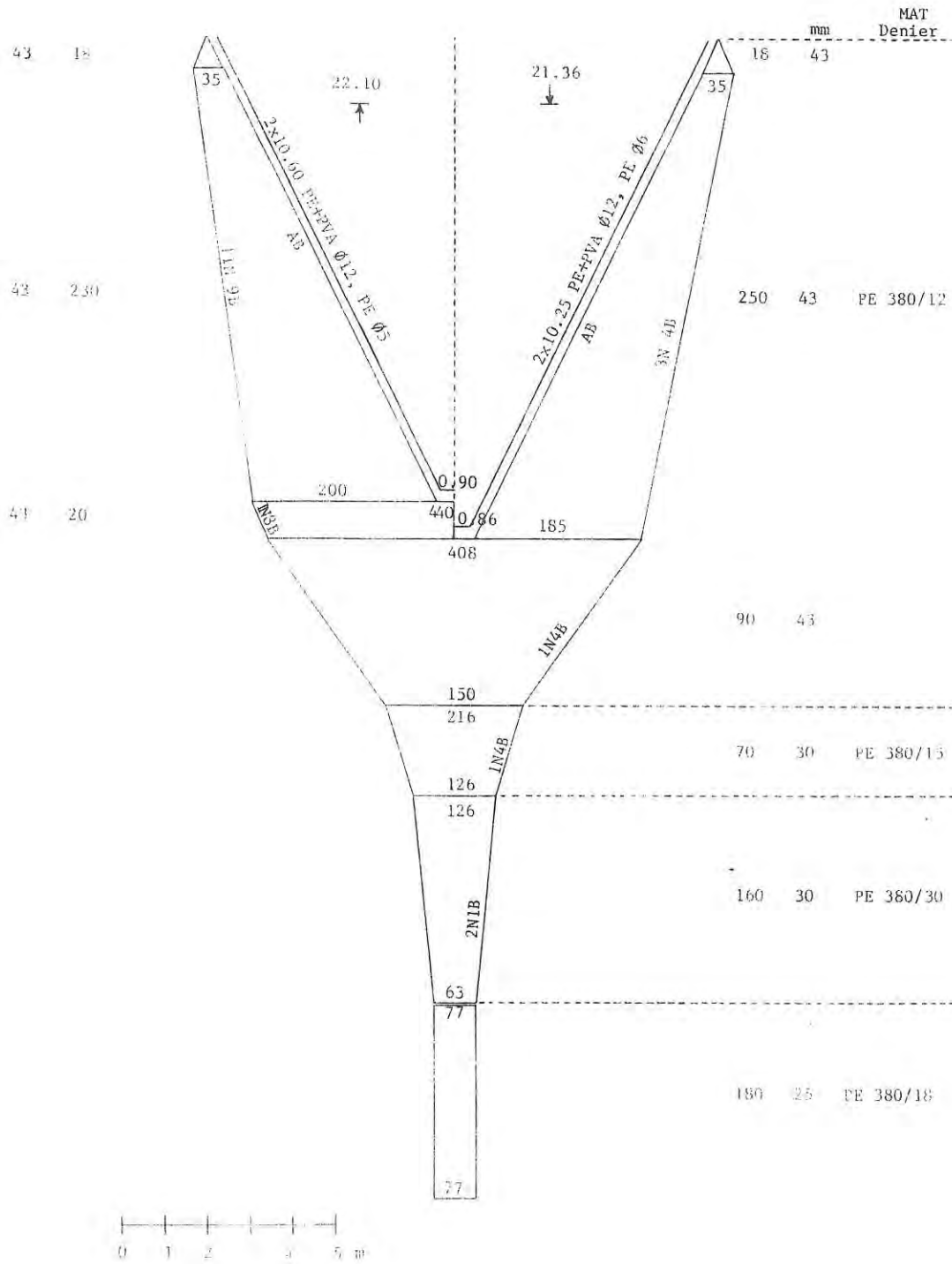
Pahang

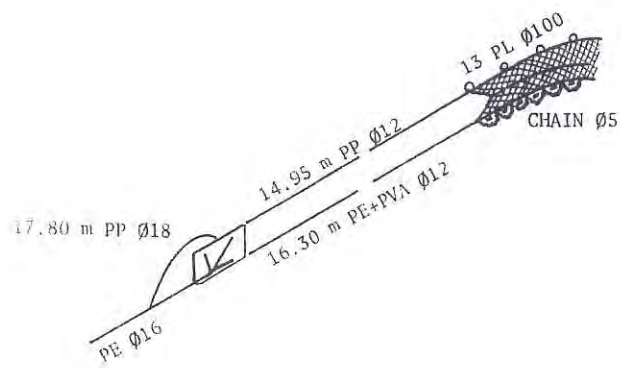
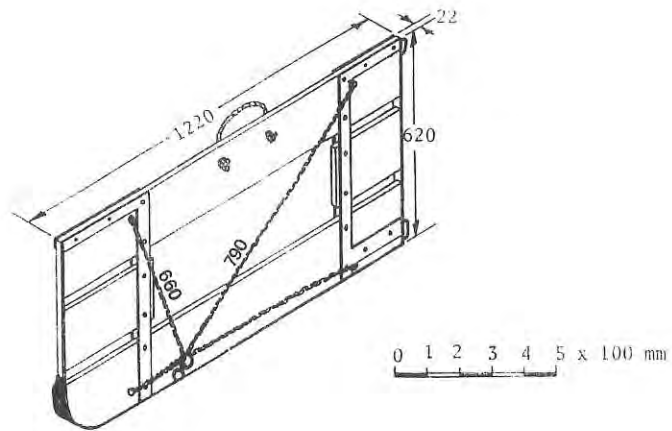


TRAWL
Bottom, otter
Shrimp, Demersal fishes

VESSEL
Loa 13.5 m
hp 45

LOCATION
Kuala Terengganu
Terengganu

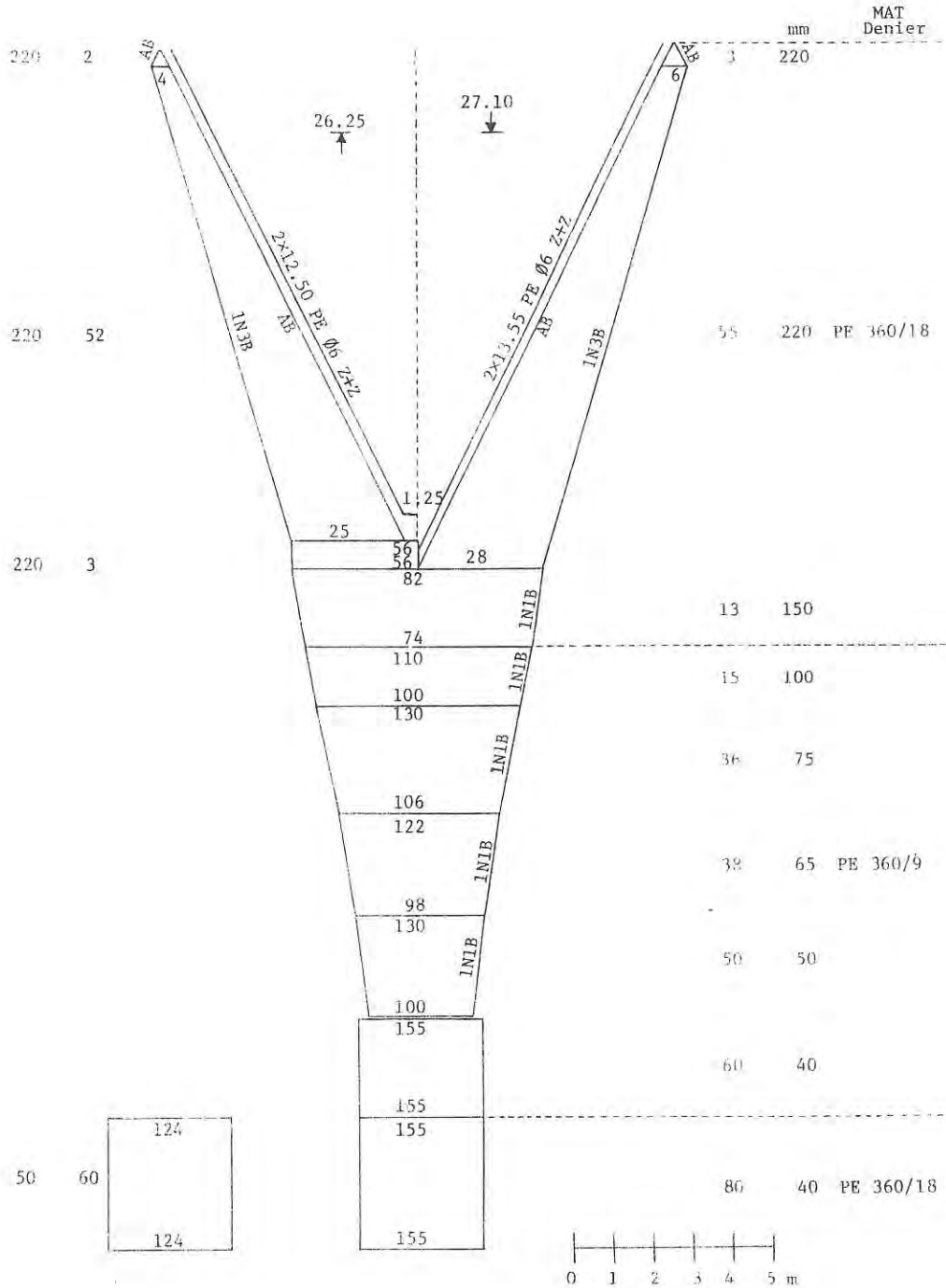




TRAWL
Bottom, otter
Demersal fishes

VESSEL
Loa 13 m
hp 37

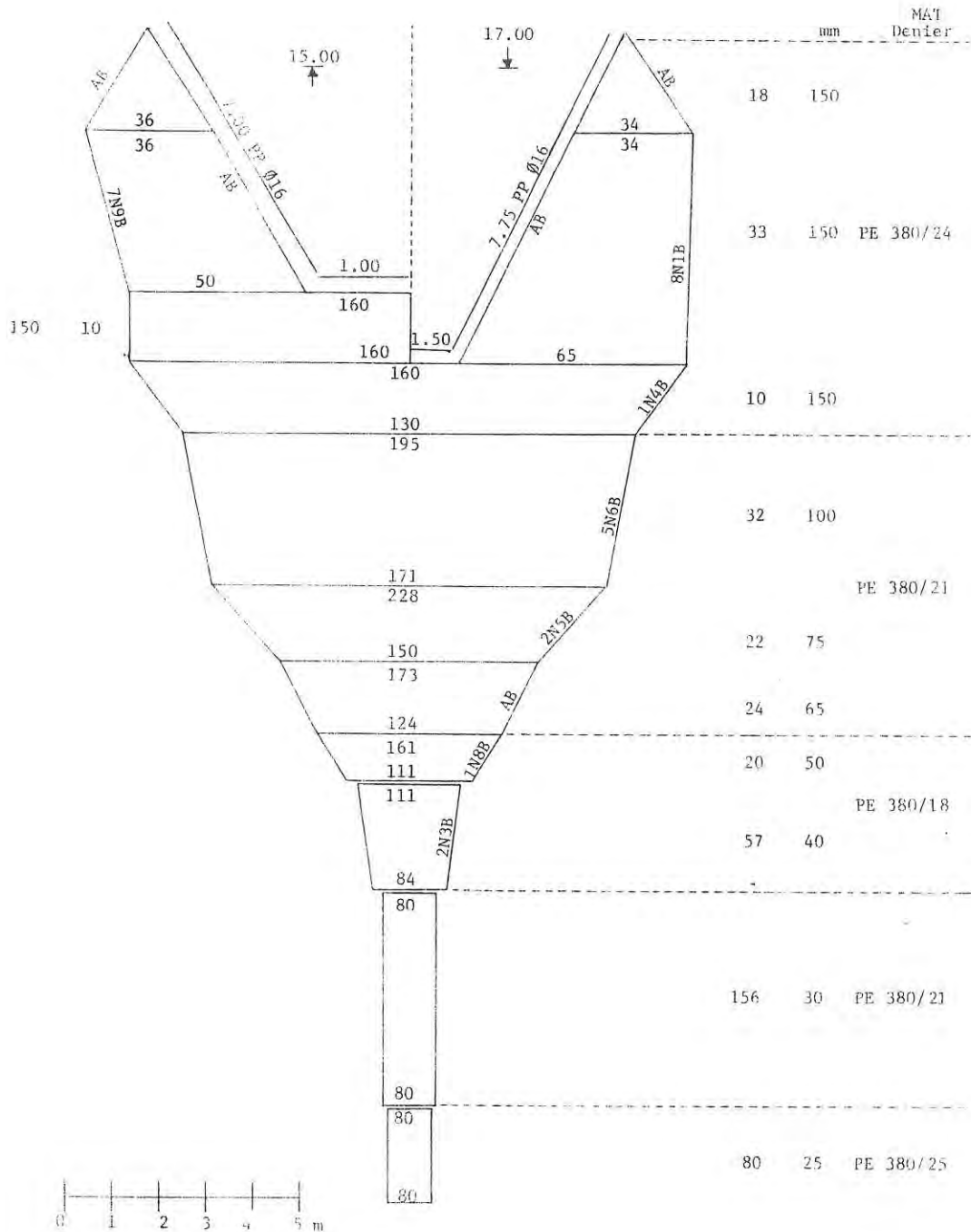
LOCATION
Kuala Terengganu
Terengganu

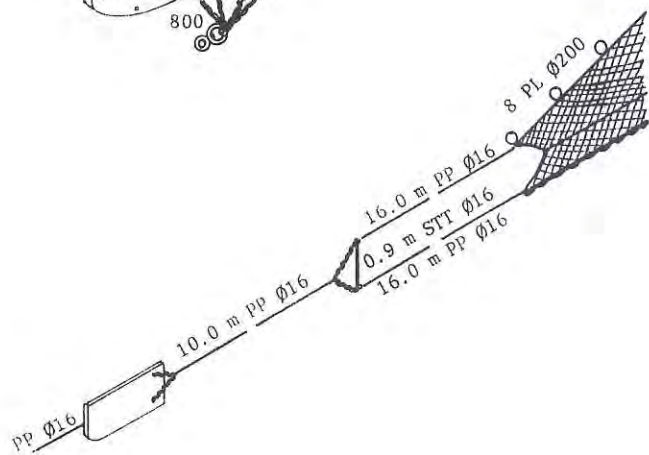
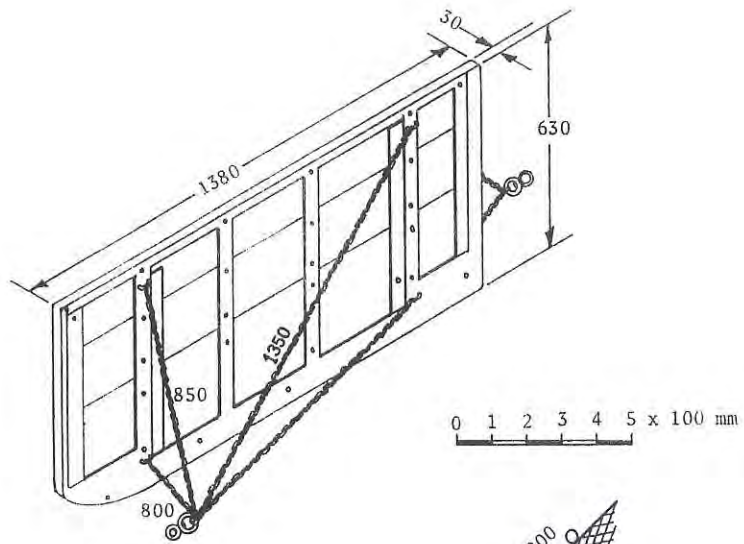


TRAWL
Bottom, otter
Demersal fishes

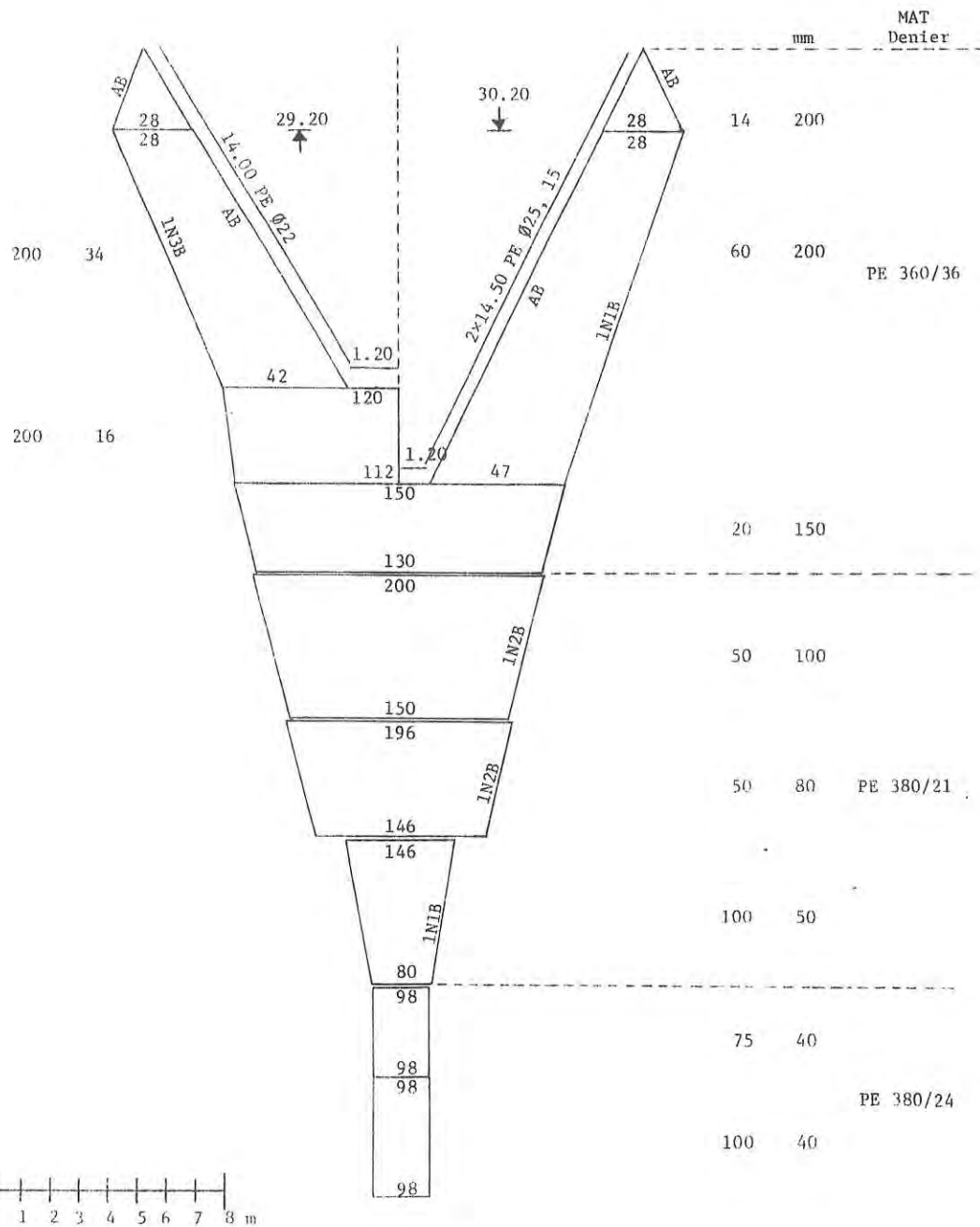
VESSEL
Loa 14 m
hp 90

LOCATION
Tg. Sepat
Selangor





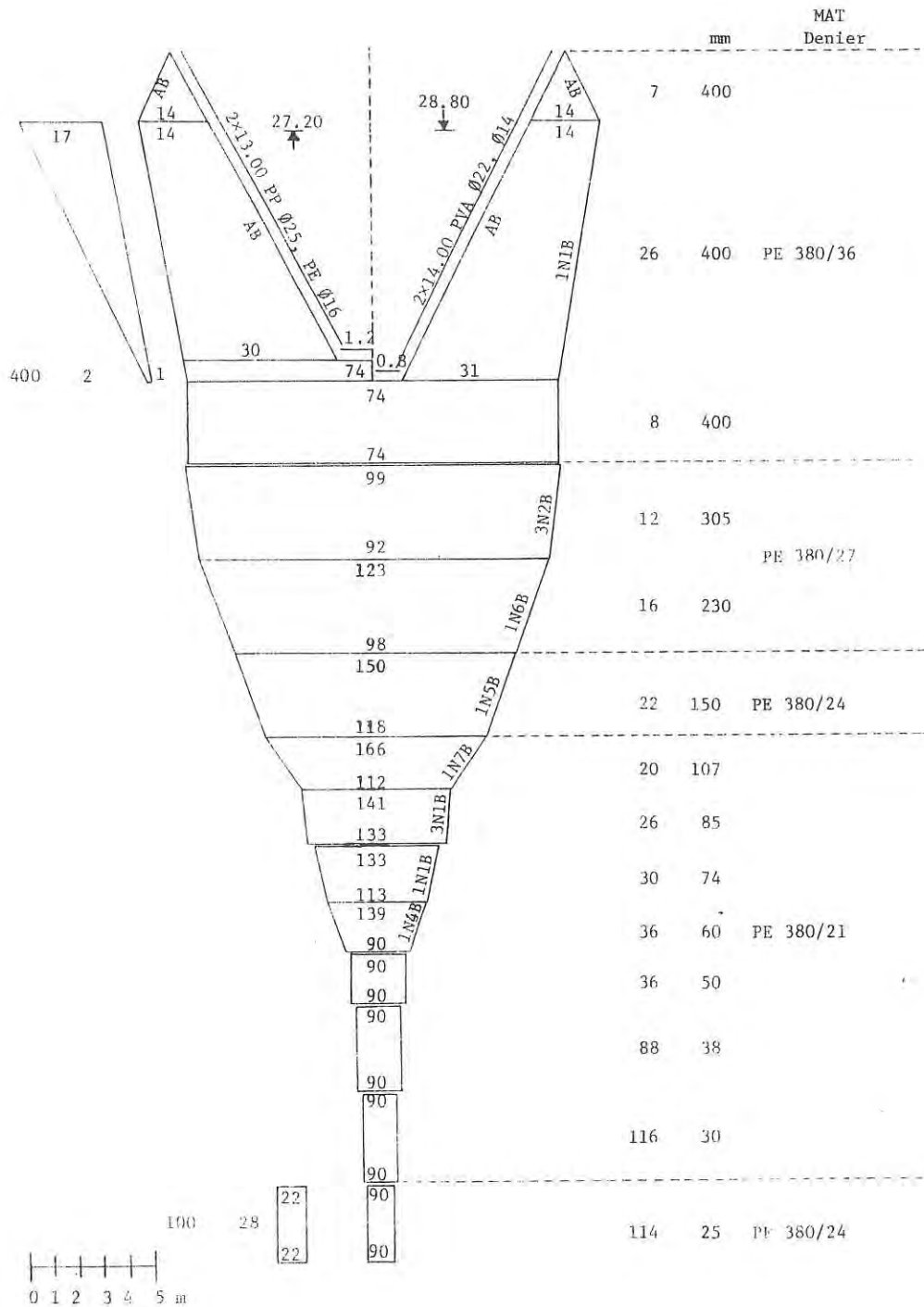
TRAWL	VESSEL	LOCATION
Bottom, otter	Loa 16 m	Kuantan
Demersal fishes	lip 140	<u>Pahang</u>

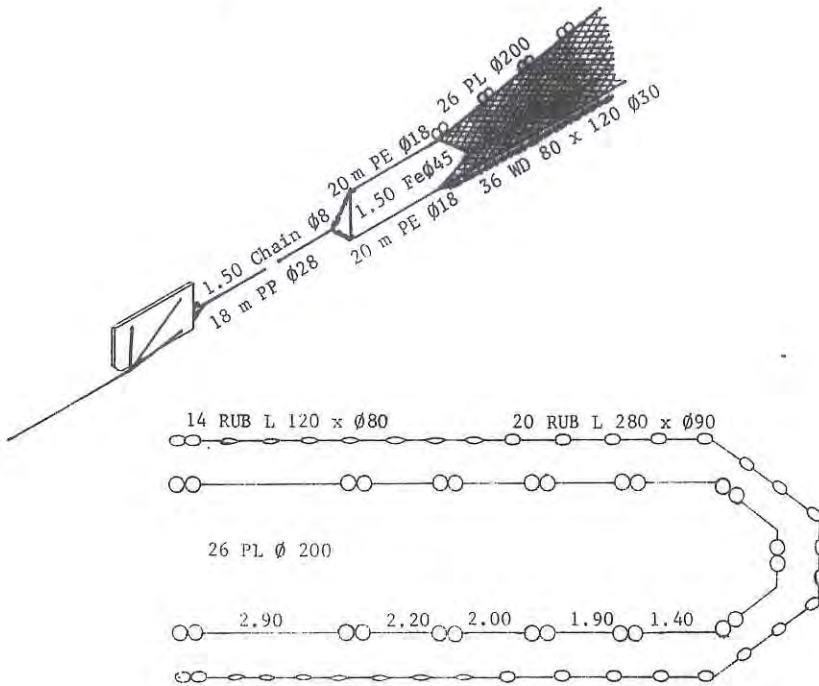
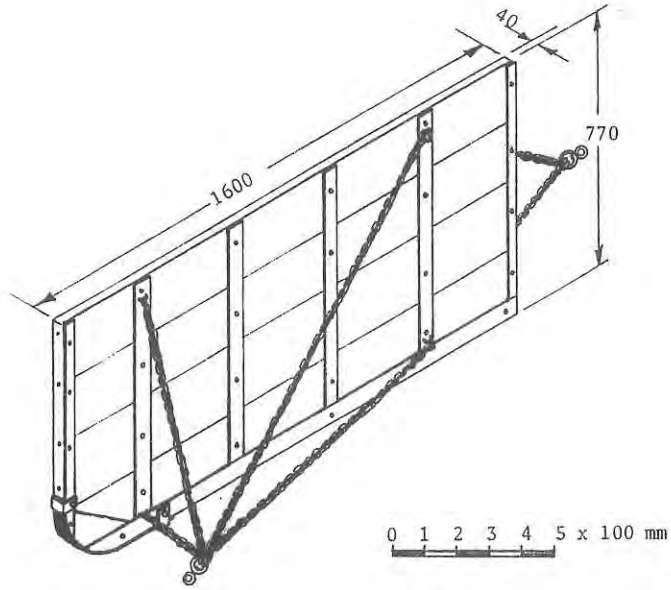


TRAWL
 Bottom, otter
 Demersal fishes

VESSEL
 Loa 18 m
 hp 190

LOCATION
 Pulau Pangkor
 Perak

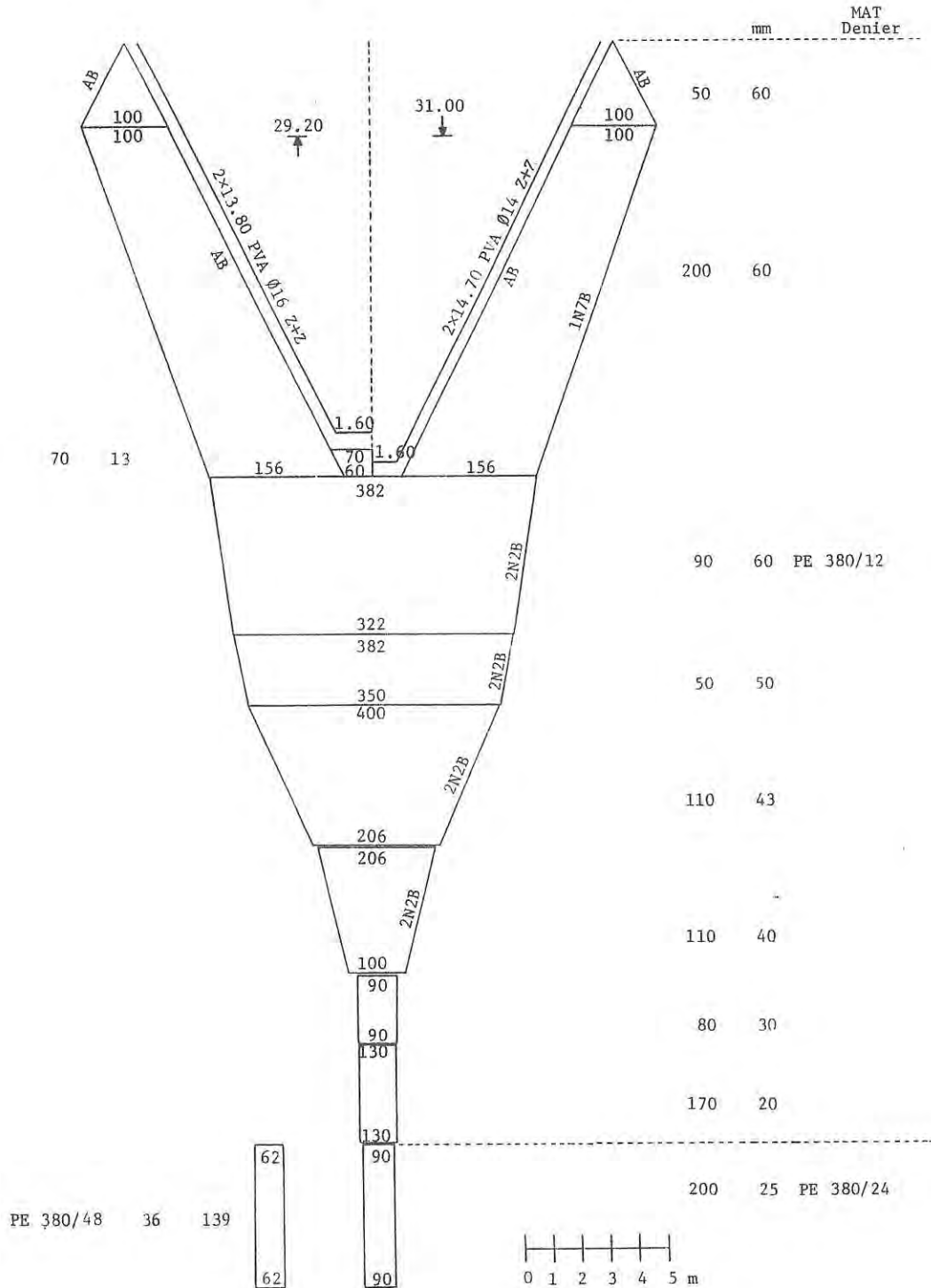




TRAWL
Bottom, otter
Demersal fishes

VESSEL
Loa 20 m
hp 250

LOCATION
Tg. Dawai
Kedah



TRAWL

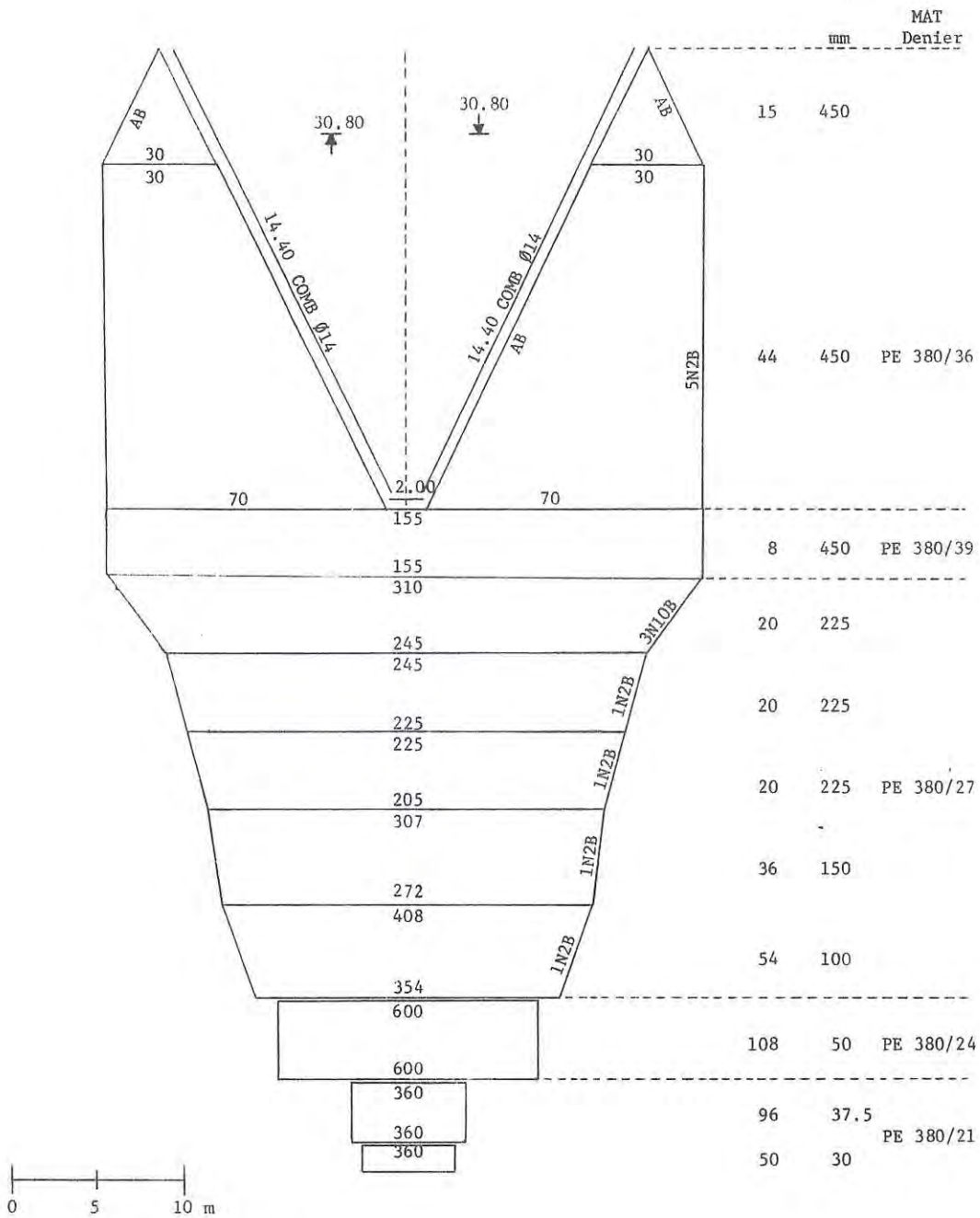
Bottom, otter
Demersal fishes

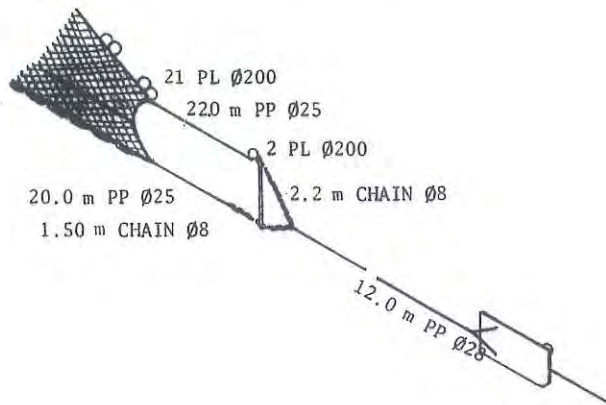
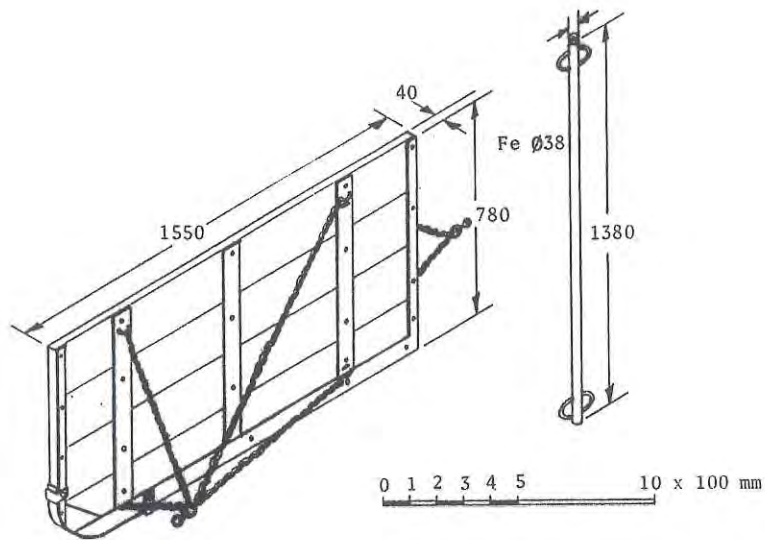
VESSEL

Loa 20 m
hp 250

LOCATION

Batu Maung
Pinang





TRAWL

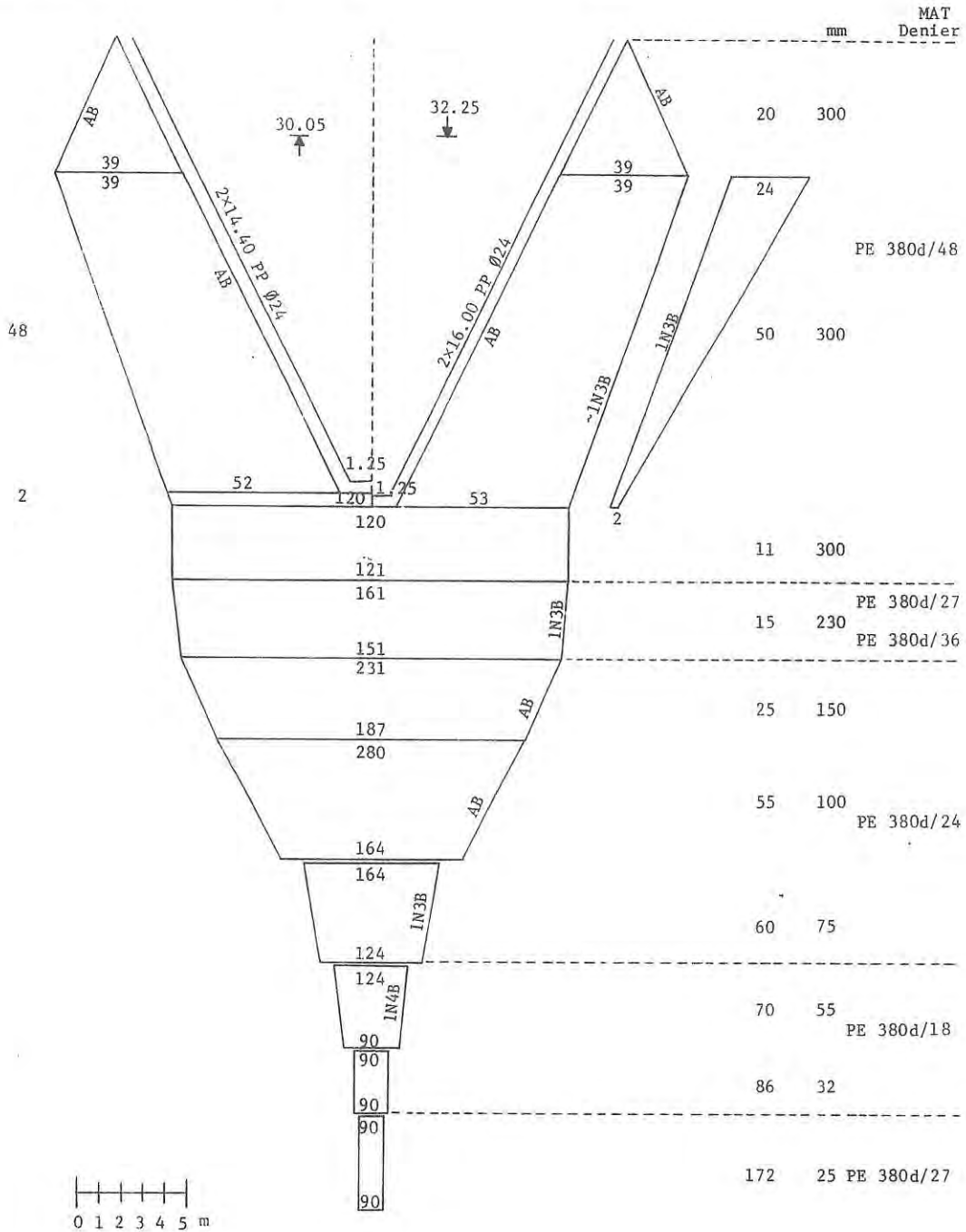
Bottom, otter
Demersal fishes

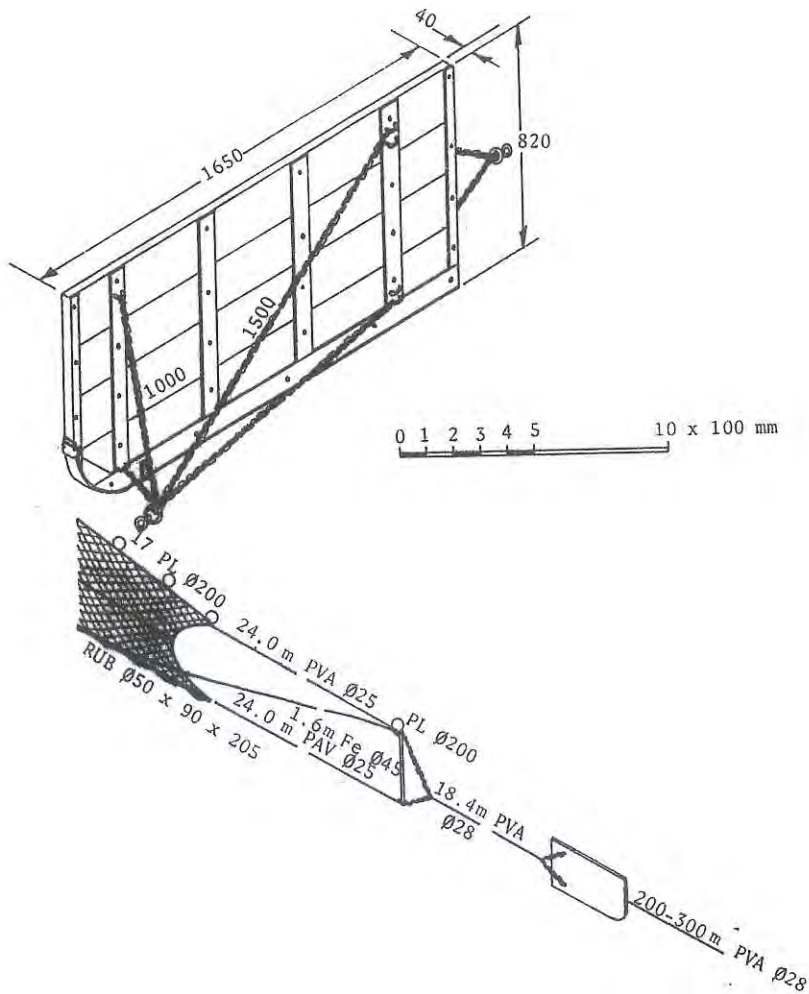
VESSEL

Loa 19 m
hp 355

LOCATION

Pulau Pangkor
Perak

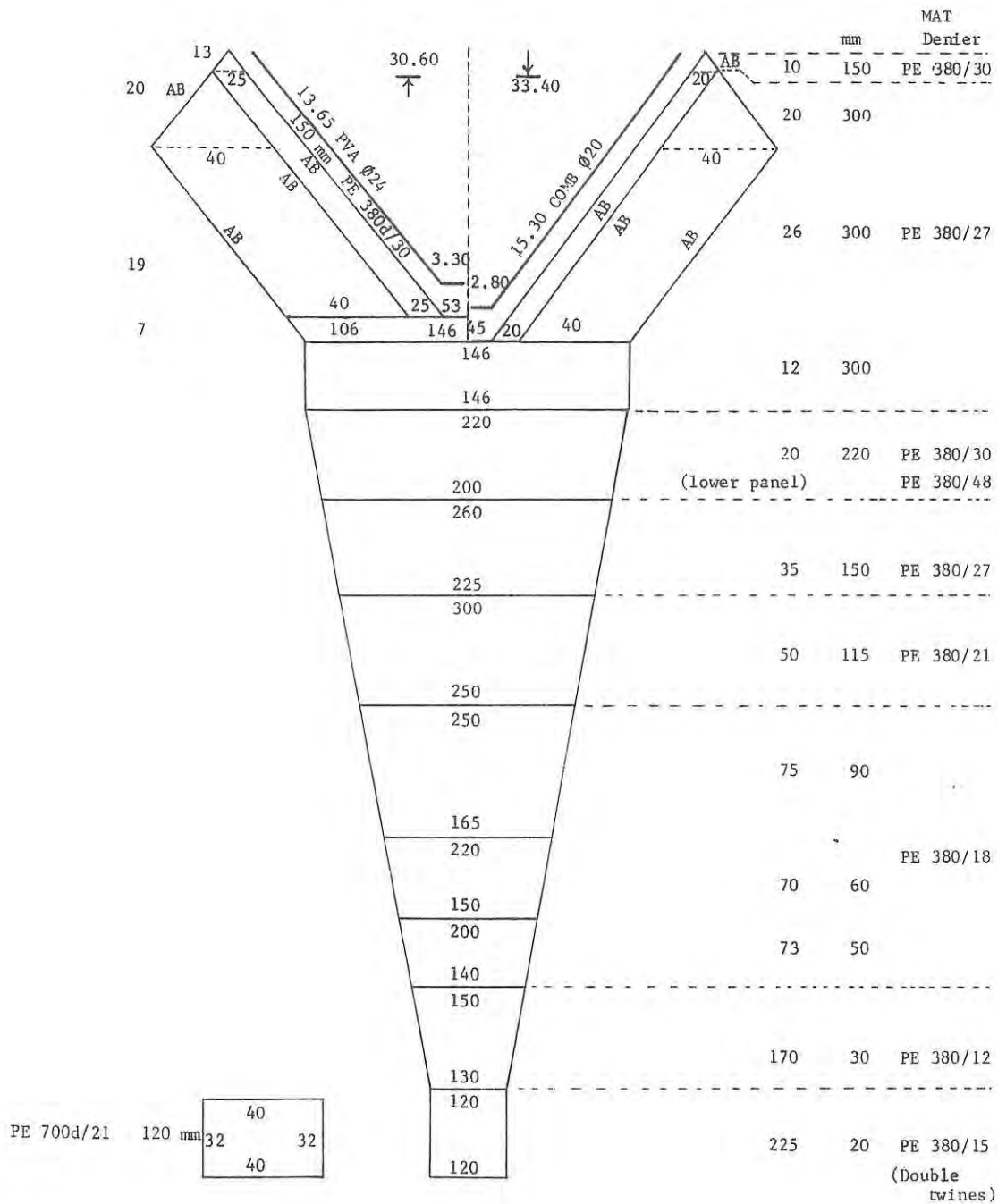


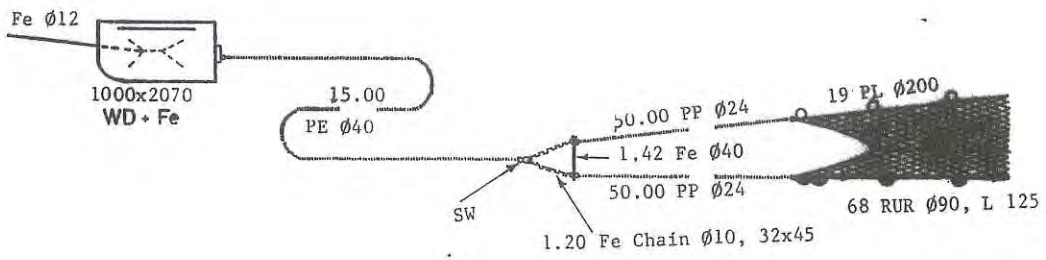
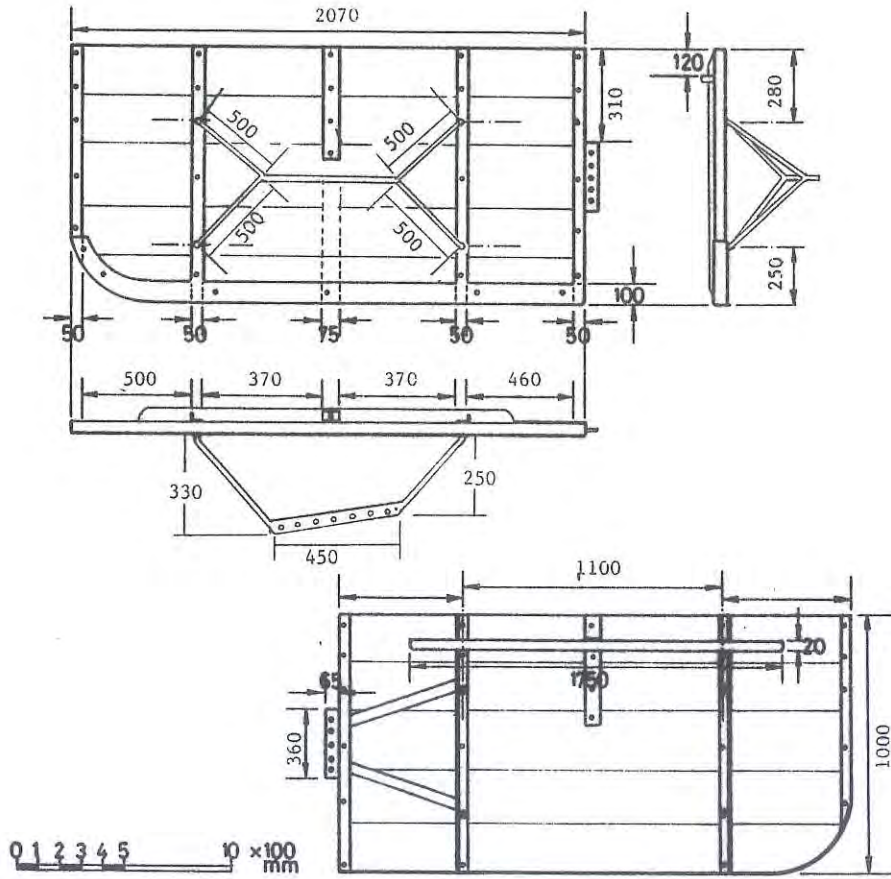


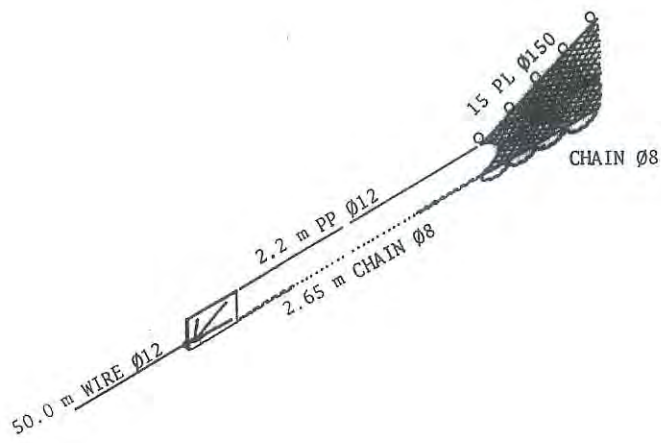
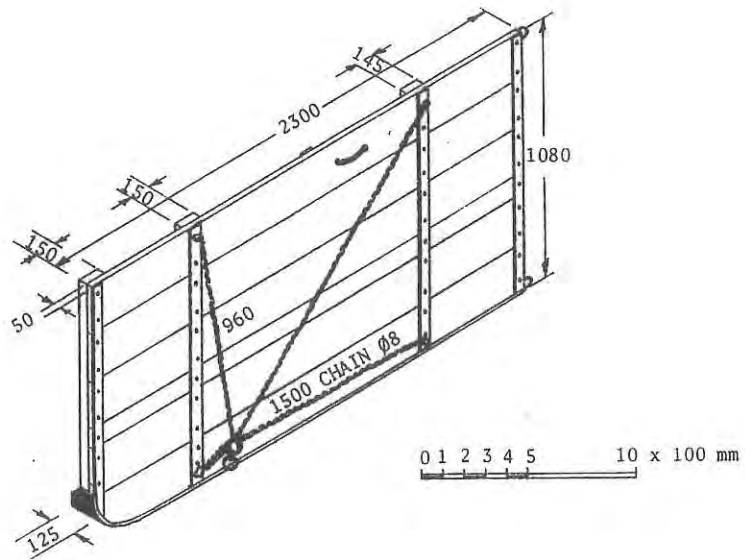
TRAWL
 Bottom, otter
 Demersal fish

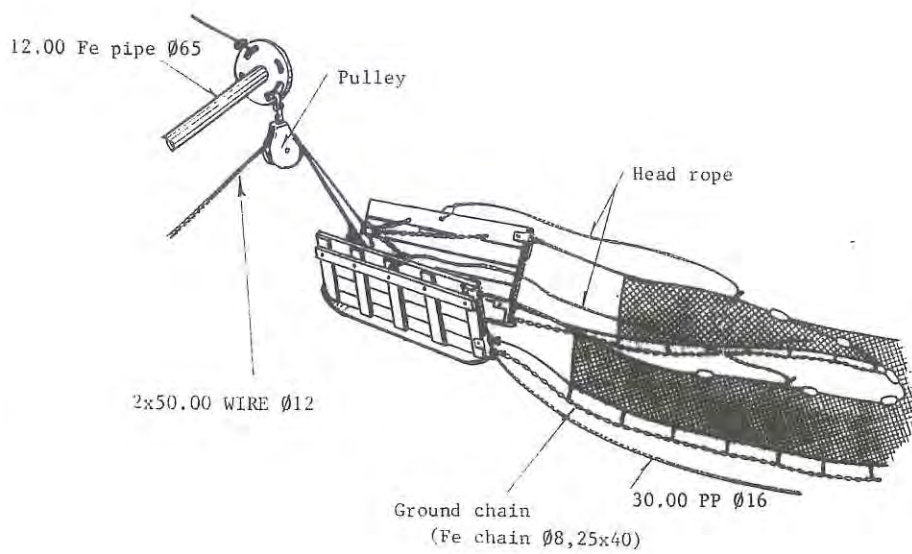
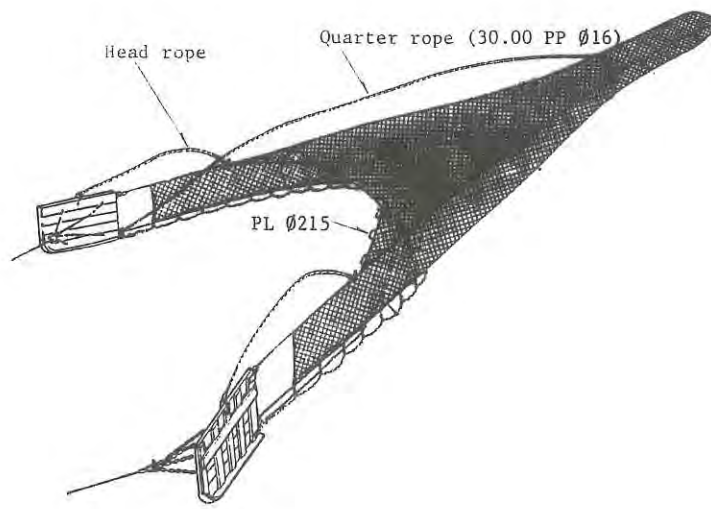
VESSEL
 Loa 28 m
 TG 207
 hp 400

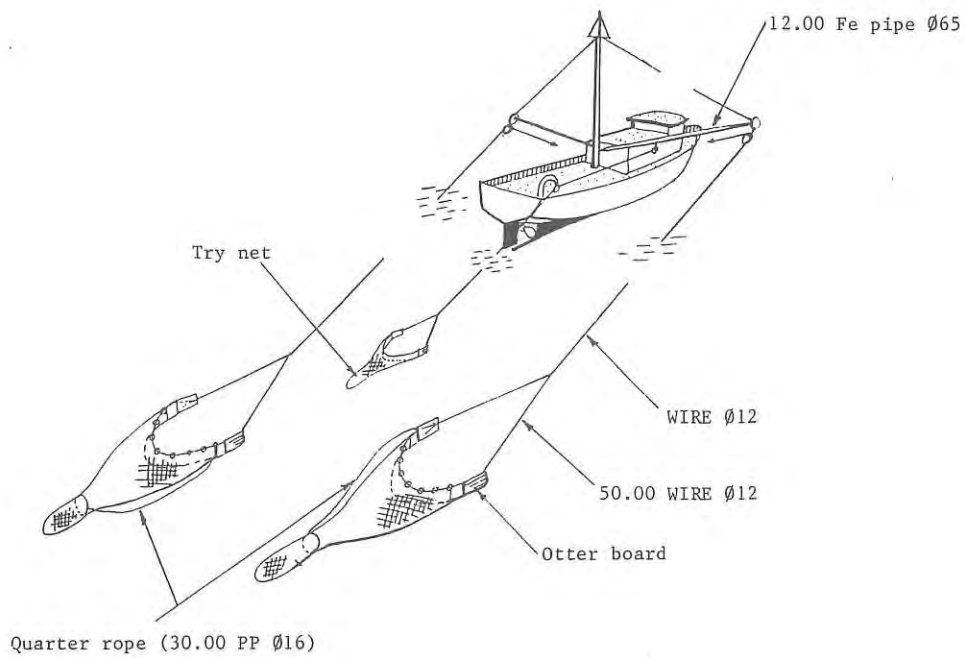
LOCATION
 Kuching
 Sarawak









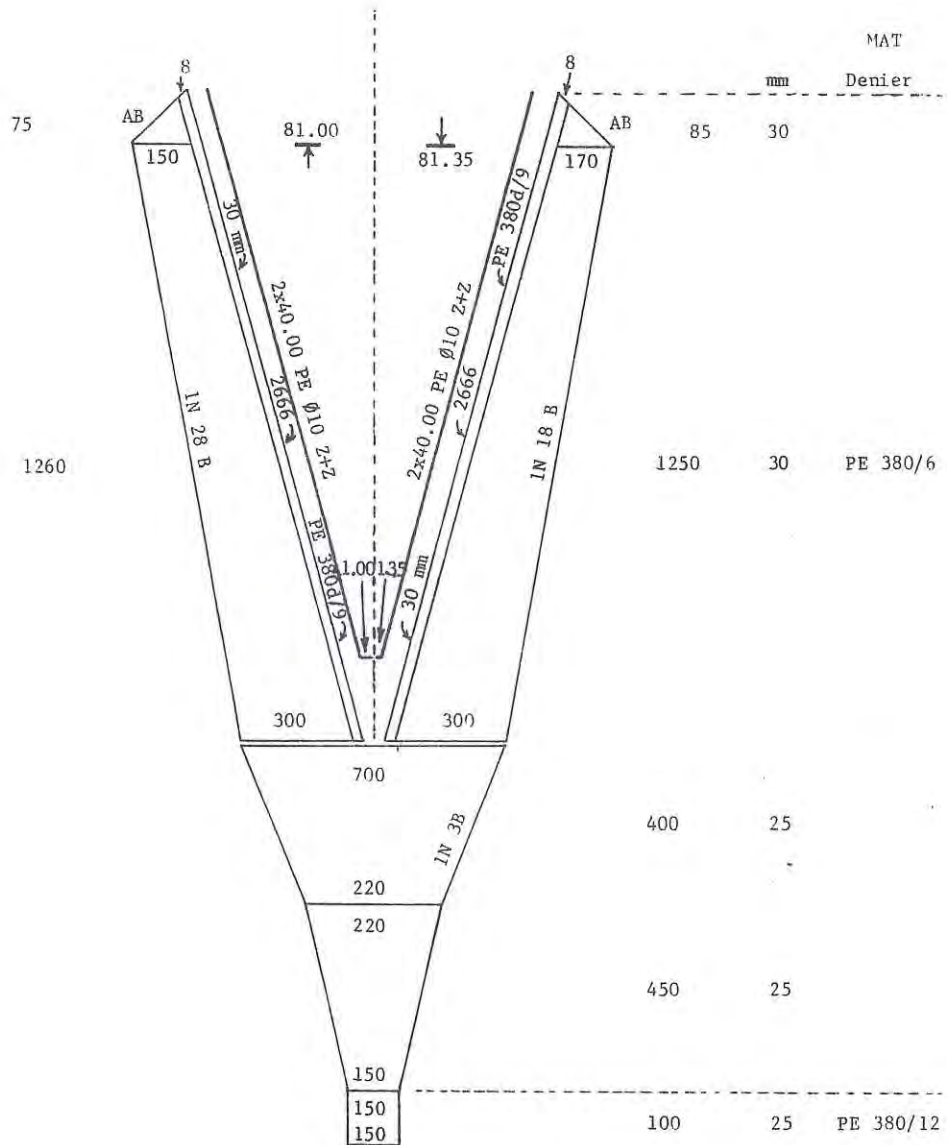


TRAWL
 Pair Trawl
 Fukat Kenka

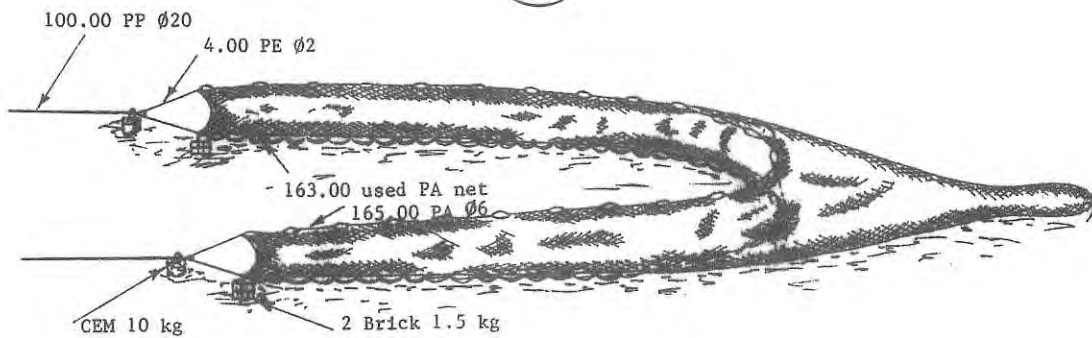
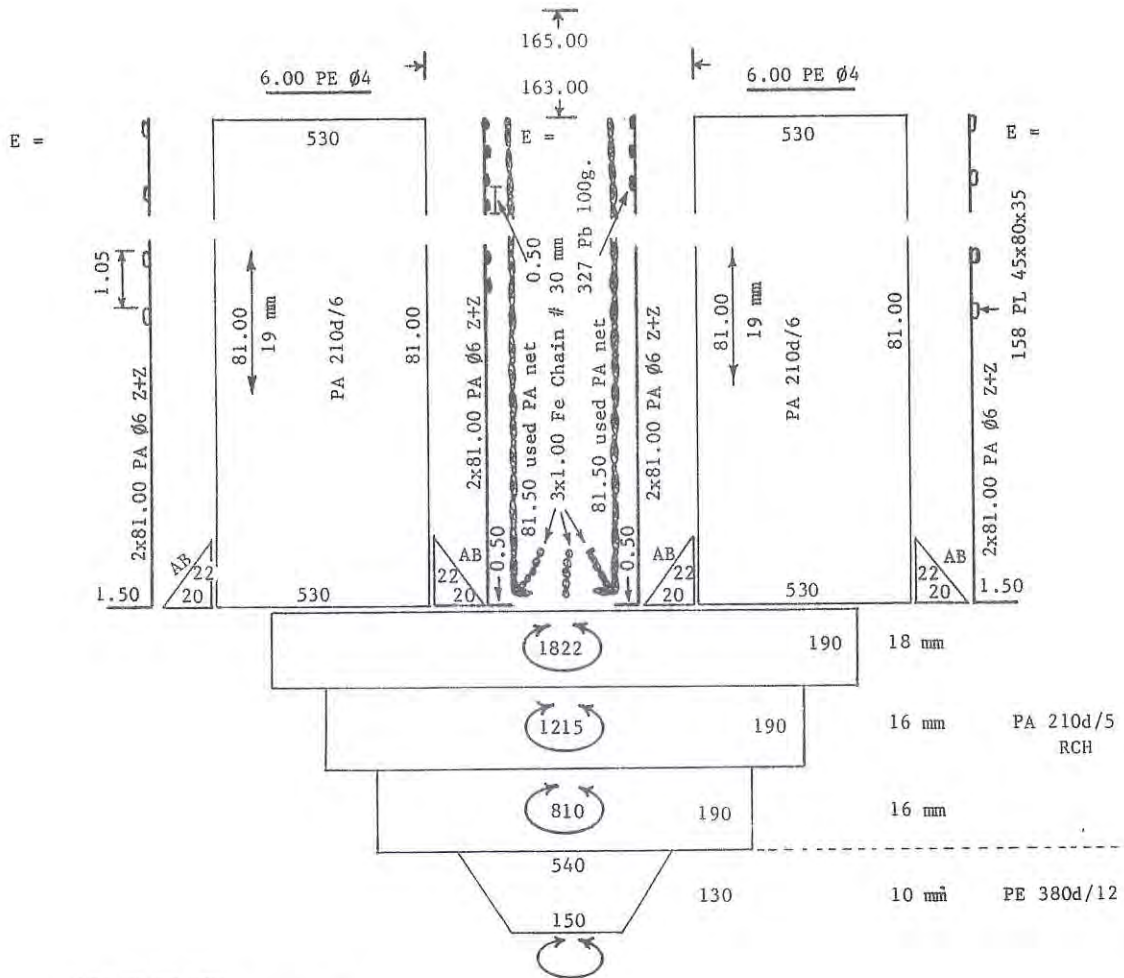
VESSEL
 Loa 2x11.5 m.
 hp 2x40

LOCATION
 Tg. Piandang
 Perak

Prawn, Cuttlefish, Squid, fishes



TRAWL	VESSEL	LOCATION
Pair trawl	Loa 2x12 m	Sungai Udang
<i>Fukat Kenka</i>	hp 2x16	Perak
Shrimp, demersal fishes		



TRAWL

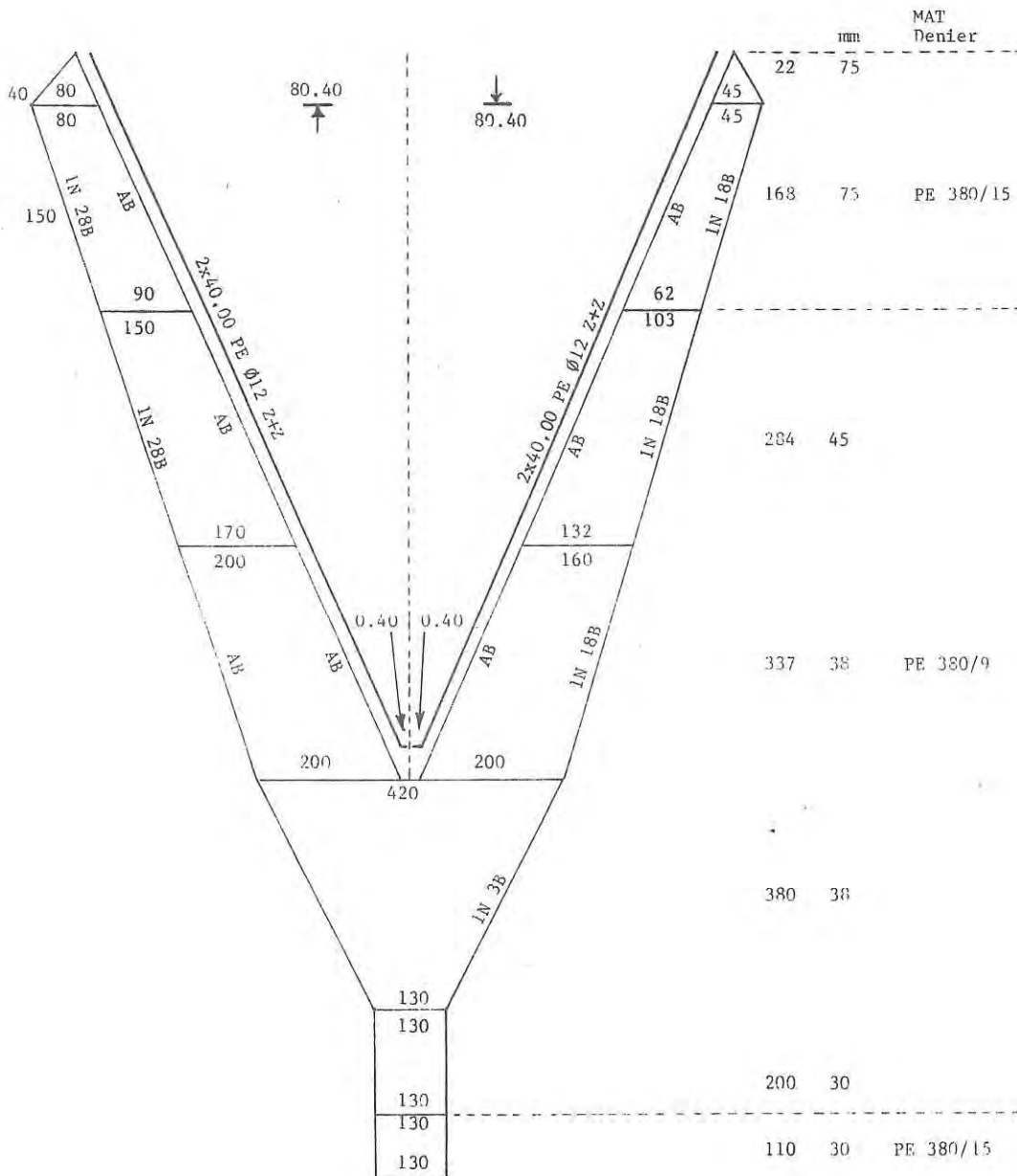
Pair trawl
Pukat Kenka
 Squid, Cuttle fishes, Prawn

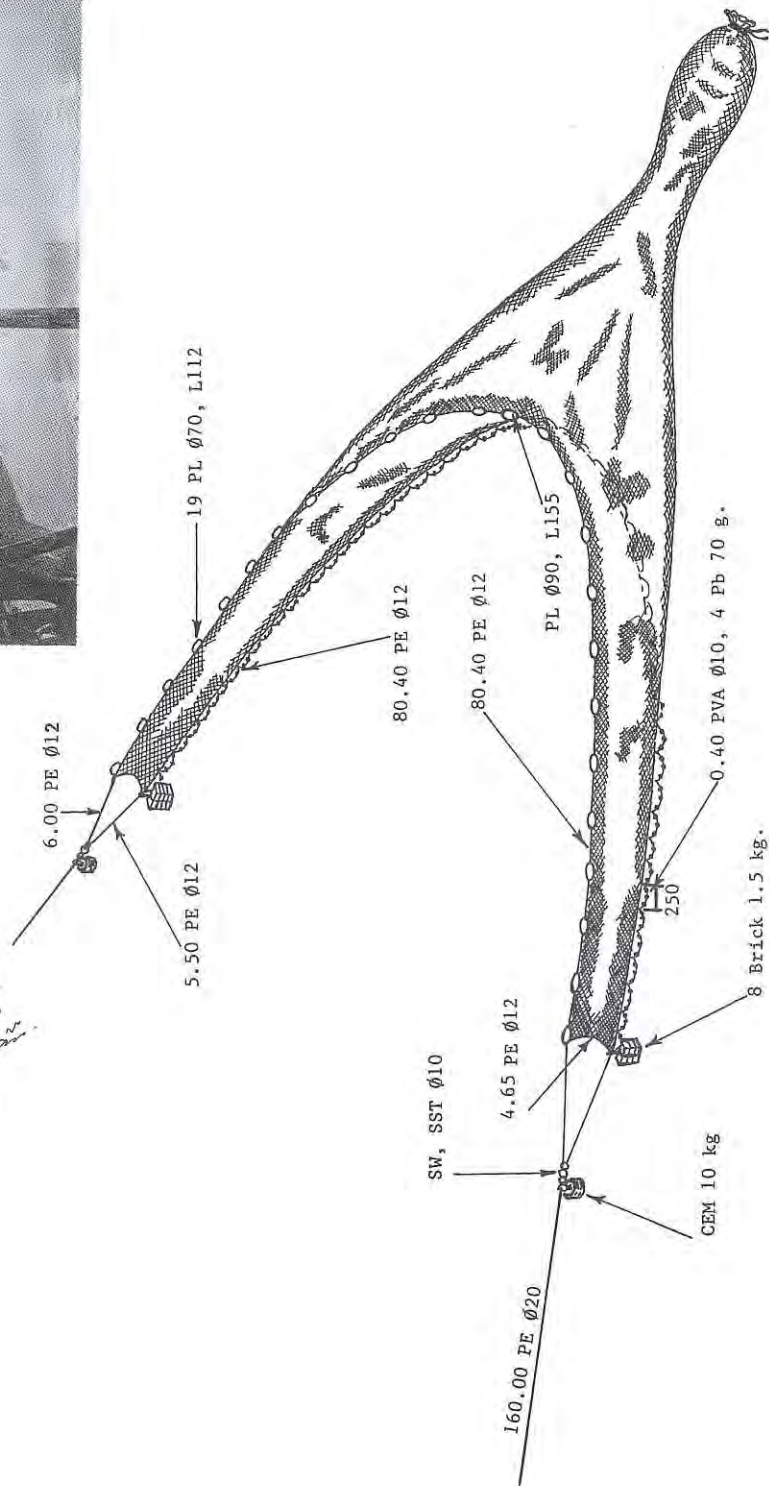
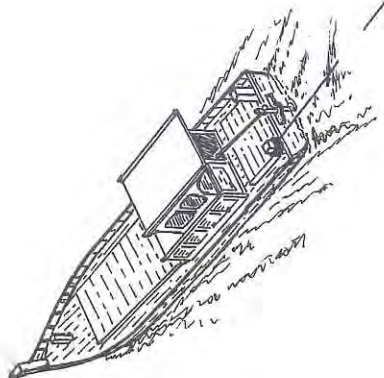
VESSEL

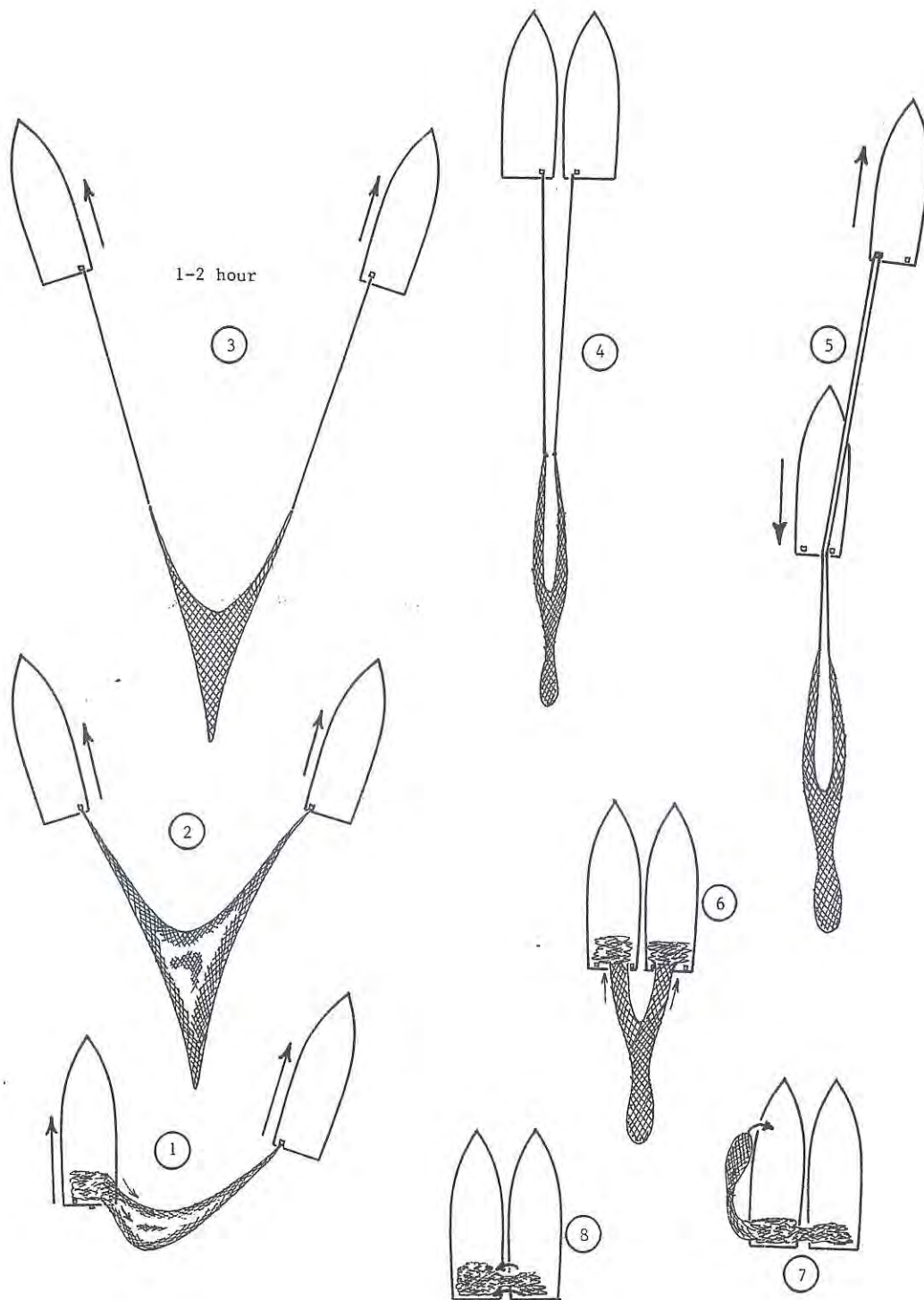
Loa 2x12.6 m
 hp 2x60

LOCATION

Tg. Piandang
Perak







<Chapter 6>

Liftnet Fishing

6.1 Introduction

The liftnet is a traditional small-scale fishing gear that has been used in coastal areas for catching crustacean and shallow water fishes. Nowadays, liftnet is becoming less popular due to the introduction of modern gear which are more efficient such as trawl and purse seine.

There was no independent statistical records for all types of liftnet fishing. Some data appear as a part of the general small-scale fishery. We can, however, roughly classify liftnet into four basic types:

- i. Portable liftnets
- ii. Boat liftnets
- iii. Stationary liftnets
- iv. Dip nets

6.2 Fishing Gear and Methods

6.2.1 Portable liftnet

6.2.1.1 Crab liftnets

The gear consists of a bamboo or metal frame, the net, and a bamboo pole or a rope with a buoy. The frame is usually round, 40-50 cm. in diameter, or square, 45 cm. along sides. The height of the frame is 15-25 cm. The net is polyethylene or nylon, with 80-140 mm. mesh size.

The fish bait is fixed to the center of the frame. The fisherman can operate this gear in very shallow water, from a rowing boat or by simply walking along the shore. The catch is usually mangrove crab and blue swimming crab. Fishing is done in the day or night-time, all the year round.

6.2.1.2 Lobster liftnet

The gear consists nylon (mono-filament) netting material of about 50 mm. mesh size rigged to two circular shape metal frames of different size. The first frame is about 40 mm. in diameter and the second one is about 30 mm. in diameter. The larger frame is tied to a monofilament line. During the operation, baits (fish) are fixed to the smaller frame. The gear is immersed till it touches the sea bed and the line is tied to the anchored vessel. The net is hauled once the fisherman feels the present of catch. The target catch is spiny lobster.

6.2.1.3 Fish liftnet

The gear consists of nylon monofilament netting material (about 45 mm. mesh size) is rigged to a metal frame (about 150 cm. in diameter). The frame is tied to a hauling line. The other end of the net is tied to a sinker. The gear is baited with jellyfish or oval squid, which are hung inside the net. The net is operated near FADs, artificial reef or rocky bottom. The baited net is immersed in water (about 10 m. depth), the hauling line is tied to the vessel. The net is hauled by pulling up the hauling line, once the fisherman ensures the present of fish in the net. Target catch is unicorn filefish.

6.2.2 Boat Liftnet

6.2.2.1 Two boats liftnet

The liftnet is set in the water, with the ground rope attached to a sinker, touching the sea bed. The net looks like a scoop net. The netting is usually nylon 210d/6-12, 25-29 mm. mesh-size, with a 0.67 hanging ratio.

The fisherman uses a fish shelter to gather the fish before transferring them first to a portable fish shelter and then into the net. The net is hauled by two boats, one at each side. The target fishes are sardine, pomfret, mackerel.

6.2.2.1 Four boats liftnet

This fishing gear is related to liftnet fishing operations which took place in the southern part of Thailand long time ago. It is no longer seen today.

The gear consists of a square or rectangular net, to which a sinker is attached at each corner. The net is usually nylon 210d/6-12, 18-120 mm. mesh-size, with a 0.67 hanging ratio. The fishing operation is the same as two boat liftnet.

6.2.3 Stationary liftnet

This is a comparatively large-scale liftnet. The stationary liftnet has a leader net, or a fence, to guide the fish into the main net, which is suspended on a wooden frame in about 0.5-2 meters depth of water. An observation platform is built, 8-10 meters high, so that the fisherman can see a passing fish school and operate the net from a good vantage point. The net is made of Polyethylene 380d/a, 4x4 mm. mesh-size, minnow net. The leader net is 30-50 meters long, and a fluorescent lamp is attached to the platform

The anchovy liftnet operation also includes a boiling house and drying area. The net is raised or lowered through a system of pulleys, and three men are required to operate it.

6.2.4 Dip net

The fishing takes place on board a small- to medium- sized vessel (8-14 m). The gear consists of a square or cone shaped net with two wooden poles or a sinker. The net is usually nylon or polyethylene, 25-70 mm. mesh-size, with an 0.5 hanging ratio. During the operation the boat is allowed to drift with current or wind. Fisherman move the fish shelter into the net, then raise the net. The main catch is black pomfret.

LIFTNET

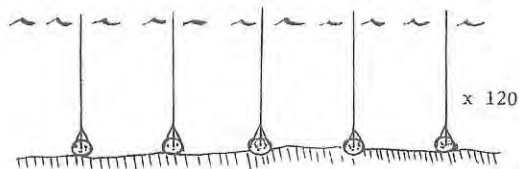
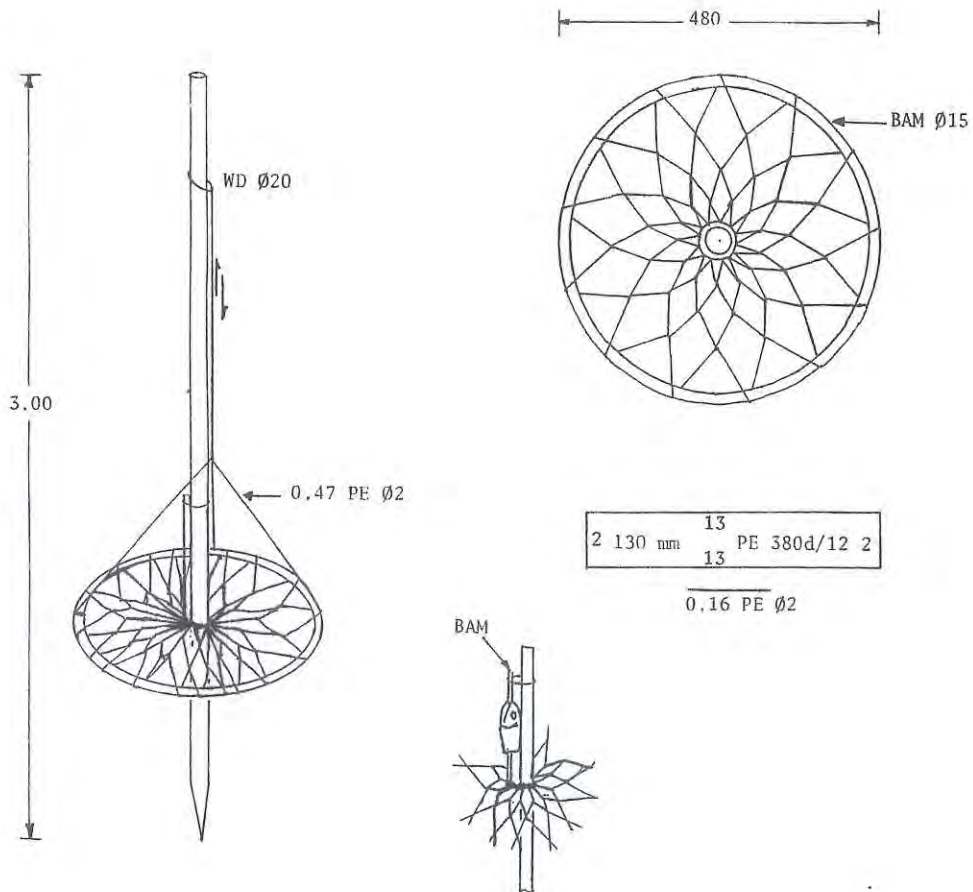
Crab liftnet, Portable
Mud crab

VESSEL

Loa 8 m
hp 6 LT

LOCATION

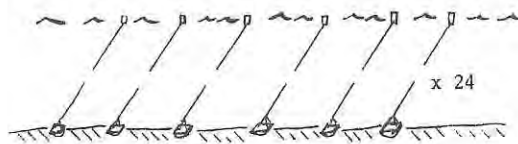
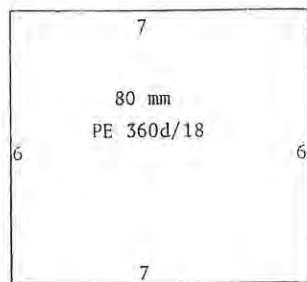
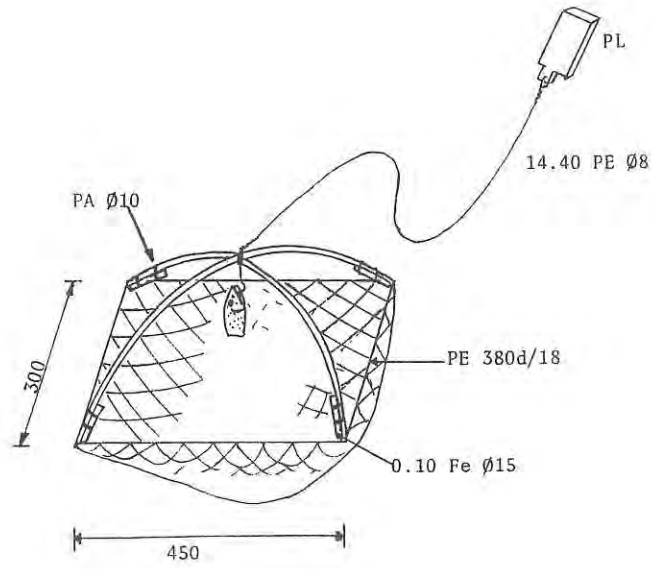
Kuala Perlis
Perlis



LIFTNET
 Crab liftnet, portable
 Mangrove crab, Blue
 swimming crab

VESSEL
 Loa 3 m
 hp -

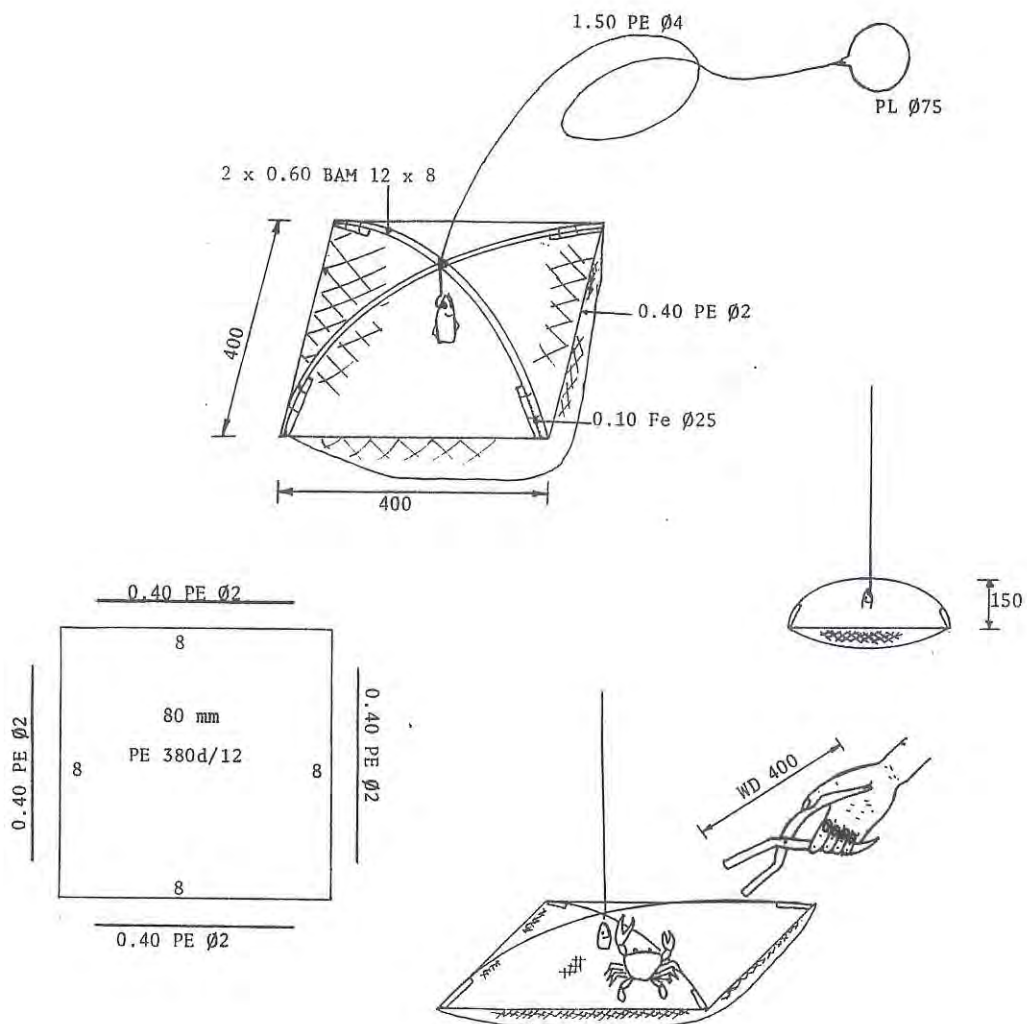
LOCATION
 Kampong Peramu
 Pahang



LIFTNET
 Crab liftnet, Portable
 Mud crab

VESSEL
 Loa 3.50 m
 hp -

LOCATION
 Selinsing
Perak



LIFTNET

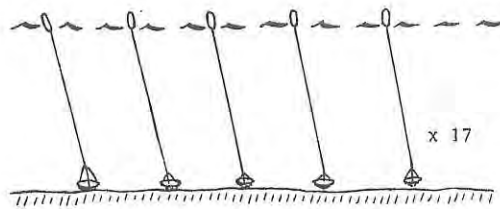
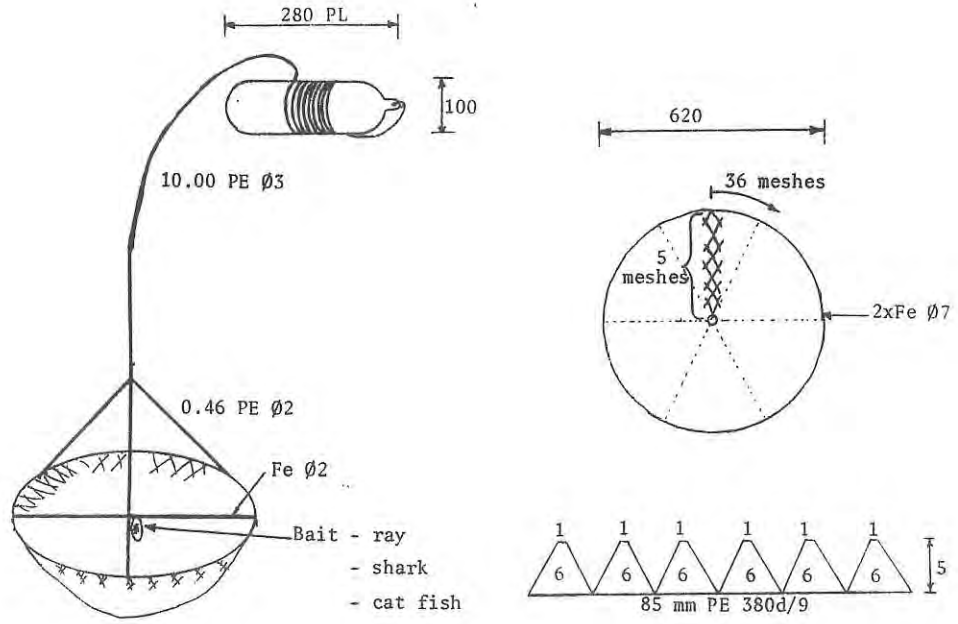
Crab liftnet, Portable
Mud crab, blue swimming crab

VESSEL

Loa 5 m
hp 15 OM

LOCATION

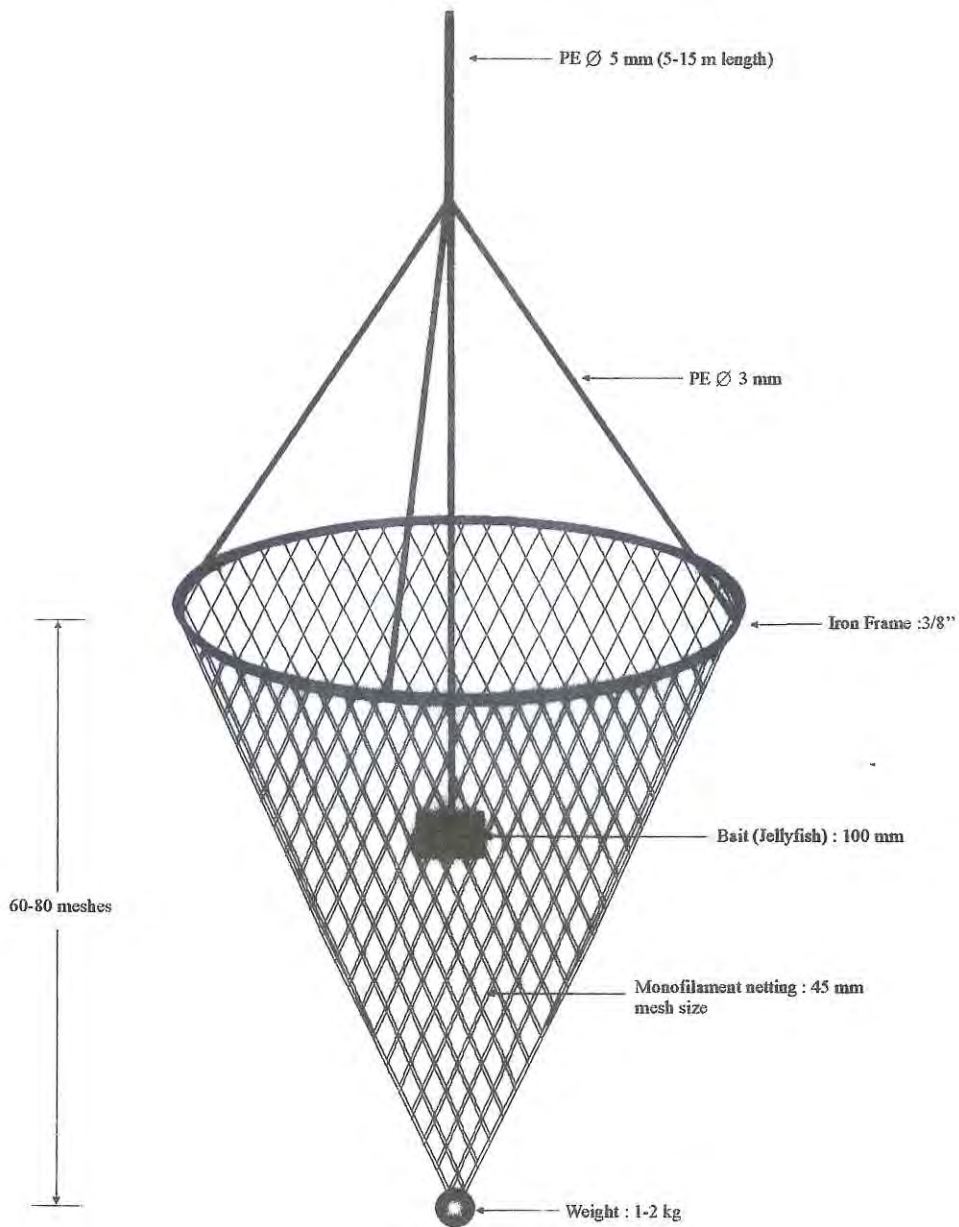
Kota Tinggi
Johor



LIFT NET
Portable
Unicorn Filefish

VESSEL
Loa
Hp : 8-15

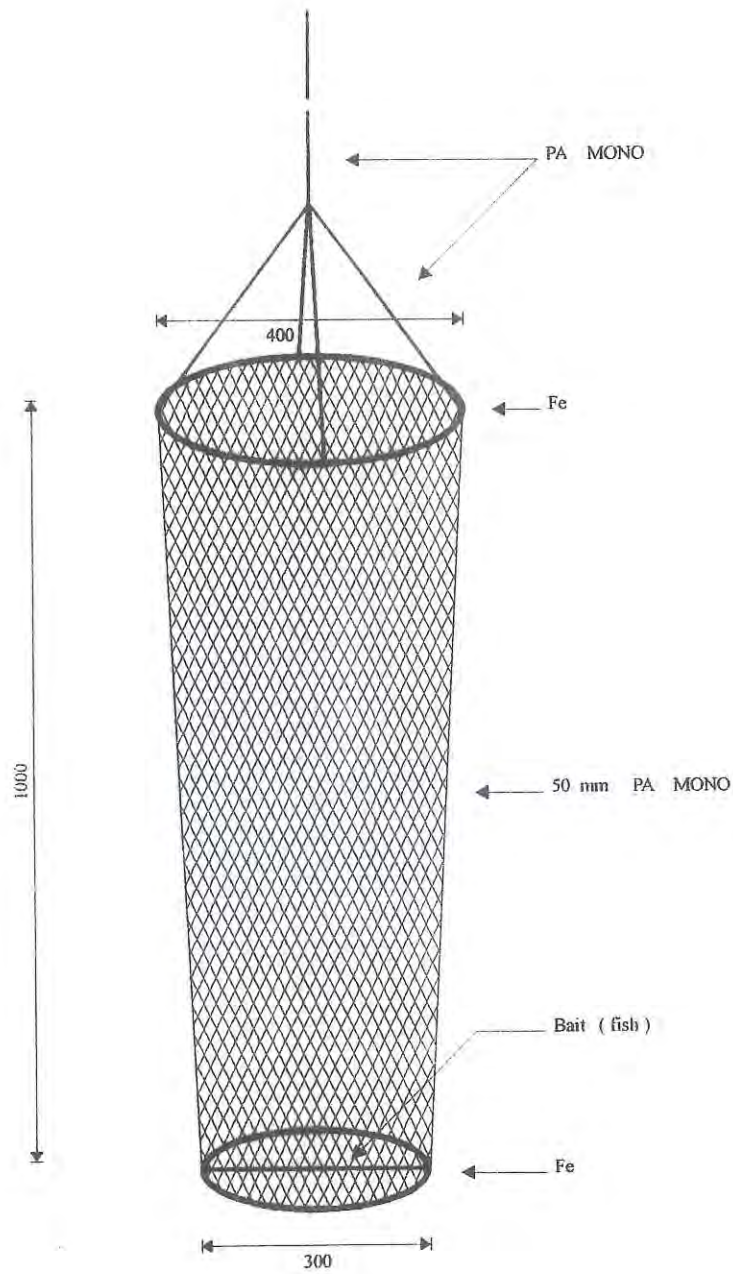
LOCATION
Kuala Terengganu



LIFT NET
Portable
Lobster

VESSEL
Hp 8-15

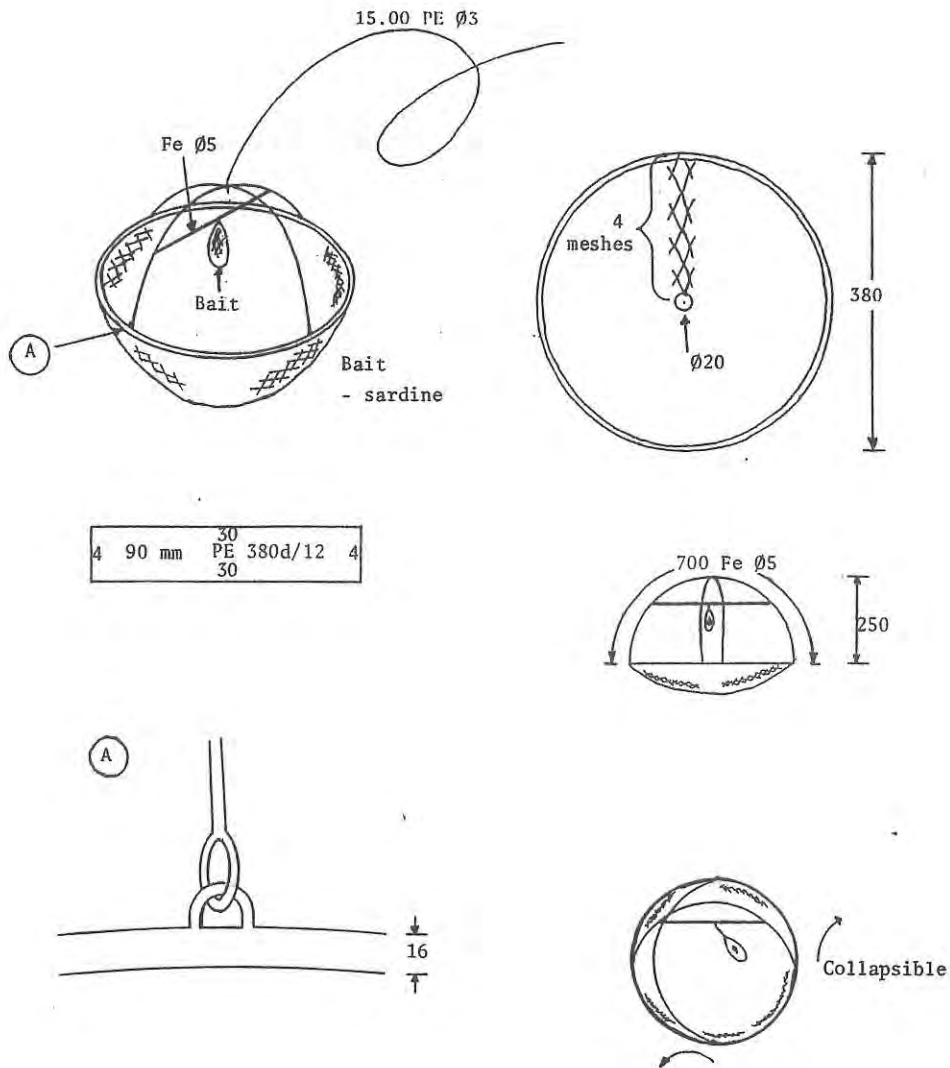
LOCATION
Sungia Rengit
Johor



LIFTNET
 Crab liftnet, Collapsible
 Mud crab

VESSEL
 Loa -
 hp -

LOCATION
 Kuantan
Pahang



LIFT NET

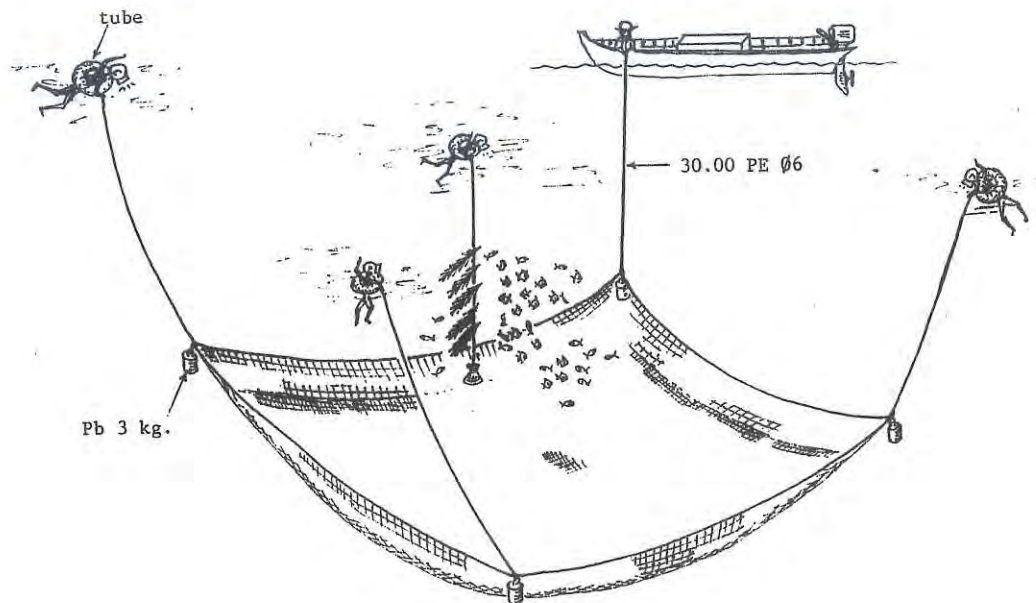
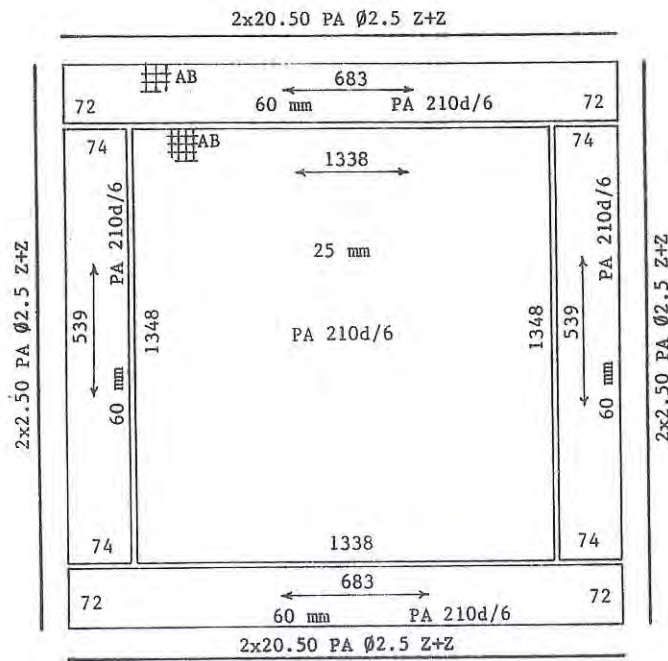
Lift net
Selambau
 Black pomfret, scad, sardine

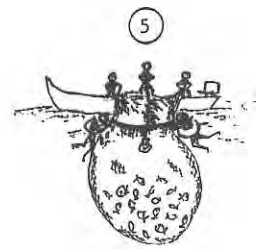
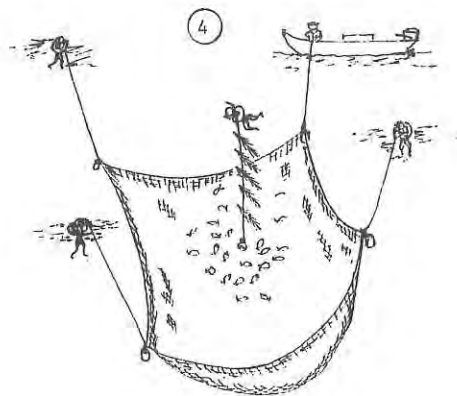
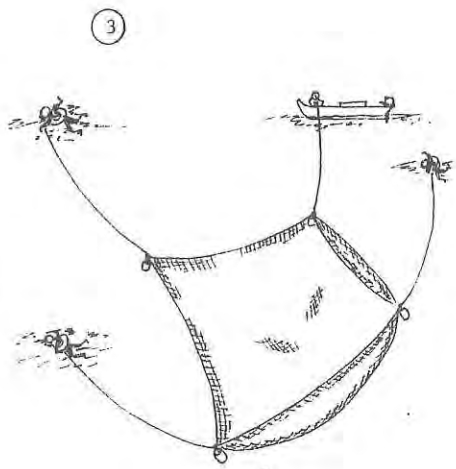
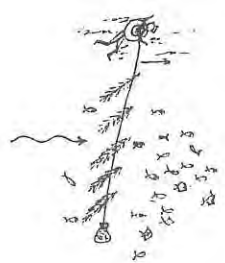
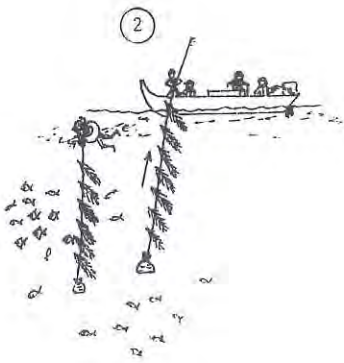
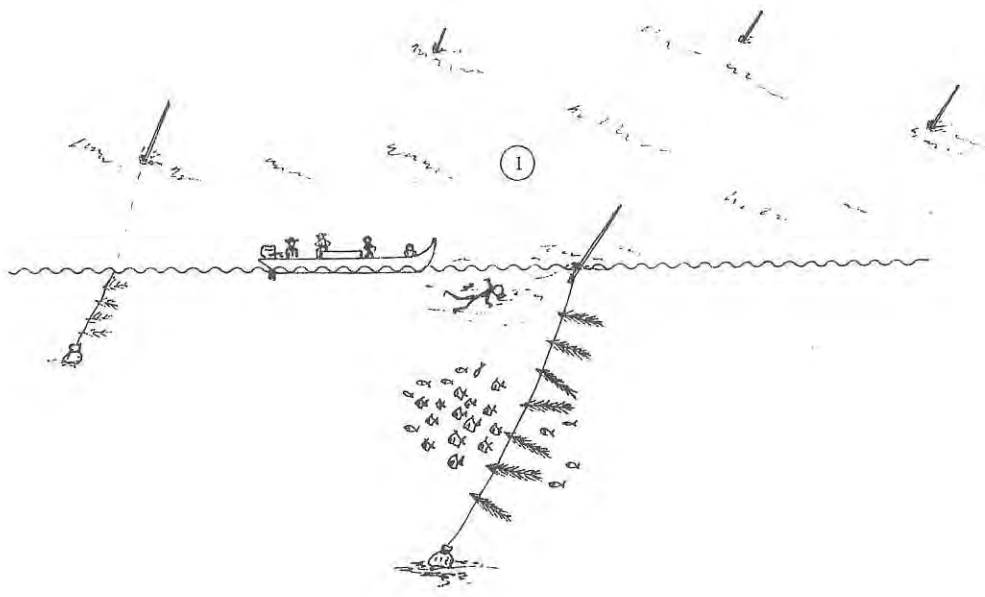
VESSEL

Loa 9 m.
 hp 40 OM

LOCATION

Kg. Mengkabong
 Kota Kinabalu
Sabah

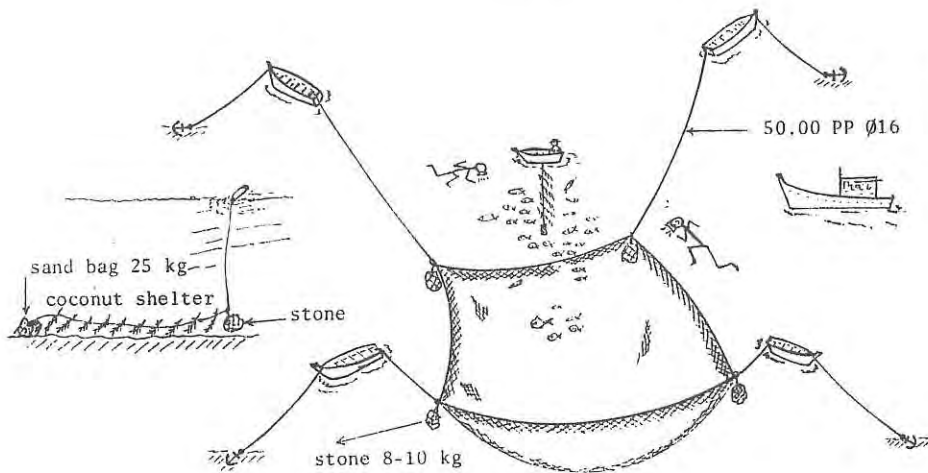
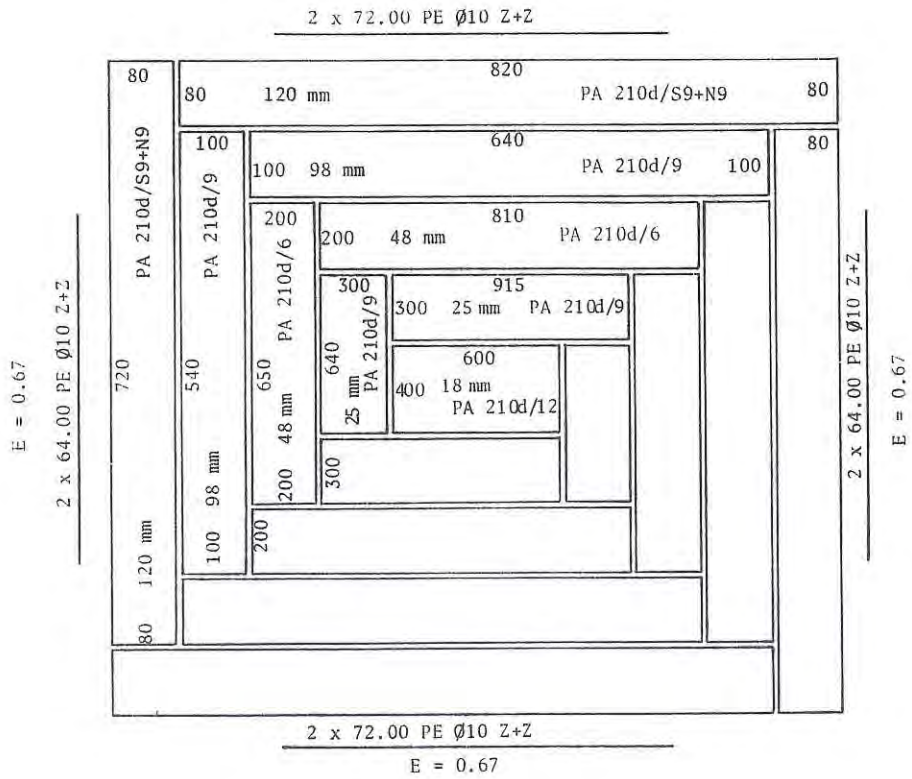


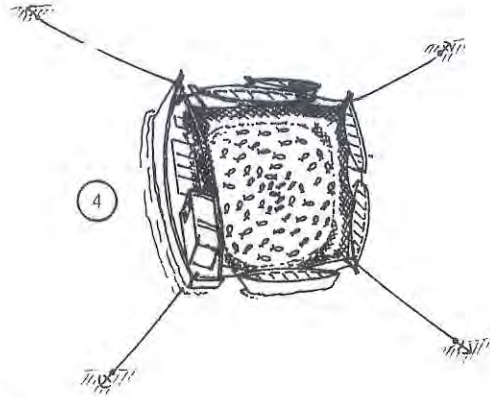
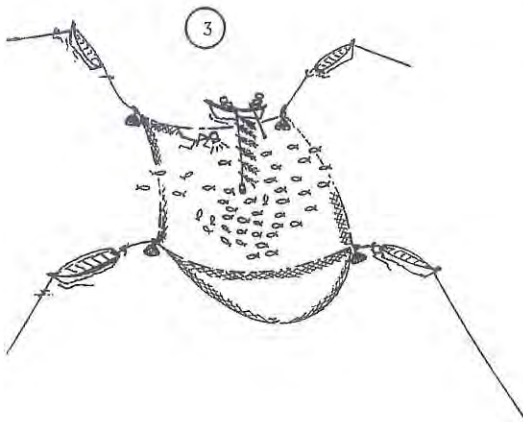
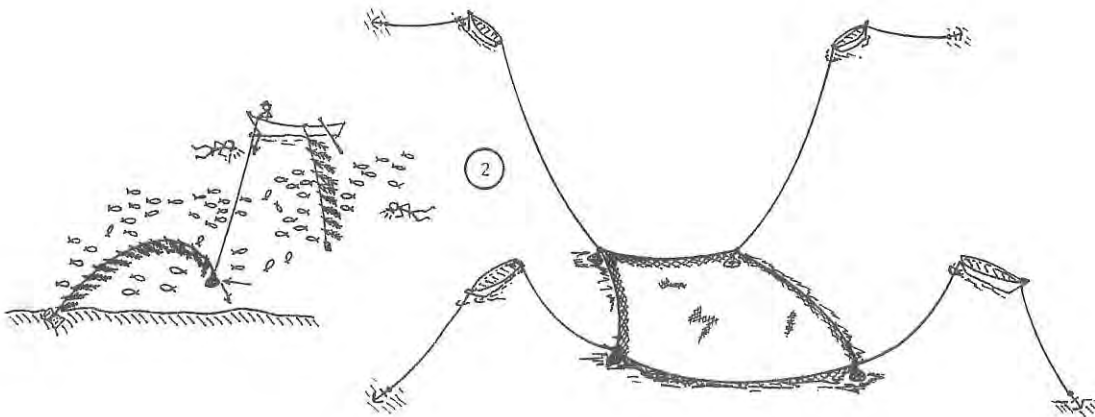
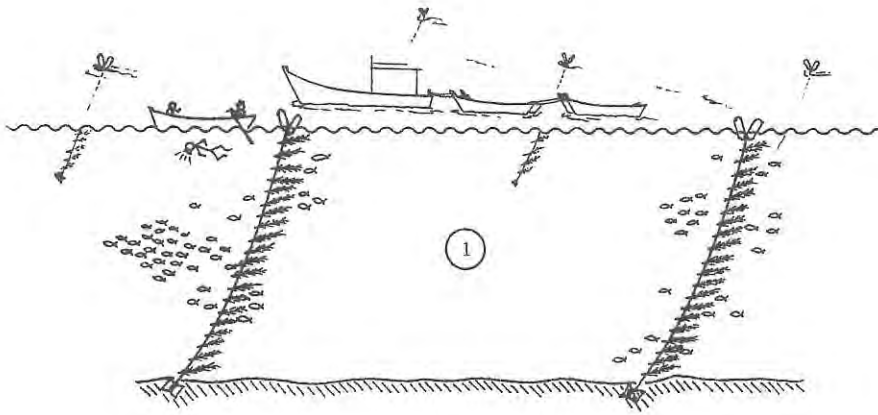


LIFTNET
 Four boat liftnet
Pukat Tangkul
 Sardine, Mackerel, scad

VESSEL
 Loa 10 m + 5 x 5 m
 GT - -
 hp 30 -
 E = 0.67

LOCATION
 Mengabang Telipot
 Terengganu





LIFTNET

Two boats liftnet

Fukat Sudu

Sardine, Trevally, Pomfret,
Scad, Mackerel

VESSEL

Loa 11.2, 10, 6 m

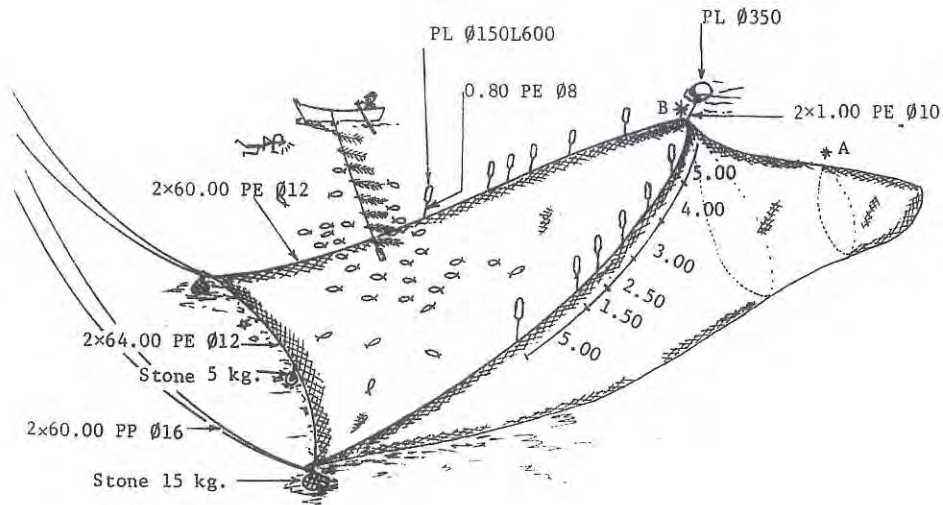
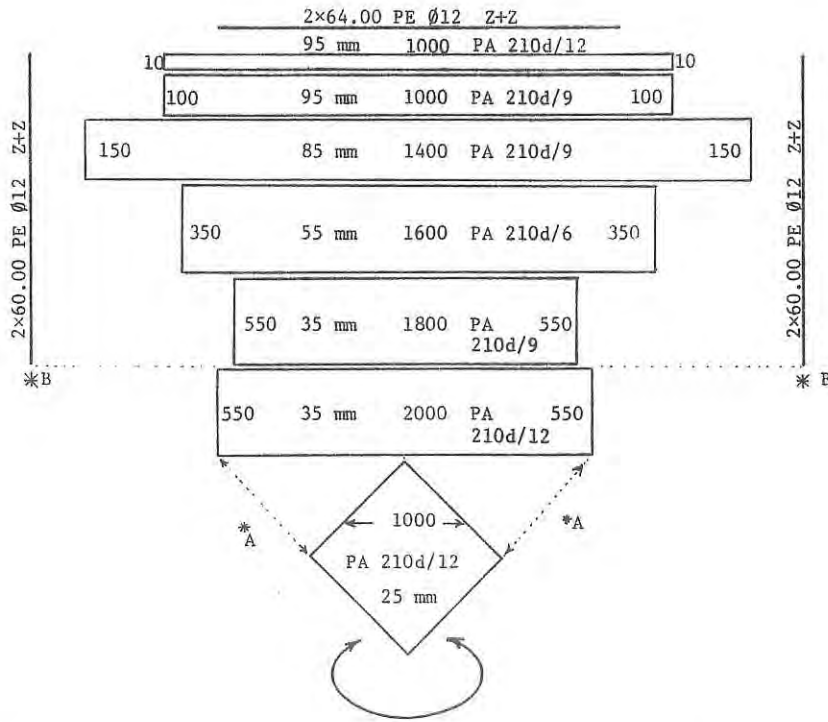
hp 24, 24, -

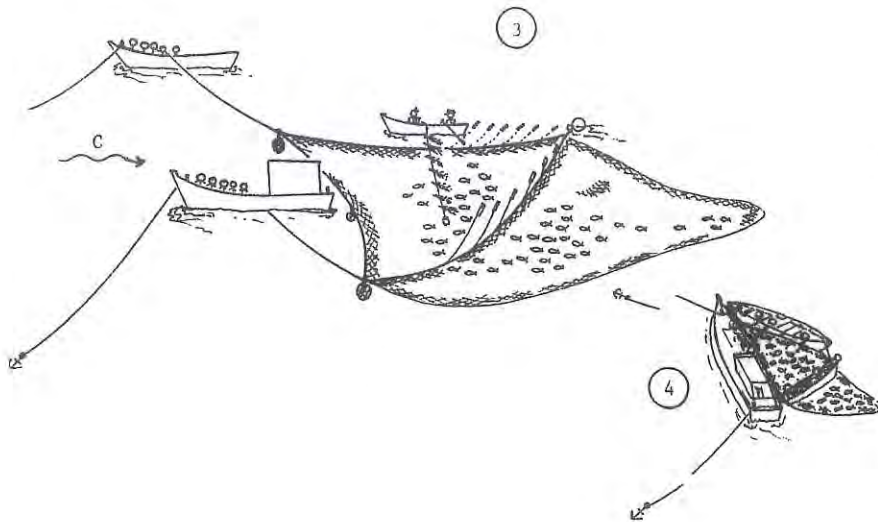
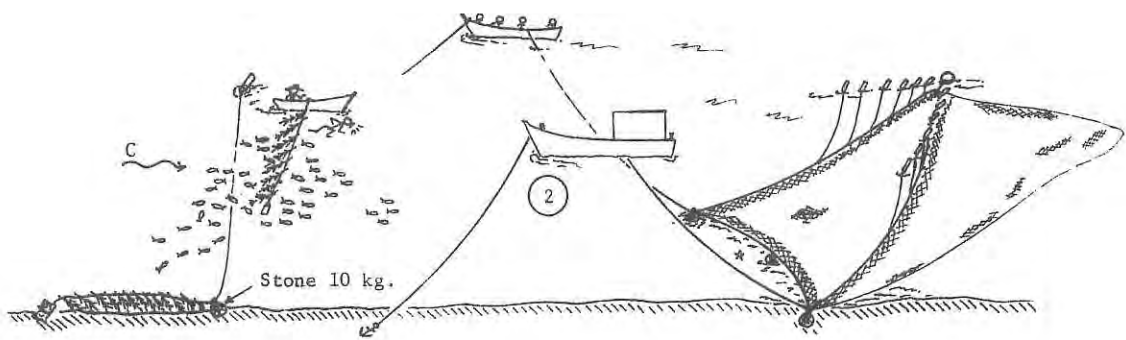
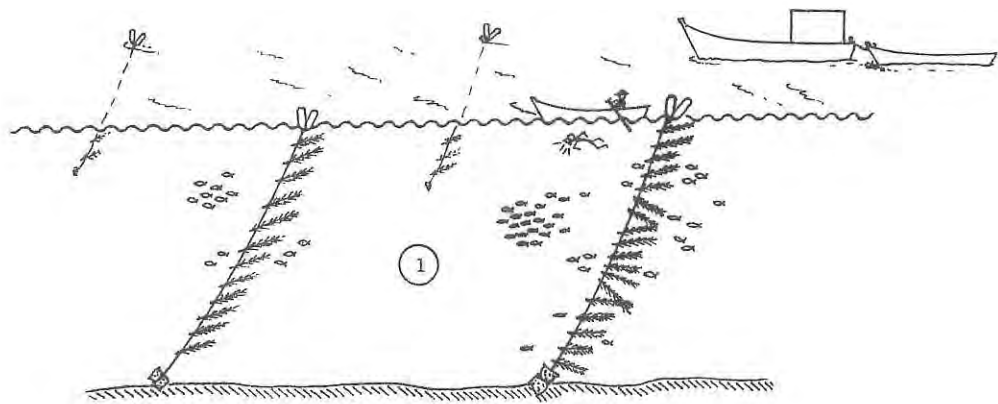
LOCATION

Tanjong Lumpur

Pahang

$E = 0.67$





LIFT NET
 Stationary-Lift net
Bagang
 Anchovy

VESSEL
 Loa 11 m.
 hp 40 OM

LOCALITY
 Kg. Indrasabah
Sabah

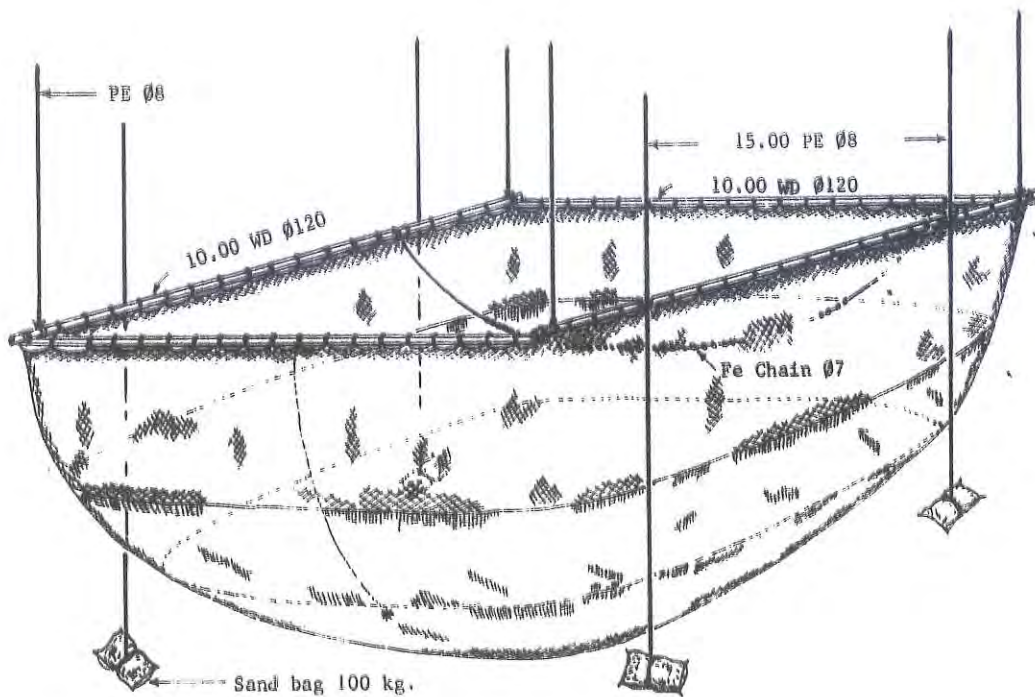
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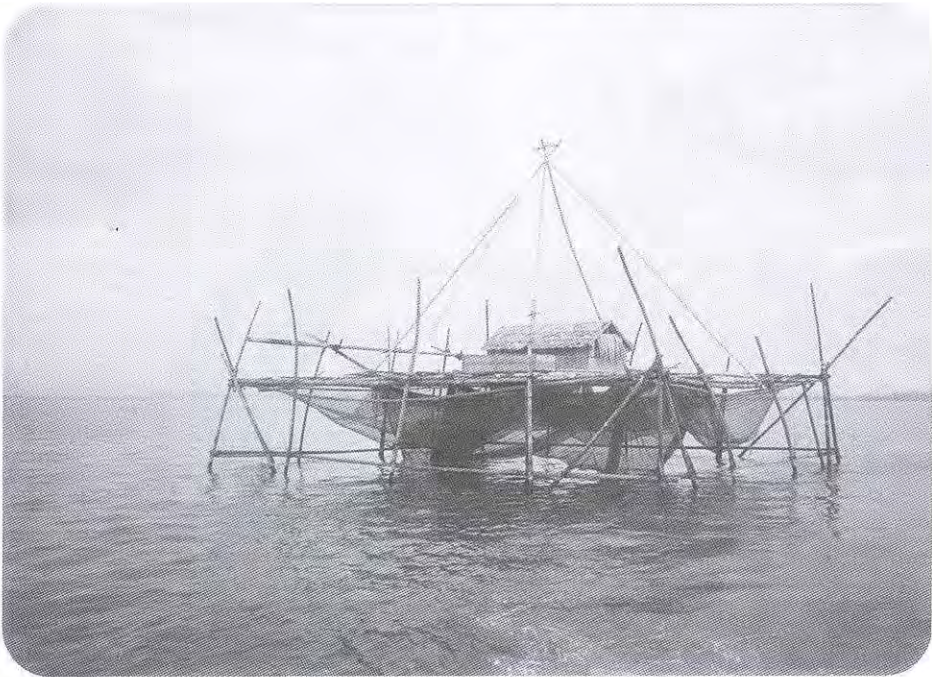
2x34.00 PE Ø6+4

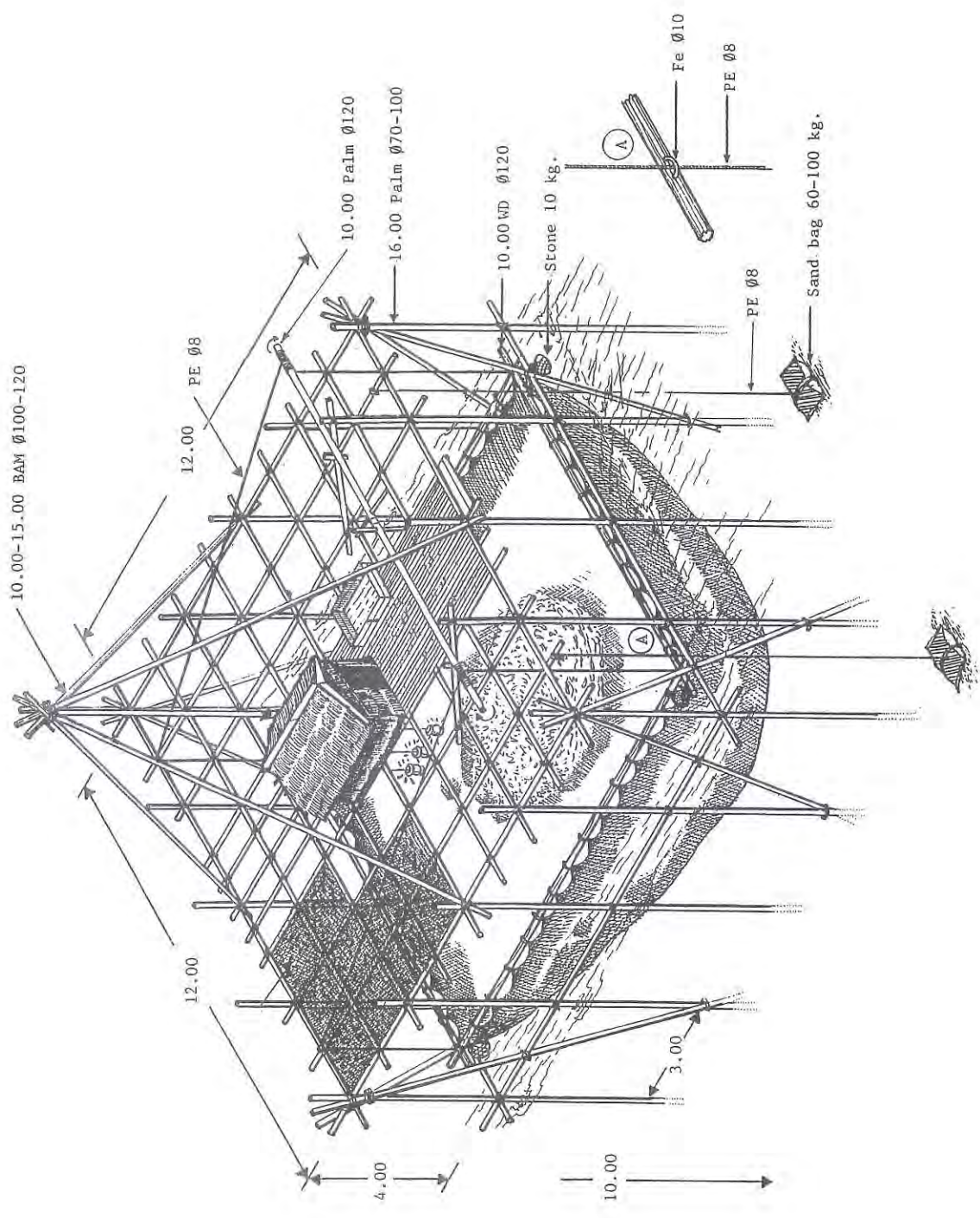
3.70	25 mm	37.50 PE 380d/9 37.50	minnow	3.70
------	-------	-----------------------------	--------	------

2.50	4x4 mm	37.50 PE 380d/9	minnow	2.50
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7.50	4x4 mm	7.50	minnow	7.50
7.50	PE 380d/9	7.50		7.50



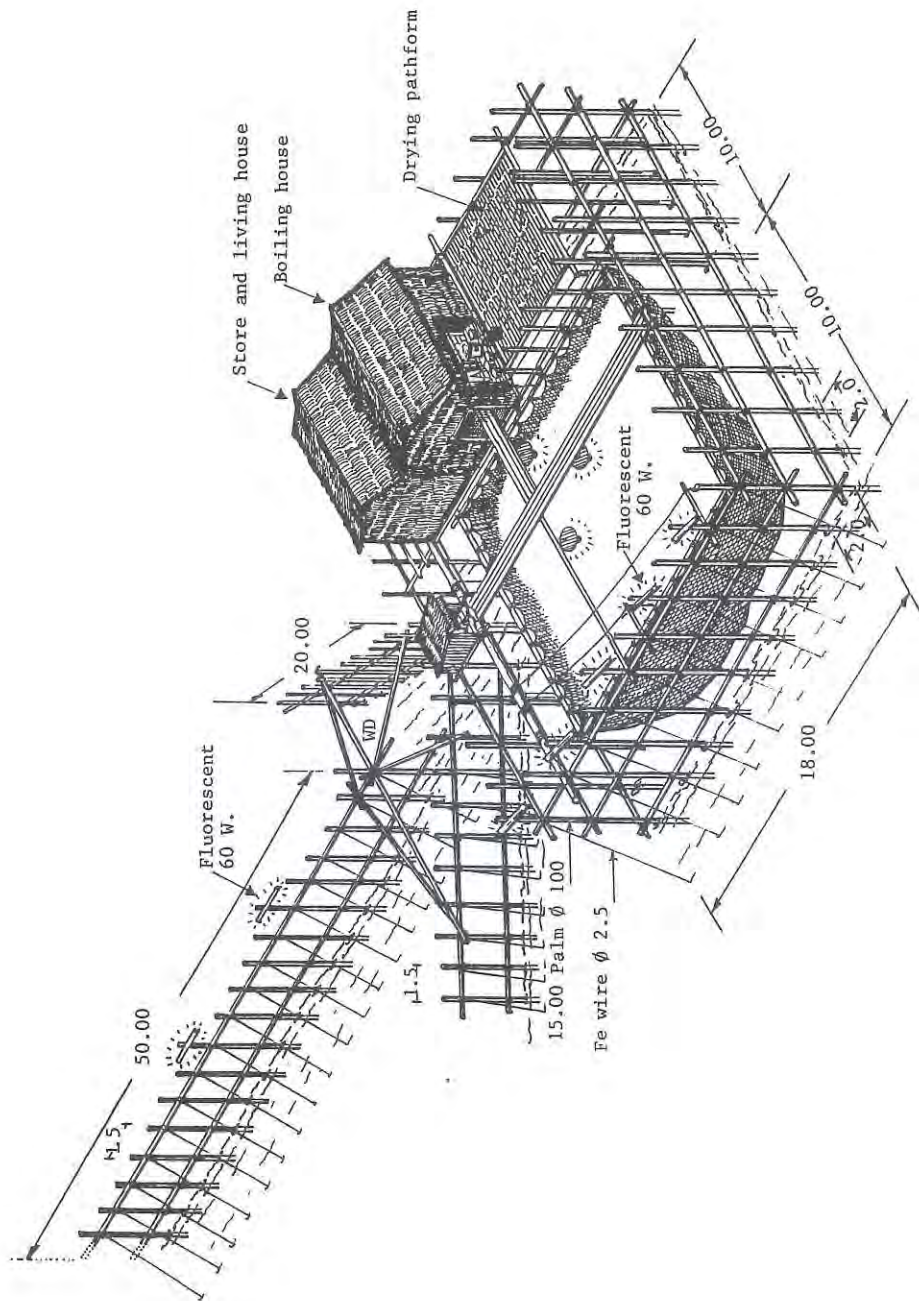


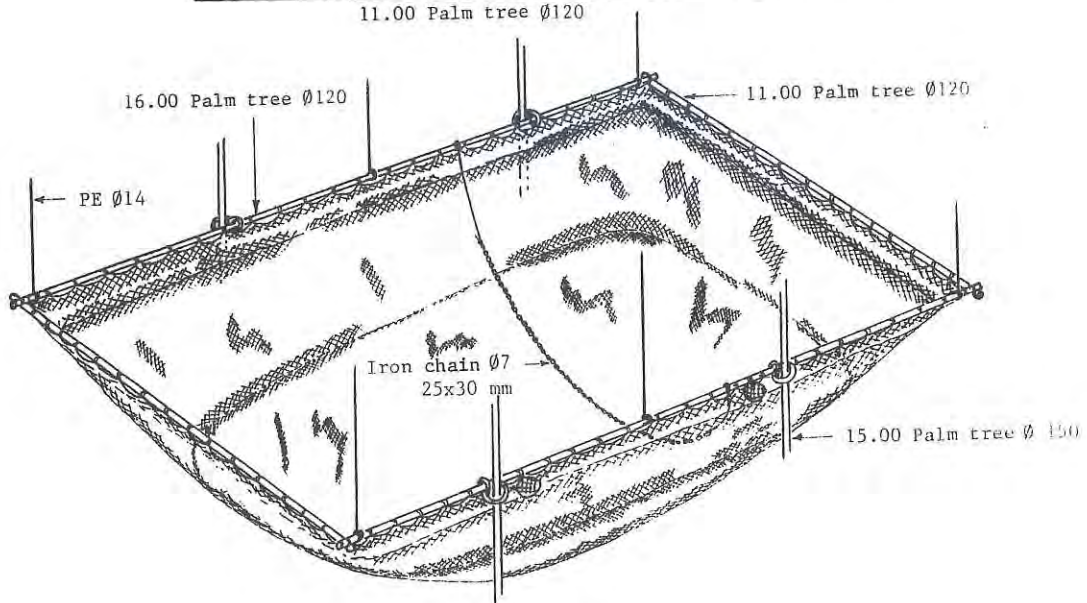
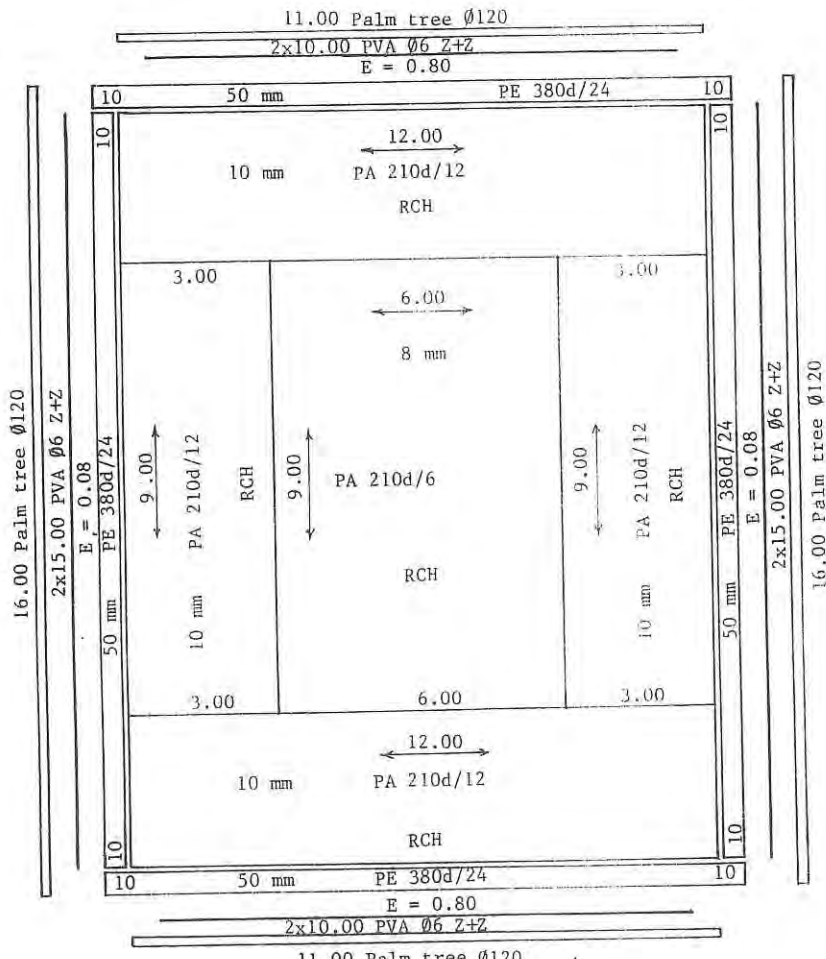


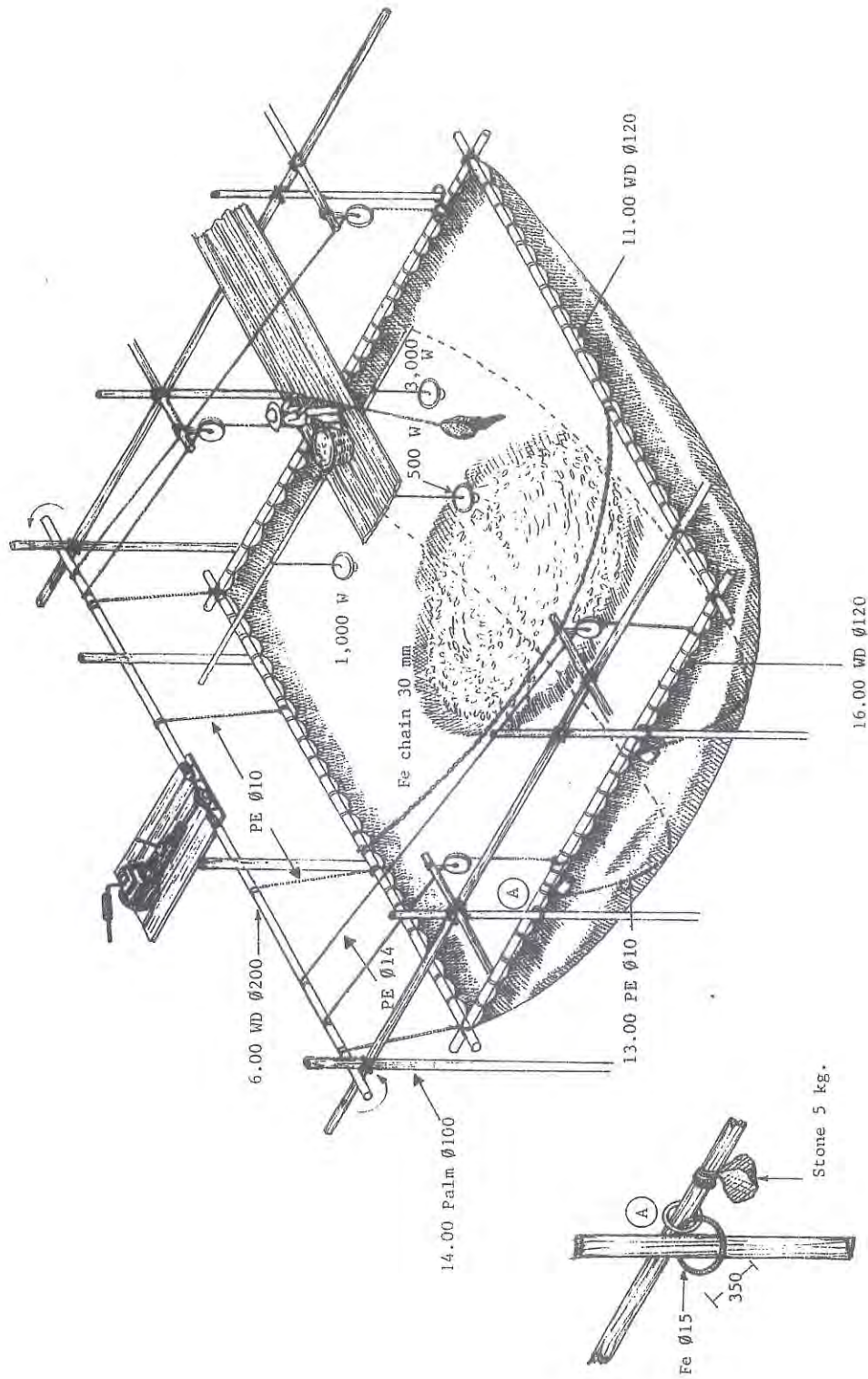
LIFT NET
 Stationary lift net
Kelong
 Anchovy, Scad, Squid

VESSEL
 Loa -
 hp -

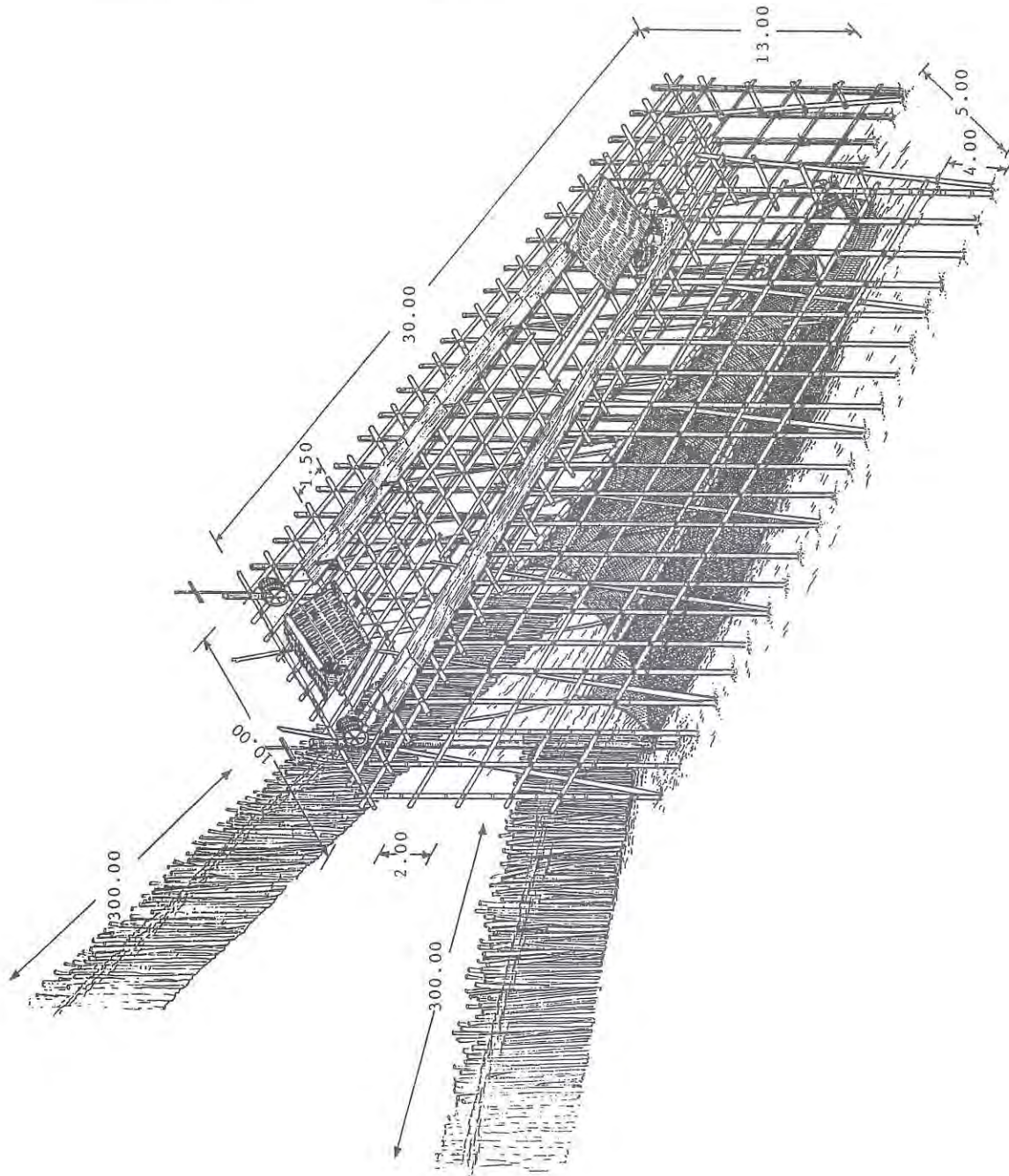
LOCATION
 Mersing (Pulau Tengah)
Johor







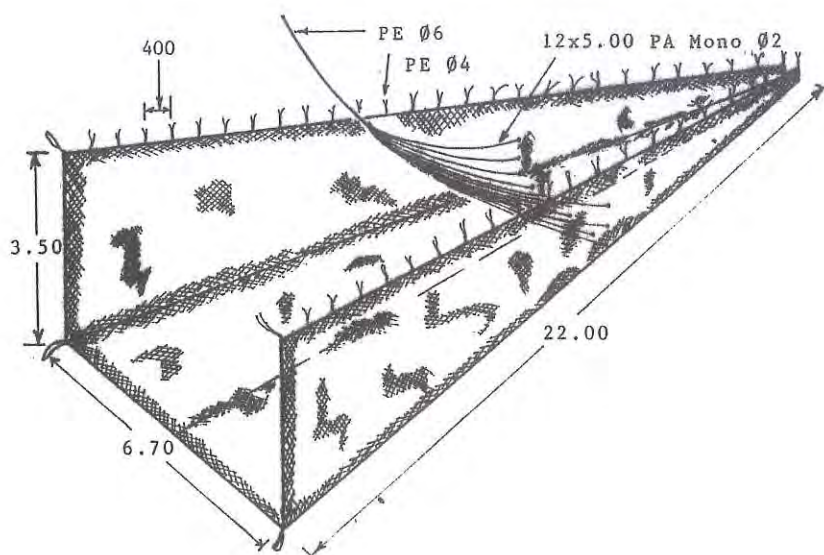
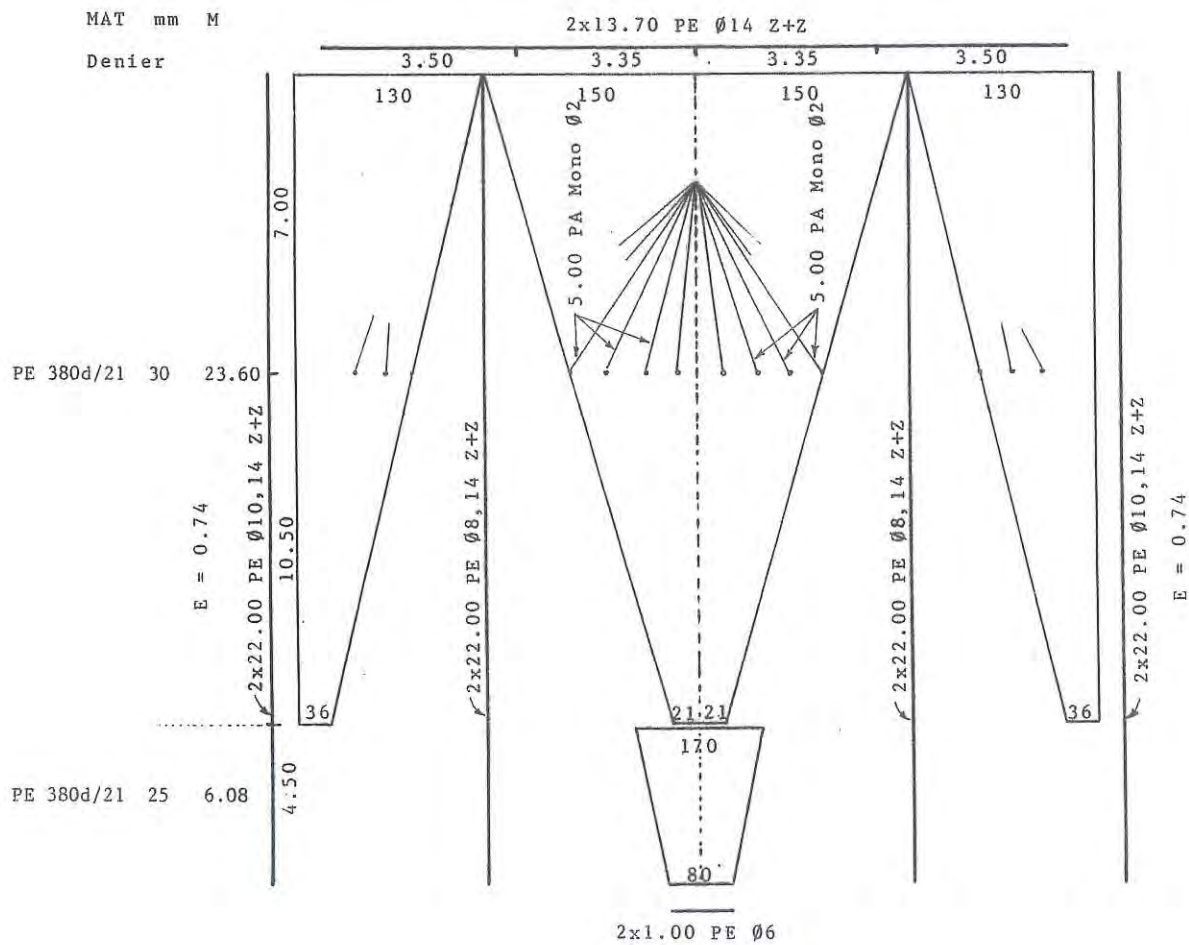
LIFT NET	VESSEL	LOCATION
Stationary lift net	Loa 12 m	Maludum
<i>Jermal</i>	hp 22	<u>Sarawak</u>
Herring, Bigeye Ilisha, Bombay duck		

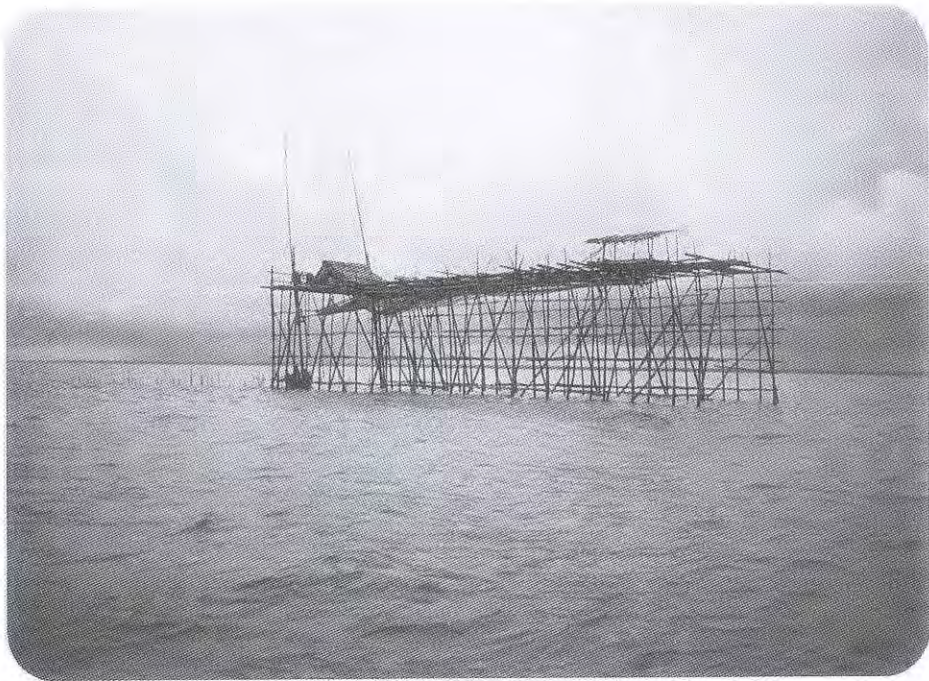


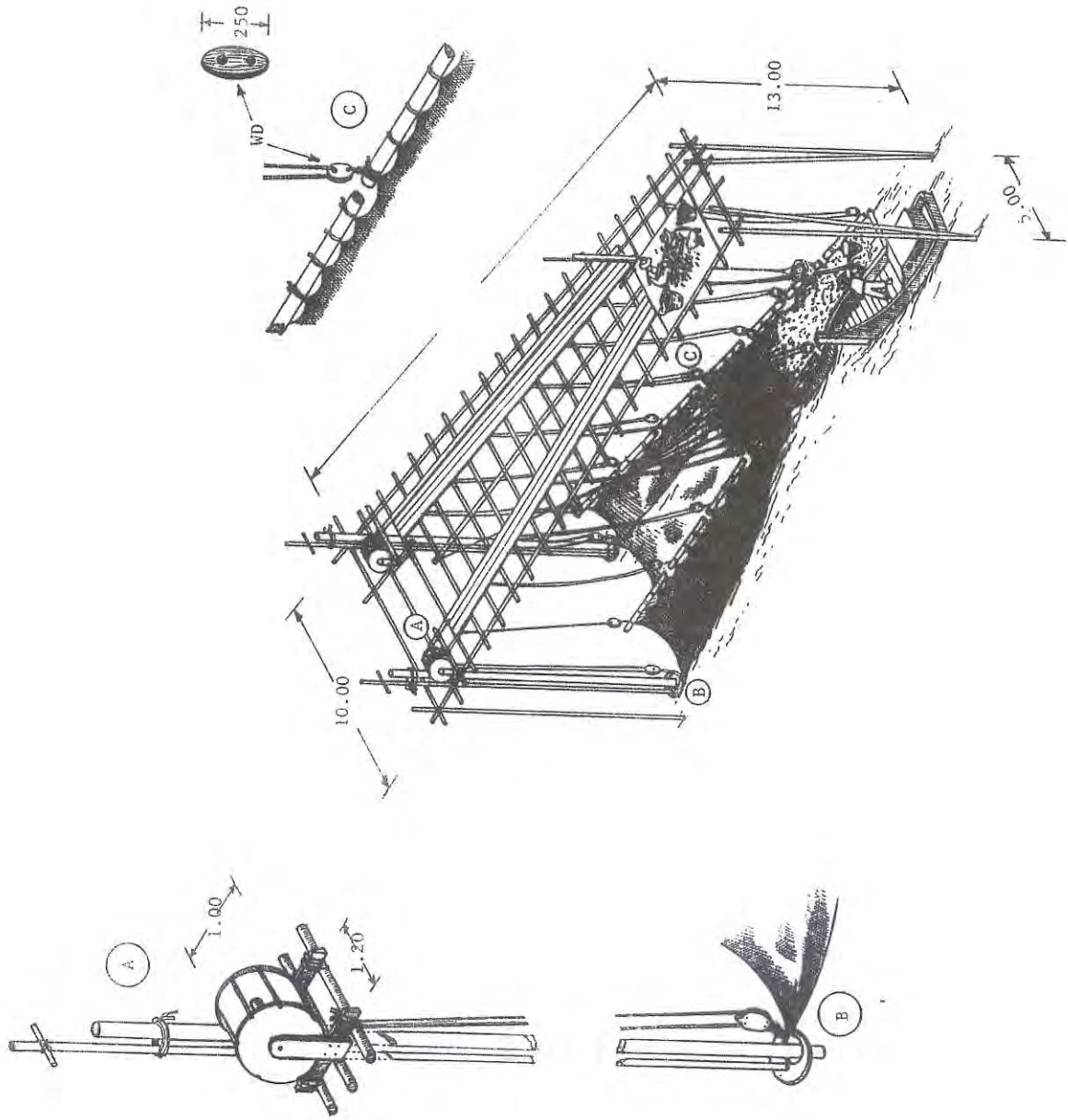
E = 0.90

E = 0.74

E = 0.90







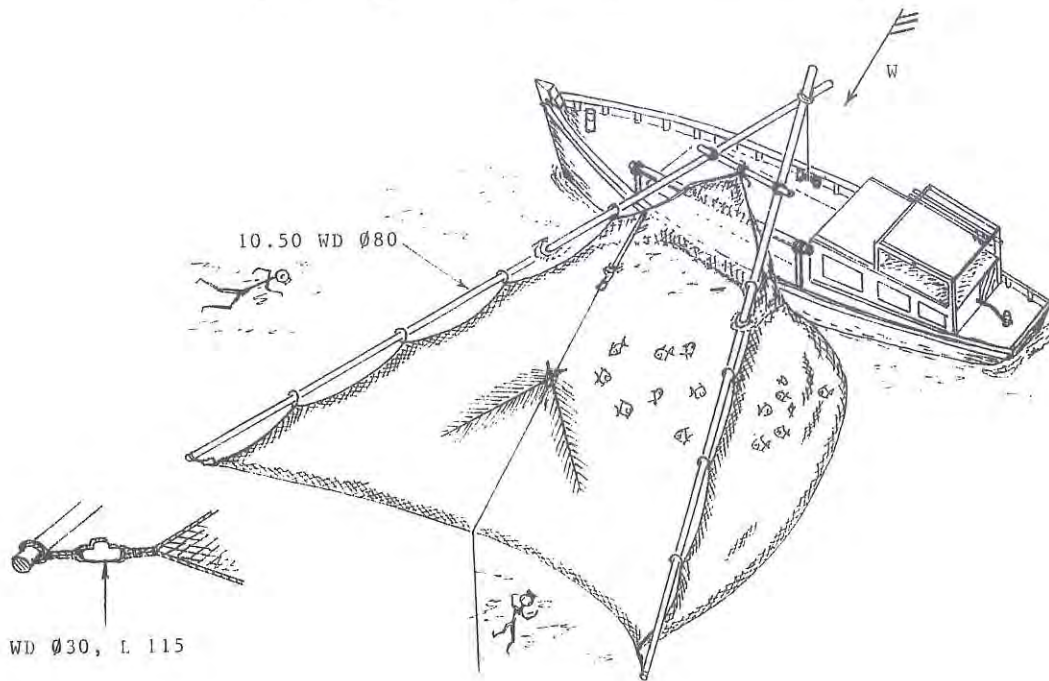
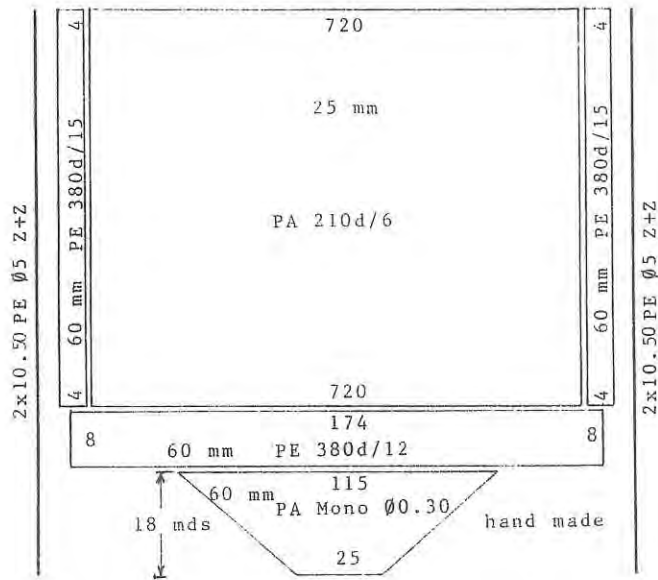
LIFT NET
 Pomfret dipnet
Pukat Panau
 Black pomfret

VESSEL
 Loa 11.5 m.
 hp 22

LOCATION
 Mukah
 Sibuh
 Sarawak

$E = 0.50$

2x9.00 PE Ø5 Z+Z



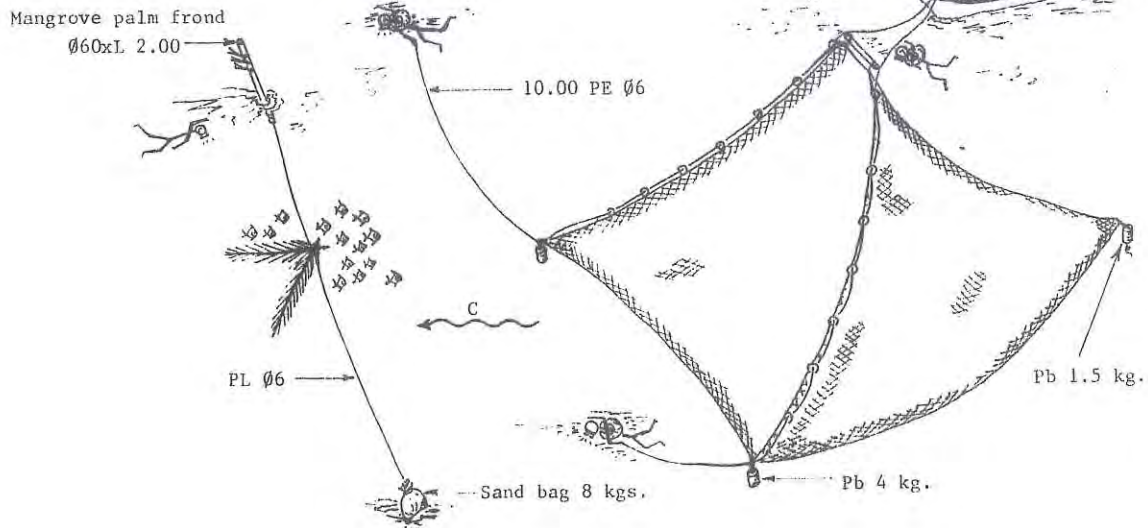
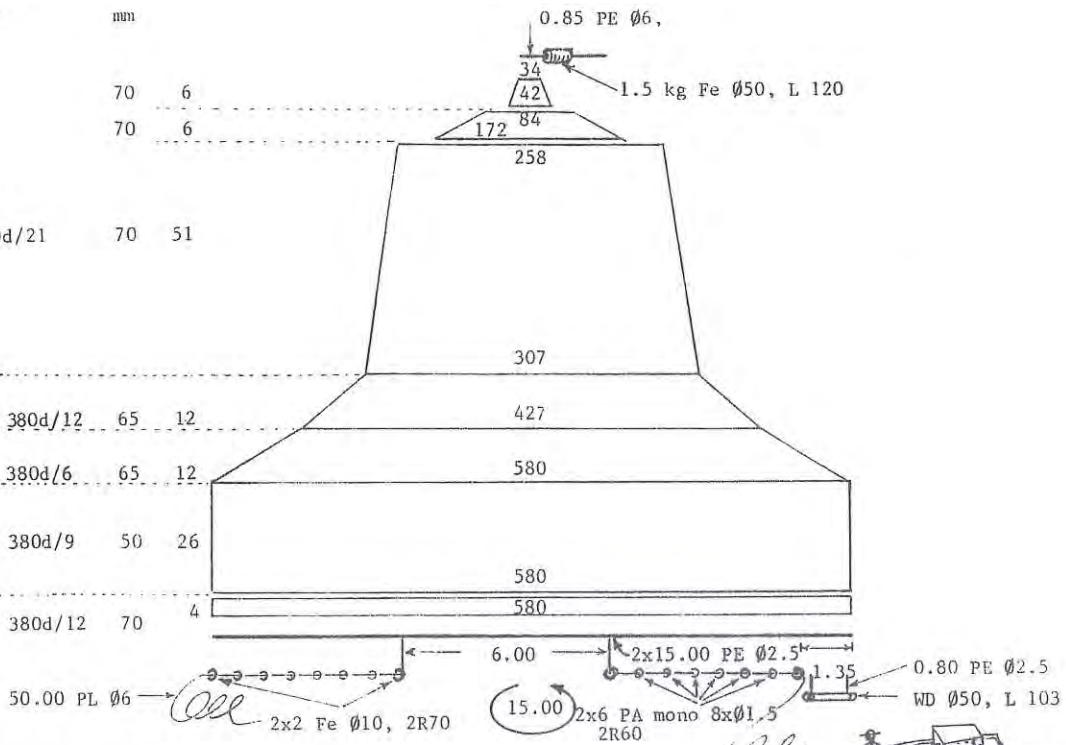
WD Ø30, l. 115

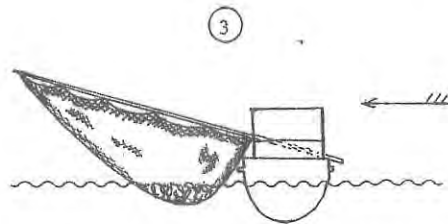
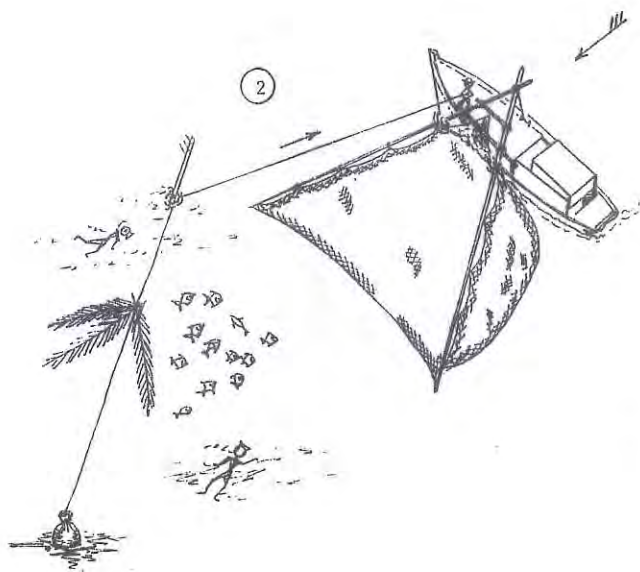
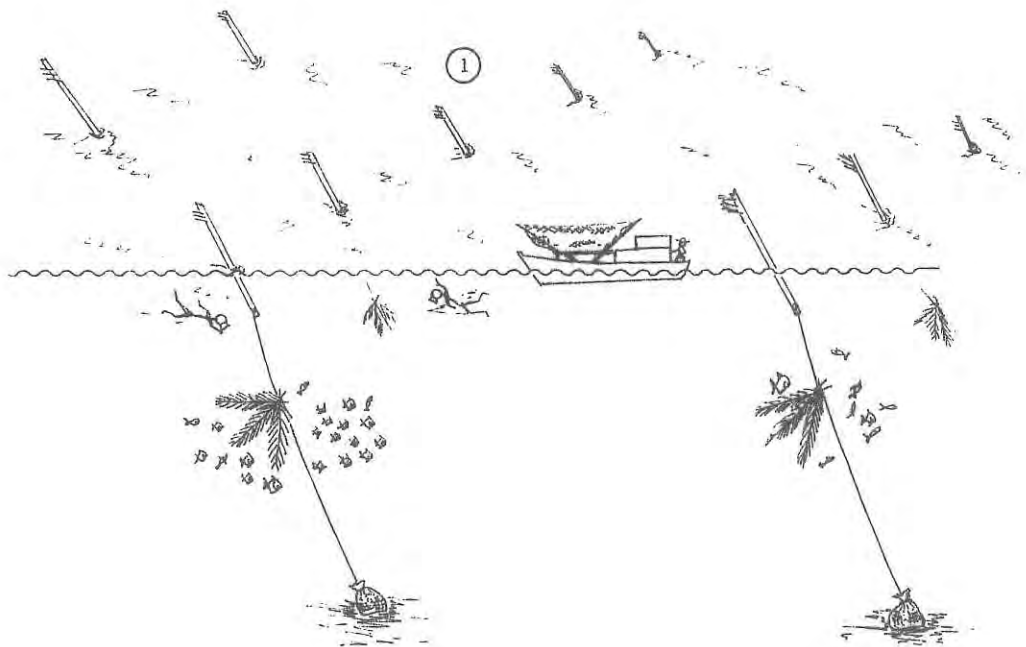
LIFT NET
 Black pomfret dip net
Pomfret Pantai
 Black pomfret

VESSEL
 Loa 11.5 m.
 hp 22

LOCATION
 Muka
 Sibul
 Sarawak

MAT	mm	
70	6	
70	6	
PE		
380d/21	70	51
PE 380d/12	65	12
PE 380d/6	65	12
PE 380d/9	50	26
PE 380d/12	70	4





<Chapter 7>

FALLING GEAR FISHING

7.1 Introduction

Falling gear is a traditional fishing gear and is very popular among small-scale fishermen in this region. The gear could be classified into two groups:

- i. Portable cast net
- ii. Stick-held cast net

7.2 Fishing Gear and Methods

7.2.1 Portable cast net

7.2.1.1 Shrimp cast net

Shrimp cast net is a small-scale fishing gear operated in Thailand and Malaysia. Its purpose is to catch shrimp in shallow water.

The webbing is Nylon 210d/4-6, the mesh size is 25 mm; and the number of meshes at the bottom of cast net is between 700-1000. Near the bottom there is a bag, with between 17-20 meshes flapped inside. A chain is attached to the bottom edge. Every 20-40 cm. of the chain is tied to 15-20 meshes above the edge to form small pockets at the bottom of the net.

The sinker is made of lead chain with a diameter of 14-15 mm. The length of the chain depends on the circumference of the bottom of cast net.

The PE line holder of 4-6 mm. diameter, 3-6 meters in length is attached to the codend.

The cast net is operated by one fisherman; sometimes with a small boat. The fishing ground is in shallow water, about 1-3 meters in depth.

7.2.1.2 Mullet cast net

This kind of net is similar to the shrimp cast net, but its size and mesh size are bigger. It needs more sinking power to sink rapidly and cover the mullet.

7.2.1.3 Squid cast net

The size of squid cast net is larger than the shrimp and mullet cast net. There are two types;

- i. Enclosing at bottom
- ii. Folded to the top.

The former is about 4-6 meters depth and 12-15 meters in circumference. It is made of a nylon monofilament with mesh size 32-43 milimeters, and the bottom part has a lead chain attached. A purse line made of nylon monofilament twine (ϕ 1.3 mm. and 100 m. length) was threaded through every fourteenth link of the lead chain for the purpose of enclosing the bottom part of the net.

The later is slightly smaller (about 3 m. length) made of nylon monofilament of 25 mm. mesh size. It is rigged with a sinker line at bottom. Numbers of nylon twines are tied to the sinker line, passing inside the net and connected to the hauling line at the top

part. The twines make the net folded when being hauled. The catch traps in the folded net.

The operation mode is similar for both gears. The net could be operated by one man. The squids are lured by lights, the net is cast into the water to cover the squid, then the purse line or hauling line is pulled, and the net is hauled up onboard.

7.2.2 Stick-held cast net

This net is developed from the common squid cast net. The net is 10-20 meters in depth, and 20-50 meters in circumference. The net is made of nylon, mesh size 25 mm. and the coned bottom salvage are polyethylene 380d/6-9 with the same mesh size or larger.

At the bottom of the net, an iron chain or sinker line is attached to the stainless steel rings to form a purse line.

The fishing operation is carried out at night using luring lights. The net is set on a bamboo boom, the light intensity is reduced to attract the squid to the surface, the net is dropped to cover the squid, and the purse line is pulled until the net is hauled up.

(This kind of gear is now being seen in Thailand using the same techniques).

FALLING GEAR

Small cast net

Jala

Shrimp

VESSEL

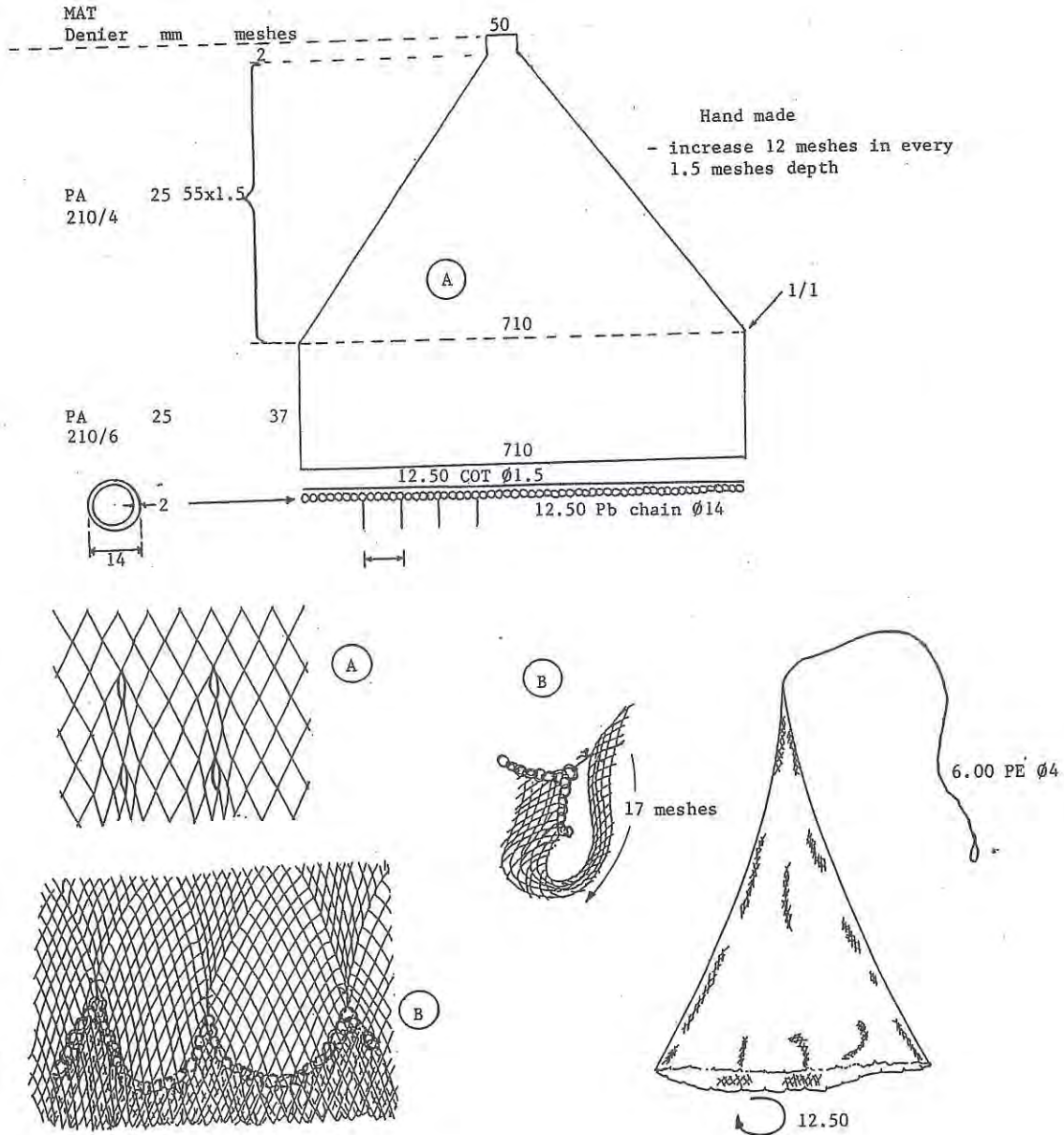
Loa -

hp -

LOCATION

Pontian Kechil

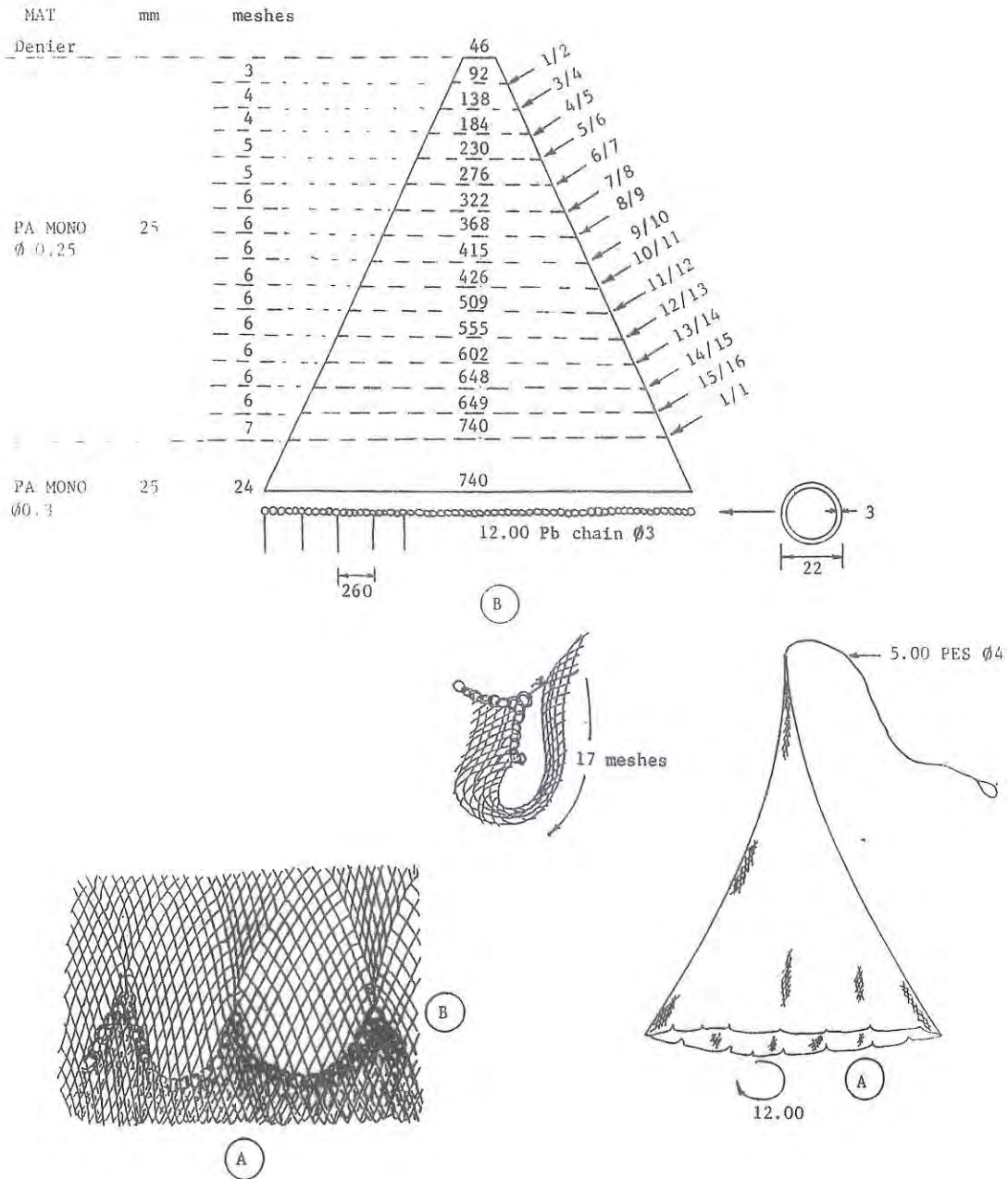
Johor



FALLING GEAR
 Small cast net
 Mullet

VESSEL
 Loa -
 hp -

LOCATION
 Batu Rakit
Terengganu



FALLING GEAR

VESSEL

LOCATION

Cast net

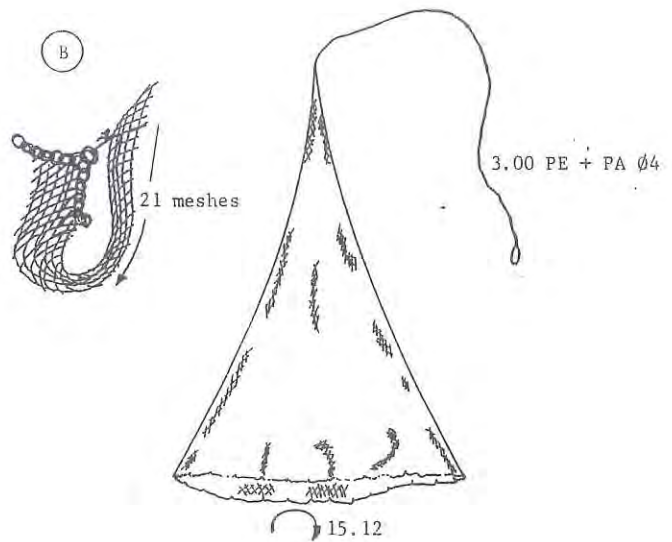
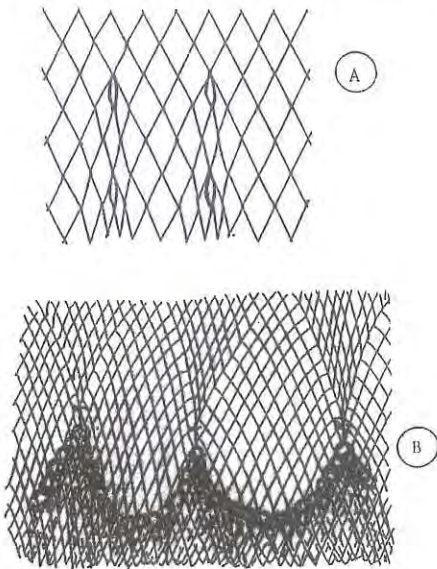
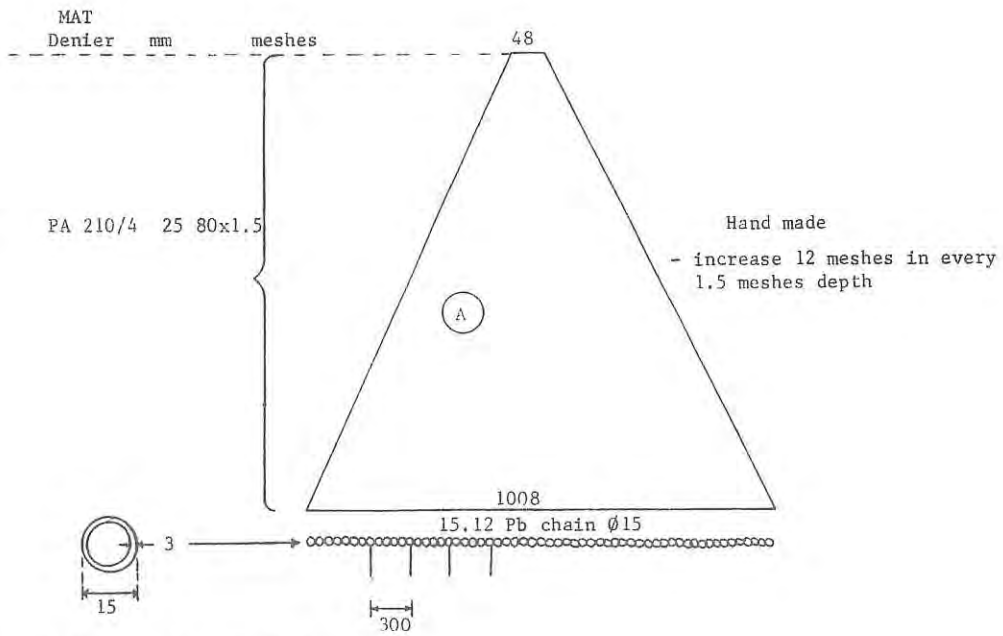
Loa -

Kota Tinggi

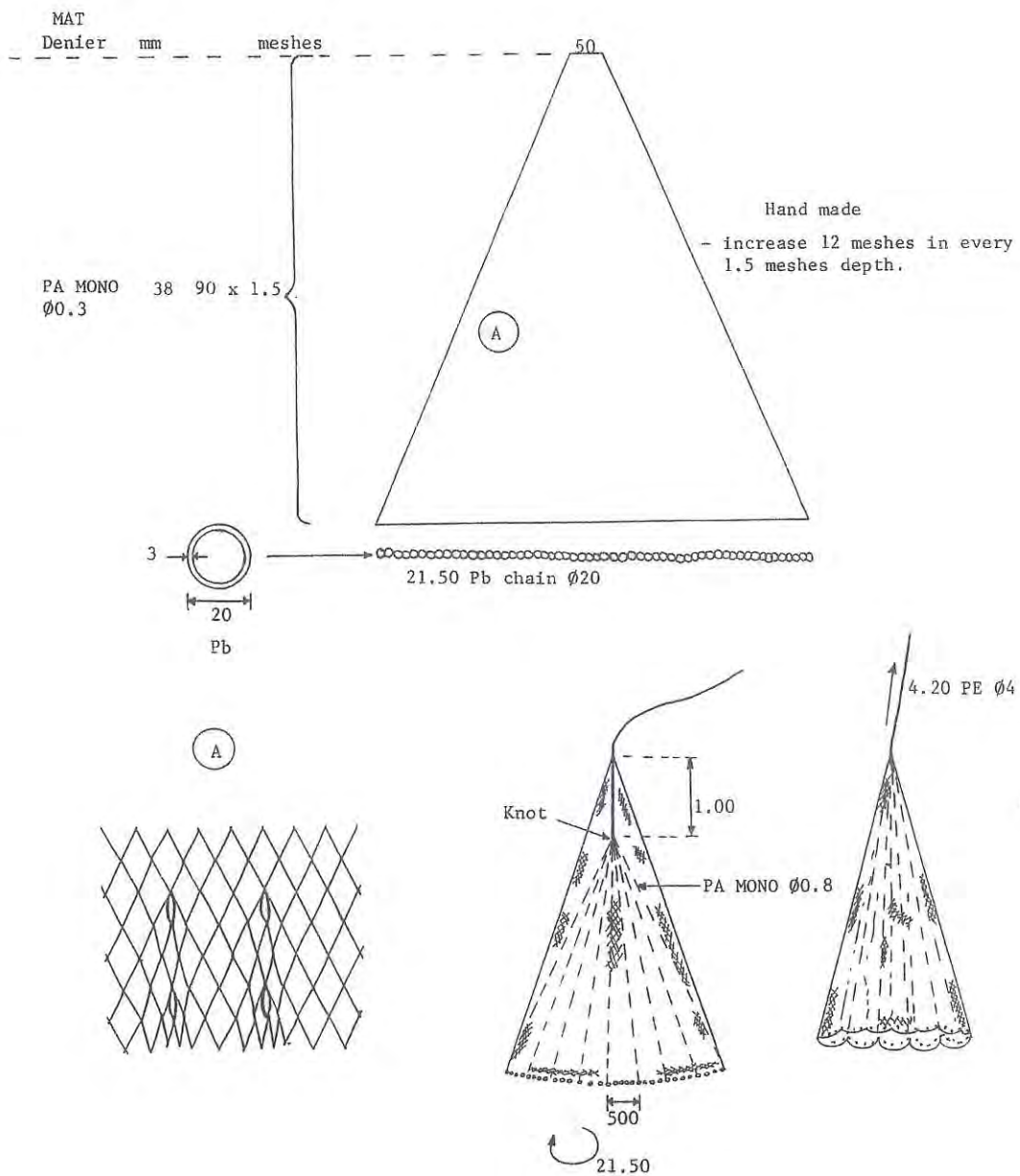
Shrimp

hp -

Johor



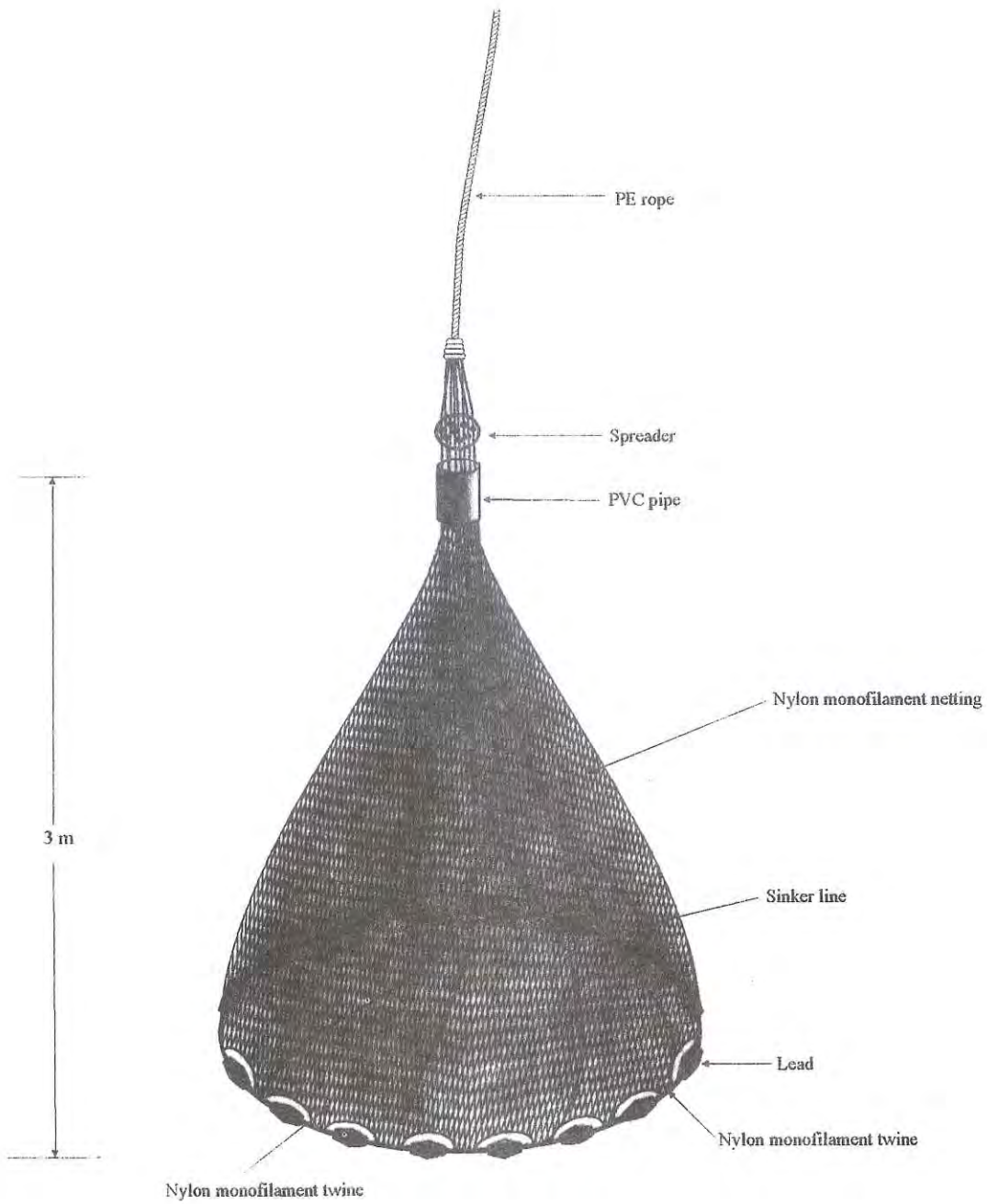
FALLING GEAR	VESSEL	LOCATION
Cast net	Loa -	Batu Rakit
Mullet	hp -	<u>Terengganu</u>



FALLING GEAR
Squid cast net
Squid

VESSEL
Loa 6 m
Hp :15

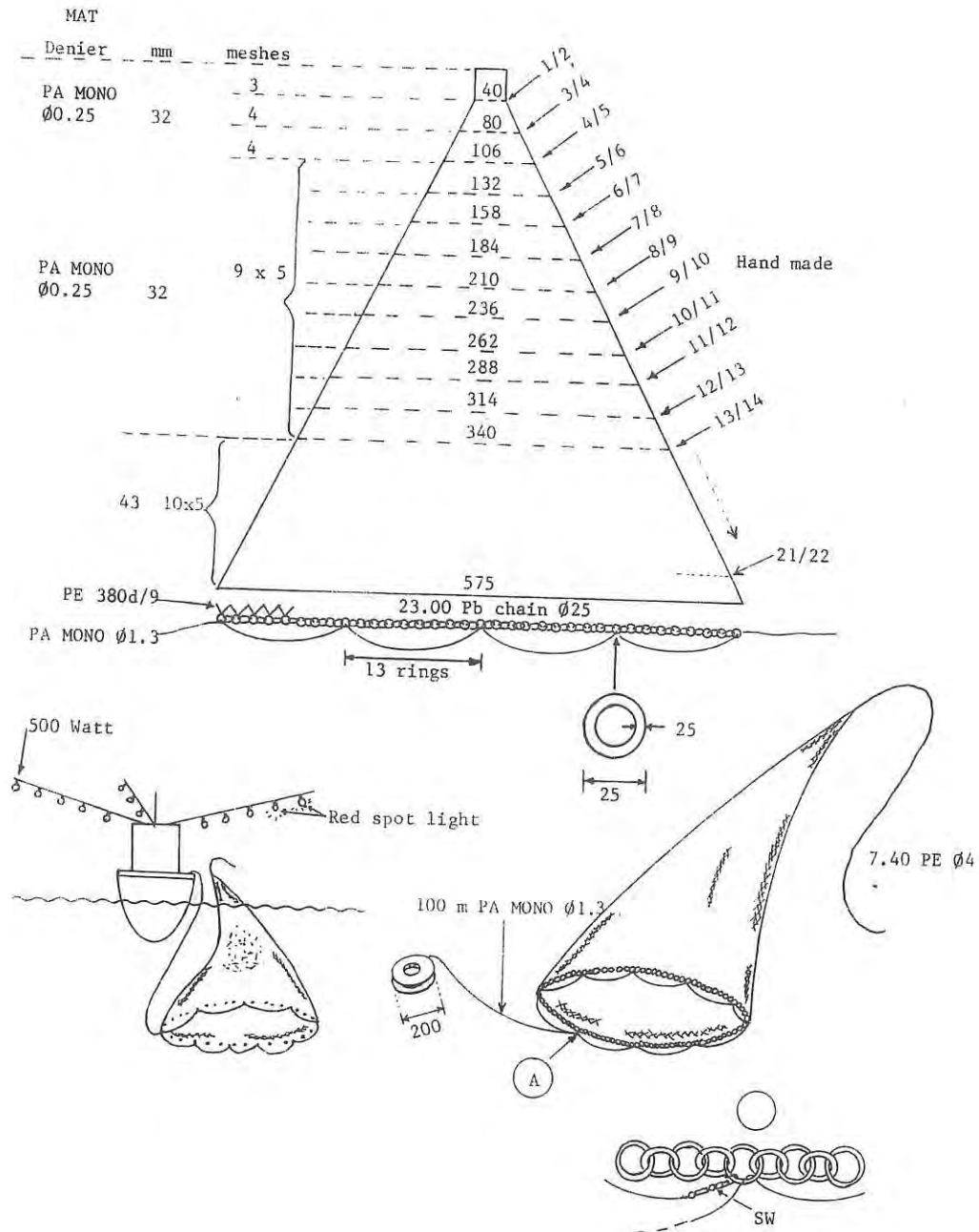
LOCATION
Langkawi
Kedah



FALLING GEAR
Squid cast net
Squid

VESSEL
Loa 14 m
hp 35
EG 7.5 KVE
LL 13 x 500 Watt

LOCATION
Mersing
Johor



FALLING GEAR

Stick-held cast net

Squid

VESSEL

Loa 16.3 m

hp 60

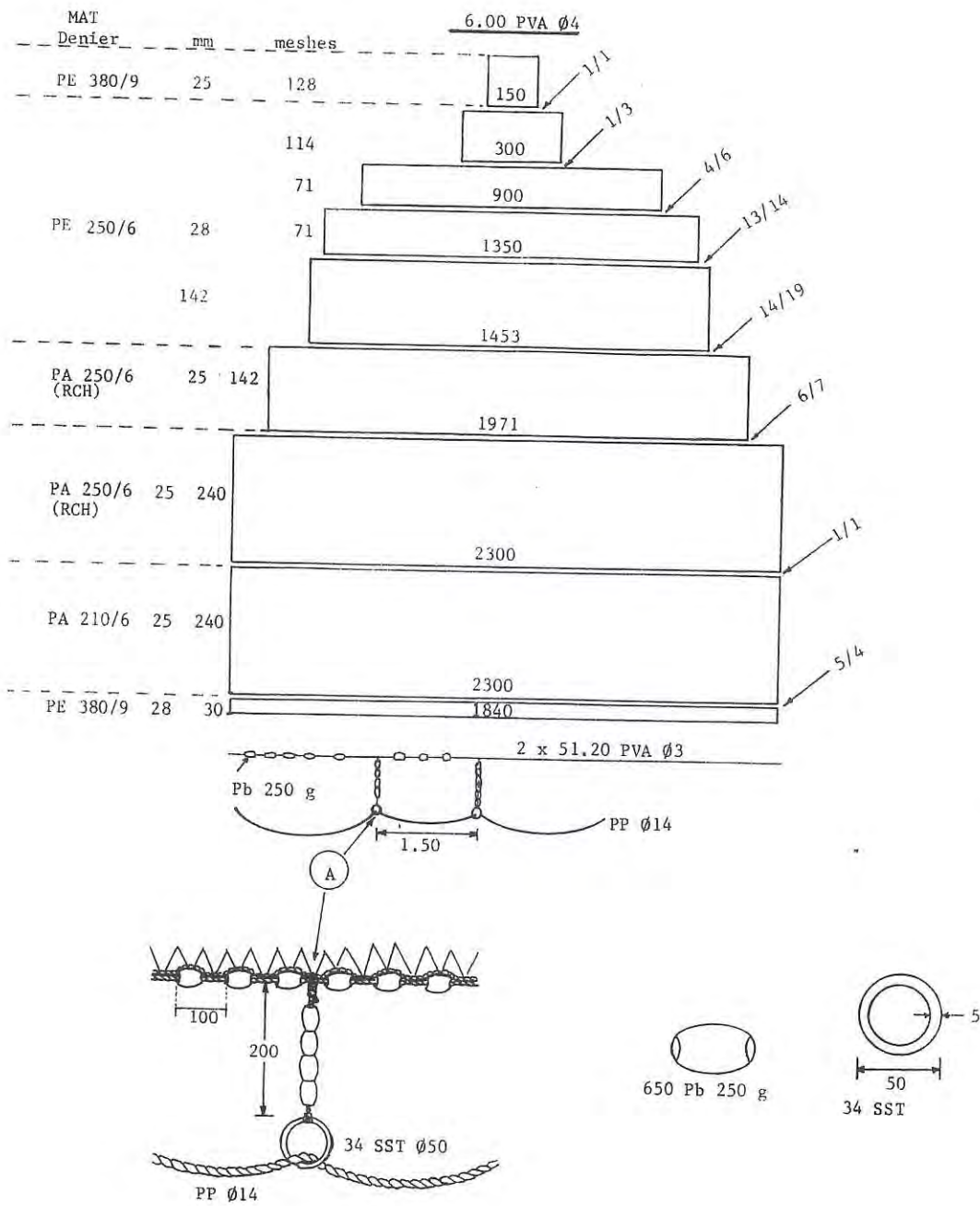
EG 2 x 6 KVA dynamo

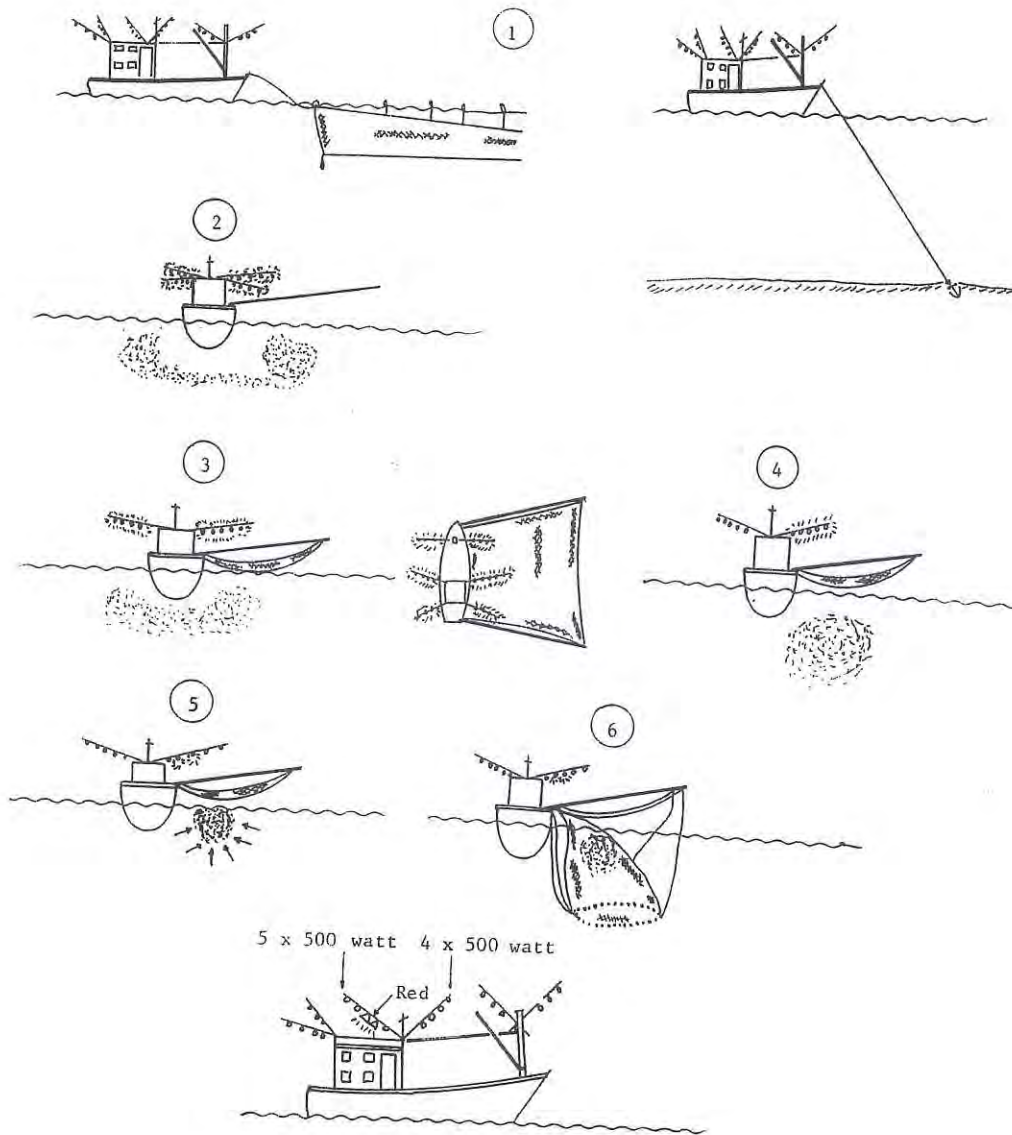
LL 22 x 500 Watt

LOCATION

Kuala Behsut

Terengganu

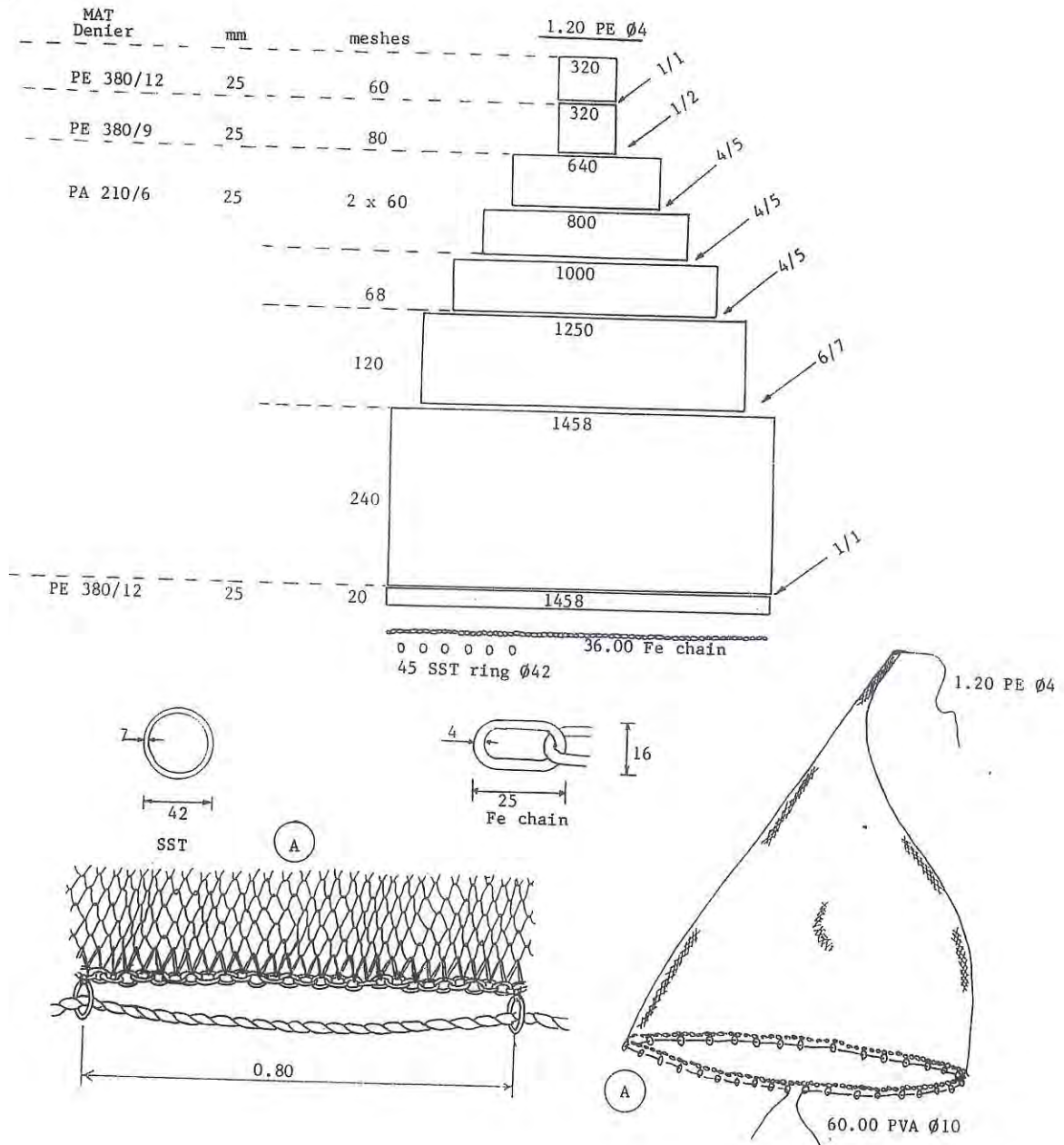




FALLING GEAR
Stick-held cast net
Squid

VESSEL
Loa 14 m
hp 35
EG 7.5 KVA
LL 9 x 500 W + 4 x 500 W spot light (2 Red, 2 white)

LOCATION
Mersing
Johor



<Chapter 8>

GILL NET AND ENTANGLING
NET FISHING

8.1 Introduction

Among net fisheries, gill net and entangling net is an “efficient fishing method” using gear of comparatively simple structure, and it has a characteristic of being easy to operate, even with a small fishing boat. The gears are the largest number to be practiced in Malaysia. According to the Annual Fisheries Statistics of Malaysia, in 2000, more than half of the total gear licenses issued by the Department of Fisheries were gill nets and entangling nets, accounting for annual landings of around 128,854 tones or ten percent of the total landings, became the third contributor of the marine fishery production in Malaysia. Various types of gill nets such as set gill nets (anchored), drifting gill nets, encircling gill nets and trammel nets are operated both in Peninsular Malaysia and East Malaysia in Sabah and Sarawak. Some of them operate on a large-scale for example Spanish mackerel and bonito drift nets and mackerel encircling gill nets, whereas gill nets for mullet, pomfret, grouper and snapper, swimming crab and shrimp are small-scale fishing gears.

8.2 Fishing Gears and Methods

8.2.1 Gill Net

The gill net could be classified into three:

- i. Set gill net
- ii. Drift gill net
- iii. Encircling gill net

8.2.1.1 Set gill net (Anchored)

Nylon monofilament is more popularly used than nylon multifilament for netting materials of most bottom set gill nets. The specifications such as the mesh size, the length and height of net, and the hanging ratio vary for different species of marine animals (see Table 8.1). These nets are fixed to the bottom, or at a certain distance above it, by means of anchors or ballast sufficiently heavy to neutralize the buoyancy of the floats. Bottom set gill nets are operated in shallow coastal waters where the depth ranges between 3 and 40 meters. This is undoubtedly an important small-scale fishery using fishing boats varying from 4 to 10 meters in length with 3 to 40 horsepower inboard or outboard engines.

Table 8.1: Structure of Bottom Set Gill Net

Species	Specification	Mesh Size	Depth of Net	Hanging Ratio E	Material	Twine Size (mm)	Boat LOA	Horse Power
Mangrove Crab		90	11	0.55	PA MONO	0.30	6	12
Blue swimming crab		80-115	7.5-16	0.26-0.59	PA MONO	0.30-0.35	4-7	6-12
Shrimp		45	60	0.66	PA MONO	0.27	6	9
Sting ray		300-515	7.5-20	0.60-0.70	210d/30 or PA MONO	1.53	4-7	3-5
Pomfret		150-170	40	0.49-0.51	PA MONO	0.30-0.42	5-10	6-24
Grouper, Snapper, Sea bass		100-170	14-40.5	0.40-0.67	210d/18 or PAMONO	0.33-1.14	4-7	6-40
Giant queenfish, Fourfinger, Threadfin		110-125	50-60	0.50-0.80	PA MONO	0.70-0.80	4-7	6-12

8.2.1.2 Drift gill net (Drift net)

There are various kinds of drift gill nets depend on the target catch (see Table 8.2). Nylon multifilament is mostly often used as the netting material, but the twine size varies from 210d/9 to 210d/30. Light brown and brown color nets are commonly used. As in Thailand, some drift gill nets, especially those for Spanish mackerel, pofret and giant-queenfish, have a width of saran nylon netting attached along the bottom edge. This acts as a sinker because the specific gravity of saran nylon yarn is greater than that of nylon multifilament.

In most cases, fishing with drift gill net is commonly carried out in the night-time. Kept on the surface, or a certain distance below it, by numerous floats, these nets drift freely with the current, separately or, more often, with the boat to which they are attached.

8.2.1.3 Encircling gill net

The encircling gill net for Indo-Pacific mackerel is a widely operated gear which is generally used in shallow water with the floatline remaining at the surface. In day-time operation, the fish school is first encircled by the net, then noise or other means are used to force them to gill or entangle themselves in the netting surrounding them. In night-time operation with electric lamp is used for the same purpose. The netting of this gear is nylon multifilament 210d/12. The size of mesh is about 54-58 mm. height of net ranges from 15 to 24 m.

8.2.2 Trammel net

Trammel nets are commonly operated to catch shrimps. The netting for trammel nets are in most cases made of nylon monofilament at the lint (linner net) and nylon multifilament at the armouring (outer net). The size of mesh at the lint is about 40-45 mm. whereas a considerable difference in the size of mesh at the armouring was observed from 110-250 mm. Details specification is as listed in Table 8.3.

The fishing operation is carried out either by day or night-time. The net is set across the tide and allowed to drift for one or two hours before hauling. The water depth of fishing grounds is between 3 and 20 meters.

Table 8.2: Structure of Drift Gill Net (Drift net)

Species	Specification	Mesh Size (mm)	Depth of Net (meshes)	Hanging Ratio E	Material	Twine Size (mm)	Boat LOA	Horse Power
Mullet		45	80	0.48	PA MONO	0.20	5	-
Dorab, Wolfherring		75-80	140+SN 15 140	0.56-0.60	210d/9 or PA MONO	0.40	14	24
Pomfret		150	80+SN 15	0.48	PA	210d/18	14	24
Fourfinger, Threadfin		45-175	80-120	0.50-0.61	PA MONO	0.34-1.25	9-12.5	22-24
Giant queenfish		144	25+SN 4	0.54	PA	210d/30	4	12
Grouper, Snapper		75	145+SN 15	0.46	PA	210d/6	4.5	4
Spanish mackerel, Bonito		80-120	78+SN 12 120+SN 15	0.54-0.67	PA	210d/9-210d/21	10-13.5	12-24
Spanish mackerel		65	185	0.55	PA MONO	0.35	12	24

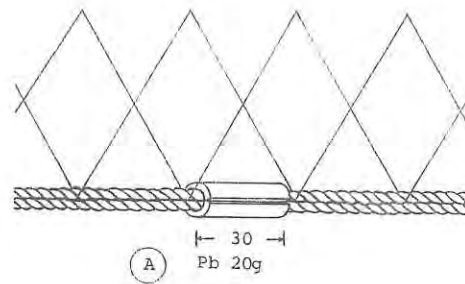
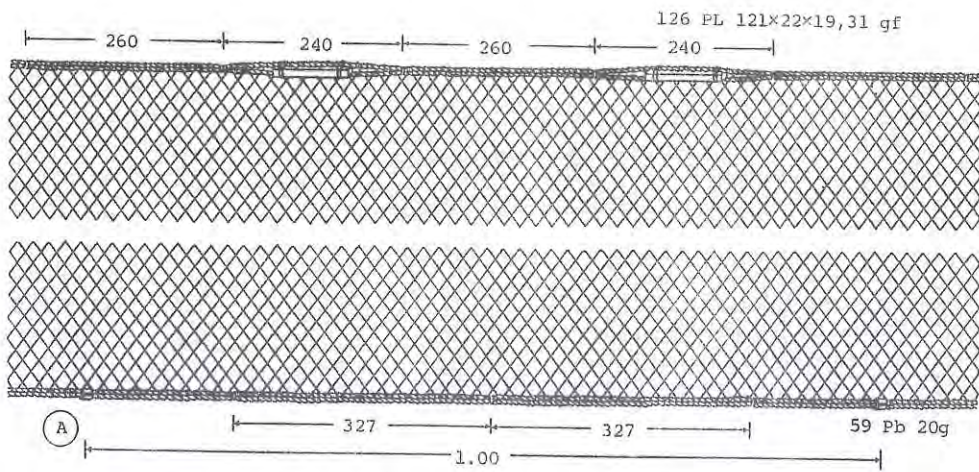
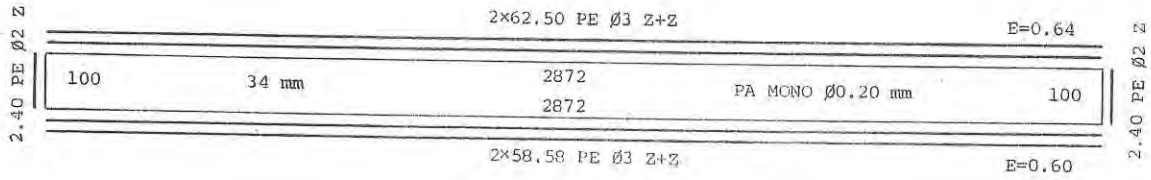
Table 8.3 Structure of Trammel Net

Species	Specification	Mesh Size (mm)	Depth of Net (meshes)	Hanging Ratio E	Material	Twine Size (mm)	Boat LOA	Horse Power
Lint (inner net)		40-45	50-60	0.44-0.59	PA MONO	0.20-0.23	6-14	9.9-24
Amouring (outer net)		107-110	14-14.5	0.54-0.64	PA Raschel	210d/6-12		
Lint		43	50	0.49	PA	210d/4	11	22
Amouring		250	7	0.76	PA	210d/6		

GILL NET
Surface set
Mullet

VESSEL
Loa 5 m
hp 9.9 CM

LOCATION
Sungai Udang
Pinang

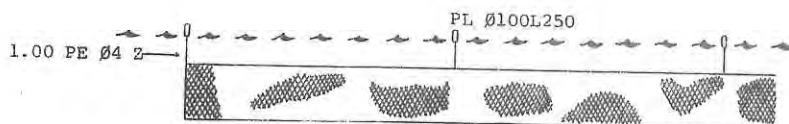
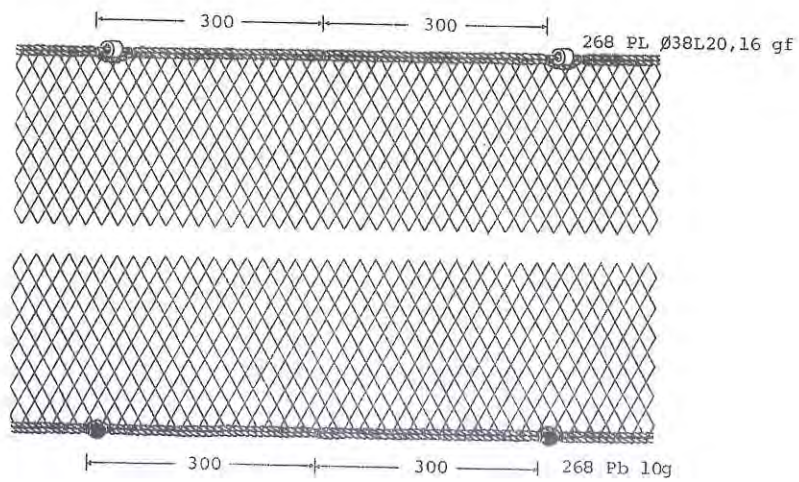


GILL NET
 Driftnet
 Mullet

VESSEL
 Loa 5 m
 hp -

LOCATION
 Kuala Behsut
 Terengganu

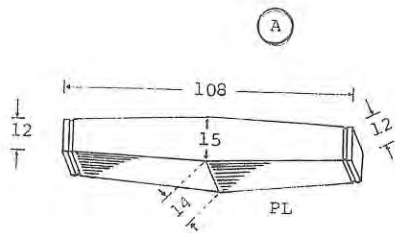
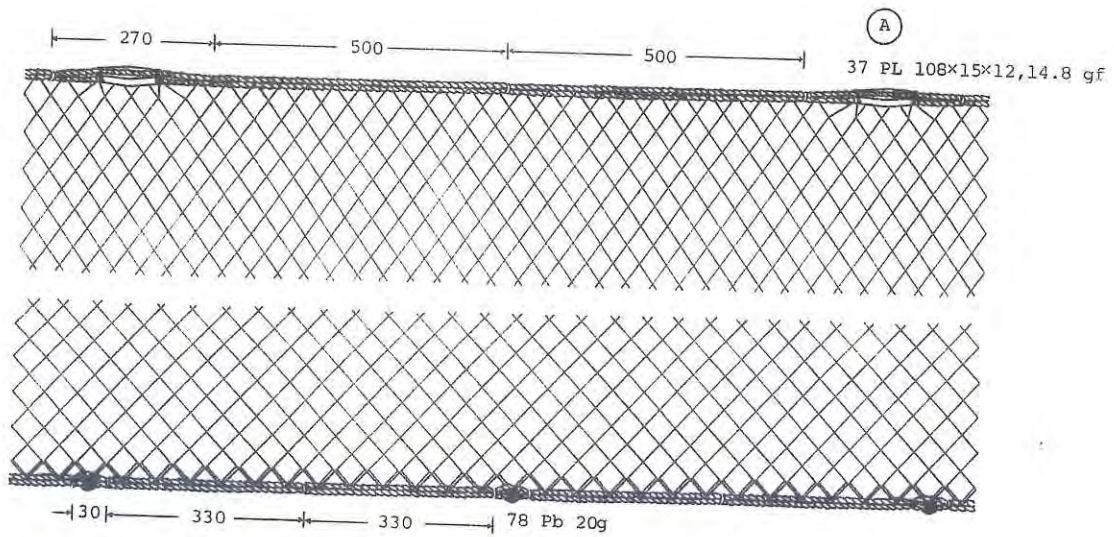
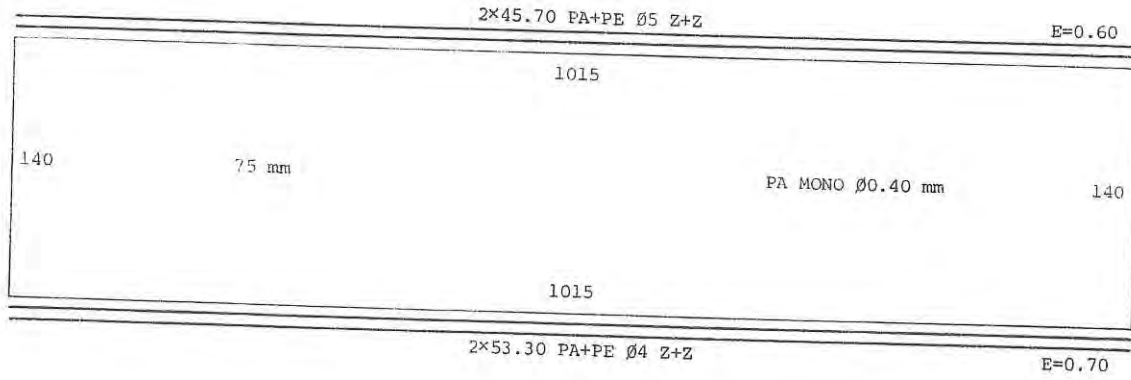
2x160.00 PE Ø2 Z+Z				E=0.48
80	45 mm	7407	PA MONO Ø0.20 mm	80
7407				
2x160.00 PE Ø2 Z+Z				E=0.48

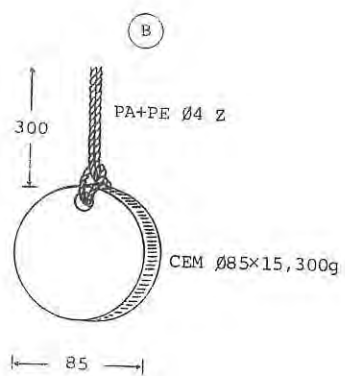
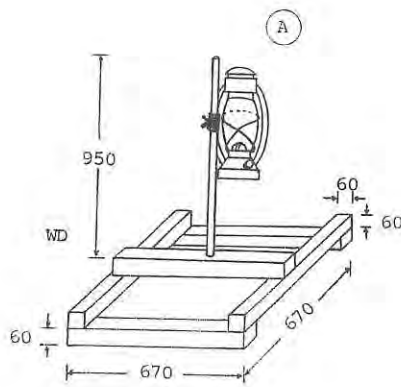
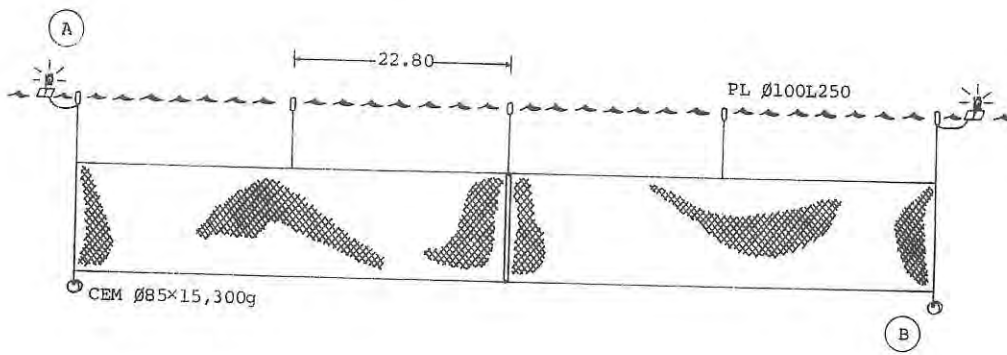


GILL NET
 Driftnet
 Dorab wolf-herring, Indian
 mackerel

VESSEL
 Loa 14 m
 hp 24

LOCATION
 Tanjong sepat
Selangor







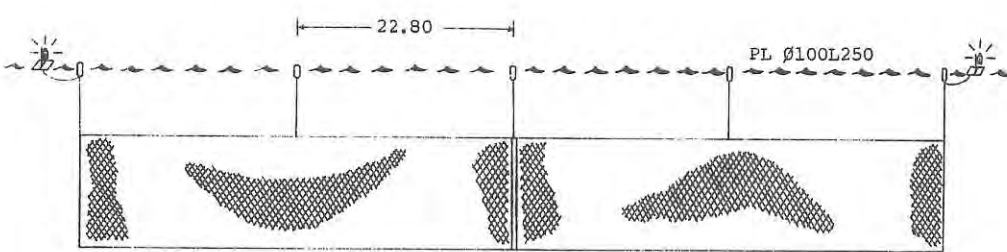
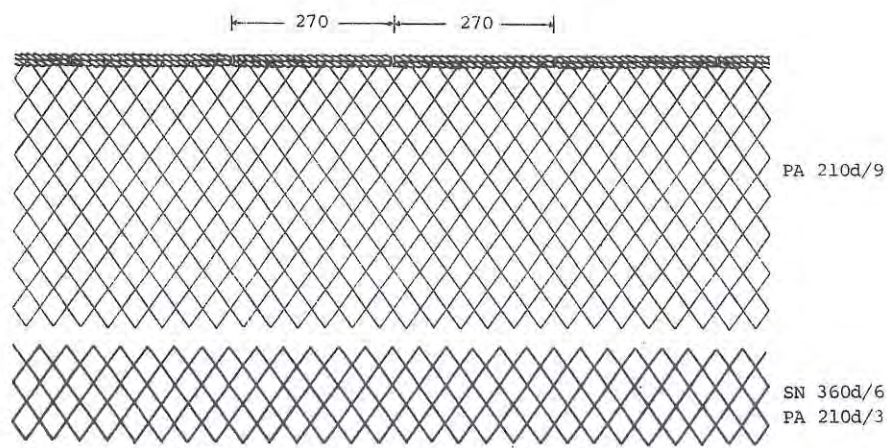
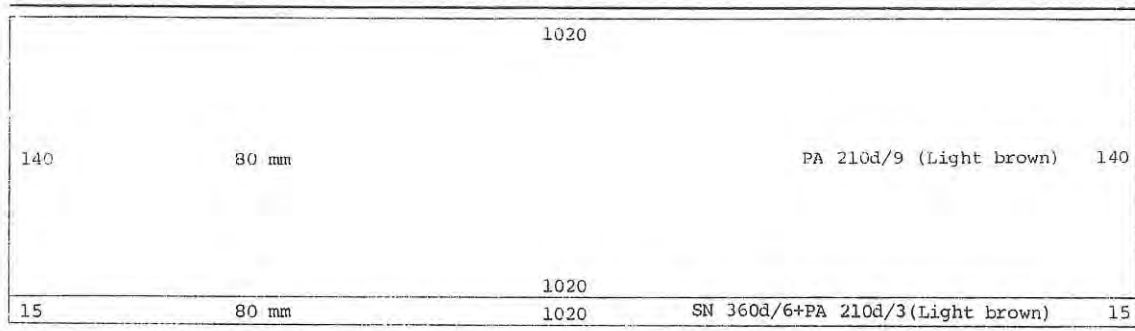
GILL NET
 Driftnet
 Dorab wolf-herring,
 Indian mackerel

VESSEL
 Loa 14 m
 hp 24

LOCATION
 Tanjung Sepat
 Selangor

2x45.70 PA+PE Ø5 Z+Z

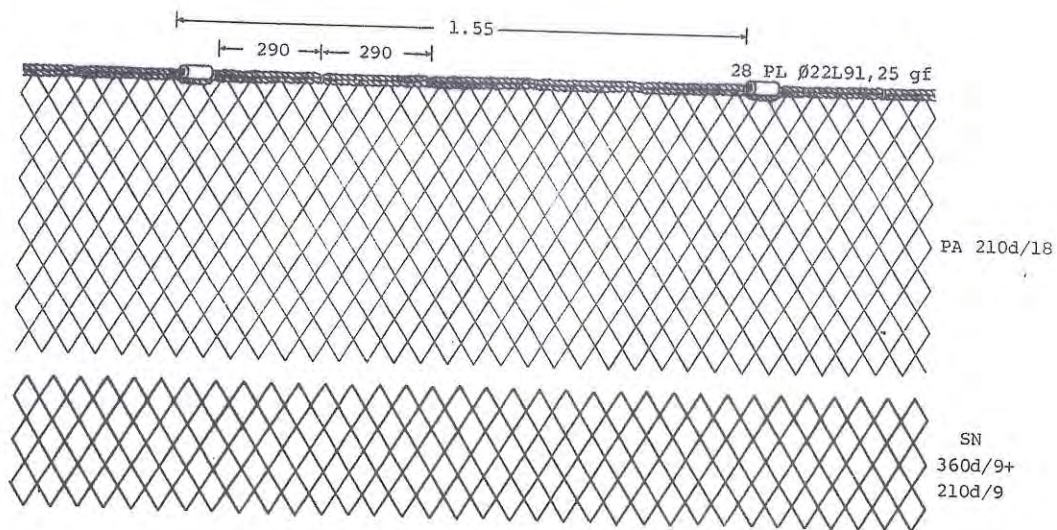
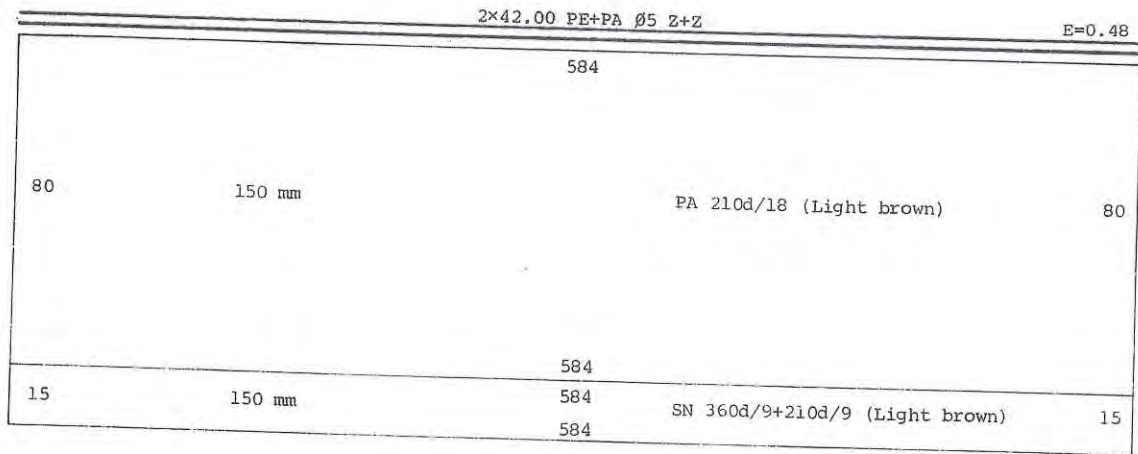
E=0.56

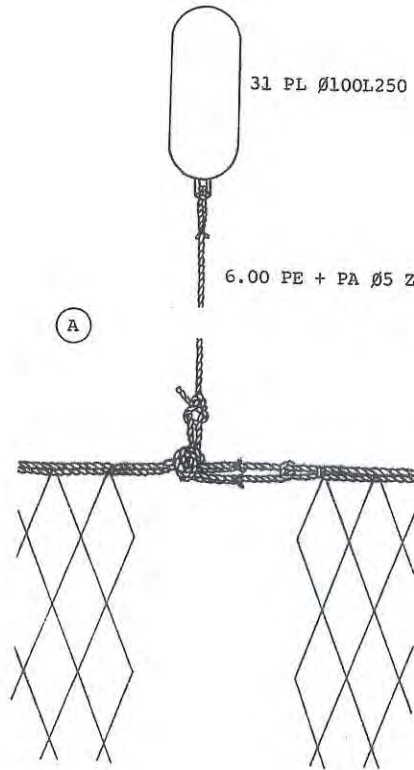
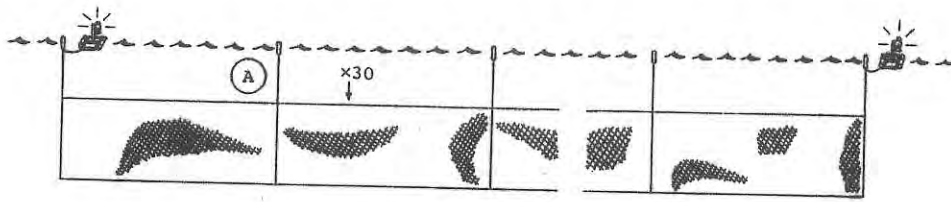


GILL NET
Driftnet
Pomfret

VESSEL
Loa 14 m
hp 24

LOCATION
Tanjong Sepat
Selangor



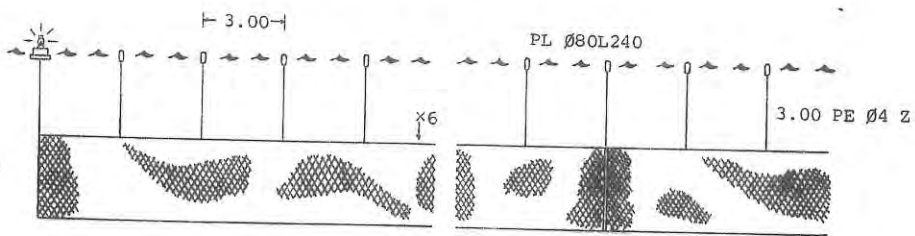
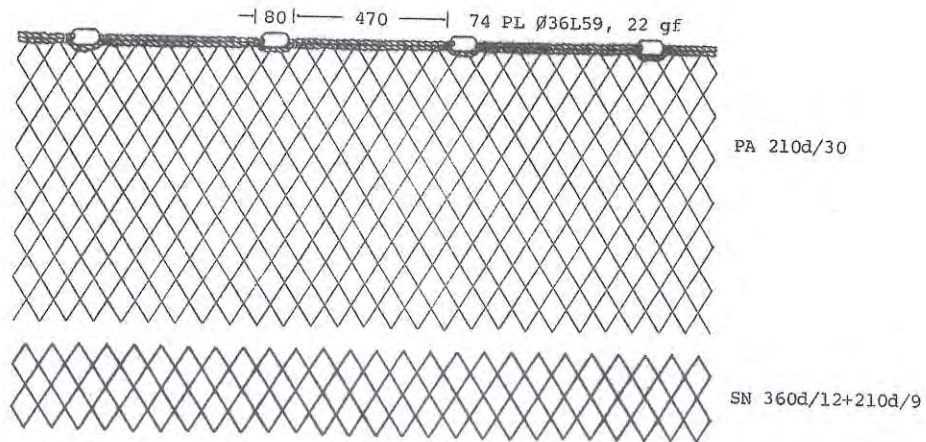


GILL NET
Driftnet
Giant queenfish

VESSEL
Loa 4 m
hp 12 OM

LOCATION
Kuala Behsut
Terengganu

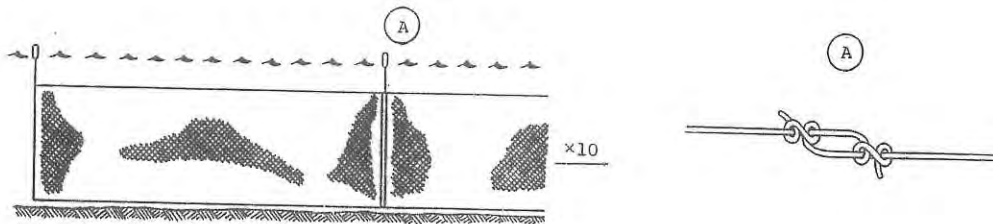
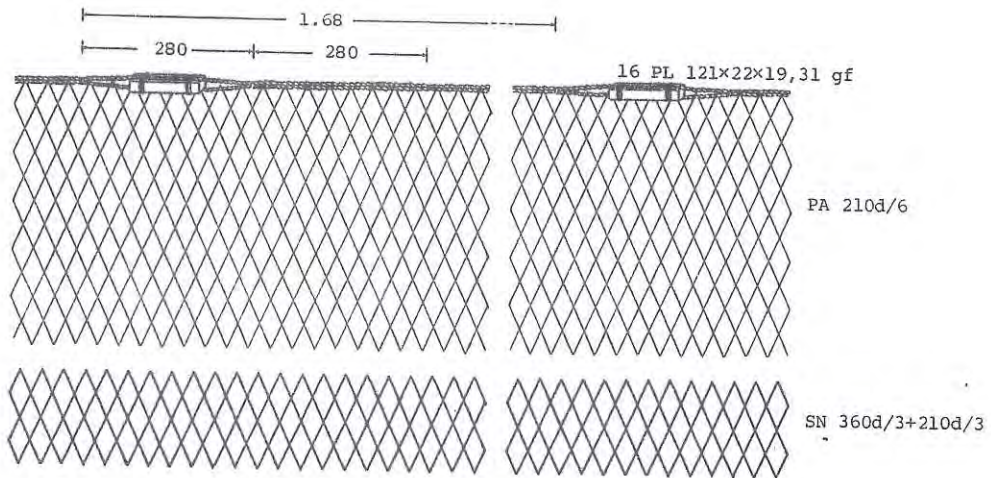
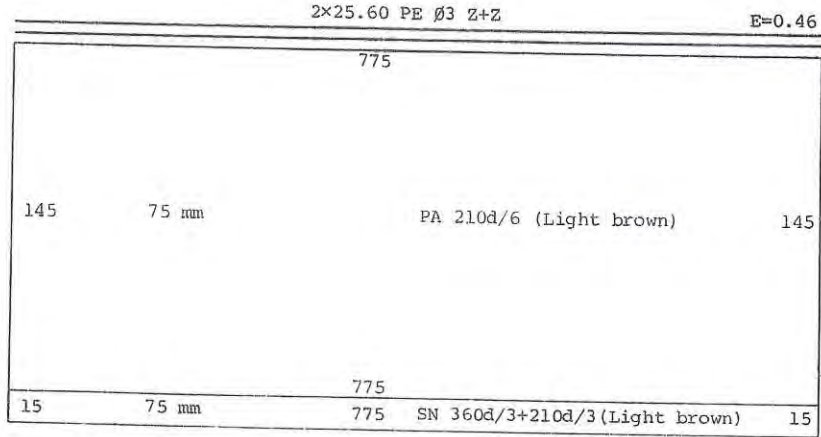
		2x40.00 PE Ø8 Z+Z		E=0.54	
		515			
25	144 mm			PA 210d/30 (Brown)	25
		515			
4	144 mm	515		SN 360d/12+210d/9 (Brown)	4



GILL NET
 Driftnet
 Black-banded trevally,
 Grouper, Snapper,
 Marine catfish

VESSEL
 Loa 4.5 m
 hp 4 OM

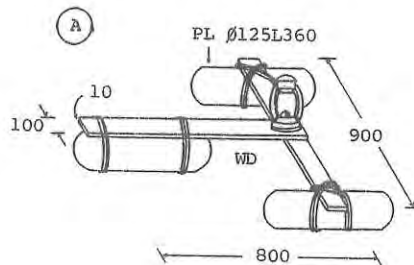
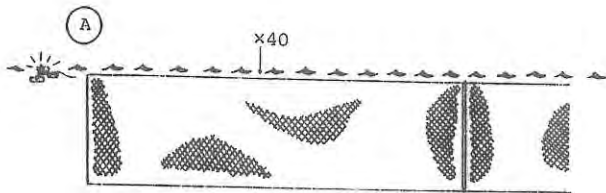
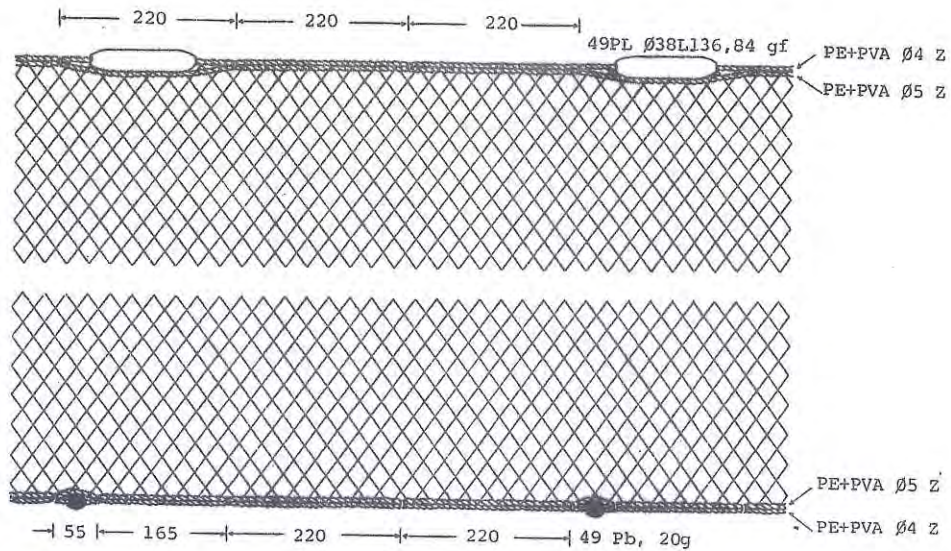
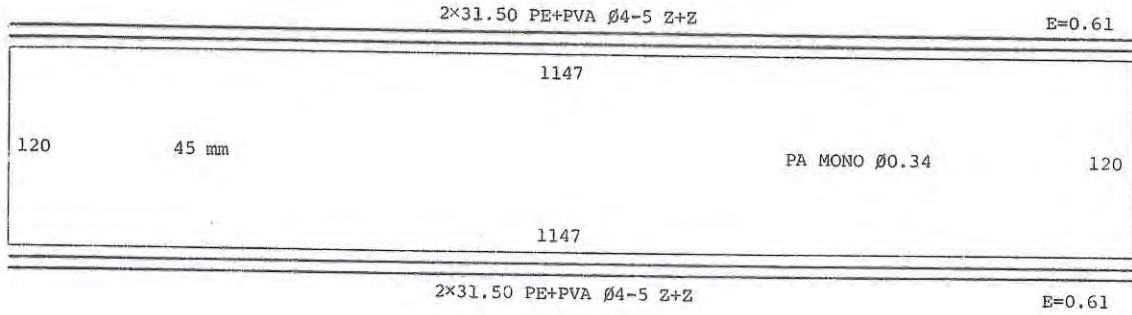
LOCATION
 Selinsing
 Perak



GILL NET
 Driftnet
 Fourfinger threadfin

VESSEL
 Loa 14 m
 hp 24

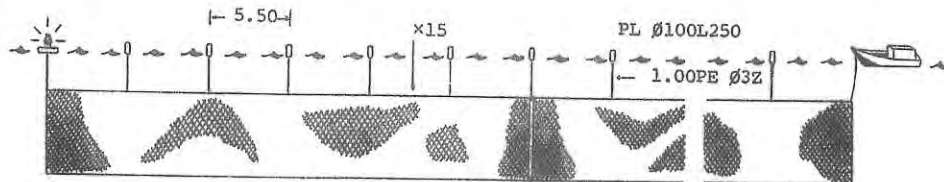
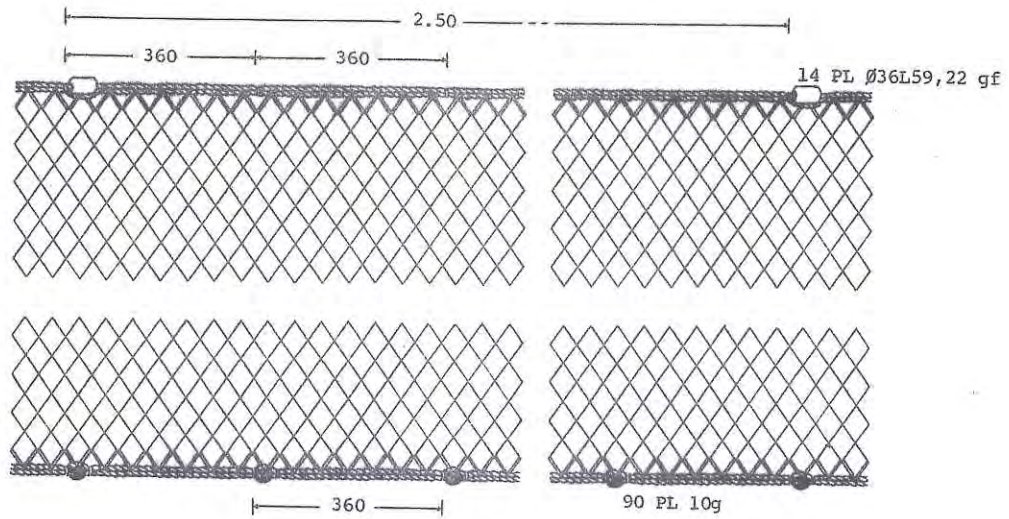
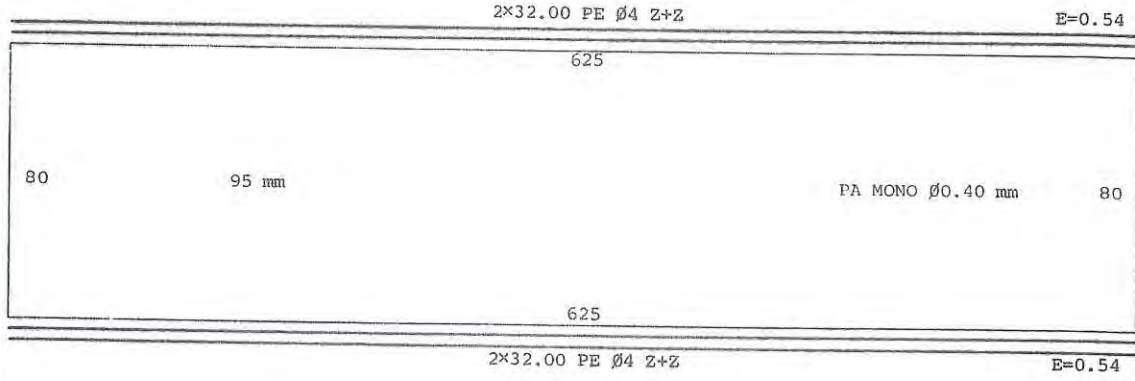
LOCATION
 Pasir Penambang
 Selangor



GILL NET
 Driftnet
 Fourfinger threadfin

VESSEL
 Loa 9.9 m
 hp 22

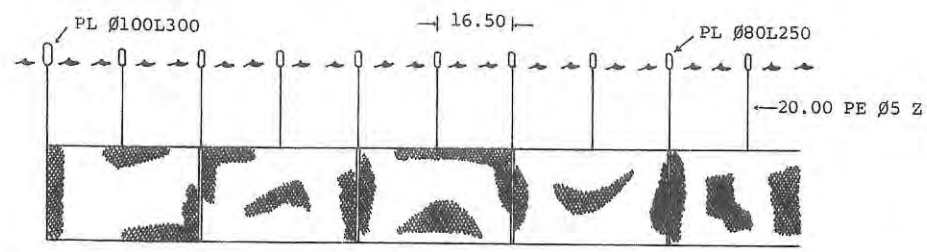
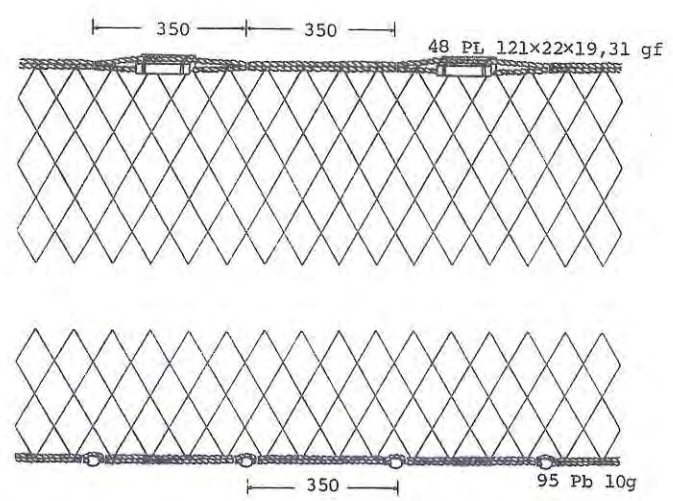
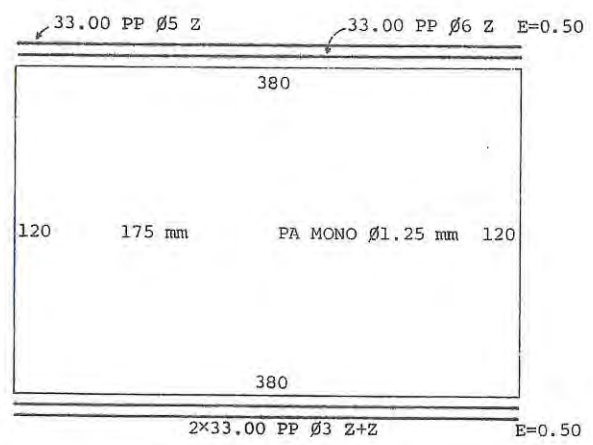
LOCATION
 Kampong Peramu
 Pahang



GILL NET
 Driftnet
 Fourfinger threadfin

VESSEL
 Loa 12.5 m
 hp 22

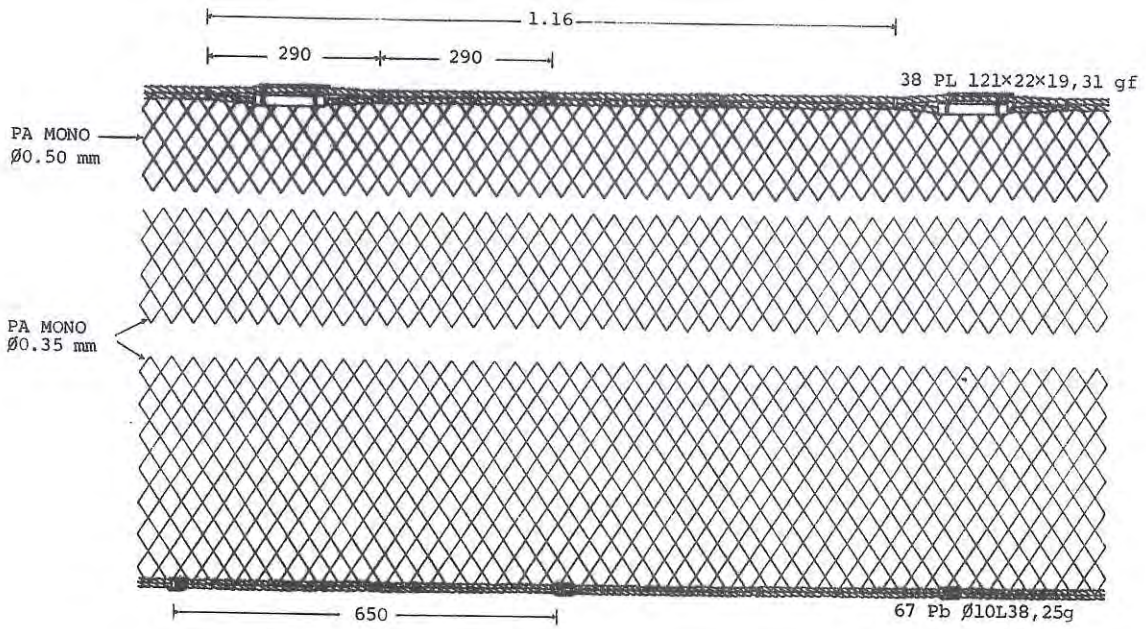
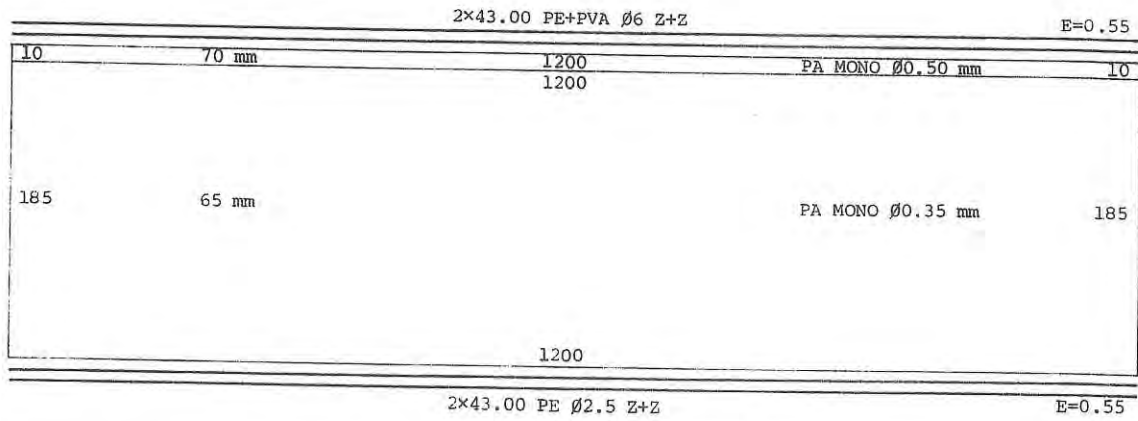
LOCATION
 Parit jawa
 Johor

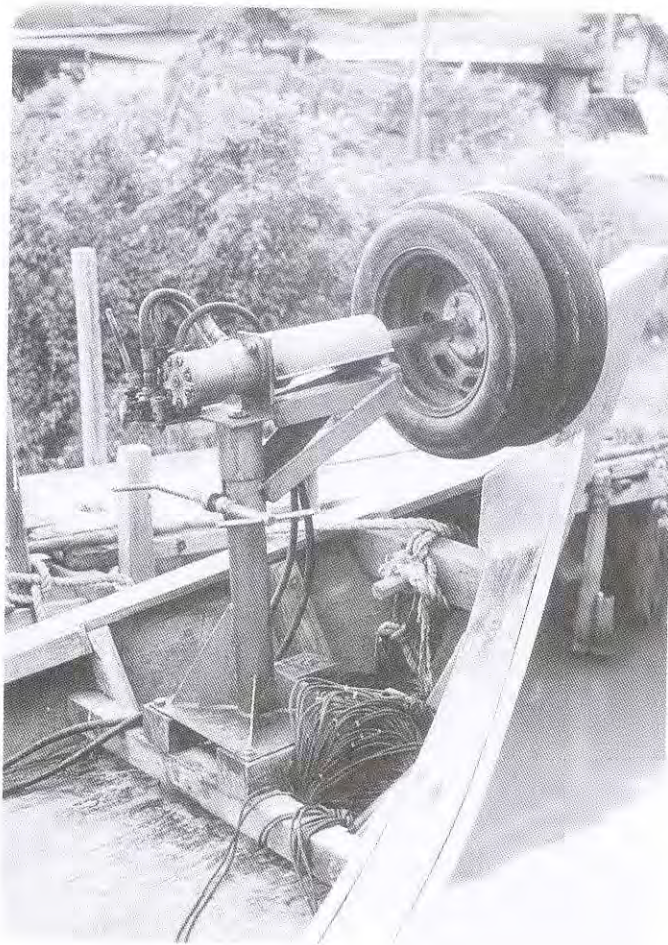
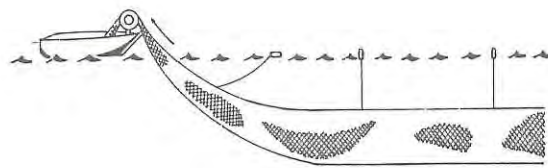
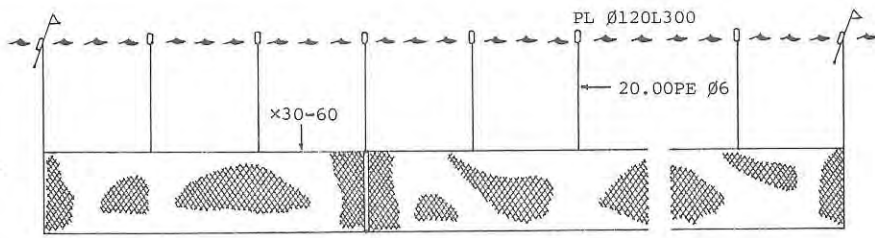


GILL NET
 Driftnet
 Spanish mackerel

VESSEL
 Loa 12 m
 hp 24

LOCATION
 Parit jawa
 Johor





GILL NET
 Driftnet
 Spanish mackerel

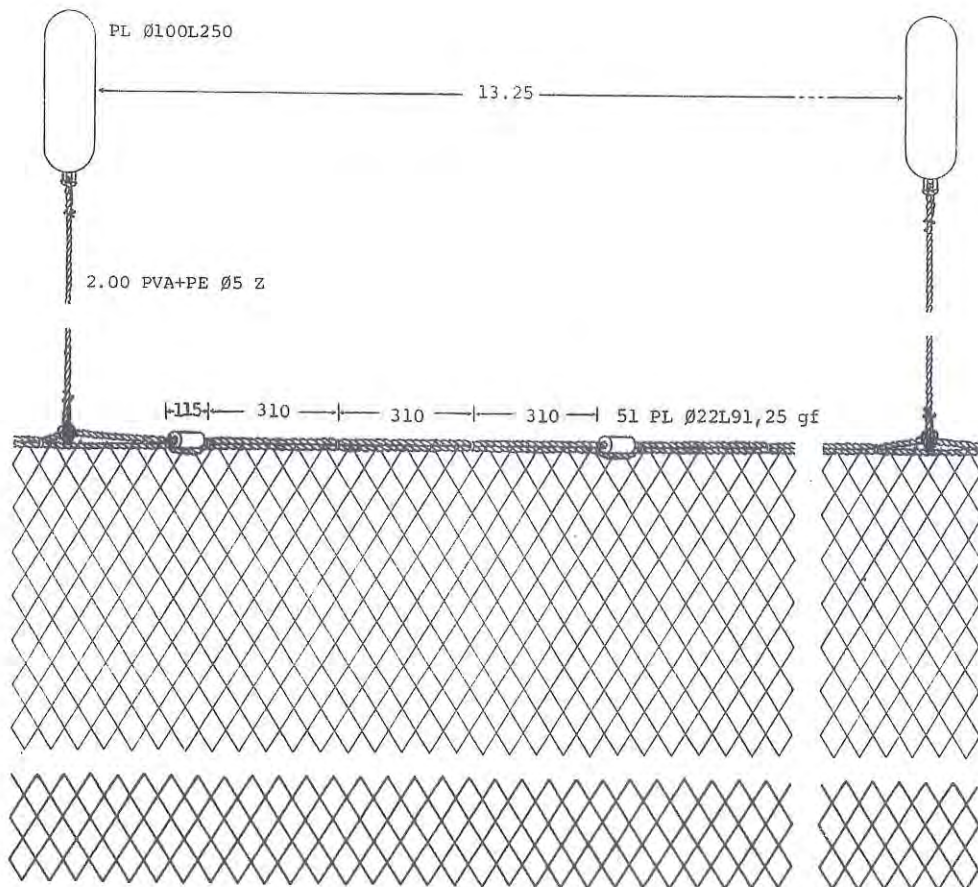
VESSEL
 Loa 12 m
 hp 24

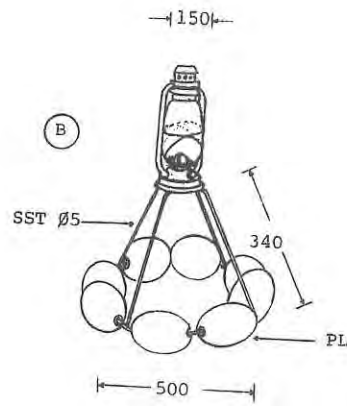
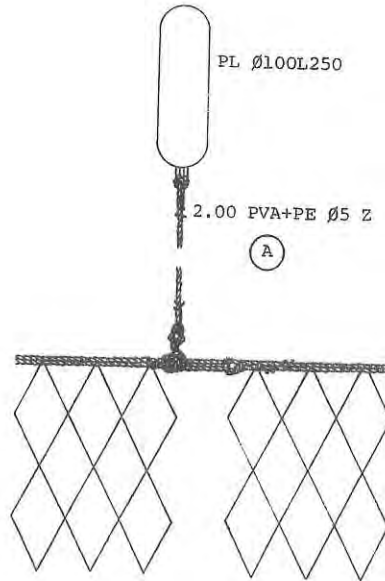
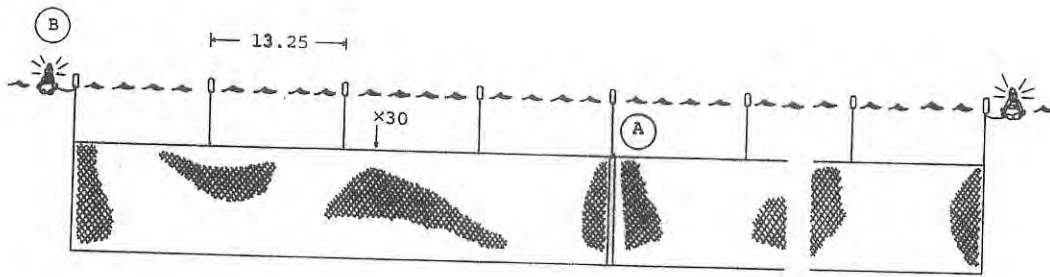
LOCATION
 Pulau Pangkor
 Perak

2x53.00 PVA+PE Ø5 Z+Z

E=0.54

		818		
78	120 mm		PA 210d/18 (Green)	78
		818		
12	120 mm	818	SN 360d/9+210d/9 (Green)	12

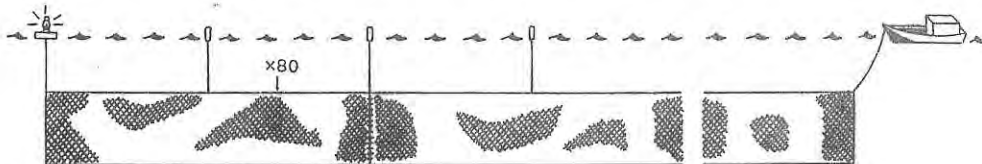
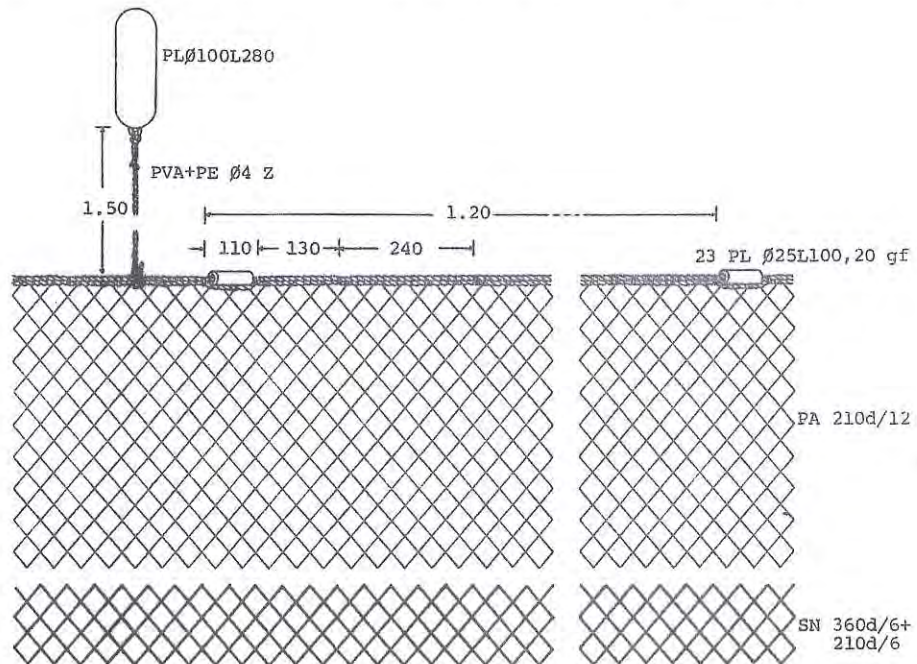
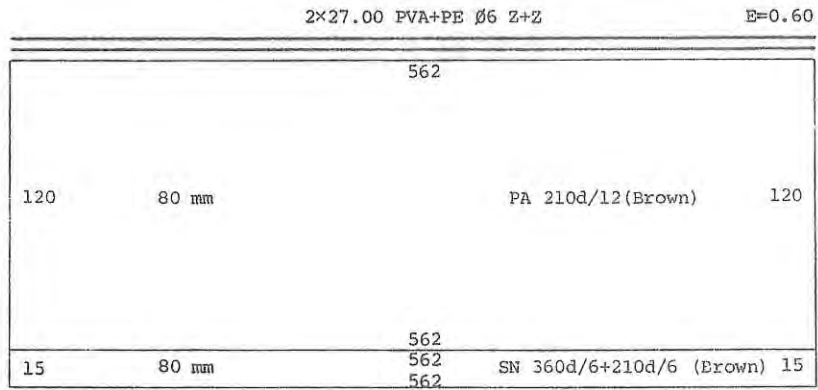




GILL NET
 Driftnet
 Eastern little tuna,
 Spanish mackerel

VESSEL
 Loa 13.5 m
 hp 22

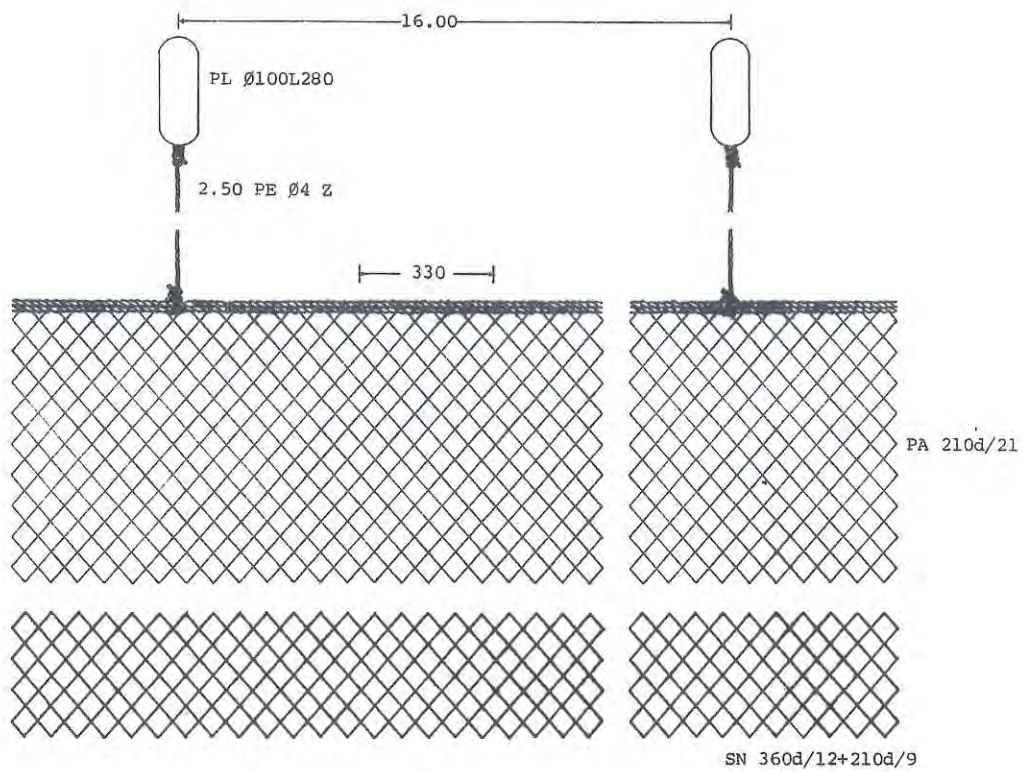
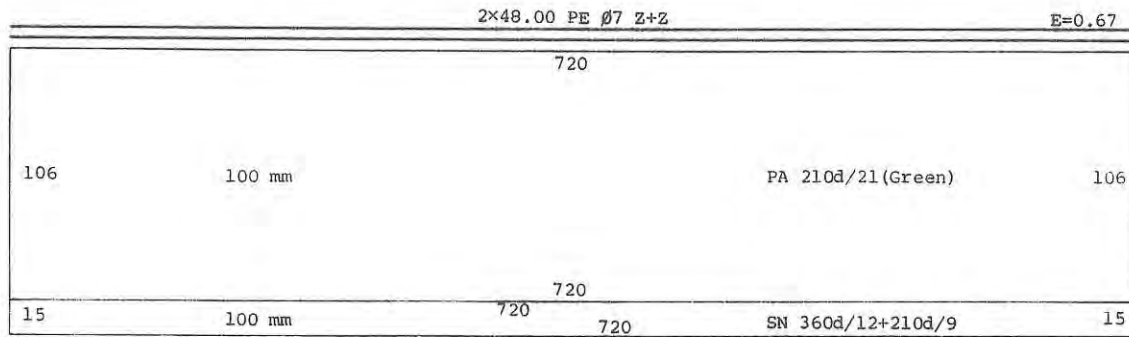
LOCATION
 Kampong Sedili Besar
 Johor

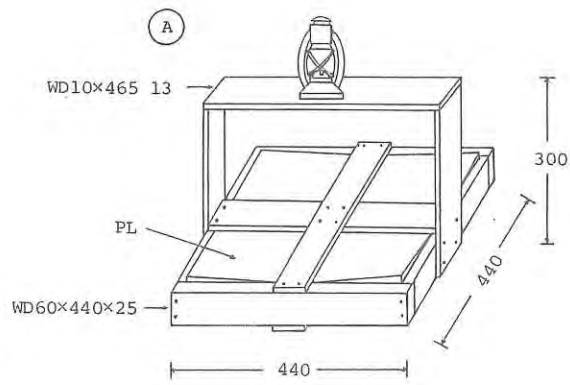
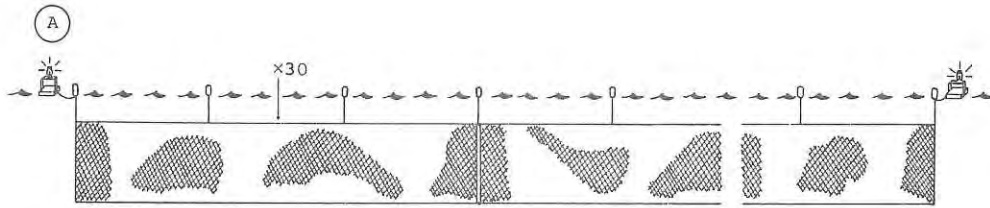


GILL NET
 Driftnet
 Spanish mackerel

VESSEL
 Loa 10.50 m
 hp 12

LOCATION
 Kuala Behsut
 Terengganu



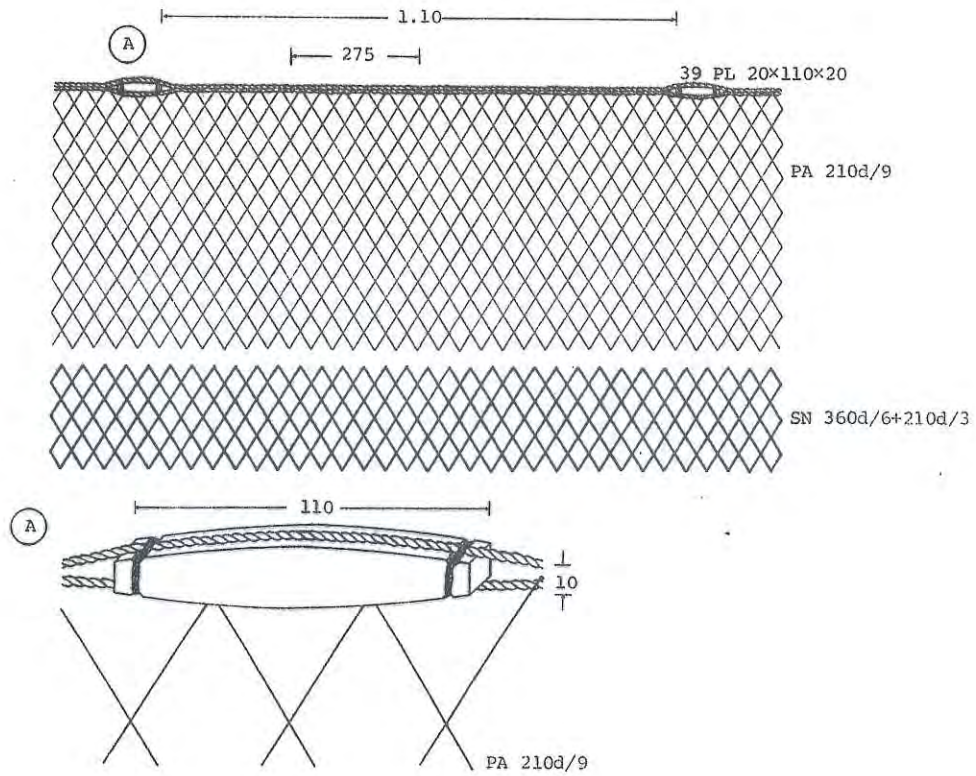


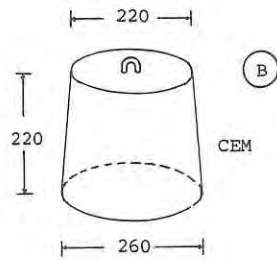
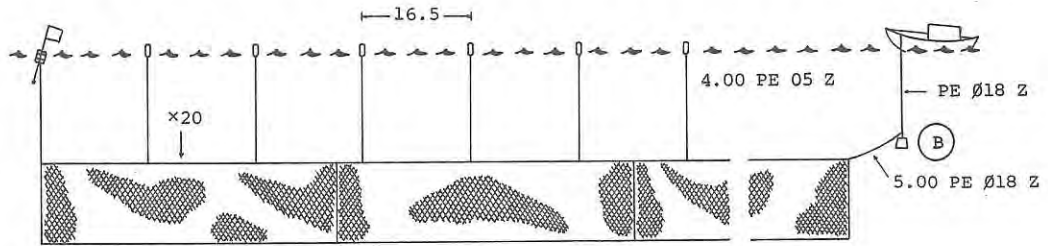
GILL NET
 Driftnet
Rantau Tangsi
 Spanish mackerel

VESSEL
 Loa 10 m
 hp 24

LOCATION
 Sungai Apong
 Sarawak

2x45.90 PE Ø5 Z+Z		E=0.54	
1000			
100	85 mm	PA 210d/9 (Brown)	100
1000			
10	1000	SN 360d/6+210d/3	10



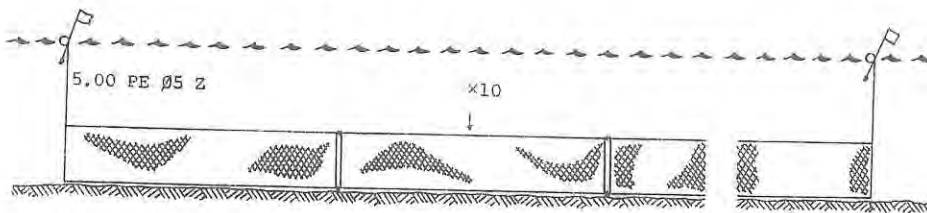
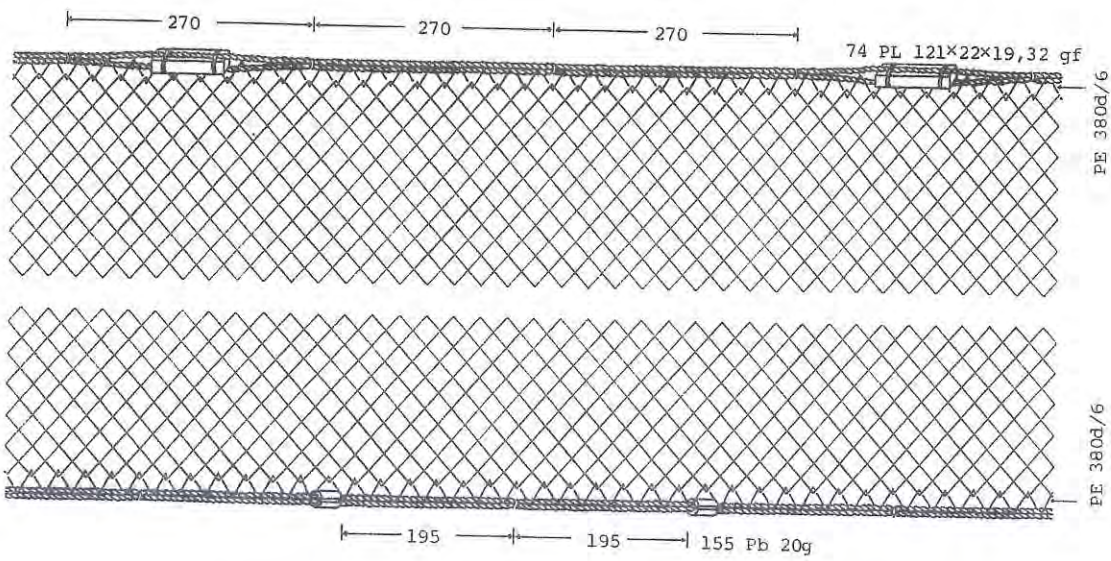


GILL NET
 Bottom set
 Shrimp

VESSEL
 Loa 6 m
 hp 9.9 OM

LOCATION
 Sungai Udang
 Pinang

2×60.35 PE Ø5 Z+Z					E=0.66
60	45 mm	2032	PA MONO Ø0.27 mm	60	
2×60.35 PE Ø5 Z+Z					E=0.66

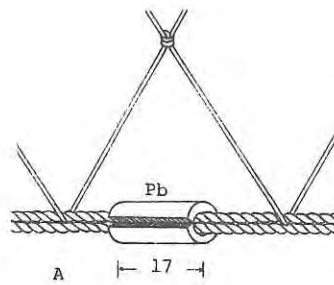
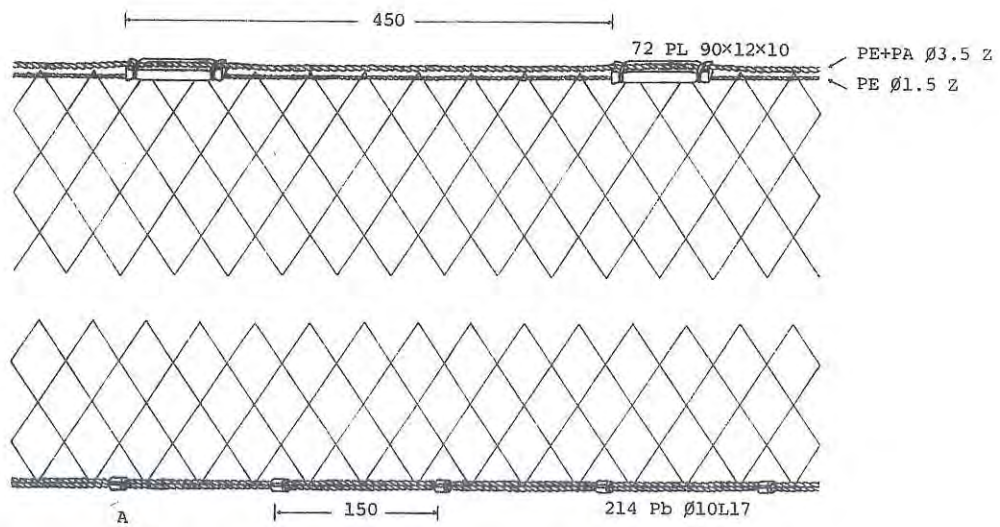


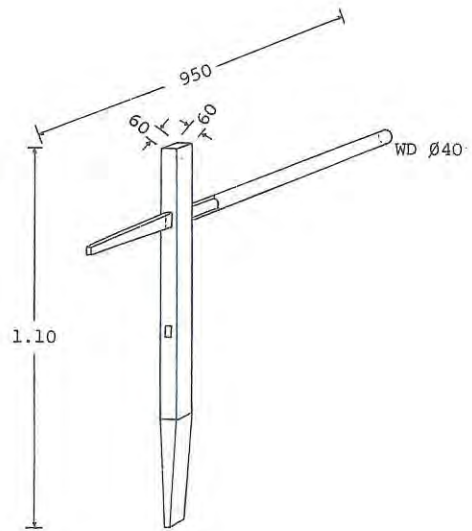
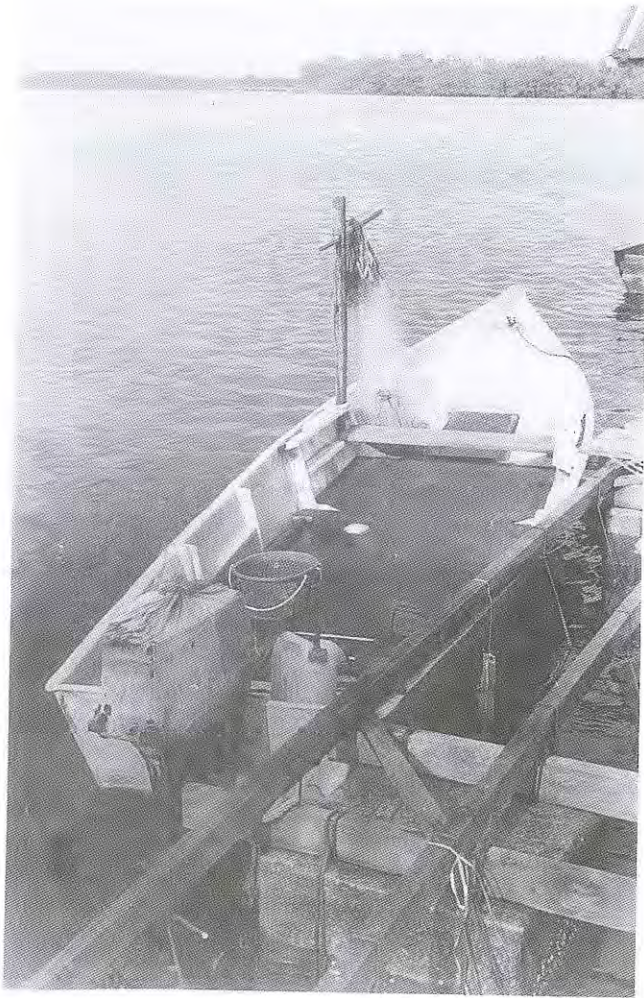
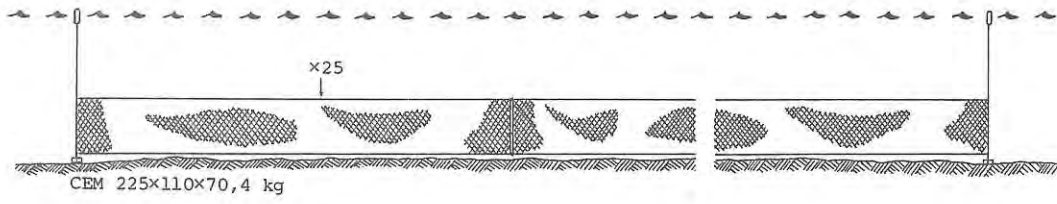
GILL NET
Bottom set
Mangrove crab

VESSEL
Loa 6 m
hp 12 OM

LOCATION
Johor Baharu
Johor

		32.00 PE+PA Ø3.5 Z		32.00 PE Ø1.5 Z	E=0.55
11	90 mm	711	711	PA MONO Ø0.30 mm	11
2×32.00 PE Ø3 Z+Z					E=0.55





GILL NET

Bottom set

Blue swimming crab

VESSEL

Loa 4 m.

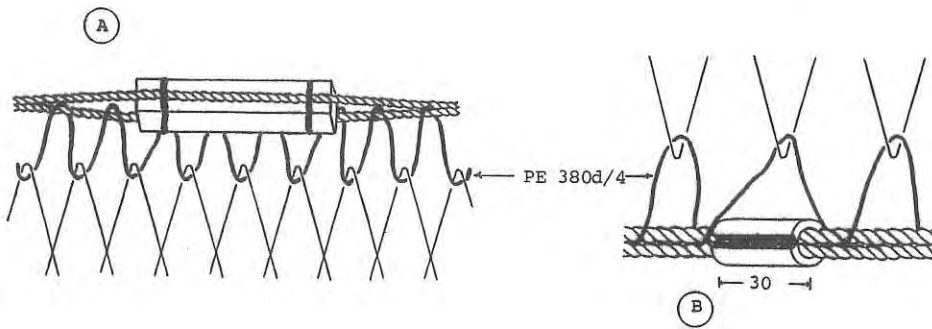
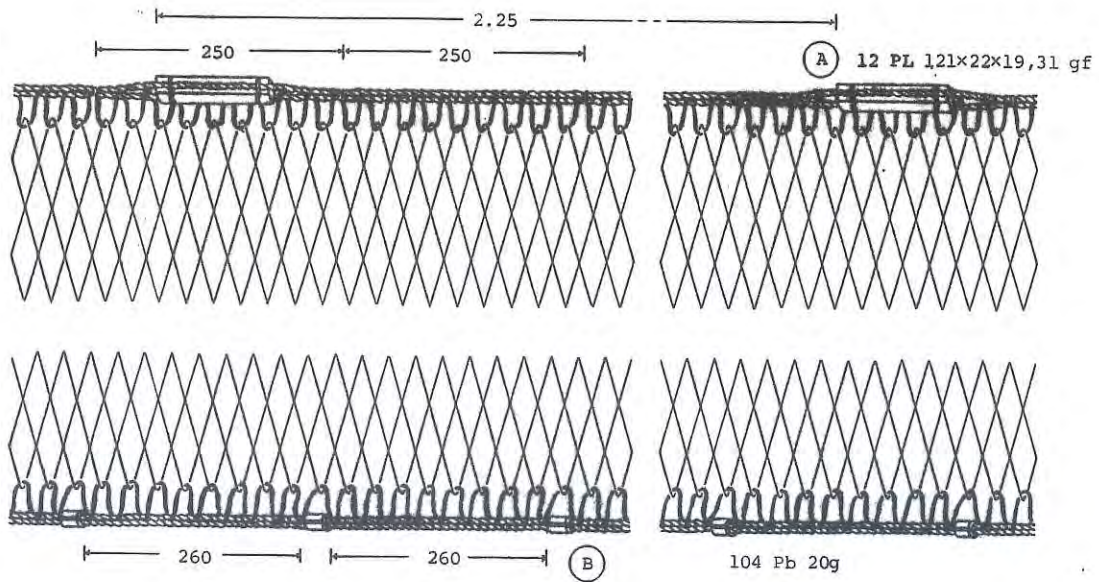
hp 6 OM

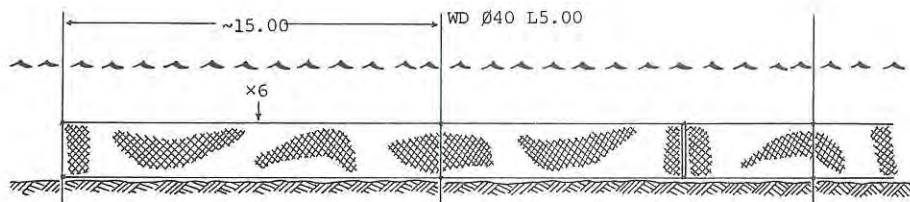
LOCATION

Sungai Udang

Pinang

		2x25.90 PE Ø3 Z+Z		E=0.26	
7½	105 mm	950	PA MONO Ø0.30 mm	7½	
		2x29.90 PE Ø3 Z+Z		E=0.30	





GILL NET
 Bottom set
 Blue swimming crab

VESSEL
 Loa 4 m
 hp 6 OM

LOCATION
 Tanjung Tokong
 Pinang

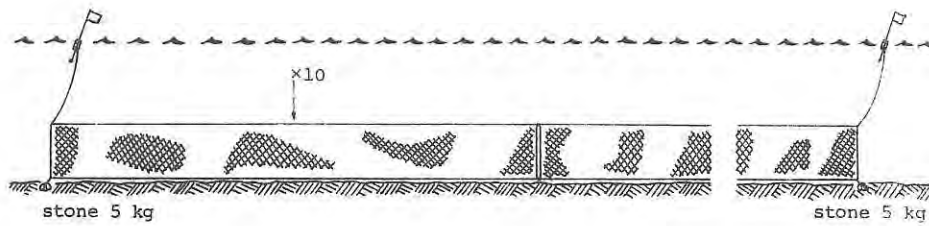
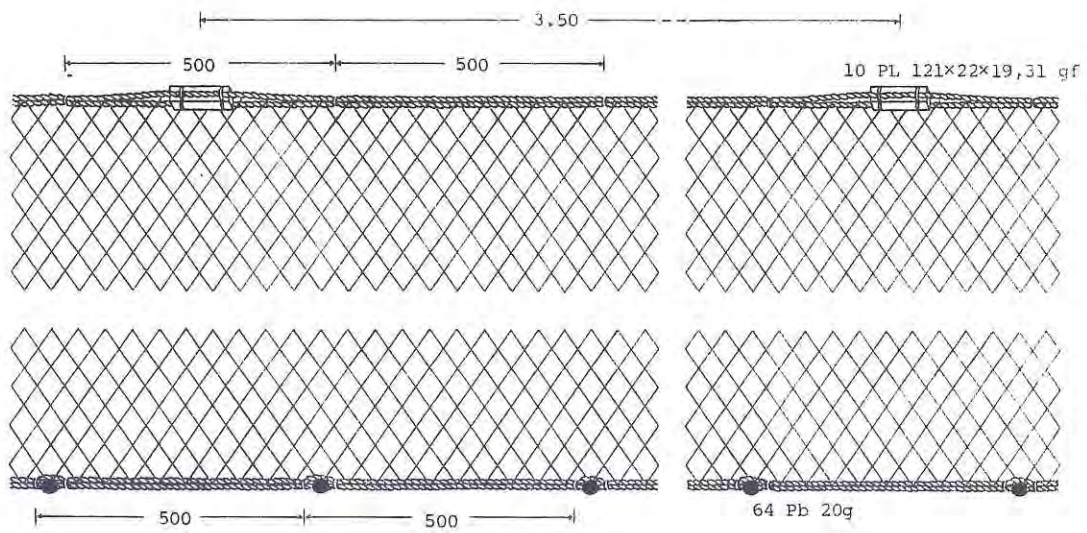
2x31.50 PE Ø3 2+2

E=0.43

11	115 mm	637 637	PA MONO Ø0.35 mm	11
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2x31.50 PE Ø3 2+2

E=0.43

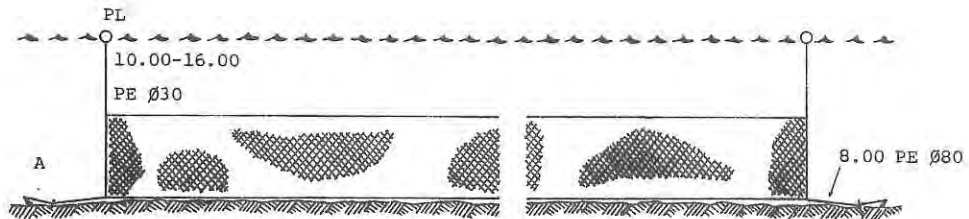
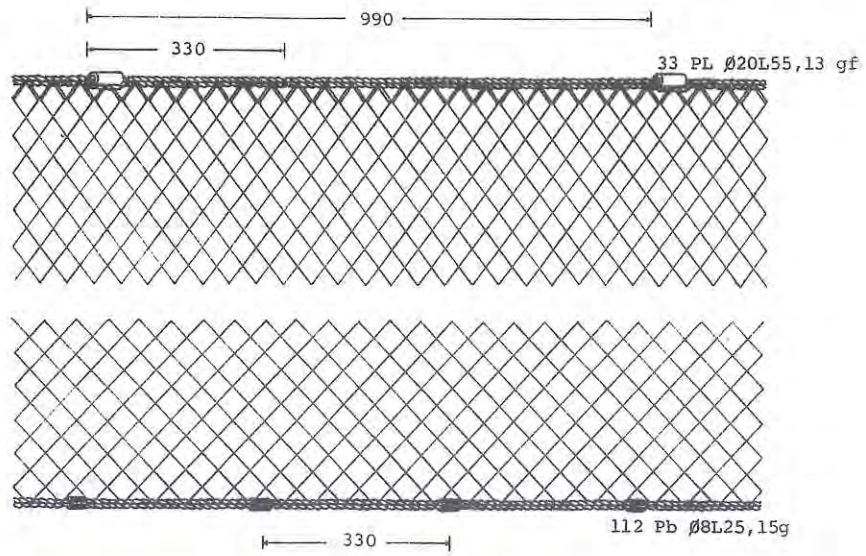


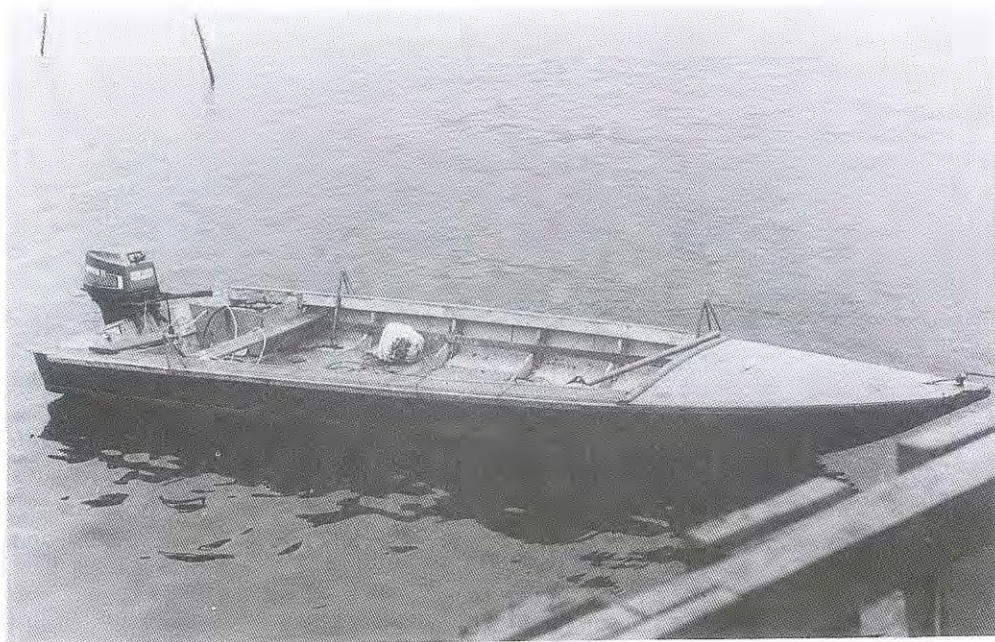
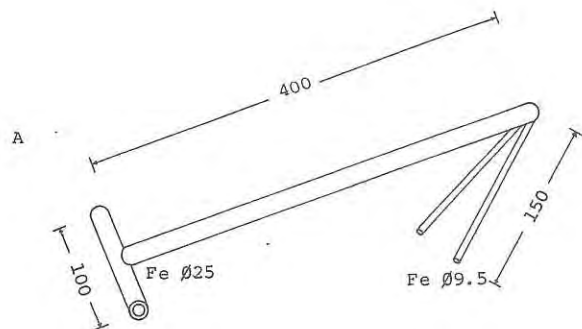
GILL NET
 Bottom set
 Blue swimming crab

VESSEL
 Loa 6-7 m
 hp 6-12 OM

LOCATION
 Johor Baharu
 Johor

2×32.00 PE Ø25 Z+Z				E=0.59
16	80 mm	678	PA MONO Ø0.30 mm	16
2×36.88 PE Ø25 Z+Z				E=0.68



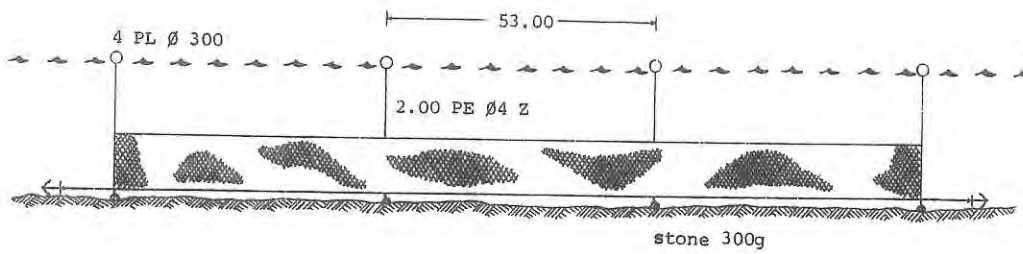
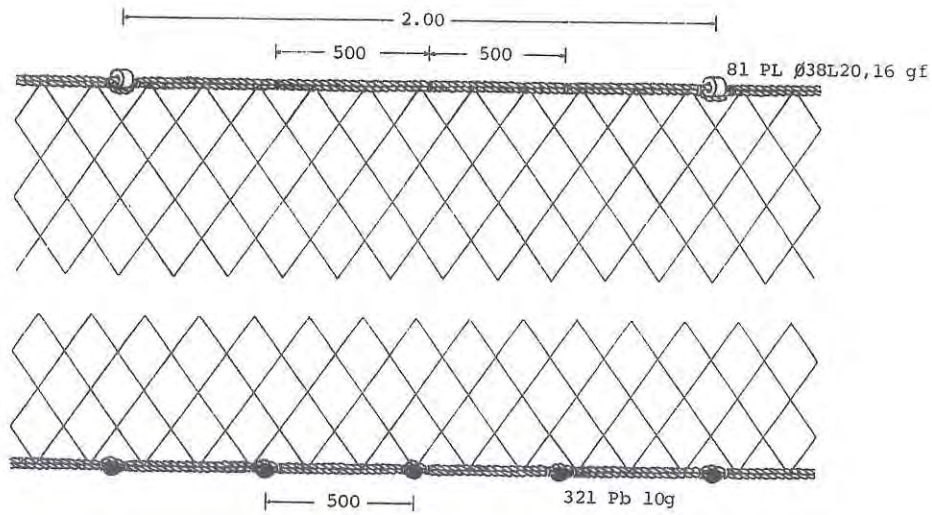


GILL NET
 Bottom set
 Stingray

VESSEL
 Loa 4 m
 hp 3 OM

LOCATION
 Kuala Behsut
 Terengganu

		2x160.00 PE Ø3 Z+Z		E=0.60	
20	300 mm	880	880	PA 210d/30 (White)	20
		2x160.00 PE Ø3 Z+Z		E=0.60	

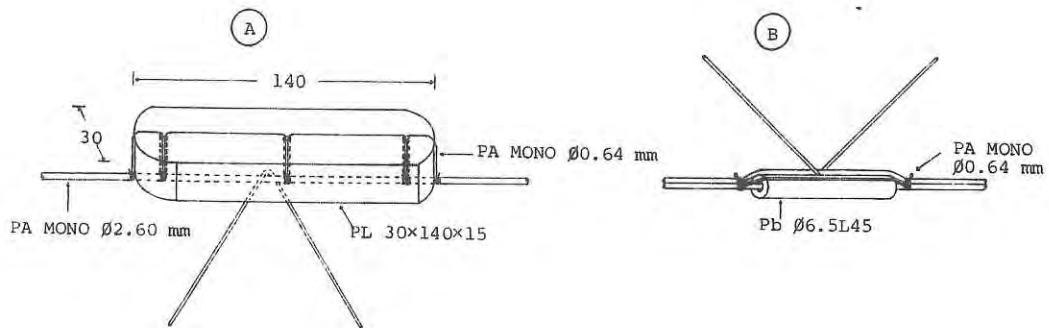
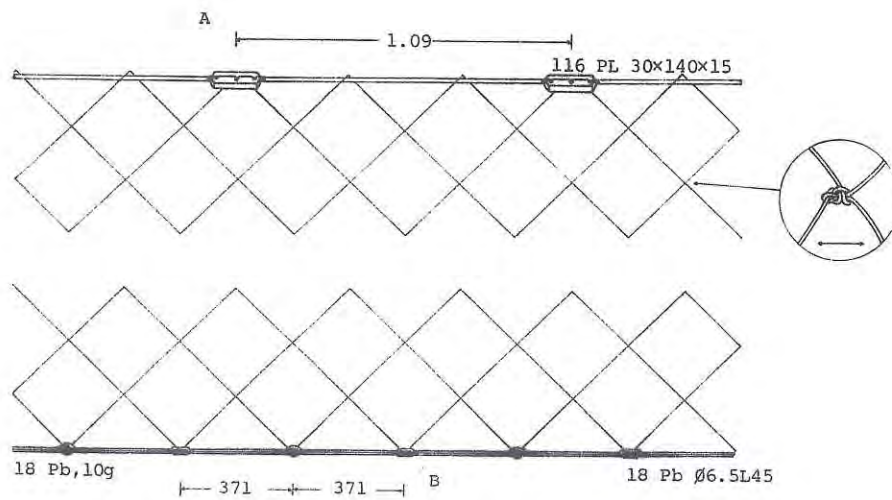


GILL NET
Bottom set
Stingray

VESSEL
Loa 7 m
hp 5

LOCATION
Tanjong Bangau-Bangau
Sabah

		124.37 PA MONO \varnothing 2.60 mm		E=0.70
7½	515 mm	345	345	PA MONO \varnothing 1.53 mm
				E=0.72
		2×127.92 PA MONO \varnothing 1.56 mm		E=0.72

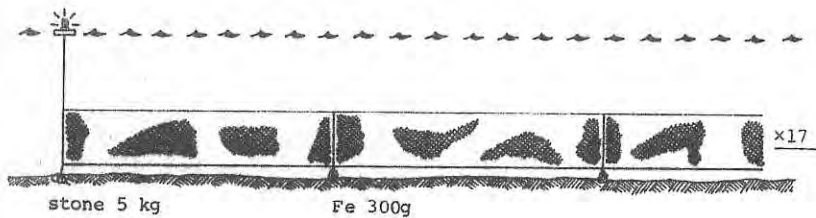
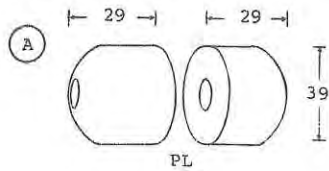
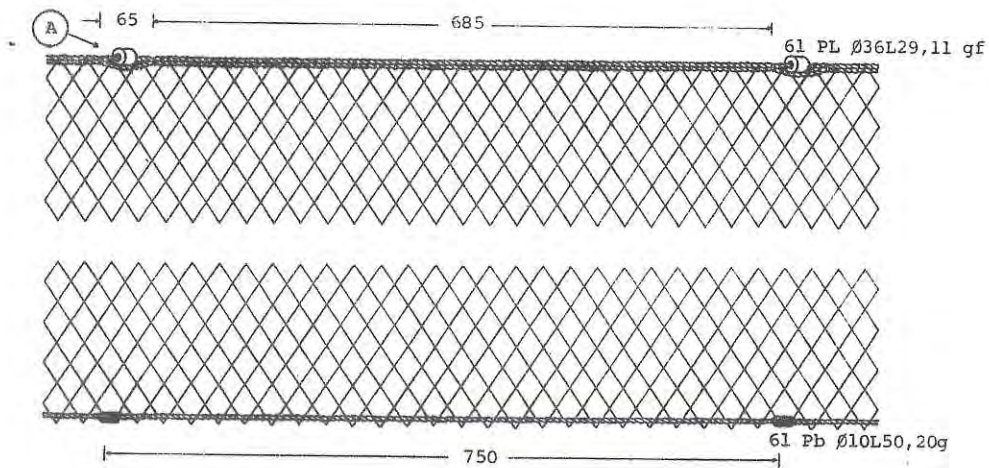


GILL NET
 Bottom set
 Indo-Pacific mackerel,
 Hardtail scad

VESSEL
 Loa 7 m
 hp 40 OM

LOCATION
 Tanjong Baram
 Sarawak

2x45.00' PE Ø4 Z+Z				E=0.57
35	52 mm	1518 1518	PA MONO Ø0.38 mm	35
45.00 PE Ø4 Z				E=0.57

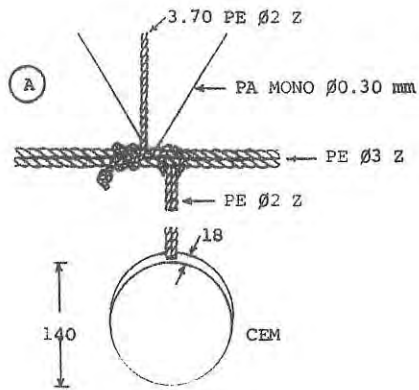
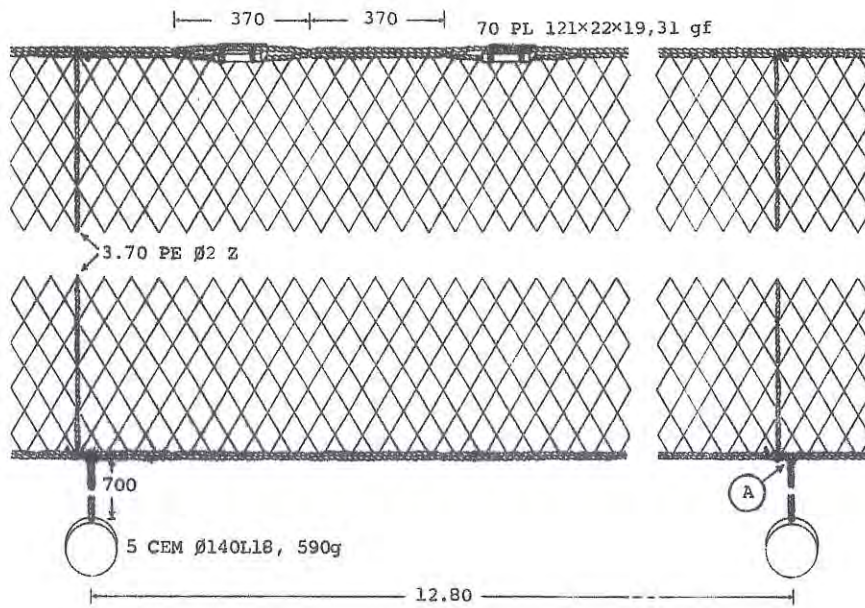


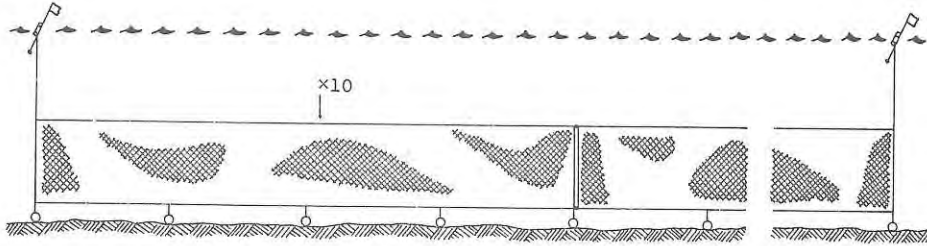
GILL NET
Bottom set
Pomfret

VESSEL
Loa 5 m
hp 6 OM

LOCATION
Telok Bahang
Pinang

3.70 PE Ø2 Z	2×51.20 PE Ø3 Z+Z				E=0.49
	40	15 mm	697	PA MONO Ø0.30 mm	40
			697		
	2×51.20 PE Ø3 Z+Z				E=0.49



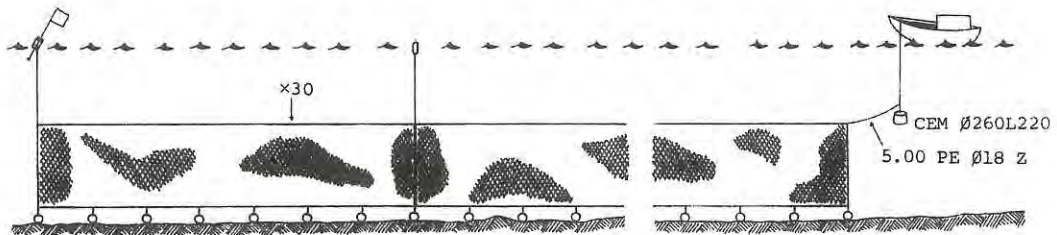
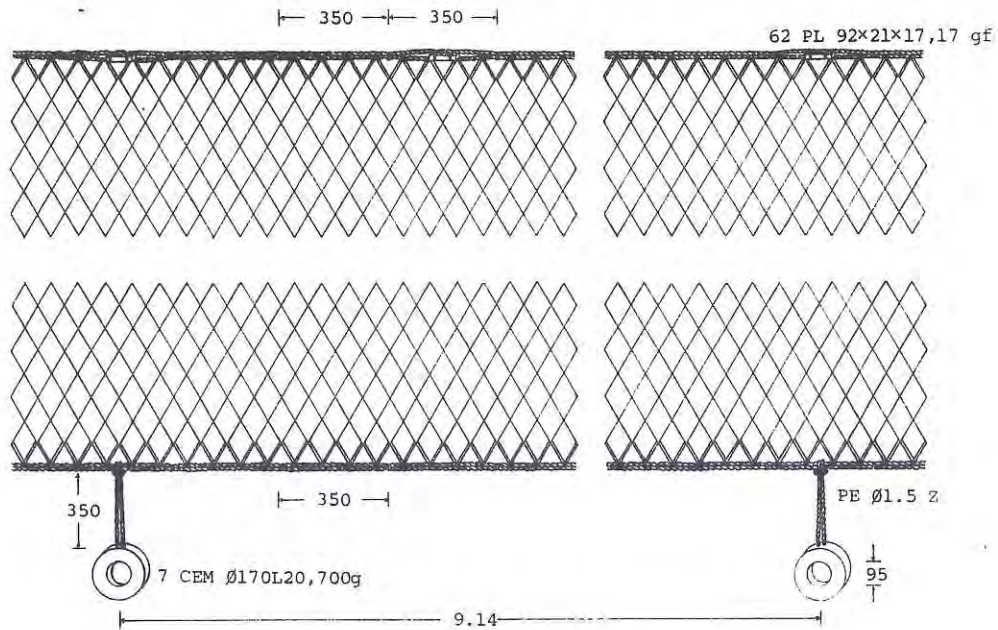


GILL NET
 Bottom set
 Rantau Tangsi
 Pomfret

VESSEL
 Loa 10 m
 hp 24

LOCATION
 Sungai Apong
 Sarawak

2×64.00 PE Ø4 Z+Z		E=0.51
639		
40	170 mm	PA MONO Ø0.42 mm
	639	40
2×64.00 PE Ø4 Z+Z		E=0.51

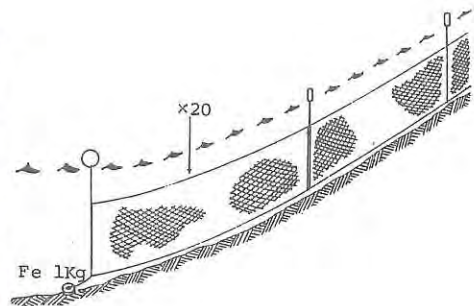
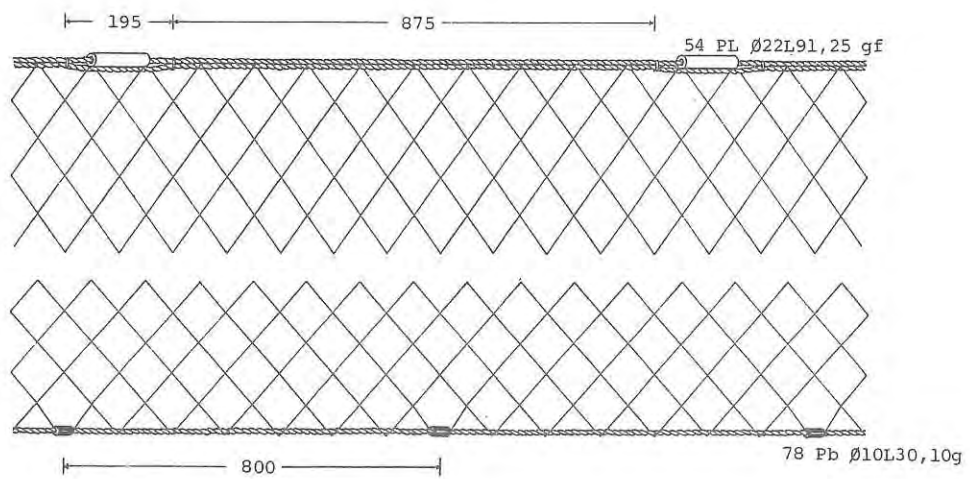


GILL NET
Bottom set
Seabass

VESSEL
Loa 7 m
hp 40 OM

LOCATION
Tanjong Baram
Sarawak

2x57.17 PE Ø5 Z+Z				E=0.67
14	170 mm	590 590	PA MONO Ø1.14 mm	14
62.20 PE Ø4 Z				E=0.67

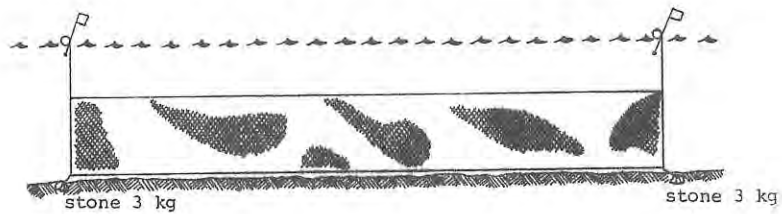
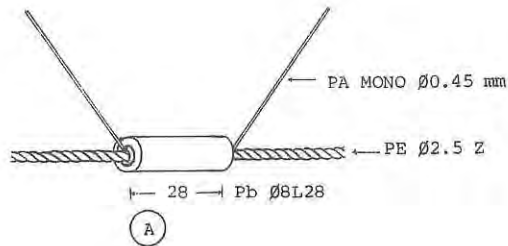
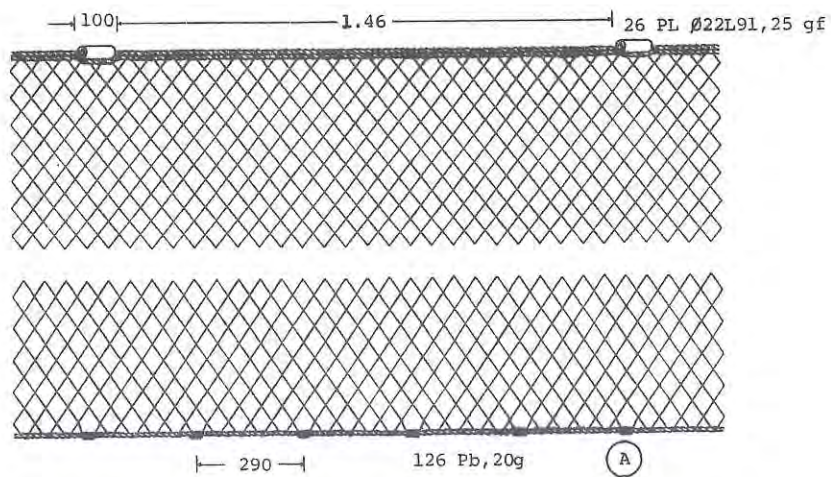


GILL NET
 Bottom set
 Grouper, Snapper

VESSEL
 Loa 4 m
 hp 15

LOCATION
 Kampong Tinagat
 Sabah

2×39.00 PEØ2.5 Z+Z		E=0.62
22	100 mm	PA MONO Ø0.45 mm
36.40 PE Ø2.5 Z		E=0.58



GILL NET
Bottom set
Grouper, Snapper

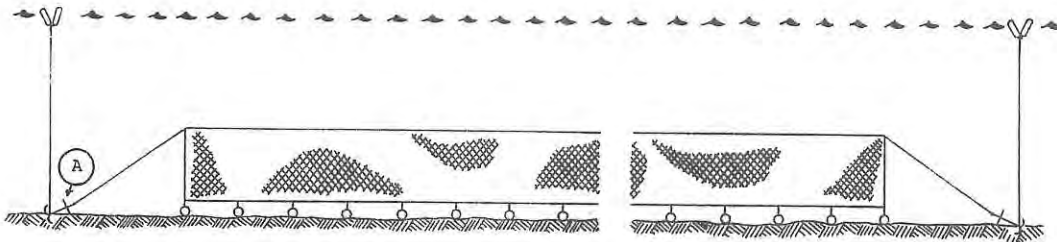
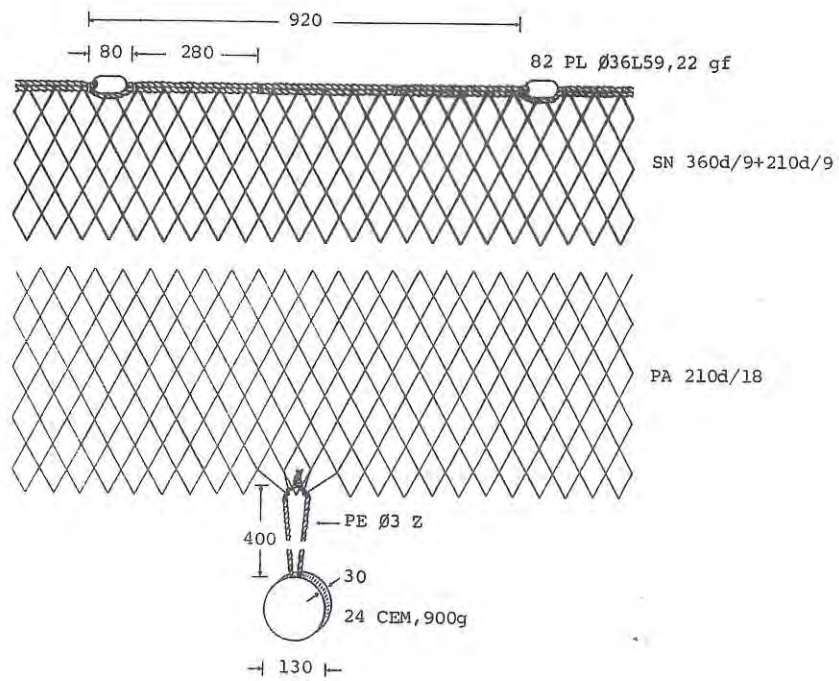
VESSEL
Loa 7 m
hp 9.9 OM

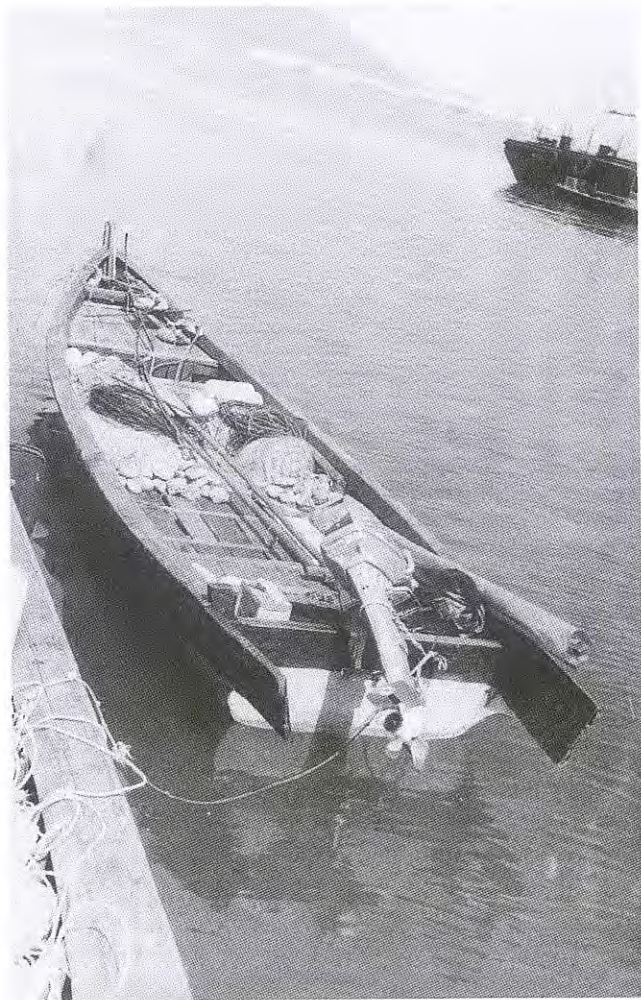
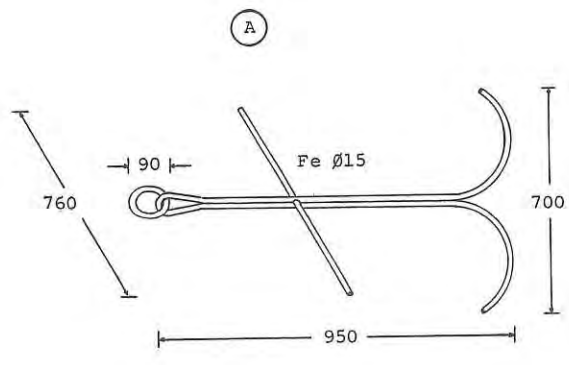
LOCATION
Pulau Pangkor
Perak

2x74.88 PA+PE Ø4 Z+Z

E=0.48

10	120 mm	1300	1300	SN 360d/9+210d/9 (Light brown)	10
			1300		
30	120 mm			PA 210d/18 (Light brown)	30
			1300		

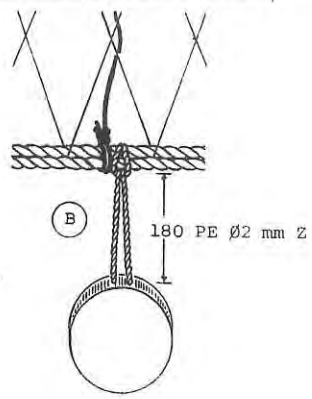
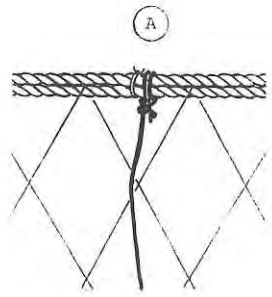
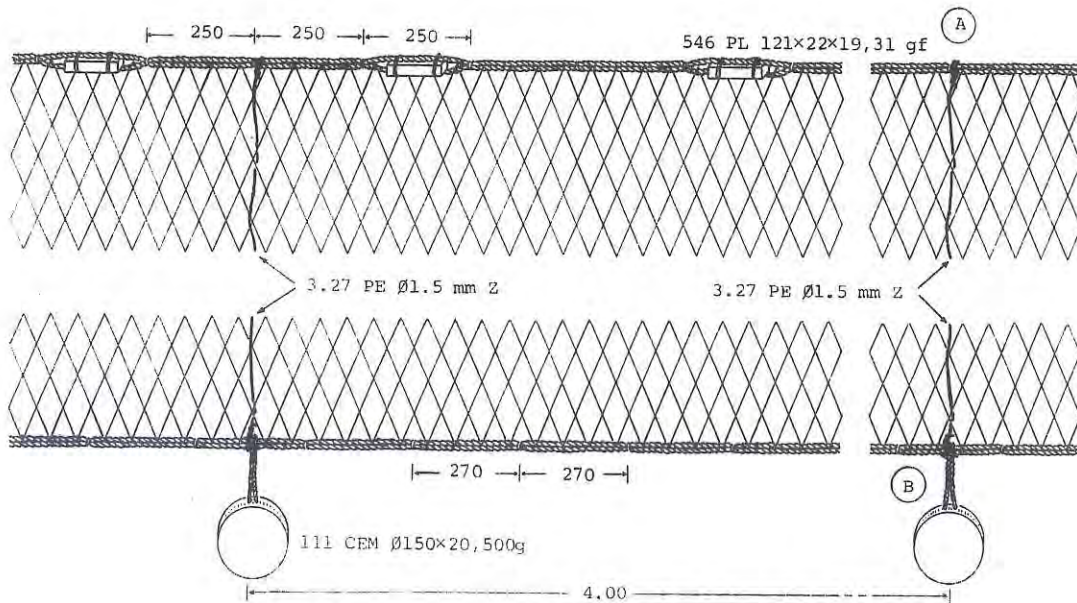
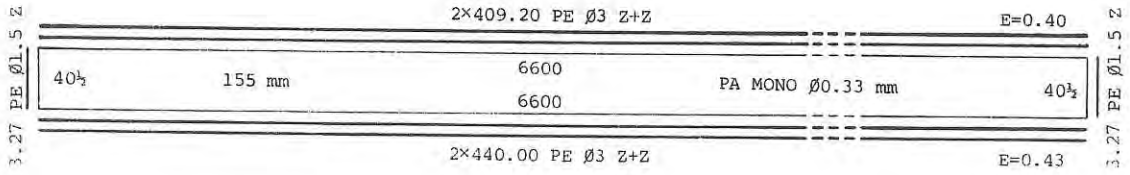


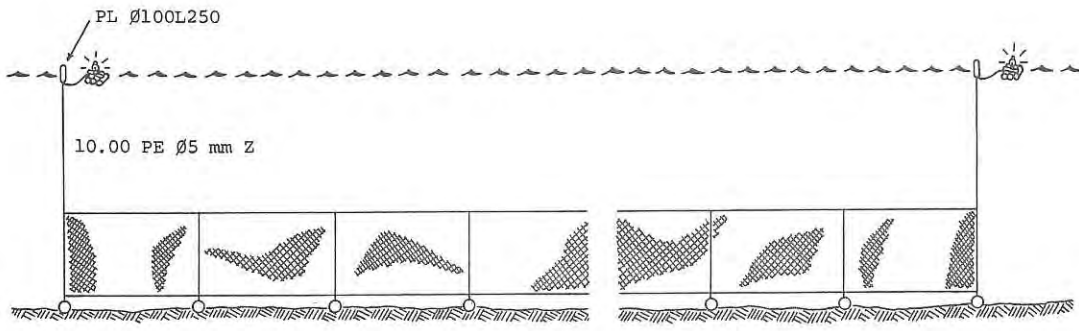


GILL NET
 Bottom set
 Grouper, Snapper

VESSEL
 Loa 4 m
 hp 6 OM

LOCATION
 Pulau Pangkor
 Perak

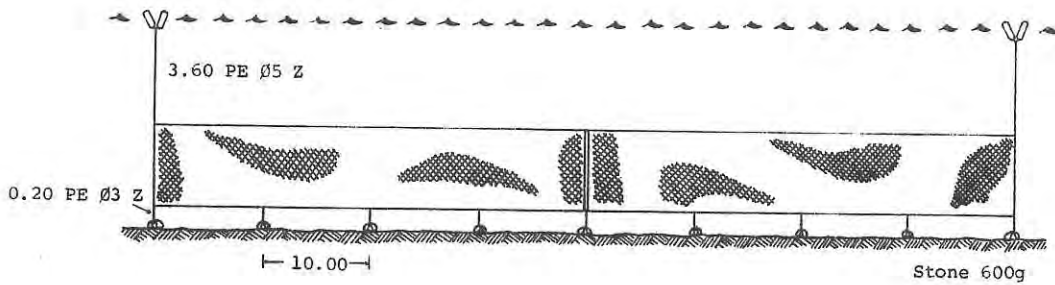
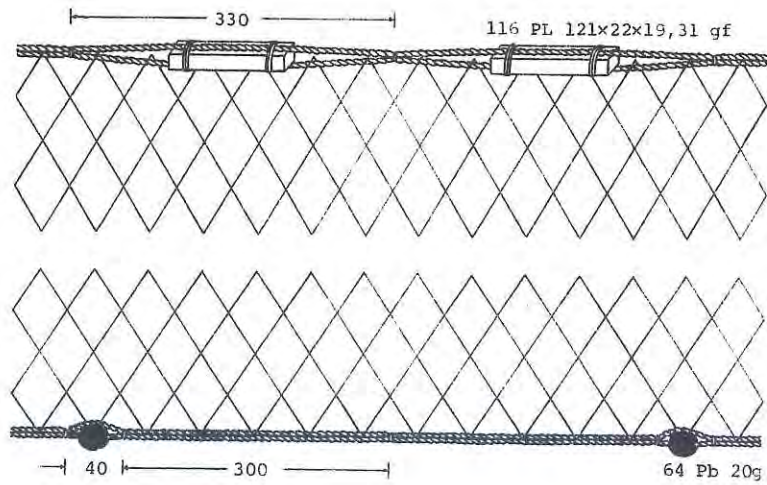
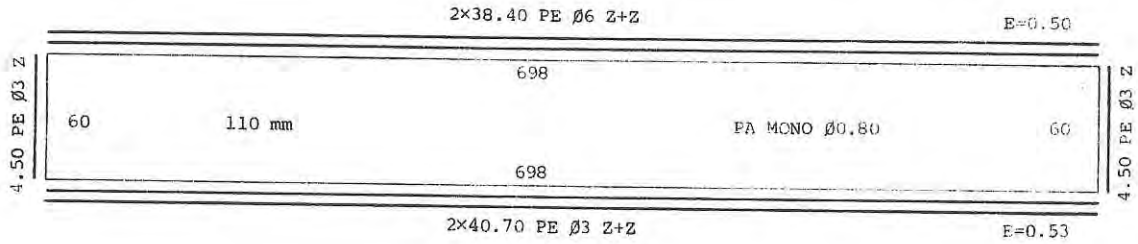




GILL NET
 Bottom set
 Fourfinger threadfin

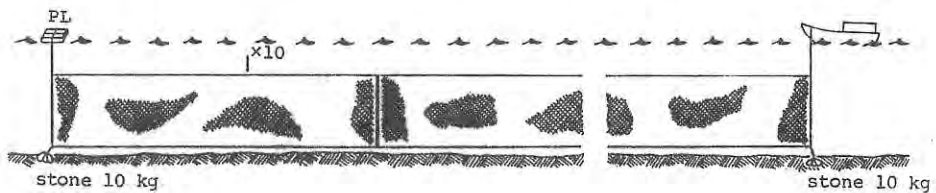
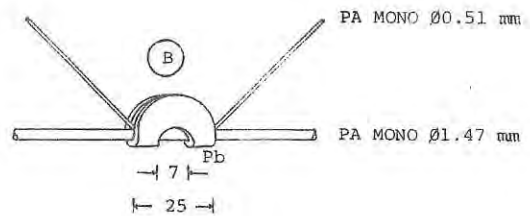
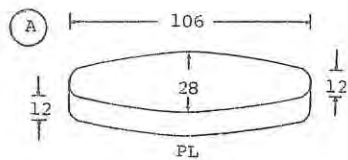
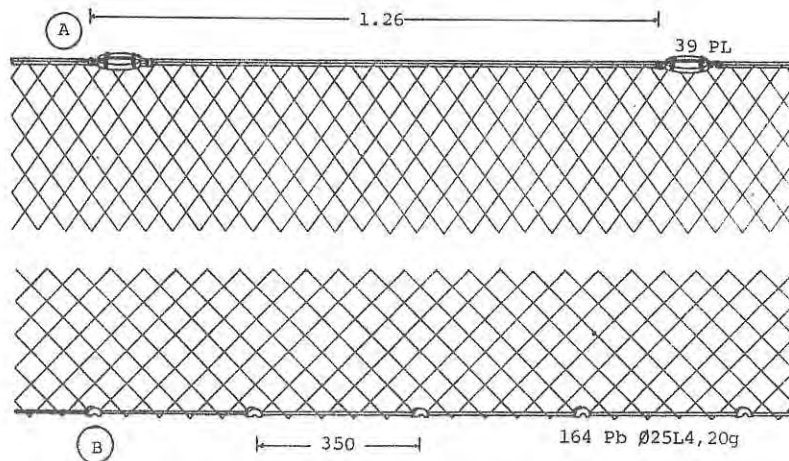
VESSEL
 Loa 4 m
 hp 6 OM

LOCATION
 Telok Bahang
 Pinang



GILL NET	VESSEL	LOCATION
Bottom set	Loa 6 m	Gantisan
Trevally, Seabass, Scad, Pomfret, Giant queenfish, Mullet	hp 30 OM	Sabah

2x48.14 PA MONO Ø1.47 mm		E = 0.59
24	102 mm	800
		800
		PA MONO Ø0.51 mm
		24
57.12 PA MONO Ø1.47 mm		E = 0.70



GILL NET

Bottom set

Giant queenfish, Fourfinger threadfin, Shark, Shovelnose ray

VESSEL

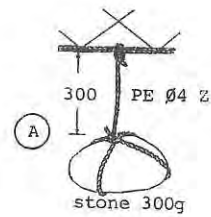
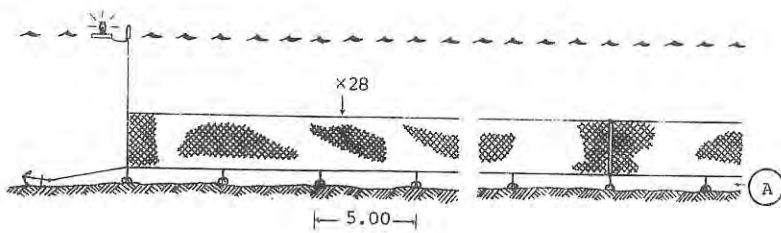
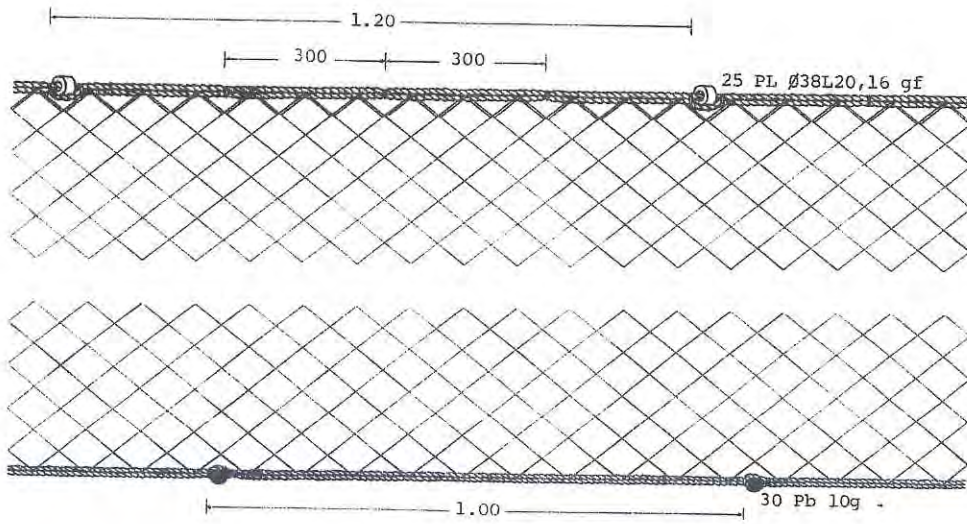
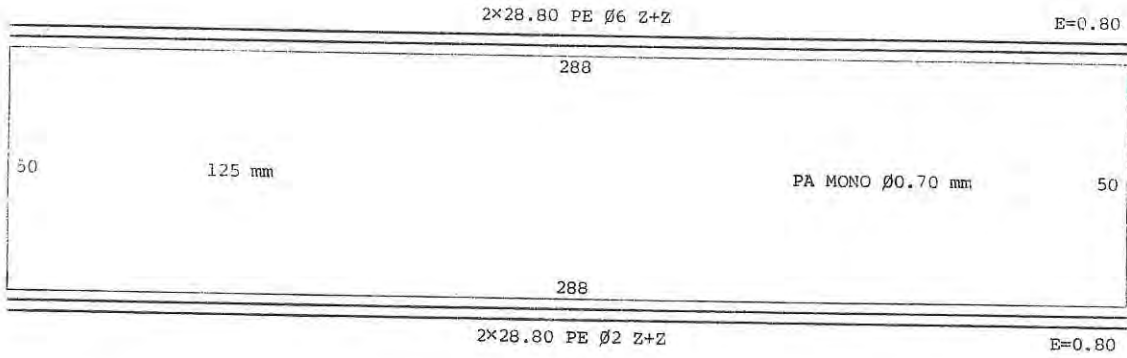
Loa 7 m

hp 12 OM

LOCATION

Kampong Peramu

Pahang



GILL NET

Trammel, Bottom set
Shrimp

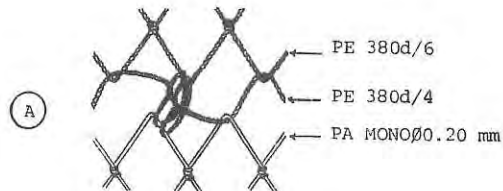
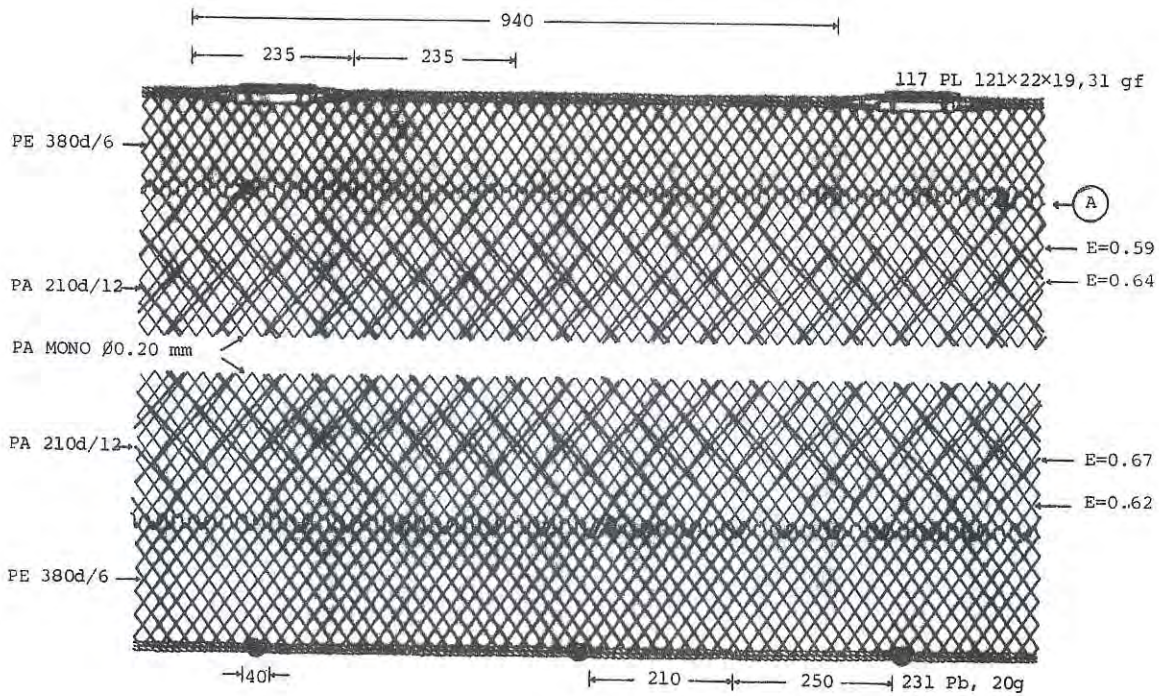
VESSEL

Loa 4.50 m
hp 6 OM

LOCATION

Telok Bahang
Pinang

14½	110 mm	1550	1550	PA 210d/12 Raschel (Yellow)	14½	E=0.64
PE 380d/6,40 mm (Green)		2×109.70	PE Ø3 Z+Z	E=0.67	E=0.59	
4	60	4650	4650	PA MONO Ø0.20 mm	4	
5½	PE 380d/6,40 mm (Green)	2×115.30	PE Ø3 Z+Z	E=0.64	E=0.62	
14½	110 mm	1550	1550	PA 210d/12 Raschel (Yellow)	14½	E=0.67

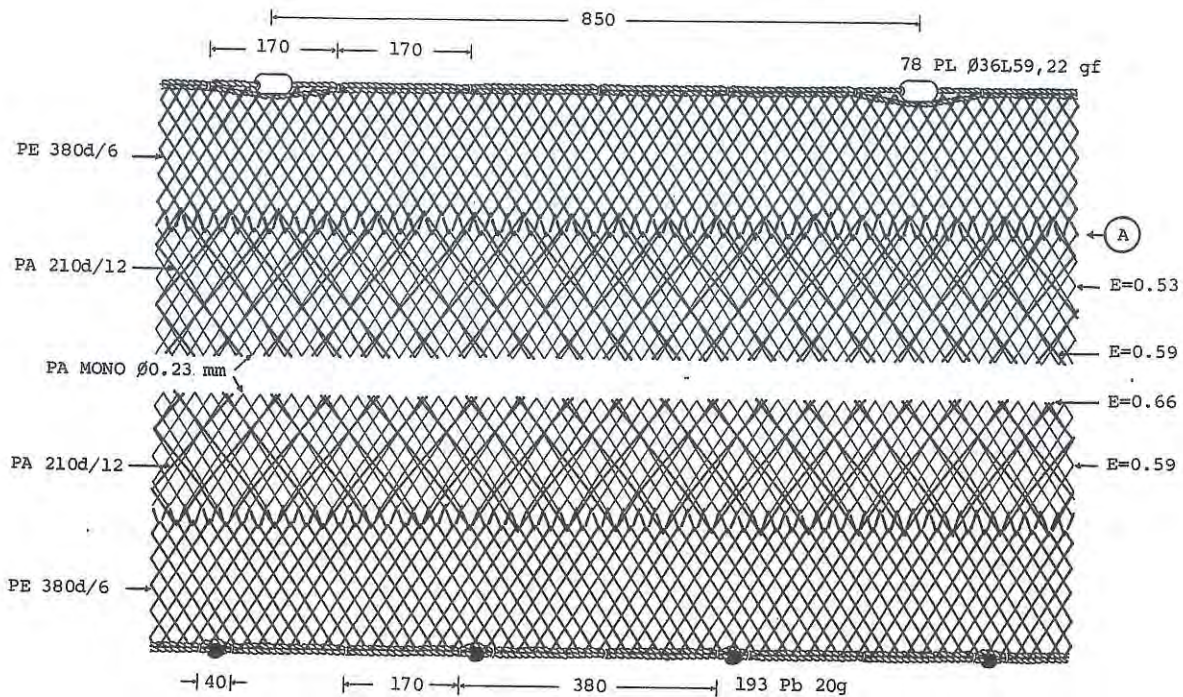


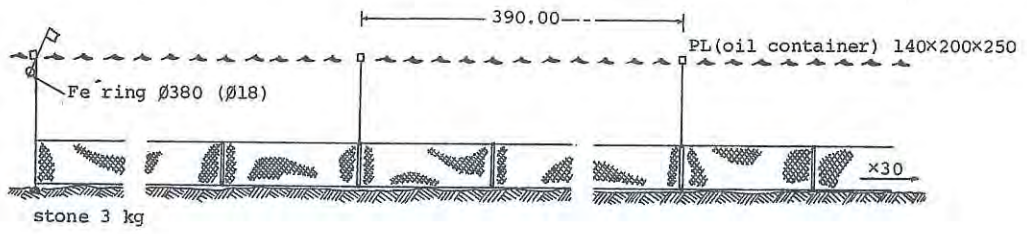
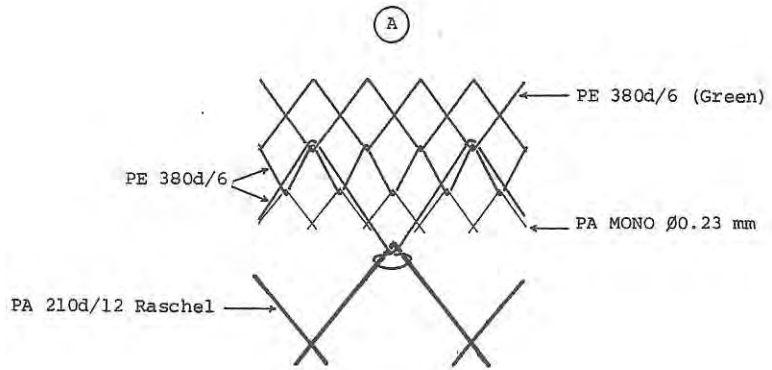
GILL NET
 Trammel, Bottom set
 Shrimp

VESSEL
 Loa 14 m
 hp 24

LOCATION
 Pasir Penambang
 Selangor

				E=0.59	
14	107 mm	1035	1035	PA 210d/12 Raschel (Light brown)	14
				E=0.66	
				PE 380d/6, 40 mm (Green) 2x65.80 PVA+PE Ø5 Z+Z	E=0.53
5					5
60	40 mm	3104		PA MONO Ø0.23 mm	60
5					5
				PE 380d/6, 40 mm (Green) 2x73.25 PVA+PE Ø3 Z+Z	E=0.59
				E=0.59	
14	107 mm	1035	1035	PA 210d/12 Raschel (Light brown)	14
				E=0.66	

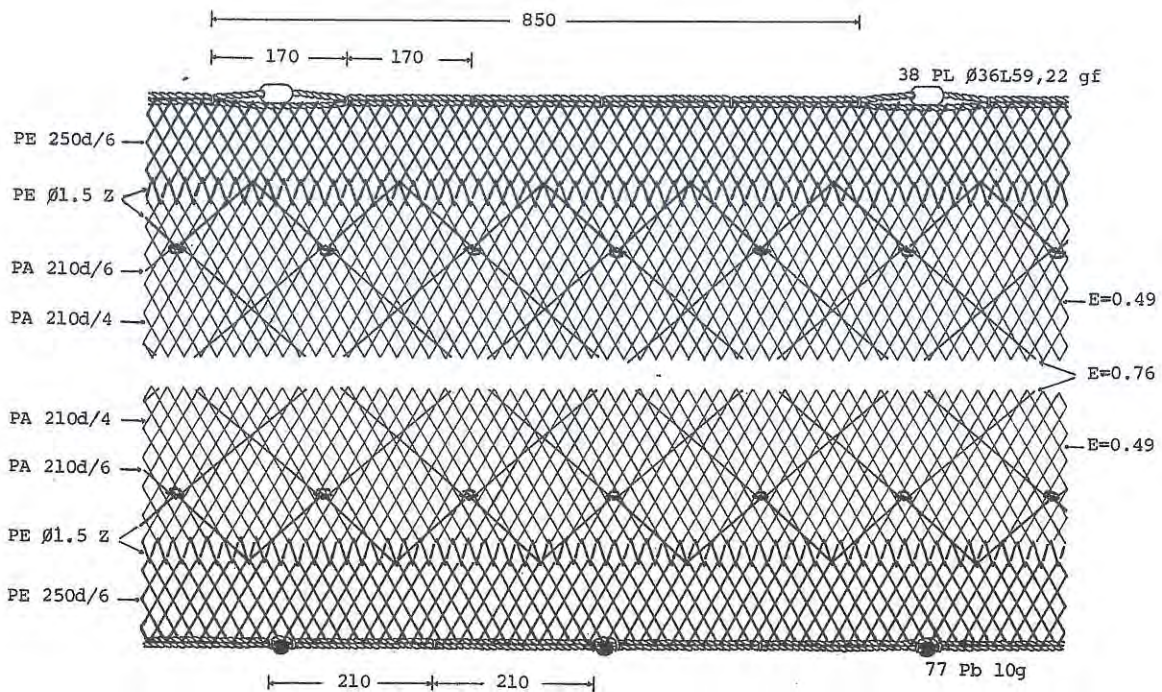
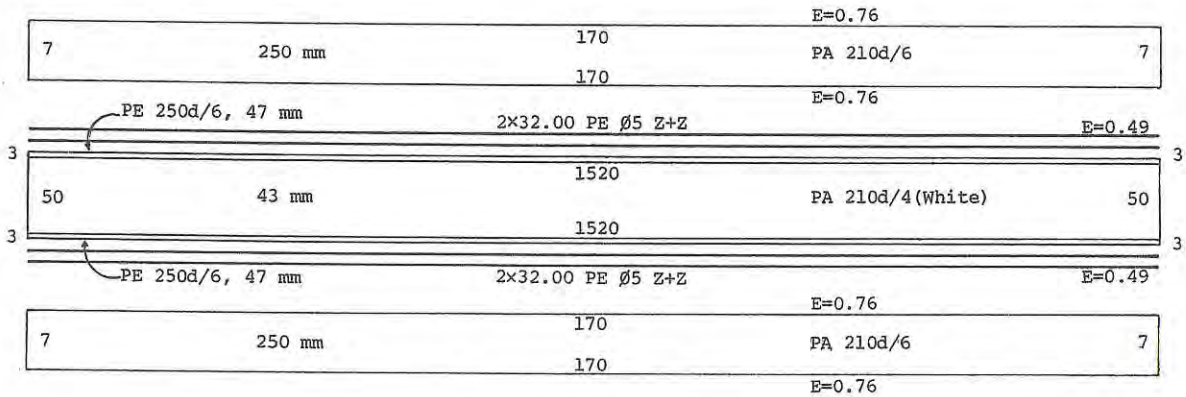




GILL NET
 Trammel, Bottom set
 Shrimp

VESSEL
 Loa 11 m
 hp 22

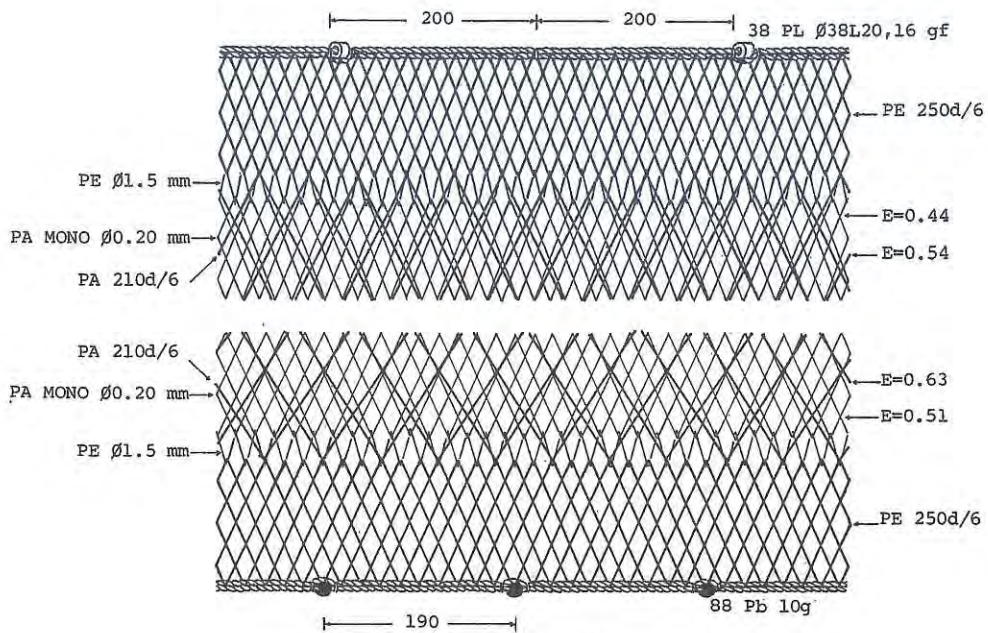
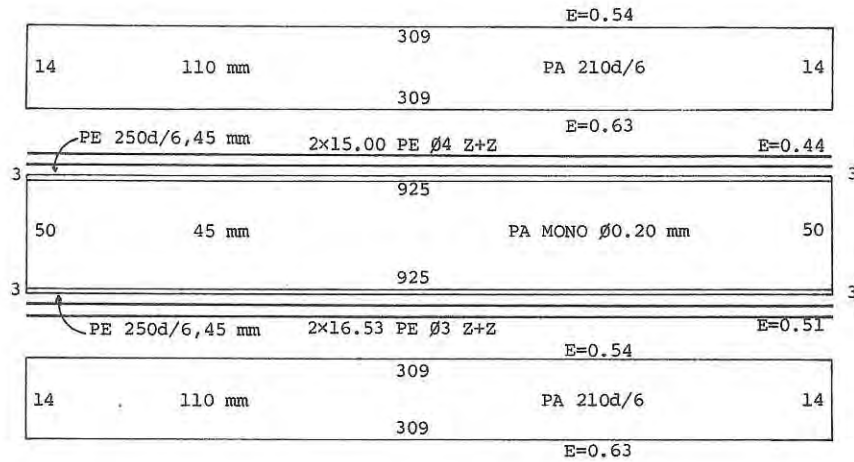
LOCATION
 Pontian Kechil
 Johor

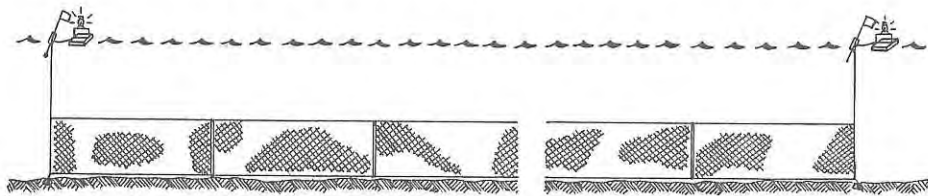


GILL NET
 Trammel, Bottom set
 Shrimp

VESSEL
 Loa 11.2 m
 hp 22

LOCATION
 Pontian Kechil
 Johor

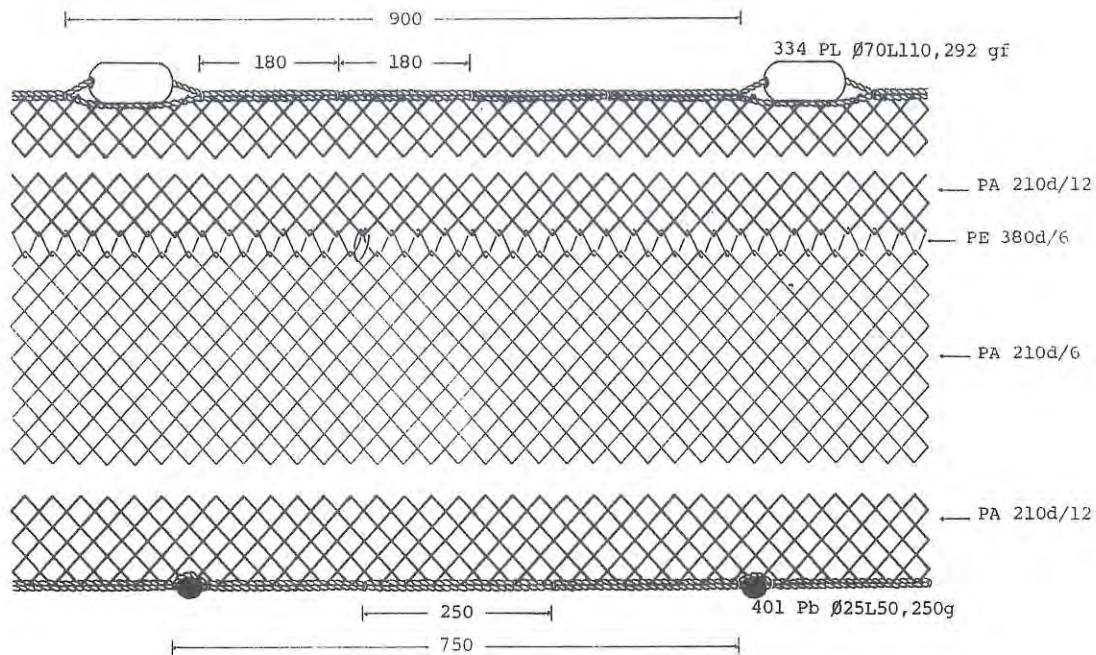
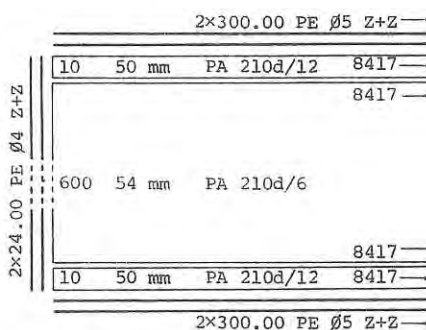
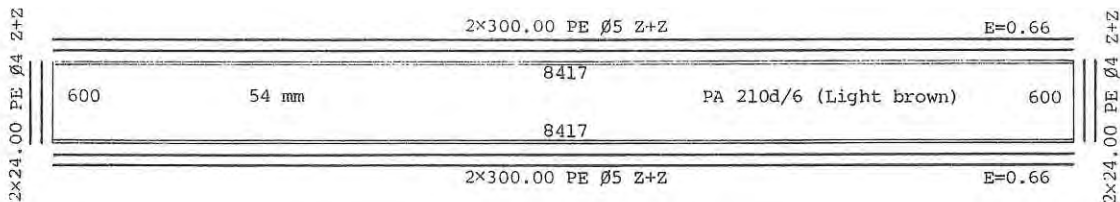


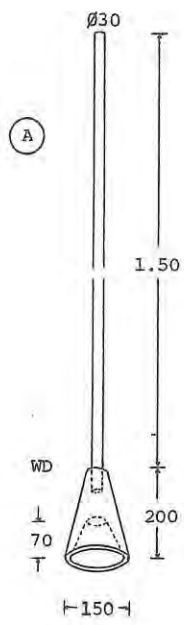
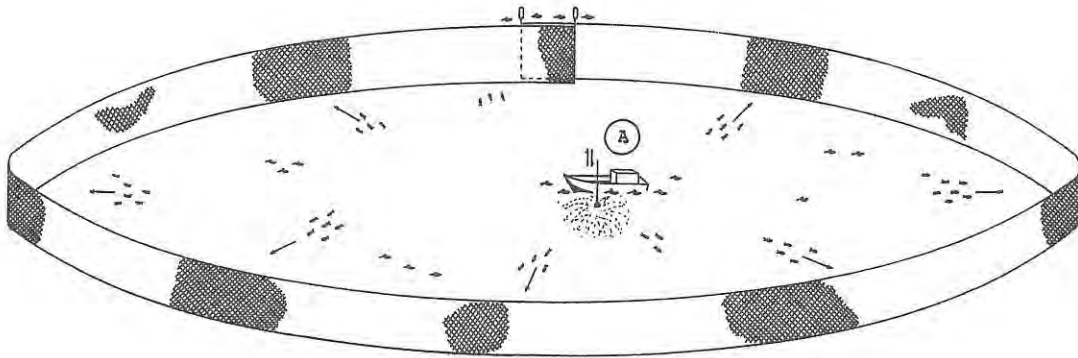


GILL NET
 Encircling
 Indo-Pacific mackerel,
 Trevally

VESSEL
 Loa 12 m
 hp 22

LOCATION
 Marang
 Terengganu



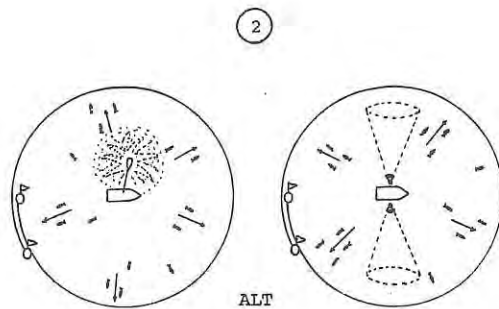
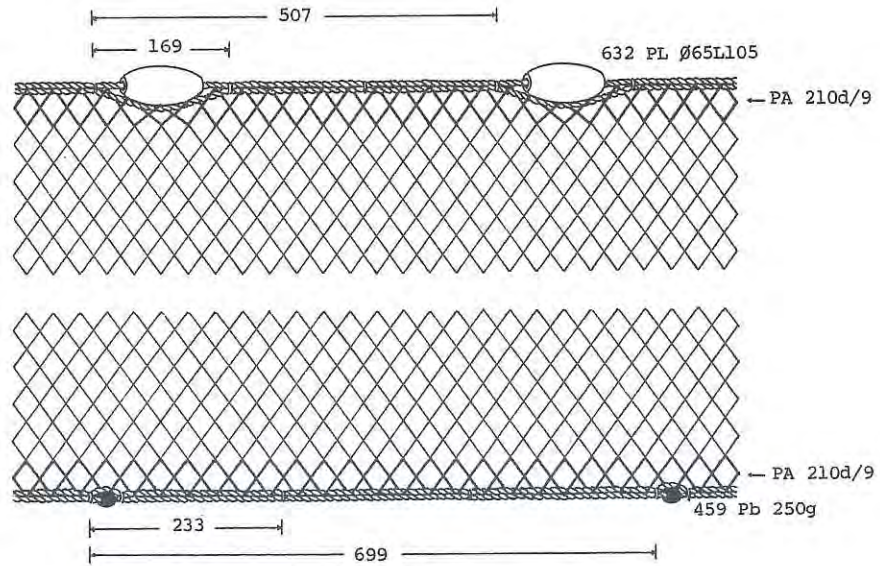


GILL NET
 Encircling
 Indo-Pacific mackerel

VESSEL
 Loa 15 m
 hp 22

LOCATION
 Kuantan
 Pahang

		320.00 PE Ø6 Z	320.00 PVA Ø8 Z	E = 0.58
300	58 mm	9512	PA 210d/6 (Green)	300
		314.46 PVA Ø6 Z	314.00 PE Ø6 Z	E = 0.57



<Chapter 9>

TRAP FISHING

9.1 Introduction

Trap fishing consists of gear that is set or stationed in the water for a certain length of time regardless of the kind of material used in its construction. The fish are confined in a collecting unit or units from which escape is prevented by labyrinths and/or retarding devices such as funnels etc. No active fishing takes place. The gear is commonly operated in inshore waters. However, there are types of trap have operated as large-scale in the offshore waters. Trap could be classified into three:

- i. Trap (Pot)
- ii. Fyke
- iii. Bamboo stake trap

9.2 Fishing Gear and Method

9.2.1 Trap (Pot)

9.2.1.1 Fresh-water prawn trap

This traditional Malaysian fishing gear is operated in rivers or around the river mouth. The trap is cylindrical, covered by a palm leaf or bamboo sticks, and is 70-165 cm. in length, 24-50 cm. in diameter. The entrance is shaped like a funnel, made of bamboo sticks, 22-90 cm. in length. Some traps have a second entrance for the purpose of confining the fish and preventing their escape. This kind of trap has one side entrance and the other side is closed by a polyethylene net or coconut shells. the trap is baited with some pieces of coconut or potatoes before being set. Fresh-water prawns and/or catfish are caught this way all year round.

9.2.1.2 Crab trap

There are three types of crab trap had been surveyed:-

- i. Pole fixed trap
- ii. Collapsible trap
- iii. Fixed frames trap

Most crab traps are cylindrical with 1-3 entrances, at the side or at the top. The entrance is always funnel-like. Crab traps are made of split bamboo or PE netting. Normally, a piece of fish is placed in the center of the trap as bait. The traps are hauled once or twice a day.

9.2.1.3 Lobster trap

This trap is cylindrical in shape. The frames are made of bamboo. The trap is covered by wire mesh. There is one entrance with two valves made of bamboo. The trap is normally set at rocky seabed. No bait is used. Trap is hauled normally once a week.

9.2.1.4 Squid trap

This trap has two shape i.e. box and semi-cylindrical. The frame is made of wood and been covered by PE netting material. It has one entrance with a valve made of PE netting. During the operation, the pot is covered with coconut leaf and is hung vertically, off the bottom with entrance is facing up. The target catch is the oval squid.

9.2.1.5 Fish trap

The shape of fish trap is usually semi-cylindrical. The entrance is either funnel-or wedge-shaped. The traps are about 70-250 cm. long, 60-180 cm. wide and 35-150 cm. in height or diameter.

Rattan is traditionally the most widely used material for making a trap frame. This natural material is not only readily available but is also strong and pliable which makes it particularly useful for building the semi-cylindrical frames. Wood for rectangular frames, and bamboo is also used to build traps.

The trap is covered by wire netting, which has hexagonal or rectangular meshes, whose one leg (bar) is about 2.0-3.0 cm. long.

There is one fishing technique (which is also used in Thailand) where the float-line is shorter than the depth of water so it does not show on the surface. This way the trap is more likely to remain in position until its owner returns to look for it, but the fishermen must also know the exact position of their traps. These traps could be baited or do not contain any bait and are kept on the sea bed for several consecutive days.

9.2.2 Fyke

There are two types of fyke-nets : mobile; and stationary. A mobile fyke-net is anchored in the fishing ground only for the duration of a fishing operation, whereas the frame of a stationary net remains in position all through its useful life.

A fyke-net is usually operated in shallow water, 3-6 meters deep, to catch shrimp, planktonic shrimp and miscellaneous fish. The net is conical. The size of the opening varies between 3x5 and 6x10 meters, and the net is 15 to 30 meters in length. The mesh size also varies, often within parts of the same net. The cod-end of the net is usually constructed of 10-20 mm. mesh size polyethylene 380d/6-9 and/or 2x2 mm. mesh size minnow netting, while the rest of the net has a larger mesh-size. In the planktonic shrimp fyke-net the whole net is of polyvinyl alcohol minnow-netting, 3.5x3.5 mm. mesh size.

Fyke nets are operated year round during day or at night, usually from after high tide to the lowest tide. The cod-end is hauled frequently to collect the catch.

9.2.3 Bamboo stake trap

The gear consists of three parts: leaders, play ground and cod-end. Leaders, whose purpose is to guide the fish into the trap, are made of bamboo stakes, netting or branches. Their length varies from 10 to 300 meters, depending on the size of trap. The play ground is either a labyrinth, C-shaped or triangular enclosure constructed of bamboo, or wooden stakes driven into the sea-bed, with or without wire netting which has hexagonal meshes. Some larger traps have two play grounds. The exit from the play ground area guides the fish into the cod-end, from where they are scooped. The cod-end is semi-circular, circular or rectangular, with a bamboo or wooden stake frame and covered by polyethylene net and/or wire netting.

Bamboo stake traps are usually positioned so that their main leader (the longest one) is perpendicular to the shore, and the opening of the trap faces the current at the ebb-tide. According to the method of operation, bamboo stake traps can be classified as follow:

- i. Ebb-tide bamboo stake trap;
- ii. Bamboo stake trap with net operation

9.2.3.1 Ebb-tide bamboo stake trap

The ebb-tide bamboo stake trap is a small-scale trap, usually set on a sand-bar at the mouth of a river. This gear is similar of the gill net. During the highest-tide, fishermen will set the bamboo stake and the semi-circular net. The bamboo stakes are placed at intervals of about 3.20 meters. The net is nylon 210d/5, 16 mm. mesh-size, 800 meters long. After lowest-tide, fishermen will check along the net to see if some fish have gilled.

9.2.3.2 Bamboo stake trap with net operation

The bamboo stake trap with net operation is a large-scale gear which is used in coastal waters with 5-20 m. depth. The leader is made of bamboo stakes, with 2-3 cm. wide gaps, 250 m. long. This trap has two play grounds and big cod-end, which is attached by chicken wire netting. A rectangular purse seine is used for fishing operation. This net is 22 mm. mesh-size polyethylene 380d/6. A long pole serves to push the net so that it surrounds the fish in the cod-end. This net is found in Kedah. Some traps have smaller cod-end and a scoop net is used for collecting the catch.

TRAP

Fresh-water prawn trap

Bubu

Fresh-water prawn

VESSEL

Loa 4-5 m

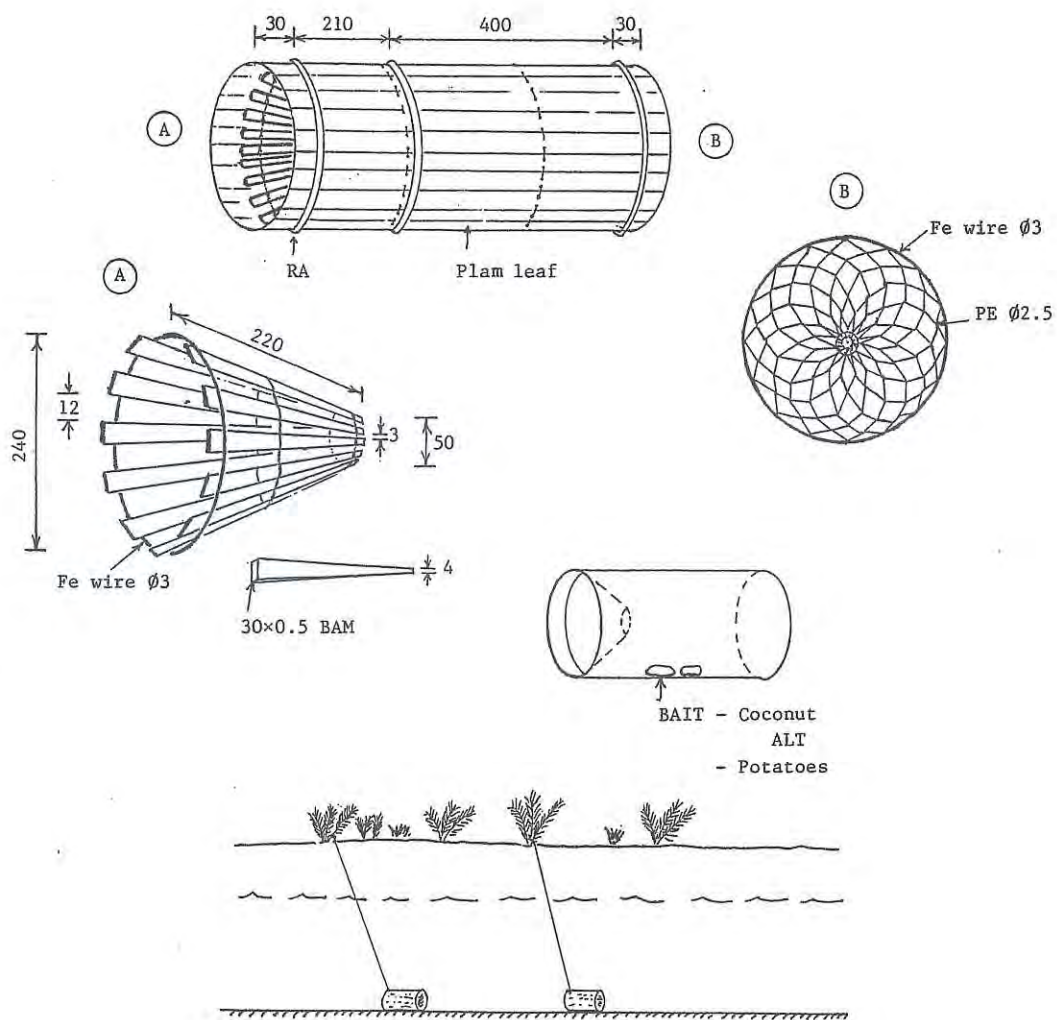
hp 8-20

LOCATION

Kg. Abai Kinabatangan

Sandakan

Sabah



TRAP

VESSEL

LOCATION

Catfish Trap

Loa 3.50-4.00 m

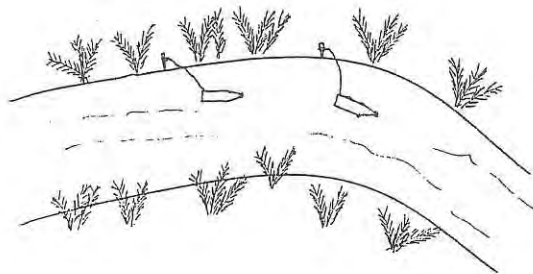
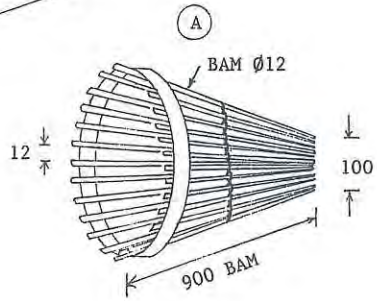
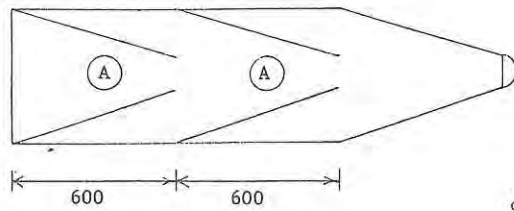
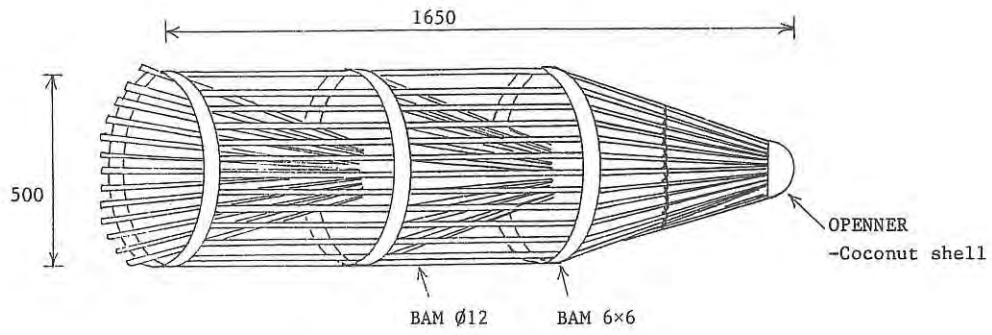
Kuala Sungai Ayam

Lukah

hp 14 OM

Johor

Catfish



TRAP

VESSEL

LOCATION

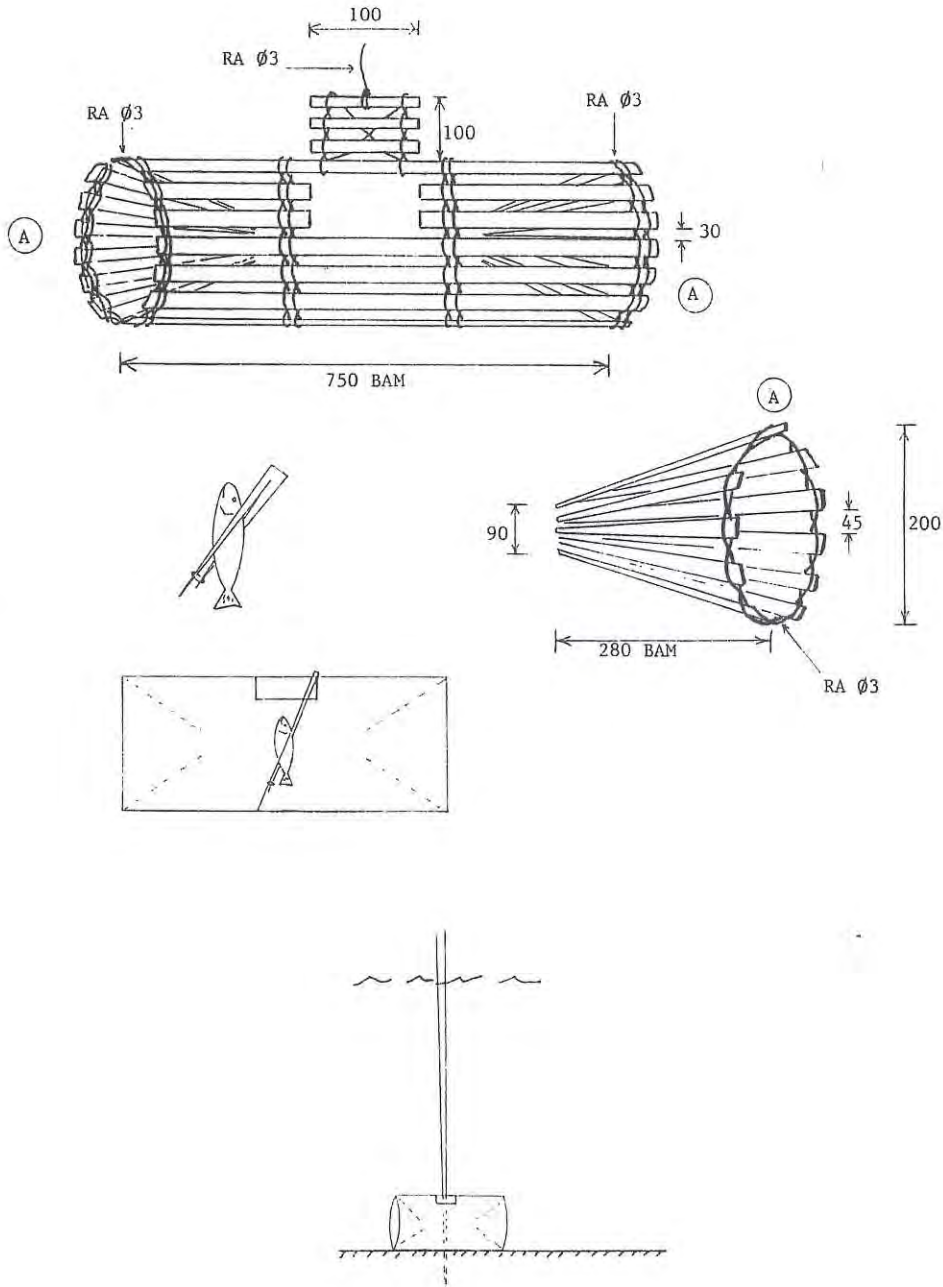
Crab Trap

Loa -

Kg. Pasir Puteh

Mangrove crab

Johor



TRAP

VESSEL

LOCATION

Collapsible Trap

Loa 5 m

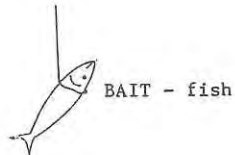
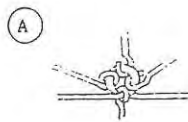
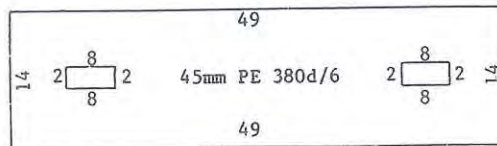
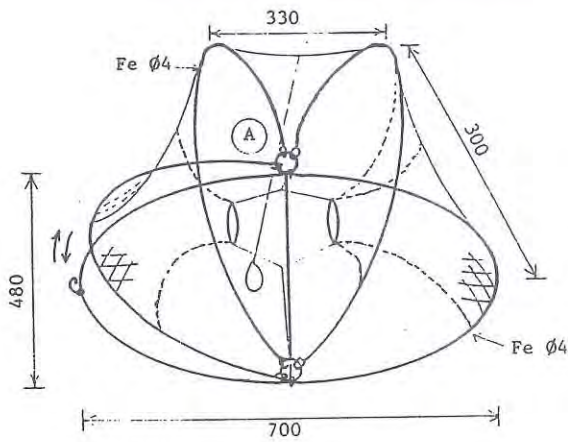
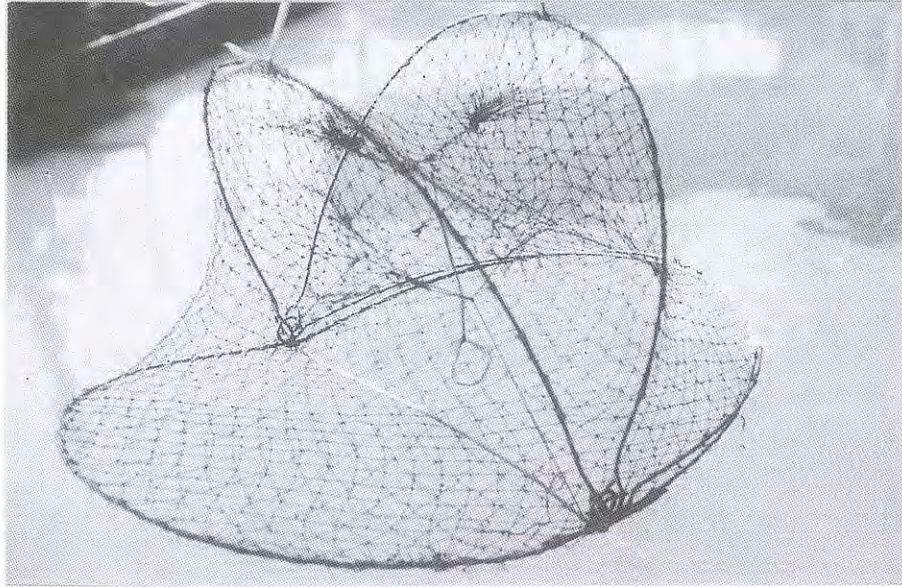
Tg. Dawai

-

hp 8 OM

Kedah

Mangrove crab



TRAP

VESSEL

LOCATION

Crab Trap

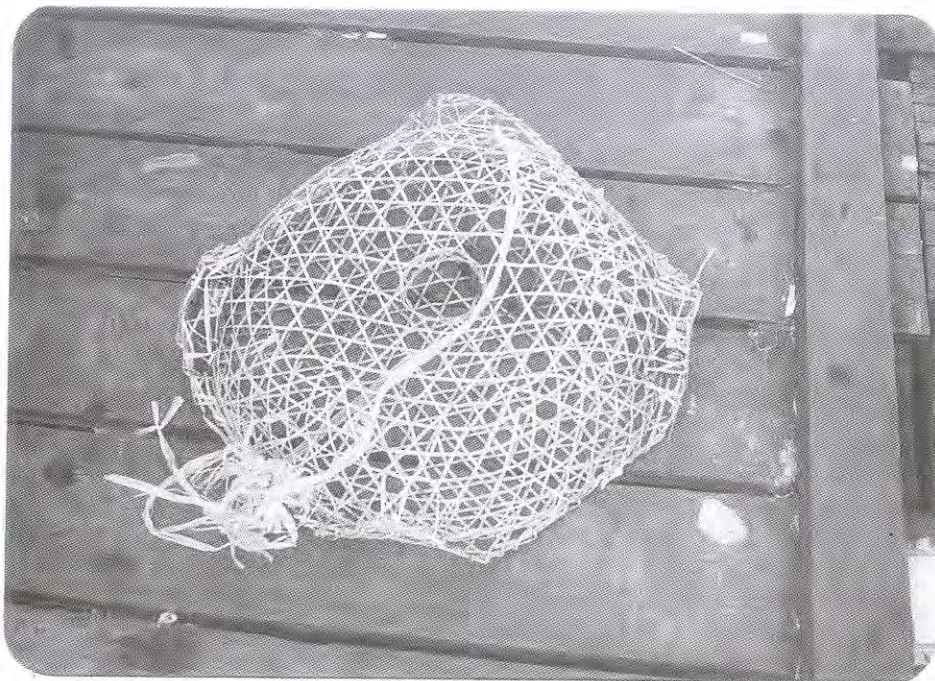
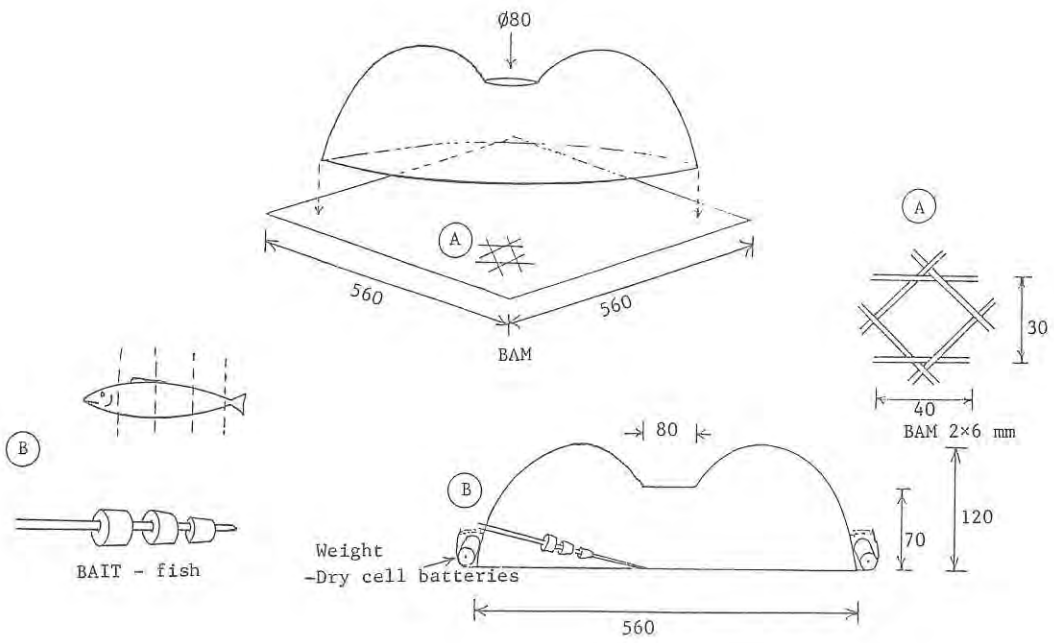
Loa -

Kg. Ais

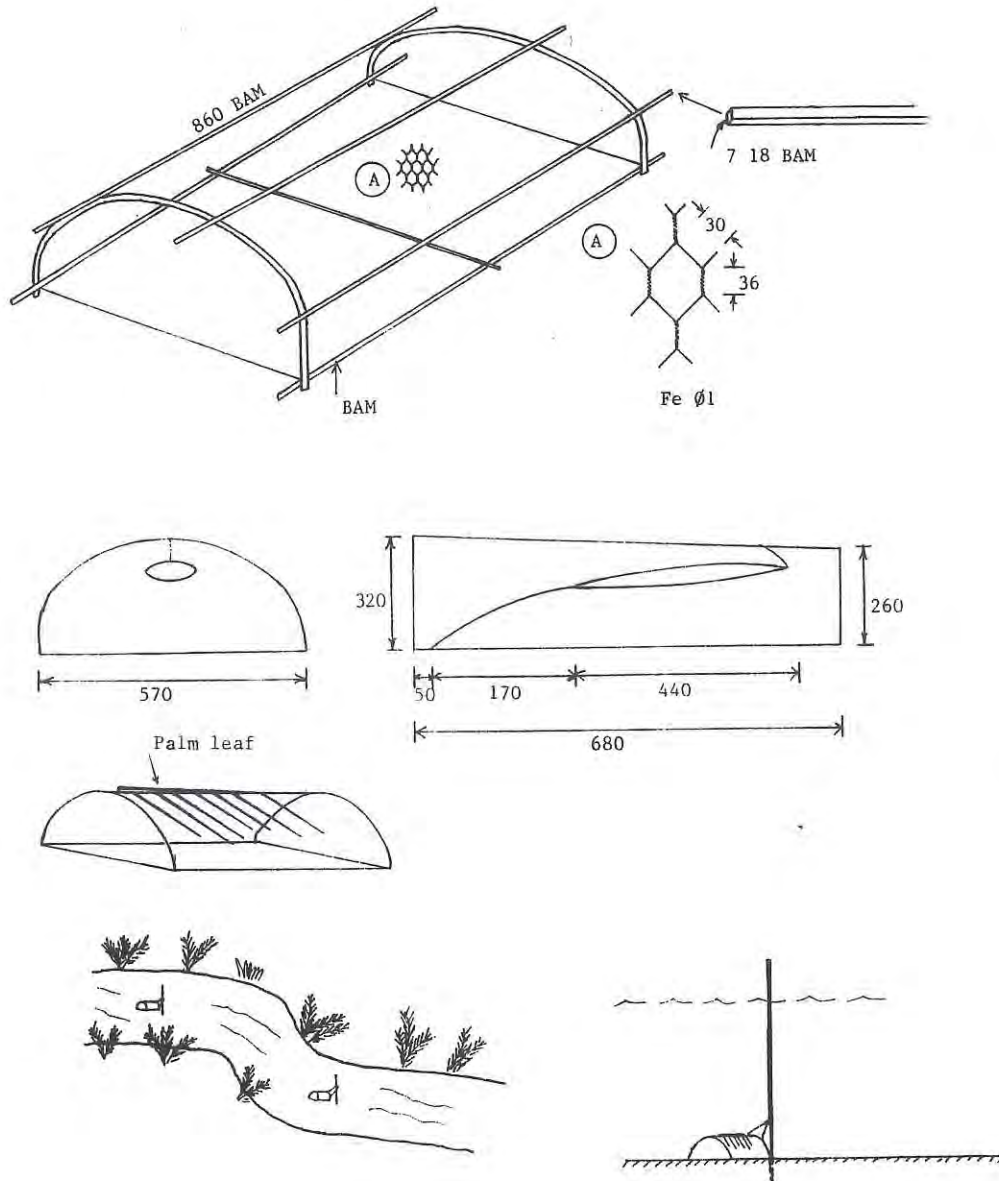
Blue swimming crab

Semporna

Sabah



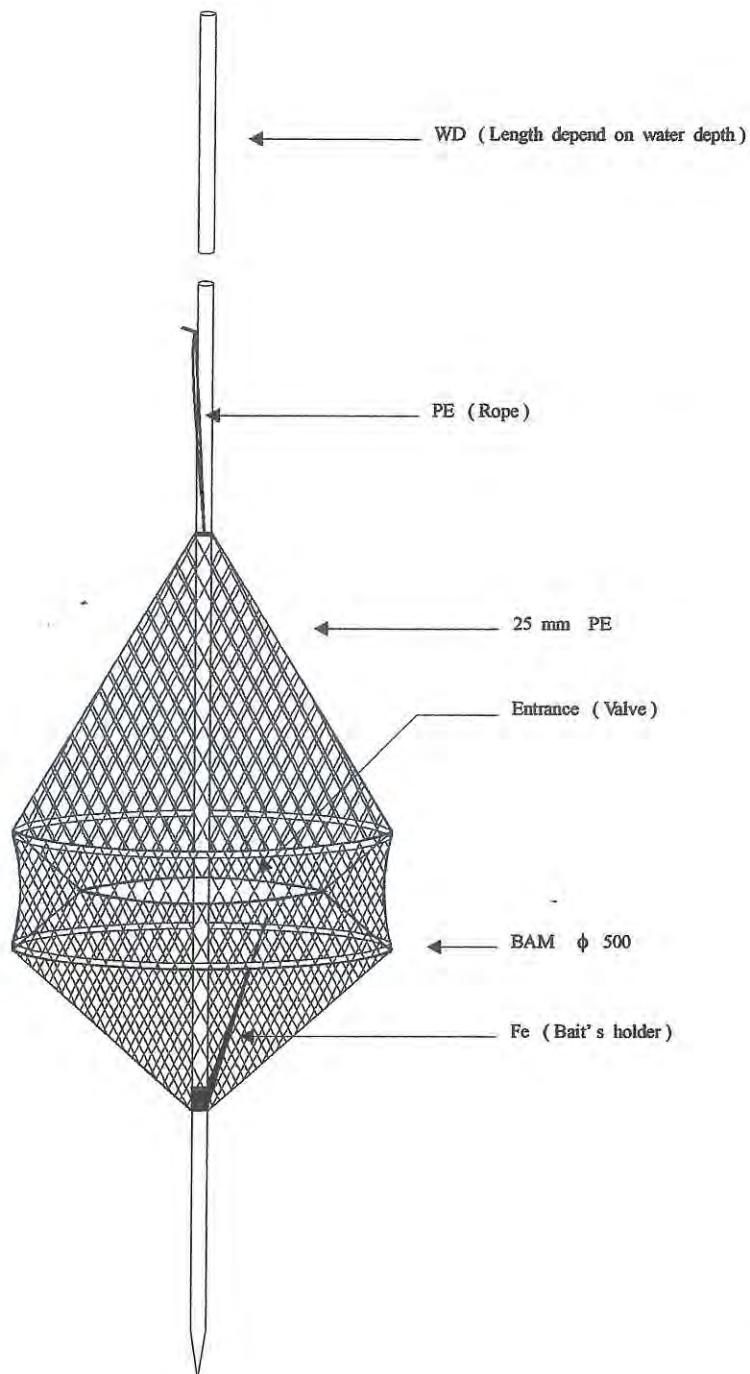
TRAP	VESSEL	LOCATION
Fish Trap	Loa 4-5 m	Kg. Bongon Bersah
<i>Bubu</i>	hp 8-10	Sandakan
Grouper, Snapper		<u>Sabah</u>



TRAP
Portable
Crap

VESSEL
Out board enjin

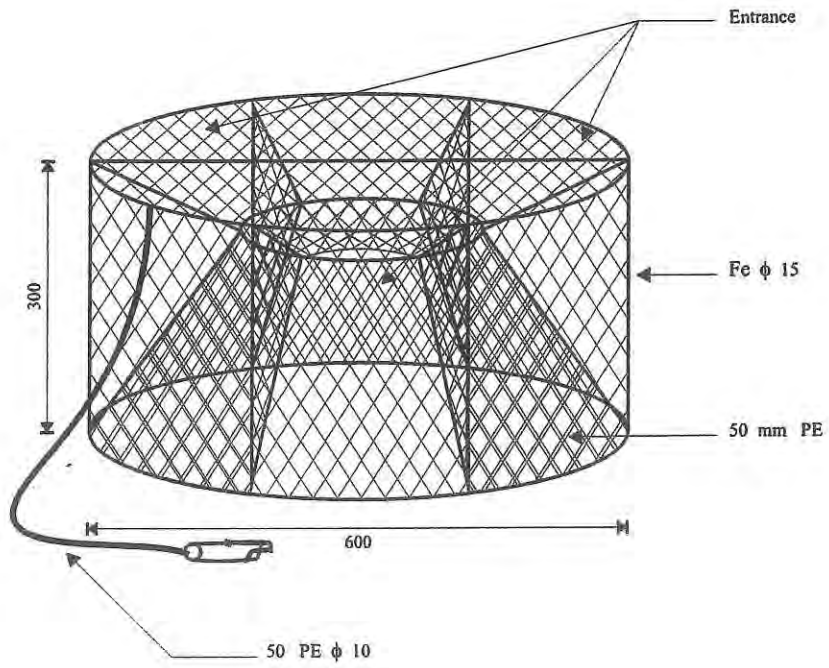
LOCATION
Kuala Perlis
Perlis



TRAP
Crab Trap
Swimming Crab

VESSEL
Loa 30 m
Hp 800

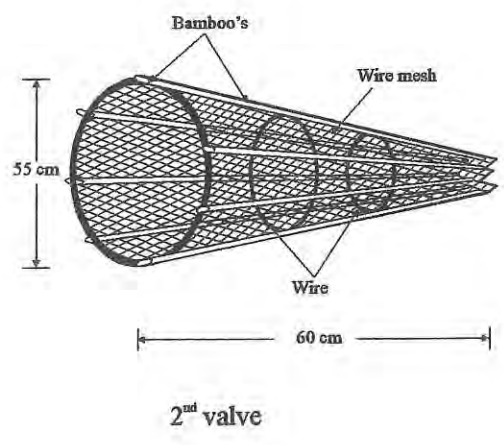
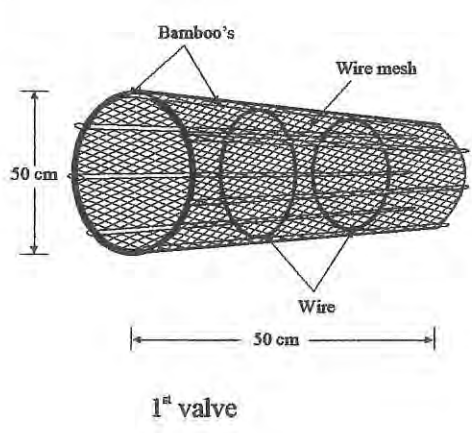
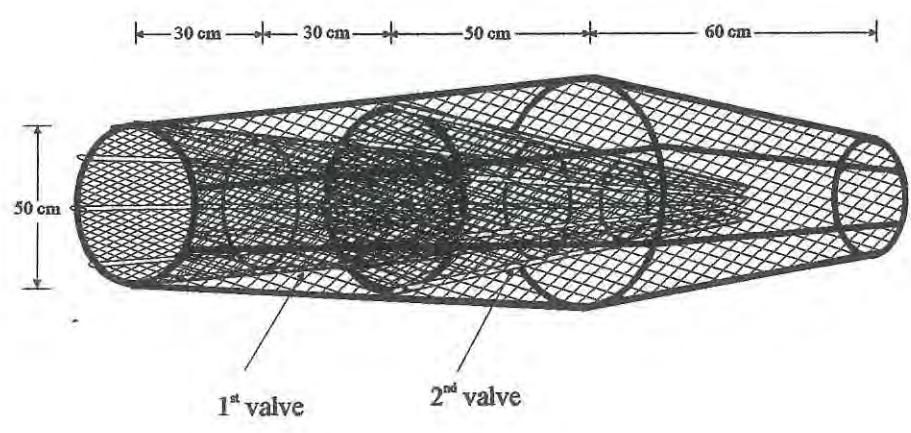
LOCATION
Labuan F.T.



TRAP
Lobster

VESSEL
Loa : 4-5 m
Hp : 10

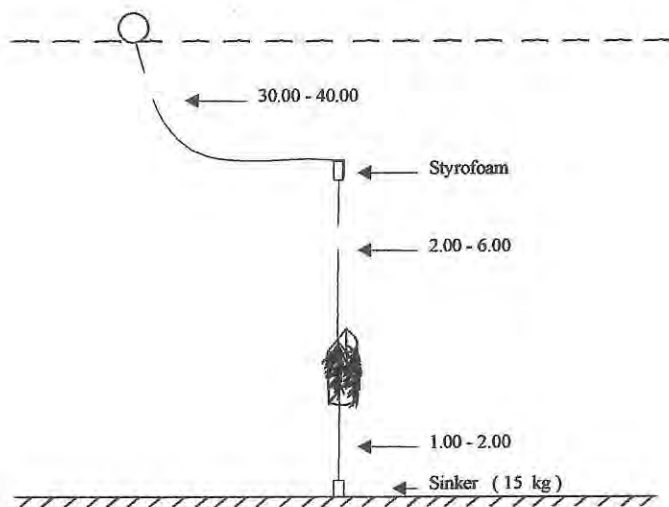
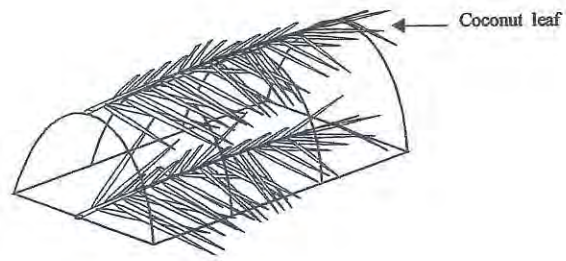
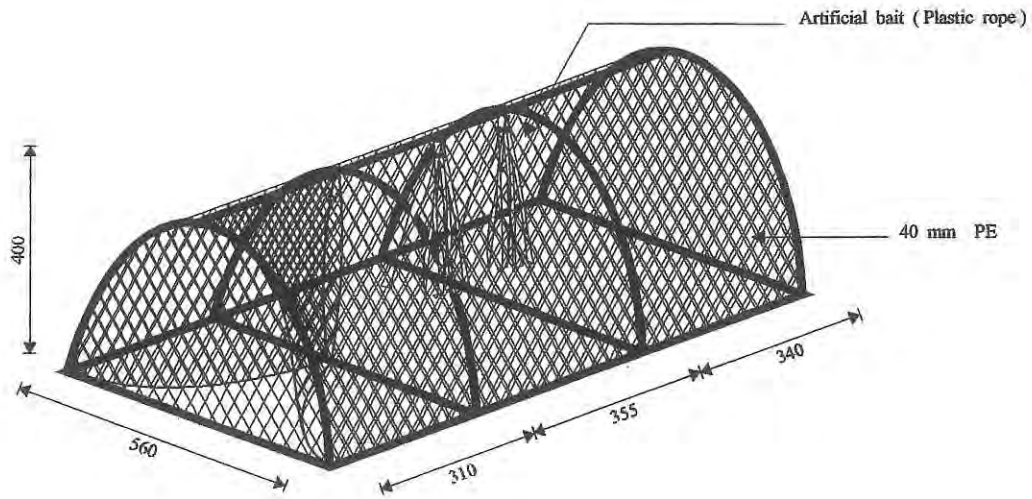
LOCATION
Balik Pulau
Pulau Pinang



TRAP
Squid Trap
Squid

VESSEL
Loa 10 m
Hp 24

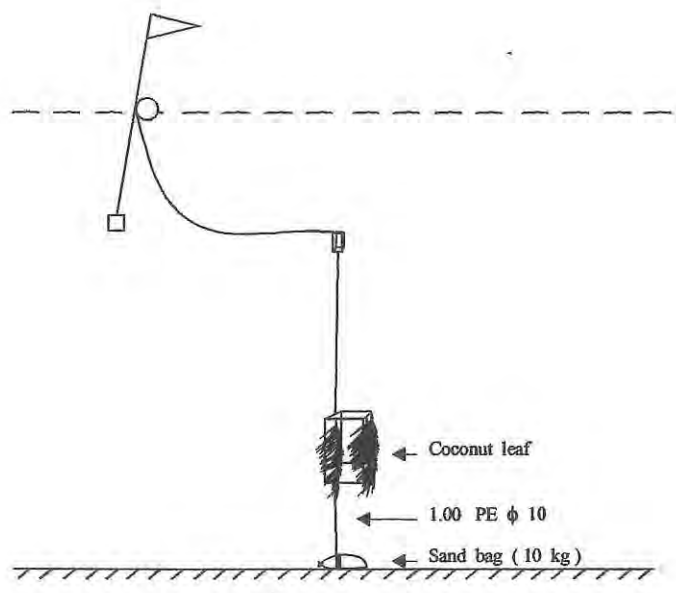
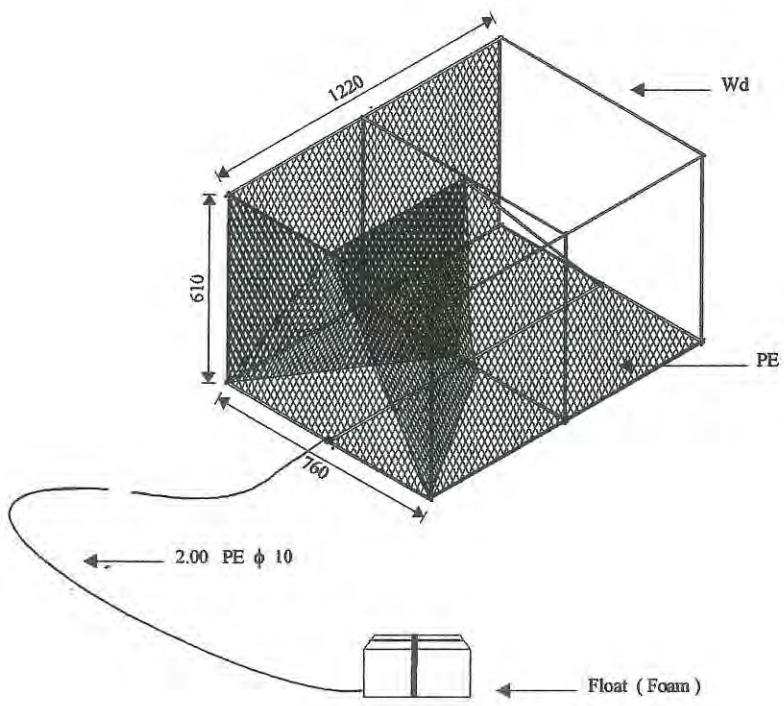
LOCATION
Kuala Jerlun
Kedah



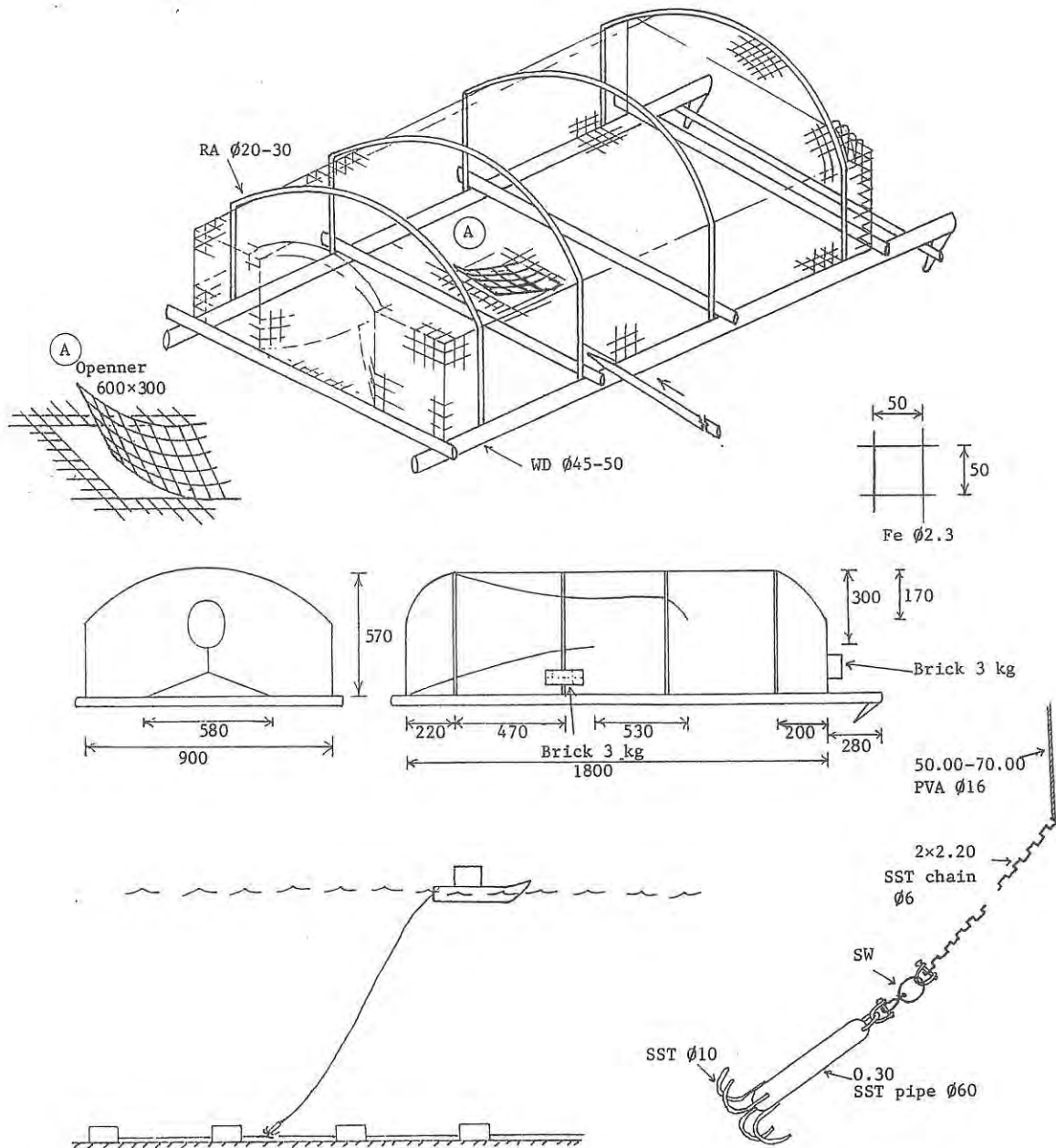
TRAP
Squid Trap
Oval Squit

VESSEL
Loa 10.5 m
Hp 22

LOCATION
Merang
Terengganu



TRAP	VESSEL	LOCATION
Fish Trap	Loa 15 m	Parit Jawa
<i>Bubu</i>	GT 12	<u>Johor</u>
Grouper, Snapper, Emperor	hp 60	



TRAP

VESSEL

LOCATION

Fish Trap

Loa 12-13 m

Pulau Pangkor

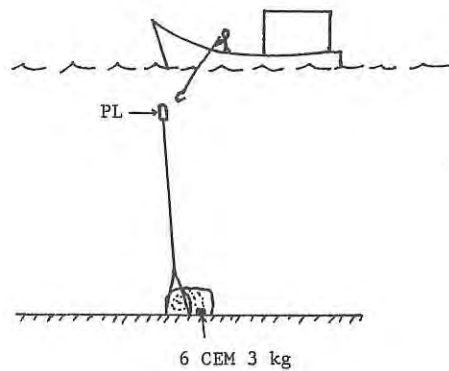
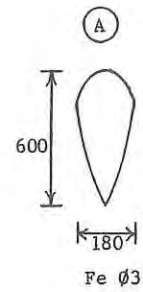
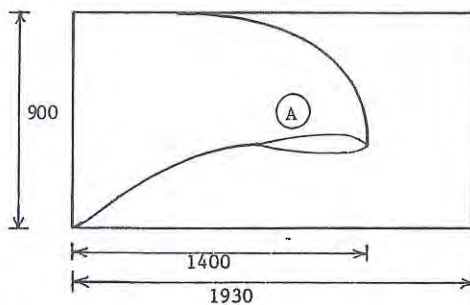
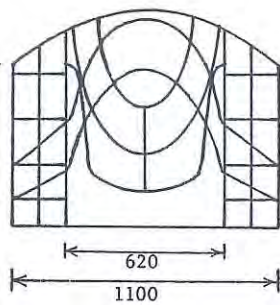
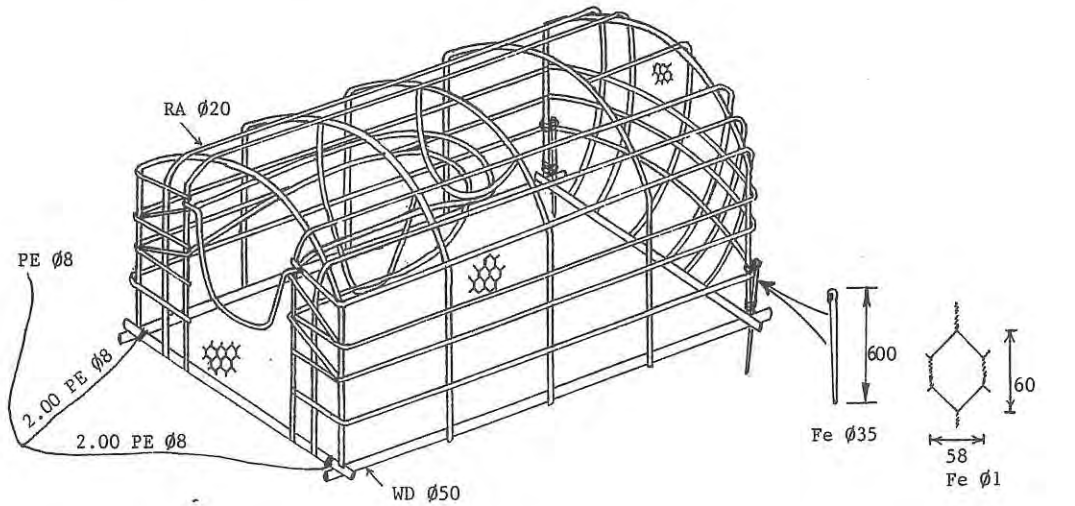
Bubu

hp 50

Perak

Grouper, Red snapper

Emperor, Rabbit fish



TRAP

VESSEL

LOCATION

Fish Trap

Loa 12 m

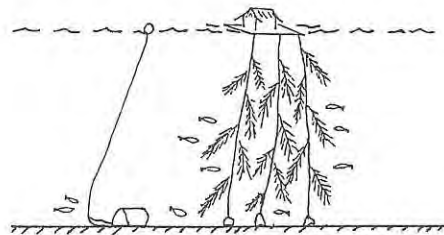
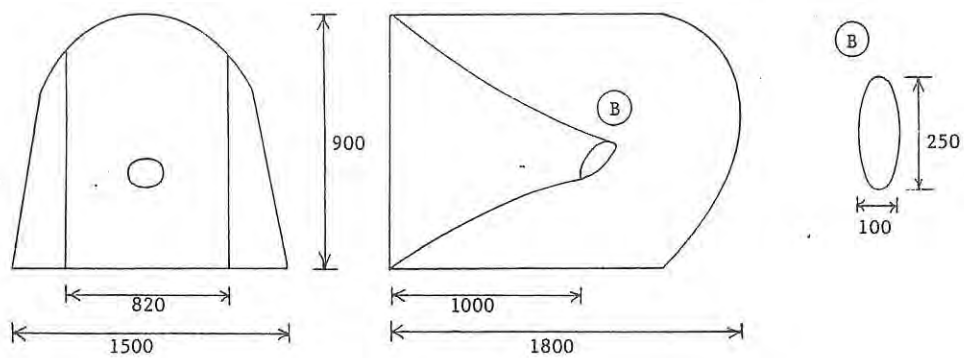
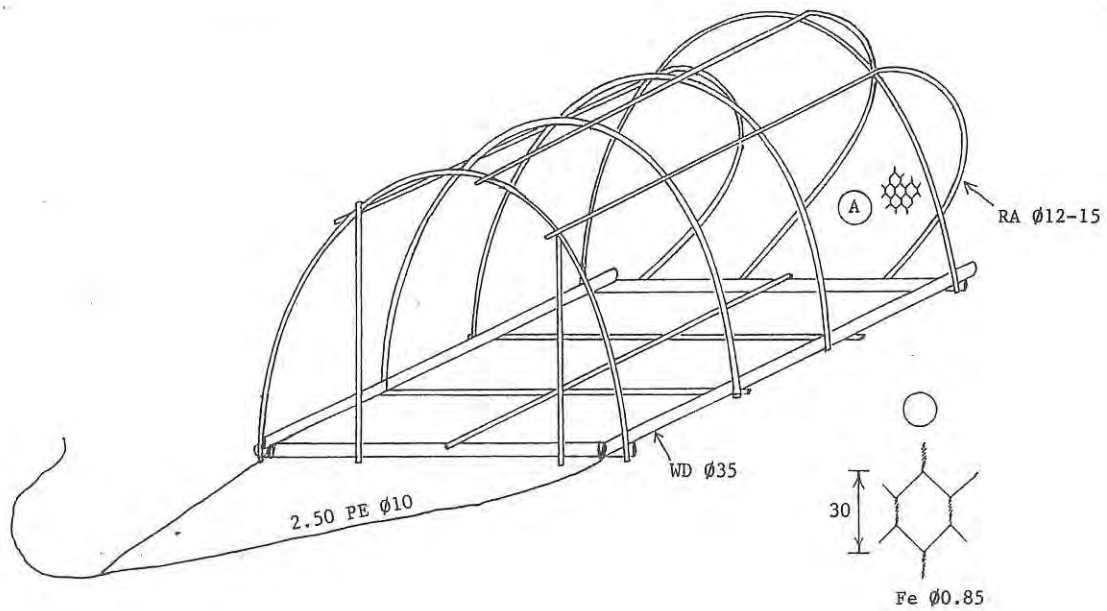
Pasir Panjang

Bubu

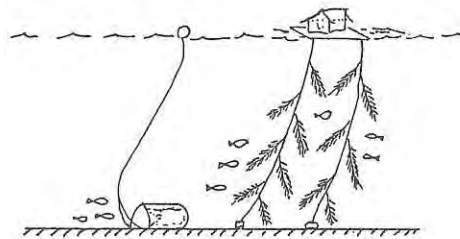
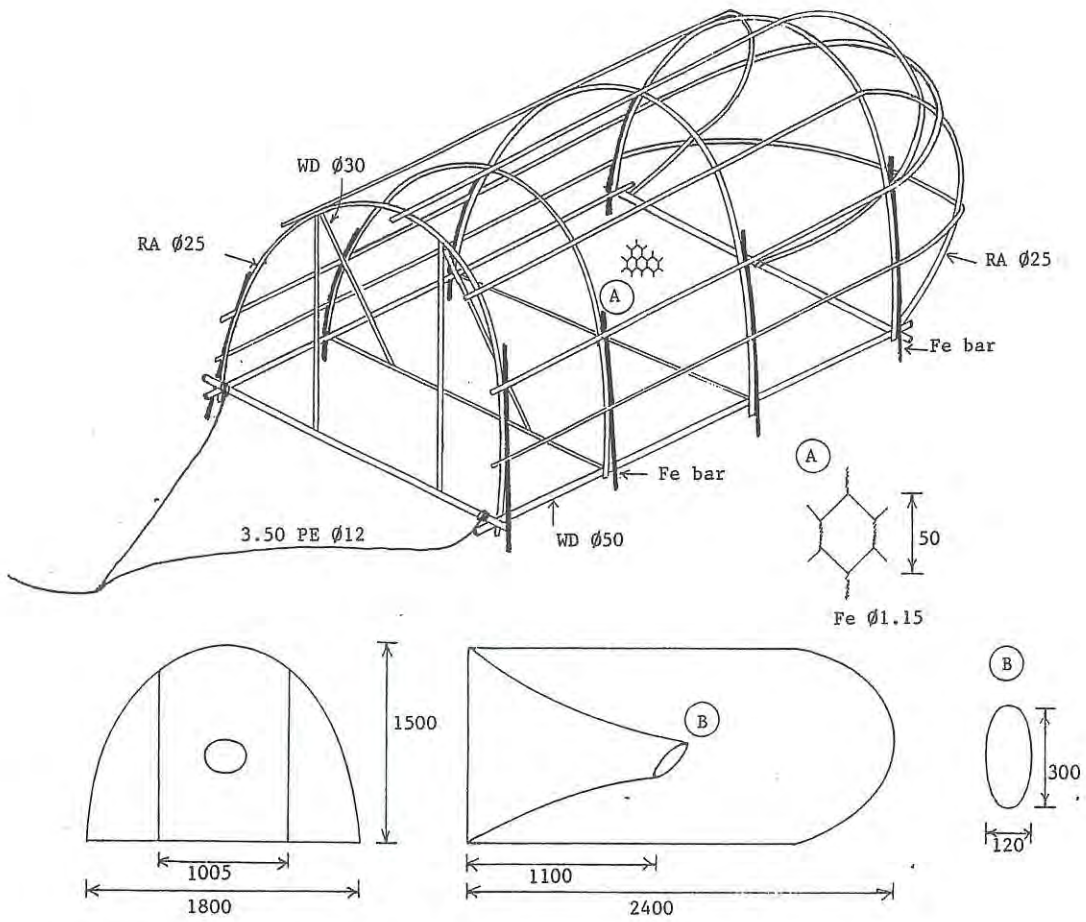
GT 6

Pahang

Threadfin bream, Rabbit fish



TRAP	VESSEL	LOCATION
Fish Trap	Loa 12 m	Pasir Panjang
<i>Bubu</i>	GT 6	<u>Pahang</u>
Snapper, Grouper, Trevally, Sea bream	hp 26	



TRAP

VESSEL

LOCATION

Fyke net

Loa 5-6 m

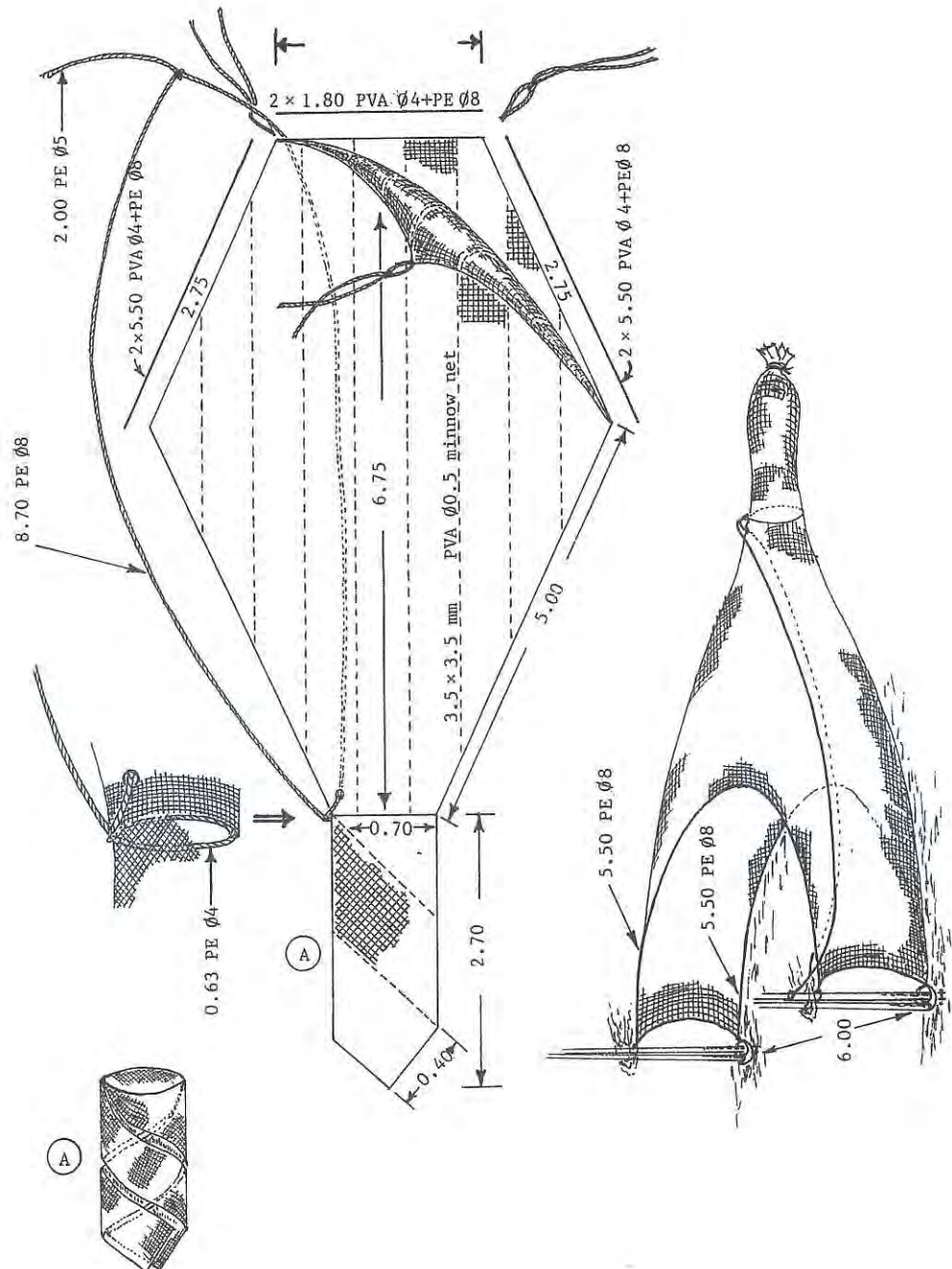
Tanjong Tokong

Gombang

hp -

Pinang

Planktonic Shrimp



TRAP

VESSEL

LOCATION

Fyke net

Loa 7.2 m

Parit Jawa

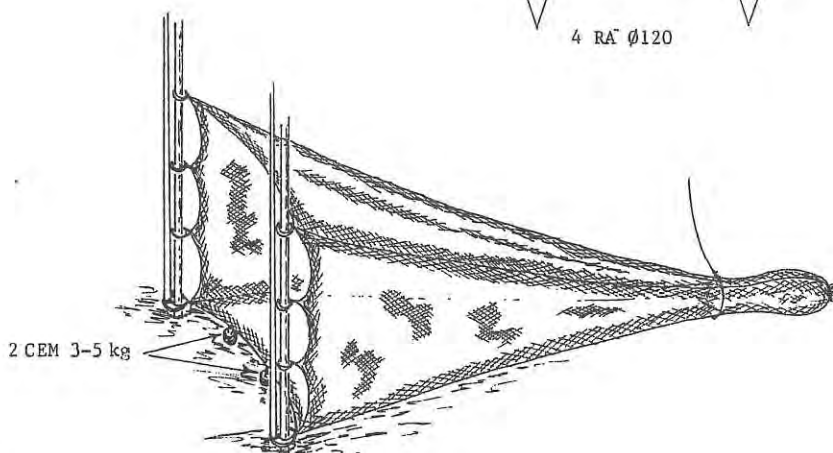
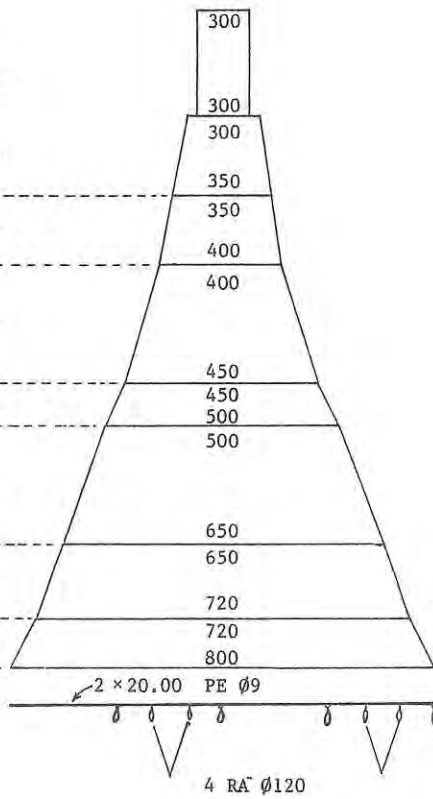
Ambai

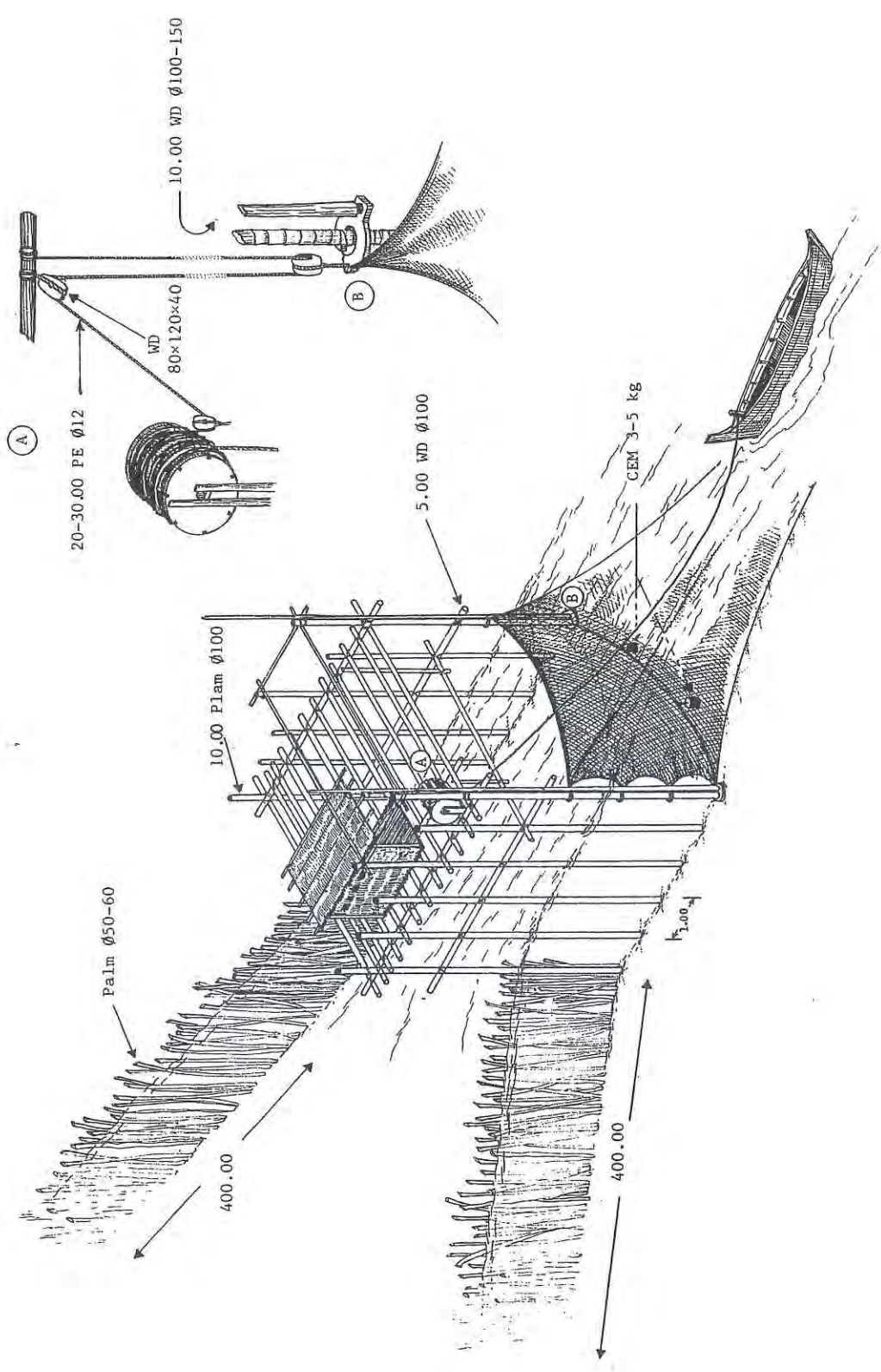
hp 15 OM

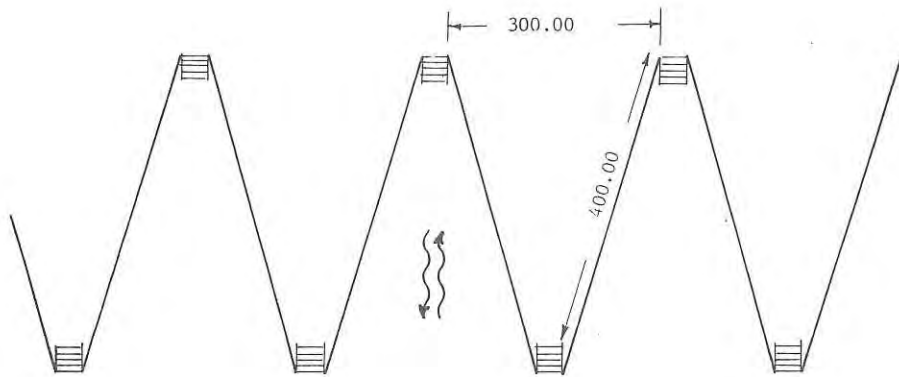
Johor

Shrimp, Misc. fish

MAT	Denier	mm
PE 380d/12	12	333
	15	200
PE 380d/9	17	150
PE 380d/12	25	100
	30	40
	40	113
PE 380d/15	45	66
	55	30







TRAP

VESSEL

LOCATION

Fyke net

Loa 7.50 m

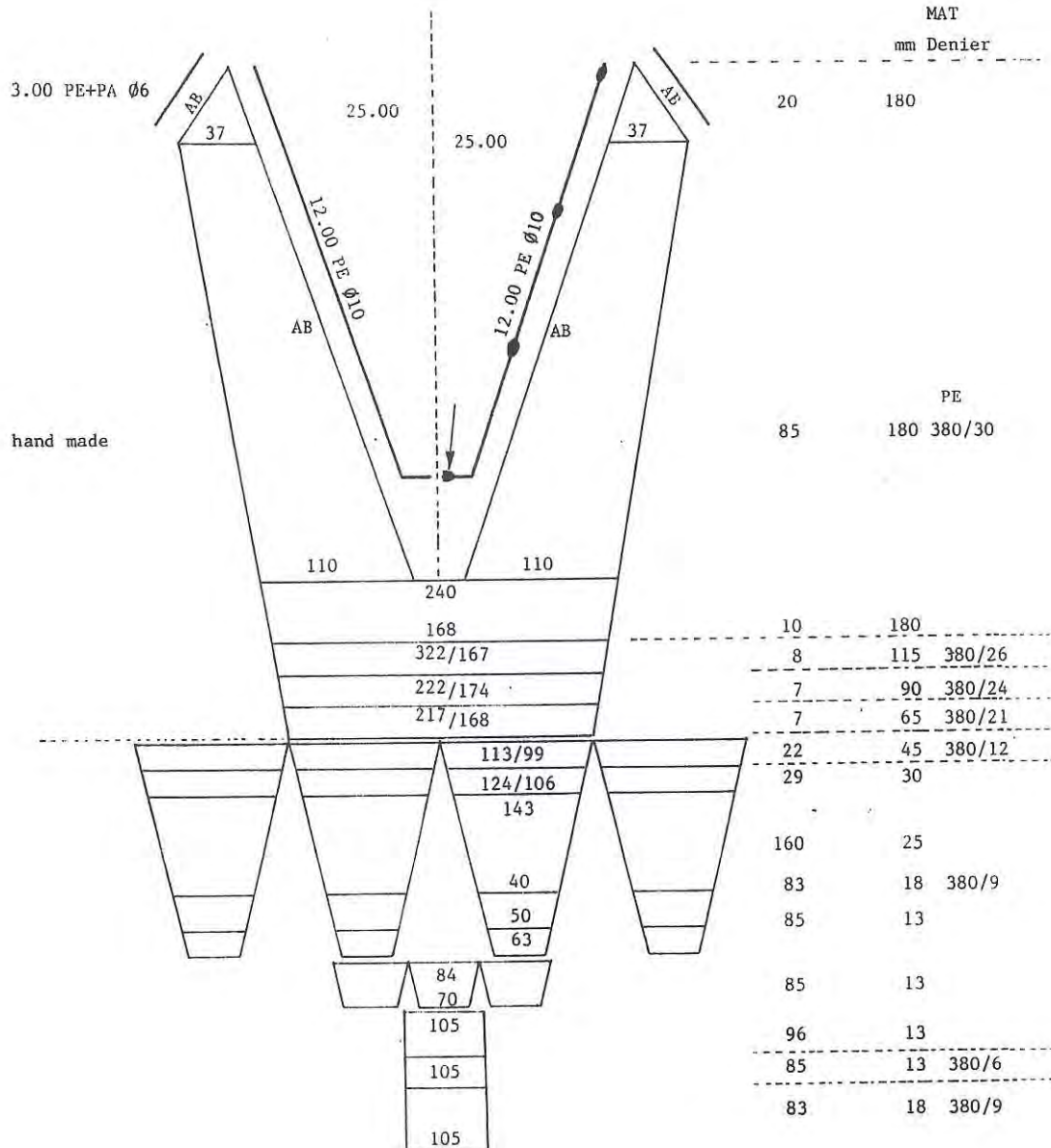
Kuala Sugai Ayam

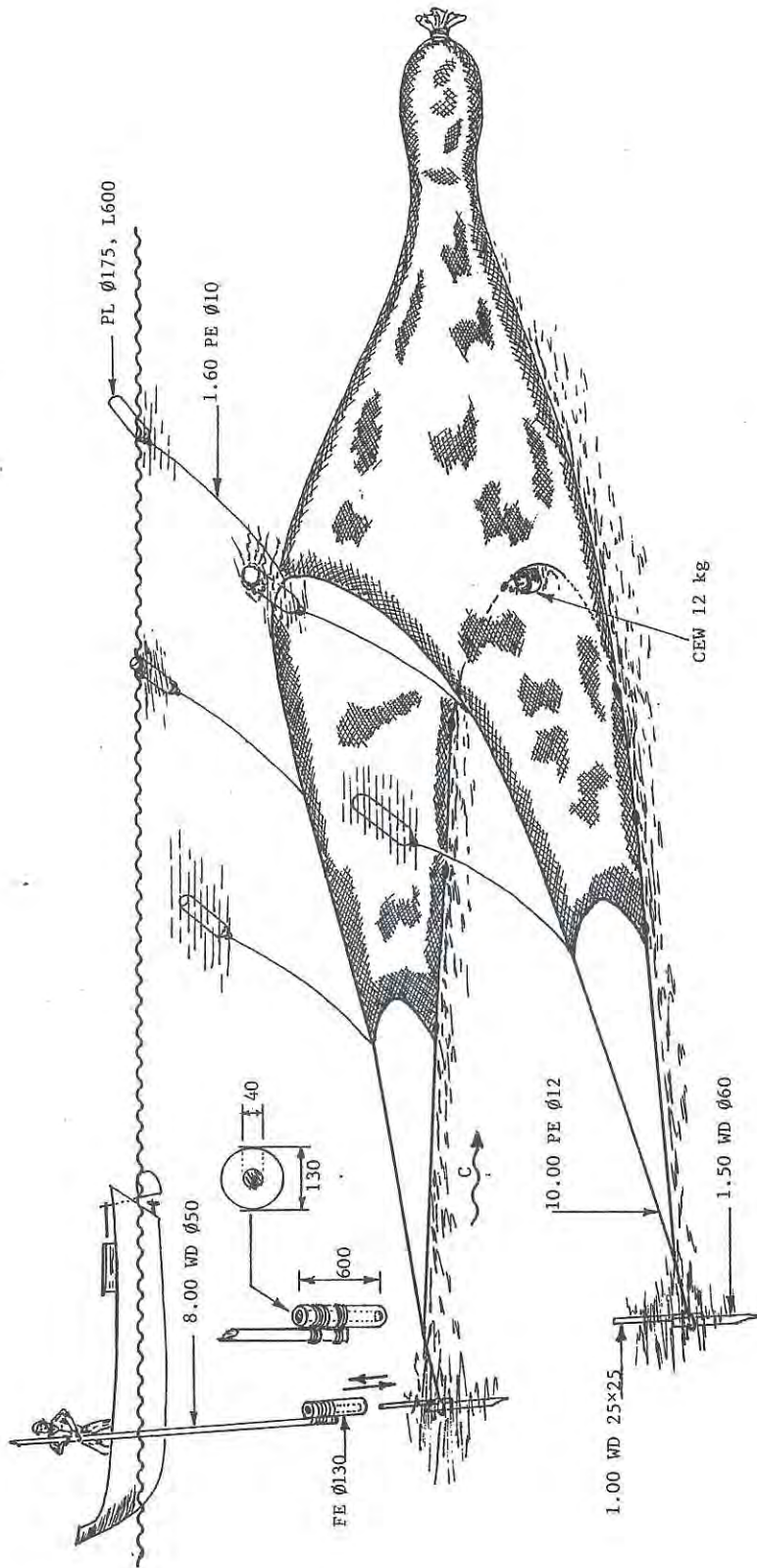
Pompaang

hp 6 OM

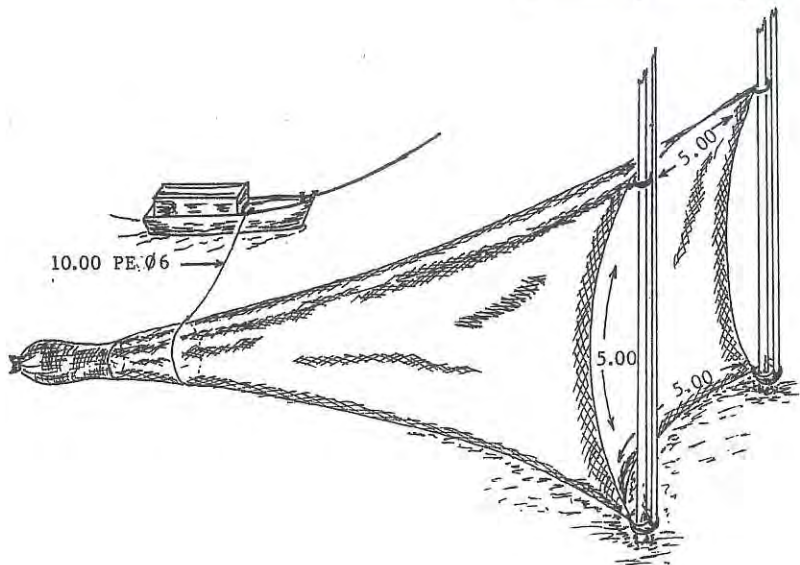
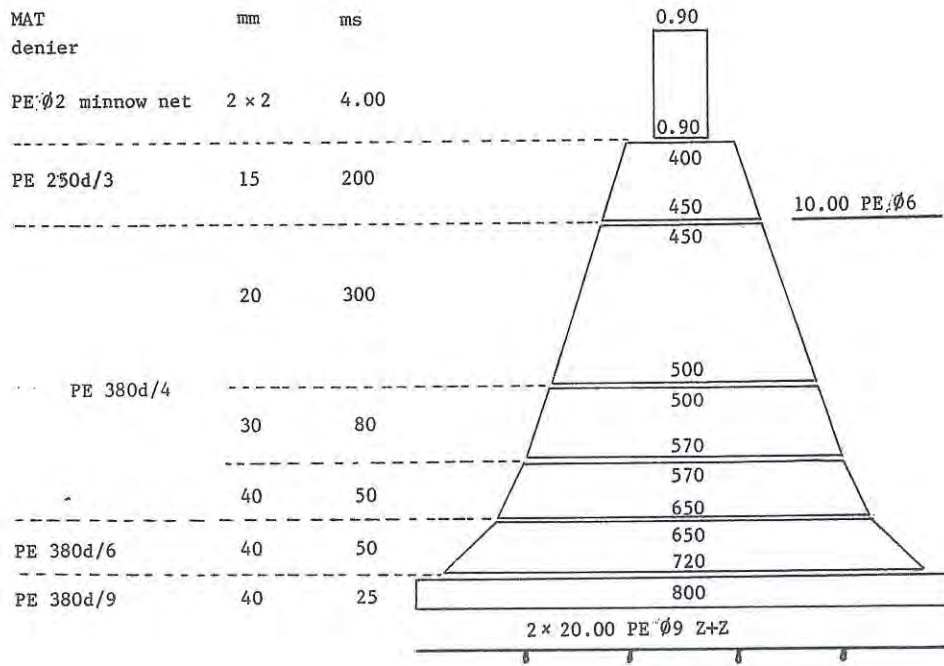
Johor

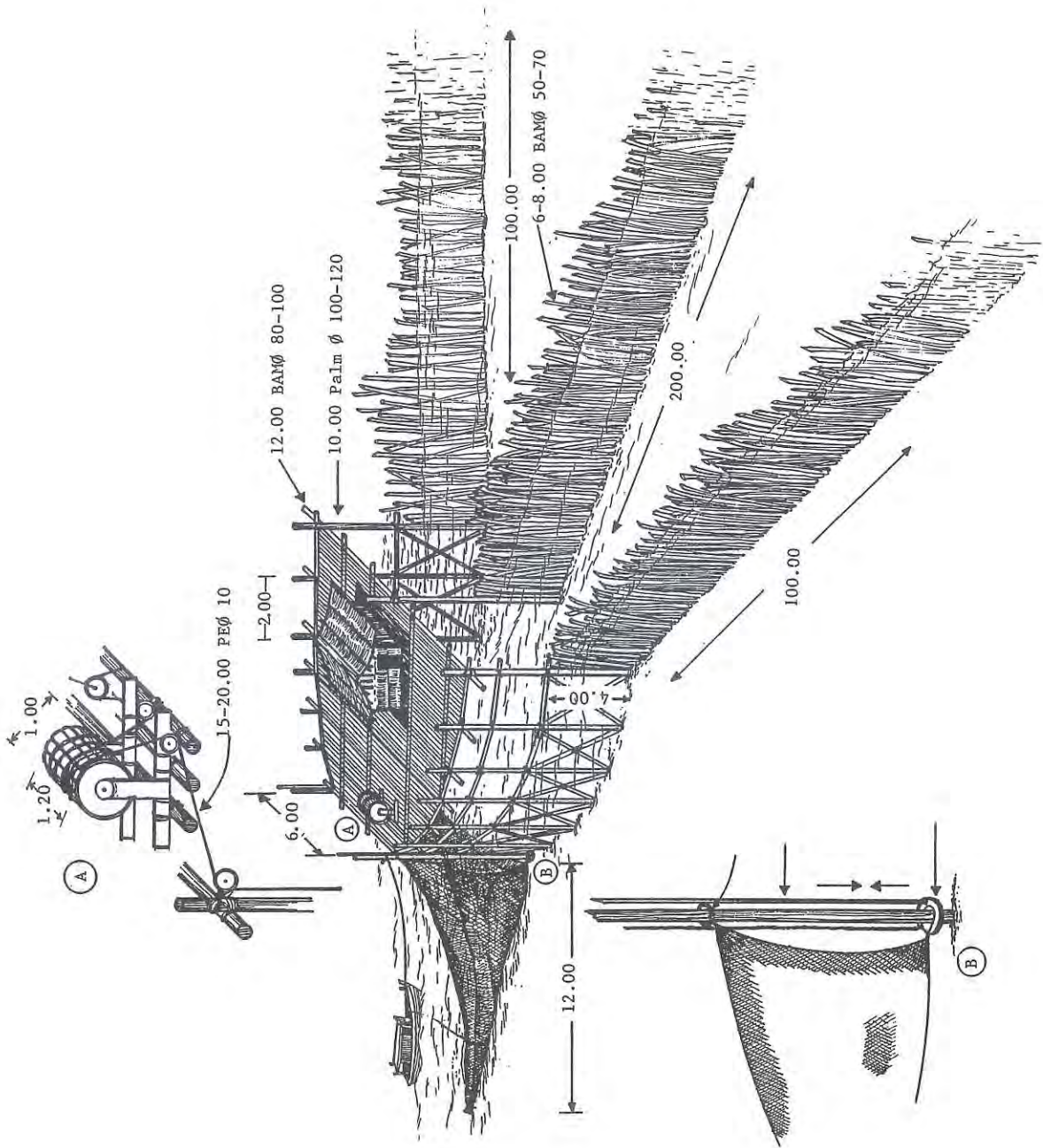
Shrimp, Misc. fish





TRAP	VESSEL	LOCATION
Fyke net	Loa 8 m	Kg. Tinagat
<i>Tugu</i>	hp 15	Tawau
Shrimp, Misc. fish.		<u>Sabah</u>





TRAP

VESSEL

LOCATION

Fyke net

Loa 10 m

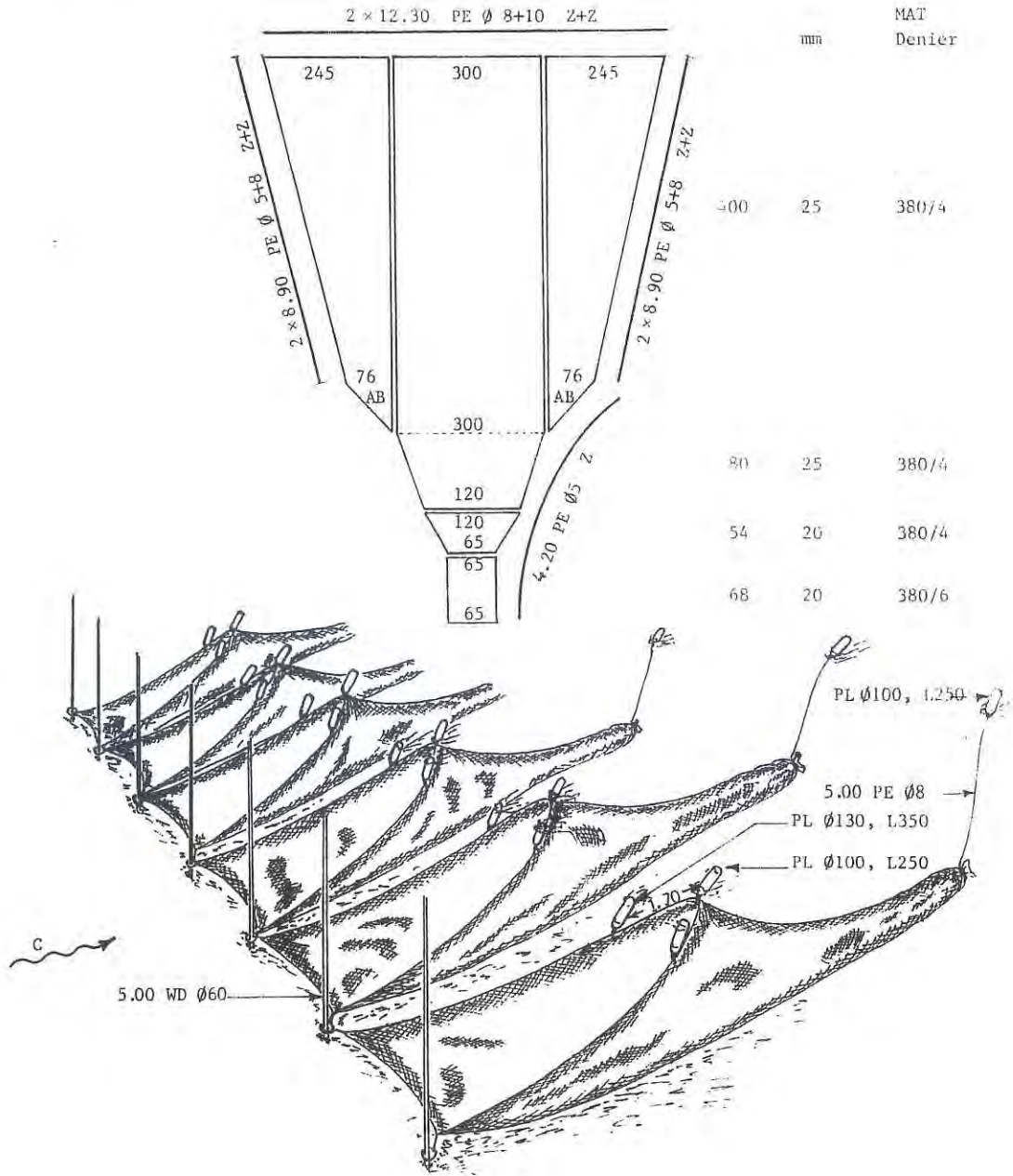
Maludum

Paka

hp 6

Sarawak

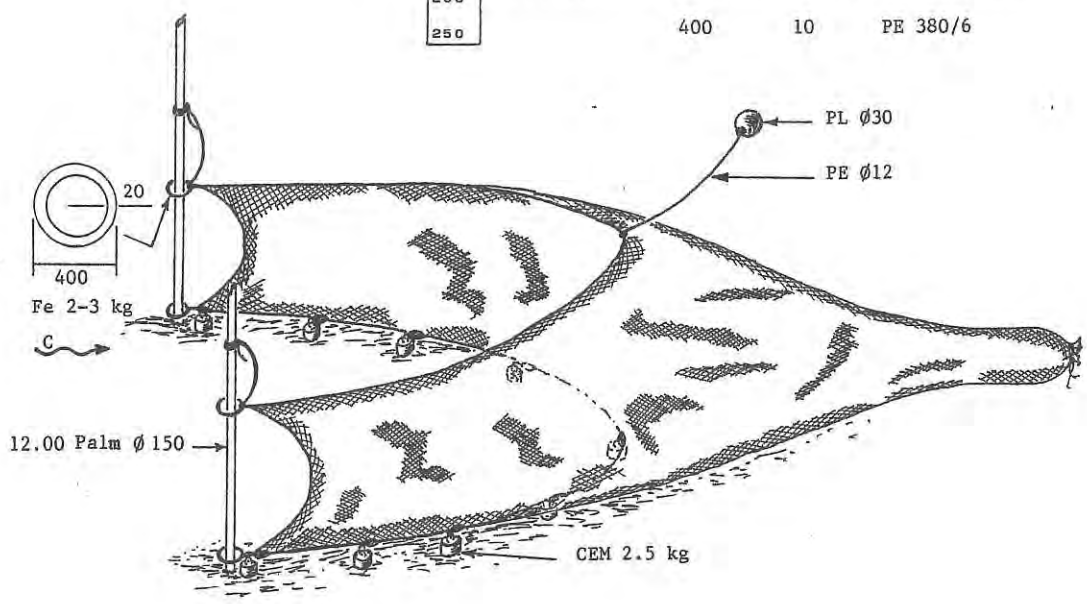
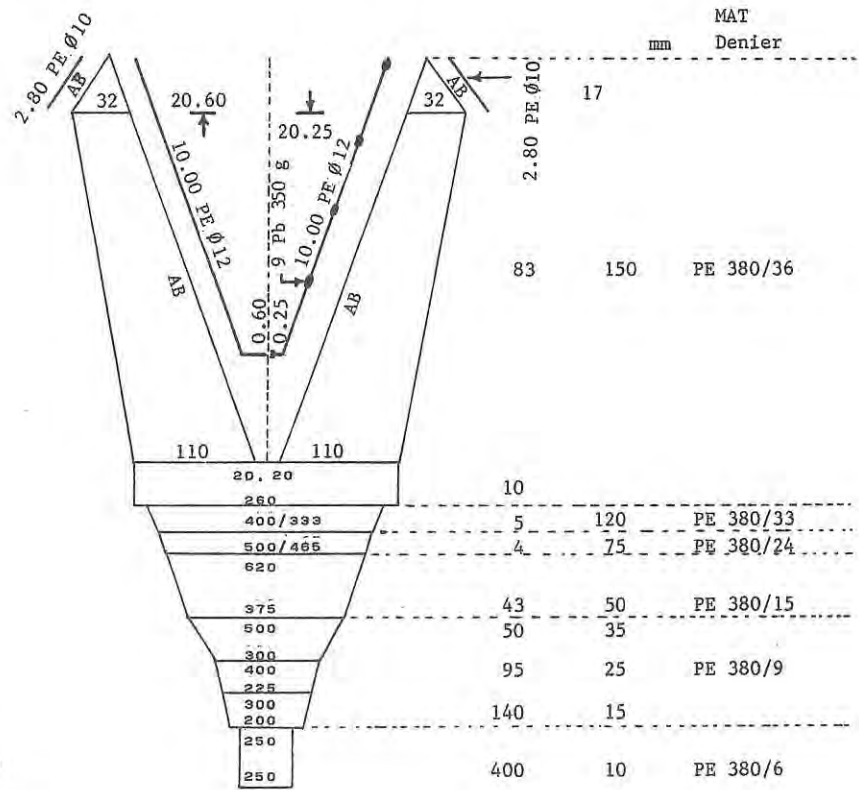
Shrimp, Bombay duck,
longtail anchovy



TRAP
 Fyke net
 Gombang
 Shrimp, Misc. fish

VESSEL
 Loa 14 m
 hp 24

LOCATION
 Sungai Janggut
 Selangor



TRAP

VESSEL

LOCATION

Barrier trap

Loa 5 m.

Lakub

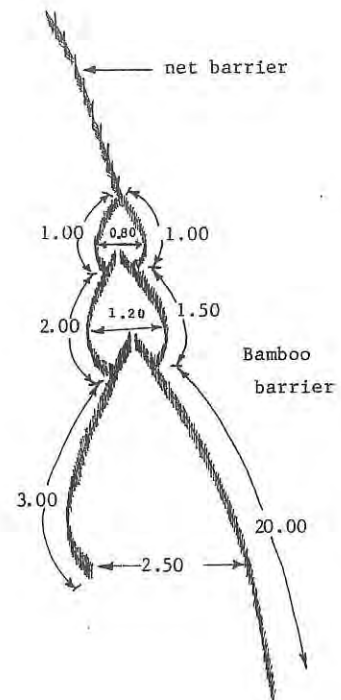
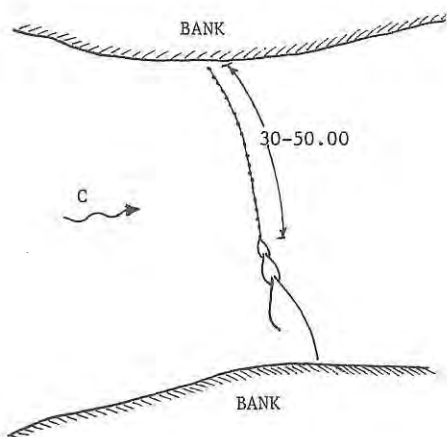
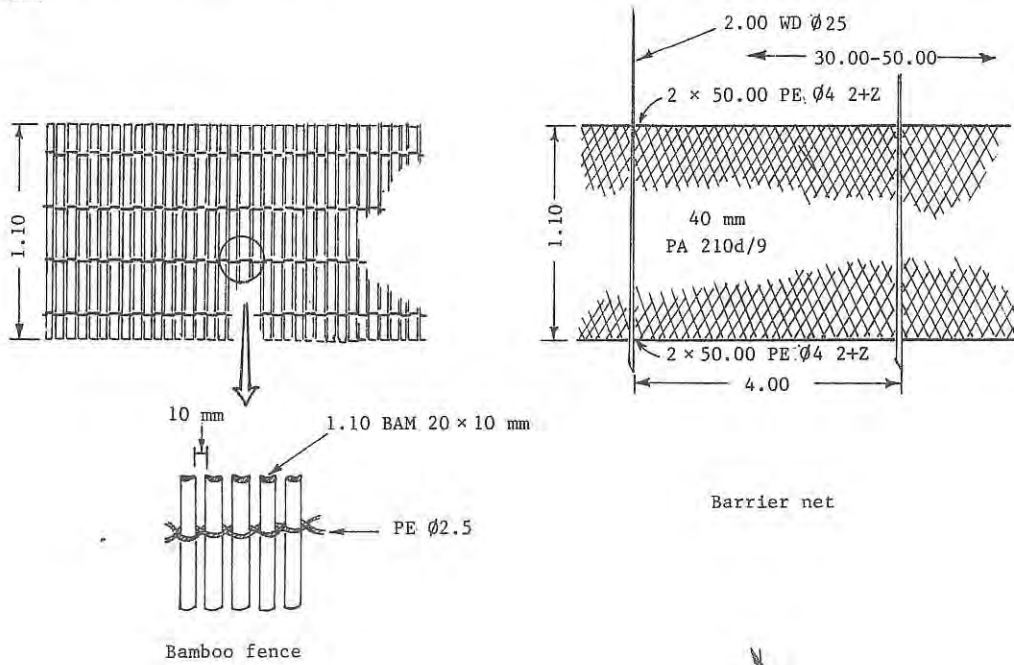
Kabat

hp. 20 OM

Kota Kinabalu

Catfish, Mullet, Shrimp, Crab,
Seabass

Sabah



TRAP

VESSEL

LOCATION

Barrier net

Loa 5 m

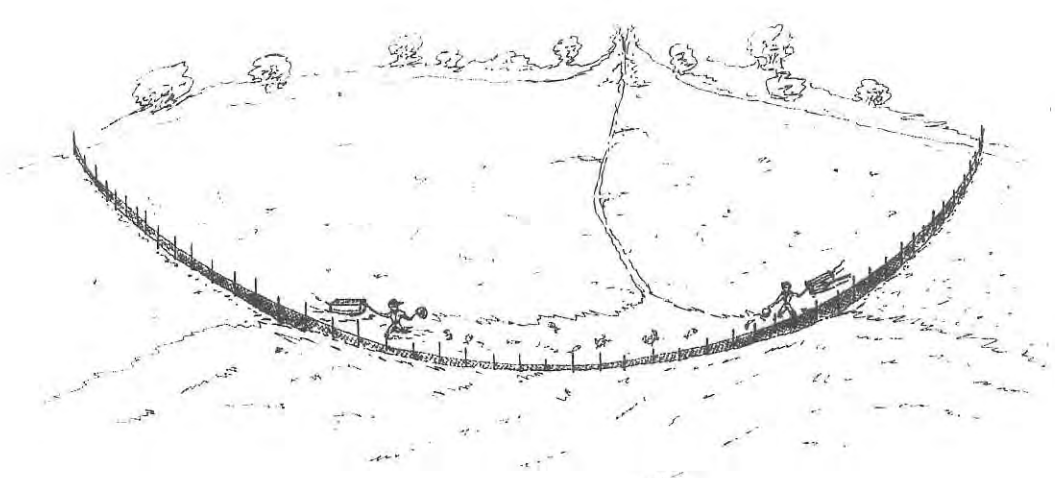
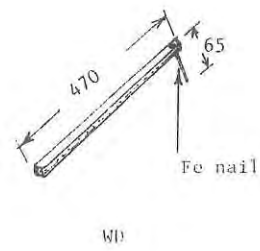
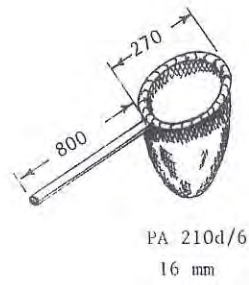
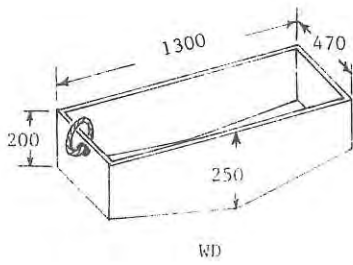
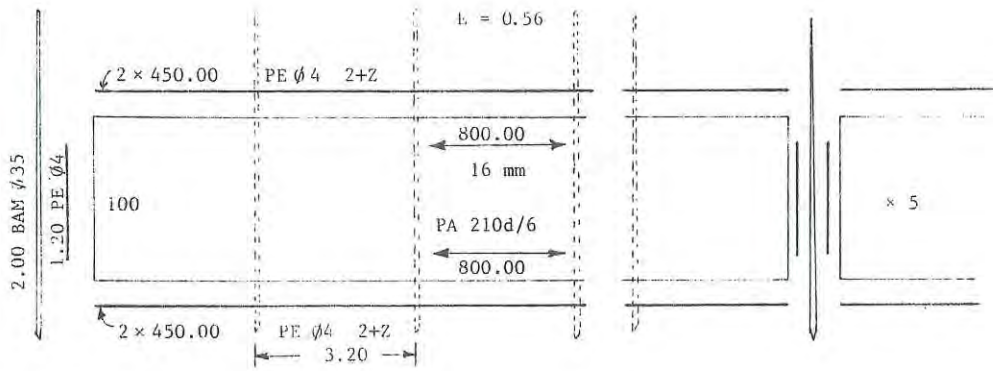
Yan

Pukat - Cekam

hp 7 LT

Kedah

Catfish, Shrimp, mud crab



TRAP

Stake trap

Kelong

Seabass, Four finger threadfin,
Mullet

VESSEL

Loa 4 m

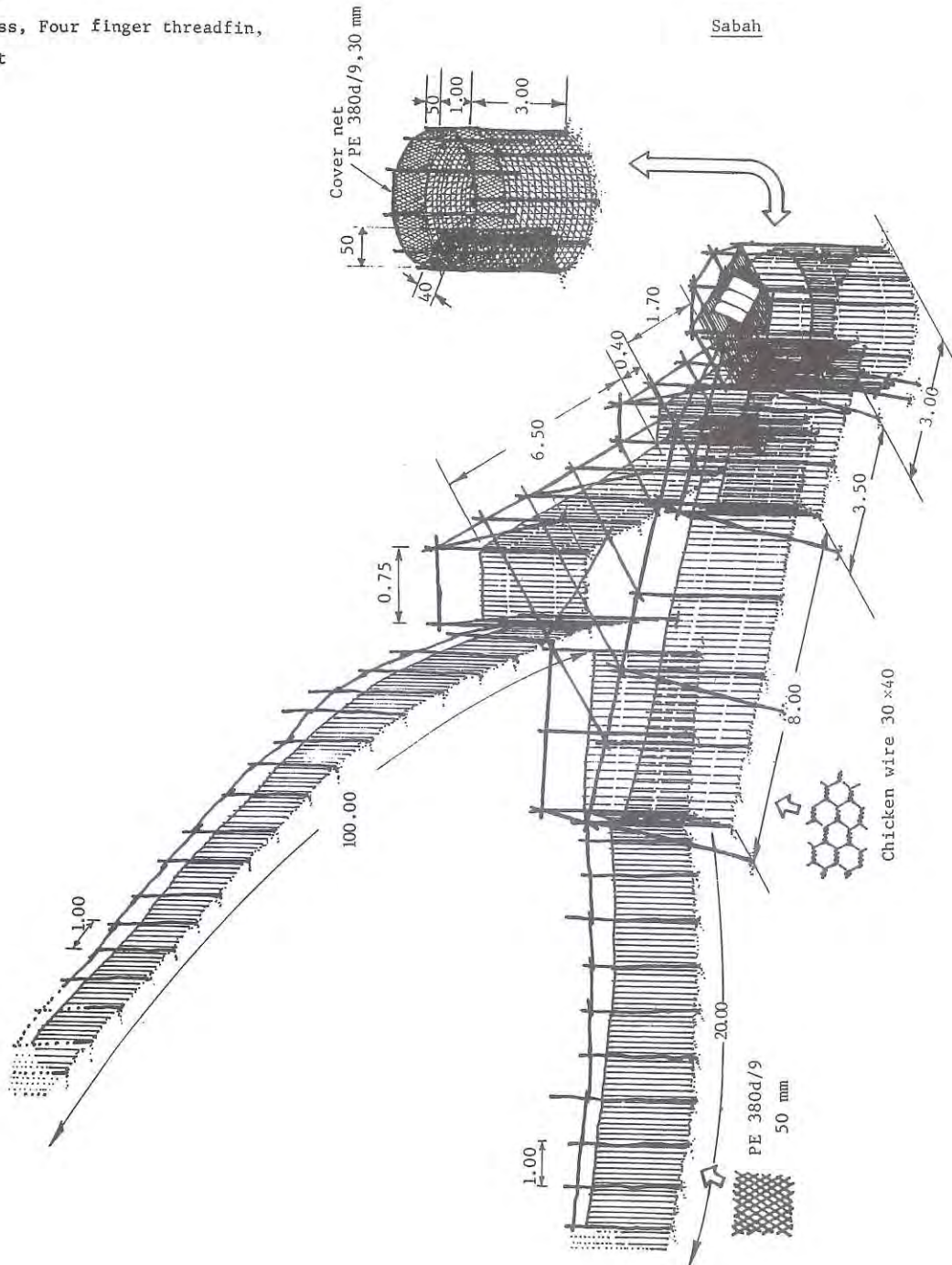
hp. -

LOCATION

Kg. Sim Sim

Sandakan

Sabah



TRAP

VESSEL

LOCATION

Stake Trap

Loa 4 m

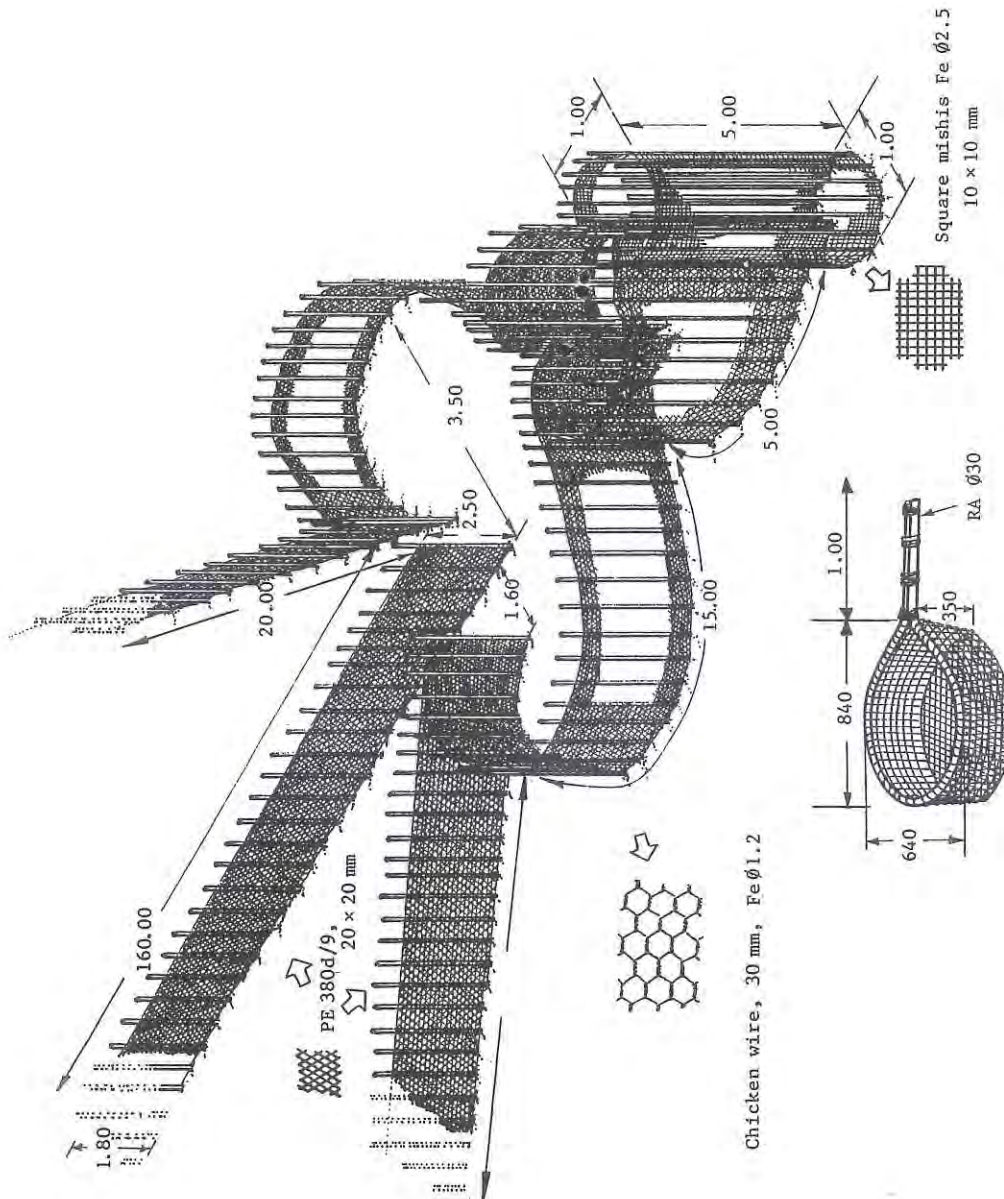
Tg. Lumpur

Belat-Kering-Kelong

hp -

Pahang

Seabass, Ray, Four finger threadfin



TRAP

Stake trap

Kelong-Kering

Seabass, Catfish, Grouper

VESSEL

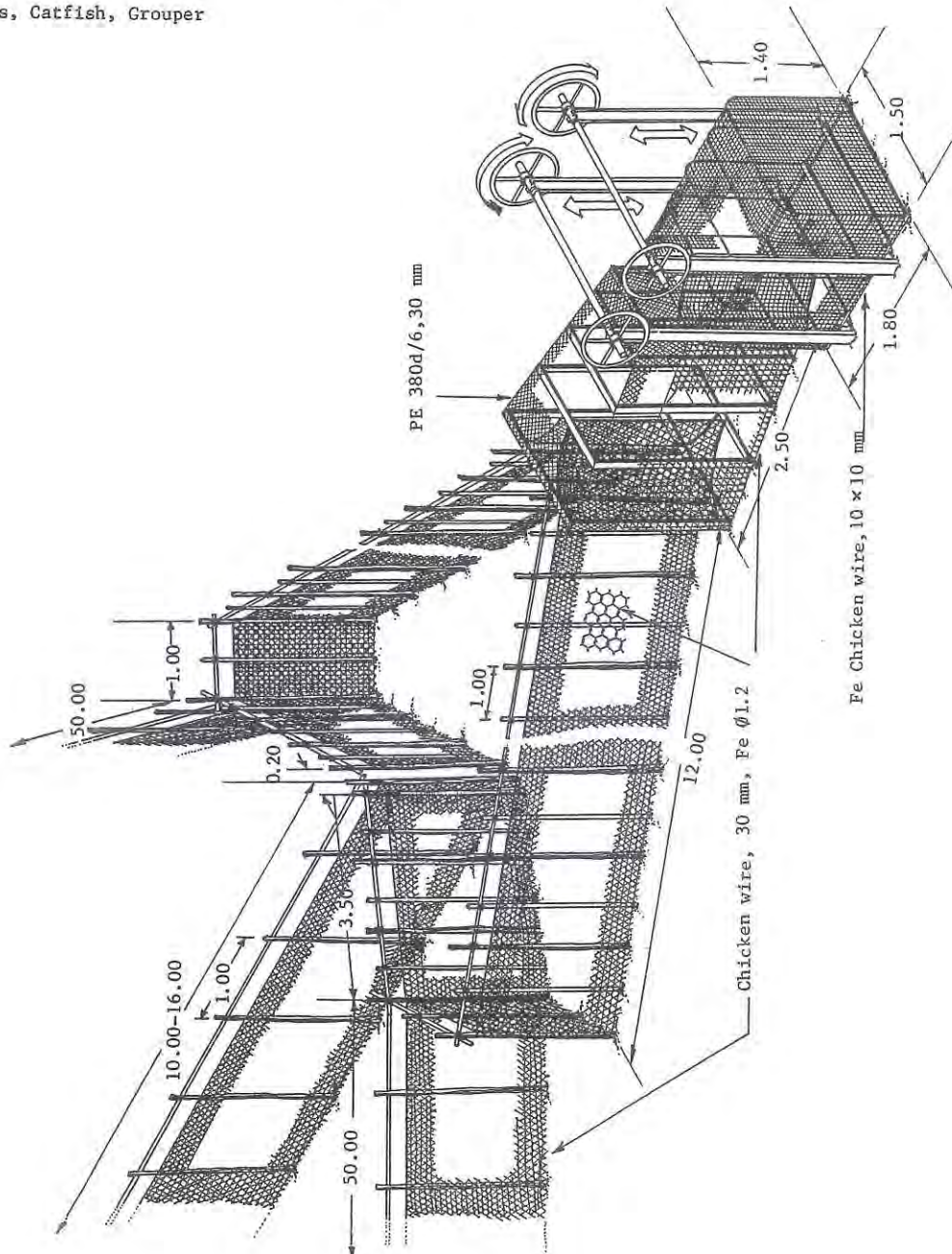
Loa 5 m

hp -

LOCATION

Kg. Pasir Puteh

Johor



TRAP

Stake trap

Belat (Kelong)

Mackerel, Sardine, Misc.

VESSEL

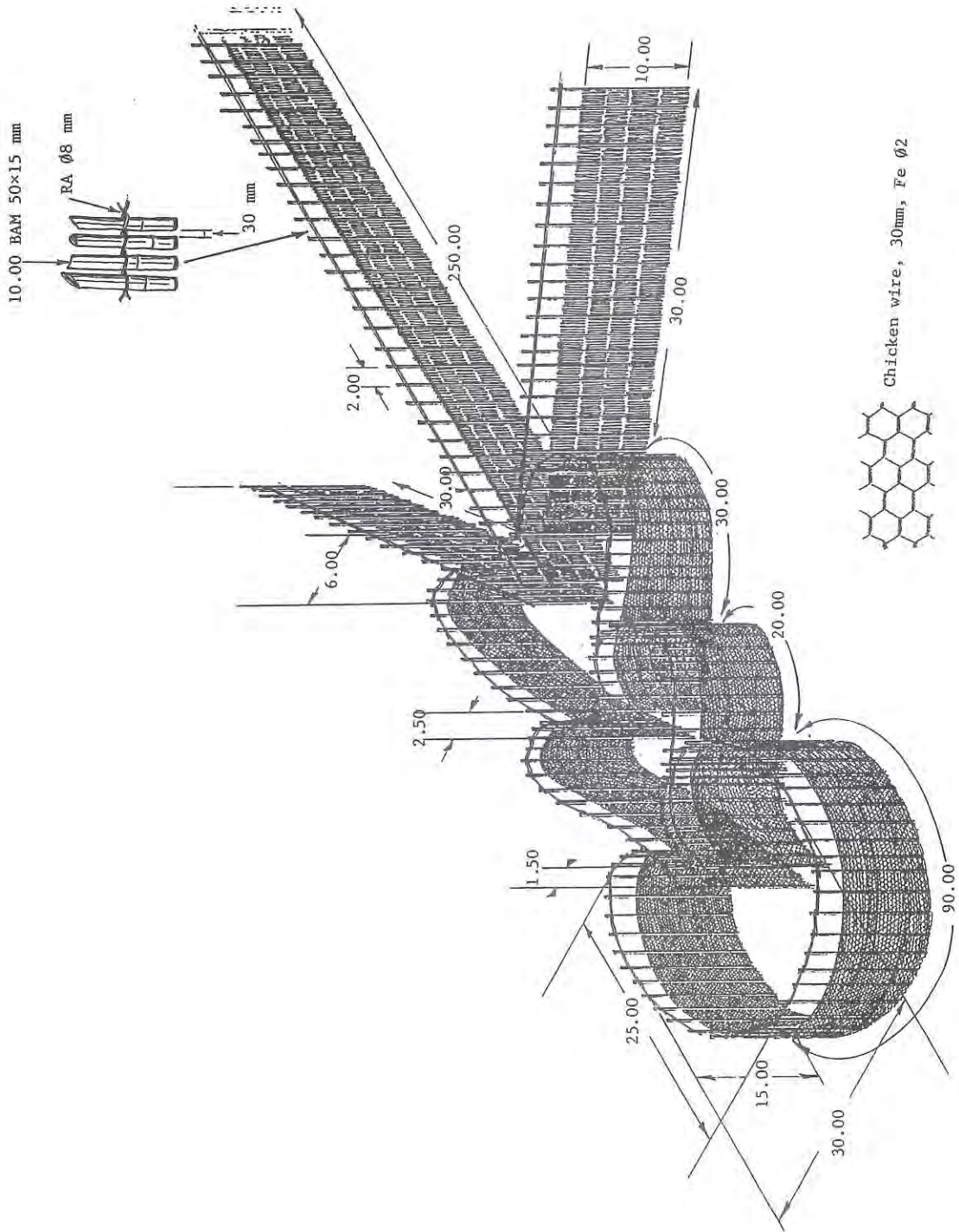
Loa 12 m

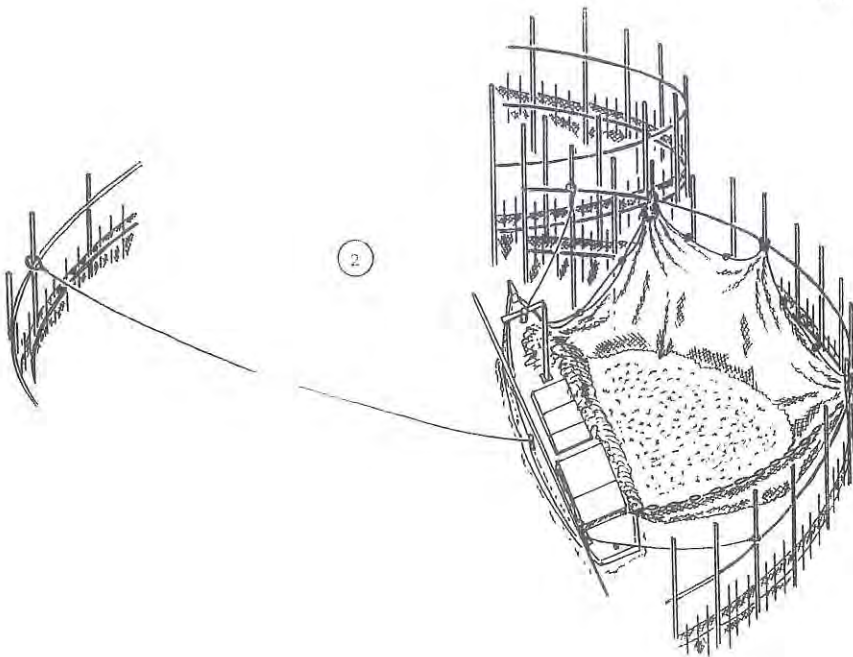
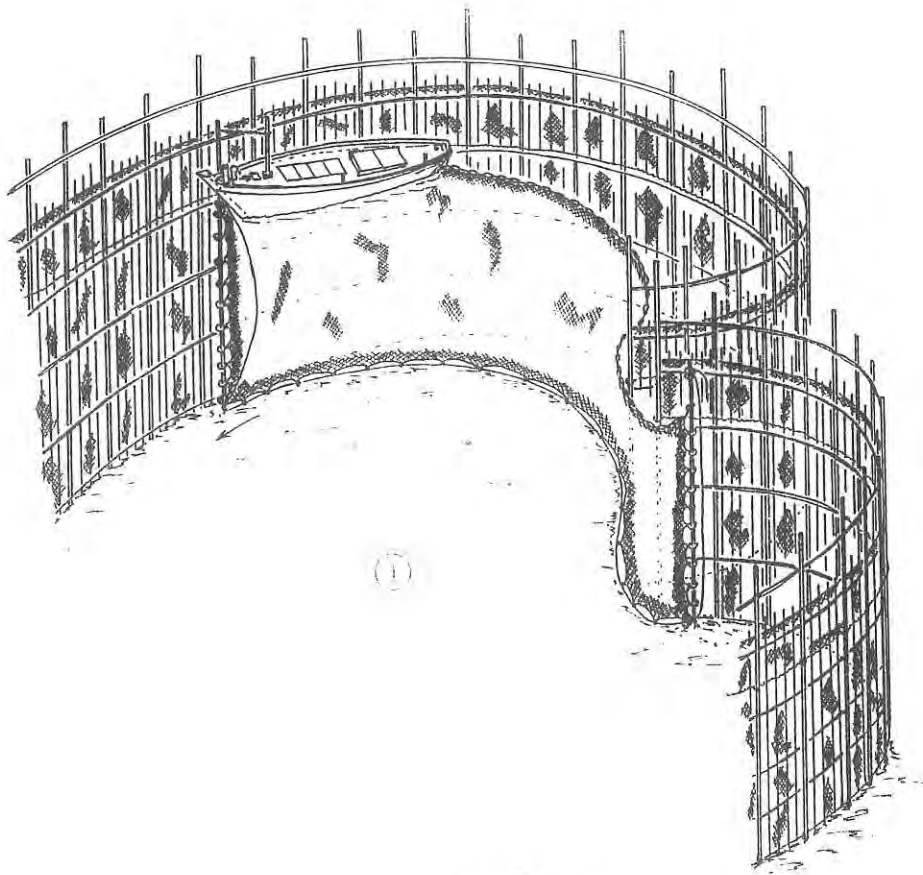
hp 6

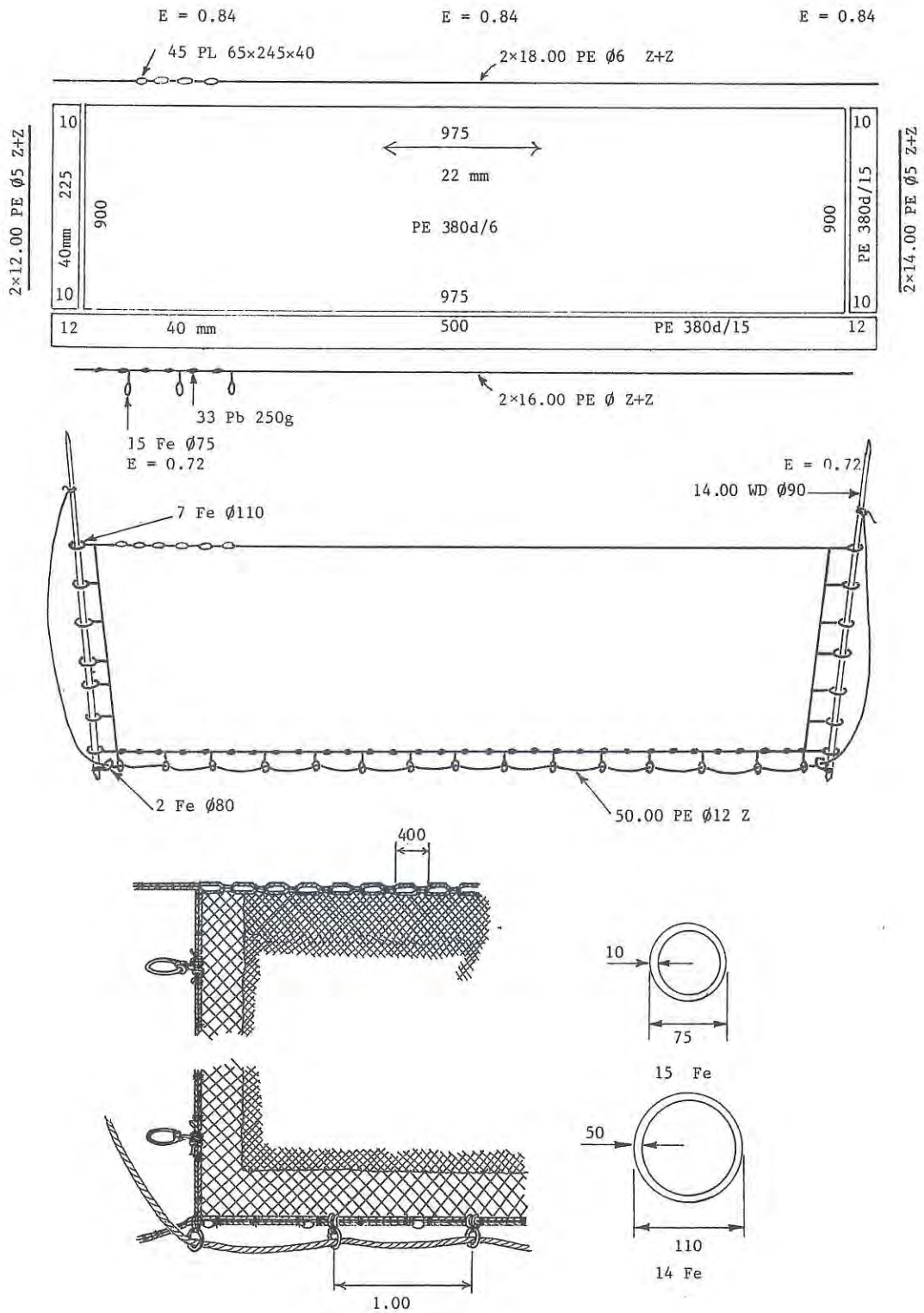
LOCATION

Kuala Kedah

Kedah







<Chapter 10>

HOOKS AND LINES FISHING

10.1 Introduction

Hook and line refers to fishing gears that are using hook to catch the fish. At present, it is the third largest number of licensed gear in Malaysia. In 2000, a total of 2180 units have been licensed. Total production of the gear in 2000 was 53837 tones (about 4% of total landing). Previously the gear has mostly been operated by small vessel in coastal areas. However, currently numbers of larger vessels (70 GRT and above) have been licensed to operate hook and lines in offshore area off Sarawak, Sabah and Labuan. The productions of these vessels were about 600 tones. Hook and line fishing of Malaysia is classified into a handline, bottom longline and trolling lines.

10.2 Fishing Gear and Methods

10.2.1 Handline

The handline consists of a main line, a branch line/hook lines and sinkers. There are two types of handline i.e baited and unbaited or lured hooks. The former is normally has a balance with a sinker between swivels, and it usually has one or two hooks, It is used for catching high-valued fish, such as Spanish mackerel, grouper, and snapper. etc. The later has a main line with several branch lines/hook lines, and use to catch small-sized such as sardines and mackerel.

Nylon monofilament is generally used for both the main line and branch/hook lines. However, for catching fish which has sharp teeth, such as Spanish mackerel, branch/hook lines are made of stainless steel wire.

Fishing with handline is commonly carried out in the early morning and in the evening in waters with a fish bank or around an island. Squid, sardine and mackerel are widely used as bait for the handline. Sometimes a live mackerel is used as bait for catching Spanish mackerel.

10.2.2 Bottom longline

The bottom longline consists of a main line, branch/hook lines and hooks. The construction of the bottom longline used in Malaysia is the same as that of Thailand. Material of the main line and branch lines is PE and PA. When PE is used for the main line, sinkers are attached to it directly or to the joints between the main line and branch lines, in order to increase the sinking force.

The hooks for bottom longlines are nearly of the same shape, but vary in size. This type of hook has a long shank and a rounded end. Sometimes barbless hooks are used for catching ray or shark.

Bottom longline fishing operations are carried out early in the morning, using a wooden or bamboo hanger to which hooks are attached. Shooting is done while removing the hooks from the hanger, which is stood upright, and bait is attached on one hook after another.

10.2.3 Trolling line

Trolling is a popular fishing method in Malaysia for catching Spanish mackerel and tunas. Fishing is done by a few persons on board a powered boat of 5 m. to 10 m. in length, preferably around sunrise and sunset. The main line can have one lure or a hook with fresh bait, or several lures. The speed of trolling ranges between 3 to 5 knots.



HOOK and LINE

Hand

Squid

VESSEL

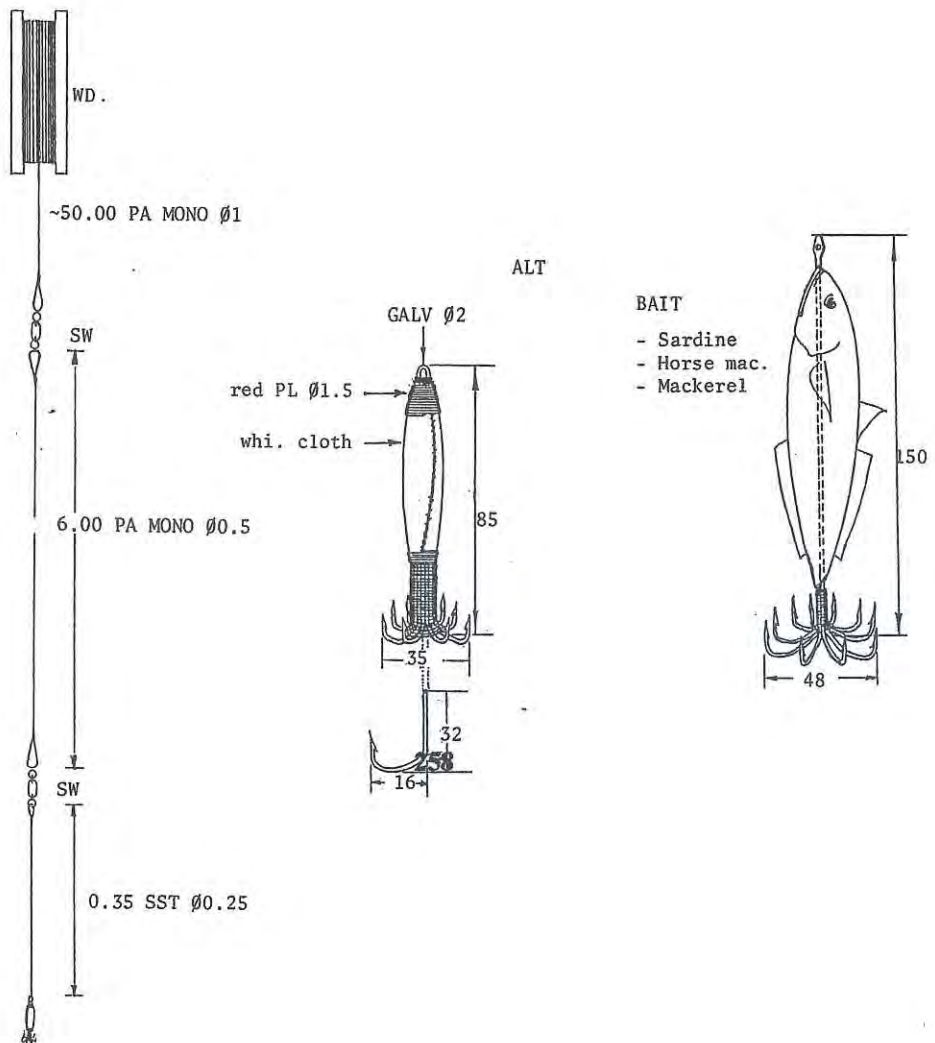
Loa 15 m

hp 45

LOCATION

Kuala Behsut

Terengganu



HOOK and LINE

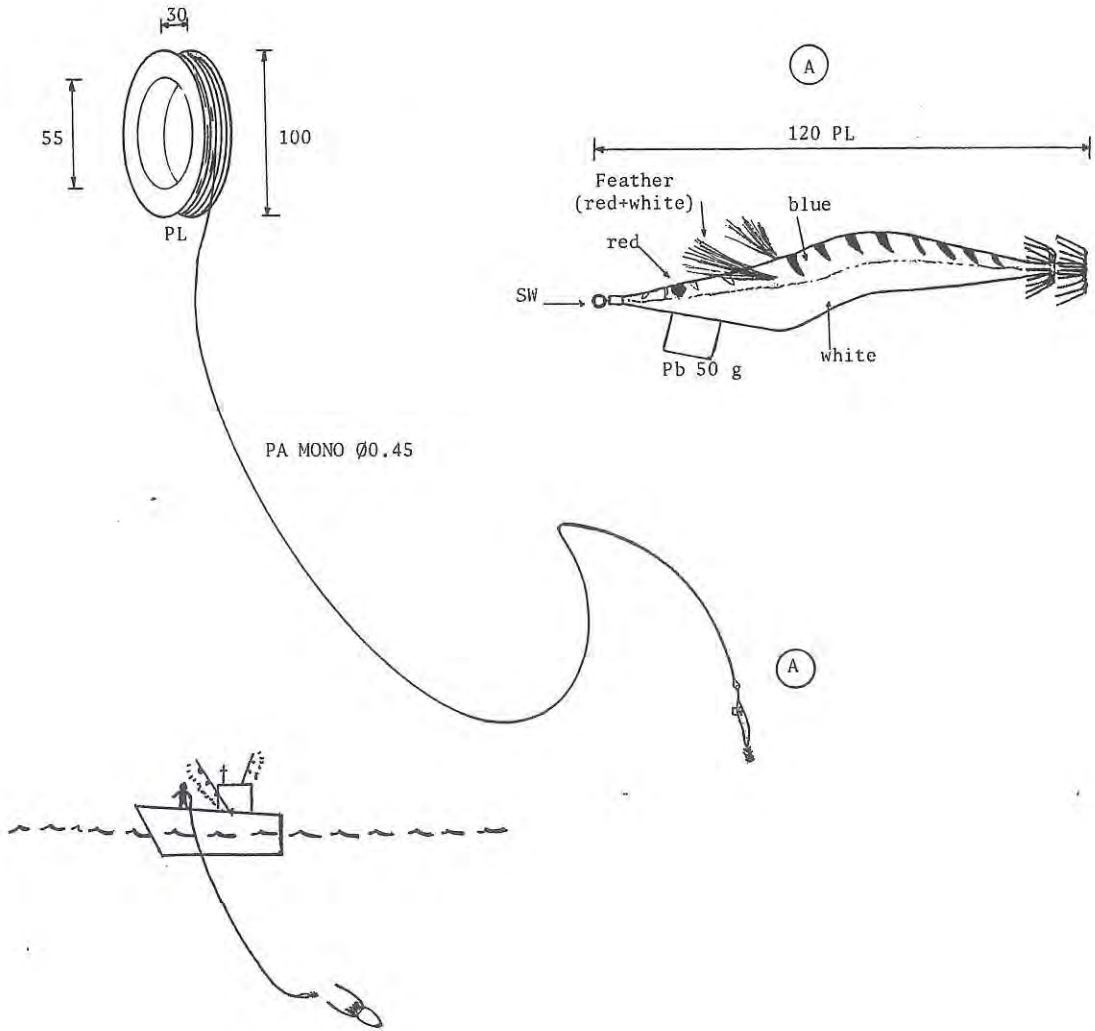
Hand
Squid

VESSEL

Loa 7.5 m
hp 40 OM

LOCATION

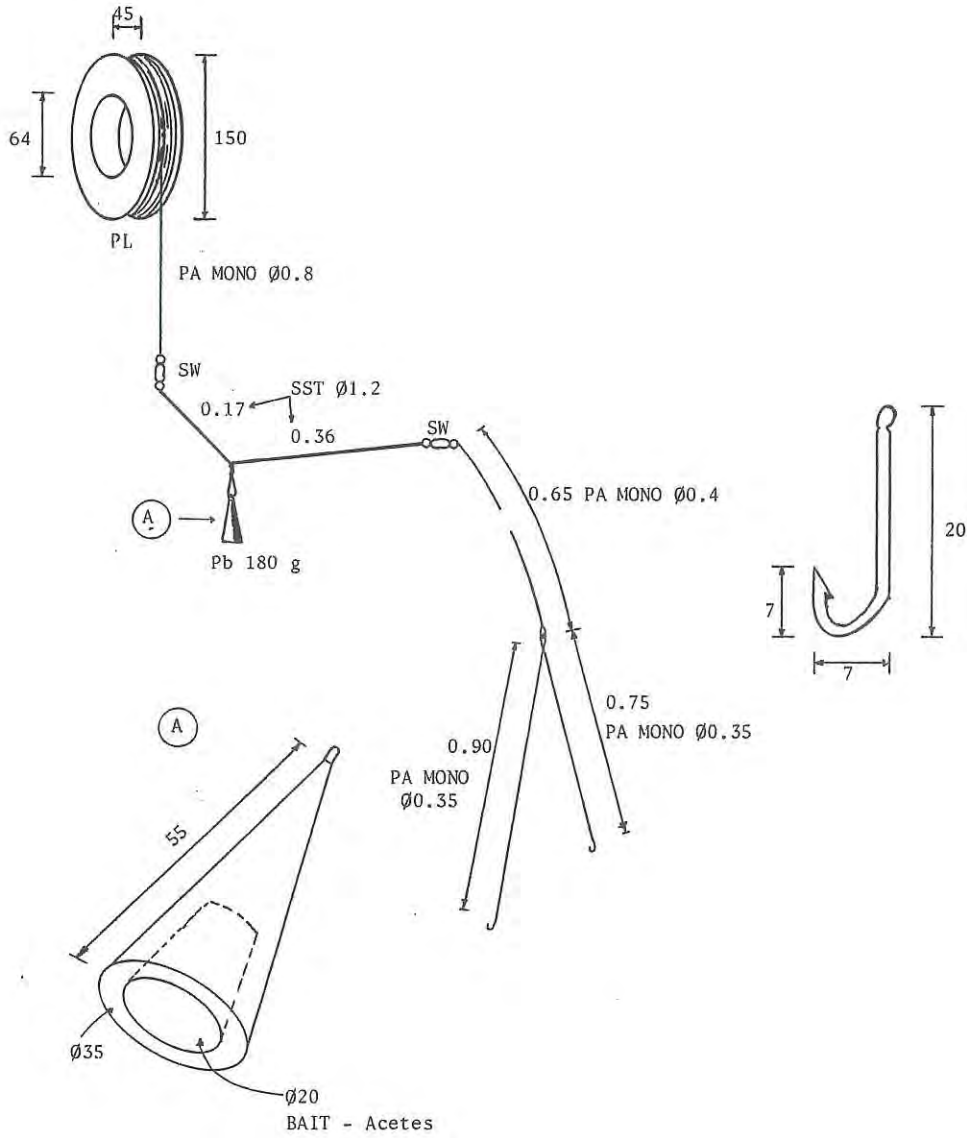
Kampong Ranca-Ranca
Labuan F.T.



HOOK and LINE
 Hand
 Scad, Threadfin beam

VESSEL
 Loa 7.5 m
 hp 40 OM

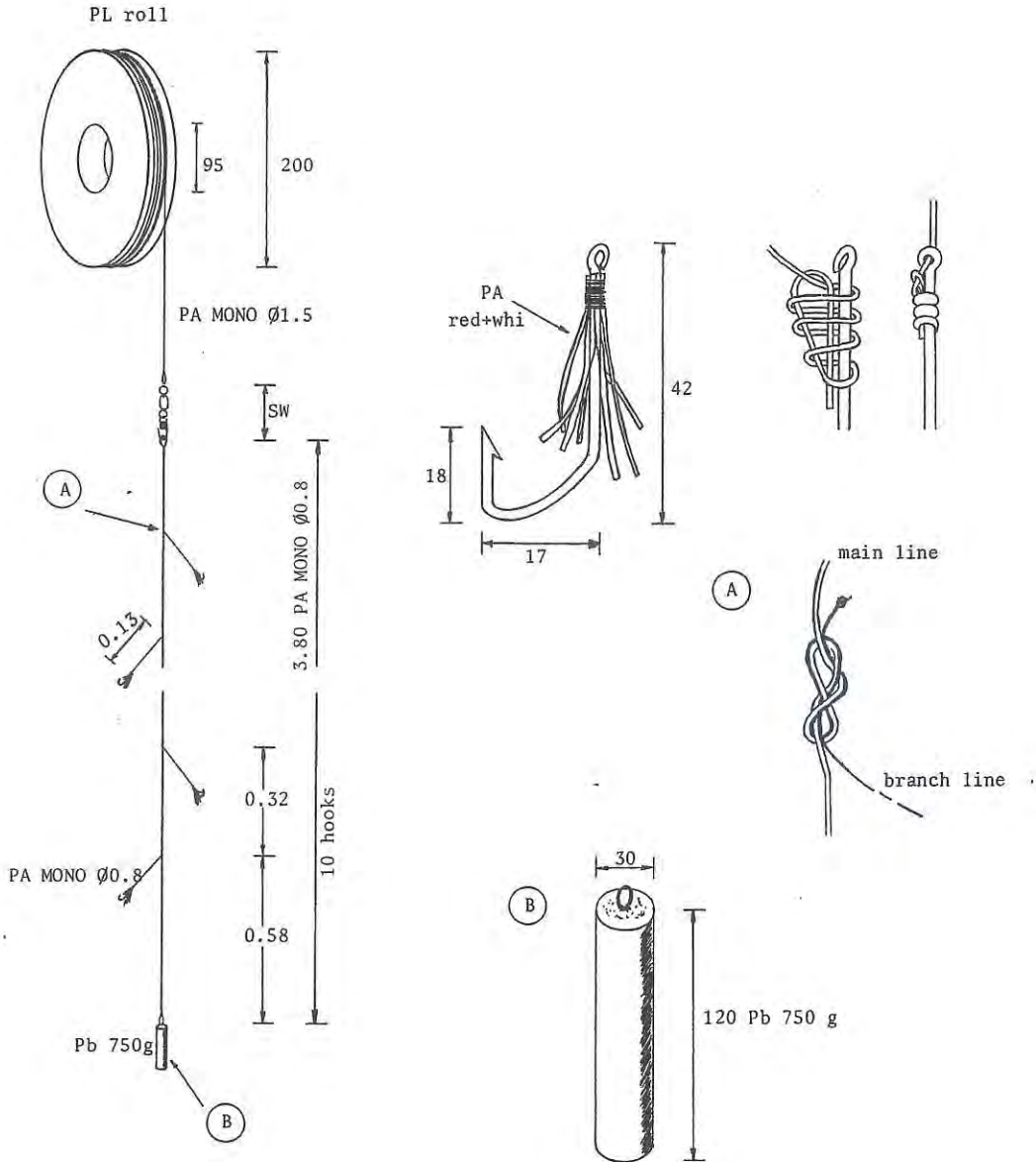
LOCATION
 Kampong Ranca-Ranca
 Labuan F.T.



HOOK and LINE
 Hand
 Jack, Trevally, Cavalla

VESSEL
 Loa 14.25 m
 hp 45

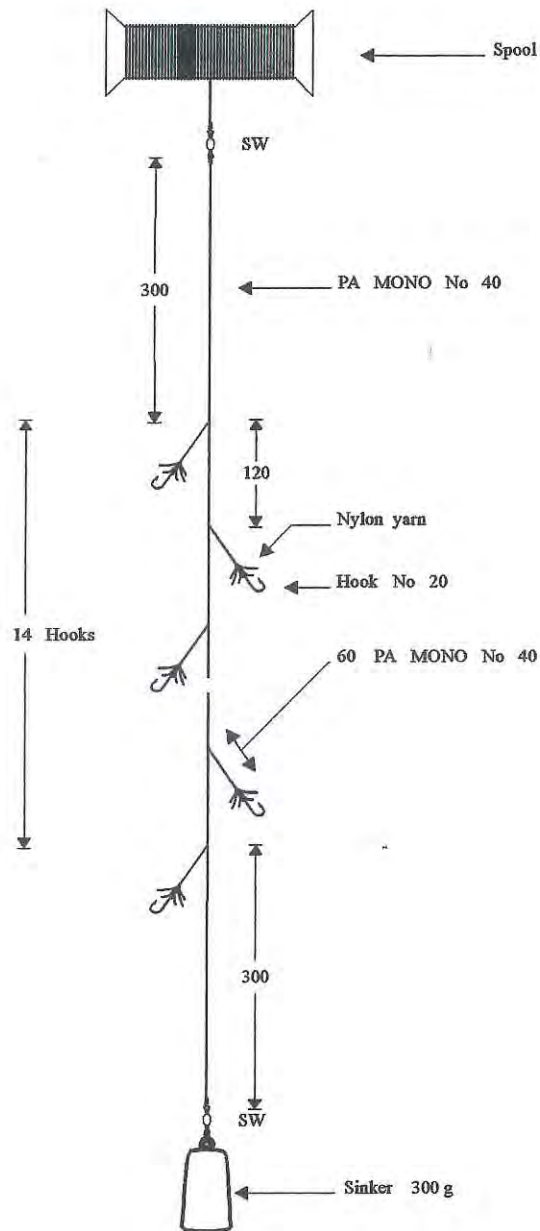
LOCATION
 Miri
 Sarawak



HOOK and LINE
Hand line Apolo
Round Scad, Scad, Sardine

VESSEL
Loa 15 m
Hp 45

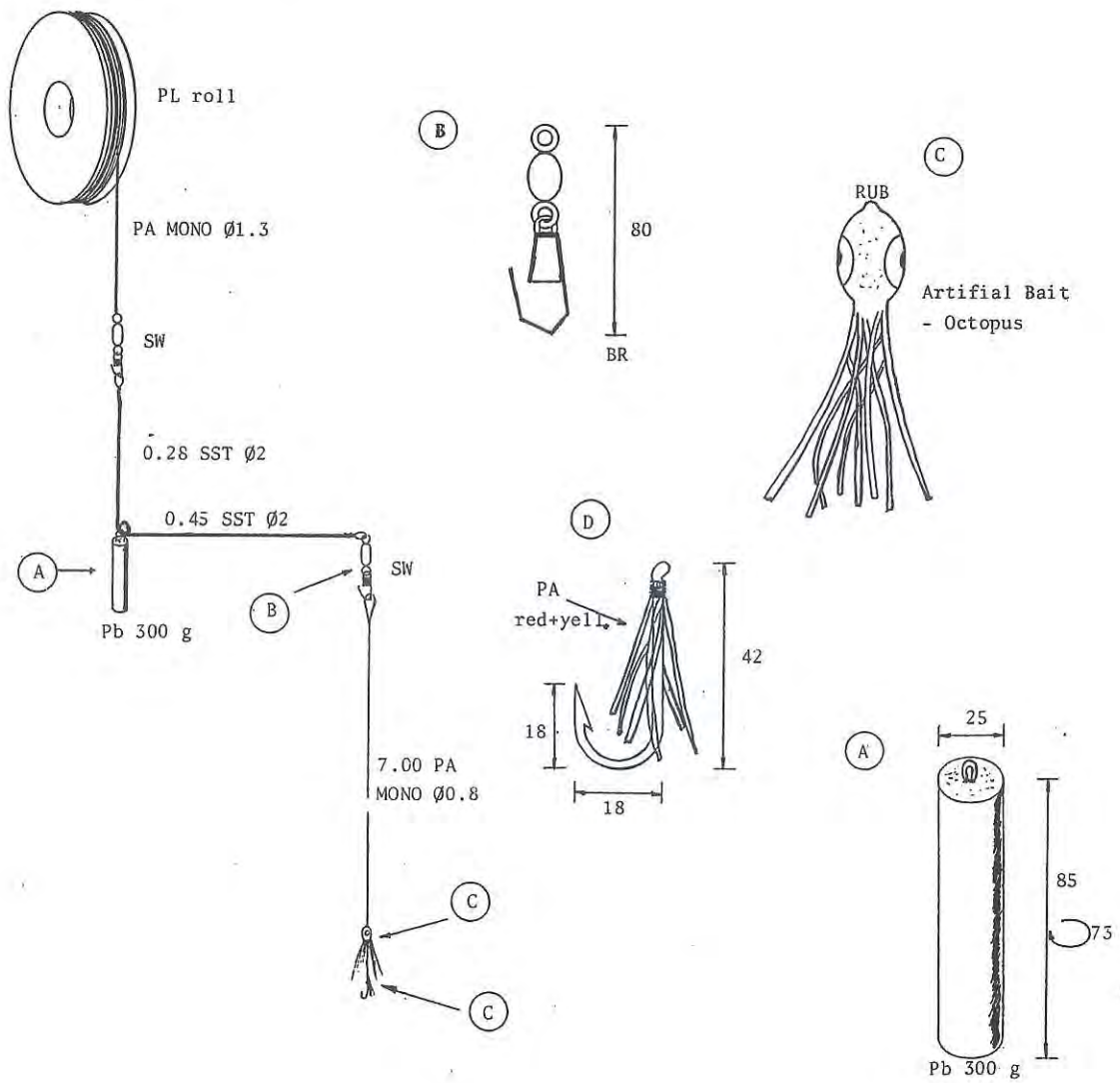
LOCATION
Kuala Terenggamu
Terengganu



HOOK and LINE
 Hand
 Jack, Cavalla, Trevally

VESSEL
 Loa 14.25 m
 hp 45

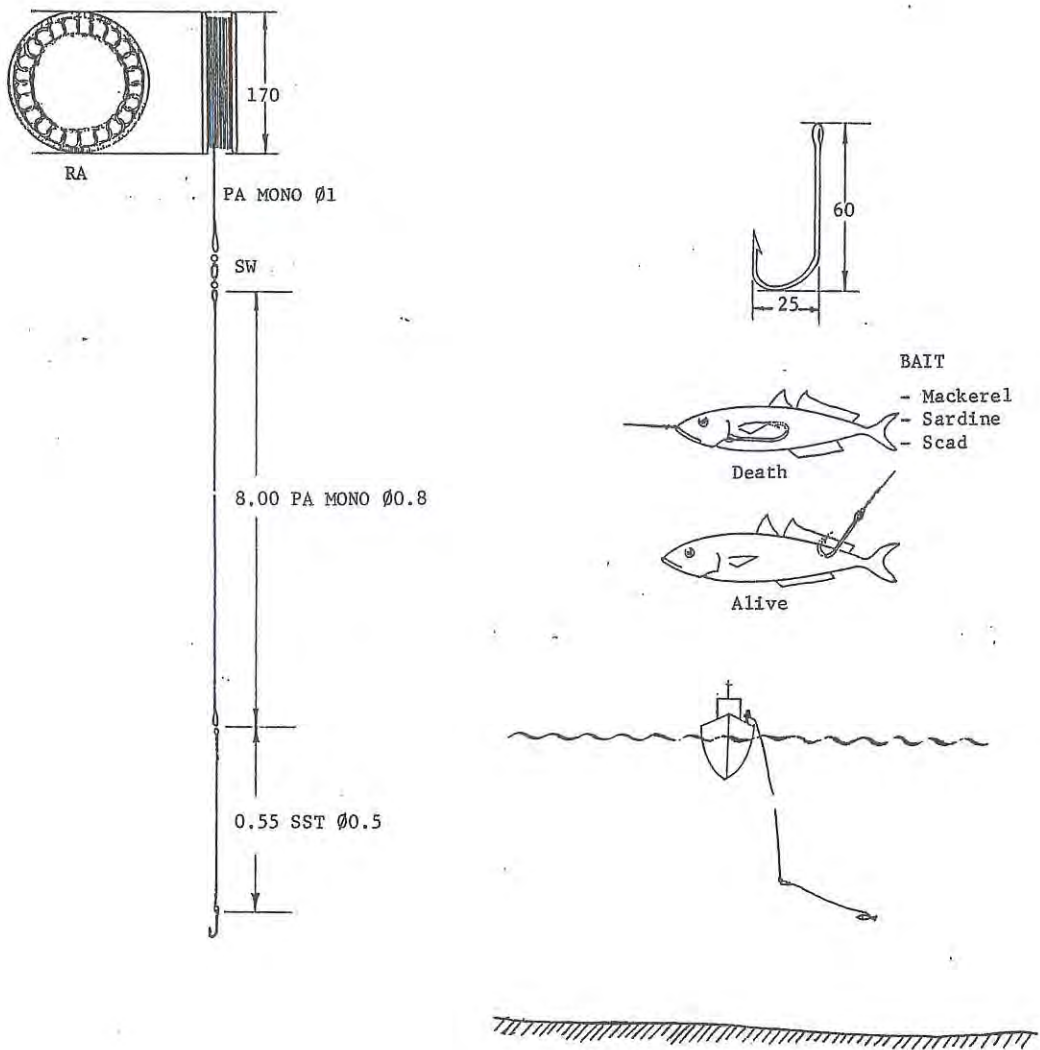
LOCATION
 Miri
 Sarawak



HOOK and LINE
Hand
Spanish mackerel

VESSEL
Loa 8 m
hp 12

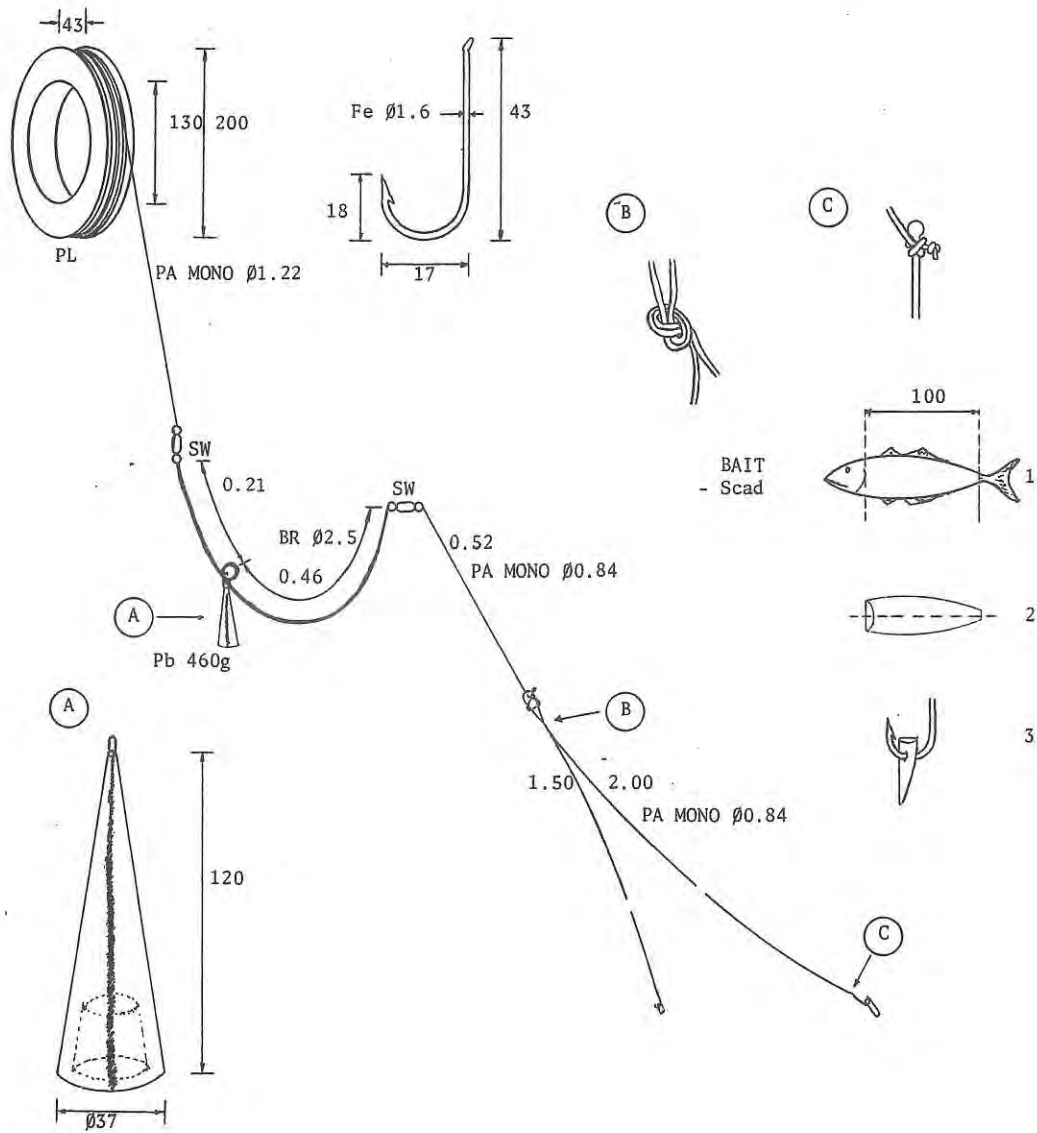
LOCATION
Kampong Balok
Pahang



HOOK and LINE
 Hand
 Emperor, Grouper, Snapper

VESSEL
 Loa 6 m
 hp 30 OM

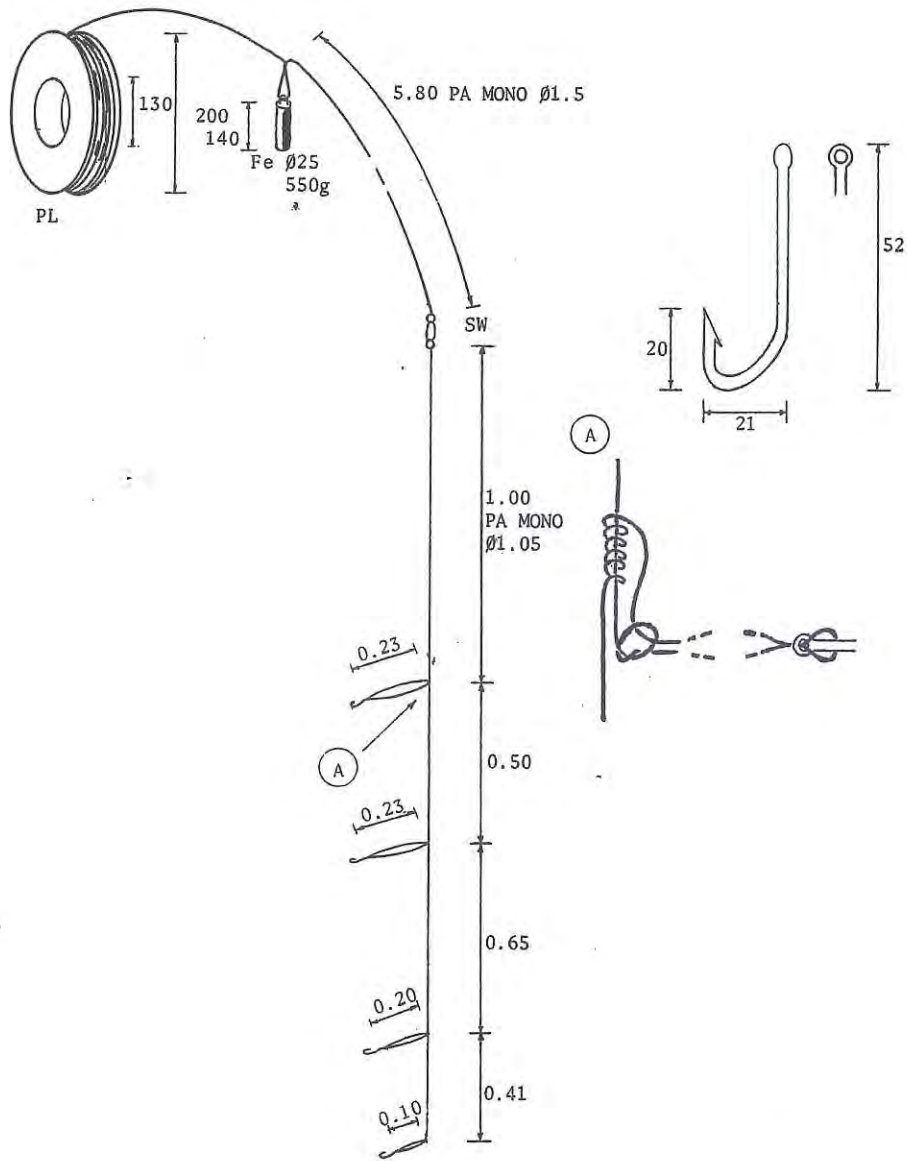
LOCATION
 Kota Kinabalu
 Sabah



HOOK and LINE
 Hand
 Snapper, Grouper

VESSEL
 Loa 9.60 m
 hp 10

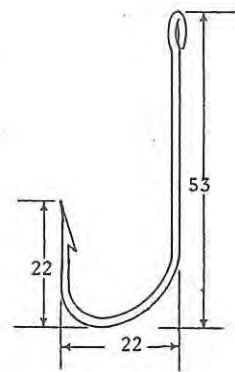
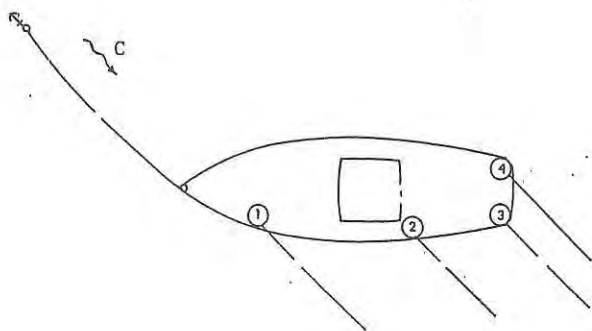
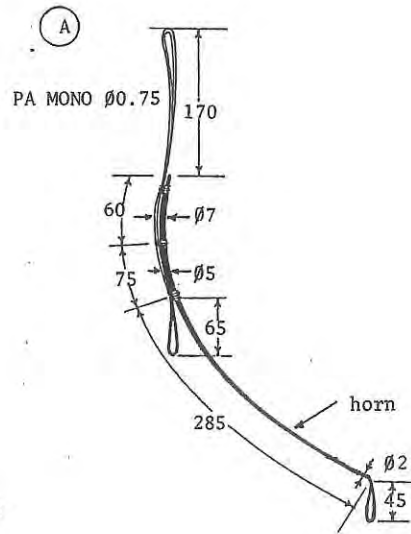
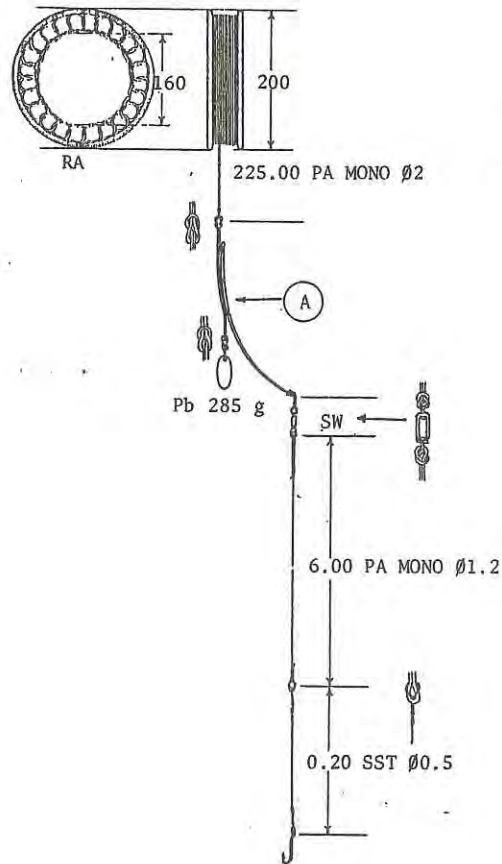
LOCATION
 Tanjung Ujung Pasir
 Labuan F.T.



HOOK and LINE
 Hand
 Grouper, Snapper

VESSEL
 Loa 12.70 m
 hp 37

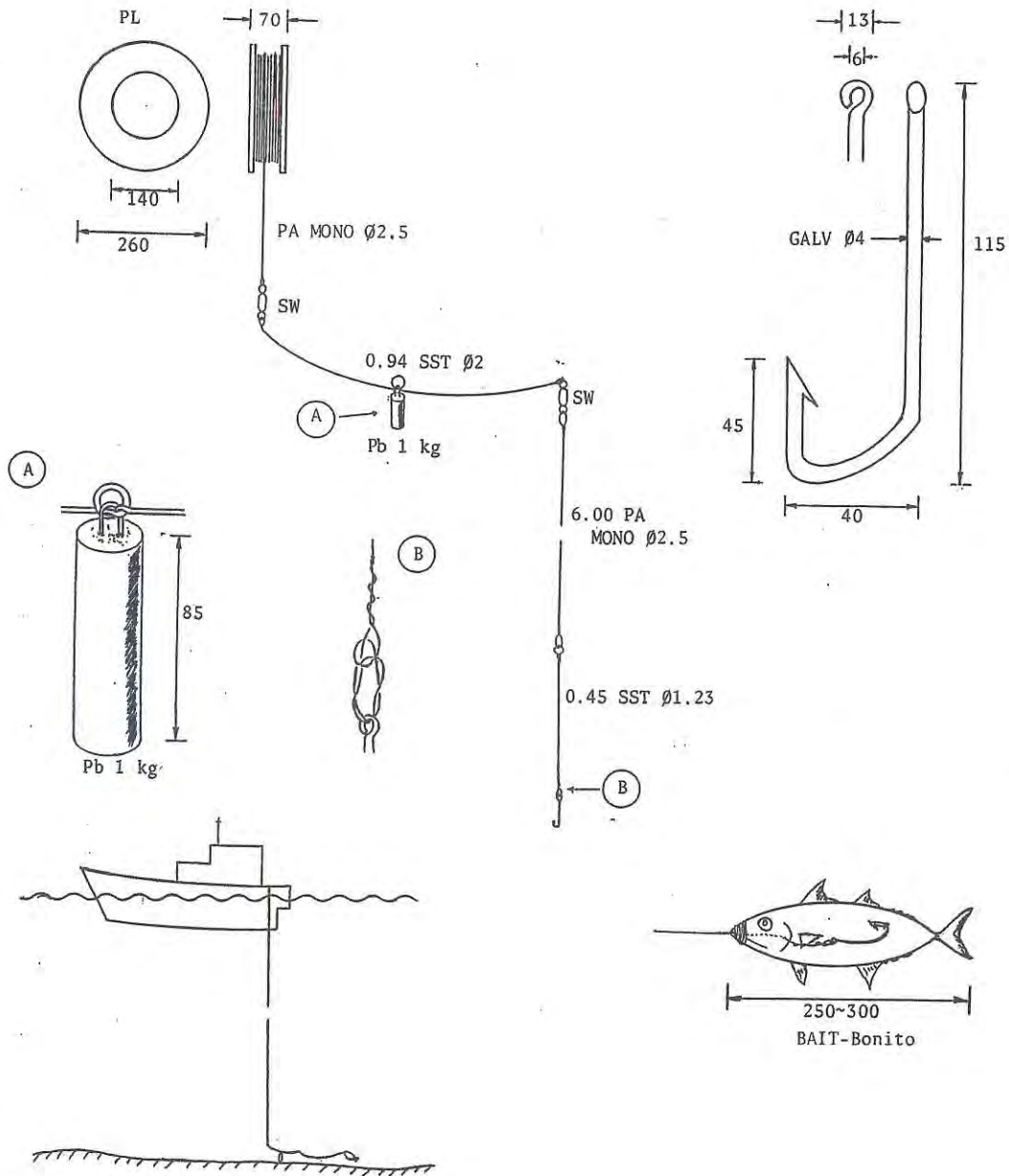
LOCATION
 Kuala Behsut
 Terengganu



HOOK and LINE
Hand
Grouper

VESSEL
Loa 14.25 m
hp 45

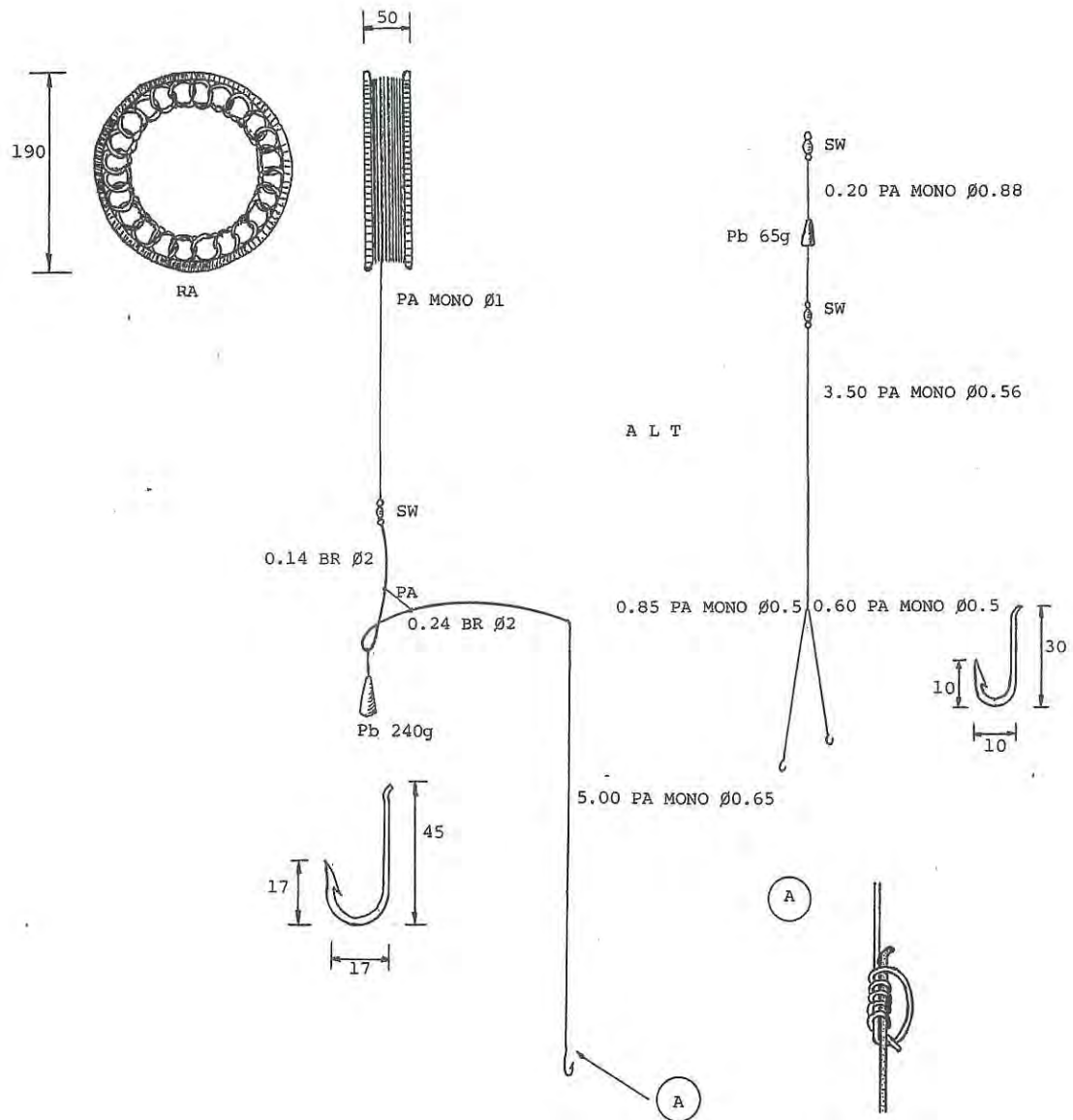
LOCATION
Miri
Sarawak



HOOK and LINE
 Hand
 Demersal fish

VESSEL
 Loa 12 m
 hp 24

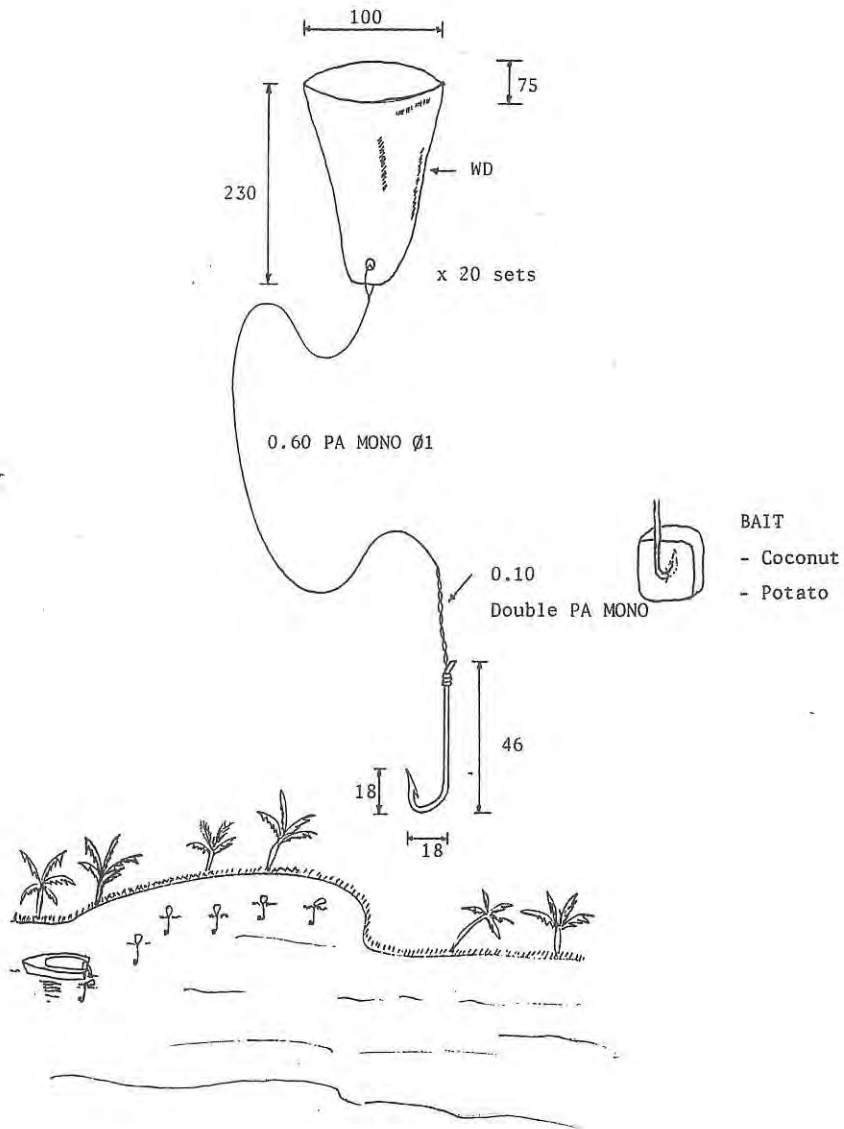
LOCATION
 Pulau Pangkor
Perak



HOOK and LINE
Drifting hook
Fresh water catfish

VESSEL
Loa 3 m
hp 8

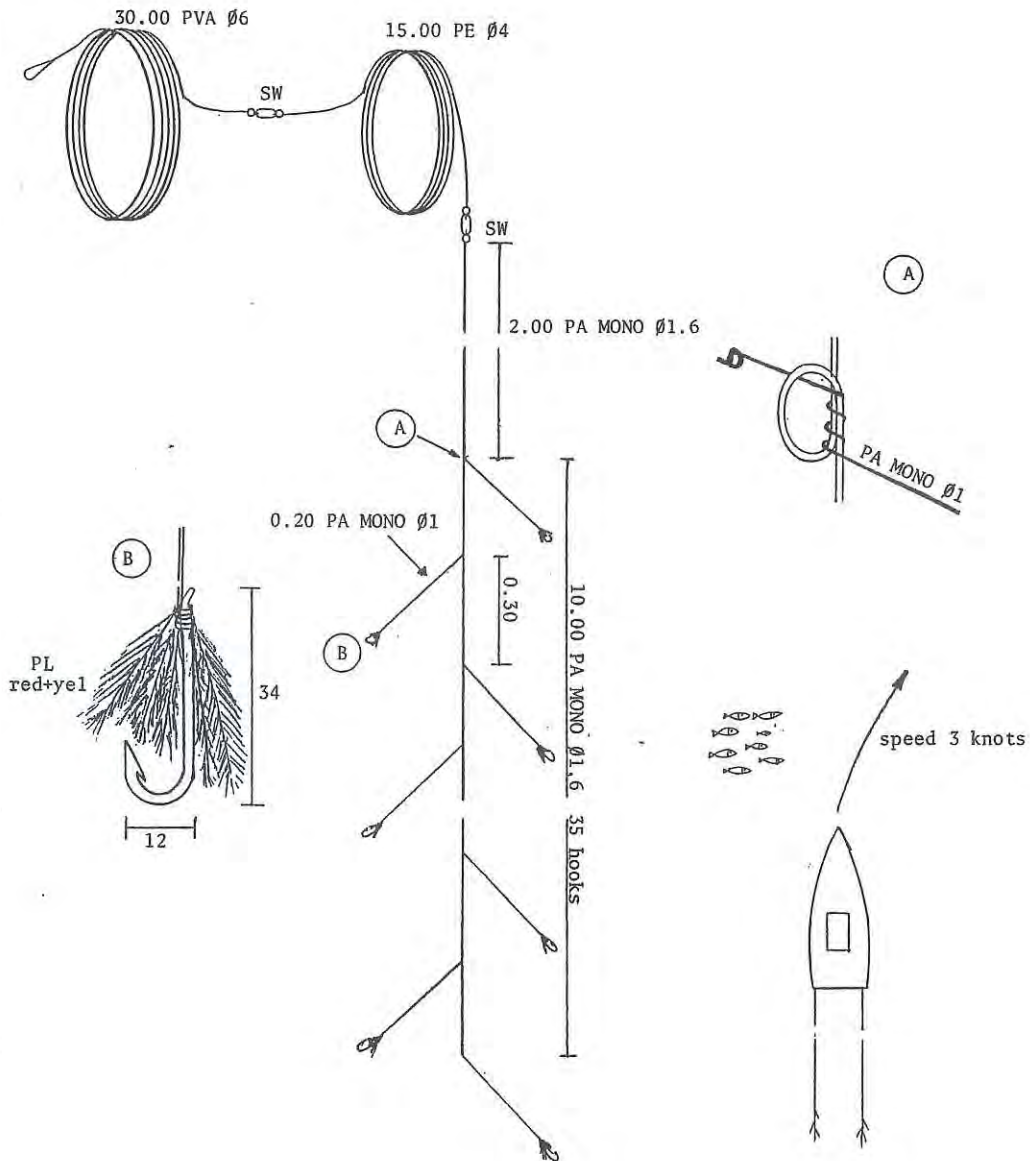
LOCATION
Kg. Abai Kinabatangan
Sabah



HOOK and LINE
Trolling
Bonito

VESSEL
Loa 15 m
hp 45

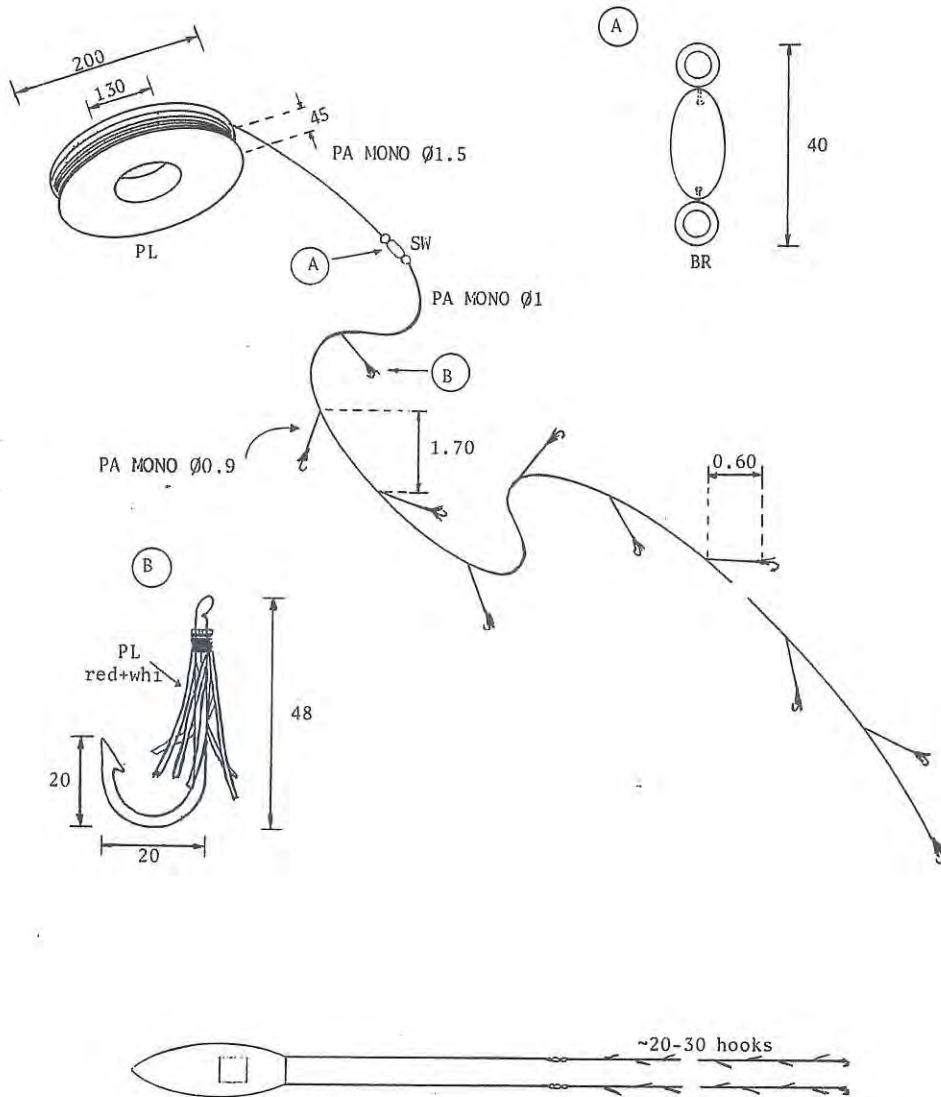
LOCATION
Kuantan
Pahang



HOOK and LINE
 Trolling
 Bonito, Dolphinfish, Jack

VESSEL
 Loa 14.25 m
 hp 45

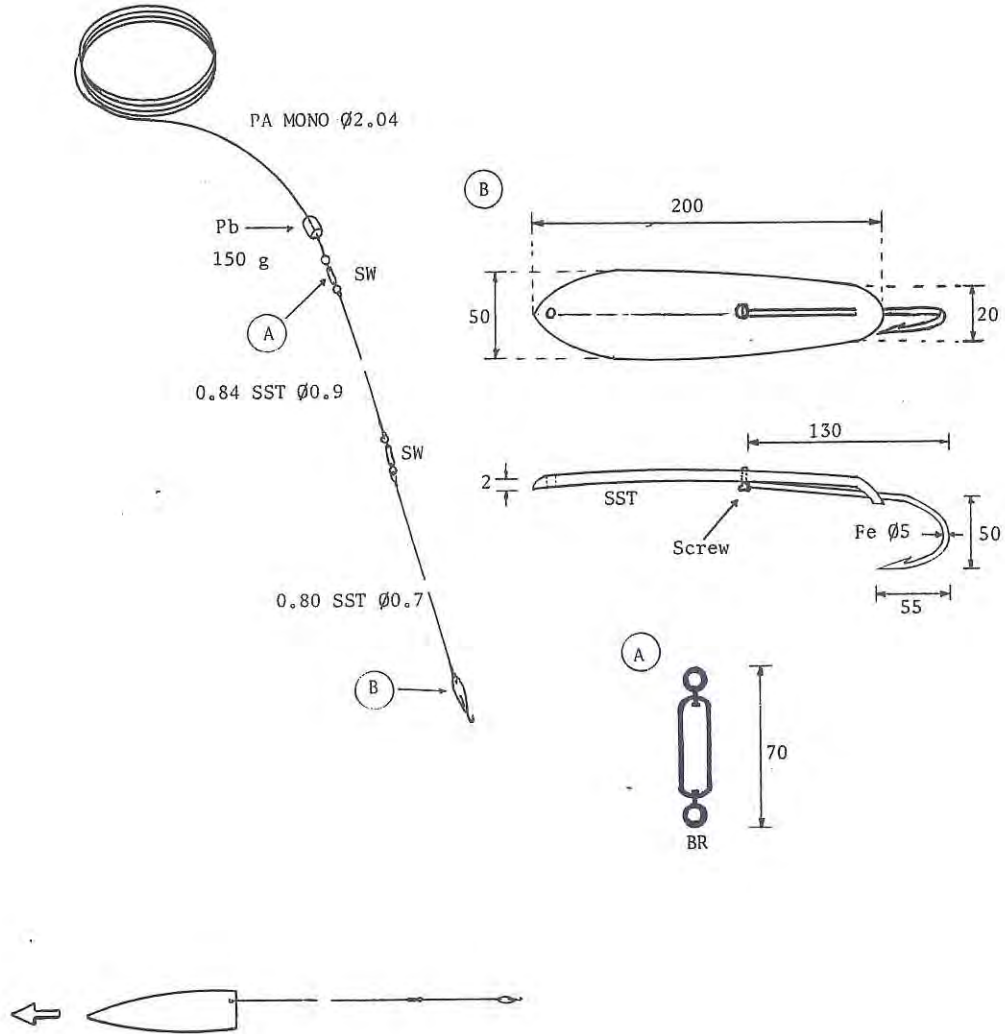
LOCATION
 Miri
Sarawak



HOOK and LINE
 Trolling
 Tuna, Barracuda

VESSEL
 Loa 8 m
 hp 5

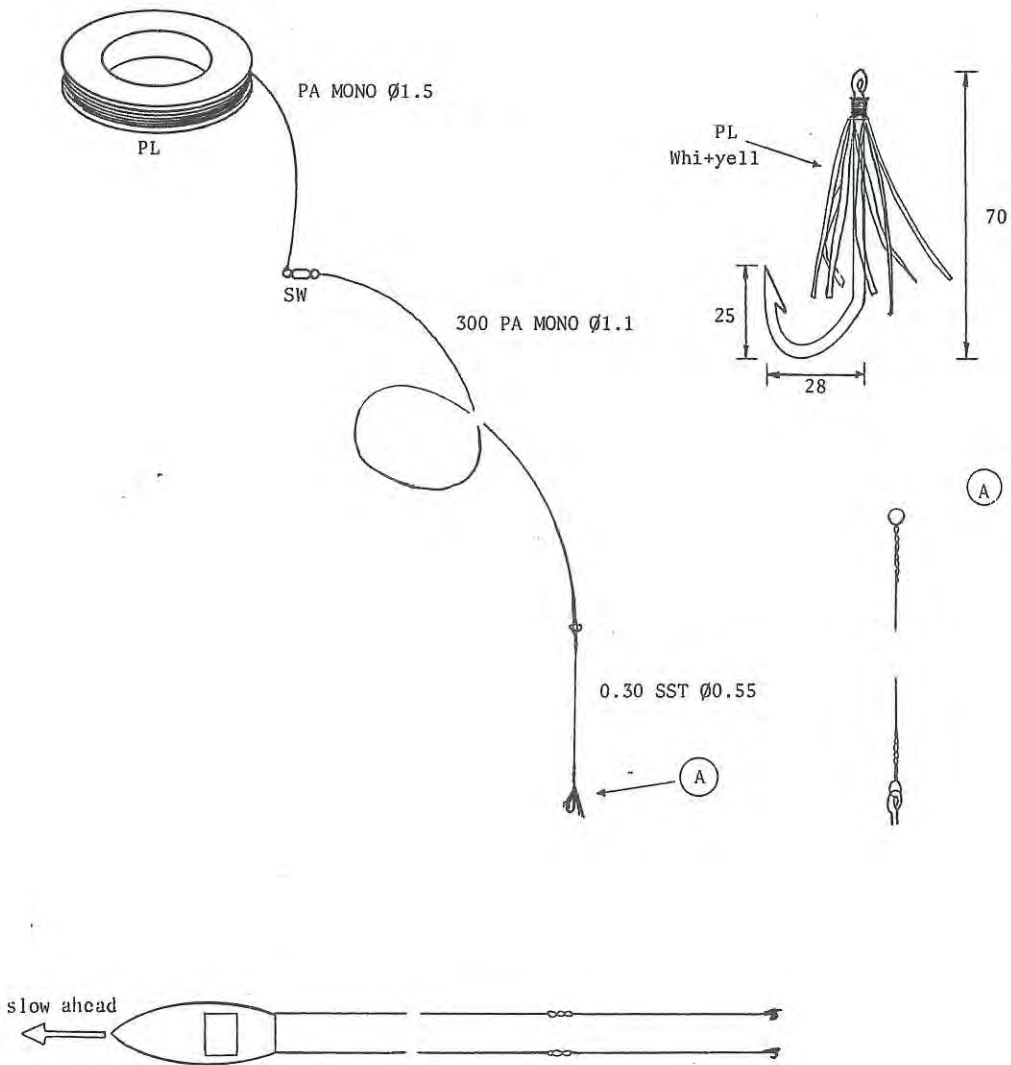
LOCATION
 Semporna
 Sabah



HOOK and LINE
Trolling
Spanish mackerel

VESSEL
Loa 14.25 m
hp 45

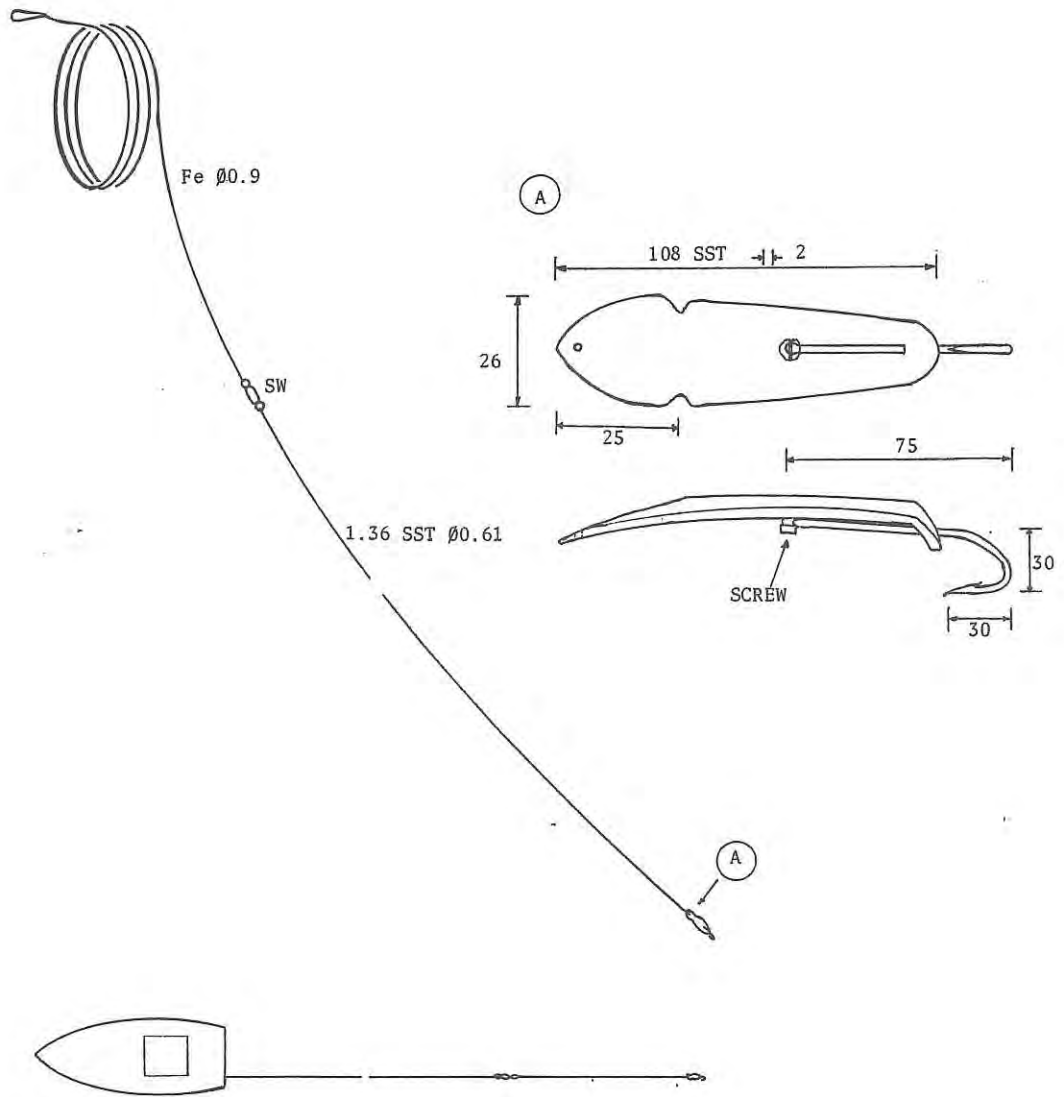
LOCATION
Miri
Sarawak



HOOK and LINE
Trolling
Spanish mackerel

VESSEL
Loa 9.60 m
hp 10

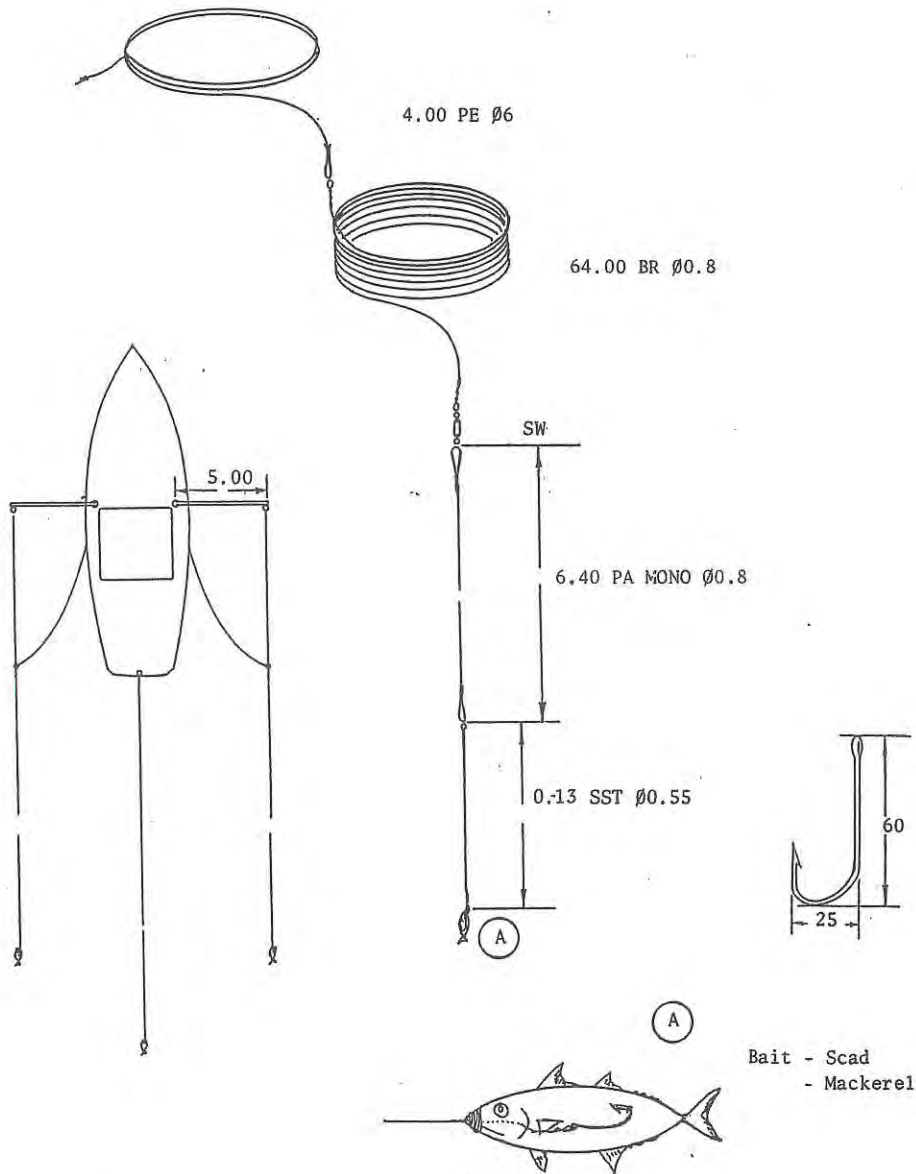
LOCATION
Tanjong Ujung Pasir
Labuan F.T.



HOOK and LINE
Trolling
Spanish mackerel

VESSEL
Loa 12 m
hp 16

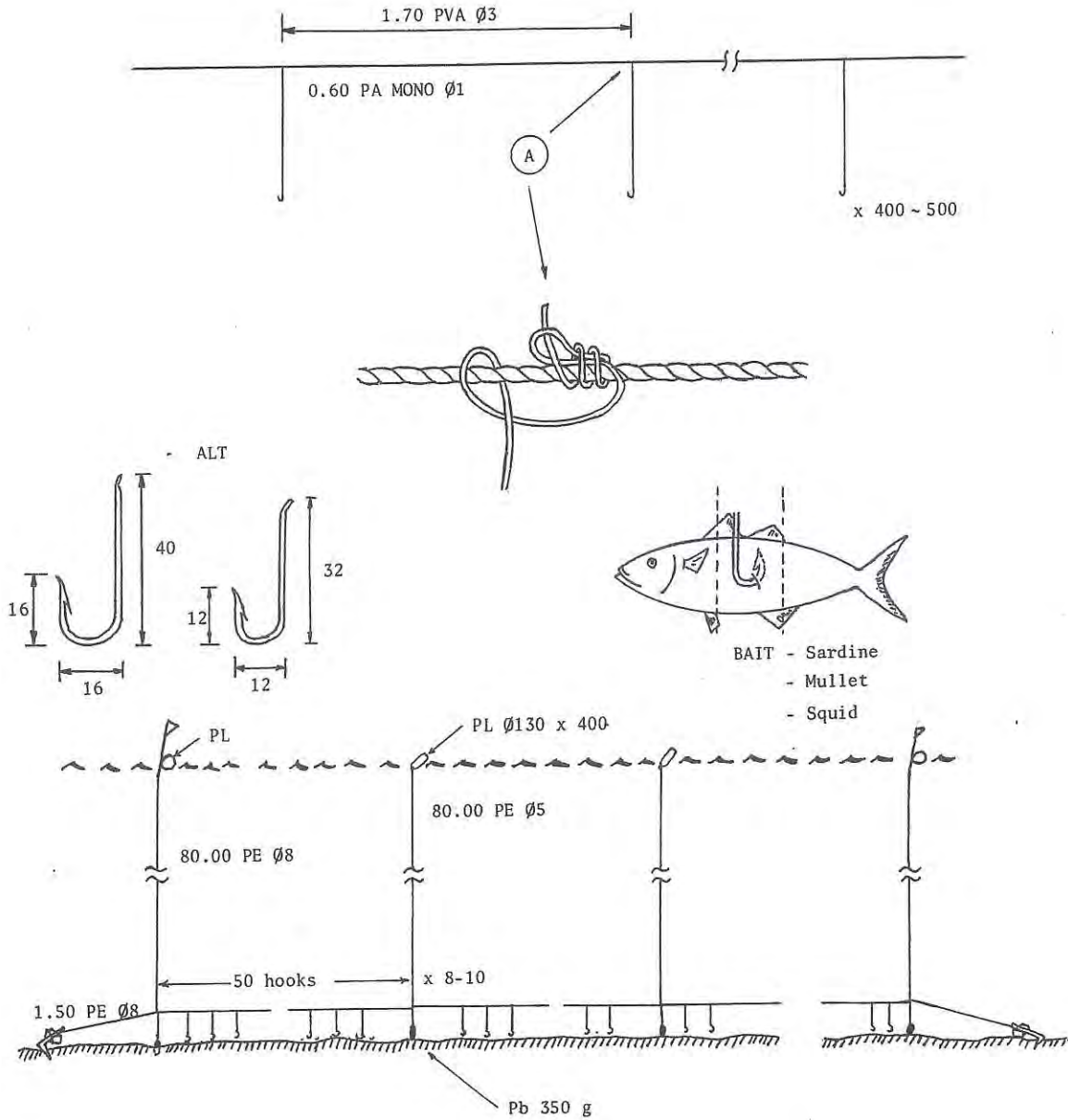
LOCATION
Kuantan
Pahang



HOOK and LINE
 Bottom Longline
 Snapper, Grouper,
 Fourfinger threadfin

VESSEL
 Loa 6 m
 hp 9 OM

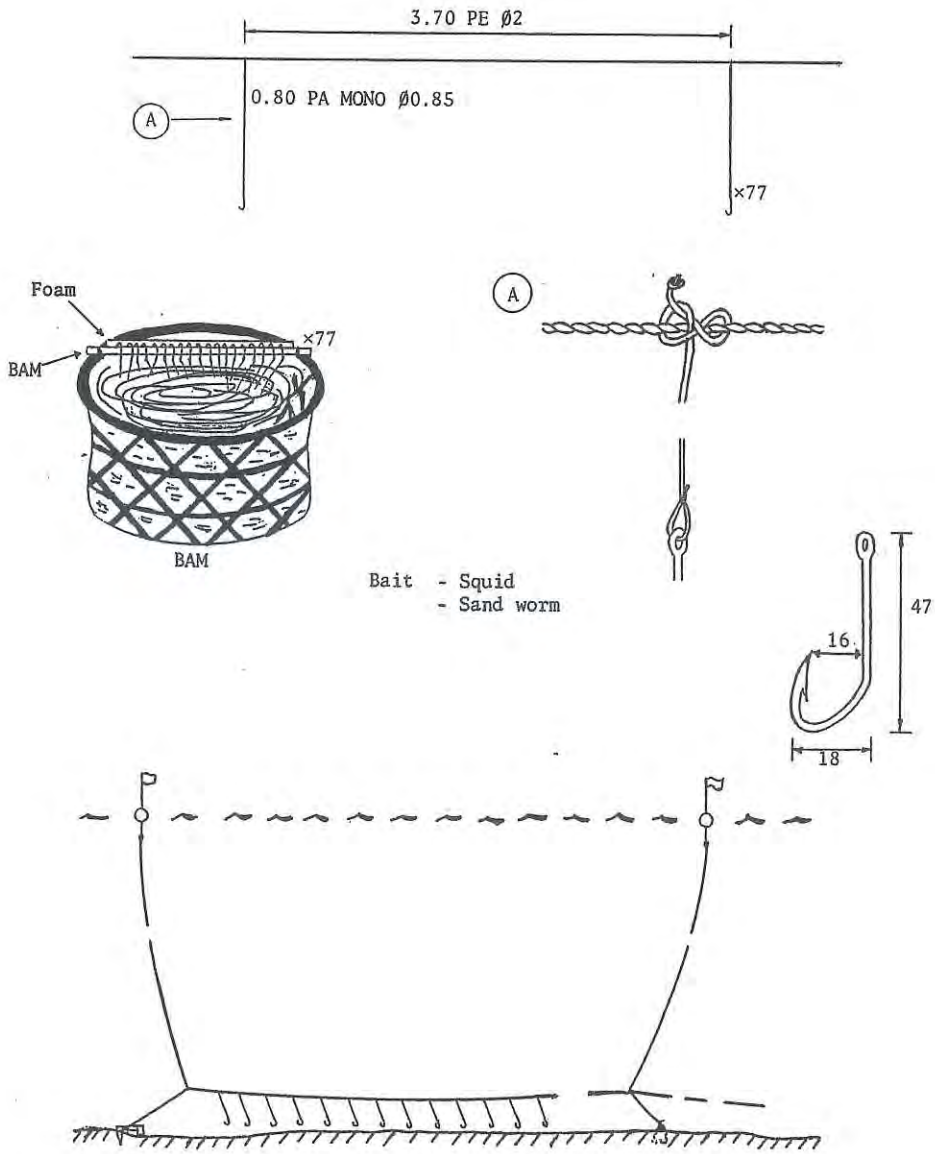
LOCATION
 Telok Bahang
 Pinang



HOOK and LINE
Bottom Longline
Emperor, Jack, Snapper,
Grouper

VESSEL
Loa 7.5 m
hp 40 OM

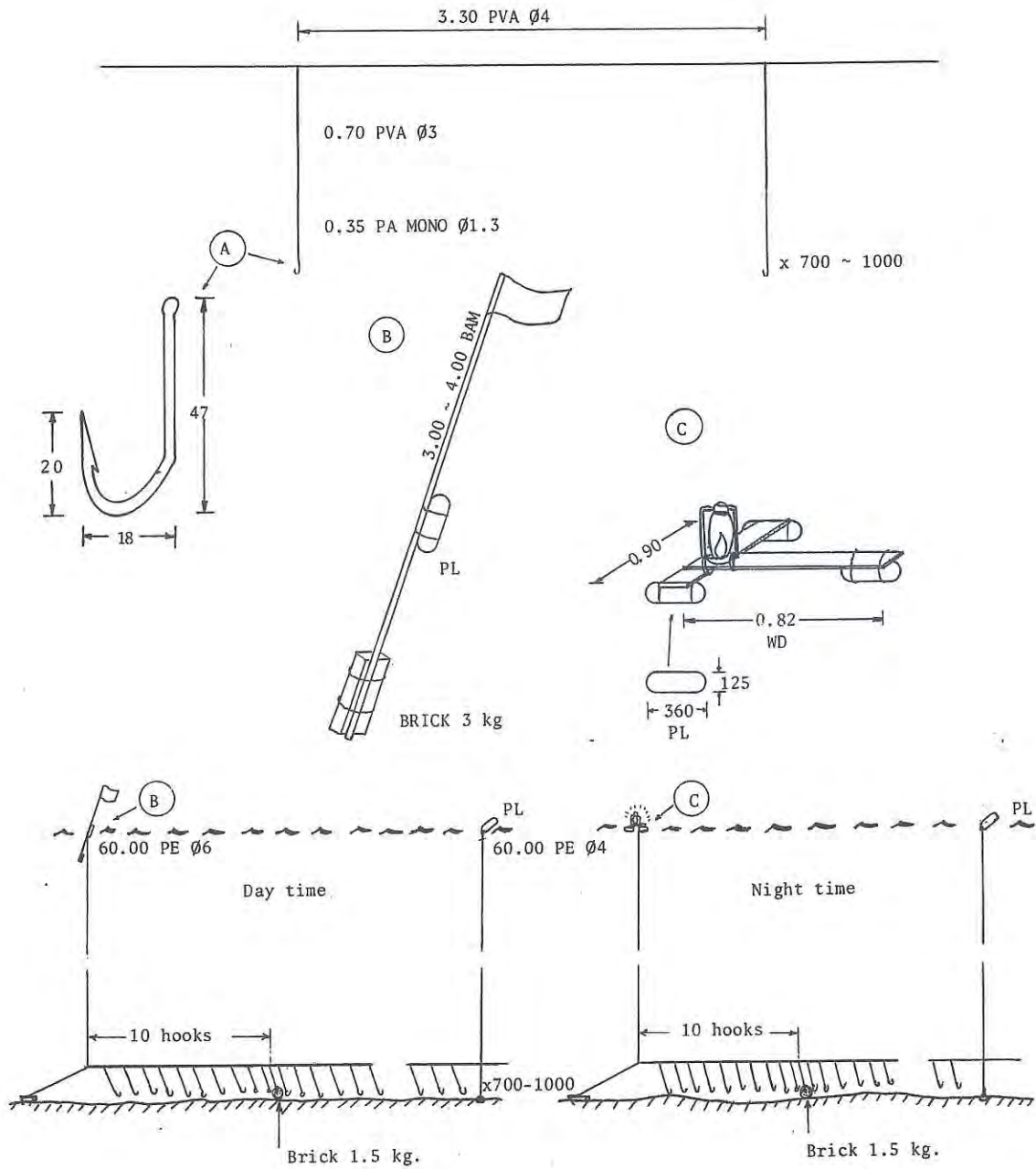
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Kampong Ranca-Ranca
Labuan F.T.

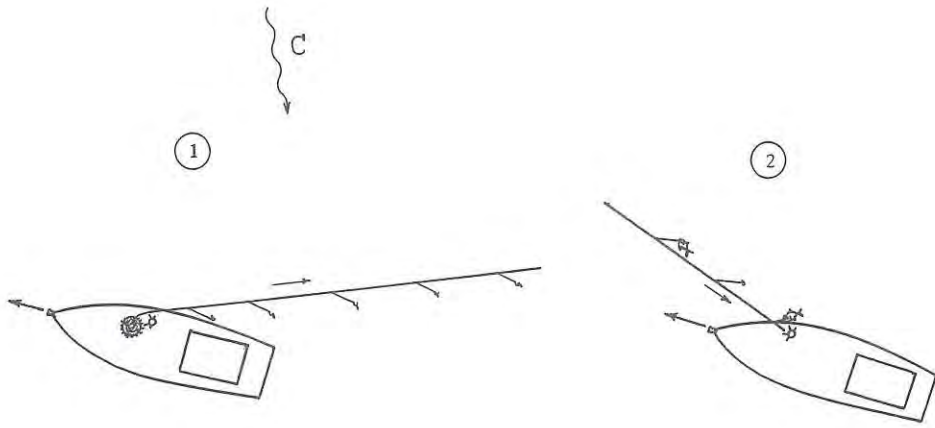


HOOK and LINE
 Bottom Longline
 Snapper, Grouper

VESSEL
 Loa 14 m
 hp 24

LOCATION
 Pasir Penambang
 Selangor

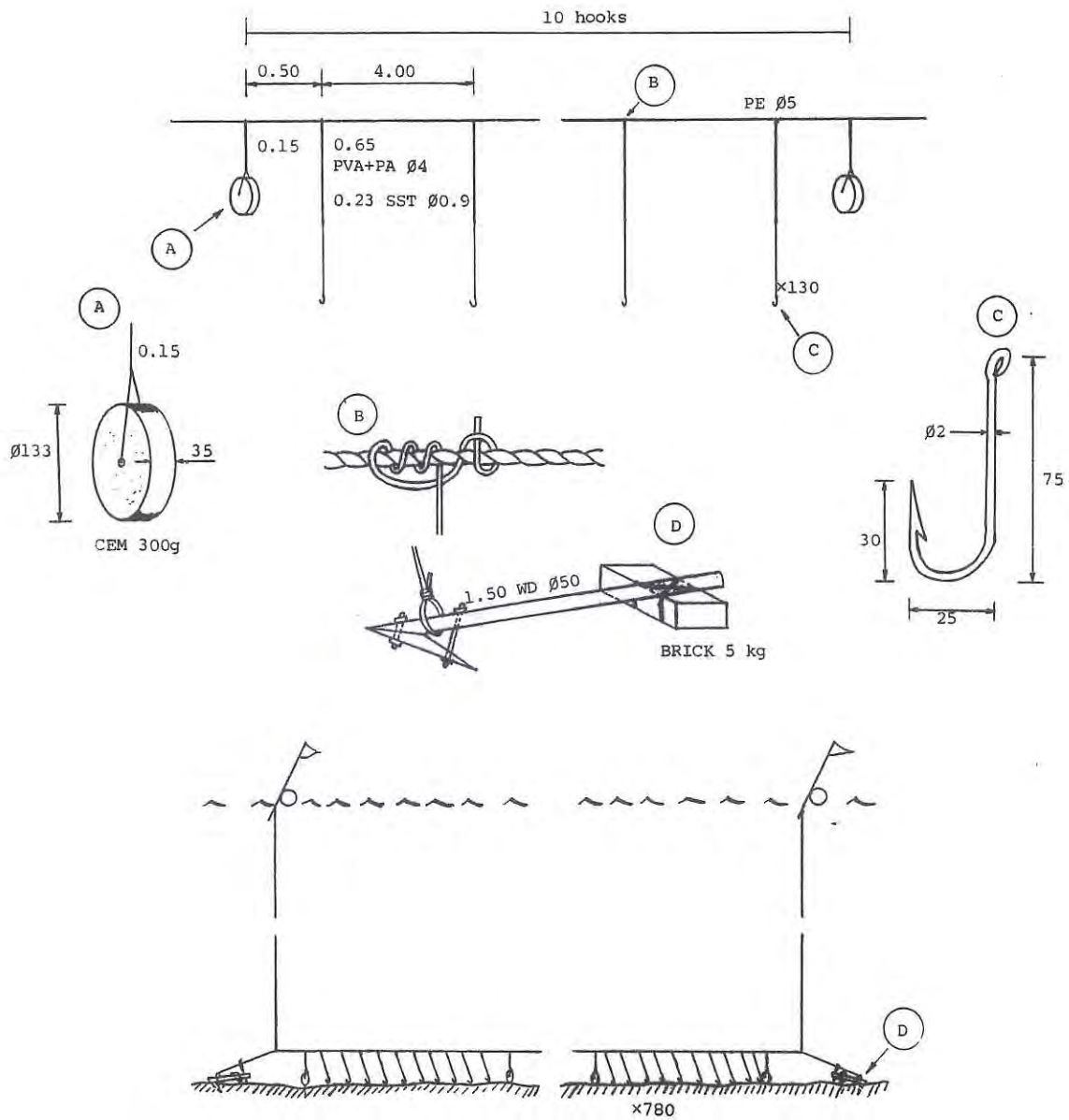




HOOK and LINE
 Bottom longline
 Grouper, Shark

VESSEL
 Loa 12 m
 hp 24

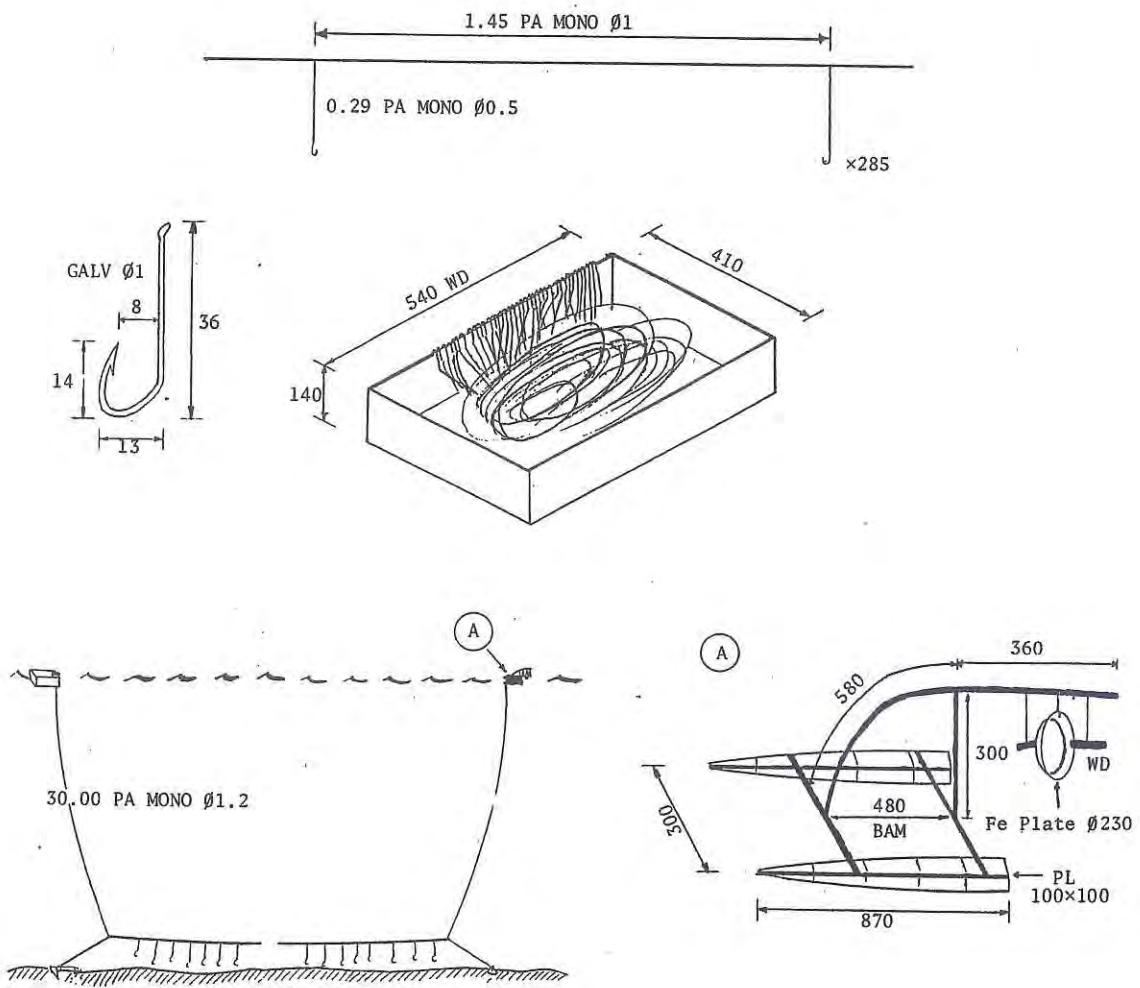
LOCATION
 Pulau Pangkor
 Perak



HOOK and LINE
 Bottom Longline
 Grouper, Snapper

VESSEL
 Loa 5 m outrigger
 hp -

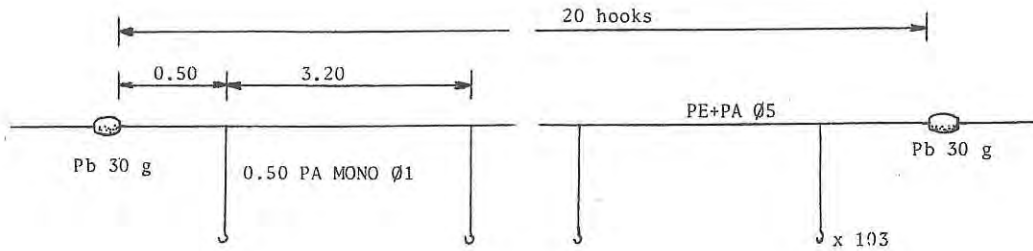
LOCATION
 Semporna
 Sabah



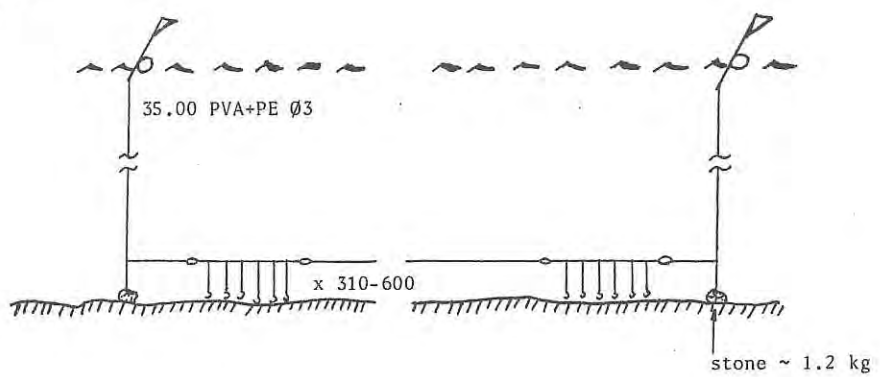
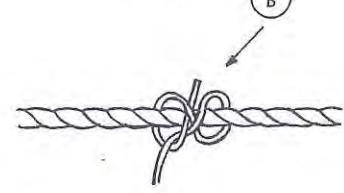
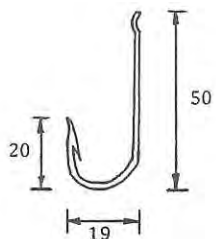
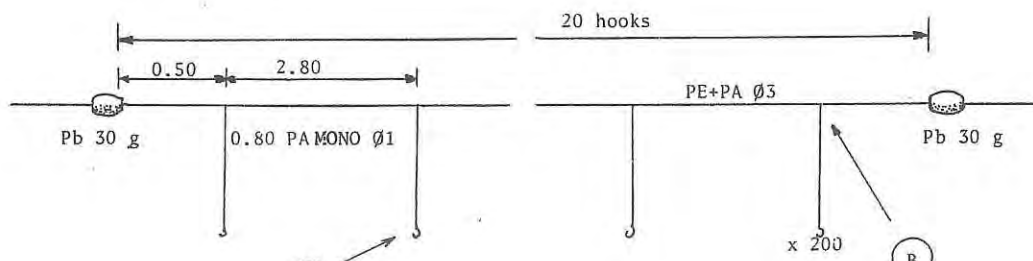
HOOK and LINE
 Bottom Longline
 Snapper, Grouper

VESSEL
 Loa 5 m
 hp 4 OM

LOCATION
 Pulau Pangkor
 Perak



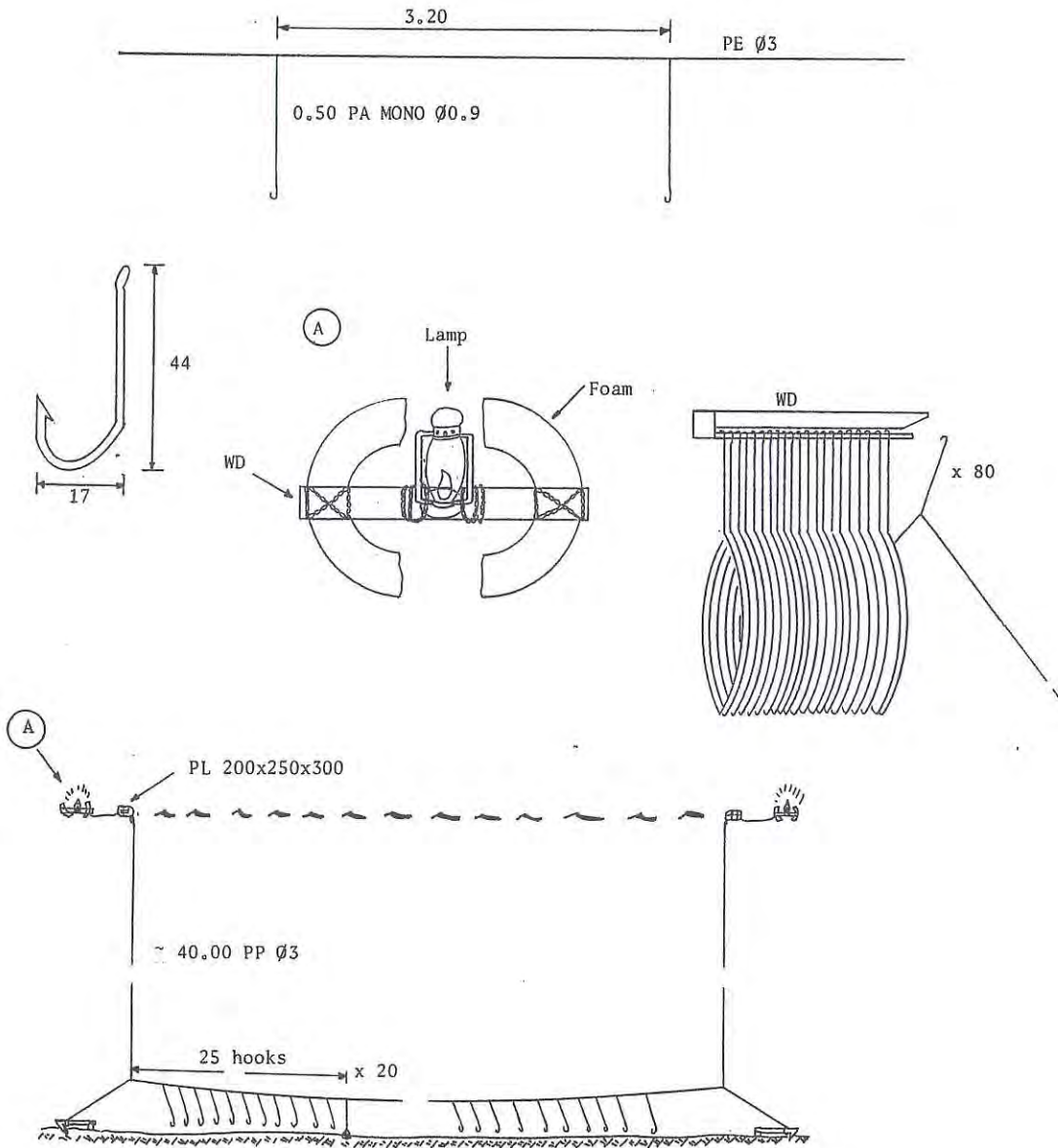
ALT



HOOK and LINE
 Bottom Longline
 Snapper, Grouper

VESSEL
 Loa 12 m
 hp 24

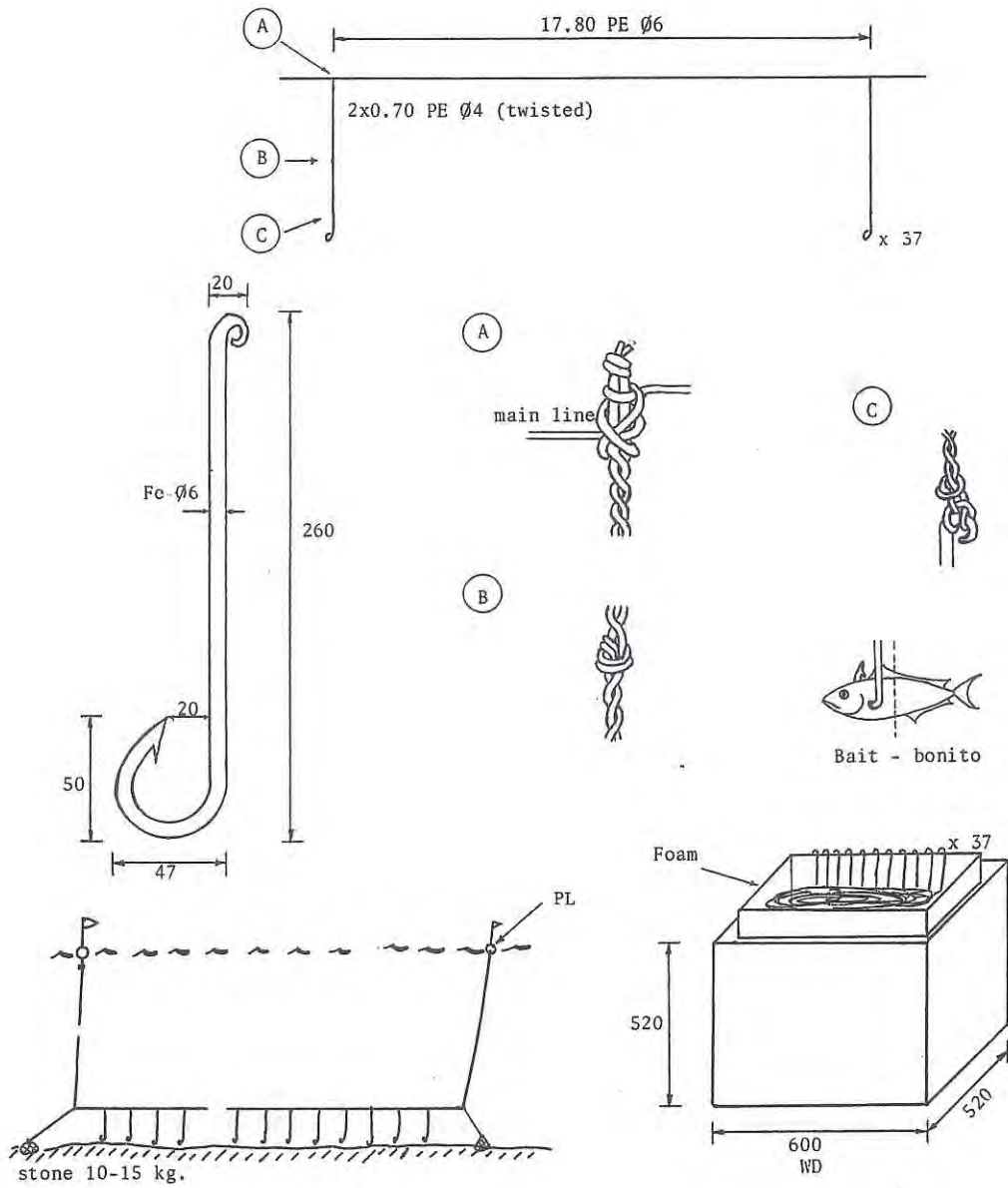
LOCATION
 Batu Pahat
Johor



HOOK and LINE
 Bottom Longline
 Shark

VESSEL
 Loa 7 m
 hp 5

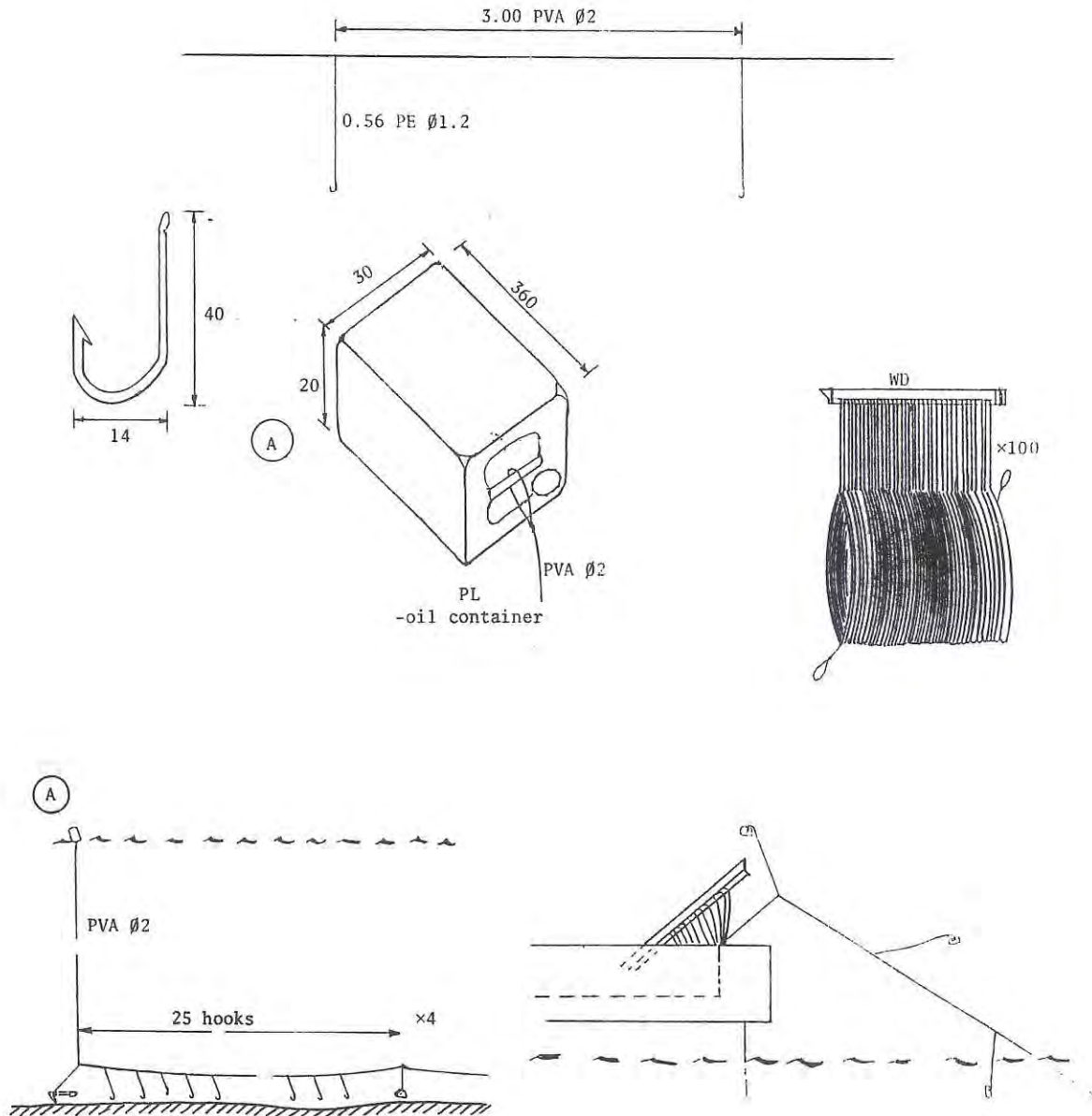
LOCATION
 Semporna
 Sabah



HOOK and LINE
 Bottom Longline
 Catfish, Hairtail

VESSEL
 Loa 4.50 m
 hp 12 OM

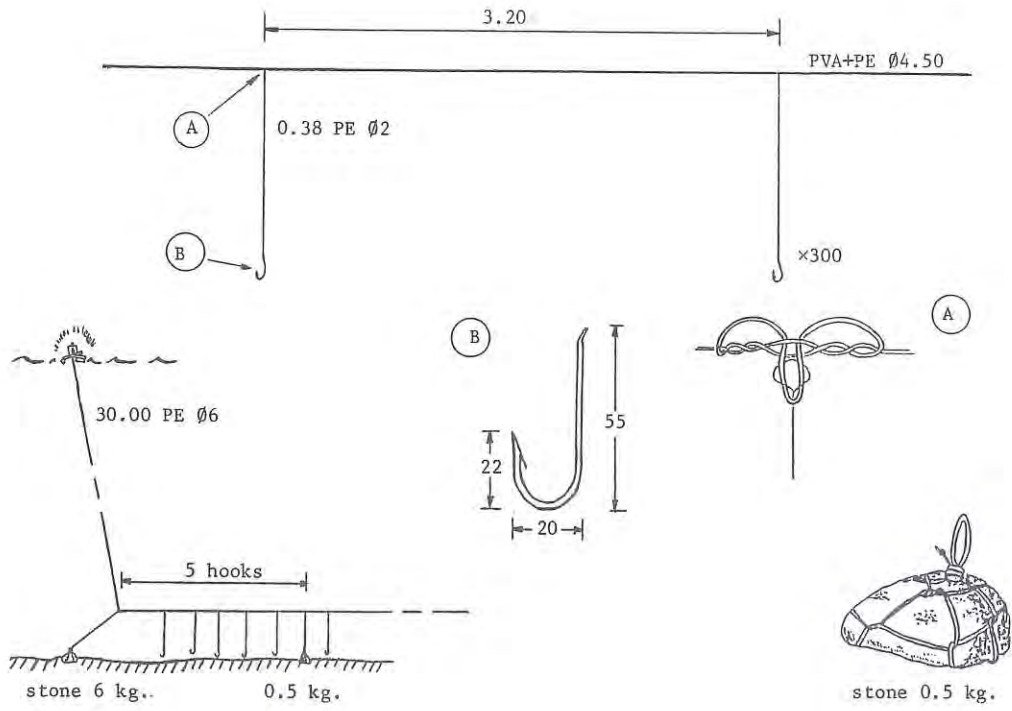
LOCATION
 Parit Jawa
Johor



HOOK and LINE
 Bottom Longline
 Shark, Ray, Catfish

VESSEL
 Loa 10.23 m
 hp 22

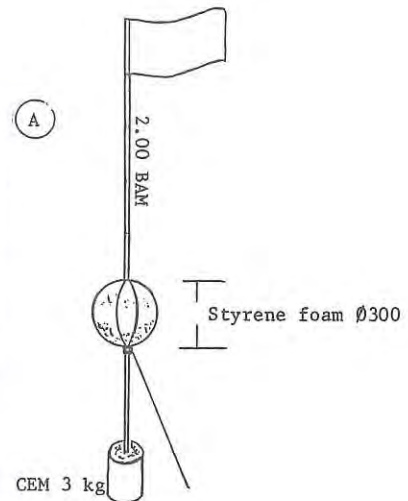
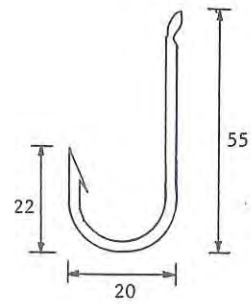
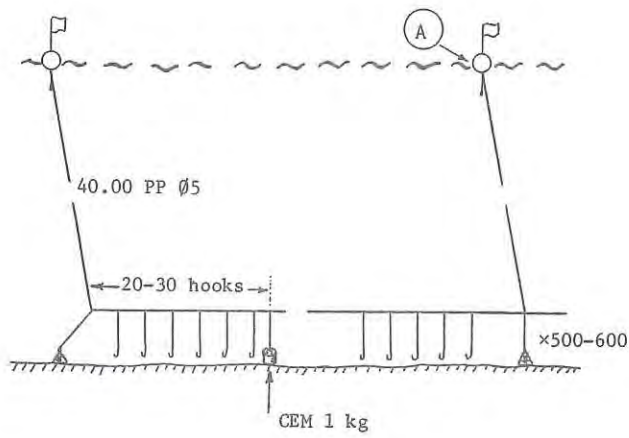
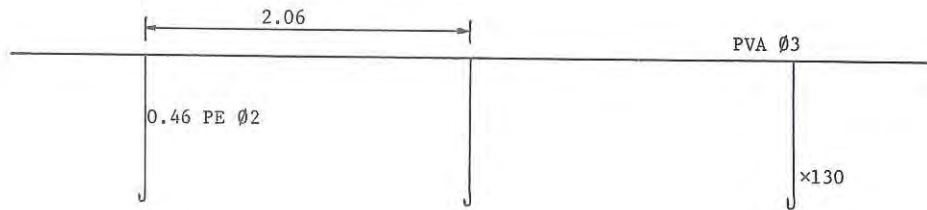
LOCATION
 Kampong Peramu
 Pahang



HOOK and LINE
Bottom Longline
Shark, Ray, Catfish

VESSEL
Loa 15 m
hp 33

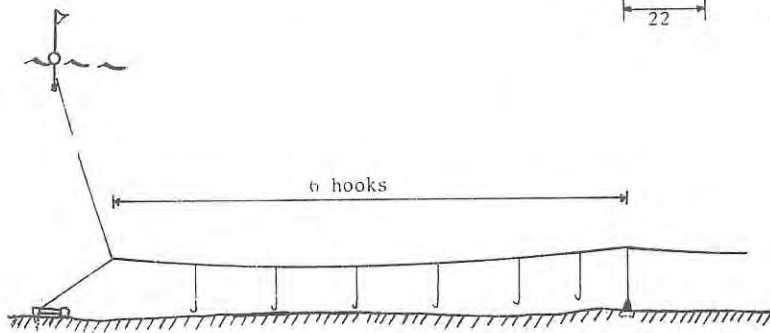
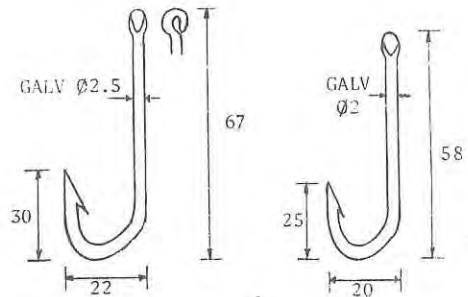
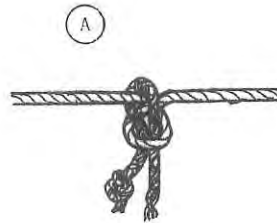
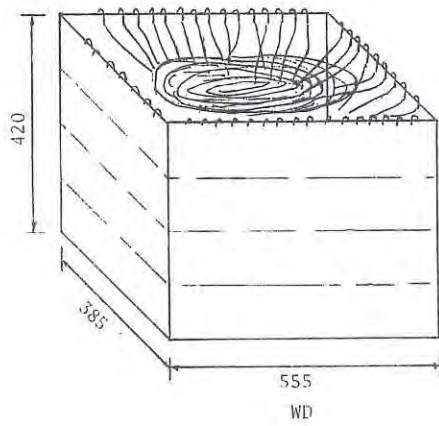
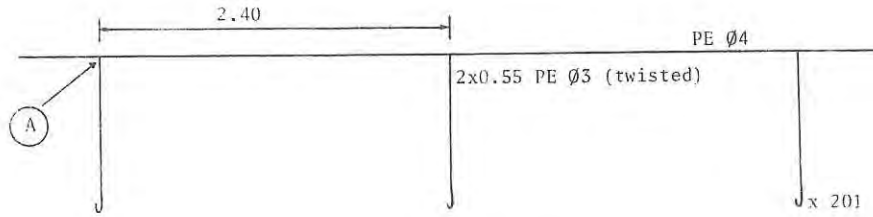
LOCATION
Kuala Terengganu
Terengganu



HOOK and LINE
 Bottom Longline
 Shark, Ray, Cavalla,
 Queen fish

VESSEL
 Loa 4.5 m
 hp 15 OM

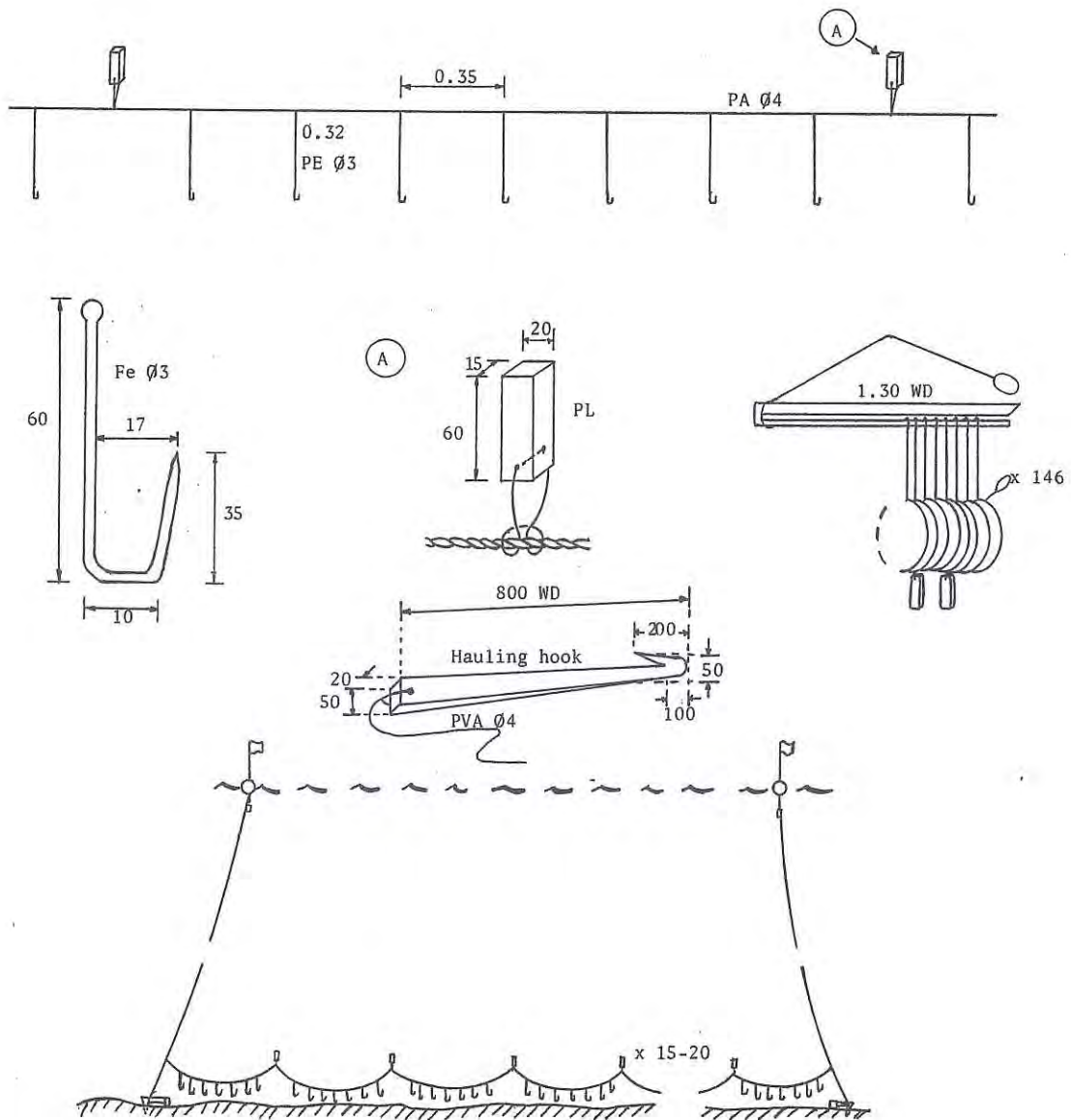
LOCATION
 Sandakan
 Sabah



HOOK and LINE
 Bottom Longline
 Stingray, Shark

VESSEL
 Loa 7.2 m
 hp 8

LOCATION
 Maludum
 Sarawak



<Chapter 11>

SCOOP NET FISHING

11.1 Introduction

Scoop net is operated widely in Malaysian coastal waters. The fishing gear is simple, consisting of a triangular net forming a bag-shape, its two sides fixed to scissors-like crossed bamboo (or wooden) sticks. The gear is pushed forward in shallow water either by hand or by boat on bigger scale. The latter type of scoop net is known as a push net (Note: Push net operated by mechanized vessel is prohibited in Malaysia). The main species of fish caught by scoop net and push net fishing are acetes and penaeid prawns.

11.2 Fishing gear and Method

11.2.1 Scoop net

Scoop net, which resembles a large spoon, can be operated by one or two fishermen. The fishing gear consists of a net and two poles to keep the net open. The skis at the end of the two poles are made of wood or coconut husk. The fishing is carried out in daytime, in shallow waters. This gear is used near the shore and in muddy areas. The net is attached to the poles and the fishermen wade in the water, pushing the net forward. From time to time the net is raised above the surface and the fisherman collects the small shrimps, Acetes or any other catch. This fishing operation can be done throughout the year.

11.2.2 Push net

This fishing gear consists of a net, poles and powered boat. The net has three distinct parts: the upper, the lower and the cod-end. A ground-rope, either a chain or rope weighted with sinkers, touches the sea bottom during fishing operation. The ends of the ground rope are fastened to the poles which hold the net. The head rope hangs along the length of the poles.

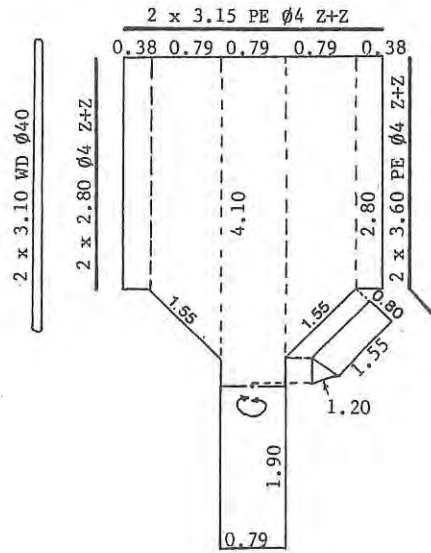
The poles are made of either bamboo or trunks of pine trees, 9-12 meters long, depending on the size of gear and the scale of fishing. Two poles are fixed in a scissors-like position, ending in wooden or iron skis which slide along the sea bed.

Push net fishing is operated from an engine-driven boat either in the day- or at night-time, in bays where the water depth is around 3-4.5 meters. When the boat arrives at the fishing ground, the net is tied to the poles with the ground rope and head rope is positioned. The gear is lowered into the water until the skis touch the bottom. The operation takes from 1-1 ½ hours. The cod end is then hauled by means of a rope attached to it, emptied, and lowered again for the next round of fishing.

SCOOP NET
Scoop net
Acetes

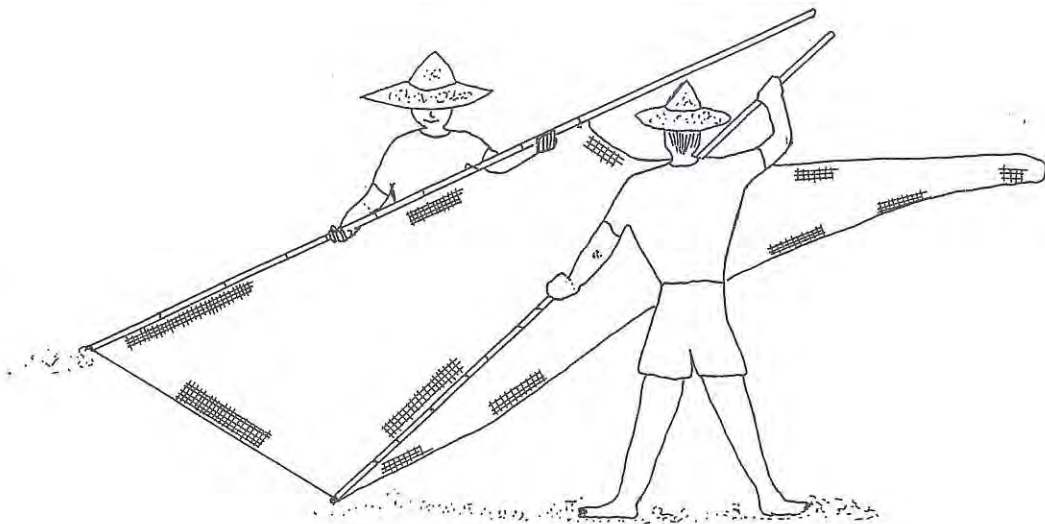
VESSEL
Loa -
hp -

LOCATION
Kampong Ranca-Ranca
Labuan F.T.



MAT
mm

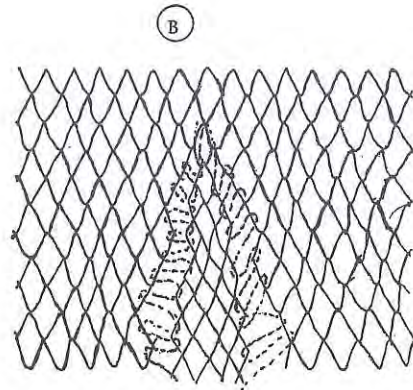
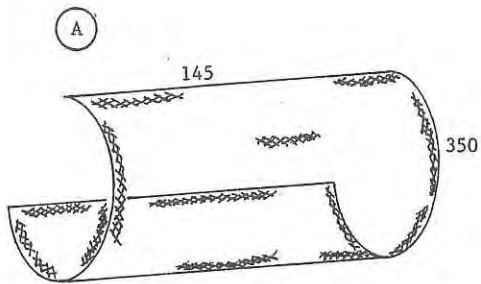
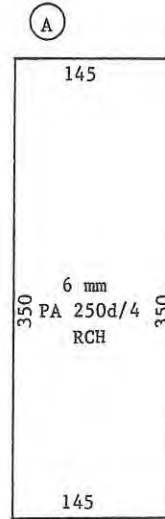
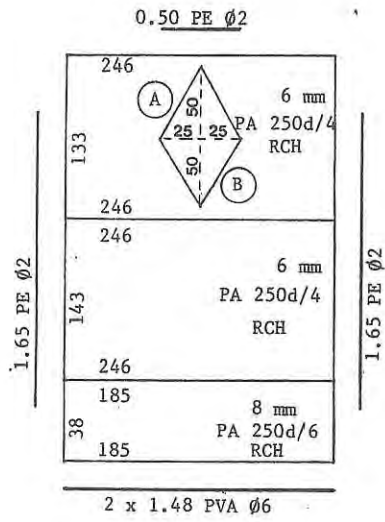
1.5 x 1.5 PE Ø0.25
minnow net

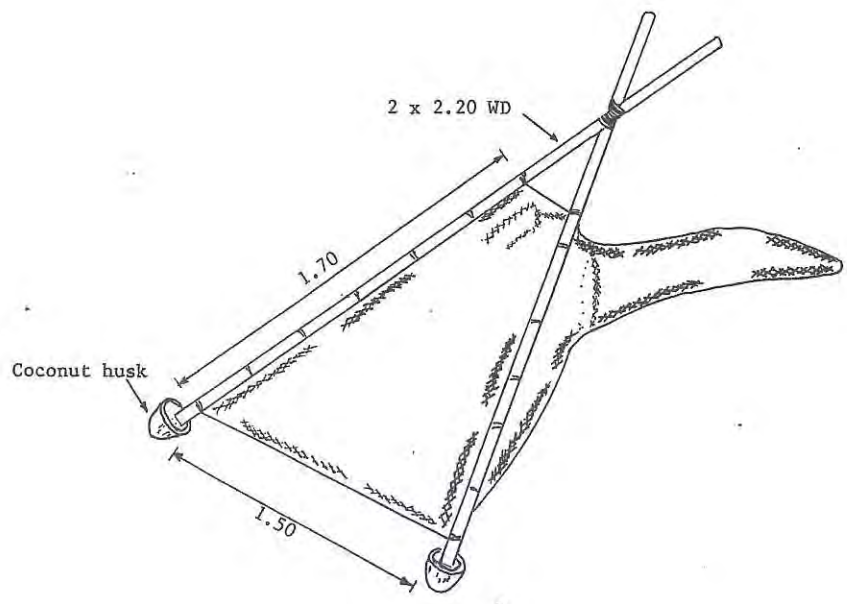


SCOOP NET
Scoop net
Acetes

VESSEL
Loa -
hp -

LOCATION
Batu Rakit
Terengganu

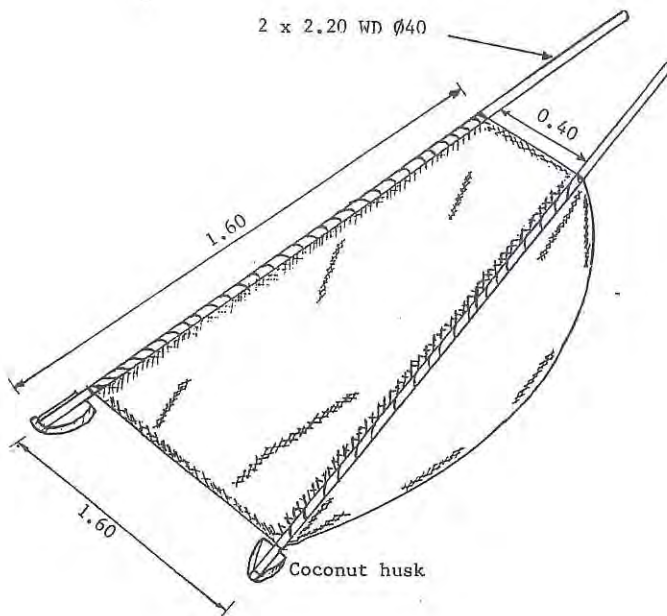
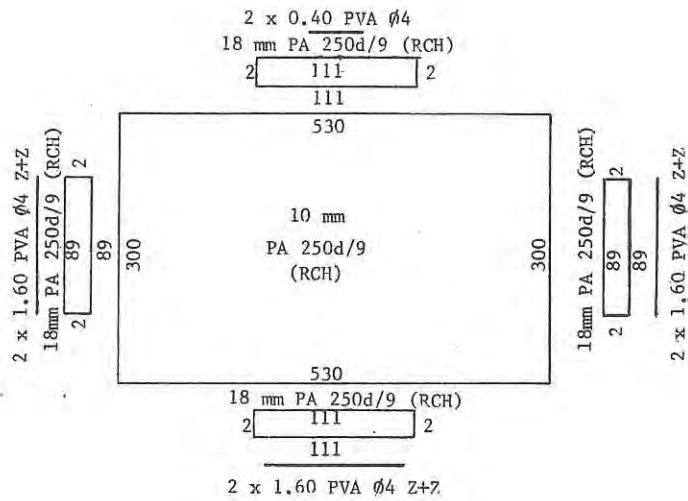




SCOOP NET
Scoop net
Acetes

VESSEL
Loa -
hp -

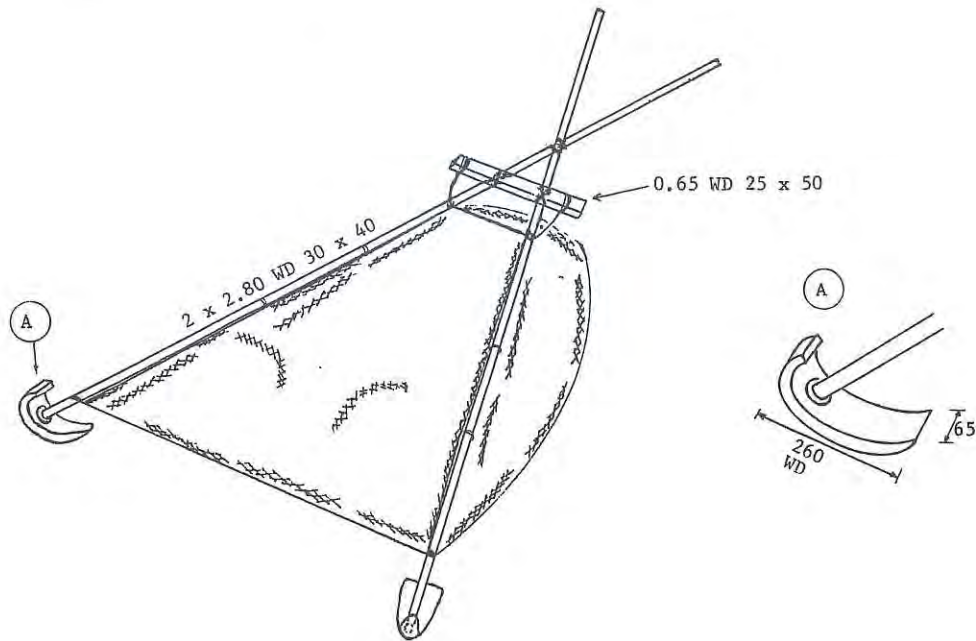
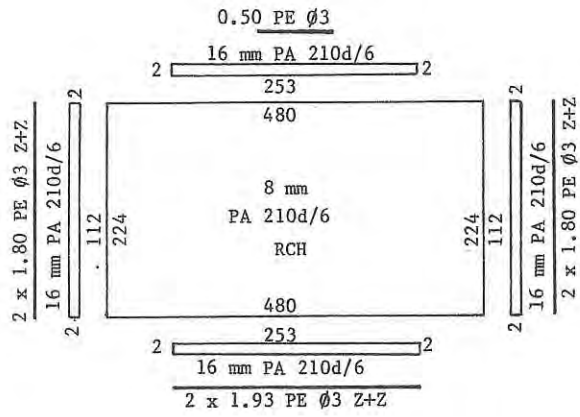
LOCATION
Batu Rakit
Terengganu



SCOOP NET
 Push net
 Acetes

VESSEL
 Loa 6 m
 hp 20 OM

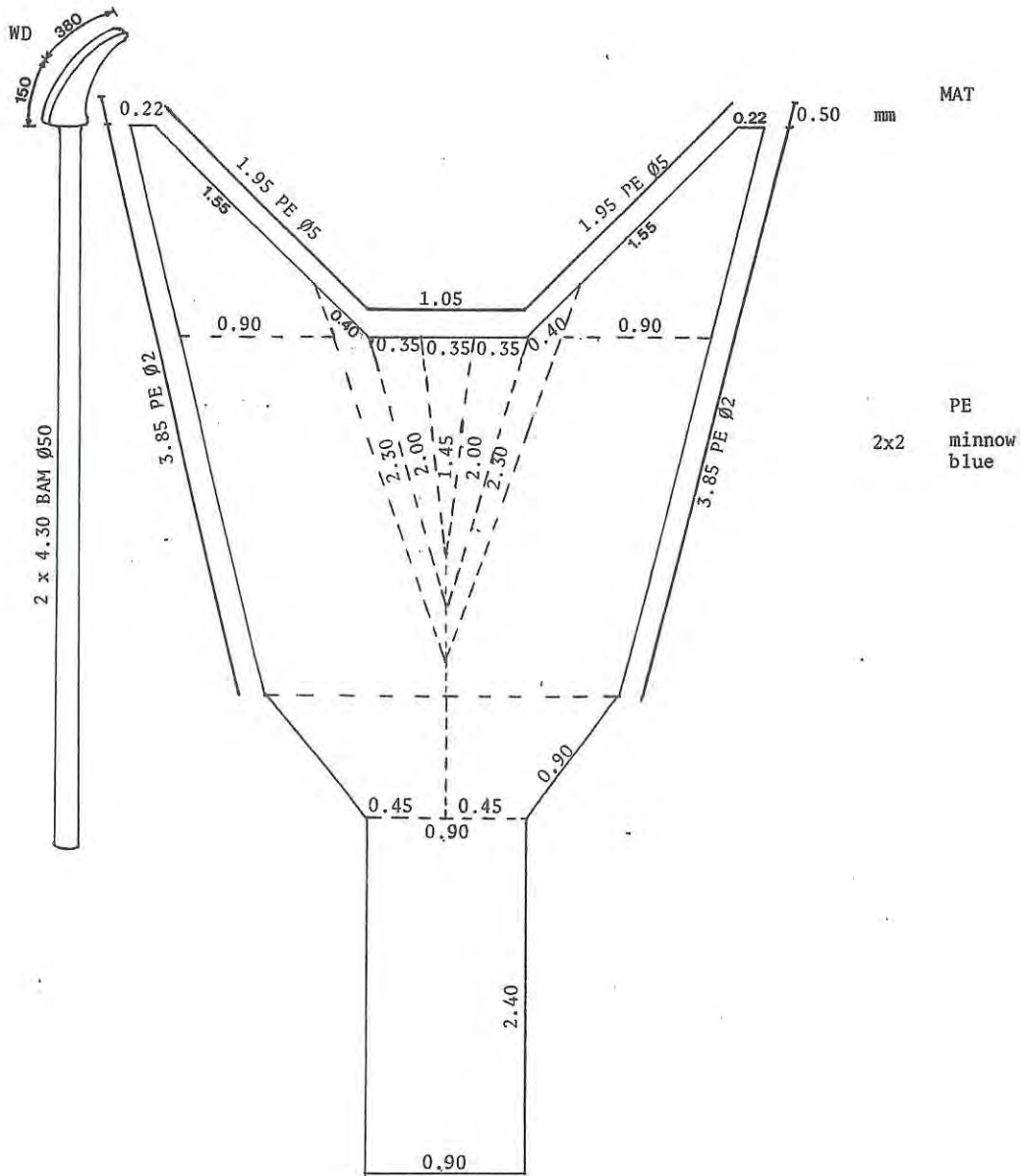
LOCATION
 Tanjong Baram
 Sarawak



SCOOP NET
 Push net
 Acetes

VESSEL
 Loa 5 m
 hp 3-5 OM

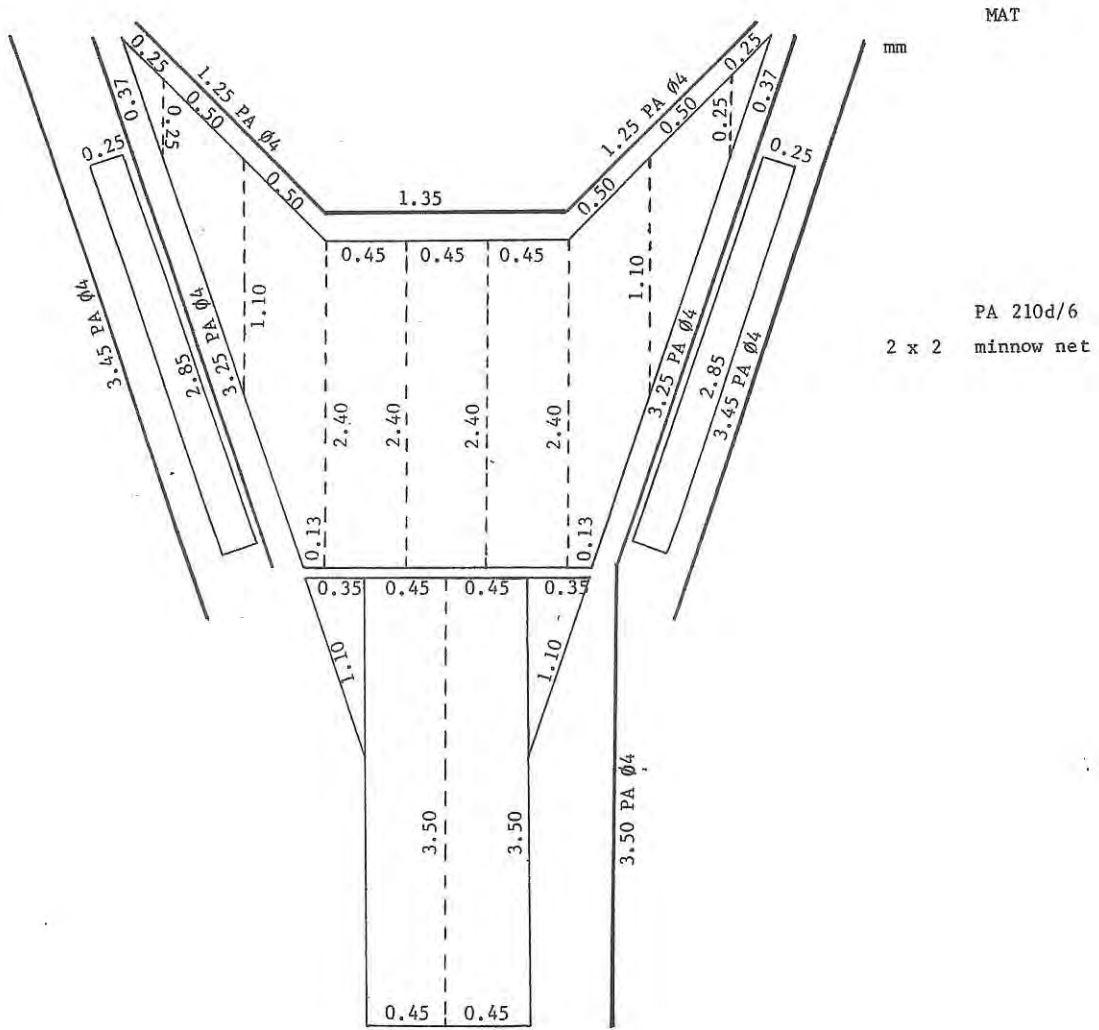
LOCATION
 Sungai Udang
 Pinang

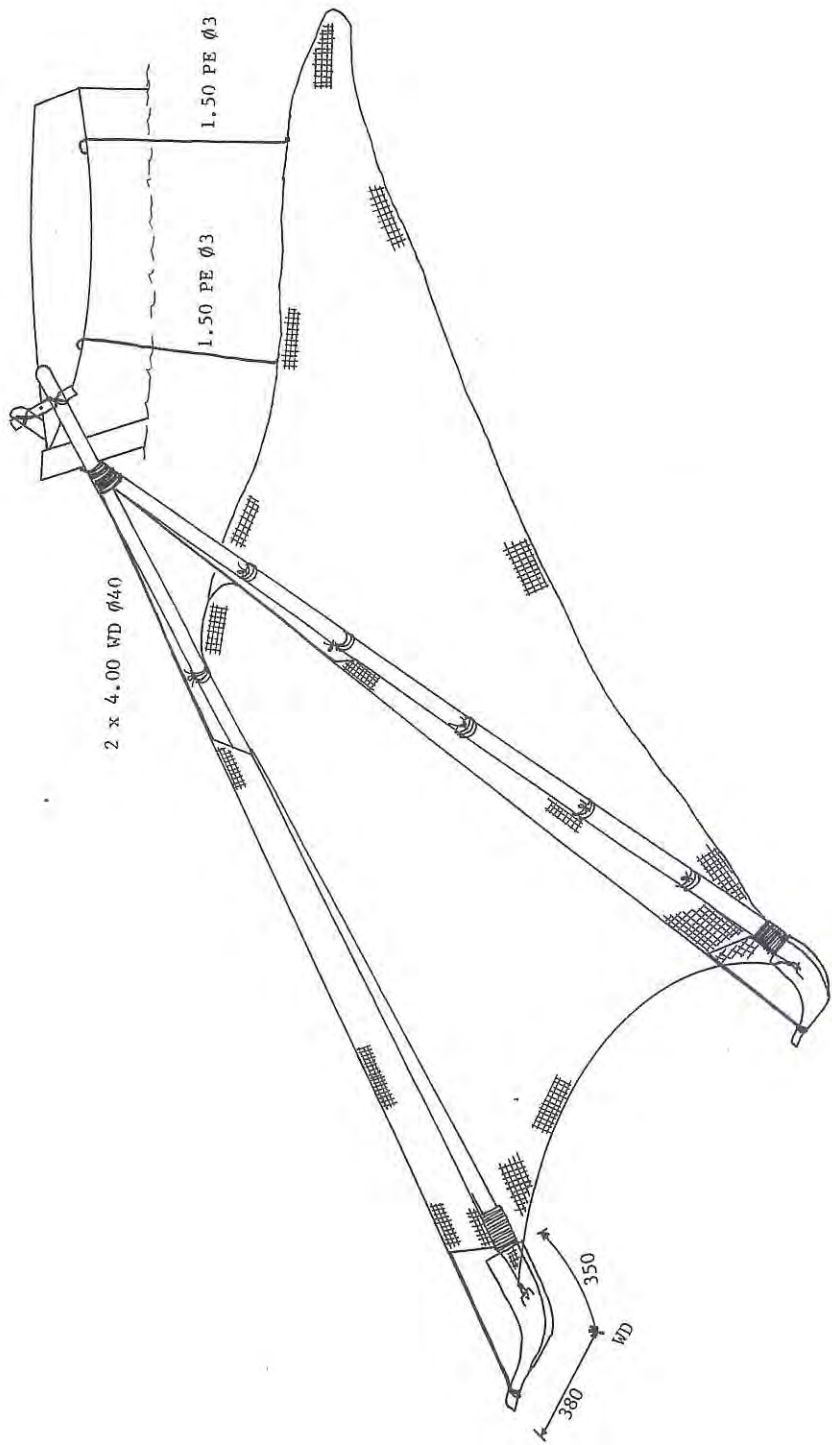


SCOOP NET
 Push net
 Shrimp, Acetes

VESSEL
 Loa 5 m
 hp 14 OM

LOCATION
 Kuala Sungai Ayam
 Johor

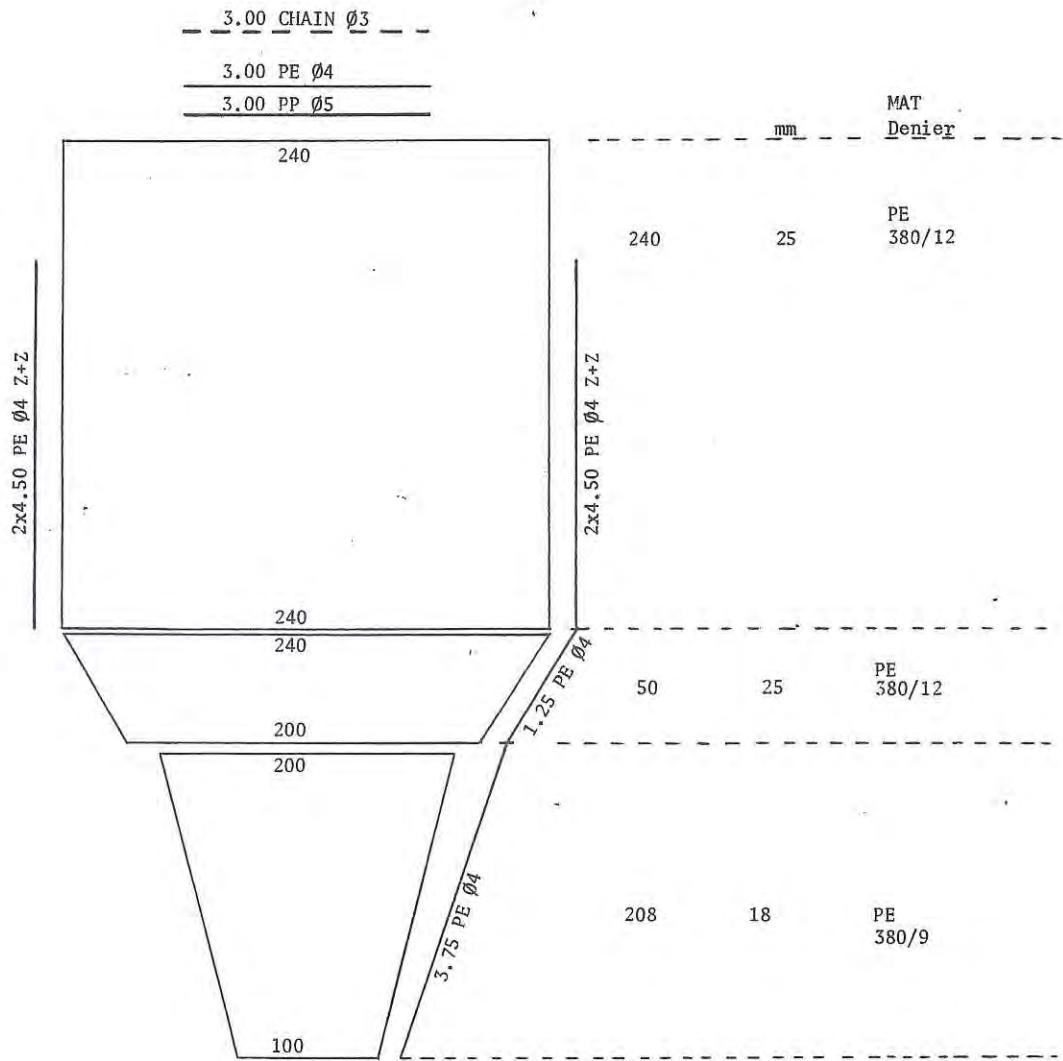


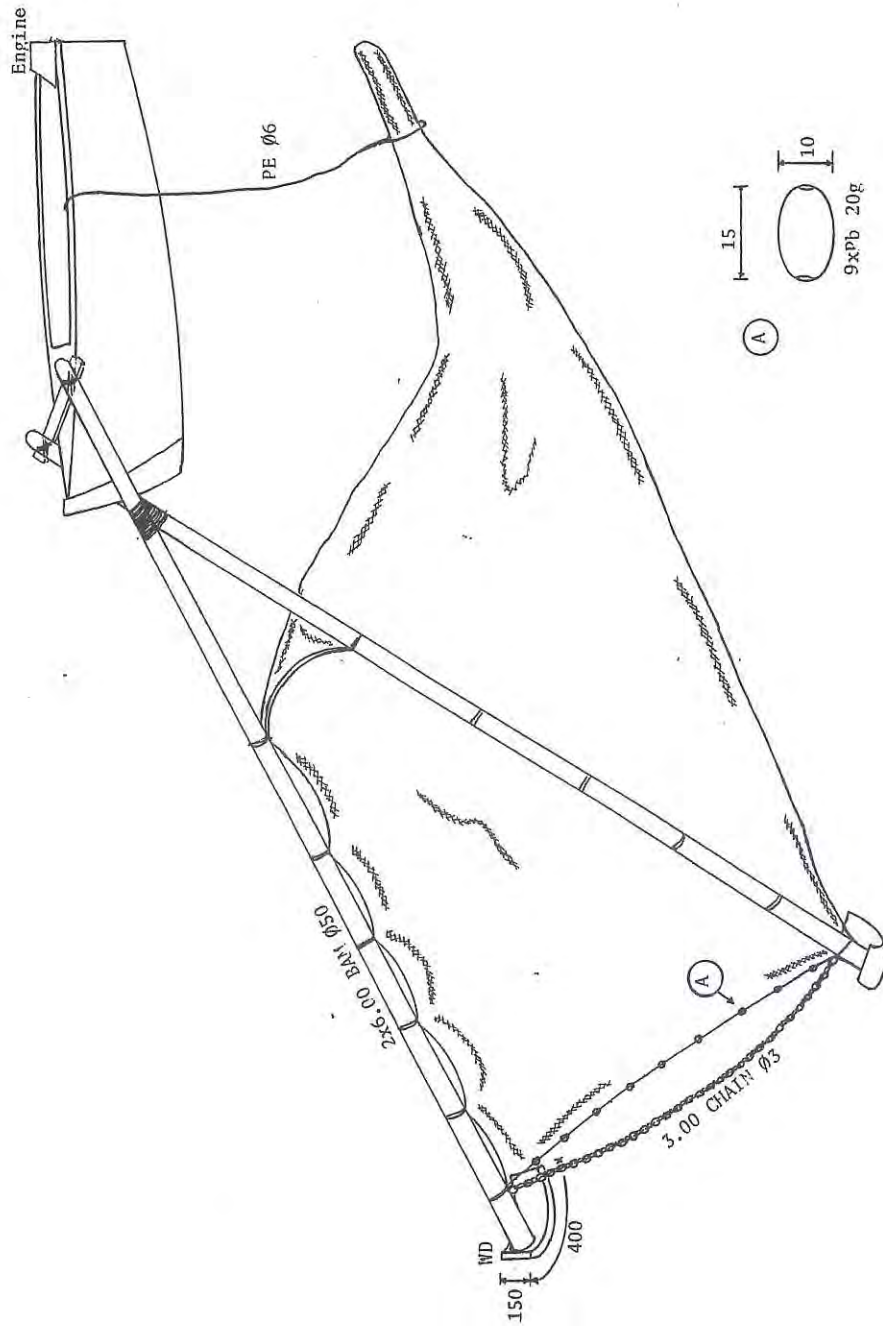


SCOOP NET
 Push net
 Shrimp

VESSEL
 Loa 6 m
 hp 15 OM

LOCATION
 Kampong Pok Besah
 Johor

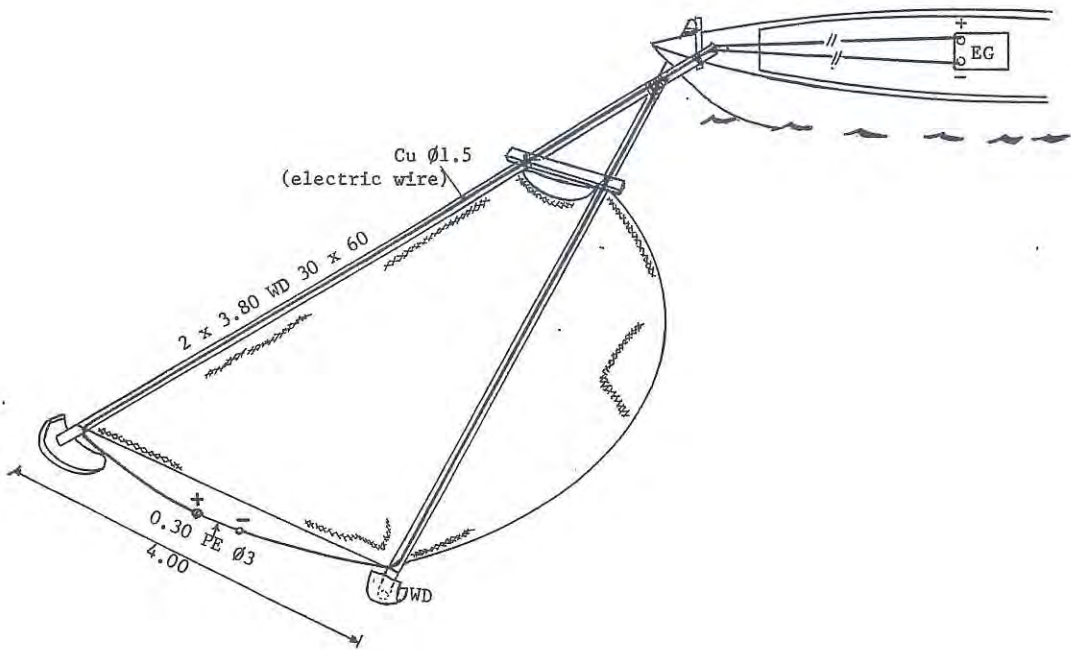
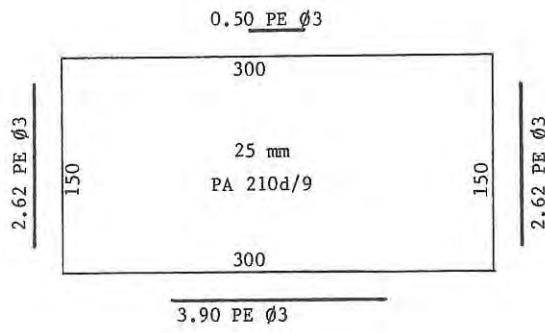




SCOOP NET
Push net
Shrimp

VESSEL
Loa 8 m
hp 30 OM

LOCATION
Tanjong Baram
Sarawak



<Chapter 12>

DRIVE IN NET FISHING

12.1 Introduction

Drive in net is becoming less popular at present due to reduction of stock and the introduction of more efficient gear. Some of the gear has been prohibited due to detrimental affect on eco-system such as muro-ami. However, there are other types of drive-in-net still operated in the area such as drive-in-net-scoop type and gilling net type.

12.2 Fishing Gear and Methods

12.2.1 Small drive-in-net for mullet or pony fish

The gear consists of rectangular net which is set like a scoop under the current. The fish are driven into the net by two men pulling on a rope tied with coconut leaves.

The net is made of Nylon and its mesh size is small, about 15 mm. The net is fixed to two bamboo stakes to make a shape like a scoop net.

12.2.2 Drive-in-net for long-tom, scad and black pomfret

The net is the same design as the gill net. Both ends are connected with 400 meters of squareline polyethylene ϕ 8 mm. The purpose of these to chase fishes into the net, after that the net is operated as a seine net.

12.2.3 Drive-in-net for yellow tail fusilier and rabbit fish (Muro-Ami)

The gear consists of a bag-net with two wings and is similar to the Thai drive-in-net. The codend materials are polyethylene with a mesh size of 25 mm. and front flap with a mesh size of 50 mm. The wings are rectangular polyethylene net, 90 mm. mesh size. The fish's school is driven toward the pre-set net by numbers of fishermen using lines with sinkers.

DRIVE-IN-NET

Small drive-in-net

Pony fish, Mullet,
Silver side

VESSEL

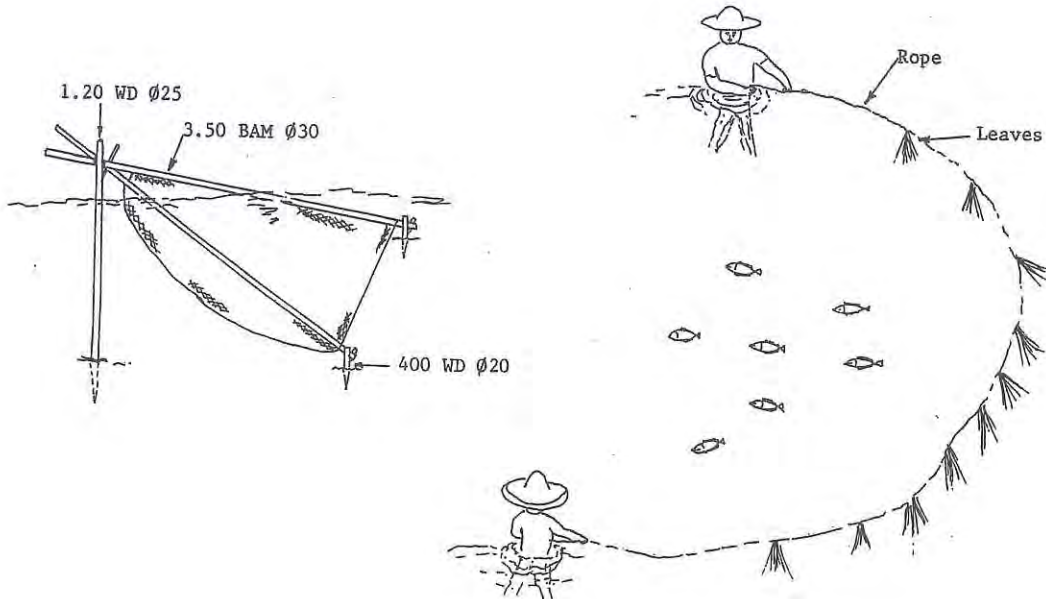
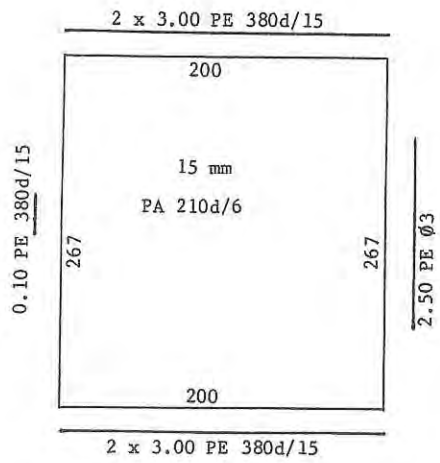
Loa -

hp -

LOCATION

Selinsing

Perak



DRIVE IN NET

Drive-in-net

Pukat-Jaring

Longtom, Scad, Black Pomfret,

Trevally

VESSEL

Loa 2 x 8 m

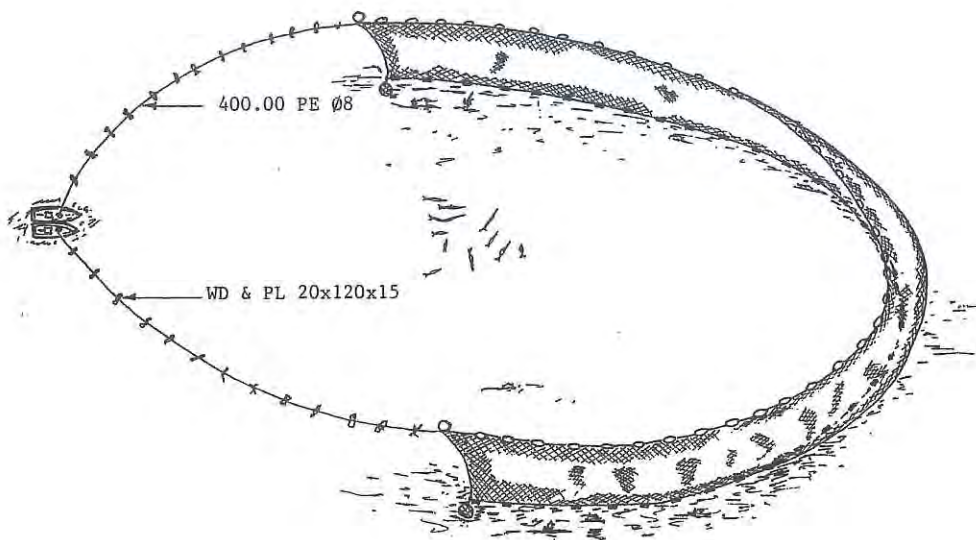
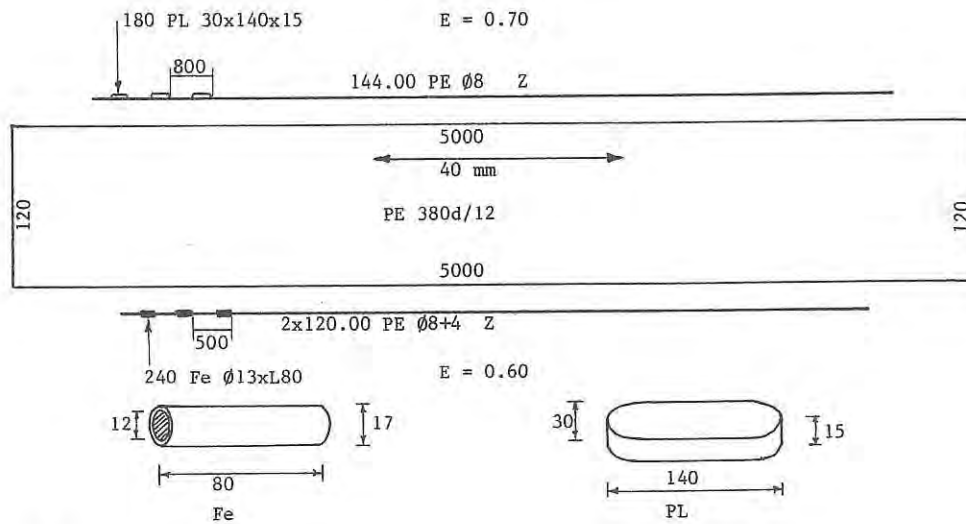
hp 2 x 5

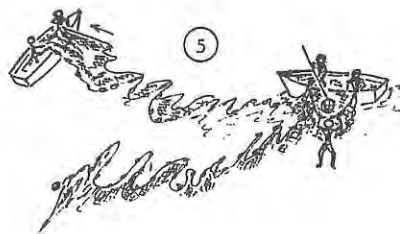
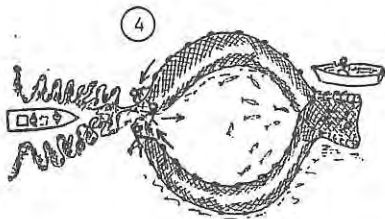
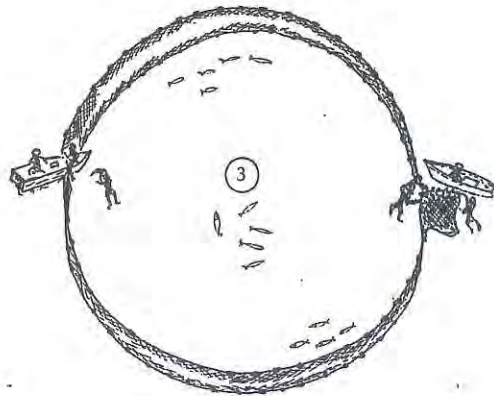
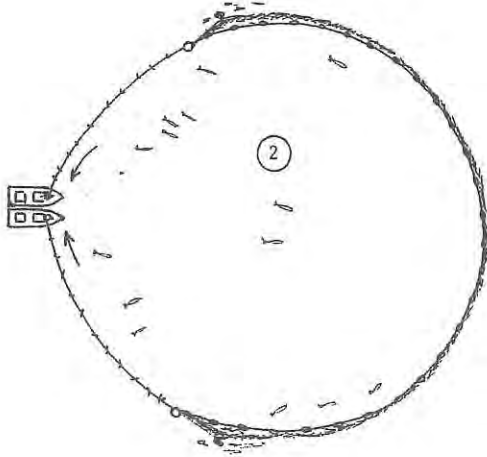
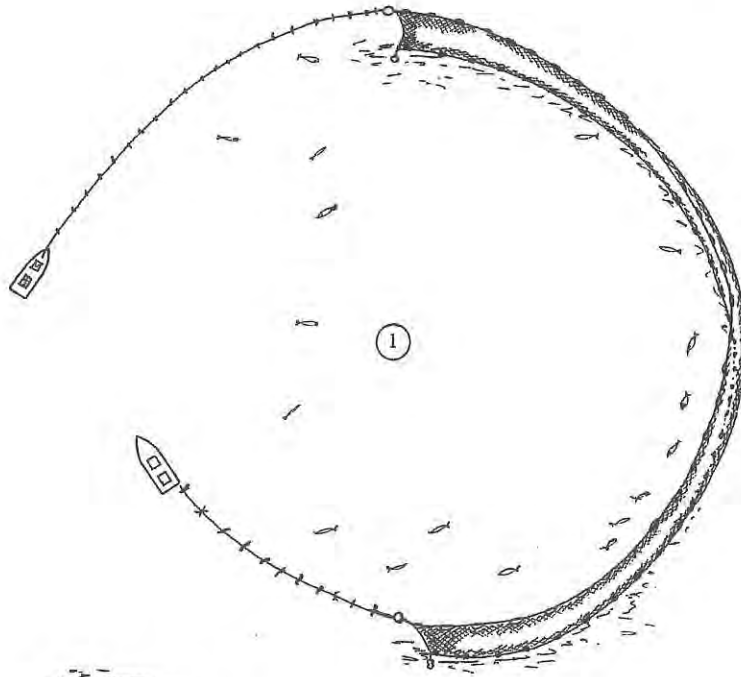
LOCATION

Bangau-Bangau

Semporna

Sabah

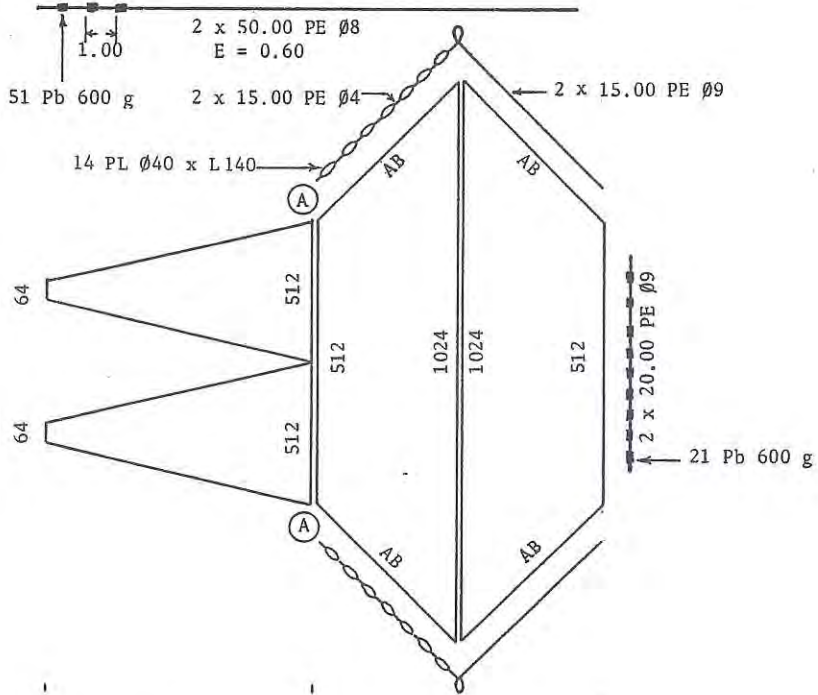
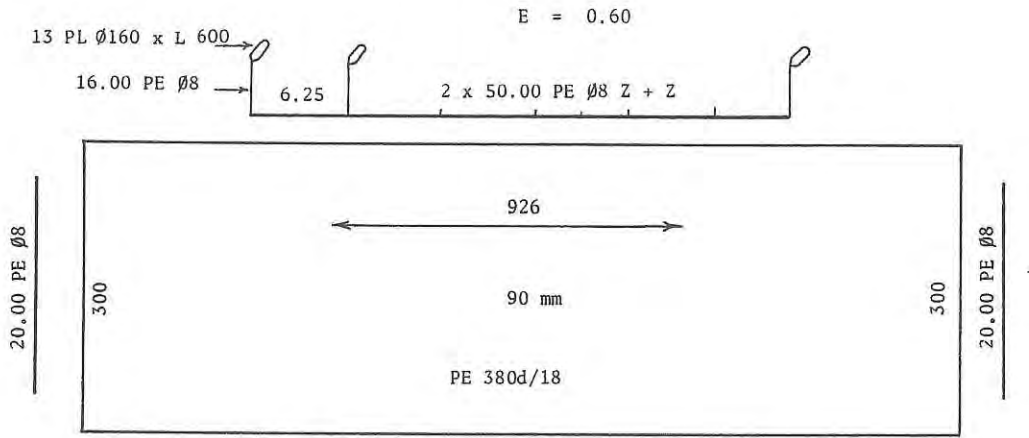




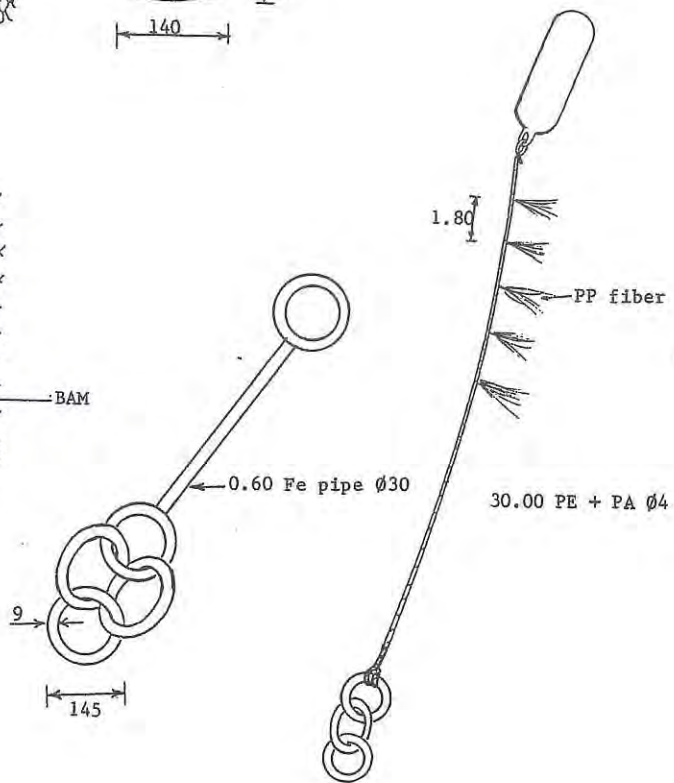
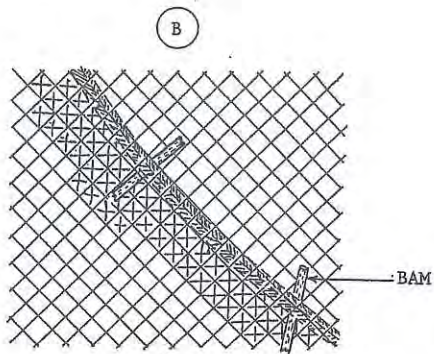
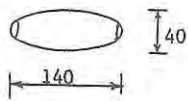
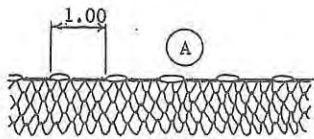
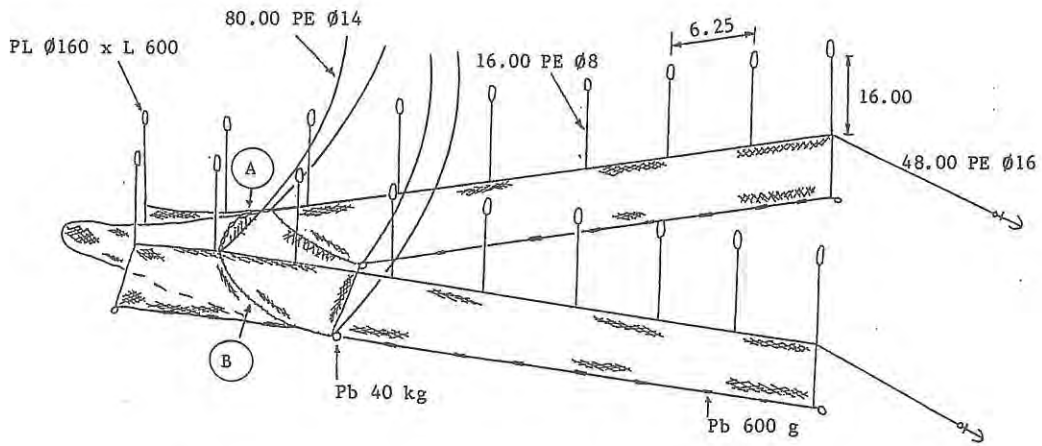
DRIVE-IN NET
 Drive-in-net
 Yellow tail fusilier,
 Rabbit fish

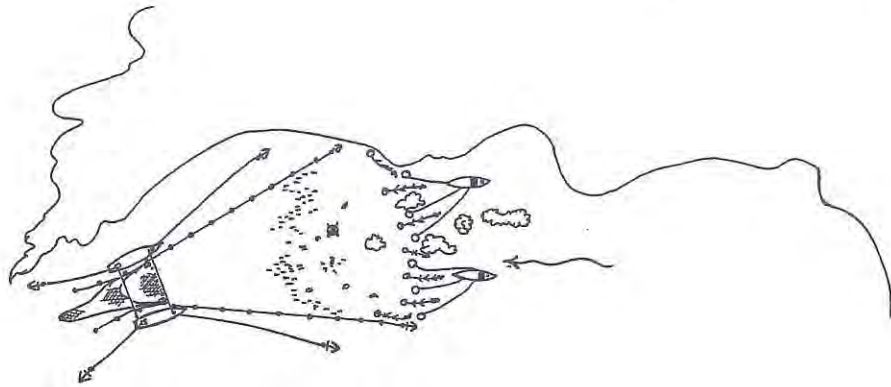
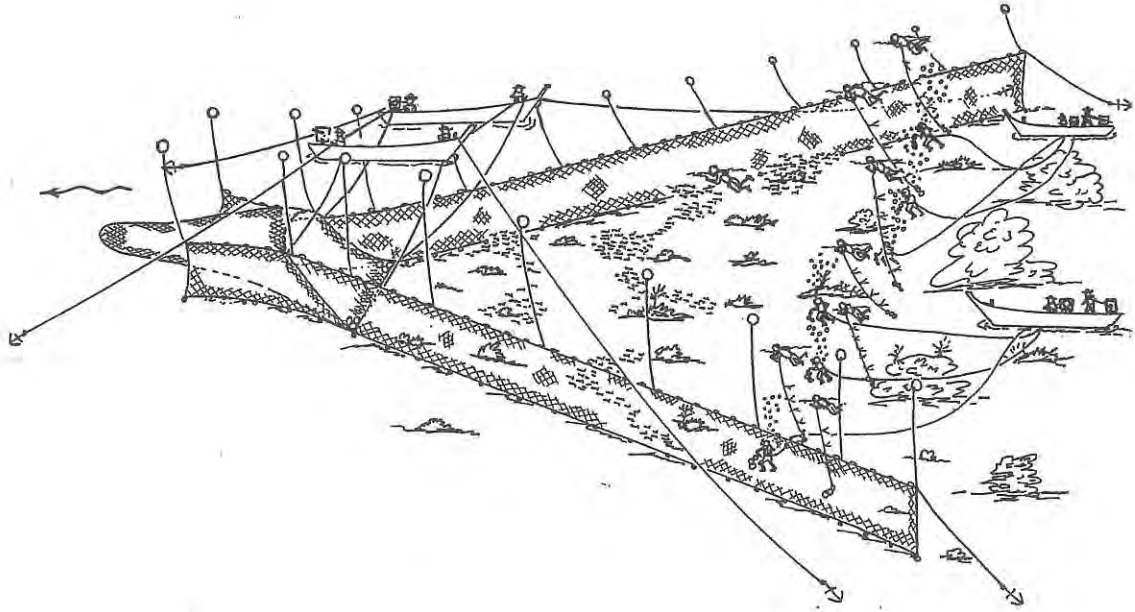
VESSEL
 Loa 17.8 + 3 x 7 m
 hp 160, 6 OM

LOCATION
 Mersing
 Johor



MAT	Denier	mm	meshes
	380/6	25	960
	380/12	50	256
	380/12	50	256





<Chapter 13>

DREDGE FISHING

13.1 Introduction

Dredge is the most important fishing gear for harvesting bivalves such as cockles and clams. Many types of dredge were found in Malaysia; from those of simple construction and operation to complicated and systematic operations such as the cockle seed rake, cockle rake and clam dredge.

Malaysia has wide expanse of coastline, which is suitable habitat for bivalves especially cockles. In year 2000, Malaysia had produced more than 60,000 metric tons of cockles, both from aquaculture and nature. At present, Malaysia is one of the cockle exporting countries in this region. Dredge has been widely used in cockle industry.

13.2 Fishing Gear and Methods

13.2.1 The rake for cockle seed

The rake for cockle seed is made of iron in the shape of a half-circle basket. The width of the basket is 0.5 m. and the diameter of iron bar is 1-1.5 mm. It is joined with a iron-wire and the sieve size is 4 mm. for collecting the seed of cockle.

The operation can be carried out by one man in shallow water.

13.2.2 The rake for cockle

The cockle rake is similar to the rake for cockle seed but its sieve size is bigger (15 mm). Its iron bar diameter is 7 mm.

The rake for cockle can be operated by one or two men in shallow water or sometimes by one man on boat with a handle attached to the rake. The rake may have only an iron frame which is fixed to a polyethylene net bag.

13.2.3 Bloody cockle dredge

This gear consists of an iron basket (25x57x17 centimeter) and wooden holder of 6-7 meters long. Fishing is done in the day-time, near a river-mouth or anywhere with muddy sea bottom. It is quite popular on west coast of Peninsular Malaysia.

13.2.4 The dredge for undulated surf clam

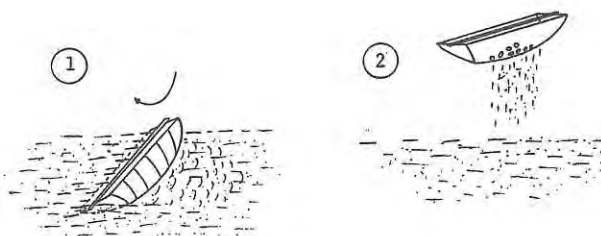
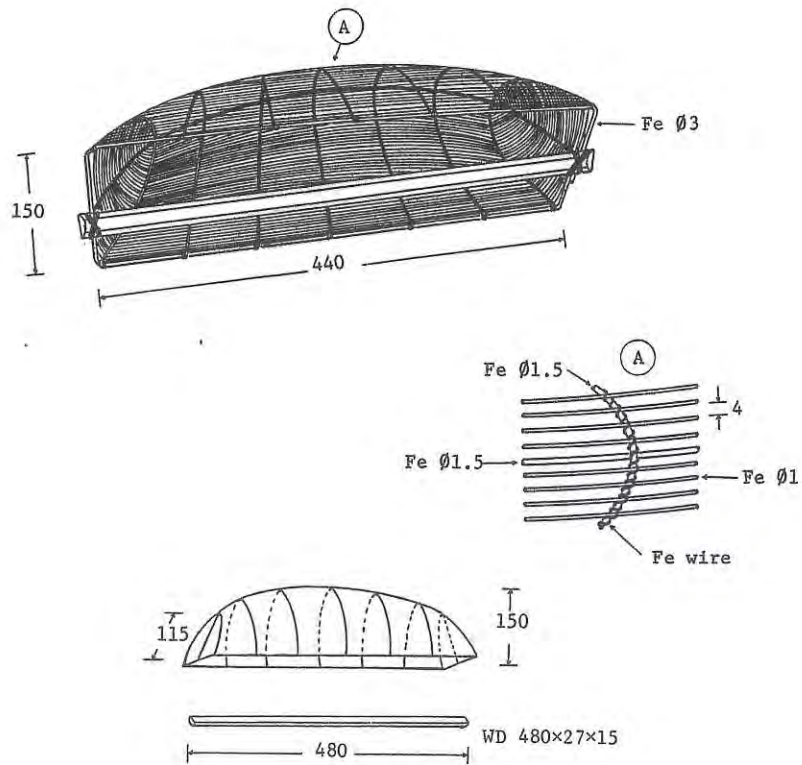
This large-scale dredge fishing is carried out from inboard-powered boats. A boat usually pulls one box-like dredge with sieve size from 10-20 mm. The size of dredge is 120x200x15 cm.

It is operated during the day for the convenient collection of clams.

DREDGE
Clam dredge
Bloody cockle (seed)

VESSEL
Loa -
hp -

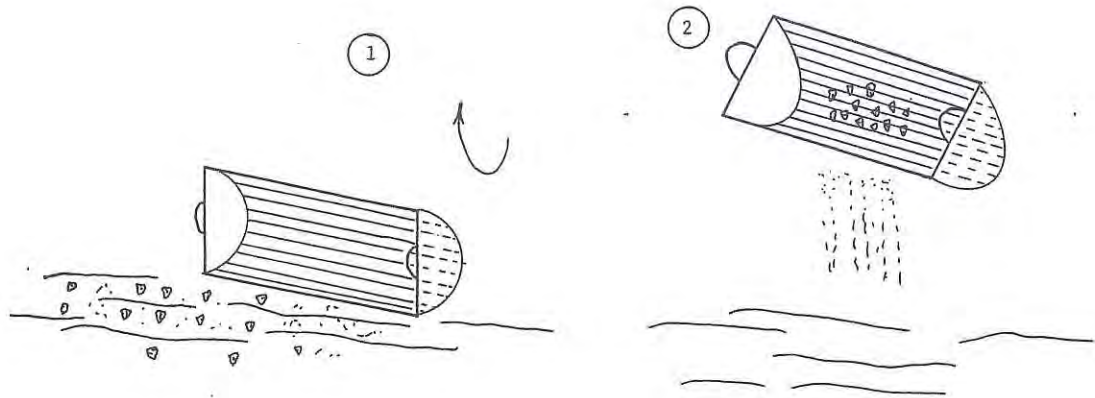
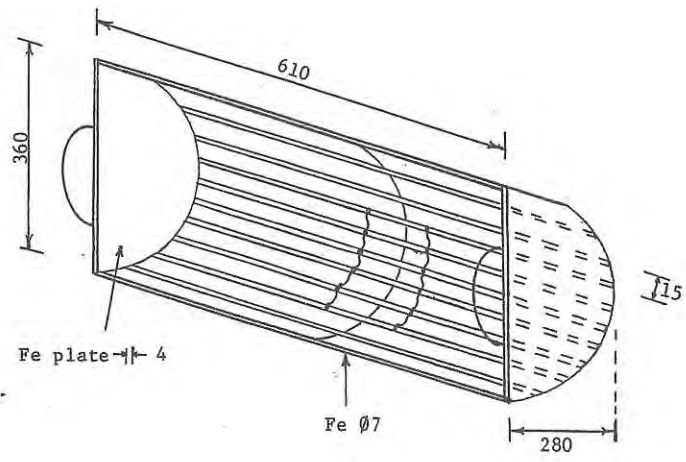
LOCATION
Pasir Penambang
Selangor



DREDGE
Clam dredge
Bloody cockle

VESSEL
Loa -
hp -

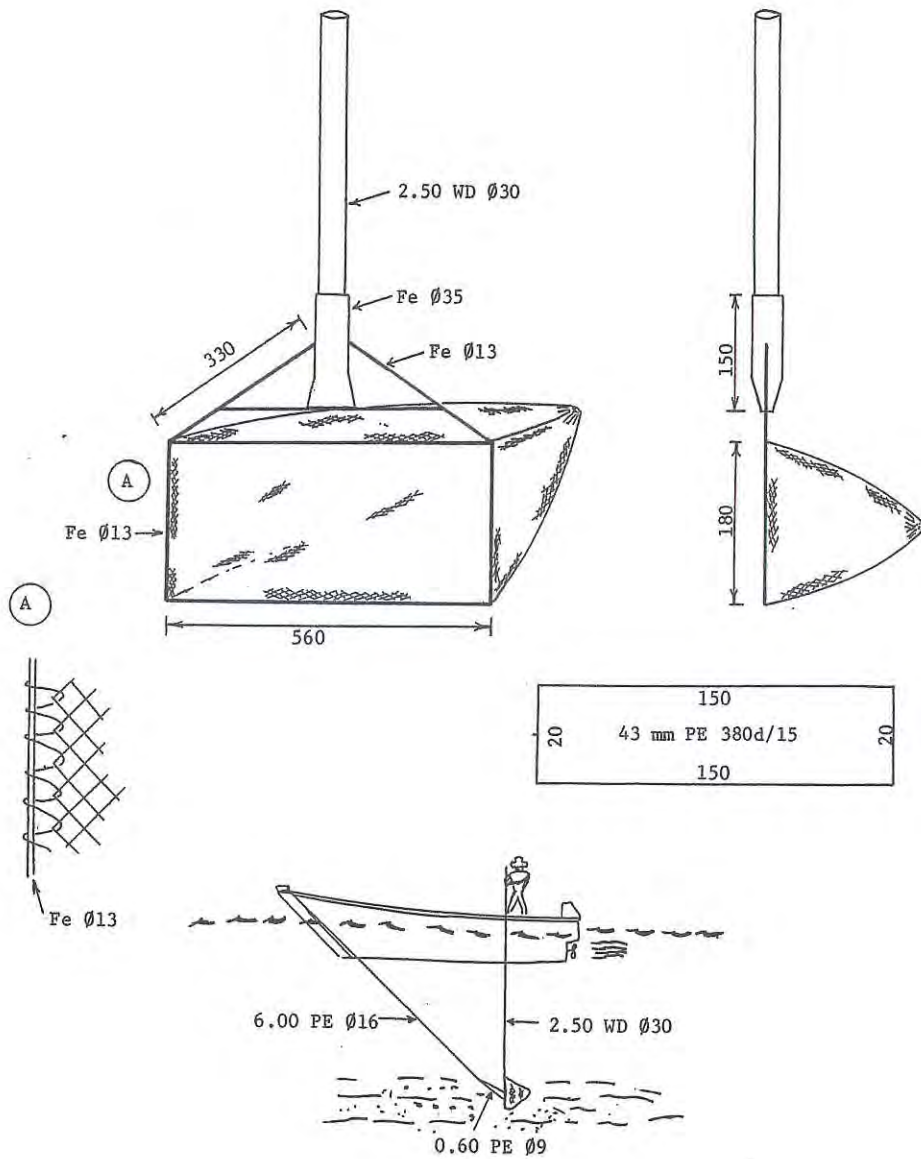
LOCATION
Kuala Sungai Ayam
Johor



DREDGE
Clam dredge
Bloody cockle

VESSEL
Loa 5 m
hp 14 OM

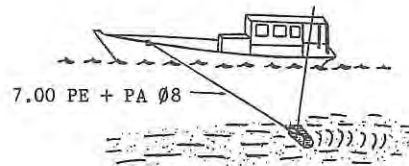
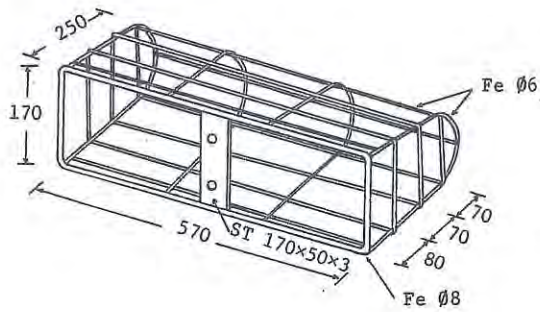
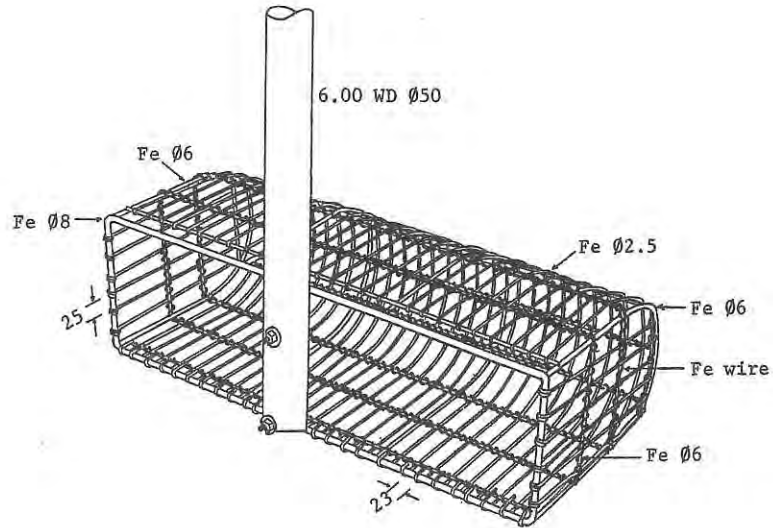
LOCATION
Kuala Sungai Ayam
Johor



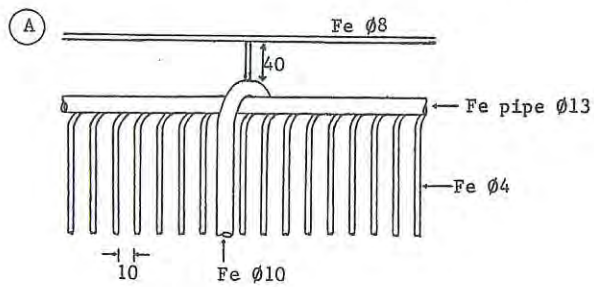
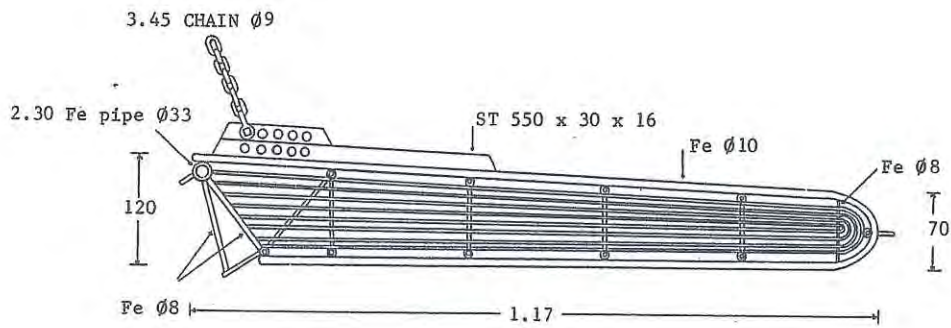
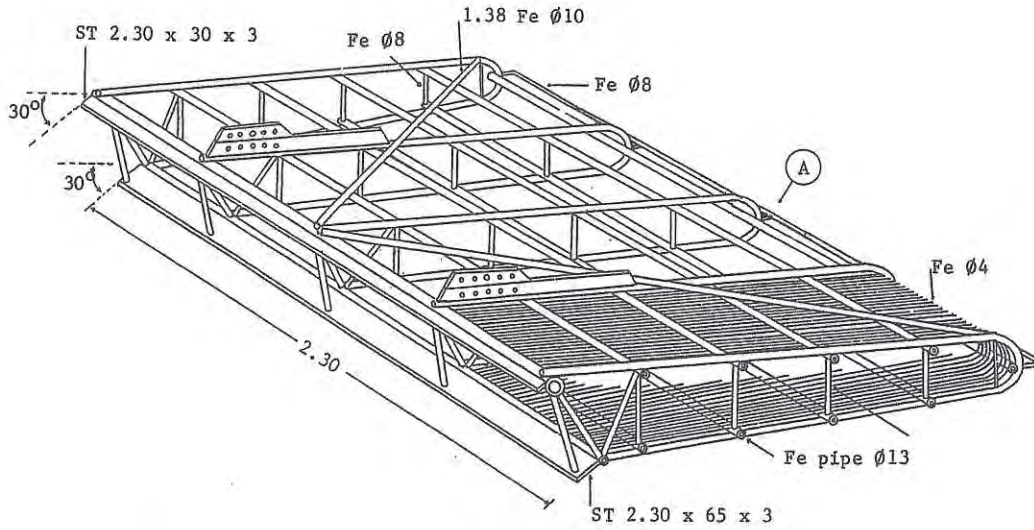
DREDGE
Clam dredge
Bloody cockle

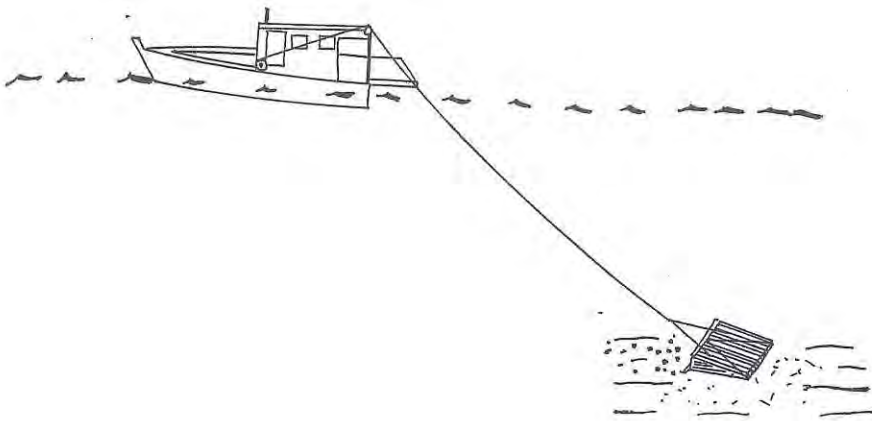
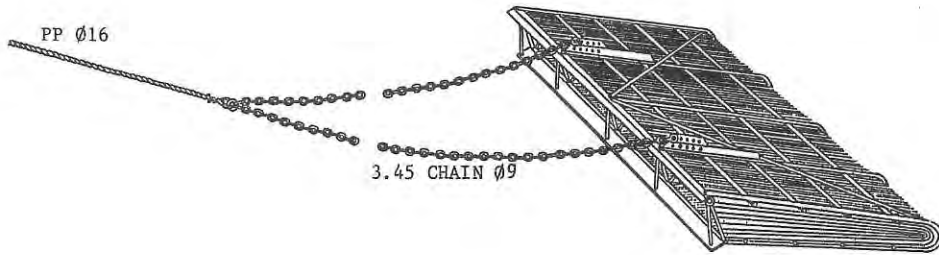
VESSEL
Loa 13 m
hp 24

LOCATION
Pasir Penambang
Selangor



DREDGE	VESSEL	LOCATION
Clam dredge	Loa 16 m	Kuala Perlis
Undulated surf clam	hp 70	<u>Perlis</u>

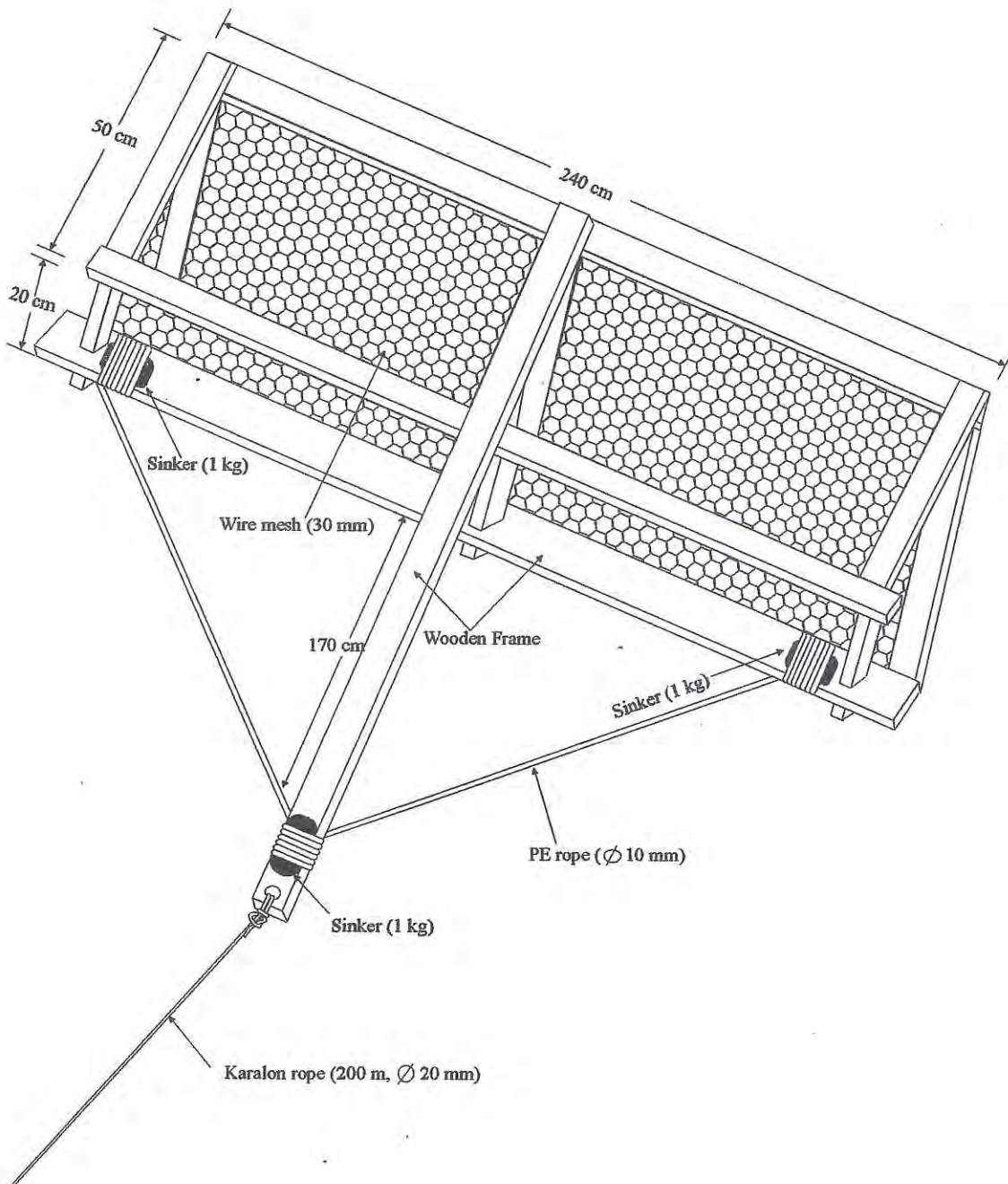




DREGE
Tangguk Tarik
Sea Cucumber

VESSEL
Loa 5 m
Hp : 14

LOCATION
Langkawi
Kedah



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