

SOUTH PACIFIC COMMISSION
SIXTEENTH REGIONAL TECHNICAL MEETING ON FISHERIES

(Noumea, New Caledonia, 13-17 August 1984)

COUNTRY STATEMENT-KINGDOM OF TONGA

SUMMARY

The development of Tonga's fisheries continues into a period of consolidation and implementation of existing projects. The major aim of the Fisheries Division of MAFF is to achieve an integrated approach to fisheries development with an emphasis on ensuring that objectives remain appropriate to the needs of the fishermen, industry and Kingdom.

A large scale boatbuilding project which aims to introduce 60 diesel powered boats in the size range 20'- 32' into the fishery, forms the core of activities in artisanal fisheries development. Setbacks have occurred during the implementation of this project although each has been successfully negotiated and progress has continued. At present some 8 boats have been completed. While acceptance by fishermen of the type of vessel is acknowledged, their ability to make the transition from subsistence/occasional cash operation into what is essentially a relatively large business has yet to be proved for the long term. However, confidence is high that with good extension services and a carefully structured training programme the project will ultimately be a success.

The deepsea longling operation centered on the MFV "LOFA", a Government longliner, continues to be successful with catches and prices showing a reasonable increase in her second year of operation.

Aquaculture is to be considered by the Kingdom and two consultants have recently visited to examine prospects for mullet culture. Research is planned in a number of areas, making use of the extensive facilities available at the Division's headquarters in Sopo. This work will be considered long term, with development of a number of projects planned at a pilot - study level to ensure feasibility before embarking on large - scale commercial ventures.

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1. ARTISANAL FISHERIES DEVELOPMENT

1.1 The Boatbuilding Project

1.1.1 Introduction:

The boatbuilding Project combines inputs from three donor agencies, as indicated below:

<u>Agency</u>	<u>Input</u>
i) UNCDF/UNDP	Construction costs of 2 fully equipped boatyards and 40 fishing boats
ii) JAPANESE GRANT AID	Engines chandlery and fishing equipment for 60 boats.
iii) FAO/UNDP	Technical support for boat construction, yard management etc.

This project forms the core of current artisanal fisheries development in Tonga and much of the Division work is directly or indirectly involved with its implementation.

Apart from the obvious benefit of increasing the fishing fleet, two others arise out of the project; the training of MAFF boatbuilders in modern construction and repair methods, and the provision of advice to local private boatbuilders.

1.1.2 Vessel specifications

Three sizes of boat have been specifically designed for construction under this project and details of their dimensions, powering etc. are provided below;

	<u>20' boat</u>	<u>28' boat</u>	<u>32' boat</u>
		(See Attach 1)	(See Attach 2.)
Length Overall	6.10m	8.60m	10.0m
Beam, moulded	2.15m	2.61m	3.2m
Draft, D.W.L.	0.68m	0.82m	1.2m
Type of construction	Carvel/splines	Carvel/splines	Carvel/splines
Thickness of planking	16mm	20mm	24mm
Sail rig	Aux. gaff	3/4 gaff/bermudan	3/4 gaff/bermudan
Sail area	6.5 ²	25.6m ² (gaff)	32.3m ² (gaff)
Engine	20HP Yanmar	20/30HP Yanmar	30HP Yanmar
Max engine revs	2,600	2,600	2,600
Fuel consumption (2,000 r.p.m.)	4l/hour	4-5.5l/hour	6l/hour
Designer	G. Pudner	O. Gulbrandsen	O. Gulbrandsen
Total value	T\$11,000	T\$23,000	T\$29,000
Cost to fisherman	T\$ 5,800	T\$12,200	T\$18,000
Est. annual catch	8-10 MT	14-16 MT	18-20 MT

The boats are constructed of Fijian imported timber, due to the shortage of suitable locally available supplies. Similarly, fixtures, glues paints etc. are imported, mostly from New Zealand with a small proportion from Fiji.

Modern boatbuilding techniques are employed, the carvel planking being made watertight by the use of wooden "splines" in the place of the more traditional caulking and putty. The hulls are sheathed to just above the waterline with Dynel cloth and fibreglass, giving a watertight finish that is impervious to attack by marine borers etc.

An interesting feature of the 32' boat is her reinforced concrete keel with a design weight of 1.2mt. The first keel of this type has been successfully cast representing a considerable saving on the imported timber and steel that would have been used on a traditional wooden keel with iron or steel ballast.

Every boat has an impressive inventory of safety equipment (flares, lifejackets etc.), electronic gear (echo sounder, radio) chandlery (rope, anchor etc), and fishing gear (some 28' and all 32' - line haulers, all boats - "Samoa" reels, line, hooks etc.).

As far as possible and practicable, local preferences for boats and their equipment have been taken full account of, although in some areas fishermen have changed from traditional requirements to more progressive equipment, an example being the sail rig. Traditionally using gaff rig on whaling and other boats a bermudan rig introduced by an FAO sailmaking consultant has received a most favourable response from fishermen. Policy now is to offer a choice of rig to the individual who will then make his own decision.

1.1.3 Boat construction progress

To date, 5 x 28' and 2 x 20' boats have been completed under the project, with 1 x 32', 1 x 28' and 1 x 20' under construction. The two outer island boatyards in Vava'u and Ha'apai are now operational, supported by the main island (Sopu) boatyard.

All three yards operate on a revolving fund basis in an attempt to control costs, productivity and inventory. This mode of operation is seen as a preliminary step towards "commercialising" the boatyards so that if privatisation is contemplated in the future, then at least the basic principles and systems will already have been set up and become established.

An incentive scheme is in operation and levels of productivity have been high with the precaution of regular inspections to ensure that a good standard of workmanship is maintained.

1.1.4 Fishermen's Loan arrangements

The boats have a good level of acceptance throughout the islands and many fishermen (over 200) have applied to be considered for the MAFF/UNCDF project. Under the terms of the project, a minimum deposit of 20% is required by the Tonga Development Bank who administers UNCDF funds for fishermen's loans.

A lack of fishermen with sufficient funds to meet the 20% deposit requirement has been a major constraint in the implementation of the project. Only 2 boats (1 x 28' and 1 x 20') have been sold to date and whilst these are proving successful, there is still a shortage of fishermen with deposits.

A demonstration/training scheme under which the Foundation of the Peoples of the South Pacific (F.S.P.) simultaneously trained and assisted fishermen to earn money for a deposit has been virtually ineffective due to mechanical problems with their boats. This has deprived the project of an important source of candidates.

In an effort to combat this problem the Division, through Government, has proposed a training scheme to the UNCDF. Under this scheme, fishermen could use UNCDF vessels for a training period during which time a deposit could be accumulated, along the lines of the former FSP project.

Major features of the scheme are as follows;

- i) Fishermen sign a six month agreement, renewable monthly, to use a UNCDF vessel for training purposes and to earn sufficient funds for a deposit. Close supervision is maintained throughout the period by the extension services.
- ii) The vessels will be fully insured during this period, and subsequently following their sale to the fishermen.
- iii) Thorough training for the fishermen will be provided, both in the techniques of the fishing operation and in matters of simple bookkeeping. An operating "log" will be kept by the fishermen during this period.
- iv) When a fisherman has accumulated his deposit, the Bank, subject to the usual loan appraisal, issues a loan and the fisherman takes over the vessel.
- v) Should a fisherman fail to earn the deposit required and wish to opt out of the scheme, a sum will be deducted from his bankings sufficient to make good wear and tear.

1.1.5 Discussion

A natural conclusion to draw from the fact that fishermen are having difficulties raising sufficient cash for deposits is that smaller, more easily affordable boats should have been constructed in the first place.

Some of the rationals behind the selection of these sizes of boat is listed below:

- i) The reefs and other fishing grounds around the centres of population are becoming heavily overfished, forcing boats further afield to provide acceptable catch rates. Boats with a capability to exploit the offshore and more remote areas are required, thus relieving pressure on the inner reefs and helping to protect their fish stocks for subsistence fishermen.
- ii) Whilst the capital cost of the boats in question are relatively high, they compare very favourably to the running costs of outboard vessels as shown below;

Period under consideration, 1,400 hours (2 years commercial use,

Boat A - 17/18' Displacement hull, carvel construction 25HP outboard engine (eg Yamaha)

Boat B - 20 Displacement hull (IAFF/UNCDF design), carvel construction, 20HP Inboard diesel. (eg 2000 20 HP Inboard)

	<u>Boat A</u>	<u>Boat B</u>
Purchase cost of engine	1,200	4,000
Fuel (A-12l/hour, B-41/hour)		
Speed of A-9 knots, B-6 knots)	7,632	3,312
Regular services	75	90
1000 hour overhaul	400	-
	<u>T\$9,307</u>	<u>T\$7,402</u>

NB. Boat maintenance costs assumed as approx equal.

At the end of this period a further benefit of the inboard engine is that, given correct maintenance it should make 3,000 - 4,000 hours before a major overhaul. The outboard engine could be overhauled again, although it would probably be at the end of its useful life.

The sail power provided for the 28' and 32' boats also serve to reduce fuel costs and engine loading.

- iii) Safety of fishermen is of prime importance to the Division and a number of recent incidents involving the breakdown of outboard engines and small dinghies have either resulted in loss of life or placed life in severe danger. The reliability of a diesel engine, combined with adequate sail power gives an invaluable increased margin of safety, especially desirable as fishermen are forced further offshore due to the depletion of near-reef fish stocks.

The proposed solution to the problem of fishermen's deposits for the new boats will provide an opportunity for fishermen to acquire the skills and confidence to manage their new boats successfully and safely.

1.2 Fish Marketing

Several studies have confirmed the fact that a large unsatisfied demand for fish exists within the Kingdom. The aim of the Division is to first satisfy this heavy demand before turning their attentions to the export market.

Since the areas of high fish landings are distant from those of population, the need exists for an integrated approach to the storage and transportation of fish on a Kingdom wide basis. To this end, a nation wide fish marketing plan is under formulation at present, to ensure that the availability of a suitable market does not become a constraint on the developing artisanal fleet.

The recently completed Vavatu fish marketing complex is operating, although in need of increased landings to fully utilise its 40 ton total capacity.

Fish is being regularly transported from the outer islands to Nuku'alofa by both the regular inter-island services and other smaller entrepreneurial enterprises.

An estimated increase in total landings of around 1,500 MT per annum will be required to satisfy demand by 1987. Since much of this quantity will be distributed to areas with a presently high level of unsatisfied demand, prices should remain relatively stable while consumption increases.

1.3 Extension Services

A great emphasis is at present being placed on upgrading extension skills, since the introduction of the new boats will require good extension support if they are to succeed.

Fishermen training is planned to take place in two stages;

i) Extension officer training

In order to provide a good service to fishermen the first priority has been to upgrade our extension staff to a level where they are capable of advising or directly assisting fishermen on all aspects of fish catching (including boat operation), handling and processing. Two forms of training are being employed; intensive in-service training utilising skills available within the Division and by sending staff overseas to gain specific knowledge of particular aspects of fishing.

The in-service training includes fishing technology, bookkeeping, navigation, engine repair and maintenance, and fisheries management. The courses have emphasised the importance of extension work and a four day period was spent on the skills of communication in order to maximise the transfer of knowledge to fishermen, via a structured approach. Extensive use was made of skills acquired by individual staff who have been previously on overseas courses. These included SPC/Nelson Polytechnic, UK Maritime colleges and other shorter courses including the recent CFTC fish processing workshop in Fiji. By utilising "at home" skills a high level of participation was achieved. Recent overseas training has included valuable instruction in fishing method technology provided by SPC. Four extension officers have been given the opportunity of travelling to Fiji to work alongside SPC Master fisherman Paul Mead.

ii) Fishermen training

This stage has now been reached and a registration scheme is being carried out to establish a firm contact with fishermen and help identify specific needs.

A manual is being produced from the in-service training course and sections of this will be simplified, translated into Tongan and issued as a series of training booklets.

Subject to approval, the training/demonstration scheme outlined in 1.1-4 will be implemented, P.C.A. providing a strong training input with two training officers. After being trained in the use of the new vessels, fishermen will need ongoing support and the extension programme is being geared to provide this.

2.0 DEEPSEA TUNA LONGLINING OPERATION:

2.1 General

The Government tuna longliner, the MFV "LOFA" continues to operate satisfactorily on a commercial basis, landings being made to two markets; albacore and selected pelagics to Levuka, Fiji and other miscellaneous species and shark to the home market. Thus the benefits accruing from the Lofa Operation are two-fold, the earning of export income and the supply of fish to Tonga. The latter contributes towards satisfying local demand while the artisanal fleet landings build up, as well as assisting with the reduction of some imported foodstuffs.

2.2 1983/84 Performance of MFV "LOFA"

Total landings from MFV "LOFA" increased by 9% to 321 MT over those of 1982/83. Out of an operating period of 365 days, 250 were spent fishing which considering that on every Sunday at sea (32 days) no longlining activity took place, is a good performance.

The operation continued to be self-supporting with no requirements for additional funds requested from Government.

2.3 Prices

For most of the last year albacore (MFV "LOFA"'S prime earning species) prices have remained depressed although the last few months have seen encouraging trends.

The world situation in the albacore market in late 1983 was characterised by a shortage of supplies and a sudden increase in demand. Predictions around this time indicated a price rise sometime early in 1984.

True to prediction continuing high demand drove prices up and current indications are that even the good summer landings of albacore are unlikely to result in a downward market trend.

A drop in yellowfin price was experienced due to excess stocks world-wide although since this species forms only 16% of LOFA's tuna export landings, the effect was minimal.

2.4 Future tuna operations

If the demand and associated hardening of price for albacore continues and catch rates do not decline then there would appear to be a likelihood of Tonga increasing her longlining activities.

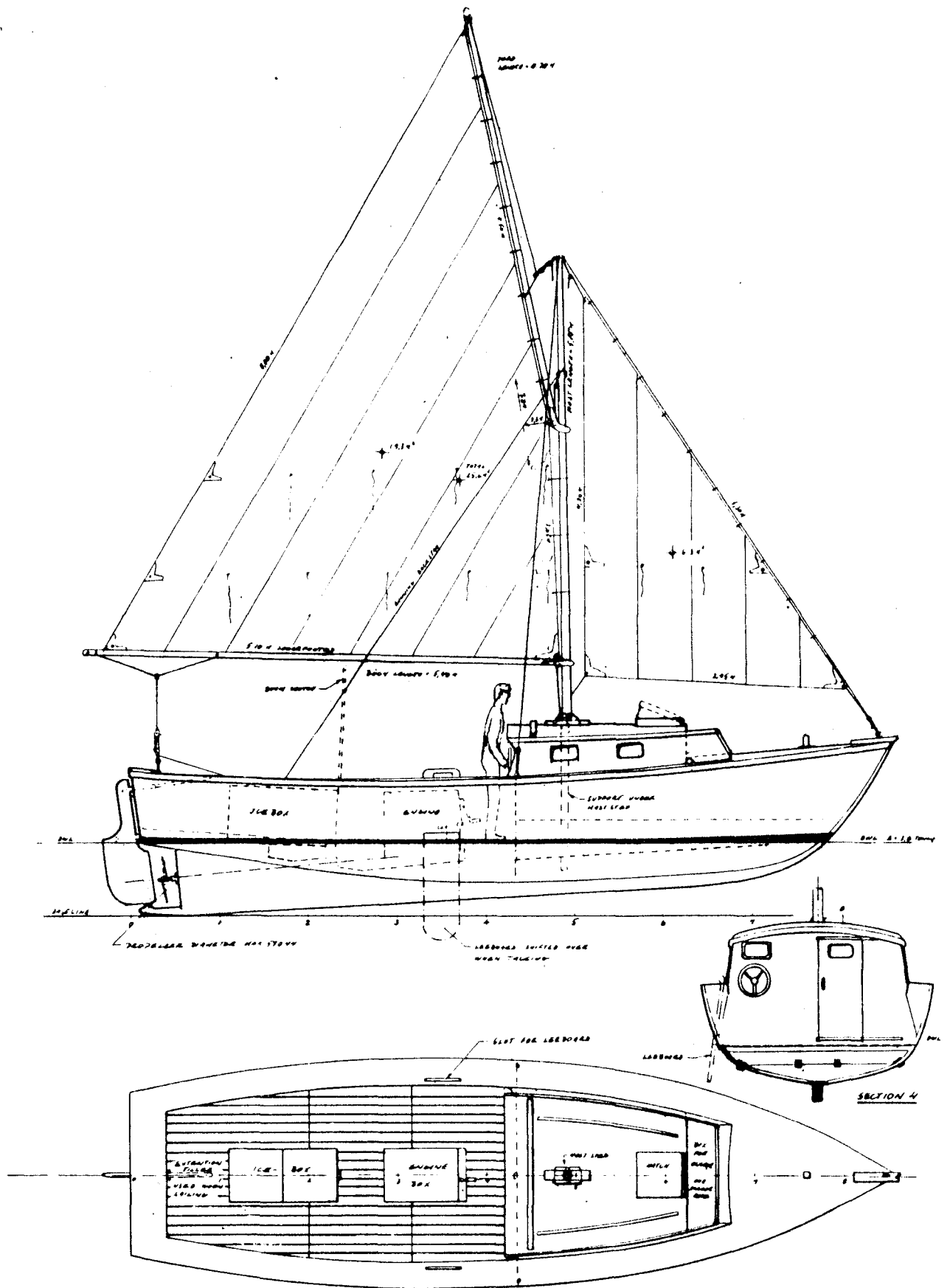
However, the dynamic situation of the tuna fishery and the likelihood of increased pressure on the stocks make the prediction of how best the Kingdom can participate in the tuna fishery a vexed one. All the variables will be considered before deciding in which direction the tuna fishing operation will be developed.

3.0 AQUACULTURE

Government have expressed a wish to investigate the potential for aquaculture within the Kingdom. Two consultancies has visited Tonga during the last year; from the East West Centre, Hawaii and under Taiwanese aid, both to examine the prospects for mullet culture.

A review of options for aquaculture within Tonga is being prepared and it is envisaged that a number of projects will be initiated at a pilot study level in the next few years.

The culture of Eucheuma striatum continues at an experimental level in Vava'u, the northern most island group. The setting up of individual farmers on a commercial basis has been delayed due to problems with fish grazing and consequently destroying the weed. It is hoped that these setbacks will be resolved with the arrival of a research biologist recently who will be working on the project for six months.



MAIN PARTICULARS

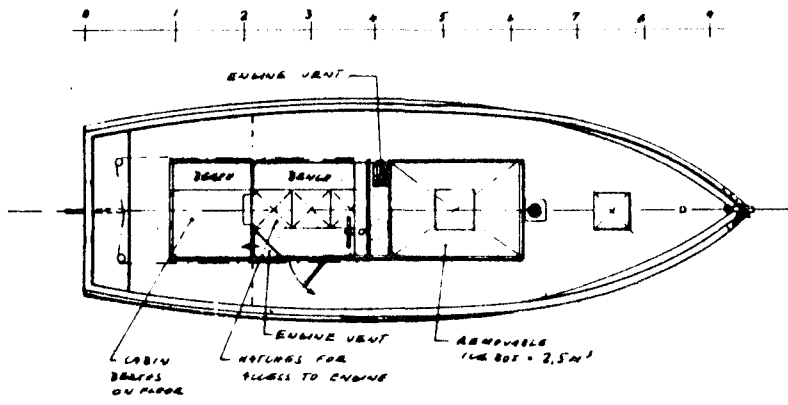
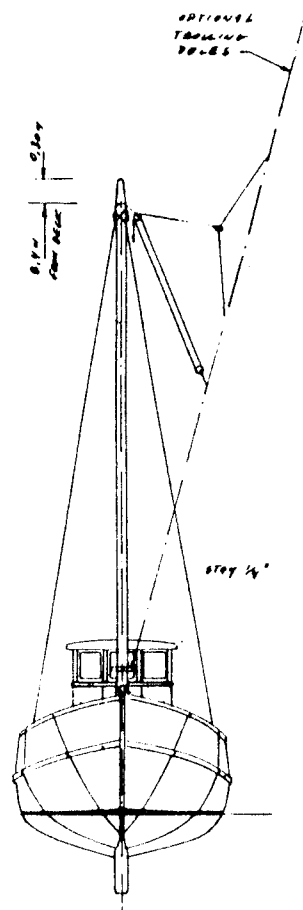
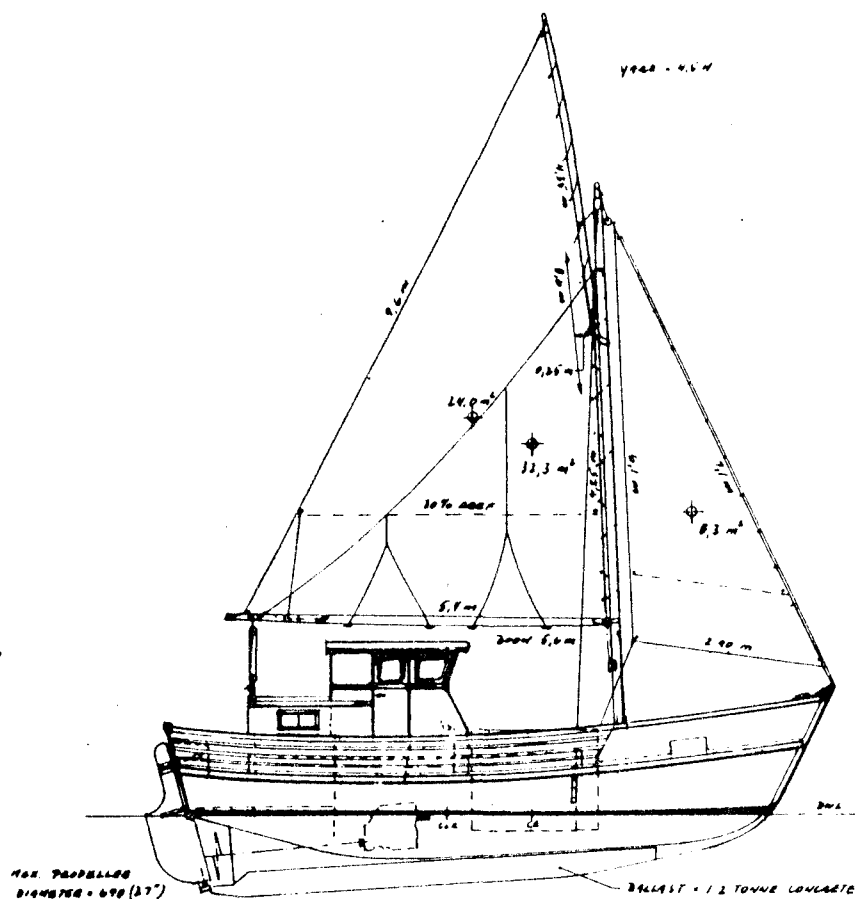
LENGTH OVER ALL	21'0"	21'0"
BEAM OVER ALL	7'0"	7'0"
DEPTH - ABOARD TO WAKE	1'7"	1'7"
LENGTH UNDERLINE - 20'	17'0"	17'0"
BEAM - 20'	7'0"	7'0"
BEAM - 20'	7'0"	7'0"
DISPLACEMENT DWS	2,000 LBS	2,000 LBS
DISPLACEMENT DWS	2,000 LBS	2,000 LBS
ENGINE POWER	10 HP	10 HP
GEN. (AUXILIARY)	15 W	15 W



B. & H. MOTOR-SAILER

GENERAL ARRANGEMENT

SCALE = 1/20	DESIGN NO.	ORIGIN
DESIGN: J. G. G. G.	TON-5	1
APPROVED: FEB 03		



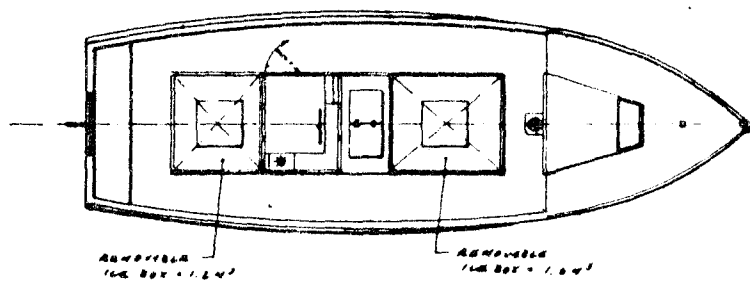
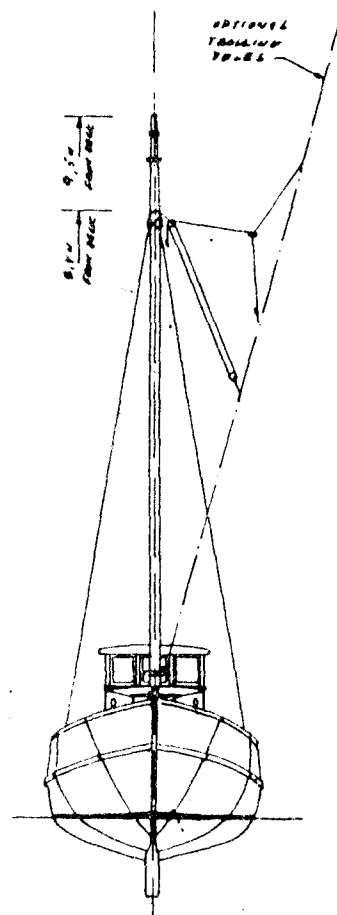
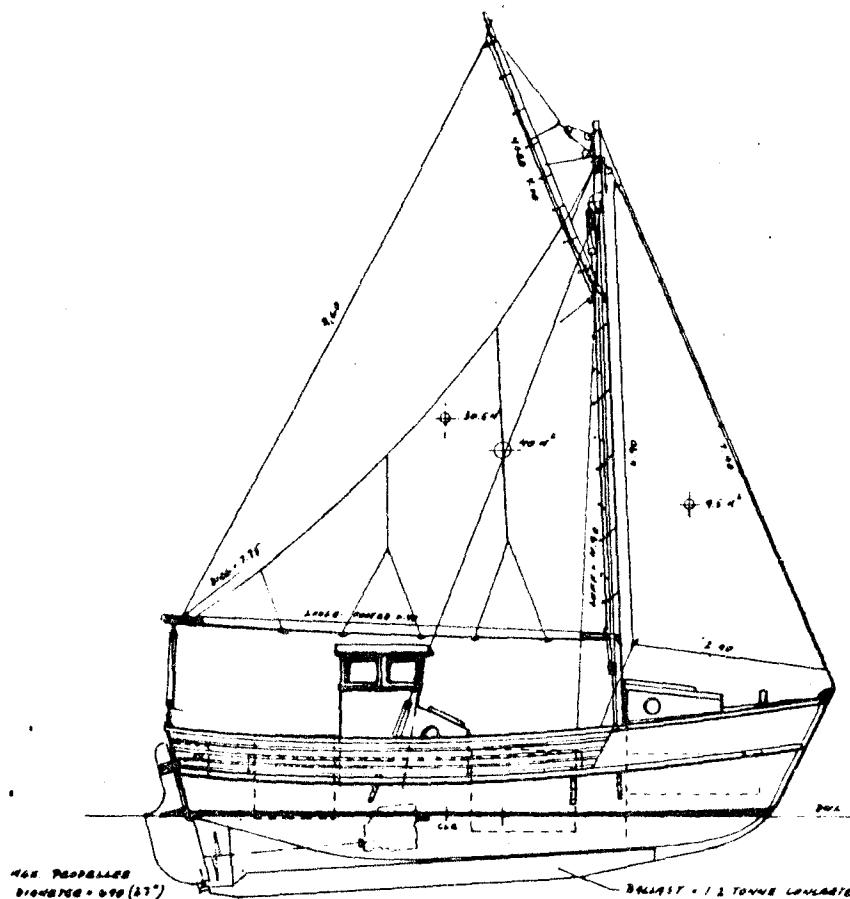
10 20 30 40 50 m
SCALE = 1:50

MAIN PARTICULARS

LENGTH OVER ALL 10.04 33'10"
BEAM MOULDED 3.304 10'8"
DEPTH MOULDED 1.204 4'0"
CUBIC NUMBER 38
LENGTH WATERLINE 8.704 28'6"
BEAM WATERLINE 3.004 10'0"
DRAUGHT MAX. DEL 1.154 3'9"
FREEBOARD MIN. DEL 0.574 1'9"
DISPLACEMENT DWT 7.0 TONNE
ENGINE POWER : 20-35 HP
FISHING METHOD: HANDLINING, TROLLING

10.04 MOTOR SAILER		
GENERAL ARRANGEMENT		
SCALE = 1:50	DESIGN NO	DESK NO
DESIGN: J. Guldstrand	TON-6	1A
GRIMSTAD, Aug-83		





10 20 30 40 50 m
SCALE 1:50

MAIN PARTICULARS

LENGTH OVER ALL 10.04 33'10"
 BEAM MOULDED 3.204 10'6"
 DEPTH MOULDED 1.204 4'0"
 CUBIC NUMBER 38
 LENGTH WATERLINE 8.704 28'6"
 BEAM WATERLINE 3.004 10'0"
 DRAUGHT MAX. DRL 1.154 3'9"
 FREEBOARD MIN. DRL 0.674 2'1'9"
 DISPLACEMENT DRL 7.0 TONNE
 ENGINE POWER : 30-35 HP
 FISHING METHOD: HANDLINING, TROLLING



10.04 MOTOR SAILER

GENERAL ARRANGEMENT

SCALE = 1:50	DESIGN NO.	DEMB. NO.
DESIGN: G. GARDINIER	TON-6	1A
GR. INST. 449-85		