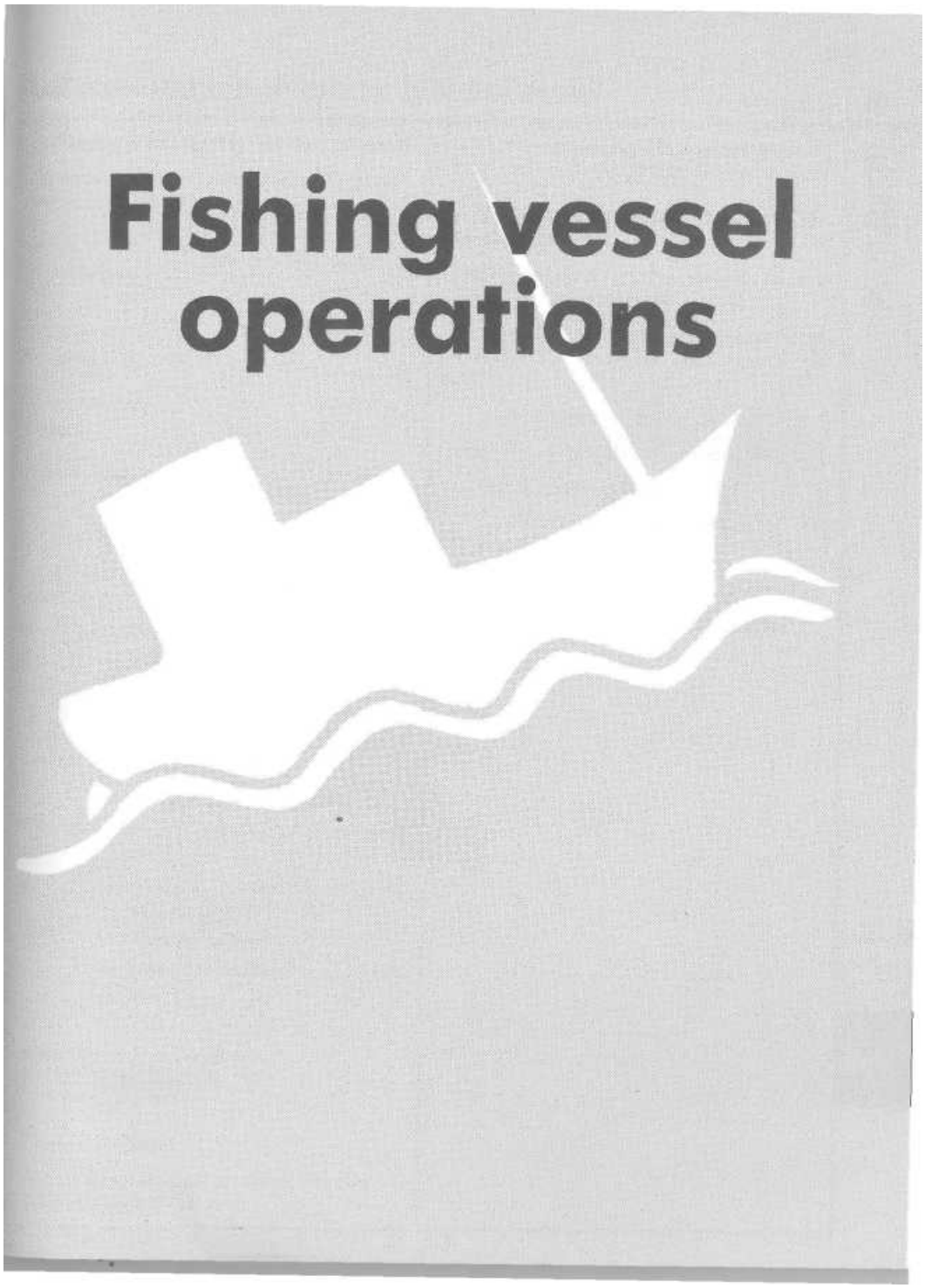
Fishing vessel operations



Fuel consumption of engine, speed of vessel

■ **Fuel consumption of the engine**

Specific consumption of fuel depending on the type of engine

Engine	Density of fuel	Consumption in g/hp/hour
2-stroke petrol	0.72	400-500
2-stroke petrol (improved)	0.72	300-400
4-stroke petrol	0.72	220-270
Diesel	0.84	170-200
Diesel (turbo-charged)	0.84	155-180

— *Consumption of fuel by an engine during a given period of time :*

C = 0.75 x P(max) x (S/d) x † x 0.001

where

0.75 is an average coefficient; free running it is between 0.7 and 0.8 and when fishing 0.5 to 0.8

C = consumption (in litres)

P(max) = maximum power of engine in HP

S = specific consumption of fuel in grams/HP/hour

d = density of fuel

† = time of use of engine in hours

Note : *time can be replaced with*

distance covered in miles

speed in knots

Approximation :

Annual consumption of a trawler = 1000 litres/HP/year

— Consumption of lubricating oil = 1 to 3% (in litres) of fuel consumption

■ **Maximum Economic Speed (Critical Speed)**

This is related to the length of the vessel at the waterline.

— for a displacement vessel, this speed, V, can be estimated as follows :

$$V \text{ (knots)} = 2.4 \times \sqrt{[L_w]}$$

where L_w = length at the waterline (m)

— *for a planing hull :*

$$V \text{ (knots)} = 5.4 \times \sqrt{[L_w]}$$

* *petrol = gasoline*

Ice, capacity of holds and tanks, fresh water

■ **Quantity of ice required**

(1 m^3 of ice weighs a round 900 kg)

— In temperate waters : 1 ton of ice for 2 tons of fish (kept for more than a week)

0.7 ton of ice for 2 tons of fish (kept for less than a week)

— In tropical waters :1 ton of ice for 1 ton of fish

These quantities may be reduced by 30 to 50% if the hold is refrigerated.

■ **Capacity of the hold in kg of fish or crustacea per m^3**

Taking into account the shape of the hold and arrangement for stowage, the real capacity of a hold will reflect a stowing rate 10-20% less than the figures shown here.

Material	Method of stowing	stowing rate kg/m^3
Ice	Crushed	550
Ice	Flake	420-480
Small fish(eg sardine)	Without Ice	800-900
Small fish(eg sardine)	In bulk with ice	650
Small fish (eg sardine)	In chilled sea water	700
Average to large fish	In bulk with ice	500
Average to large fish	In boxes with ice	350
Average to large fish	Frozen whole	500
Average to large fish	Fresh or frozen fillets	900-950
Tailed shrimp	Frozen in blocks	700-800
Tuna	Frozen in bulk	600

■ **Capacity of a live tank or well**

Crustacea in well or tank on board : 120-200 kg of Crustacea per m^3 of tank **(Note** : *adequate water circulation is essential)*

Crustacea in cage or 'car' set in sea : 400 kg of Crustacea per m^3 of cage Live bait well : 30/50 kg of bait per m^3 (water renewed 6 to 8 times per hour)

■ **Consumption of fresh water,** minimum allowance to plan :

vessel length 10 m : 10 to 15 litres of water per person per day

20 m : 20 to 25 litres of water per person per day

30 m : 30 litres of water per person per day

Bait: quantity required

■ Longiine

The quantity of bait required obviously depends on the bait type, target species and type of longiine. The figures here are rough estimates taken from examples in use.

Bait type	Quantity (in kg) per 100 hooks
Sandeel, Sardine	2.5-3
Mackerel, Horse mackerel	5-6
Needlefish (for drifting longiine)	10

If mackerel is used as bait, the following estimates may be given.

Target species	Weight of bait (g) per hook
Whiting	20-25
Small sharks, cod, rays	40-60
Large sharks	200 - 300
Swordfish	100 to 450

■ Live bait for tuna

In planning to catch in the order of 10 to 30 † of tuna, reckon on 1 † of bait (the proportion will increase a little with the tonnage of the vessel).

Speed of operation

■ **Longlining** (manual operation aided only by a line hauler)

— **Bottom longline**

number of hooks per man per day : 500-1000
speed of baiting : 2-4 hooks/min/man

speed of shooting (coastal) : 50-150 m/min

speed of shooting (deep-water) : 200-300 m/min

speed of hauling (coastal) : 15-40 m/min

speed of hauling (deep-water) : 60 m/min

— **Midwater drifting longline (tuna type)**

speed of shooting : 400-600 m/min or 500 hooks/h

speed of hauling : 200 hooks/h at 3-5 knots

■ **Gillnetting**

Length of net per man per day : 500-1000 m

speed of shooting : 6000-9000 m/h

speed of hauling : 700-1500 m/h

■ **Purse seining**

Shooting the seine usually takes 2-5 min

Speed of pursing :

Length of purse seine (m)	Duration (mins)
300	7-10
800	10-15
1200-1400	15-25

Speed of hauling with power block :

Length of purse seine (m)	Duration (mins)
300	20-25
800	40-60
1200-1400	60-100

Loading or broiling may take several hours depending on the catch.

■ **Trawling**

The amount of time needed to shoot and haul the warps depends on the depth. Shooting the rest of the gear (doors, sweeps, bridles, net) may take 5-15 min. Hauling may take 15-25 min (excluding warps).

Bookkeeping

■ **Rules**

— Keep a record of all expenses and receipts

— Take a lot of care in organising and classifying records

— Check accounts very regularly

■ **Keeping and presenting accounts**

— The methods of settling and presentation of the accounts depend on the habits and traditions of local fishermen, which will determine the following :

— Particular costs are defined as **joint expenses** (fuel, ice, food etc.) or **boat expenses** (vessel maintenance, renting of equipment, etc.).

— Income from the catch is divided to pay certain expenses, as well as the **labour share** (crew share) and the **boat share;** these proportions vary among different fisheries.

— Division of the labour share among the crew may depend on individual responsibilities, amount of experience, etc.

NEVER mix the payment of the skipper with the boat's accounts, which are the accounts of the company or owner (even if the skipper is the owner).

Keep these two accounts well separated, preferably in two separate books.

(1) A book for the accounts of the crew, skipper included

Date	Transaction #	Grass Receipts from sale and fish	Joint Expenses
			(several columns for different expenses)

This will help with calculation of crew payments.

(2) A book for the boat's accounts (accounts of the company)

Date	Transaction #	Expenses charged to the Owners
		(several columns for different expenses)

This will help with calculation of the boat's net income.

— **Gross receipts - joint expenses = net receipts**

— **Net receipts** are divided into **labour share** and **boat share**

— The labour share is divided among the crew according to the contract (calculated every week or after each trip)

The **boat share - boat expenses = gross profit** (calculated on an annua! basis)

Bookkeeping (continued)

There is a **net profit** only if the gross profit is greater than the sum of interest on loans plus amortisation of equipment.

Table of **loan repayment**

Amortisation is the cost associated with the loss of value, (through use, wearing out) of the **investment**

(vessel, motor, etc.). Depreciation is a related term which is used more commonly. When money for replacement of equipment (which is wearing out) is set aside and considered a cost, this may be called amortisation, and the amount set aside should be equal to the depreciation (anticipated loss of value) of the equipment. During normal periods while the amortisation is calculated, it is not represented by actual payments of money; the money associated with amortisation costs is actually available, but should be set aside for replacement of vessel and equipment, as this eventually becomes necessary.

— Examples of amortisation periods :

new hull	10-15 years
motor	1 -4 years
navigation equipment	5 years
outfitting and fishing gear	3 years

— 2 types :

(1) linear depreciation :
value of the purchase
duration of amortisation

(2) accelerated depreciation : re sidual value X depreciation rate

— The sum of the amortisation allotments should equal the actual purchase price of the equipment. All equipment should be amortised during the period in which it is actually used.

■ **Keeping accounting records**

• gross receipts = sum of (joint expenses + crew shares + boat expenses)

• money available at year-end = [money available on January 1 (cash + savings) + gross profits (before taxes) + amortisation]

***Example of accounts in a situation where the boat and crew split 50/50**:*

			joint expenses								boat expenses			
date of trip	record #	receipts (sales)	tax on sales	fuel	oil	ice	fishing gear	food	crew share	boat share	taxes	rent for equip.	maint & repairs	gross profit
Jan 9		1000	50	150	50	20	30	60	320	320	32			288
Jan 12		300	15	180		15		50	20	20	2	30	85	97
Jan 15		600	30	140		20	45	65	150	150	15			135
Jan 23		1200	60	200	20	30		50	420	420	42		150	228
		receipts from sales-joint expenses =net receipts								boat share	boat expenses			gross profit

Local fisheries regulations and data

Use this blank page for records of local fisheries regulations and other useful local information.