CARICOM Fishery Research Document No. 13

REPORT OF THE JOINT MISSION AND WORKSHOPS BY CFRAMP AND CANADIAN COAST GUARD FOR SMALL FISHING VESSEL INSPECTION TRAINING

Bridgetown, Barbados
20-24 September, 1993

St. John's, Antigua
04-08 October, 1993

ABSTRACT

This report documents the preparations, activities and findings of the CFRAMP funded workshops conducted in response to the recommendation of the Subproject Specification Workshop for Licensing and Registration Systems. The technical content of the workshops was provided by a Canadian Vessel Inspector whose time was provided by Transport Canada through the Canadian Coast Guard.

After an orientation and familiarization mission for the trainer, two one week long workshops were conducted in each of Bridgetown, Barbados and St. John's, Antigua. Two participants, drawn from the Fisheries, Customs or Coast Guard Departments, were invited from each country; only Trinidad and Tobago, of the CFRAMP countries, was unable to participate.
CARICOM Fisheries Management Unit

CARICOM Fisheries Management Unit
Belize City, Belize
November, 1993

Introduction

These workshops were held in response to the recommendation from the CFRAMP Licensing and Registration Systems Subproject Specification Workshop (SSW) that CFRAMP undertake to provide training for Fisheries Officers in the area of vessel inspection. During the SSW it was reported that in several participating states fisheries officers routinely conducted inspections of fishing vessels and were called on to certify that they were seaworthy and fit for fishing. It was also reported that in most cases such inspections by fisheries officers consisted of checking for the presence of the items on a list of safety equipment. In few cases were the officers trained, or even expected, to assess the condition of the hull, machinery and equipment prior to certifying the seaworthiness of the vessel. The concern was expressed that there was a potential liability of the fisheries officer or the government in the event of mishap should it be determined that a loss was attributable to incompetence in the inspection of the vessel.

There are three main types of inspection pertaining to fishing vessels, safety inspections, hull and machinery inspections (surveys), and fish quality inspections. Even though fisheries officers in the region are frequently responsible for all three areas the training provided in these workshops was only intended to address the first two and focused primarily the factors that pertain to the safety of life at sea. The majority of the workshop time was spent on the hull and machinery inspections as checklists of safety equipment are relatively simple to monitor.

The training was provided at a level that was intended to equip participants with the basic skills to assess the condition, equipment and suitability of a vessel for fishing. Sessions covered information necessary for inspection of vessels ranging from simple open vessels, outboard powered, through to inboard powered, decked vessels up to 20 meters. The sessions did not directly address large vessel inspection (>20 m), new construction inspection or evaluation for approval of vessel designs. The training was organized into two separate workshops to allow participation of at least two officers from each country and still keep the group to a manageable size (12-15 persons).

The course instructor, Mr. Lloyd Button, is trained as a Marine Surveyor and holds a Diploma in Naval Architecture from the Marine Institute in Canada. He was made available for the training workshops by the Canadian Coast Guard, where he works as a Ship Inspector in the Ship Safety Branch, St. John's, Newfoundland.

Preparation

Prior to the first workshop Mr. Button traveled to Guyana, Trinidad and St. Vincent to gain familiarity with a range of fishing vessels operating in the region and the administrative structures in place. The vessel types included the flat bottomed "Guyana" boats and the keeled "snapper" boats of Guyana, the glass reinforced plastic long-liners, multipurpose boats and pirogues in Trinidad and the canoes and speedboats of St. Vincent and the Grenadines.

Meetings were held with the Harbour Master in Georgetown, the Director of Maritime Services in Port of Spain, and the OECS Fisheries Surveillance Coordinator at the OECS Fisheries Unit in St. Vincent.

Upon arrival in Barbados a series of site visits accompanied by staff from the Barbados Fisheries Division reviewed the Barbadian situation and selected sites for the field sessions of the workshop.

Barbados Workshop

The first session of the Barbados workshop got under way at 10:00 on Monday, 20 September. Participants (Listed in **Appendix 1**) were welcomed by Mr. Wilson Wade, Acting Permanent Secretary, Ministry of Agriculture. An additional welcome and introductory remarks, were given by Mr. Paul Fanning, CFRAMP Data Manager/Analyst. The first technical session of the week's agenda (**Appendix 2**) was conducted by Mr David Robin, OECS Surveillance Coordinator, who presented a review (**Appendix 3**} of the legal regimes pertaining to fishing vessel inspection in effect in the CARICOM countries. After the discussion arising from Mr. Robin's presentation, proceedings were turned over to Mr. Button to begin the sessions pertaining to the theory and practice of vessel inspection. The technical information covered in the course are documented in the extensive set of course materials provided to each participant.

The final session of the five day program was a group discussion and review of issues, conclusions or lessons taken from the workshop and recommendations to address deficiencies in regional vessel inspection capabilities. The points raised in the discussions are combined with results of the Antigua session in the results section below.

Inter-Sessional Preparation

In response to a prior request from the Barbados Fisheries Division, Mr. Button spent September 27-28, during the week after the workshop, conducting vessel inspections with the Barbados Fisheries staff. The Barbados vessel inspection program is the most advanced in the region and well able to benefit from the opportunity to further enhance the skills of the staff in this way.

A stop was made in St. Lucia while en route to Antigua, to meet with several local builders of traditional canoes as further familiarization for Mr. Button with the small fishing vessels used in the Eastern Caribbean islands.

Upon arrival in Antigua sites were visited to confirm suitability and arrangements for field sessions during the second workshop. Preparations by the Antigua Fisheries Division were well in hand and no revisions were required.

Antigua Workshop

The first session of the Antigua workshop got under way at 10:00 on Monday, 04 October. Participants {Listed in **Appendix 1**) were welcomed by Mr. Eustace Royer, Chief Fisheries Officer, who chaired the opening session. Mr. Fanning explained the purpose of the workshop, the role played by CFRAMP in sponsoring it and welcomed the participants on behalf of CFRAMP. An additional welcome and opening address were given by Mr. Lennox Weston, Permanent Secretary. Mr. Weston emphasized the importance of obtaining the benefits of harvests from the sea while ensuring due regard to the safety of life at sea. A vote of thanks to CFRAMP and Canadian Coast Guard was made by Ms. Cheryl Jeffery of the Antigua Fisheries Department, whose own contributions to the preparations for the workshop were recognized by Mr. Royer. The workshop program from this point forward was the same as for the Barbados session (**Appendix 2**).

Results and Recommendations

Mr. Button has prepared a consultants Report on Activities (**Appendix 4**) which documents his technical findings and recommendations. Although the findings perforce pertain only to the countries that were visited by Mr. Button the recommendations are intended to provide constructive guidelines applicable in most or all of the participating countries.

Discussions from the final sessions of the two workshops which pertain to the implementation of new or enhanced Vessel Inspection systems have been summarized in what follows. It was observed that benefits from the training provided in the workshop were dissipated if countries failed to implement consistent and complete vessel inspection programs. To do this the workshops identified the need for additional training and expertise coupled with the need for an improved administrative framework supporting vessel inspection.

Training and Expertise

Several means of obtaining improvements in the degree of training fisheries officers receive in the area of vessel inspection were identified. The first, based on the use of extra-regional trainers to conduct training workshops, such as the ones just completed, was seen as a short-term solution but one that was useful in the initial development of expertise within the region. A second means was based on utilizing the significant level of technical expertise that already exists in the region and enhancing it by providing further training as trainers, in the region or elsewhere. Such intra-regional training can either be delivered on an ad hoc basis through workshops or similar fora, or can be institutionalized in regional training establishments (e.g. JMI, CFTDI). In the latter case the training should lead to a formal certification.

Administrative Framework

The administrative framework refers to the legal, political and bureaucratic apparatus that support a governments role in any activity, in this case, the inspection of fishing vessels.

Legal

The current legal requirements regarding vessel inspection were described by Mr. Robin in his presentation and paper included in this report. The notable point was that in various countries, fishing vessels are exempted from vessel inspection requirements either due to their generally small size, less than some mandatory lower limit, or specifically because they are solely engaged in fishing. Both cases stem from governments desire firstly, to protect a primarily artisanal activity from undue and prohibitive expense and, secondly, to minimize the regulatory costs associated with management of the fishing industry. The other significant point, raised by a number of participants was that, in some cases, even where legal provision was made for fishing vessel inspection, the inspections were conducted haphazardly, rarely or not at all.

Additional legal considerations exist at the international and regional levels. With the implementation of regional agreements on fisheries such as the OECS Common Fishing Zones and eventually the CARICOM Intergovernmental Agreement, there arises a need to ensure that

common standards for safety (ILO, IMO), navigation (IMO) and prevention of pollution (MARPOL) are known and enforced.

Political

As with any government activity, the most important prerequisite to implementing or improving the inspections of fishing vessels is the political will to do so. This requires that governments meet the fiscal needs of a new or expanded activity and withstand the resistance by vessel owners to bearing an additional expense. To do this the policy makers must have the information to weigh those costs against the benefits of such a program.

In both workshops there was a consensus on the need to work closely with the vessel owners. Through education and consultation, fisheries officers can foster the industries understanding, particularly among vessel owners, of the benefits to be obtained through improvements in the safety and seaworthiness of the fishing fleet. The first and greatest benefit to be had would be a reduction or elimination of loss of life among the fishers. Benefits accruing primarily to the industry would be reduced loss of vessels and consequently, reductions in the costs of insurance. Governments, nationally and regionally, stand to benefit from reductions in the substantial costs of search and rescue operations for missing fishermen. It was reported that one search in the past year had cost several regional governments a total in excess of US$ 1,000,000.

The workshops did not attempt to estimate the fiscal costs of a given vessel inspection program as these would be highly specific to the particular circumstances in each country. Additionally, the high cost of safety equipment was recognized as an impediment to obtaining compliance with more stringent standards. The possibility of obtaining favourable prices on a range of safety equipment, including pyrotechnics and a robust waterproof container to protect safety equipment, by central or coordinated purchasing was noted. A government program, through Fisheries Departments or Fisheries Cooperatives, to provide such equipment to the industry at cost and without duty would be one means of minimizing industry resistance and hence political costs.

Bureaucratic

The major need, after trained personnel, is for a coordinated approach between different government agencies to attain consistent application and widespread compliance with vessel inspection requirements. The current situation in many countries places responsibility for inspecting and certifying of fishing vessels in the Fisheries Department or Harbour Master (or equivalent maritime authority) while the Coast Guard, Marine Police or Maritime Wing of the Defence Force is responsible for monitoring and enforcing compliance on a day to day basis, particularly at sea. This makes it critical that the agency responsible for inspections ensures that the enforcement agencies have full information pertaining to inspection standards for various classes of vessels and that vessels due for inspection can be identified and located as inspection certificates expire.

It is also important that all agencies involved in the vessel inspection process work in concert towards educating and assisting the industry in reaching compliance with new and higher standards of marine safety. This can include fisher training sessions, assistance obtaining new equipment and the provision of "courtesy" inspections to identify vessel deficiencies in an informal manner.

Appendix 1. Participants in the CFRAMP/CCG Fishing Vessel Inspection Workshop Part 1. Barbados, 20-24 September, 1993

Name	Title	Address / Telephone
Gittens, Winston Holder, Eustace Leslie, Dennis Weekes, Cycle	Marine Mechanic Fisheries Assistance Senior Mechanics Mechanic	Fisheries Division Min. of Agriculture Bay St., St. Michael Barbados 809-426-3745
Turton, Michael	A/Sub-Lieutenant	Barbados Coast Guard HMBS Willoughby Fort Pierhead Lane Bridgetown, Barbados
Baldeo, Roland Mitchell, Moran	Fisheries Officer Fisheries Extension Officer	Fisheries Division Min. of Agriculture and Fisheries St. George's, Grenada 809-440-3814 440-6613 (fax)
Adams, Ray McLennan, Irvin	Fisheries Officer Fisheries Officer	Fisheries Dept. Min. of Agriculture Georgetown, Guyana 592-61833 or 64398
Robin, David	Surveillance Coordinator	OECS Fisheries Unit P.O. Box 846 Cane Garden St. Vincent 809-457-2979
Matty, Phillipp Vitalis, Lambert	Fisheries Assistant Fisheries Assistant	Fisheries Dept. Min. of Agriculture, Industry and Labour Kingstown, St. Vincent 809-456-2738

Gregory, Keithroy	Fisheries Assistant	Fisheries Division
Jeffrey, Cheryl	Graduate Fisheries Asst.	Min. of Agriculture
Looby, George	Fisheries Assistant	Point Wharf Pilgrim, Albert
	Data Collection Officer	St. John's, Antigua
Lino, Clive	Fisheries Inspector	Fisheries Department
Usher, Ulric	Operations Manager	P.O. Box 148 Princess Margaret Dr. Belize City, Belize 501-2-44552
Guiste, Harold	Fisheries Officer	Fisheries Dev. Div.
Philbert, Algernon	Sr. Fish. Liaison Off.	Min. of Agriculture Gov't. Headquarters Roseau, Dominica 809-448-2401
Ellison, Raymond	Sr. Fisheries Inspector	Fisheries Division
Mathews Barry	Fisheries Instructor	P.O. Box 470 Min. of Agriculture Marcus Garvey Dr. Kingston 13, Jamaica 809-923-8811
Jeffers, John	Fisheries Assistant	Min. of Agriculture P.O. Box 272 Plymouth, Montserrat 809-491-3612
Wade, Leslie	Coast Guard Engineer	Police Department Plymouth, Montserrat
Edward, Charleton	Customs Officer	Customs & Excise Dept. Min. of Finance Basseterre St. Kitts and Nevis
Evelyn, Vernon	Customs Officer	As above, Charlestown
Simmonds, Joseph	Fisheries Officer	Fisheries Division Min. of Agriculture P.O. Box 39 Basseterre St. Kitts and Nevis
Wallace, Patrick	Commanding Officer	SKN Coast Guard Basseterre St. Kitts and Nevis

Appendix 2. Agenda for CFRAMP/Canadian Coast Guard Fishing Vessel Inspection Training Workshop

Monday	10:00	**Welcome and Introduction** Departure of Official Parties
	*	
		Overview of Vessel Inspection Issues Legal regimes for fishing vessel inspection - D. Robin Role of fisheries departments in vessel inspection Basic elements of vessel inspection
	13:30	Seaworthiness, stability and suitability for task Fish quality on board
Tuesday	08:30	**Hull survey** Terminology General inspection guidelines - wood General inspection guidelines - grp Watertight integrity
	13:30	Site visit
Wednesday	08:30	**Major fittings and components** Rudder and steering gear Deck fittings Mast, boom and rigging Vents and closures Acceptance Trials
	13:30	Site visit
Thursday	08:30	**Machinery** Shaft and bearings Propeller Through-hull fittings Fuel storage and handling Exhaust systems Electrical installations
	13:30	Site visit

Friday	08:30	**Life saving and fire fighting equipment** Life rafts and p.f.d. Lifeboat and equipment, EPIRB's Pyrotechnirs First Aid Supplies Fire Protection Equipment and precautions Navigation Equipment - lights, compass, radio, etc
	13:30	**Review Session with wrap-up and recommendations**

Appendix 3. REGIONAL REGIMES FOR FISHING VESSEL INSPECTION

David V Robin
Surveillance
Coordinator
OECS
Fisheries Unit

AIM

The aim of these notes is to provide an overview of some of the regimes applicable to inspection of small fishing vessels in the region and to highlight some possible requirements for their enhancement.

INTERNATIONAL FRAMEWORK

A meeting of consultants on safety on board fishing vessels, jointly convened in 1974 by the Food and Agriculture Organisation of the United Nations (FAO), the International Labour Organisation (ILO) and the Inter-Governmental Maritime Consultative Organisation (now known as the International Maritime Organisation), for the purpose of finalising the text of Part B of the Code of Safety for Fishermen and Fishing Vessels, which applies to vessels of 24 metres in length and over, recommended that the three Organisations should continue to operate with a view to establishing voluntary guidelines for the design, construction and equipment of vessels of less than 24 metres in length. These guidelines for vessels of 12 metres in length and over but less than 24 metres were published in 1980. The guidelines aimed inter alia "to provide information on design, construction and equipment of small fishing vessels with a view to promoting safety of vessels and safety and health of the crew" and to "guide those concerned with framing such national laws and regulations." '

Since being published, these guidelines have been widely employed in the formulation of shipping and fishing laws of many States. Associated provisions for the inspection of vessels have been included in such legislation to provide the necessary monitoring mechanisms which will ascertain that prescribed standards are being adhered to.

REGIONAL FRAMEWORK

In most cases in the region, the (Merchant) Shipping Acts of CARICOM states which

[1] FAO/ILO/IMCO Voluntary Guidelines for the Design, Construction and Equipment of Small Fishing Vessels regulate shipping activities provide for the registration of fishing vessels. However, most of these laws provide for a mandatory minimum cut-off point of 15 GT. As the majority of fishing vessels in the region fall below this mandatory cut-off point, the inspection needs of fishing vessels are scarcely addressed under the (Merchant) Shipping Act.

To address the safety inspection/monitoring needs of the region, two (2) approaches have been used or are being considered. These are:

1. Delegation of the responsibilities under the Shipping Act from the marine authorities to the fisheries authorities, in respect of fishing vessels; and

2. Placing these responsibilities, in respect of fishing vessels under the fisheries act.

In Trinidad and Tobago, the responsibility for the keeping of a register book for fishing vessel, by the Registrar of Ships, under Section 14 (1) (b) of the Shipping Act is delegated to the Director of Fisheries, in respect of fishing vessels not exceeding 24 metres. Apart from inspection, safety certification and monitoring, this responsibility involves the requirement for the registration and the marking of fishing vessels in accordance with the provisions of the Shipping Act and Regulations.

In the case of Barbados, information provided states that the Shipping Act does not make provision for the inspection of fishing vessels. The Barbados Fisheries Act 1993 - 6, makes provisions at Section 31 for the inspection and certification of fishing vessels. Section 31 (1) clearly embodies the principle which requires the existence of a valid certificate of inspection, in respect of any vessel, a pre-requisite for its legal operation. This section also makes provisions for:

1. adherence to prescribed standards (sub-sections 3 and 10). These are only described briefly.

2. display of certificate in a conspicuous place (sub-section 5).

3. validity for a finite period, unless cancelled - in this case one (1) year (sub-section 6).

4. random inspection of fishing to monitor and ensure that prescribed standards are being adhered to (sub-sections 7 and 8).

5. cancellation of certificate if vessel is not being maintained according with the certificate of inspection (sub-section 9).

6. Penalties for breach of the aforementioned provisions are given in sub-section 10.

The Shipping Acts of the OECS Member States are for the most part typical examples of those which are unable to adequately address the requirement of the fisheries sector because of the high mandatory cut-off point. St Vincent and the Grenadines is an exception as it does not have a cut-off point. However, the process is extremely lengthy as small craft receive the same treatment as large ships. St Vincent and the Grenadines also has provisions in its Fisheries Act allowing for the registration and inspection of local fishing vessels. A question may arise as to which law has superior authority, given that the fisheries Act of 1986 did not provide for the repeal of the provisions of the Merchant Shipping Act relevant to fishing vessels.

Section 29 of the St Vincent and the Grenadines Fisheries Act provides that no vessel shall be put to sea "unless there is in existence in respect of such vessel a valid certification of registration".

Sub-section 30 (1) empowers the Chief Fisheries Officer to inspect without notice at any time, "any local fishing vessel for purpose of satisfying himself that such vessel is being maintained in a seaworthy condition".

Sub-section 30 (2) allows for the cancellation of the certificate of registration if the vessel is not found to be seaworthy upon inspection pursuant to sub-section 30 (1). The vessel shall be removed from the register of fishing vessels and deemed to be not registered.

Sub-section 31 (1) prohibits the use of any local vessel for fishing or related activities unless there is in existence a valid Certificate of Registration in respect of that vessel. Sub-section 31 (2) provides for a penalty where vessels are used in contravention of subsection (1).

A first draft of a revised OECS harmonised fisheries law includes provisions for the registration and seaworthiness of local fishing vessels.

It provides inter alia that:

1. "No local fishing vessel shall be used for fishing or related activities unless such a vessel is registered under this Act and there is in existence a valid certificate of registration and a valid certificate, of seaworthiness issued in respect of that vessel."

2. "The Chief Fisheries Officer shall ... inspect the fishing vessel ... and if satisfied that the vessel is seaworthy and fit for the purpose of fishing shall:

   (a) issue to the owner a certificate of seaworthiness in respect of that vessel;

   (b) register the vessel ..."

3 "The Chief Fisheries Officer, or any fisheries officer designated by the Chief Fisheries Officer for this purpose, may at any time inspect without notice any local fishing vessel for the purpose of determining whether the vessel is seaworthy and fit for the purpose of fishing,"

4 "whereupon inspection ..., the Chief Fisheries Officer, or any fisheries officer designated by the Chief Fisheries Officer for the purpose of carrying out inspections .... is satisfied that the vessel is not seaworthy or unfit for fishing he may cancel the certificate of seaworthiness in respect of that vessel."

Penalties are provided for breach of these regulations.

OECS Member States are also considering a draft Registration of (country) Fishing Vessels Act which will remove the functions of registration and inspection from the (Merchant) Shipping Act.

TRAINING CONSIDERATIONS

Inspectors

A determination of seaworthiness implies the need for inspection of all aspects of a vessel. These will vary depending on the size and complexity of the vessel.

The inspection should include but not be limited to the following areas:

1. The integrity of the hull, through hull fittings, bulkhead door, hatches and pipes and other fittings;
2. Stability of the vessel;
3. Vessel machinery including propulsion and power generation plants;
4. Bilge pump arrangements;
5. Main and back-up power supplies;
6. Main and auxiliary steering systems;
7. Fire safety;
8. Navigational equipment/aids;
9. Lifesaving appliances.

There is the need for the development of prescribed standards for different classes of vessels. Fishermen

To parallel the training of vessel inspectors there is the need to ensure that fishermen are trained. All efforts will go to naught if fishermen are unable to appreciate what is required; ie the prescribed standards, and maintenance of their vessels in accordance with these standards. There is, therefore, need for some certificates of competency for fishermen. These may be at various levels, say, basic, middle and upper and should be determined by the type/class of craft to be operated and the area of operation.

Training for fishermen (vessel captains) could be covered under the following broad headings:

1. Watch-keeping;

2. Navigation;

3. Meteorology;

4. Seamanship;

5. Prevention of Marine Pollution;

6. Safety and Management;

7. Stability;

8. Ship constructions

9. Search and rescue.

Here again, the requirements for certification must be standardised.

Appendix 4. Small Fishing Vessel Inspection Workshop Consultants Report On Activities And Findings

Prepared For: CFRAMP

By: Lloyd Button
Ship Safety Branch
Canadian Coast Guard

Date: 1993-12-08

Includes Appendices:

A. International Comparisons on Fishing Vessel Safety

B. Further Training

INTRODUCTION

Among other deliverables, the terms of reference for the vessel inspection consultant supplied to CFRAMP by the Canadian Coast Guard required the provision of a "report on all activities undertaken during the consultancy". This document is offered as fulfillment of that requirement. The report is divided into an Introduction section, a Technical Observations and Comments section and concludes with Recommendations. Appendix A is an international comparison on fishing vessel safety prepared as a part of a Canadian Coast Guard study done in 1987. **Appendix B** deals with further training.

The itinerary arranged by CFRAMP allowed two one week workshop sessions, one each at Barbados and Antigua. A five week period was spent in the region.

Time outside of the formal workshop sessions was spent with familiarization of vessel types and related fishing activities. The first week was spent in the southern portion of the Eastern Caribbean with stops at Barbados, Guyana, Trinidad, St. Vincent, then return to Barbados. After the formal workshop period at Barbados, a further two days of field inspection was spent in company with Barbados fisheries inspectors. A familiarization visit was made to St. Lucia. A two day period of pre-workshop familiarization was spent with Antiguan fisheries officials.

Following the workshop at Antigua, a three day period was spent in report preparation.

The degree of fishing vessel development and the types of vessels found in the region are quite diverse. On a technological continuum, vessel types range between outboard driven dugouts at 20 to 30 feet overall length to factory produced fiberglass vessels up to 50 feet overall length propelled by inboard diesel engines and equipped with modern electronics. Other larger more complex vessels are active in the region, for purposes of this workshop and report however, vessels longer than 65 feet overall length were not considered. The current degree of fishing vessel inspection effort varies widely across the region with some jurisdictions newly establishing safety regimes and offers having in place long standing inspection processes. Generally, the people currently doing fishing vessel safety inspections are fisheries workers for whom the safety of life at sea and suitability of vessels for the fisheries pursued are areas of concern among many others. The fisheries workers are the front line field contacts between government agencies and the primary producers. Their duties are many and varied. Workshop participants came from diverse backgrounds, with a broad range of formal credentials represented. The objective of the workshop was to offer a very basic grounding in fishing vessel inspection. These sessions should not be construed as an all inclusive treatise of the subject, indeed what is achievable in such a short time frame should only be considered as scratching the surface. The need for a comprehensive treatment of vessel inspection in the region is acknowledged by CFRAMP. One of the mandates of this program is to recommend potential candidates from these sessions for further training and to make recommendations with respect to suitable training approaches, possibly at Canadian based institutions, at Caribbean based institutions or some other arrangement for blending of Canadian expertise into the needs of the Caribbean states.

The one week workshops allowed three one-half day field sessions wherein the primary inspection procedures discussed in the classroom were then presented in practical form. These practical sessions included both wood and fiberglass hull construction and repair procedures, through hull fittings, shafting, rudder fittings, electrical grounds, anodes, dry-docking and many other "in water" and "out of water" inspection items. Field sessions also offered good opportunity for discussion regarding many safety and vessel design considerations with readily available examples.

Lecture material was prepared in advance of the trainers arrival in the region, with topics being decided on with guidance from Mr. Paul Fanning, CFRAMP Data Manager/Analyst and research of the trainer's own accord and experience. The familiarization visits in advance of actual workshop presentations allowed "fine tuning" of the lecture material. Classroom sessions were conducted using a multi-media format of lecture handouts, pamphlets and brochures, overhead projections, graphic presentations, videos and open discussion. A technical reference library of printed material including design drawings was made available during both one week sessions, Document reproduction services were available to participants for the duration of the workshops.

The following topics were covered during the lecture sessions:

- Seaworthiness, Stability and Suitability for Task
- Fish Quality Maintenance
- Hull Inspection
    - Wood Construction
    - Fiberglass Construction
    - Inspection for watertight Integrity
    - Underwater Survey

- Inspection of Outfit and Components
- Sea Trials
- Inspection of Machinery and Equipment
- Inspection of Lifesaving Equipment
- Inspection of Navigation Equipment
- Inspection of Fire Fighting Equipment
- Vessel Inspection Recording

The following video titles were made available:

- The Brighter Side of Distress
- Sea Survival
- End of the Nancy J
- Fire Prevention and Control
- Alcohol and Boating
- Small Vessel Safety
- Can Fishing Be Safe?
- The Chemistry of Fire
- Safety Equipment and Survival Procedures
- Medical Emergencies at Sea
- Fishing Vessel Stability

The following titles made up the aforementioned reference library:

- Boatbuilding Manual - Robert M. Steward
- Nordic Boat Standard
- Sea-fish Industry Authority - UK, Wood Boat Rules
- Coast Guard Study Into Fishing Vessel Safety - CCG
- Training Manual For Inspectors of Fishing Vessels - CCG
- Safety and Health Practice for Skippers and Crews - CCG
- Sea-fish Industry Authority - UK, G.R.P. Rules
- Fisherman's Manual - World Fishing
- Marine Technology and SNAME News (May 1990), (paper on grp yacht surveys)
- Fish Inspection Regulations - DFO, Canada
- National Fish Quality Improvement Program - Procedural Manual
- Inspection and Repair of Wooden Hulls - USCG

-. Fish Hold Linings For Fishing Vessels - Dept of Fisheries, Newfoundland
- First Computer Inspection Report - CCG
- Teach Yourself Naval Architecture - B. Baxter
- Guide to Inspection Regulations for Small Fishing Vessels - CCG
- Marine Surveying Basic Aims - J.W. Bull
- Proposed Small Fishing Vessel Safety - CCG
- Wooden Ship Decay and How It Can Be Reduced - Dept of Fisheries, Newfoundland
- Marine Survey Manual - Gibbs & Cox
- Small Fishing Vessel - Safety Manual - CCG
- Stability and Trim of Fishing Vessels - J. Anthony Hind
- Safety Standard For Small Crafts - American Boat and Yacht Council
- Inspection Report System for Fishing Vessels < 15 tons - CCG

TECHNICAL OBSERVATIONS AND COMMENTS

The variety of vessel types seen during the course of this program offered a challenge with respect to providing technical comment in context of vessel design and inspection. The following paragraphs will attempt to shed some light through a record of observations and discussion held while in the region. These comments are based on a relatively brief period in the Caribbean but are augmented by several years of vessel design and inspection work in diverse locations.

The variety of vessels encountered could well keep an inspector/naval architect busy for years in identifying, measuring, categorizing and analyzing. The variety of wood types used, the style of fastening, methods of achieving certain structural details, hull shapes, superstructure configurations, fishing methods and gear, powering installations and differing boat building philosophies all conspire along with many other local practices to render any attempt at generalization across the region virtually impossible. This section highlights on a country by country basis observations in many areas of fishing vessels design, construction, operation and inspection. A mandate of vessel inspection cannot be addressed in its full context without also looking at design, construction and operation all of which also have a bearing on a fishing vessel's existence.

Some of the items addressed in the following discussion are: Stability and Sea-keeping, Structure, Machinery Installations, Underwater Fittings, Outfit, Lifesaving and Fire Fighting Equipment, Sea Trials, Inspection Requirements/Regulating regimes and Inspection Recording procedures.

GUYANA

One full day was spent in the Georgetown area, during which discussions were held with local fisheries officials and a visit was made to the fish landing area at Georgetown harbour. Three styles of wooden vessels were seen, all built locally of local grown timbers, a variety of woods being used to satisfy the variety of vessel types and their uses. The quality of woods available appeared to be good.

The smallest vessel, referred to as a "Chinese seine boat" is an open craft of 18 to 28 feet overall length driven by outboard engines of 15 to 25 horsepower and used as day boats. This vessel's hull shape is a long slender type, having a flat bottom, straight sides, straight, moderately raked stem (20 degrees from vertical), straight sheer line and flat transom stern. These boats are of simple rugged, heavy plank construction. From a vessel inspection/safety perspective, the following comments are offered: 1) These vessels are weak in the stem region in that the planks forming the vessel's sides are not adequately tied together across the stem piece. 2) The thickness of planks used in the boat sides is excessive. 3) Fastenings are sometimes too small in diameter. The excessively thick planks in conjunction with undersized fastenings on otherwise adequately sized transverse frames made for a lack of homogeneity in the structure, which likely contributes to the untimely demise of some of these boats. This was evident in the number of boats of this class seen "falling apart" lying on the mud at Georgetown. The wood appeared in good condition, but the vessels were literally coming apart due to failed fastenings. The Chinese seine boat, being of wood construction, would likely prove to be inherently buoyant in a swamped condition; however, this margin of safety would be compromised, as in any open boat, by the size of engine used, the weight of fishing equipment and number of persons on board.

The second class of vessel of interest in Guyana is the boat locally referred to as a "cabin cruiser". These boats are between 30 and 45 feet overall length, driven by outboard engines of up to 65 horsepower, fitted with an icebox for fish preservation and spend up to ten or twelve days at sea with four to five crew members. Aside from a small cabin at the bow (from which the vessel presumably derives its name), this is a large open boat with no attempt at watertight transverse subdivision. The forward cabin space is formed by a flush deck and slightly constructed transverse bulkhead, the purpose of which appears to be privacy of space rather than water tightness or strength. Construction type is carvel plank on single sawn frames. The hull shape might be described thus: long, slender multi-chine, having a shallow arch mid-ship section with knuckles formed at plank adjoinments, near-straight sheer line, stem profiles ranging from curved, to straight, to reverse curve, sharp fore-foot and flat transom stern.

These vessels are, in general terms, of adequately sized scantlings, and built to good standards, however, the following observations are offered:

1) Although a good measure of longitudinal strength is provided by single length hull planks, builders should be encouraged to provide additional strength at the gunwale and in the form of continuous well-fastened bilge stringers.

2) Fasteners in this class of vessel are undersize in some cases.

3) Joints between the individual pieces forming transverse sawn frames are inadequately fastened.

4) Underutilization of knee pieces at the transom and at thwarts could contribute to these vessels "springing" apart.

5) These vessels are inadequately tied together across the stem. The upper end of this size range should have breast-hooks fitted.

6) Being of wood construction, these boats may prove to be inherently buoyant in the event of swamping, however, given the length of time spent out, number of crew, and increasing size of iceboxes, some provision should be considered for attaining a measure of transverse watertight integrity and/or buoyancy tanks.

7) Since these vessels are at sea at night, navigation lights should be fitted.

8) Mast and rigging arrangements where fitted on these vessels are generally of a poor standard.

9) Little or no evidence of basic life saving, fire fighting or communication equipment was seen.

The largest of the Guyanese wooden boat fleet is the gillnet or snapper boat. These vessels appear to be an evolution of the "cabin cruiser" type. They are up to 60 feet overall length with inboard diesel engines. Hull shape is essentially a round bilge, heavy displacement type with knuckles appearing at the adjoinments of excessively wide planks. The vessels show a variety of stem profiles, a sharp forefoot, flat transom stern and deep skeg to accommodate the shaft arrangement. An inboard rudder is usually fitted. Construction is carvel plank on single or double sawn frames. These boats are decked over their length with a large, non-integral icebox fitted in an opening in the deck and a wheelhouse superstructure, usually aft, but also seen fitted forward. No watertight transverse bulkheads are fitted and of the examples seen, no attempt was evident at maintaining watertight integrity in the deck. The construction of these vessels is, as in the case of the previous two types discussed, generally good with the wood and some of its utilizations being of a suitable standard, however some practices observed warrant comment:

1) This class of vessel appears to have evolved quickly with no attention paid to a formal design process. The role of these vessels in the Guyanese fishing industry is gaining importance. The demand to go further from home port in order to increase catch sizes dictates increases in the amount of fishing gear, the number of crewmembers and the size of the fish box. The limits of an informal trial and error design approach to vessels of this class will soon, if it is not already, be reached. This accelerated vessel evolutionary process is not uncommon and only when life or property is threatened as a result of this too much, too big, too fast approach are the people who participate forced to take a closer, more analytical look at the process. These boats and similar ones in other parts of the region are, I feel at this point in their evolution.

2) The size and placement of iceboxes present a particular hazard with respect to transverse stability.

3) Vessels of this size without transverse bulkheads experience significant stresses in rough seaways which could result in catastrophic breakup.

4) The lack of any measure of transverse watertight division presents significant

danger in the event of loss of watertight integrity in the planking or underwater through hull fittings. Unlike their smaller, open counterparts, these vessels with inboard diesel engines, more elaborate outfit, and larger amounts of fishing gear would not likely have the benefit of inherent buoyancy in event of swamping.

5) The one new vessel of this class available for close scrutiny had a substandard shelf/clamp arrangement. Such members provide the essential hull to deck strength interface in a wooden boat and are a vital shortcoming when not fitted.

6) The size of fastenings seemed also to be a problem for this class. The situation of boats "coming apart at the seams" while the wood was still intact was observed with respect to these vessels as well.

7) There is a general lack of running lights for night time operation.

8) Mast and rigging fittings are of a poor standard.

9) A lack of lifesaving, firefighting and communication equipment was observed.

The table following is extracted from a paper entitled "Artisanal Fisheries of Guyana" by Chackalall and Dragovich dated 1979.

CERTAIN CHARACTERISTICS OF THE ARTISANAL FISHING FLEET OF GUYANA

Boats (No.)	Power	Length (m/ft)	Gear	Trip Length	Catch Composition	Crew	Preser-vation	Est. Annual Catch Thousand (lb)	Principal Fishing Area
2	Inboard Diesel	14/45	Hand-line	12-15 days	Snapper, grouper	8	Ice	84	Continental Shelf Edge, rocky areas (between 10 and 20 fathoms isobaths)
93	Inboard Diesel	12-15/40-50	Gill net	10-12 days	Gray snapper, croaker, gill-backer, tarpon pagees, mackerel, shark, trout	3	Ice	84	Areas between 10 and 20 fathoms isobaths
233	Outboard to 48ho	2-11/8-35	Gill net	2-3 days	Gray snapper, trout, pagee, shark, croaker, tarpon, gill-backer, mackerel	3	Ice	44	Area between 10 and 20 fathoms
388	Sail,	6-9/15-	Chinese	12 h	Seabob, White-	2	Fresh	24	Estuaries,

	Outboard 6–9 hp	30	Seine		belly, immature fish, bangamary, butterfish, cat-fish				river mouths, and banks on coast
178	Outboard 6 – 9 hp	6-9/15-30	Cadell	12 h	Cat-fish, shark	2	Fresh	24	Area between 5 and 10 fathoms isobaths
76	Sail	6-9/15-30	Pin seine	12 h	Mullet, snook, gueriman, cat-fish, croaker, bangamary	2	Fresh	24	Inter-tidal Zones
46	Combinatio n*	6-9/15-30	Combin ation	12 h	Combination	2	Fresh	24	

*** Includes sail and outboard motor. Sources: Fisheries Division, Ministry of Agriculture 1978 (unpublished).**

This table gives a more detailed breakdown of vessel types in Guyana, likely a reflection of more thorough research, but also possibly indicative of the changing fleet. A glaring difference is the quoted outboard engine horsepower. The numbers quoted for similar size vessels during my brief visit tend to be significantly higher. This is a typical development where these machines find an acceptance. A desire to have more horsepower seems to be universal, and similar indications were observed elsewhere in the region where outboards are in use, especially in St. Vincent and St. Lucia where the dugout is the dominant craft. High powered outboards are also prevalent in Trinidad and Barbados where both wood and fiberglass pirogues are used. The trend to overpower these vessels should be discouraged both as a safety measure and from a fuel economy perspective.

TRINIDAD

One day was spent in the Port of Spain area with brief excursions to two fish landing sites and meetings with Coast Guard and Fisheries officials. A fiberglass boatbuilding facility was also seen. Due to the brevity of the visit to Trinidad and the geographic separation of sites, only a basic overview of the situation there is possible. The following insert is a brief description supplied by Fisheries Division officials of vessels operating in the jurisdiction of Trinidad and Tobago.

INSHORE VESSELS

i. Open pirogue constructed of wood or fiberglass, ranging in length from 4.6 metres to 9.7 metres, powered by outboard engines of horse power rating from 25 HP to 150 HP, Those which trawl using a single stem trawl manually operated and operate in 1 - 3 fathoms are categorised as Type I Trawler vessels.

ii. Open pirogues constructed of wood or fibreglass, ranging in length from 10.3 metres to 12 metres, powered by inboard diesel engines of horse power ranging from 80 HP to 150 HP. Large vessels are decked with mounted seat, baitwell, toilet and sleeping accommodation. Those which trawl using slightly larger nets and a single stern trawl manually operated, in 4 - 5 fathoms maximum are categorised as Type II Trawler vessels.

iii. Bum-boats open true ribbed vessels constructed of wood or fiberglass ranging in length from 4 metres to 9 metres, powered by outboard motors of horse power rating from 25 HP to 75 HP. Larger vessels are decked with mounted seat and baitwell. Bum boats operate in Tobago fisheries.

iv. Mini stem trawler vessels, commonly referred to as 'Stern drags', categorised as Type III Trawler vessels are powered by inboard diesel engines of horse power rating of 75HP to 217 HP, utilize a hydraulic winch to retrieve a single stem trawl. These vessels range in size from 10,6 metres - 13.6 metres in length, possess super structure, electronic fishing aid and communication equipment.

OFFSHORE VESSELS

i. Multipurpose vessels, ranging in size from 10.6 metres to 13.6 metres using inboard diesel engines of 165 HP to 235 HP and adapted for a variety of fishing methods. These vessels have a super structure and are equipped with electronic fishing aids, communication and navigation equipment and have a storage capacity of 4.5 tons to 6 tons.

ii. Industrial 'Gulf of Mexico' displacement hull trawler vessels double rigged, around 22.3 metres in length utilize inboard diesel engines of 180 HP to 365 HP and are equipped with electronic fishing aids and communication equipment. Storage capacity in the vicinity of 13.5 tons.

iii. Longliners, ranging in length from 13.7 metres to 22.9 metres utilizing inboard diesel engines of 180 HP to 365 HP and are equipped with electronic fishing aids and communication equipment. Storage capacity in the vicinity of 4 to 13.5 tons.

Fiberglass has made significant inroads in recent years as a boatbuilding material, this being especially the case among the larger vessels, with large numbers of fiberglass pirogues also in evidence. No opportunity was available to view a good cross section of the wooden vessels, therefore no comments are offered with respect to design and construction. The visit to the fiberglass boatbuilding facility afforded an excellent inspection of work in progress, and in my opinion, the workmanship and ultimate seaworthiness of these vessels were of a good standard. Clearly, due attention was being given watertight integrity of the hull, adequate closing appliances in the deck and superstructure and suitable provision of transverse watertight subdivision. There also appeared to be substantial effort made towards achieving positive buoyancy in the swamped condition through foam and integral buoyancy tanks. Such objective becomes clearly compromised however as added weight in the form of fishing gear and other outfit items are placed onboard.

A particular disconcerting practice was encountered with a chance visit to a boat from the fiberglass builder earlier visited, when there was discovered to be no attempt at maintaining the watertight integrity of the aft engine room bulkhead in way of the shaft. A very rough opening had obviously been cut in the bulkhead and no bulkhead gland fitted. The vessel in question had

just arrived back in port from an aborted trip to the fishing grounds. Some work had earlier been carried out in the main deck which involved creating access through the deck to the lazarette compartment. These newly formed accesses were not of sufficient standard to keep water on deck from finding its way below. The master had aborted his trip to the grounds for fear of sinking. When the water found its way below the main deck there was then no transverse watertight bulkhead intact to prevent the whole of the under-deck space flooding all the way to the forward engine room bulkhead. This is not an uncommon practice, to find a boat-builder initially making good efforts at providing a product of integrity, but having those efforts shortchanged due to actions of others of less familiarity with the final objective or due to financial constraints as the building nears completion. An inspection regime executed by knowledgeable participants would move towards alleviating incidents such as the one described.

From discussions with Coast Guard and Fisheries officials in Port of Spain, it is understood that some progress is being made towards a vessel inspection process which would encompass a technical surveying component. Certainly the current "Draft Harmonized Safety Standards for Fishing Vessels from OECS Member States" is a thorough point of reference for lifesaving, firefighting and general safety equipment. A six month training program is evidently under serious consideration. A vessel design, construction and survey component would undoubtably contribute significantly to the usefulness of such a training program.

As a closing comment I would point out the trend towards overpowering with outboard motors the many classes of open boats seen in the Port of Spain area.

ST. VINCENT AND THE GRENADINES

Nearly two full working days were spent on the island of St. Vincent, where the local fleet consisted of a variety of small open boats up to 30 feet overall length. These vessels are primarily outboard motor driven with some use of sails and oars, and are used exclusively as day boats, some venturing as far as 60 miles offshore. There are five basic predominant types, categorized locally as follows: Canoes, Pirogues, Whalers, Bow and Stern boats and Double Endeas. Another variety referred to locally as Sloops are built and used in the Grenadines, but these were not seen during the course of this activity.

Wood as hull material is on the wane in St. Vincent, as elsewhere, and a common approach is a light fiberglass lay-up over a traditionally built wood hull (an effort at lengthening the life of an aging craft one presumes). The wooden vessels seen were generally of a reasonable standard of construction, although with considerable room for improvement. Fiberglass hulls of the pirogue variety are popular and these are usually of a good standard, with inherent buoyancy designed and built in.

Plywood/Epoxy is reported to be another popular boatbuilding technique, although no vessels of this type were seen during the project. The tendency to oversize outboard motors is also evident in St. Vincent. This practice has a significant effect on transverse stability, especially on the dugout. By its nature, a narrow round bottom hull, the dugout with high washboard sides, without ballast placed low in the hull, tends to be inherently unstable. A large outboard engine mounted on the high transom found on the dugout raises the centre of gravity. Whilst underway

at speed, the dugout would not tend to heel due to its high rate of advance through the water, however, at rest the tendency to overturn would be considerable. From discussions throughout the region, I learned that prior to the prevalence of the outboard it was common to carry stones as ballast in dugouts, but this practice has fallen out of favour with the quest for greater speed.

A general dearth of basic lifesaving, firefighting and rudimentary emergency equipment was evident during my brief visit to landing sites on St. Vincent. When questioned on this matter, the boat owners' response was usually the universal one - "I take all loose equipment home to prevent it being stolen".

The predominance of open boats in St. Vincent, and in such a variety highlights the need for the establishment of guidelines regarding load carrying capability and engine horsepower. The variety of vessels and their uses makes this a rather difficult task compounded by the fact that builders and suppliers (and fishermen too of course!) are by nature of strong entrepreneurial bent and any attempt to suggest standardized guidelines with respect to loading or engine horsepower would likely be met with strong resistance. Such information would have to be in the form of suggested guidelines. A major effort at measurement and evaluation would be essential in order to establish a baseline reference for standardized guidelines, especially for traditional style wooden boats. The task would be much easier for fiberglass vessels built out of production moulds or plywood/epoxy vessel built of a common design. Most production fiberglass boat-builders in North America adhere to an industry guideline with respect to capacity and powering. These guidelines might be self-imposed by industry associations (United States) or might stem from government regulation/standards (Canada).

BARBADOS

Approximately two weeks were spent in Barbados, one week of which was taken up with conducting the workshop. Three days prior to the workshop were spent in familiarization with the local fleet. Two days following the workshop were used to accompany the local fisheries officers on routine vessel inspections. Visits were made to the primary landing sites at Speightstown, Oistins and Bridgetown along with visits to several secondary and tertiary sites. Visits were made with shipwrights engaged in repair, rebuild or new construction of wooden vessels. A visit was also made to a local fiberglass boatbuilding facility.

The stated of the fleet in Barbados, the inspection regime already in place and the relationship between local fishermen and boat-builders and fisheries official all served to make an ideal environment in which to conduct this workshop/training program.

Three principal vessel types are identified by Barbados fisheries officials for inspection purposes, these are: 1) Moses, 2) Launches (Day boats) and 3) Ice Boats (offshore vessels). The following, extracted from a Barbados government publication describes these types:

MOSES

> Moses are open boats varying from 3m to 6m in length and propelled either by oars or outboard engines of 10-25 horsepower. Moses are used mainly for fishing on the reef.

LAUNCHES (Day boats)

Launches are usually wooden fishing vessels varying from 6 to 12 metres in length and propelled by inboard diesel engines, ranging from 10 to 180 horsepower. A few launches are made of fiberglass. The engine is amidship in the cabin house and the vessel steered by tiller.

ICE BOATS (Offshore vessels)

Ice boats are offshore fishing vessels which spend several days at sea before returning to base. They are made of either fiberglass or wood and many are similar in appearance to the launches. Most of these vessels measure over 12m in length. They are equipped with insulated ice holds of capacity ranging from 4 to 12 metric tonnes, inboard diesel engines and modern communicating, navigating and safety equipment.

Two other types were also identified by local officials: Longliners with inboard engines up to 65 feet overall length used offshore and a launch type with outboard engine.

Barbados by far, has the most developed fishing fleet of the jurisdictions seen during this workshop. The fleet is dominated by the inboard driven launch type with the small open moses types being second in gross numbers. Wood is still the most prevalent material, however fiberglass, as elsewhere, is making significant inroads into the local fleet. A variety of woods are used across the vessel types, typically utilized thus: Mahogany - Frames and Stem; Greenheart - Keel; Silver Bally - Planking; Oregan Pine - Planking; Santa Maria - Planking. The standard of workmanship varies somewhat from mediocre to good, with excellent examples of wood boat construction exhibited in some medium size moses types. The fiberglass Ice Boat being manufactured on the island of Barbados is to a very good standard of construction. The existing regulations and new draft currently available to the Barbados fisheries division service are quite thorough in their requirements for safety equipment and procedures on board. Statistics supplied by the division indicate a decline or leveling off of incidents where vessels need assistance at sea, and this in the face of a growing fleet. These records are available from 1967 onwards. Such numbers should certainly be seen as an endorsement of the present inspection regime. With the level of technological sophistication increasing in the fleet and vessels able to go further afield, stay longer, withstand more adverse weather conditions and greater commercial pressures being brought to bear the incidents at sea statistics are likely to continue providing justification for regulatory intervention on the part of the government. Conventional wisdom among developed nations (eg. Canada); with respect to financial rationalization of the support required for offshore small fishing vessel fleets, has it that money spent in prevention through education, regulation and gently-nudged self-compliance are a cost-effective use of public funds, considering the alternatives of search and rescue and towing. The benefit of additional lives saved is of course immeasurable in monetary terms.

The following comments are intended to highlight some specific items which fisheries officials in Barbados might consider addressing in their role as vessel inspectors:

1) Launches and Ice Boats of wood generally show a lack of attention to some detail in their assembly. Longitudinally these vessels sometimes lack bilge stringers, deck shelf/clamp, hog or kelson piece, and often have poorly made joints in the keel. Lacking also are

consistently fitted knees in transverse and longitudinal joints. The transverse strength across the stempiece is usually poorly executed and, especially at the upper end of the size range, these vessels could benefit substantially from the fitment of breasthooks. Deck openings usually show poor or no fitment of carlin pieces. These are specific wood boat building details which seem to have over the years been lost from the shipwrights craft. Wood is losing ground to fiberglass as hull material and perhaps the lack of such important structural details is indicative of a generally waning skill.

Scantlings seem adequate throughout most of the wood boat fleet however, one example of a vessel of 50 feet length overall was seen, and in the absence of any design drawing/analysis, it would appear to me some of this vessel's structure was seriously undersized, specifically the transverse frames, forward deadwood and horn timber.

Fastenings too is an area of concern in the Barbados fleet. The fastener in common use is copper rod with a coin on each end, the ends flattened to make the assembly into a rudimentary "rivet". The coins appear to fail early in the life of these "rivets" thus rendering the rod ineffective as a holding device in tension. The rods often appear to be of inadequate diameter for the task at hand. As discussed under the Guyana fleet notes, my "inadequacy of fastening" theory stems partially from observations of boats falling apart on the beach with the wood still intact but the fastenings having sprung free. In Antigua where the preferred fastening is a bolt and nut arrangement for all main structural items (even futtock frames), boats last much longer, with some reported to be fifty years old.

2) A widespread practice in Barbados is the lengthening of wooden hulls. This process involves disassemblage of the aft end of the boat from about the existing sternpost to the transom. The transverse frames in this region are completely removed and the horn timber lengthened to provide the centreline backbone support. Planking is removed in a staggered pattern so that when the new planks are placed a good shift of butts pattern is achieved. The woodwork in these lengthening efforts seen during my stay in Barbados is quite acceptable, however only in a few instances were the aft deadwoods also lengthened. In most cases the deadwoods were not pushed aft thus leaving the extra length of hull as a cantilever inadequately supported at its fixed end and too weak over its considerable length to support itself. A hogging aft body was not an uncommon sight in these boats. The rudder was usually placed in a new position as for aft as possible thereby moving it beyond the propeller wash {only in the few cases where the deadwoods too were lengthened was the propeller also moved aft). With the rudder this far removed from the propeller wash one has to wonder about its response to the helm and course keeping effectiveness especially in slow maneuvering situations.

3) The lack of transverse watertight subdivision or integral buoyancy in wood hulls is evident in Barbados as elsewhere in the region. The implication of these shortcomings were discussed in earlier paragraphs. Suffice to say here the chance of surviving a flooding incident is significantly less when subdivision is not built in. The fiberglass vessel being built in Barbados has quite adequate watertight subdivision with integral foam filled buoyancy and would likely survive afloat any incident short of a totally

overwhelming sea or catastrophic structural breakup. These safeguards, however, become compromised with the deadweight loaded on board be it fish, ice, gear or other added weight. Field inspectors should be cognizant, on these fiberglass vessels, of how easily this subdivision is loss when a bulkhead is pierced for a convenient fitment of a minor wire, hose or some other equipment. Vessel owners will often pierce a watertight bulkhead near the deckhead in the false belief that a hole cut high up inside the hull will somehow not sacrifice the subdivision. This is simply untrue, In the event of one side of the division being flooded the water will flow into the damaged compartment, thereby bodily submerging the vessel until the waterline is at the deck level. If a bulkhead is pierced at just below the deckhead the water will of course flood into the next compartment, then so on until the boat is completely submerged. If the then submerged vessel has not enough inherent buoyancy remaining it will sink. The scenario painted here is not an uncommon one and is often found to be the case with vessels having sank when those on board were of the erroneous belief they were on an unsinkable platform.

4) An area of expressed concern on the part of the Barbados fisheries officers is the increasing size of ice boxes on board the local fleet, and without doubt these boxes pose safety challenges in two ways: a) encroachment into deck space to the point where accesses are being blocked and treadspace on deck is compromised and b) limits of stability and loading are being reached.

The first of these two concerns is quite easily addressed in that guidelines could be drawn up and published for access clearances, deck spaces and any other aspects of the vessels' work safety which these oversized boxes might be jeopardizing. The second concern of stability and loading cannot be as readily addressed without a more technical approach to the problem. In my opinion, the size of some ice boxes seen represent a near infringement on safety and seaworthiness. Such opinion may however be substantiated only with objective technical analysis and such analysis would need be in the form of what is referred to in naval architecture parlance as "trim and stability booklet". The preparation of this booklet for one vessel would then represent data relevant for only that vessel - unless the vessel in question were one of several identical boats having sistership status. Vessels built of wood as "one-offs" by different builders to different owners' preferences do not normally qualify as sisterships. Boats produced out of a production facility such as a fiberglass boatbuilding shop could well qualify as having sistership status. Where a number of vessels of a class (or sisterships) exist, the feasibility of carrying out stability and loading analysis becomes more realistic in that the technical information which is expensive to produce may apply to a series of vessels and not to only one as in the case of a "one off wooden boat. The cost may be amortized over several vessels in other words. The present fiberglass fleet status in Barbados is in my opinion at the stage in its evolution where a stability analysis applicable to a number of sisterships should be considered. Two objectives would be achieved: a) the technical analysis on which to case decisions regarding stability and loading for the vessel class thus examined would then be available as a matter of record to all in the industry and b) such analysis could serve as a benchmark against which other similar boats could be judged and from which guidelines could be established. It simply won't do for government inspectors to tell fishing vessel owners and operators "your vessel looks unstable". Such seemingly callous expressions

will not alter behavior. A technical analysis based on established naval architecture principles would carry more weight with vessel operators as well as form a solid basis for regulatory intervention.

5) A systematic underwater inspection procedure should be considered for larger vessels in the Barbados fleet. Presently through hull fittings, shaft/bearings/propeller arrangements, and steering arrangement are not inspected on a regular basis. The underwater hull itself is seen out of the water frequently as vessels are taken out at the primary landing sites on a yearly basis for regular maintenance thus facilitating an informal underwater hull survey. It is the underwater hull attachments that are not seen regularly and are the items most prone to cause problems. The larger Ice Boats and some Launches travel quite long distances from shore and the consequence of failure in any item associated with the underwater outfit could be serious and result in a dramatic toll on human and materiel resources.

6) Basic lifesaving and firefighting equipments are adequately covered in the existing regulations. However, general observance leads me to believe these are areas where some gentle nudging might be employed by the inspection service. One area of firefighting which might be considered in the installation of a fixed fire smothering system in the engine room on vessels larger than about 40 feet overall length. Also, the lack of a facility to service inflatable liferafts on the island leaves this device a much underutilized lifesaving aid.

7) One final note on observations made in Barbados (and this applies to all jurisdictions where larger vessels were seen dry) - boats are poorly supported by docking blocks when out of the water. Boats are often seen propped with single length, slender supports thus creating a point load on the hull. Oil drums are also widely used. These too, while creating the impression of distributing a load over a larger surface, in fact, due to their rigid shape also create heavy point loads onto the hull surface. A more suitable approach would be built up supports of alternating short pieces of timber which could be contoured to the hull shape at point of contact.

ST. LUCIA

One full working day was spent on the island of St. Lucia, this time spent in company with a fisheries officer on visits to several landing sites on the southern end of the island. The dominant vessel type seen was the open dugout with built up washboards, driven by outboard engines and ranging in size between 20 and 30 feet overall length. The fiberglass pirogue seen elsewhere in the region is beginning to show up in St. Lucia.

My observations regarding open boats being overpowered with large outboard engines in St. Vincent are equally valid for St. Lucia. St. Lucian officials indicate a high loss of life from accidents involving dugouts, suggesting a need for pre-emptive actions. Guidelines with respect to matching size of outboard engines to open boats were made available to workshop participants. These guidelines were contained in the American Boat and Yacht Council - Safety Standards for Small Craft and might not be directly applicable to the type of boats in question

they could however serve as a reference from which to develop fleet-specific suggestions. Lack of basic lifesaving equipment also appears to be a problem in St. Lucia.

One area of particular concern which came to light during discussions in St. Lucia is the need to have emergency rations of food and water on board smaller open boats. These boats go long distances offshore in a region where currents are pronounced. If mechanical breakdown occurs, the boats may drift quickly out of range of assistance. Incidents of fishers on a quick day trip to the grounds spending several days lost at sea are not uncommon. Basic food and water rations could mean a difference of life and death in such situations.

ANTIGUA

The fleet in Antigua is made up of approximately 250 vessels categorized by fisheries officials as follows:

Sloop: any vessel with one mast, of which could be open or closed deck, cabin or no cabin, inboard or outboard motor. Size ranging from 16-55 feet overall length.

Sport: vessel used primarily for trolling. These vessels are normally made of fiberglass and carries modern navigational and communicational equipment. Rod and reel assisted by out riggers are the main fishing tackle used. Size of vessels range from 18-60 feet overall length.

Launch: vessel with no mast and been propelled by inboard motor. Size ranging from 25-70 feet overall length.

Open boat: vessel with no pronounced decked surface. The bottom of the boat forms the working platform; powered by one (1) or two (2) outboard motor(s). Size ranging from 8-25 feet overall length.

Open Cabin: same as open boat, but has a cabin or well pronounced spray-shield. Cabin could be either forward or aft. Size ranging from 12-27 feet overall length.

Long Liner: Vessel used primarily for surface longlining; especially for highly migratory pelagic species; swordfish, tunas etc. Size of single vessel counted (53) feet overall length.

The majority of vessels seen during the consultancy period were of the sloop, launch or open boat variety, almost exclusively of wood construction. The wood vessels in Antigua are built to an acceptable standard of wood construction with substantial bolt and nut fastenings employed throughout. My comments in the Barbados section regarding details of the boatbuilding art being gradually erroded are also pertinent. Significant details of wood boat construction are either missing or poorly executed. One omission seen in the Antiguan vessels not noted elsewhere was the lack of continuity in transverse frames across the centreline. Frames were seen to be often

butted against the keelpiece without a floor fitted. A variety of woods are used in construction, mostly from within the Eastern Caribbean region but with some species being imported. Locals indicate vessels of the sloop type last thirty years or more.

The following items highlight some particular areas which inspectors should be aware of:

1. The Antiguan fleet shows a general lack of watertight subdivision barriers. This omission has been discussed elsewhere in this report, particularly in the Barbados section.

2. Several incidents of missing hatch covers and other closing appliances were noted on decked vessels.

3. Vessels lacked knee joints in areas of critical transverse/longitudinal strength transitions.

4. Bulwark rails and sanctions were not fitted

5. Bilge stringers were poorly or not at all fitted

6. The requirements of basic safety equipment are recognized by fisheries authorities and the information is circulated to receptive fishers. However, enforcement and compliance with these requirements generally fall short due to financial considerations.

7. A number of vessels from the pleasure boat sector seem to be finding their way into commercial fishing activity in Antigua. These boats are usually of fiberglass construction and usually require extensive repairs/modifications to make the transition. Inspectors should be aware that such conversions often result in areas of watertightness, structural integrity, stability and loading and operational considerations all being compromised.

RECOMMENDATIONS

The following recommendations are a broad ranging set generated over the course of experiences gained during a brief but intensive exposure to the many and varied fishing vessels and industry conditions existent in the Eastern Caribbean region. Some recommendations are of my own accord, some resultant of discussion with participants at many levels of the industry from the people in the fishing boats to senior government officials. The responsibility for tabling all of these suggestions is however my own and the intention in all cases is to be constructive:

1. The wooden boat fleet in Guyana would benefit greatly from introduction of formal design and construction skills. The raw materials so readily available could be utilized more effectively with proper implementation of boatbuilding skills. A scantling standard should be developed and made available to builders. Use of nut and bolt fasteners should be encouraged especially in the main structural members.

2. The larger (greater than 40 feet) decked vessels throughout the region should have watertight subdivision fitted in the form of at least three watertight bulkheads.

3. A project to establish stability and loading characteristics of vessels employing ice boxes should be instituted. This is especially important in Guyana and Barbados. A similar project of "design inventory" would be beneficial for all vessel types in the region but would require a major effort.

4. Inspectors should concentrate on seeing the following minimum safety equipments on board: life jackets, fire extinguishers, bilge pumps, lights, radar reflector, emergency food and water supplies.

5. Inflatable Life Raft or other emergency floatation aid should be on board all vessels greater than 40 feet.

6. Boat owners and fisheries workers should be provided with some basic guidelines regarding carrying capacities and outboard motor capabilities for open vessels, especially dugout canoes.

7. If new wooden vessels continue to be constructed in Barbados scantling standards should be developed or an existing set of wooden boat construction rules should be adopted/modified to suit (eg: Lloyd's Register Of Shipping Rules For Wooden Boats). Use of fasteners in accordance with these rules should be encouraged.

8. A process of training fishermen in basic seamanship, navigation and safety should be instituted, especially in Barbados where the fleet is growing in technical advancement and commercial considerations are pressuring crews to go further from shore for longer periods.

9. All jurisdictions in the region seem to be grappling with the question of who should have responsibility for the many regulatory aspects of the fishing industry. The Canadian experiences has led to a wide fragmentation of the many aspects of government regulation with which fishers have to contend. Any jurisdiction at the developmental stage with respect to registration, licensing and inspection regimes would be well advised to keep officialdom to a minimum

10. As vessels become larger and more sophisticated preparation of design drawings should be instituted as a part of an inspection regime.

APPENDIX A

IHTERHATIONAL COMPARISONS ON FISHING VESSEL SAFETY

Maritime nations were asked to provide details of their approach to fishing vessel safety. Replies were received from Japan, Norway, United Kingdom, and the Netherlands. A summary of their replies, along with comments on Canada and the United States follows.

Canada:

fishing vessels over 15 gross tons, about 4,000 boats out of a fleet of 41,000. Vessels over 150 gross tons or 24.4m in length, about 400 in total, receive a comprehensive inspection annually and are drydocked every two years. Vessels between 15 and 150 gross tons receive a complete inspection, including a drydock survey, every four years.

The remaining fleet, about 37,000 boats, are not subject to inspection although they must comply with regulations and some spot check surveys are carried out.

Japan:

With a very large fleet, more than 300,000 boats under 12m in length alone, Japan does some inspections on all fishing boats.

Fishing vessels over 20 gross tons undergo a quadrennial inspection in drydock with an intermediate inspection every two years. These vessels must comply with stability and safety regulations covering hull, machinery, lifesaving, and firefighting equipment.

Vessels under 20 gross tons but over 12m in length which fish more than 12 miles from land undergo a renewal Inspection every six years, with an intermediate inspection every three years. These vessels must also meet comprehensive stability and safety regulations.

Fishing vessels over 100 gross tons are also required to have certain radio equipment on board.

Fishing vessels under 12m in length, of which there are more than 300,000 in Japan, are Inspection by the Japan Craft Inspection Organization which is established and semi sponsored by the government.

Fishing vessels over 12m in length are inspected by government surveyors who are allocated to 64 branches of the Ministry of Transport all over Japan.

Norway:

All new fishing vessels over 10.67m must comply with the rules of Det Norske veritas. Where these rules are not applicable, the design and strength must satisfy the requirements of the Norwegian Maritime Directorate.

Vessels over 50 gross tons receive a comprehensive hull and machinery survey every five years, with intermediate equipment surveys.

Vessels under 50 gross tons, but over 10.67m in length, are inspected at two year intervals.

Deep sea fishing vessels over 15m in length and trading more than 90 nautical miles from the Norwegian coast are inspected and certified annually.

The stability of all fishing vessels over 10.67m in length must comply with the requirements of the Norwegian Maritime Directorate.

United Kingdom:

All U.K. registered fishing vessels of 12m 1n length and over are subject to comprehensive safety requirements covering hull and superstructure, freeboard and stability, machinery and equipment, structural fire protection, nautical equipment, and lifesaving appliances.

The standards to be met approximate the Torremolinos Convention requirements and are enforced by mandatory survey and certification every four years by a specialized section of the Department of Transport's marine survey force.

Vessels under 12m in length are not subject to survey and certification but are required to meet mandatory requirements for lifesaving and fire appliances and are subject to general legal requirements about seaworthiness.

The Netherlands:

There is no lower size limit of fishing vessels subject to inspection by government surveyors. According to the Dutch Shipping Act and Decrees all fishing vessels, about 600 in total, are subject to the same comprehensive annual inspection. The inspection includes drydocking, hull, machinery, safety equipment, and so on.

Although there is no difference in the kind of inspections, there are different sailing areas from coastwise to restricted in which different standards apply.

United States:

Safety regulations for U.S. commercial vessels have long been under the authority of the Coast Guard. U.S. fishing vessels are, by federal law, substantially exempt from these regulations. Only minimum safety standards are applicable and they address Hfesaving and firefighting equipment. The only licenses required for commercial fishermen are for those persons operating vessels of over 200 gross tons. Less than 1.5 percent of U.S. fishing vessels are in this category. Attempts to regulate the U.S. commercial fishing industry in the past have failed. Economic burdens that would accompany federal safety regulations were cited as being too great to justify the potential improvement in safety. A 1971 study entitled "Cost Benefit Analysis of Alternative Safety Programs for U.S. Commercial Fishing Vessels" recommended licensing of Masters, mandatory standards with full inspection and certification of new vessels, and a combination of mandatory and voluntary standards combined with inspection and certification for existing

vessels. The Coast Guard prepared appropriate legislation in 1975; however, a voluntary safety program was selected as a viable alternative.

Today there are approximately 33,000 U.S. documented commercial fishing vessels 1n the United States. Over the past several years casual ties involving this type of vessel have resulted In an average annual loss of 84 lives and 248 vessels. The annual death rate per 100,000 fishermen is approximately seven times greater than the national average for all types of U.S. industry groups and is believed to be the highest for any industry.

The human error in these casualties generally results from a lack of technical knowledge in vessel problems that do not relate to the business of catching fish. These include poor watch-keeping practices and procedures, navigational errors, rules of the road violations, and a lack of understanding of the various forces acting upon the vessel, especially vessel stabi1ity.

The U.S. Coast Guard established a full time Task Force to study the problem. The Task Force determined that an all voluntary program consisting of Vessel Standards and a Safety Awareness and Education Program to be the best approach.

The vessel standards program is contained in Navigation and Vessel Inspection Circular (NVIC) 5-86, "Voluntary Standards for U.S. Un-inspected Commercial Fishing Vessels". NVIC 5-86 is technical in nature and addressed towards insurance underwriters, naval architects, boat builders, marine surveyors, and vessel owners. It includes recommended voluntary standards Intended to be used as guidelines for increased safety on board U.S. un-inspected commercial fishing, fish processing, and fish tender vessels.

The Safety Awareness and Education Program centered on the development of the fishing "Vessel Safety Manual". It was developed in a joint effort between the North Pacific Fishing Vessel Owners' Association (NPFVOA) and the U.S. Coast Guard Fishing Vessel Safety Task Force. Whereas the NVICs are intended for the technical and design side of the fishing vessel industry, the "Vessel Safety Manual" is specifically tailored for the operational aspects and is focused on the fisherman. Master, and crew. The guide contains chapters which parallel the vessel standards but with more emphasis on pictures and diagrams. It is designed as a working reference tool for Masters and their crews operating a variety of vessels in different fisheries.

The Coast Guard[1]s Fishing Vessel Safety Initiative 1s the only comprehensive on-going U.S. governmental program aimed at improving the safety record on commercial fishing vessels.

CONCLUSION:

1. Among the countries considered, Norway and the United Kingdom, with fleets somewhat smaller than Canada's, approach fishing vessel Inspection 1n a manner similar to Canada. That 1s, vessels under 10.67m, approximately 15 gross tons, are not Inspected, but they must meet minimum lifesaving and firefighting equipment requirements.

2. The Netherlands, with a small fleet of only 600 boats and Japan, with a fleet in excess of 300,000, do some inspection on all fishing vessels regardless of size. The United States, with a fleet of 33,000 boats, do no inspections at all but rely on self-inspection.

3. Canada, with a fishing fleet operating in extremely harsh climatic conditions, has a record which compares favourably with other countries. From data supplied by Norway and the United States, the following statements can be made:

    - Canada, with a fleet of 41,000 boats, averages about 28 deaths a year.
    - Norway, with a fleet of 26,000 boats, averages about 35 deaths a year,
    - The United States, with a fleet of 33,000 boats, averages about 84 deaths a year.

4. Regulation and inspection is effective in reducing the loss of life at sea.

APPENDIX B

CFRAMP Fishing Vessel Inspection Program

Further Training

The terms of reference for this program called for the consultant to (a) identify from among the workshop participants "candidates for further training as trainees" and, (b) identify "an appropriate training program and institution".

The following persons are considered to be good candidates for further training: -

(1) DENNIS LESLIE

(2) EUSTACE HOLDER

(3) RAYMOND RYAN

(4) CHERYL JEFFERY

(5) GEORGE LOOBY

(6) JOHN IEFFERS

A specific course of instruction in small fishing vessel inspection is not known to be offered at institutions specializing in Marine Training in Canada. Vessel inspectors in the service of the Canadian Coast Guard come primarily from one of three professional marine disciplines: Marine Engineering, Seagoing Masters and Mates, and Naval Architecture. Canadian Coast Guard Ship Safety Inspectors come into the job usually after several years experience in the marine industry. To fulfill the requirements of small fishing vessel inspection duties, a candidate would require knowledge of the marine industry drawn from training, experience and exposures across the above three marine specific disciplines and any training program would have to be customized to suit the backgrounds of the recommended candidates. Since such a program does not already exist, CFRAMP might consider one of the following scenarios to fulfill the requirements of a small fishing vessel inspection trainers course for the region:

(1) The Marine Institute of Memorial University at St. John's has established programs in Naval Architecture, Marine Engineering, and Deck Officer Training along with expertise in all aspects of small vessel design and operation. The Institute has a long record of conducting custom tailored, short, intensive courses in various marine fields, for International clients.

For CFRAMP's needs, an on-campus course could be provided at the Institute in St. John's or an arrangement could be made whereby staff would travel to the region. This avenue may be explored further by contacting:

Mr. Sterling Pritchett
Marine Institute of Memorial University
P.O. Box 4920
155 Ridge Road
St. John's, NF CANADA
A1C 5R3
Telephone (709) 778-0200
Telefax (709) 778-0346

(2) The Transport Canada Training Institute at Cornwall, Ontario is another possible source which CFRAMP might access. The Institute specializes in the transportation sector and is a full service teaching facility. Staff for a vessel inspection program could be drawn from the expertise available in the pertinent disciplines at Ship Safety Branch. Although a vessel inspection course is not in the regular calendar, the Institute offers design and delivery of client specific programs incorporating client identified contents. This avenue may be explored further by contacting:

The George A. Scott Centre
Transport Canada Training Institute
1950 Montreal Road
Cornwall, Ontario
CANADA
K6H 6L2
Telephone: (613) 936-5701
Telefax: (613) 936-5716

(3) A third option, which is open to CFRAMP in developing fishing vessel expertise in the region would be to arrange secondments of expertise from one or both of the sources identified in (1) and (2) above. The trainers could spend an extended period in the region (up to eight months), and deliver the training program at an existing training institute in the Caribbean. A pre-delivery period of course preparation, pan spent in Canada and part spent in the region could also be required. This avenue could be pursued by CFRAMP via the contacts identified above and through the International Training Division of Transport Canada under whose auspices this workshop was arranged.