Proc., Symp. on Advances and Priorities in Fisheries Technology, SOFT(I) and CIFT Cochin, 11-13 Feb: 426-430, (1998)

A Cost Effective System for Medium Size Vessels in Deepsea Fishing

M. NASAR and S. AYYAPPAN PILLAI
Central Institute of Fisheries Technology, Cochin 682 029

Capability of medium size vessels, presently operating not far from the shore, to be employed for deepsea fishing is limited. A cost-effective engineering solution to employ these vessels for deepsea fishing by erecting an operating base at sea is discussed. The concept is introduced and an outline of the engineering aspects is discussed.

Key words: Medium size fishing vessel, deepsea fishing, fishing platform

The coastal fishing fleet in India have attained saturation point. The immediate need in fishing is to exploit the resources beyond 50 m depth at least up to 50% of the estimated maximum sustainable yield. Even though the pressure on coastal fishing is forcing the operators to move out in bigger vessels, the deeper water medium class vessels still resort to coastal fishing for fear of inadequacy of the vessels for deepsea fishing. Increasing production from the deepsea by deployment of vessels through chartering and joint ventures could only marginally increase production as they were fishing mostly within the 100 m range. Almost 70% of the cost of operation of medium class vessels are accounted for by fuel that goes up to 90% in the case of deepsea vessels. The ever-increasing fuel price is a matter of serious concern. The need of the vessels to adapt to different gear quickly and economically is another important factor in deep-sea fishing. Trained and highly experienced personnel for operation of medium class vessels are easily available while those for large vessels are few.

The above considerations point towards a deepsea fishing policy involving medium class vessels that are less capital intensive and can quickly and economically be adapted for operation of different gear. Deepsea fishing is generally associated with large vessels, whether it is power intensive trawling or low energy longlining. Therefore the concept of employing medium class vessels for deepsea fishing would seem conflicting and impossible. The criteria for successful deepsea fishing the world over has, in the past, been quantity and this has been achieved through more power, larger vessels and bigger gear which could be used on almost any type of seabed. The declining fish resources of deepsea, especially in the North Atlantic, and the increased legislation to protect the dwindling fish stocks has made other countries to change their approach towards deepsea fishing and are now trying to evolve new type deepsea fishing vessels which are flexible, modular, energy conserving, cost efficient in construction and operation and, most importantly, adopt a highly responsible approach to fishing. A method for overcoming two important hindrances in deepsea fishing efforts of the country, viz. absence of sophisticated vessels and

higher capital investment, by advocating the use of medium class vessels for deepsea fishing is discussed.

Design aspects

Large vessels are considered suitable for deepsea operation due mainly to their endurance (large fuel, fresh water and ice storage's), sufficient accommodation and fish preservation facilities. This is accompanied with consequent higher power needs and constructional, operational and maintenance costs. Such a vessel, apart from the advantage that it can exploit resources from a distant area, may not be, in most cases, more efficient in fishing than a medium class vessel operating near to shore. If a medium class vessel with adequate power to support the intended gear, is fuel efficient, has minimal motion characteristics and maximum stability in adverse weather conditions and has an insulated fish hold can be employed, deepsea operation could be made cost efficient. But this is stymied by the low endurance and inadequate onboard fish preservation facilities for longer duration. If these problems could be overcome without adding more facilities the proposal will become highly attractive for deepsea fishing.

A method suggested to overcome these problems is to create a base of operation away from the shore near to the area of fishing operations for sufficient group of such vessels, so that these vessels need travel only a short distance for fishing from the base. The method envisages a deepsea fishing platform that could easily be erected and relocated whenever needed to support a minimum number of medium size fishing vessels in the 15-16 m range. Such platform must have the following:

- Adequate facilities for handling, grading and storing fish
- Fuel oil storage to meet the needs of individual operating units
- Adequate *in situ* ice production
- Adequate fresh water storage which is either replenished from mainland or be produced *in situ* depending on economic considerations
- Minimum accommodation/recreational/rest facilities for the crew of the operating units as well as of the platform
- Adequate facilities to support the day to day maintenance of the vessels and their gear
- Adequate communication facilities to direct the operations of the vessels as well as to contact the mainland

The platform can be divided into a number of standard modules supporting oil storage, fresh water storage/production, ice plant, accommodation, operation control, fish handling and storing area, refrigerated store, generator station, gear store and maintenance depot. A platform of any size according to operational needs can be installed in short time by adding the required number of standard modules. These modules can be towed to the required position by the individual operating units themselves. Each module could be designed as a barge with required function that could also be propelled by a pusher tug. The platform can easily be stationed using conventional anchors and repositioned according to the operational needs. Size of

the platform can be determined by the sea conditions at the area of operation and facilities required. Individual refrigerated stores only need to be transported to the mainland. Pusher tugs could be utilised to transport the refrigerated barges to shore and the barges are designed to replenish platform requirements on their free run from mainland. These barges can easily be designed to accept reefer containers, which will enable easy and fast unloading at harbour and transportation of fish in prime condition to the point of processing/export.

The individual fishing vessels need have only the following:

- Adequate power for the intended fishing operation
- Required fishing gear
- A small wheel house for vessel control
- An insulated fish hold
- Global Positioning System (GPS), Fish Finder and low power communication facility to contact the platform

Modular design can be adopted for deck arrangement of individual operating units to facilitate change of fishing method economically and quickly as and when needed. Engine room arrangements and propulsion system too can follow a modular design for change of propulsive power according to operational requirements and the hull design of these units must support this change optimally. Sketches of refrigerated barge units for frequent transportation to shore, individual operating unit, and typical composition of a platform are shown in Figs 1, 2 and 3 respectively.

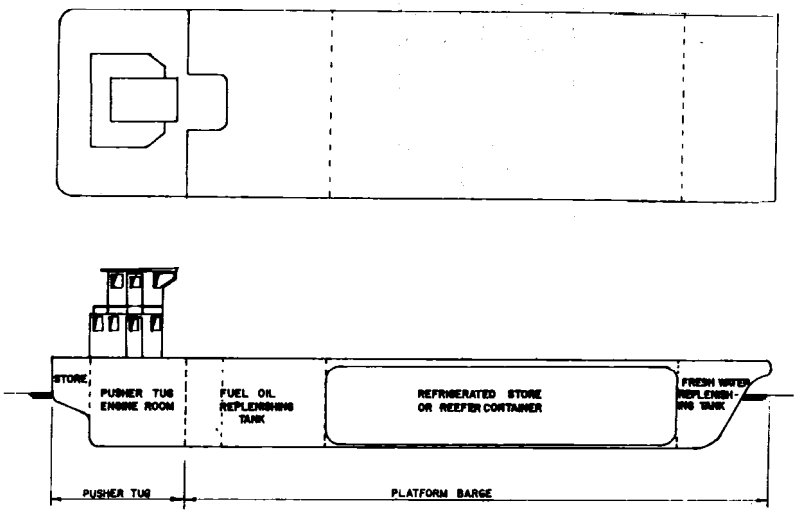

Fig. 1. Sketch of refrigerated transport units

Advantages

Construction of a modern deep sea fishing vessel and its maintenance require sophisticated shipyard facilities which are expensive and time consuming, whereas the modular barge units of the platform and individual fishing units can be easily

fabricated locally near the fishing centres. The engineering design involved is relatively simple as is the fabrication compared to deep-sea vessels. The size and operational aspects of these fishing units will be the same as that of an existing medium class vessel. Some of the existing vessels themselves could be economically employed in the above concept.

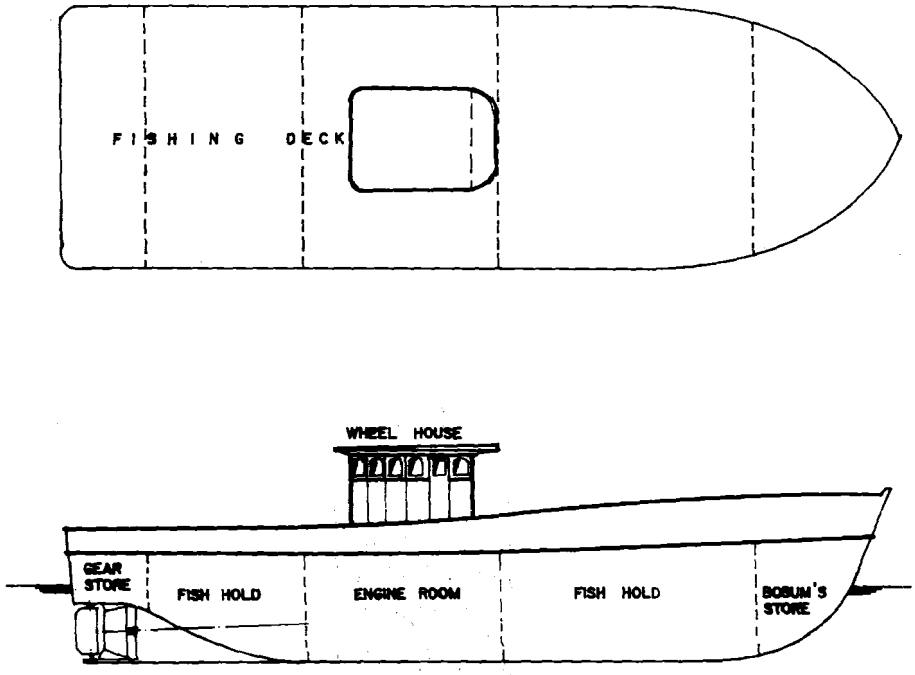

Fig. 2. Sketch of individual operating units

The individual units need not go too far from the platform for fishing. This leads to safe deepsea operations and feeling of high security in the crew motivating them to contribute more time to fishing. Crew can take short rests on the platform having almost zero motion characteristics compared to a deepsea vessel, which also will lead to better performance of the crew. Down time of individual units will be minimum or almost nil due to the availability of maintenance facility on the platform nearby.

The vessels can transport the catch in fresh state to the nearby platform where fish can be graded and preserved more efficiently than onboard the vessels. The preservation facility onboard the platform can be optimally used leading to energy conservation. Bycatch utilisation also can be effectively carried out as the fishing units need not discard low quality fishes for want of space, and even their processing can be arranged onboard the platform.

Total fuel consumption of the proposed system compared to a group of deepsea vessels having same fishing efficiency will be much lower. The individual units can effectively be assisted by inexpensive vessel-to-platform communication for efficient fishing using remote sensing data made available from mainland which will lead to higher efficiency in harvest compared to individual deepsea vessels. Since extensive

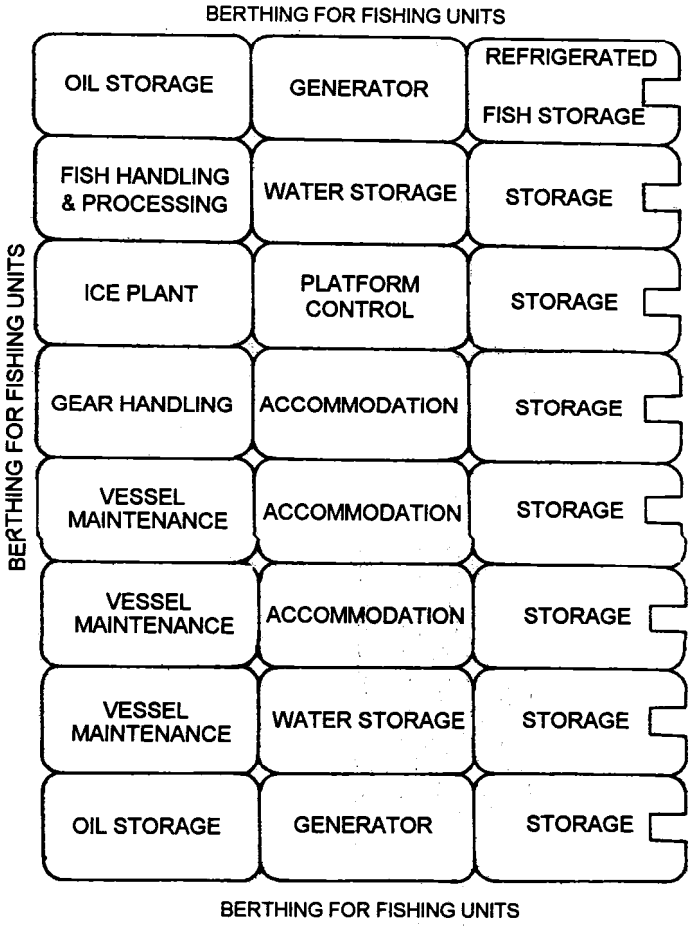

Fig. 3. Sketch of a typical deepsea fishing flatform

accommodation facilities are not required onboard the fishing units modular design of deck arrangement, engine room arrangement and propulsion system are possible leading to economical and quick adaptation to different gear and power requirements as needed. The proposed deepsea fishing system is cost effective and practical under Indian conditions for development of deepsea fishing.