

HYDROGRAPHY FOR COUNTRIES IN TRANSITION WHERE DO YOU START ?

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1. INTRODUCTION

The relationship and importance of hydrographic surveying to the economic success of a State are not always fully understood. In Europe it is theoretically possible for the economy of a State to progress by co-existence with its immediate neighbours. This is also theoretically possible in other parts of the world but where the region is developing, or in transition, the relative distances between developing States and developed States is a key issue. The European States are able to utilise road, rail and sea transportation over relatively short, well defined and surveyed routes. The developing State is usually some distance from the market places of the world and additional costs of transportation have to be added to the cost of the products.

If the transportation is subject to additional risk factors the cost of the transportation and therefore the products is still further increased. Most of these risks are related to poor charting and poor safety of navigation information. The remoteness of some of the developing States also creates problems within the projects designed to reduce these risk factors. An example of this is the fact that echo-sounders fitted to the three tugs in the port of Dar es Salaam have not worked since the first occasion that they needed repair. A project sponsored by an Aid Programme, in their wisdom, donated this equipment to the Tanzanian Harbour Authority, but no account was taken of the fact that the nearest technician and the nearest spare parts for the equipment were 3000 miles away. The cost of repair to the equipment, which would have had to be borne by the Harbour Authority, therefore, would be, at least, 100 times the initial cost of the equipment.

In many developing regions, where either the necessary expertise is not available within the region or where the road and rail infrastructures are weak, the trade of that State could be seriously affected. The trade is almost exclusively via

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the ports of that State, or through the ports of the neighbouring State. It has been estimated that during the 1990s, 98.3% of all South African imports and exports were by sea, 1% by road or rail and 0.7% by air. The expression 'a continental State with an island economy' stills holds good for nearly all States in Africa and possibly in South America and the Far East as well.

The importance of hydrography in the cycle of coastal State development, particularly in developing States, cannot be overstressed. In the light of the vast developments in technology and the apparently enormous task ahead of project teams, the question is constantly being asked, "Where do we start?"

2. ECONOMIC FACTORS

As indicated earlier sea-borne trade is vital to the development of most States in the world. In Western Europe, the Mediterranean, North America, Scandinavia, and parts of the Far East hydrography has advanced and has kept pace with new technology. Sophisticated shipborne equipment, such as the Electronic Chart Display and Information Systems (ECDIS), is now being fitted to many ships. This system integrates nautical charts, produced from hydrographic data, with all the other real-time sensors on the bridge of the vessel to give the mariner a composite and as near complete picture of his environment and its dangers as possible. Research is being undertaken to extend this further to include real time tidal and weather information and data from many other sources. The standard for the exchange of this type of data (S-57, Edition 3) has received general international acceptance to the point where many other disciplines are adopting the standard for the transfer of their data.

This is the way that the developed States of the world are progressing and the momentum of the technological advance is such that even States with relatively sophisticated technical infrastructures are finding it difficult to keep pace with the developments. It is inevitable that these States will further benefit from the technology available and the gap between these States and developing States will be forever increasing. Linked to these developments is still greater success for the States concerned and for their standard of living.

In Africa, during the colonial era, hydrographic surveys were undertaken in many areas, usually where trade was important. At the time these surveys were extensive and the resulting charts and publications were more than adequate to encourage trade in these colonies. The financial power and success of the colonial powers is testament to their ability to exploit the resources of the colonies and to do it in the most efficient way possible. At one time, between 1790 and 1820, England had 19 major survey expeditions world-wide, stretching from Canada to Australia with famous surveyors such as Vancouver, Cook, Flinders and Bligh undertaking surveys that were to lay the groundwork for the trade which was to follow. Hydrographic surveys, and the products they generate, are still the vital components necessary for maritime trade to succeed regardless of how developed a State may be.

As the colonies became independent, other priorities claimed the attention of their new governments and the available financial resources. The hydrographic and charting knowledge of the region was rarely left with the new State. Although the information has generally been made freely available to all, the fact that the data was held outside of the new State has meant that they would have to develop their own collection of data or database. With this situation, the lack of expertise and appreciation of the significance of adequate charting, and with the other priorities in the new State demanding attention, it is perhaps understandable that the earlier services and surveys were rarely extended or maintained. Examples are the current surveys in parts of Namibia and on Lake Victoria, which date back to 1900 and on the coast in the region of Mombasa and Dar es Salaam where the last controlled hydrographic surveys were undertaken in 1958. When this is viewed against the requirement to update charts daily by radio warnings and monthly by written notices it creates problems for prospective trade by sea. In some cases the priorities that existed in the early days of independence are still present and it is difficult to persuade the appropriate Government Minister to spend money on hydrography when thousands of people are dying from a new strain of malaria.

3. NECESSITY FOR NEW SURVEYS

It could be argued that some areas have not changed since the early surveys were undertaken 100 years ago and there is merit in this. Off East London where the continental shelf is very narrow, less than 5 nautical miles in parts, some of the data from the original surveys of the last century are still being used. The horizontal positioning skills and the technology available to measure depths accurately have required old surveys to be redone and obviously this is done commencing in the areas of greatest importance. It is also possible that gaps in these surveys failed to detect hidden dangers to navigation that should now be detectable.

There are also very distinct requirements for charting in different nautical spheres. The international maritime community requires the latest information in critical areas as soon as possible. These areas include harbours, harbour approaches, channels, straits and generally to within about 5 nm of the coast. Coastal trade and the fishing communities require charts that are usually of a larger scale and contain greater detail and in areas that include the coastline. Lastly there is the small craft community that requires similar information but in a slightly different format for use in more confined spaces aboard their vessels. The first two are by far the most important and are the areas that will be considered.

4. STATUS OF SURVEYS IN AFRICA

At a Conference on Regional Co-operation in Hydrography, Aids to Navigation and other Services for the Safety of Navigation in Southern Africa, held in Maputo (Mozambique) in 1995, the National Reports of more than eleven States in the region indicate the dire need for new surveys to be undertaken. A figure gives an indication of the coverage and status of surveys in Africa and the coastal States who are undertaking surveys or who are providing safety of navigation information. Another figure gives an indication of the major trade routes in southern Africa for the international maritime community.

It became very clear at the Maputo Conference that a concerted effort was necessary to upgrade all the services in the field of safety of navigation and hydrography was one of the major areas of concern. The delegates from those States requested Study Team visits to Tanzania, Kenya, Angola and Madagascar. This was undertaken in both Kenya and Tanzania during May 1996 and a Report submitted to the States and the international organizations concerned. From these visits it was apparent that not only was the upgrading of all services necessary to improve trade, but it was vital to ensure the safety of life in the prevailing circumstances. Three days after the Study Team's visit to Tanzania during which the drastic need for all services to be provided was identified and, although it was not directly related, a ferry capsized on Lake Victoria with the loss of more than 700 lives. There were no services or infrastructure to prevent such a disaster nor to deal with once it had happened.

It can be safely stated that with the exception of Algeria, Namibia, South Africa and parts of Egypt, Morocco, Mozambique, and Tunisia, most ports, port approaches and critical areas in Africa need urgent hydrographic surveys to be undertaken. Some projects have been started but generally the confidence of international shipping in the information available is low. It has been reliably established that insurance charges on cargoes and vessels trading with Madagascar is 20% higher than the norm.

5. IMPACT ON TRADE

In modern maritime trade where the smallest operational detail is examined and considered, many decisions for the navigator are prescribed in economic terms. The routes for vessels, time in port, types of cargo, ships' complements and many other factors that were previously the prerogative of the master are now decided for him and only the safety decisions are left to him. In this scenario it is difficult to foresee how international shipping can be induced to service many ports in Africa and the development of these States therefore must be seriously impaired.

It is equally difficult to concentrate on one aspect of the problem, namely hydrographic surveying, charting, and safety of navigation information. It would serve little purpose for accurate charts and information to be made available only to find that other harbour services are not. The problem should be seen in an 'holistic' sense and consideration should be given to the problems as a whole.

6. SERVICES REQUIRED

Survey related Services

- a) Accurate and up-to-date charts of harbour approaches and harbours are absolutely essential, as are the charts of difficult areas and features that have to be traversed for a vessel to enter and leave a port safely. These should be at scales of between 1:5,000 to 1:50,000;
- b) Charts of the vessel routes to ports and harbours at scales 1:100,000 to 1:300,000 are the next charting priority.
- c) Charting of the remainder of the coastal region could be essential for fishing and other activities but this will have to be assessed and prioritised against the requirements to improve the economy by international trade. These charts should also be at scales between 1:100,000 and 1:3,000,000;
- d) Charts of areas beyond those mentioned above are not a priority as they would be at small scales of between 1:500,000 and 1: 6,000,000. These charts are also available through a number of Hydrographic Offices who provide world folio of charts.
- e) All charts have to be maintained by the provision of coastal radio navigation services (Coastal Navigation Warnings) through which urgent messages are related to the mariner advising him of newly discovered dangers or of any changes to the environment that could affect the safety of his vessel.
- f) Where these changes become permanent the mariner has to be provided with regular up-dating services whereby he is able to amend or correct the chart that he is using. The charts and their updates or corrections would have to be available on a world-wide basis. For this reason it is advisable that the coastal State becomes a member of the relevant international organizations such as the IMO, IHO and IALA.

Additional Services

- a) Buoys and lights are needed to guide the mariner and to advise him of dangers or have preferred routes. The provision of these services would be under the guidance of IALA but the positions and characteristics of these

buoys and lights have to be displayed on the charts and in any allied publication necessary for the service to succeed.

- b) In addition to the Coastal Navigation Warnings mentioned in e) above, it should be possible to provide a NAVAREA Coordinator with urgent information about dangers or changes over a wider area than the immediate coastal area of the State.

Steps to be Taken

In many States in Africa the problem has not been considered as an issue of major priority as there have been so many other issues that have required attention and whatever funding is available. As a result the importance of hydrography to trade, which in turn will generate funds, has not been appreciated. In most developing States the responsibility for the provision of charting and safety of navigation information is fragmented amongst a number of Government Departments. These could include the Departments of Transport, Communication, Land Surveys, and Interior. In addition the control could be held by a number of authorities such as Ports and Harbours, the Navy or the Dredging Authority.

The need for sophisticated equipment is low. It should be possible to undertake the necessary and immediate hydrographic surveys with standard equipment such as single beam echo sounders and terrestrial horizontal position equipment. Similarly the charts produced need only be the standard paper charts with the necessary allied paper publications.

The steps that should be considered therefore are as follows:

- a) Sensitize the Government of a coastal State to the benefits of navigational information.
- b) Identify a project that will include: the product that will benefit, the land transportation necessary, the harbour facilities needed, the charts necessary, the navigational safety information that should be provided and its frequency and the infrastructure necessary to maintain the standards of the services once they are in place.
- c) Prepare an "holistic" appreciation and plan.
- d) Obtain support for the plan from the relevant international organizations responsible for the various disciplines involved, such as the International Hydrographic Organization (IHO), the International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA), the International Association of Ports and Harbours (IAPH), and the International Maritime Organization (IMO). In addition, regional associations, technical committees, and authorities of these bodies should be involved, both in the preparation of the plans and in obtaining acceptance.
- e) Presentations should be made to the various donor and funding agencies such as the World Bank, NORAD, DANIDA, USAID and many others.

These presentations will achieve greater success with the support of the various international organizations.

- f) Project managers and contractors should be appointed both to undertake the necessary survey and compilation work and to assist the coastal State in establishing the required streamlined authorities to have the future control of the services and be able to maintain them.
- g) Training is as ever an extremely vital aspect and all of the international organizations have schemes whereby training can be undertaken. The training should be sufficient for the current task and then developed to eventually handle the most sophisticated systems if necessary.

7. CONCLUSION

The cycle of events that prevents a developing State from establishing itself as a major maritime trader has to be broken. Hydrography is a part and possibly the vital element in providing the opportunities for the development of new and better trade. The problem has to be seen in a 'holistic' manner and any project or development work undertaken has to leave in place the authority and infrastructure to control them, financial planning and mechanisms to ensure viability, and the necessary trained personnel. Anything less is doomed to eventual failure.