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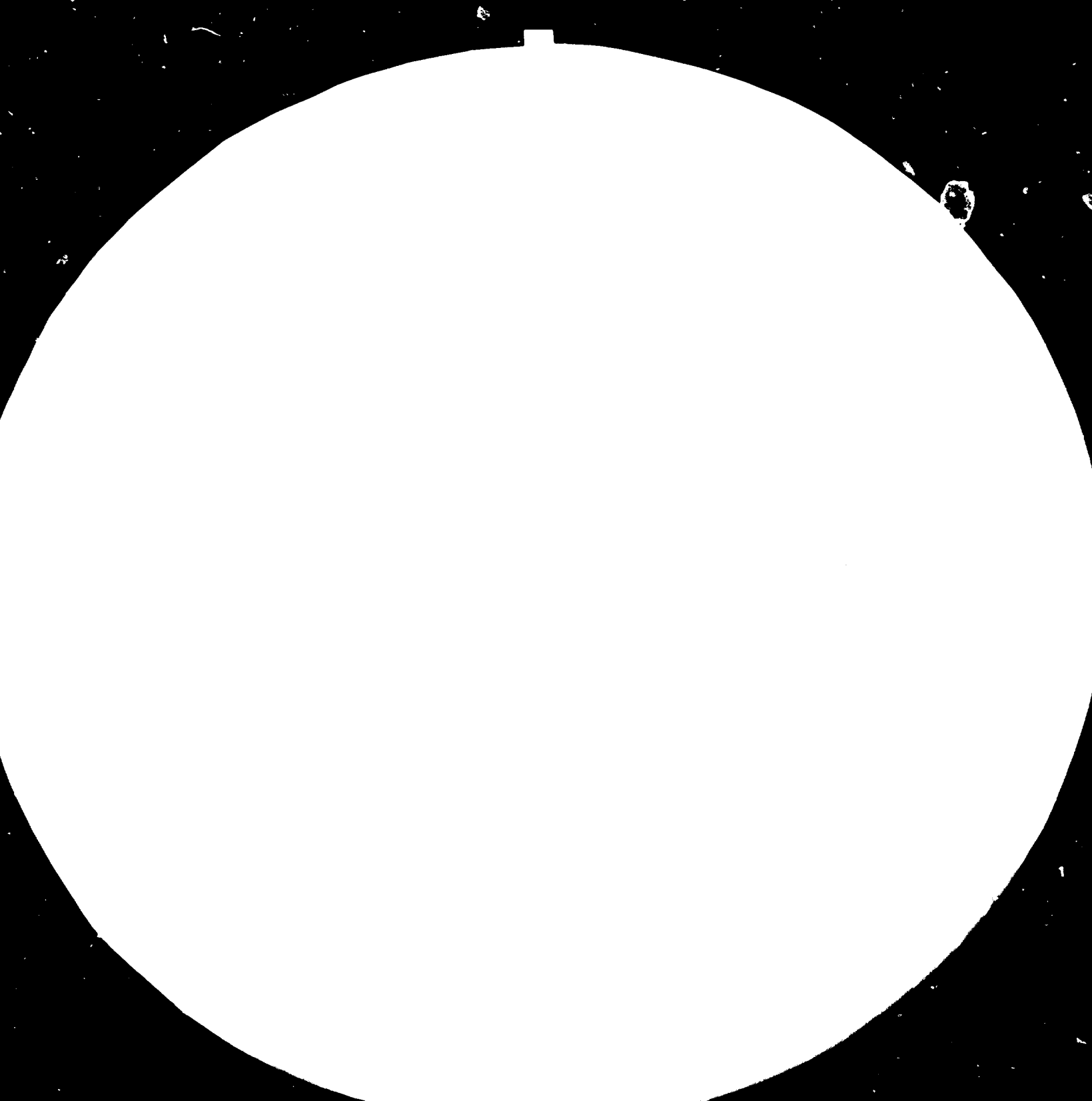

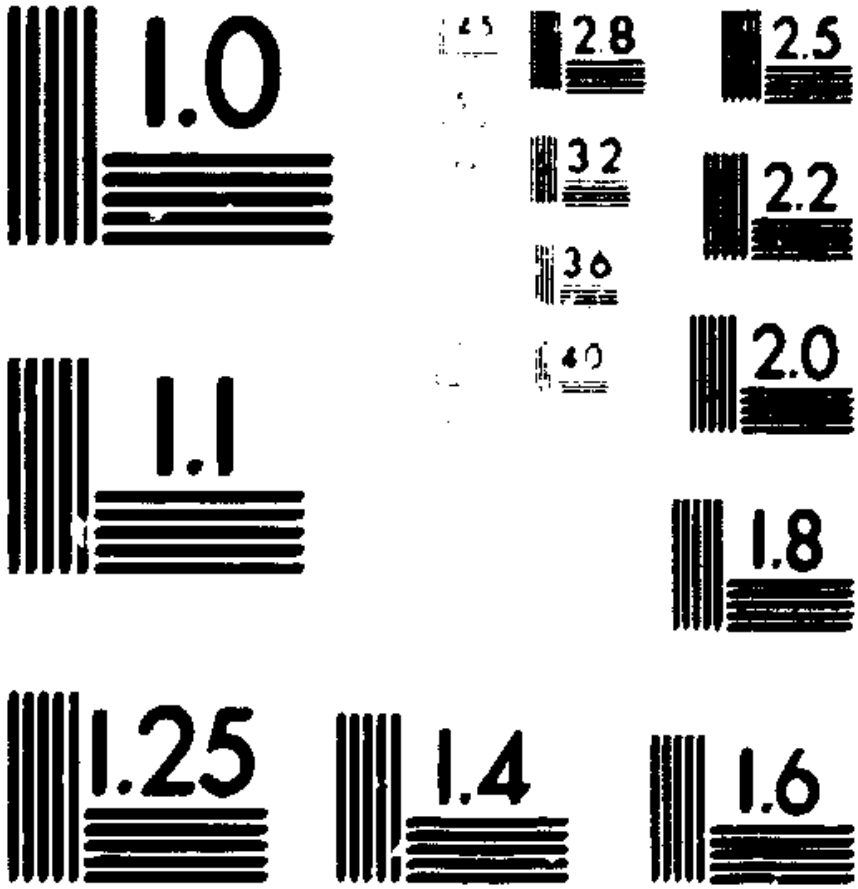

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SHIPBUILDING AND REPAIR DEVELOPMENT IN PAPUA NEW GUINEA*

prepared by

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** Papua New Guinea

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Boatbuilding

Boatbuilding activity in PNG has more or less followed the historical and cyclical pattern that has developed with the industry in other countries. Over the past decade, activity has been characterised by surges in demand followed by depressed conditions, although such peaks and troughs have not fallen into any distinguishable pattern. It is considered that at present, boatbuilding activity is in a depressed state, primarily as a result of recent minimal economic growth, and the economic conditions facing the country generally. While economic factors are usually the primary cause of marine industry depression in other countries, other factors, such as a high degree of dependence upon one particular consumer market (example the fishing industry) frequently inflate the problem. The domestic boatbuilding industry, at this stage of its development, does not face this ubiquitous problem.

Marine transport has always occupied an important role in the development of PNG, and will continue to do so. Boatbuilding skills have developed over a long period of time. Updated techniquies and skills been introduced progressively, primarily via the Missions, and the legacy remaining (and still perpetuated) is an important feature of boatbuilding activity, especially at village level, although it is now declining in influence.

For the purposes of this paper, the following categories of boatbuilding have been identified:

(a) Village Community
(b) Village Commercial
(c) Mission, commercially based and private
(d) The Public Sector
(e) Commercial

(a) Village Community

The major distinction for this activity is that it usually occurs within the confines of one or more villages that are linked by language, cultural and clan relationships. Generally, such activity is inspired by the presence of one or more persons in the community that profess to have a degree of knowledge of boat construction, usually through having been involved or in some way associated with such work in the past.

The motivation for such groups' to build their own vessel can be one or more of the following:

- economic considerations (cannot afford to buy a new vessel, or feel that they can build cheaper than commercially supplied).

- as a community project to provide gainful employment (although few participants are paid in monetary terms)

- as a means to an end of fulfilling self reliance/independence objectives for their community.

Once the project is completed (construction can be up to 5 or more years), it is usually wound up. There is generally no continuity of operation.

In the past, government financial assistance and inducements made it relatively easy for such communities to finance their project. However, the granting of such assistance tended to ignore other issues, such as the capability and competence of the community to undertake such a task, the ability of the community to operate and maintain the vessel, and the operating economics of the project post completion.

Up to 20 such community projects currently underway have been identified, although they then to be confined to two or three regions. All have suffered, or are suffering, major problems. The nature and scope of same are discussed later.

(b) Village Commercial

The characteristics of such operation are that the builder(s) have usually registered as a business group or association, and ostensibly operate along commercial lines in the sense that they solicit or accept orders for their product, operate with a profit motive, and maintain a basic record system. However, at this point the distinction tends to blur.

Village commercial groups may have been formed by one or more persons who have received either formal or informal training in wooden boatbuilding. The primary informal training influence has been via missions, and applies to the older generation of builder, while the younger generation may have had the benefit of structured and formal training. The difference between the two is demonstrated by the latter's willingness to utilise different construction techniques and material forms, and disposal towards modern workshop facilities, while the former is less adaptable in outlook and may remain content with traditional production facilities in the absence of anything more appropriate.

The yearly output of such groups varies widely depending on how well-organised they are, their ability to source orders, and their cashflow position. If all aspects were favourable, construction time for a standard type vessel would average six months or even less - however, rarely are all aspects favourable, thereby lengthening construction time, in some cases significantly.

Generally, construction of wooden planked (carvel) vessels in the range 7m to 9m are the norm, but vessels outside of this range are occasionally undertaken. Village group purchasers of such vessels will usually have some commonality with the builder or his community, especially intra-province.

Village commercial yards all lack financial strength. What facilities that do exist have usually been provided by way of surplus funds retention (uncommon) or contributions from the community (common). Working capital facilities are unheard of, with the result that such yards are totally dependent upon consumer financing.

These yards form a very important component of the boatbuilding spectrum, and a number of proposals will be developed to offer solutions to the diverse and specific problems that are faced.

Around 10 village commercial yards are in operation, with the large majority located within Milne Bay Province.

(c) Missions

Mission involvement has incorporated two main features - the provision of vessels for missions' own use, and informal vocational training. Both objectives continue to prevail, although the emphasis has perhaps changed. While vessels are still required for Mission work, the numbers of same have decreased. While training still forms an important part of mission field work, increasing emphasis and importance is no being placed on formal trade training.

Until recently missions did not become involved in commercial boatbuilding work. However, with requirements to become more self-supporting or even net revenue generators, some branches of the church have either taken the step to commercialisation of their most vivid example of the former is Span Enterprises, the proprietary company business arm of the United Church in PNG.

Because of the importance of vessels in Missions' field operations, the marine facilities they maintain are integrated, undertaking in addition to wooden boatbuilding, repair work and marine engineering. All have experienced personnel running their operation. All generally keep to themselves, rarely soliciting outside help or assistance in financial or other areas.

Up to six missions have direct or peripheral involvement in boatbuilding.

(d) Public Sector

Government or departmental involvement in boatbuilding is only selectively based, despite the number of departments having an interest in the sector. The Fisheries division, either on a national or provincial level, is the largest proponent, with facilities spread over a number of locations. The growth of boatbuilding activity by fisheries stations has corresponded more or less to its position as a fishery centre, the encouragement given by its sponsor, and the level of enthusiasm/skills brought to the project by station management.

Such involvement is primarily 'need' oriented. A second but lesser objective is training in conjunction with overall fisheries education. However, this latter aspect can become submerged in or confused with more general vocational training. Boat production is cyclical and does not follow any set pattern, usually as a result of 'need' requirements, and funding constraints.

Another, but much smaller, branch of Fisheries boatbuilding activity is incorporated within the National Fisheries College (NFC). Single unit production only is undertaken, over usually one or more courses, and the completed vessel may either be sold to recover costs or alternatively utilised by the NFC.

The Madang Technical College (MTC) also has a boatbuilding section. similar to the NFC, unit production is only undertaken, and the vessel is sold upon completion.

No provincial governments have any direct involvement in boatbuilding activity at this time.

(e) Commercial

Commercial activity is that regarded as being undertaken by business entities, primarily wholly or largely foreign owned and managed. Such boatbuilding has of recent times been of ad hoc/one off nature. In very few cases does it comprise what could be termed the major business activity of the entity.

In a number of cases the firm's entry into boatbuilding has been only of limited duration and for specific purpose, to be followed by withdrawal for short or long periods. This situation is perhaps understandable in view of the limited market for vessels of a type which are built by the commercial sector. Sometimes the short term venture has been profitable for the firm concerned, but in other cases, the venture has resulted in firms incurring losses. In the latter situation, this has probably caused the firm to withdraw permanently from boatbuilding.

For those firms with a major (but all the same incidental) interest in new boat construction, their other activities are usually capable of allowing them to mothball such operation, and to resurrect it whenever the need or opportunity arises. Such firms are usually horizontally structured, and can continue to profitably and efficiently utilise their investments in plant, facilities and people for and in other areas. Smaller firms, or those not so structured, are usually the first to suffer if demand falls off.

Capability of new vessel construction in steel, wood and fibreglass, up to about 15m in length, is within the domain of the larger firms. Series production is unusual (apart from large multi-orders from say government), although most firms tend to try and standardise their designs and hence output.

The three main categories of commercial activity are:

(1) that undertaken by firms, or divisions of firms, with an ongoing interest in servicing, or association with, the marine sector (examples are Steamships shipyards, New Britain Engineering, Sariba Slipway)

(2) opportunist activity, by firms who have capability in wood, steel or other construction, but whose primary activity is in other non-related areas (examples are Hornibrooks, Barclay Bros, Kavieng Welding Service).

(3) Small boat builders or assemblers, primarily involved in assembling or moulding aluminium or FRP dinghys and canoes. (Examples are Steamships Machinery, Kekereka Plastics).

These firms are considered to all have varying degrees of importance to the (Small Scale Marine Sector),with perhaps the first category most so, as they have the capability for fulfilling the need for specialist vessel requirements otherwise unavailable in PNG. Departure of these firms from their type of boatbuilding activity would render PNG almost totally dependent upon imports.

Hull Repair and Servicing:

By virtue that marine transport is so important to the country, and that there are correspondingly large numbers of vessels in existence, it follows that repair and servicing facilities should occupy an important position within SSMS Infrastructure.

PNG has a number of slipway facilities, although such are not spread evenly throughout the country. (See MAP2) Furthermore, there exist conflicting view points as to their capability, cost and appropriateness to certain sectors.

The country has no capability at all to service (below waterline) vessels of over 500 g.r.t. However, as this type of vessel is hardly within the SSMS with which this paper is concerned, no further comment is appropriate.

Below the level of 500t capacity, there exists the following facilities.

- slipways over 100t capacity (7)
- slipways 50t-100t capacity (6)
- slipways under 50t capacity (6)

For slipways over 100t, associated facilities are well developed. All are available for commercial work, with the exception of the defence slip in Moresby. All companies operating such slipways are either wholly or primarily involved in the marine sector.

Slipways of 50t - 100t capacity all have capability in dealing with most types of vessels. All are commercial, with the exception of the NFC slip in Kavieng.

Slipways under 50t capacity have been developed for specific purpose and use (such as an adjunct to another operation, or to provide self sufficiency), and commercial utilisation is not one of their primary purposes.

Generally, slipways under 50t are constructed because the proprietors of such a facility see same as providing (or having the potential to provide) a return on funds invested (that is, it is viewed as a productive and revenue generating asset); alternatively, because it is a necessary component of their other business interests or activity.

Few slipways under 50t are seen as capable of generating a net accounting benefit, and are provided mainly as a complementary facility to a more major undertaking, or for social or community use reasons.

The major business (and revenue) of a slipway is generated as a result of the legislative (survey) requirements imposed on shipping over a specified size (ie 10M.) via the Merchant Shipping Act and amendments. With the numbers of larger and older type vessels on the PNG coastal trade now showing signs of steady reduction (either voluntarily because of economic considerations, or compulsorily because of regulatory, licencing or other requirements), and replacement by lesser numbers of newer and perhaps smaller special or multipurpose vessels, the potential for economic utilisation of larger slips is being steadily reduced.

As far as smaller vessels are concerned, because vessels under 10m length do not require registration and are not bound to observe rigorous survey requirements, the tendency has been for vessels in this range to be constructed under survey length (ie under 10m). This has resulted in fewer vessels regularly requiring the use of slip facilities.

However, all vessels require to undergo hull maintenance and service at regular intervals over their life (although some small vessel operators would seemingly dispute this fact), so compulsion is only one reason for slipway utilisation. Slip facilities are important to the SSMS. In their absence, certain provisions of the Merchant Shipping Act would be difficult to enforce.

Lack of use, or unavailability to use, results in reduced operating efficiency, accelerated depreciation and thus higher operating costs, quite apart from potential safety considerations.

Larger coastal vessels are considered to be adequately catered for, with facilities located in four strategic shipping regions (Rabaul, Madang, Samarai and Port Moresby). For smaller vessels, commercial slip facilities are not evenly or appropriately distributed having regard to vessel numbers. Facilities catering to this market are in essence confined to the above places only.

Marine Engineering.

(for diesel) inboard and petrol outboard engines)

This sector is perhaps the best catered for in PNG, interms of distribution of, and expertise within, service facilities. The large majority of provincial centres have such facilities, usually provided by the distributors or agents of particular make types, or alternatively by general or special engineering workshops, either operating independently or associated with repair yards, or associated with a major user, such as Works and Supply, or the Government Ships Authority. The middle group normally have no make allegience.

Most organisations operating in this area are well equipped with plant and people resources, and should be able to handle most repair or servicing tasks. Where difficulty can and does arise is in the area of obtaining spare parts. Problems arise for any number of reasons, the primary ones being considered as follows:

- the proliferation of makes and models
- the age of the engines
- the sometimes deficiency of distributors to hold (or secure quickly) adequate part stock.
- the practical difficulties of distribution of parts in PNG.

Some of these issues are further discussed in later sections.

The Consumer Component

Village and Business Group Operators.

This segment presently comprises the largest user/ownership group of small vessels (5m-15m) in PNG. They are the sigificant component of the feeder trade (inter feeder port, and feeder port-main port), commonly called 'village shipping'.

The motivation for such a group to become involved in maritime activity is judged as primarily relating to self support and independence. Commercial operation and a profit motive are not necessarily seen as significant objectives. In very general terms, village shipping is probably not commercially viable (on a realistic accounting basis), nor is an economically sound business propostion. Its continued existence/expansion can only be attributed to the informal nature of the activity.

However, the justification for, and survival of, village shipping is the provision of base level transport and communication services, without which the economies of remote areas would be either severely retarded or break down completely. Village shipping has thus become a significant factor of rural development, particularly in those areas ehich are not served by road. Although the government has adopted the promotion of village shipping as an integral part of rural development policy (National Development Strategy White Paper 1976), until recently limited efforts were made to implement such policy. (The Department of Transport has however proposed a major project and study in this area which will begin in 1983).

While the economic situation affecting agricultural commodity prices has perhaps had something of a depressing effect on agricultural output, and thereby the demand for transport services plus other flow on activity, village shipping is seen as continuing to provide a significant market for the indigenous boatbuilding industry.

Over the last few years the financial help provided by government and other institutions has lessened in scope, with the result that groups are generally finding it increasingly difficult to secure the funds necessary to purchase a vessel. Apart from this, continued operation of the vessel in the absence of a positive cash flow is more or less dependent upon the sponsoring village or wider community providing cash inputs, in the absence of any form of subsidisation. When this input is exhausted, then the vessel is inevitably laid up on a short or long term basis, or alternatively is sold.

A further factor affecting the provision of village shipping, and thus the requirement for vessels, is the scope and reach of any land transport infrastructure (roads). Although no detailed study of this issue has been undertaken, it is apparent that where a coastal road link exists between two centres, then road transport quickly assumes the role as the primary transport mode at the expense of village shipping. The reasons for this occurring are somewhat mysterious, as if costs are assessed realistically, then shipping must have a significant financial advantage to producers and users over land transport. (See MAP 3.)

Other Commercial Operators

These vessels are usually a component part of a wider commercial activity, and are thus a vital adjunct to this activity. Although they operate within a commercial environment, they may or may not return a profit in performing their activity. Becauses the vessels are operated within the commercial contest, more substantial financial resources may be available for their maintenance, operation and ultimate replacement.

Most vessels operated in this sector have in the past been sourced from outside the country, primarily Australia. It is firmly believed that the local boatbuilding industry is capable of meeting the needs of this sector.

Government

Government, both national and provincial, and institutions of government, occupy a major role as vessel operators within the SSMS. The Departments of Health, Police, Defence, Harbours Board, Primary Industry and Transport (Navaids) all operate their own special purpose vessels as part of their function or charter.

The most significant and important, in terms of numbers and function, are those vessels operated by Primary Industry and Transport. Both departments involvement is of decentralised nature - in the case of Primary Industry (Fisheries) via provincial government directed fishery stations, and in the case of Transport, via the Government Ships Authority and thence to provincial governments.

Fisheries use of vessels covers predominantly fishing, fish collection and fisheries research/teaching activity. Most vessels utilised are purpose built, but not overly specialist.

The GSA involvement is perhaps the most visible and significant component of public sector involvement in the SSMS. The GSA vessels are of two major types - so called 'B' class trawlers, of recent one-design steel construction, and sourced from New Zealand, Australia and PNG. The other type are wooden trawlers of varying designs and ages. Most have originated from Australia.

There is soon to be another study initiated into the future role of the government fleet. If the study results in totally decentralising the fleet, and passing ownership over to respective provincial governments, then it is conceivable that some governments may opt towards re-equipping their fleet. However, such is conjecture and hypothesis at present.

The major co-ordinating influence on public sector acquisition of vessels is via the Department of Works and Supply Tenders Board, at provincial and more particularly national level.

The Fishing Industry

"The very foundation of a fishing industry is a shipbuilding industry. No nation which operates successful coastal or offshore fisheries acquires the majority of its vessels from overseas sources. Yet that appears to be the policy established by PNG, as it has not actively supported the establishment of its own shipbuilding capability, despite having numberous slipways and yards throughout the country".

The above is a quotation from a circa 1976 UNDP/FAO Fisheries Advisory Division document on the fisheries sitution in PNG. Regrettably, and in spite of the rhetoric and good intentions in the past, nothing much has changed, save for the efforts of a small number of fishery stations that have implemented their own programms. This latter aspect however can be as counter productive as no programme at all in certain areas/circumstances.

If the country is to initiate a major thrust into fisheries development at both the artisinal and industrial level, then (in common with the above) one of the aspects which will govern the success or otherwise of same is the state of readiness of the domestic boatbuilding and maritime servicing sector to provide its share of the input.

In other countries, the most important available market for the boatbuilding industry is the fishing industry, in that the state of the fishing industry dictates trends in the boatbuilding industry. In this writers assessment, such super-dependence is not an ideal situation. Because of other considerations and circumstances, this situation is not likely to occur in PNG for many years to come.

No assessment is currently available as to how many fishery-related vessels are currently in operation in the country, although this is now underway. Similarly, no numbers can be provided by any organisation as to forecast (either optimum or otherwise) demand in the future. Absence of such data makes effective planning impossible.

Marine Engine Distribution

With the loss of popularity of sail for boat population, and its inappropriateness for certain vessels, the growth in use of marine engines has been spectacular over the last two decades. As a result there has emerged a large number of distributors/makes of engines in operation.

Government interest in this area was highlighted by a commission of enquiry in the mid 1970's which included, inter alia, marine engines. As a result of this inquiry, a variable tariff policy was introduced which had the intent of reducing the proliferation of makes and models of (specifically) outboard motors. Concessionary and penalty tariffs were applied to motors of arbitrary power output, ostensibly to reduce the model range and thus provide for more efficient servicing and spare parts availability.

It could be argued that the objective was achieved, in that it was financially disadvantageous to acquire a motor outside of the concessionary tariff range. However, this resulted in the same proliferation of outboard makes, but at least compressed the makes into less models. The primary criticisms were that the policy did not solve the real problem of guaranteering spare parts availability of ability to service and secondly, that the policy discriminated against certain types of motor on the basis of arbitrary power output.

Approximately seven different makes of petrol outboard are available in PNG, through six distributors. Distribution of the three most popular makes is nationwide through the distributors own (usually vehicle) dealer network, while the other makes are generally only distributed in limited or specific areas.

Servicing and parts availability problems can arise due to the propensity of manufacturers to change their models frequently. Outboards are primarily a consumer/pleasure product, and are subject to regular upgrades/facelifts to satisfy consumer and marketing demands. However, most major manufacturers (of makes available in PNG) produce commercial or work type models of somewhat lesser sophistication then pleasure models, but even these are subject to regular change. The work type model predominates in PNG.

The writer is aware of the debate concerning outboard motors (high fuel consumption, too sophisticated, tendency for break down, poor parts and servicing availability, etc), but what has to be appreciated is that the use of outboards is now an entrenched feature of transport in river, coastal and island regions of PNG. Frequently the heaviest concentrations of outboard motors are in areas remote from distribution centres, and thus are extremely difficult to service adequately or cheaply. Given this fact and the tendency (demand) for multiple make availablity in PNG, problems will continue to occur. The challenge is to appreciate the nature of the problem areas that arise in the use of outboard motors and adopt/institute balanced and realistic measures to best deal with same.

Diesel inboard engines share similarities to outboard motors on the PNG scene. Diesels are of a more specialised nature in their application, and are less consumer oriented. However, certain makes (especially Japanese) alter their models on a seemingly regular basis.

The writer has identified approximately thirteen different makes in use in PNG, and and inderterminate number of models within these makes. The general ruggedness of diesels theoretically gives extended life, and as such there are a number of relatively old engines still giving good service. However, like any item of a mechanical nature in PNG, the most robust construction will not prevent break down in the hands of careless or untrained operators.

Of the thirteen makes, only three are considered to be present in large numbers. With one or two exceptions, popularity of any one type is not universal throughout the country, but rather is confined to specific areas or regions, generally within the domain of the distributor or his agent. Problems can and do arise where the user is remote from the distributor. Small distributors turning over only minimal units may not have the inclination or resources to carry large or even adequate stocks, but this is by no means confined to small distributors alone.

Consumable Materials

For boatbuilding operations, the major material input is either timber (or timber derivatives), or steel plate.

Because of the popularity of wooden vessels, existing timber mills and suppliers are familiar with, and generally cater to, the sector's requirements in this area. Despite the abundance of timber resources, the policy of pricing for the domestic market on a par with the export market, coupled with the not infrequent logistical difficulties and hence cost of supplying to remote or distant locations, results in a generally high cost to the boatbuilder and hence purchaser. Utilisation of timber for vessel construction is infinitesimal compared to other uses. Wooden vessel construction would have to increase multiple-fold for such use of timber in this appliation to assume any degree of signficance.

The use of marine specification plywood for vessel construction represents a major potential growth area. Ply is manufactured locally by PNG Forest Products at Bulolo. The large proportion of output is exported, with the result that shortages can and od occur domestically. And additional criticism made is that the manufacturer is not attuned to the requirements (quantity wise) of the domestic boatbuilder. No solution is given to this problem, if it does assume significance.

Steel plate, when required, is generally freely available domestically through the importers. However, if required to be indented, delays may occur.

Supply of other consumables and gear is generally satisfactory.

Training

Training of persons working within the production component of boat building and repair falls into two categories - artisan boatbuilding and shipwright, and engineering and mechanics. The general approach to training in both areas is largely fragmented and unco-ordinated.

(a) Boatbuilding

The earliest boatbuilding training was via missions, as previously discussed. Although the early 70's saw the emergence of structred training schemes, missions have retained the training aspect as one of the prime functions. Their role in this area has been one of the main contributors to the skill level in village commerical activity. Mission training is regarded as informal, and although perhaps narrowly based (primarily wooden vessels, and a limited number of same), provides basic level instruction.

Village commericial activity usually features a form of informal instruction, although the presence of trainees may be more directed towards

help in completion of the vessel than effective training; however, some boatbuilders take this role seriously, as it may mean (in the longer term) the difference between continuity of activity or close down. Most trainees are members of the village or clan group.

Training at the village community level is fraught with problems, as the 'trainer' may only be a 'trainee' himself!

A course in boatbuilding is part of the cirriculum undertaken at the NFC. Such training is informal, and is apparently intended to supplement the knowledge of matters marine of those undertaking the course. It is not known to what level of sophistication the course attains.

Fisheries stations are sometimes involved in boatbuilding training where they have established a facility for construction or repair of vessels. Again training is informal. Trainees are only engaged for short periods, so the effectiveness of any programm is questionable.

In 1975 the Education Department, via the Madang Technical College, began offering a formal pre-employment technical training (PETT) course in wooden boatbuilding. The course is of 1 year duration. It is designed for school leavers and other who desire a career in boatbuilding. It is a prerequisite for apprenticeship entry into the industry. Other advanced and specialist block courses are offered for those undertaking indenture.

Practical training of apprentices by commercial firms in the industry completes formal training.

(b) Engineering

For outboard motor applications, training is undertaken via the following - Works and Supply, some fishery stations, some vocational schools, MTC, and some distributors.

Works and Supply operates an eight month duration course at Embogo, Popondetta. The aim is to train students in a fundamentals of outboard mechanics and servicing, with the intention that they return to their village area and set up repair facilities for the benefit of the local outboard owner. However, little though has been given as to how this will come about. Embogo has not yet been visited by the writer.

Fisheries stations, refer other sections.

Vocational schools may have informal courses from time to time. However, all schools suffer from funding constraints, and apart from basic operating and servicing instruction, the courses are of limited value.

The MTC intends to offer a small engine course in 1983, within the PETT context.

The three main distributors of motors all offer varying degrees of training, but presently most training is oriented internally. One distributor has sophisticated training facilities, incorporating classrooms, instruction material, demonstration gear, and experienced tutors. The facilities are located in Port Moresby.

For diesel applications, informal training is via Missions, while structured training is undertaken by technical colleges and commercial institutions. The technical trade courses are of PETT nature. Locations of such courses and other information on same is not known.

Marketing and the Market

Knowledge of the market for vessels within the SSMS, and the issues surrounding same, is rudimentary. This basically stems from an indequate information base, and makes any evaluation of the present status and future demands of the SSMS difficult, let alone the assessment of the capability of productive elements within the SSMS to cope with future demand.

It is further considered that appreciation of the marketing concept has been submerged within a veriety of other issues, if it was ever appreciated in the first place. This comment does not just apply to village commercial builders.

The 'market' can be segmented as follows:

- village shipping
- the fishing industry (both artisinal and industrial)
- the public sector, including the government fleet
- others, including missions, trading companies etc.

No accurate record of the number of vessels currently in these segments, or their characteristics, is available - however, this is being rectified.

The largest segment of the SSMS is the village vessel. The demands of this segment are generally met from the village commercial and community boatbuilding industry, although some commercial companies have made inroads in this market. For larger vessels, it is not uncommon for a group to source a second hand older type vessel from Australia, although this is only possible if financing is assured.

The fishing industry forms a much smaller component, but potentially is the most dynamic and promising of any segment.

The Public sector market features purpose built vessels. Because of the tender process, and specification, such vessels are commonly sourced externally to the chagrin of local commercial builders. Second hand vessels are prevalent, probably because of funding limitations. Of all the segments, the public sector should be the easiest to plan in advance for, but this rarely occurs.

Plantation and trading companies, and missions are again a much smaller component. The latter caters to and fulfills its own requirements. The former are characterised by having a somewhat aged fleet of vessels, most of which are sourced externally.

Infrastructure

In much the same way as air and land transport cannot function safely, effectively and economically unless there exists adequate and appropriate support facilities for these modes, so far does the same situation apply to the SSMS. Provision of infrastructure and ability to utilise same is a basic requirement. obviously infrastructural elements do exist in the form of slipways, wharves etc, but these are either unevenly distributed, unsuitable to the needs of the SSMS, unaccessible, or delaquidated, or a combination of same.

Because such facilities do not have commercial justification, then in the absence of public sector involvement they will not generally be made available.

Equipment and Facilities

In the majority of cases, the facilities of the village commercial builder restrict or constrain efficiency of activity, and can contribute to higher costs. Some examples are

- building sheds being predominantly open wall, bush material structures which have limited life expectancy and give limited weather protection to vessels under construction, or those working on same.
- workshops, being remote from an electric power source, not utilising basic power tools (unless of course the builder has his own generating capacity). Similarly, for reasons of non-existent or inadequate generating capacity, larger items of wood working machinery are not utilised.
- in the repair and maintenance field, slipping facilities are non-existent (save one known basic arrangement). Thus, maintenance of vessel tends to be neglected, simply because of the practical difficulties of getting the vessel from the water.

Skills

As stated previously, the technical skill of the village commercial builder is seen as one of his greatest attributes. In contrast, the limited skills of the community builder is his greatest handicap.

With the commercial builder, his competence is generally restricted to smaller vessels of traditional design and construction. Outside of this, he usually needs technical help and assistance (not widely available), particularly for over survey length vessels. His experience (apart from the younder generation of builder) is limited to wood, and he would have little appreciation of other materials (quite apart from the fact that he does not have or presumably want the facilities to utilise other materials).

Few vessels are built from plans or drawings, rather the design is incorporated in the form of completed frames or moulds. As such, most vessels are more or less built to the same design within a yard, with variations only in length, beam and internal configuration. Most builders are considered capable of undertaking a one-off design (using plans), but would require assistance in the areas of lofting, material estimation and costing.

The level of business acumen and awareness is only rudimentary. This perhaps is to be expected in the context of their current activity, but is not satisfactory if they are to develop and expand their activity along true commercial lines, and are hence answerable to external entities which may provide assistance.

A further area where builders are uninformed is the tendering process - with government vessel requirements and an increasing number of private vessels being ordered as a result of tender, the ability to understand and participate in the process is of importance.

Training and Employment (Boatbuilding)

From what has been observed of the existing formal training institution, and discussion with those affected, it is considered that the course offered is appropriate for its purpose. What is of more immediate concern is the fact that graduates of the course are not being employed post completion of the programm.

The course accepts up to 15 students a year, for a one year (40 week) programm.

The facts are:
- from 1975 (inception) to 1982 the college has graduated around 110 students.
- of the '75 and '76 graduates, 21 out of 26 obtained employment in the industry immediately after graduating.
- in the period '77 - '81, only 12 out of 70 obtained immediate employment
- in 1982, no placements of graduates were made
- there has only been one organisation regularly taking graduates.

In the normal event, these statistics would result in such a course being abandoned. To their credit, the Education department has not pursued this option, or even considered it.

In the view of the teachers involved, the quality or ability of the graduate is not at issue - rather, it is seen as the declining number of industry participants, and the generally depressed activity level within the industry.

The facts above only relate to immediate employment in the boatbuilding/repair sector after graduation. It is not known whether such graduates subsequently obtain employment in their field of training, or another perhaps related field. However, various sources have stated that to be effective and build on his knowledge, the graduate needs to be employed within a short time frame of completion of the course.

It is believed that this situation is primarily unique to boatbuilding. Other trades in the marine field do not suffer to the same extent.

Advisory Services

The provision of advisory services (in the form of technical and business assistance) to national groups within the boatbuilding and boat operating sector is fragmented.

Until recently, the national government funded several technical adsvisors in various locations, with one of their duties to provide assistance to those groups undertaking a boatbuilding project, on an as required basis. However, with recent retrenchments within the public sector these positions have been abolished, and unless retained or reinstated by respective provincial governments, they will disappear. While the positions were substantive, the uncumbents generally were of capable providing a useful service, although their ability to perform affectively was restricted by funding constraints.

The ability of provincial based Divisions of Commerce or Business Development Offices to provide the necessary level and quality of advisory help to the SSMS is questionable. This problem has to be viewed in the context of budgetary constraints, staff shortages, other priorities, and the capability of shaff involved. Such offices tend to operate in a reactionary manner. Howere, the problem also lies with the group needing help, as often they do not solicit it, or if they do, it is too late.

Advisory assitance, or follow up activity, would not seem to be part of the function of lending agencies such as the Development Bank. Such institutions are in a favourable position to foresee problems arising, as, for example, non-repayment is as good an indication as any of potential difficulties. Little interaction or communication between interested agencies is common in this case.

STRATEGIES FOR DEVELOPMENT

It should be emphasised that the strategies are not necessarily intended as a basis of future policy - rather, they are put forward in an attempt to define realistic development proposals that may be acceptable in the political sense, and advantageous to those relevant component parts of the SSMS.

The strategies have as their foundation two general assumptions, the acceptance of which is essential for any development being capable of taking place.

(a) that the government and the community acknowledge the position that the operational component of the SSMS occupies in the country, and furthermore, that both wish to see its future position enhanced in terms of efficiency, economy and serviceability.

(b) that the government regards an indigenous small scale boatbuilding and repair capability as both justified and desirable, and furthermore, wishes to see its position strengthened so that it may better serve the furture needs of the operational component of the SSMS.

The justification for the operational component of the SSMS lies in the fact that it will, for an indeterminate time period ahead, continue to be a key element of the transport and communication network, and is therefore a basic tenet of economic and social development.

The justidication for the productive component of the SSMS (boatbuilding and repair capability), is seen as being more specifically based in the following areas:

(a) resource development
- development of the country's natural resources, especially fisheries, will require the capability for construction and repair of vessels.

(b) economic value
- although the proportion of local content (or added value) for various vessel types is unknown, it is expected to be high for wooden vessels, but substantially lower for other vessels.
- While the cost of construction locally may be higher than overseas yards, the foreign exchange saving for local construction, especially in wood, is considerable.

(c) employment creation and retention
- boatbuilding is a labour intensive operation and while it is not a large employer by virtue of its overall size, any employment opportunity is valuable, particularly relating to skilled or semi-skilled employment.

(d) regional development
- with the largest proportion of units located in underdeveloped areas, the industry makes a significant contribution in terms of employment and the economy in these areas.

Strategy - General Boatbuilding and Repair.

(a) that a bounty be paid on new, commercial vessel construction undertaken in local boatyards.

(b) that a bounty be paid on major refits or rebuilds undertaken in local boatyards.

(c) that commercial vessels under survey length qualify for a subsidy on the cost associated with normal hull maintenance work undertaken in a local boatyard; additionally, where the closest boatyard is a certain distance from the vessel's normal home port, then the vessel qualifies for a subsidy on the cost of getting the vessel to and from the boatyard.

(d) that all commercial vessels under survey length, funded through a government aid program or a government owned agency be required to undergo regular slipping, as a condition of it obtaining the assistance.

(e) that government departments or agencies thereof be excluded from becoming directly involved in boatbuilding activity, where this activity can be undertaken on an acceptable basis by the commercial sector.

(f) that a prospective purchaser (including the public sector) of any vessel type up to a certain size, be required to justify the sourcing or purchase overseas of any vessel; furthermore, that any such vessel subsequently purchased overseas and without adequate justification be subject to the imposition of a penalty duty.

Comments

One of the greatest problems facing the boatbuilding industry in PNG relates to an inadequate level of orders for new vessels or in other words, a lack of continuity of work.

This problem is universal in that it affects all countries with a boatbuilding industry to a greater or lesser degree. World wide, for economic or other reasons, most governments support their boat and shipbuilding industries with a variety of direct and indirect subsidies and bounties.

The PNG industry receives none of these at present.

Various reasons have been given as to why the commercial boatbuilding and repair sector operates cyclically, and at a level significantly below productive capacity, and therefore marginally in a financial sense. The most important of these reasons are.

- local vessels too expensive
- inadequate or inappropriate purchase/consumer financing available.

- vessels generally capable of local construction, but which are imported, either for reasons of convenience, cost or design specificiation.

- vessels being uilt by the public sector.

Vessel Cost

Because of the degree of support received by overseas shipbuilding industries, and the fact that PNG receives none, any direct comparison between the cost of a new vessel sourced overseas and that constructed locally is not particularly valid. Although the writer is of the view that the price of a locally constructed vessel is significantly higher than the imported equivalent, no specific research has been undertaken to substantiate this view, or determine excitly how much more expensive the local supplier is. This issue now is being examined.

Additional factors contributing to higher costs include the generall lack of standardisation of vessel range (although some yards do try to maintain standard production designs), and more importantly, minimal on-going quantity series production.

The availability of a bounty as in point (a) of par 5.3.1. has as its objective a redress of or conterbalance to higher prices experienced locally. The form the bounty scheme would take, and the level(s) of same, must equate to prevailing circumstances. It may also place an obligation on the local industry to review its own costing procedures and pricing plicy.

Purchase Finance

This matter has been touched on in the context of para 4.1. (c). The nature of the problem is very difficult to resolve satisfactorily, being as it is integrally tied to the economic situation, government policy, and private (banking) sector policy

Imported Vessels

From all available information, it is believed that there are comparatively large numbers of small vessels in PNG that have been sourced externally. Of the three reasons given, cost and specification are of most relevance. The issue of cost has been discussed above. Specification is a more complex issue. Obviously if a ferrocement or aluminium vessel is specified, local industry has little or no capability to supply. However, the real point here is to ask whether it is essential to have a ferro cement or aluminium vessel, or whether (say) a wooden vessel would suffice.

It is acknowledged that in some cases, specific purpose implies a design specification requiring a degree of production sophistication that is unavailable locally. For the majority of small craft in PNG However, this is not of great relevance.

Public Sector Involvement.

Production boatbuilding in the public sector is primarily confined to that associated with provincial fisheries activity and does not involve large numbers of units. There perhaps exists a grey area in determining whether fisheries stations should(be permitted to) pursue the level of involvement in boatbuilding that they currently occupy. Because such activity is funded publicly, and is not commercially based, little opportunity is available to account for the activity and determine whether the funding involved is being utilised in the best possible manner. This is a highly contentious issue.

It is believed that the issue of public sector (fisheries) involvement in boatbuilding has to be viewed in regard to particular circumstances and needs. For example, the Manus fishery boatbuilding activity is seen to be justified, for reasons of specific but limited need, and remoteness from commercial boatbuilding activity. The case of the Samarai (Kuiaro) station is somewhat different. Boat production is seemingly ongoing and has a semblance of commercial influence.

Yet this area has the greatest concentration of underutilised commercially based boatbuilding capacity in the country.

The writer is of the view that unless a fisheries station (or any other public agency) can show that it has a specific requirement to become involved in vessel construction which cannot be adequately (in terms of cost, capability, location or time) met by the commercial sector, then it not be permitted to become involved.

Strategy - Marine Sector Infrastructure

(a) that respective provincial governments provide, in the absense of private sector initiation or involvement, small vessel slipping and associated facilities; the locations being identified as:
Wewak, Lae, Rabaul, Kimbe

(b) that respective provincial governments, in association with involved central government agencies, actively pursue the issue of intebration of existing marine facilities to serve the wider needs of the SSMS in their area; locations are:
Lorengau, Kavieng, Madang, Daru.

This issue has been discussed previously. Marine infrastructure in the form of slipways and associated facilities if available only in a few locations throughout the country. Non existent, inadequate, or inappropriate servicing facilities are considered as being one of the major reasons for inefficiency within the operating component of the SSMS, and also are seen to contribute to ultimately higher operating costs than should be the case.

For the reason that infrastructure of this nature is inherently non-economic, public funding of such facilities is considered essential if they are to be firstly created and then maintained.

Justification for point (a) lies either in association with fisheries development (Wewak and Kimbe), or by virtue of the vessel numbers involved (Rabaul and Lae). In the Rabaul situation, infrastructure already exists, but for various reasons the availability of same is regarded as inappropriate to the needs of the SSMS. In this case, especially where the existing facilities are grossly under utilised, opportunity must be present for both the provincial government and a shipyard operator to initiate a dialogue which may result in productive use of existing facitilites.

In regards to point (b), integrated facilities already exist, but may not be (as yet) widely available. Of the four locations, Daru and Lorengau have as their primary reason for existence the servicing of a particular user group (Daru - previously the government fleet, now fisheries; Lorengau - fisheries). Madang has adopted a broad based approach, but its facility would benefit by the inegration of marine engineering capability currently available only to the government fleet. The most disturbing example of a 'closed ship' approach is the National Fisheries College facilities in Kavieng, which will always be grossly underutilised as long as the NFC retains exclusive use and control over the facilities.

In all cases, funding (for acquisition) is not the issue. The facilities already exist, and all are publicly owned. What is required is a change in approach or attitude. In three out of the four locations, this is recognised and mult-use should become a reality in the near future.

Strategy - Marine Engines and Engineering.

(a) that an importer of marine engines will provide written undertaking that he will invest in and maintain an acceptable stock of spare parts and servicing capability relating to his

range in at least one accessible location in the country; and that should a model be withdrawn or superseded, he will continue to maintain such stocks.

(b) that a pilot project be established in one area to provide basic facilities for outboard motor repair and servicing.

(c) that the import duty of 10% attaching to tariff classification items 84.06.21 and 84.06.44 (via marine diesel engines, and parts thereof), under 52.5kw (72HP) be amended to become free of duty.

The position relating to marine engines has been briefly discussed in other sections of this report. The issue is a complex one, and conclusions reached have of necessity to be treated with caution. However, two basic problem areas are apparent from the incidental investigations carried out. These are

- availability of parts continuing to be problematical, and
- the investment in training programms is of little benefit if those trained are unable to utilise their training in practical terms.

Re point (a), it is acknowledged that no direct or enforceable controls can be put in place under the present free import policy. In any event, import control may not provide a realistic solution to the problem.

Rather, subtle monitoring of the position, and if need be an approach to the manufacturers concerned may be the most effective policy for this area. It should be noted that the largest majority of distributors recognise their responsibility and act accordingly, but the system in vogue has no way of preventing others from adopting a different approach.

Re-point (b), while training of those associated with outboard motors is fragmented, at least training is being undertaken. While programms can and inevitably will be better co-ordinated and structured, the most glaring deficiency in the area relates to the opportunity for those involved to utilise their skills in the village enviornment where they are most in need. This in turn largely relates to the non-existent or inadequate facilities in these areas. A pilot project (location not yet determined) has been proposed as part of the 1983 NPEP programm, which will, if accepted, provide basic facilities to enhance the potential for outboard motor servicing. There is no reason why such a project cannot ultimately become self funding. It is intended that if such project can be proven as viable and fulfills an unsatisfied need, then other similar projects may be initiated.

Point (c) is self explanatory. All other marine diesel engines are free of duty, and no reason has been offered as to why this category of engine (the most common in use in PNG) attracts duty.

Strategy - Training and Employment.

(a) that the PETT boatbuilding course offered via the Madang Technical College be extended to two years.

(b) that government subsidise the wages of apprentices from the MTC who are placed with approved employers.

(c) that in conjunction with the MBP village commercial boatbuilding project, graduates be made available to those targeted participants for varying periods on a 100% subsidised basis.

(d) that additional specific purpose and short duration boatbuilding courses be made available via the MTC on a subsidised basis, and that these courses be primarily directed to the needs of the older and experienced boatbuilder working in the village commercial context.

The major concern related to the PETT course at MTC is that graduates are not finding appropriate employment, as discussed in para. 4.6. The writer is of the view that the course, while it does cofer a fair amount of ground over its 40 weeks, cannot do justice to the many areas involved in the trade over this period of time. Furthermore, only one material medium (wood) is concentrated upon. Other material mediums are of necessity neglected (due to time constraints) even though there exists complementary facilities at the College which cater to these other skills.

Re point 9b), of the reasons given for lack of employment opportunity is the general lack of activity within the boatbuilding sector. Mere subsidisation of wages will not necessarily guarantee employment opportunity. However implementation of this policy would be considered as enhancing opportunity when activity does pick up.

Re point (c), this strategy is seen as serving the dual purpose of enabling practical experience to be gained in a controlled environment, as well as providing two way practical assistance to the village builder concerned.

Re point (d). No courses of this nature are currently available. Such a programm is seen as a complementary part of the MBP project.

Strategy - General

(a) that the access to an quality of business advisory assistance available through Divisions of Commerce and the Development Bank be improved by way of specialised training in the nature and workings of component parts of, and interaction between, the SSMS.

(b) that as a first step towards better understanding the nature of the market for smaller vessels, and the needs of same, dynamic, provincially based registration systems be implemented to provide first level information sources. (Note - this is currently underway).

(c) that the requirement for specifically based (business) advisory literature and aids, directed to the SSMS, and supplementary to proposed advisory services, has proven application, and should be proceeded with.