



Characteristics of SIODFA Vessels Operating in the Southern Indian Ocean Deep-sea Trawl Fisheries

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April 2015

1. INTRODUCTION

As part of the preparations for management procedures for fisheries whose management is to come under the aegis of the Southern Indian Ocean Fisheries Agreement views have been expressed that there should be a limit bottom fishing effort or catch in the Area to existing levels in terms of the number of fishing vessels and other parameters that reflect the level of catch, fishing effort, and fishing capacity. This implies that fishing mortality of target stocks is not increased (a), either by an increase in the number of vessels in the fishery, (b) by an increase in the number of days fished or (c), an increase in the fishing power of the vessels being used in the fishery. This reflects a reality that has been widely expressed, e.g. as recently noted by Gueye (2008):

“The crucial importance of fisheries resources for livelihoods and food security, the survival of marine ecosystems, employment and development has been undermined by decades of over-capacity and overfishing – driven, to an important extent by government payments to support shipbuilding and operating costs, securing access to distant water resources and guaranteeing revenues in the sector.”

In previous recognition¹ of this conservation need, the Southern Indian Ocean Fishers Association (SIODFA) had committed not to expand the fleet size they operate in the Southern Indian Ocean, which is at present four vessels, one by each operator.

The purpose of this report is to document the characteristics of the existing SIODFA fleet to facilitate the identification of the fishing power of the current fleet. In doing so, it is acknowledged that a wide range of variables contribute to the fishing success of fishing operations beyond the physical characteristics of the vessels themselves and that the variables of vessel dimensions are usually only used because that is the only information that is available to analysts examining factors related to vessel catch success. It is also recognized that such information may be useful to non-SIODFA researchers working on management measures related to fisheries in the Southern Indian Ocean.

¹ Meeting SIODFA Technical Meeting, Fisheries Research Centre, Albion, Mauritius. 25 – 28 April 2006

2. SIDOFA FLEET CHARACTERISTICS

2.1 Introduction

SIDOFA operators were polled on a wide range of characters applying to their vessels. It should be apparent that much information that was requested does not directly relate to factors affecting the fishing power of the vessels. However, it was thought that the information sought was relevant and would be of use in future possible analyses. Thus, the opportunity should be taken to capture this information. The information sought was as follows.

Vessel Data Item (to be completed)

Vessel name	Main engine
Operator	Auxiliary generators
Flag	Generators
Previous Flag	Generator (shaft)
Registration No.	Fuel capacity
Int. Radio Call Sign	Lub. oil capacity
Type of Vessel	Fresh water capacity
IMO No.	Fresh water maker
Built - where	Main winch
Year Built	Factory layout
Previous Name	Maximum no. of berths
Classification	Normal Crew Complement
Dimensions	Certification
Tonnage	Incinerator
Vessel speed	Automatic Location Communicator
Fuel consumption	Vessel communication types and numbers
Fish holds	Echo sounders
Cargo capacity	Net acoustics
Refrigerating machinery	Navigation
Plate freezers	Underwater video system
Freezing capacity	Warp length measuring system

This information is shown in Table 1.

2.2 Relative Vessel Characteristics

2.2.1 Region of Construction

The four vessels in the fleet were all built in different countries. Three of the vessels were originally built in Europe for operations in North Atlantic fisheries and as such had become available as vessel capacity has been relocated from this area, reflecting both declining abundance of fisheries resource in that area and the changes in fishing access possibilities. The vessel built in Japan was originally built to target Pollack fisheries.

2.2.2 Age of Vessels

The average age of the fleet is 31.3 years: of the vessels of European origin, the average age is 34.3 years. That the vessels are still functioning profitably in the Southern Indian Ocean, adjacent to the Southern Ocean is testament both to their builders and the effort expended to ensure that maintenance and support for the vessels is of the highest standards possible. It must be noted that at some point these vessels must be replaced and it will be impossible to exactly match their physical dimensions.

Table 1
SIODFA Fleet Vessel Characteristics

Name	<i>F.V. Tomi Maru No. 58</i>	<i>F.V. Nikko Maru No. 1</i>	<i>F.V. Atlas Cove</i>	<i>F.V. Will Watch</i>
Operator	Kanai Fisheries Co., Ltd.	Transnamibia Fishing (Pty) Ltd PO Box 106, Walvis Bay Namibia	Austral Fisheries Pty Ltd 14 Neil Street, Osborne Park, Western Australia 6017 Australia	Sealord Group Limited Vickerman Street Nelson New Zealand
Flag	Japan	Namibia	Australia	Cook Islands
Previous Flag	N/A	Japan	Norway	Panama
Registration No.	127153	2000WB003	0777	CI/01/1
Int. Radio Call Sign	7LGH	V5NM	VHGT	E5WW
Type of Vessel	Motor Ship	Stern freezer factory trawler	Multipurpose Longliner - stern factory trawler	Stern freezer factory trawler
IMO No.	8613621	-	9 171 008	7 225 831
Built - where	Niigata- shi,Niigata,Japan	Niigata Engineering Co. Ltd Japan	Karmsund Maritime Services, Kopervik, Norway	Glasgow United Kingdom
Year Built	1986	August 1987	1999	1972
Previous Name	N/A	No change (Japan)	<i>Osterbris 2</i>	<i>St. Benedict (UK) > Will Watch > Cheung Shing > Will Watch</i>
Classification	J G	JG Class	Ice Class C	Lloyds 100 A1
Dimensions		LOA 73.89 m Beam 11.80 m Depth 4.45 m (2 nd deck Dmid); Depth 7.15 m (upper deck)	LOA: 68.10 m Beam 12.60 m	LOA : 74 m Beam : 12.65 m Depth : 4.54 m
Tonnage	1204GT	1418 GRT; 505 net	1772 GRT	1587 GRT; 525 net
Vessel speed	13.5knot	Max 15.2 knots Service 13.8 knots	Max 16 knots Service 14.5 KTS	Max 13.8 knots Service 12.5 knots
Fuel consumption	12 MT/D	Fishing – 10 000 l /24 hrs Steaming – 11 000 l/24hrs	Steaming – 13500 L/24hrs Trawling - 10,000L/24hrs Longlining – 7000L/24hrs	Approx 8000 l/24hrs
Fish holds	4	Seven at –35°C – upper (50t), No.n1 port (35t) & Stb	One – 772m ³	One of approximately 575 m ³

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		35t), No. 2 (250t), No. 3 port 75t) & Starboard (75t), No. 4 (80 t)		
Cargo capacity	727 t	860 & 28m ³ (600 t frozen fish)	450 t	430 t frozen fish
Refrigerating machinery	4 compressor	4 x Hasegawa VZ-62R 4 x 75 kW motors	2 x SES International T-61s	5 x Grasso of 75kw each
Plate freezers	6 plate freezers	6 freezers	2 plate, 2 blast	6 freezers
Fish processing machinery	Head cutter x 2		Baader 424 head cutter	
Freezing capacity	46t/D	45 tonne/24 hrs	50 tonnes/24hrs	40 tonnes/24hrs
Main engine	8M40CFX, Niigata	Niigata 8M40CFX 2134 kW (2900 bhp)	MAK 4325kW 5800 bhp	British Polar 1988 kW (2650 bhp)
Auxiliary generators	Main engine – 2900 HP. 6NSBC-G, Niigata	2 Yanmar M200AI-EN, 750 kW (900 bhp), 900 rpm	Caterpillar 675 kVA 500 kW	2 x Cummins 1 x Caterpillar
Generators	Two auxillary generators of 400KVA each. CNS-400CN	1 x Taiyo Brushless AC445 V 3-phase 60 Hz 750 kVA @ 900 rpm	Caterpillar 1137 kVA 960 kW	2 x 425 kVA 1 X 550 kVA
Generator (shaft)	1	1 Taiyo as above	ABB 2250 kVA	-
Fuel capacity	488.35m ³	812 m ³	850 m ³	550 m ³
Lub. oil capacity	14.33m ³	16.98 m ³	21m ³	20 m ³
Fresh water capacity	22.92m ³	50.76m ³	83m ³	45 m ³
Fresh water maker	AFGUE-Z, Atras, Sasakura	Sasakura Vacuum AFGU-KE30	Fontemar	Atlas
Main winch	Hydraulic winch, Kawasaki	Hydraulic – 2 x 40 tonne	Karmoy High Pressure Auto Trawl	Brattvaag low pressure - hydraulic powered
Wing-to-wing spread (m)				
Demersal trawl				
Mid-water trawl	1			

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Lateral net opening	30 m	≈60% of wing-to-wing spread	≈60% of wing-to-wing spread	≈60% of wing-to-wing spread
Cod-end mesh stretched size (mm)	110	110	110	110
Foot-rope weak link (mid-water trawl)	n/a	Yes	Yes	Yes
Factory layout	Mid –deck	H&G layout (2 x heading machines – Baader & Josmar), washing, sorting & packing	H & G Layout – Baader, washing , sorting and packing	Baader 423 & Baader 417 heading saws, washing tanks and packing stations
Maximum no. of berths	32	50	50 2-patient hospital	50
Normal Crew Complement	27	45	30	42
Insurer	Hokkaido Kisen Fishing Vessel Insurance Association	Hull - Sunderland Marine Africa (Pty) Ltd & Co-Insurers; P&I Club - Shipowners Mutual Protection & Indemnity Ass.	Hull and Machinery: 60% Mutua Pesca, 40% Sunderland Marine.	New Zealand Insurance (IAG New Zeland) 50%; Associated Marine Insurance Agent Pty – 50%.
Certification details	P&I standard cover, Total loss, Partial Loss, Salvage Charge,	Local General Safety, Safe Manning, International Tonnage, Ships Station, Local Tonnage, Non-Convention Ship Oil Pollution Prevention, Ships Medical, Deratting, Liferaft, Hydrostatic Release, Stability Booklet, Fire Fighting Equipment, HACCP Est. & High Seas Fishing Permit	BV Registered No. 31F216 IMO 7351147 Ice Class 3/3 Class Hull, Machinery, Boilers, Refrigeration, Solas Safety Construction, Solas Safety Equipment, Solas Radio, Marpol Annex I/II/III, Marpol Annex VI Prevention AP Certificate, Safe Manning Certificate, EU Certified	Lloyds Register number 7225831. Class – 100 A1 Stern Trawler LMC Vessel Safety Certificate, Radio Equipment certificate IOPP certificate
Incinerator	1	Yes	Yes	Yes
Automatic Location Communicator	1	Blue Finger and Thrane & Thrane	Yes	Yes

Name	<i>F.V. Tomi Maru No. 58</i>	<i>F.V. Nikko Maru No. 1</i>	<i>F.V. Atlas Cove</i>	<i>F.V. Will Watch</i>
Vessel communication types and numbers	Inmarsat Tel:343230010 Inmarsat Fax:343230040	Email: skipper@amosconnect.com Inmarsat B: +873 365 903710 Fax: + 873 365 903711 Inmarsat C: 465 903 710	Fleet 77 +870 600 935 454 Inmarsat B +870 350 302 610 Iridium: +881 631 449 577 Inmarsat C: 450305710	Inmarsat B +870 Iridium 2 X Inmarsat C with VMS
Echo sounders	FCV-10,FCV1500L,ES-70	Simrad ES60 Furuno FCV 10 plus other systems	Simrad ES60; 38kHz Simrad ES70 38 & 200kHz	Simrad ES60 Furuno FCV 40
Net acoustics	FNR-80	Furuna CN 24	Furuno CN22 & CN24 Simrad ITI	Furuno CN22 Simrad ITI
Navigation	Furuno Plotter GP-500	SeaPlot Pro Chart Piscatus 3D seabed mapping 2 x Furuno GPS	SeaPlot Pro Chart Plotting System; MaxSea Plotter; 3 x Furuno GPS	SeaPlot Pro chart plotting system Piscatus 3D seabed mapping system 3 x Furuno GPS
Underwater video system	n/a	Tritech Seacorder	GoPro Hero 4	Tritech Seacorder
Warp length measuring system	2300m Electric warp length indicator	Nishimo K-500	Karmtrawl systems	Rapp Hydema

2.2.3 Fish Processing and Storage Capacity

The ability to stay on the grounds fishing will depend on the vessels fuel capacity and rate of consumption; catch rates, processing and hold capacity and social factors, primarily the need to rotate crews to maintain their morale and hence productivity. Food and water supplies will be an additional constraint. Table 2 shows the respective capacity of the fleet to maintain operations at sea as a function of these variables.

2.5 Fishing Equipment

As Table 1 shows, all of the SIODFA vessels are fully equipped to enable effective fishing operations in the Southern Indian Ocean. Their equipment enables skippers to precisely position the fishing gear in relation to targeted fish aggregations, the sea floor and the position of the vessel. This requires that the vessels are equipped with winch controls that can accurately measure warp distance release, net position acoustic equipment and fish finding acoustic monitoring systems. All vessels are equipped with acoustic systems that permit the vessel to undertake scientific fish stock acoustic surveys. And, all vessels are now equipped with trawl-mountable video cameras, or are in the process of acquiring this equipment. This will permit vessels to immediately investigate the nature of sea-floor fauna in the case that evidence of a vulnerable marine ecosystem is encountered.

Table 2
Operating characteristics of the SIODFA Fleet

Operating Constraint	<i>F.V. Ocean Explorer</i>	<i>F.V. Nikko Maru No. 1</i>	<i>F.V. Southern Champion</i>	<i>F.V. Will Watch</i>
Fuel capacity: maximum number of days at sea ²	108	≈ 80	≈ 71	69
Freezing capacity t/day	45	45	50	40
Freezer hold capacity (m ³)	650	888	850	430
Operating days on grounds at maximum freezing capacity ³	16.2	19.7	17.0	10.8

2.3. DISCUSSION

Fishing vessels, when built, are designed by their owners for specific fisheries taking into account anticipated catch rates, steaming distances to the grounds and between fishing grounds. That none of the vessels of the SIODFA fleet have been specifically built to suit the characteristics of the fishery in which they operate is testimony to the managerial skills of the operators and the abilities of the officers and crews of the vessels they operate. From a societal perspective, this fishery is usefully using existing capital assets that would have otherwise been discarded.

Describing the vessel characteristics of a fishing fleet provides two potential purposes:

- i. Description of the fishing power of the fleet as determined by the dimensions and characteristics of the vessels and
- ii. Providing a basis for estimating the consequences of replacing vessels in the future on the consequential fleet fishing capacity.

² Fuel consumption will depend on whether the vessel is steaming or fishing. Low catch rates imply increased steaming, greater fuel consumption and thus fewer possible days at sea. Fuel consumption when steaming is ≈ 40 – 45% greater than when fishing.

³ A skipper's dream! Other constraints, not least variable catch rates and inclement weather, prevent achieving this goal.

A major control on fishing power in this fishery is skill-related. The nature of the targeted bottom fishing that is undertaken requires that the trawl be relatively small to ensure that it is manoeuvrable. Thus, irrespective of the vessel size, bottom trawls do not exceed a foot rope length of 25 m. And in the case of midwater trawls, where manoeuvrability is also a requirement, ground ropes are standardized at 70 m. Thus, it is the fishing gear, more than the vessel dimensions, once they are in the functional range for the fishery that provide the physical constraints on the fishing power of a vessel. Thus, it is the view of SIODFA that moderate changes in the dimensions of a replacement vessel are unlikely to affect the fishing power of the fleet – though this possibility must be kept under review.

4. LITERATURE CITED

- Gueye, M.K. 2008. Will the WTO Mandate Stand up against the Tragedy of the Commons in Fisheries. International Centre for Trade and Development. *Bridges* 12(3): 12 – 13.
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**Appendix 1
Vessels of the SIDOFA Fleet**



F.V. Will Watch

F.V. Nikko Maru No. 1



F.V. Atlas Cove

F.V. Tomi Maru No. 58

