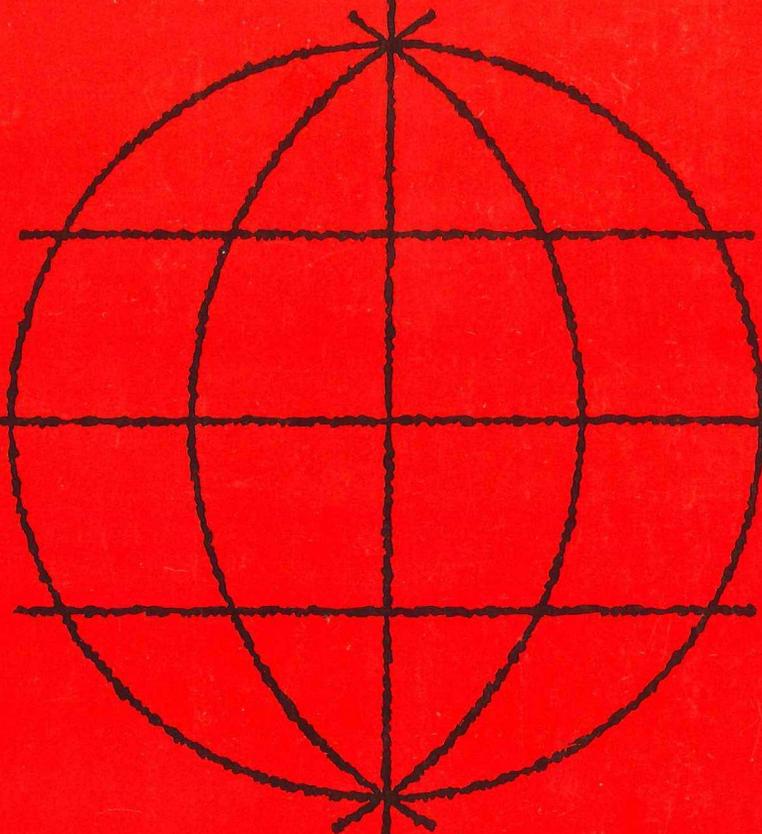


TIJDSCHRIFT VOOR VERVOERSWETENSCHAP

ISSN 0040 - 7623

SOME TRANSPORT PROBLEMS  
IN DEVELOPING COUNTRIES



1

VIJFTIENDE JAARGANG 1979

# TIJDSCHRIFT VOOR VERVOERSWETENSCHAP

(Magazine for Transport Science)  
(Revue pour L'étude Scientifique des Transports)

## REDACTIECOMMISSIE

Prof. Dr. H.C. Kuiler (voorzitter) – Drs. P.A.Th. van Agtmaal – Dr. F. van Dam –  
Drs. G. Gort – Mr. G.W. van Hasselt – Dr. J.B. van der Kamp –  
Prof. Drs. H.J. Noortman – Dr. W. Winkelmanns

## REDACTIERAAD

Prof. Dr. W.A.G. Blonk – Drs. J.A. Bourdrez – Mw. Mr. O.D. Gerbers –  
Dr. H. den Harder – Drs. J.H. van der Marel –  
Prof. Ir. G.C. Meeuse – Dr. H.J. Molenaar – Prof. Drs. J.B. Polak –  
Prof. Drs. E.H. van de Poll – Prof. Dr. J.P.B. Tissot van Patot –  
J.J. Tulp – Prof. Mr. K. Vonk – Drs. H.A. Vos

Redactiesecretaris: Drs. E.J. Visser

Vaste medewerkers:  
Mevr. Mr. O.D. Gerbers  
Mr. J.G.W. Simons  
J. Voordouw

VIJFTIENDE JAARGANG  
1979 – Nr. 1

KWARTAALSCHRIFT VAN DE STICHTING  
NEDERLANDS VERVOERSWETENSCHAPPELIJK INSTITUUT  
TREUBSTRAAT 35, 2288 EH RIJSWIJK



## INHOUD

EDITORIAL .....	5
<i>Prof. Drs. H. J. Noortman</i>	
TRANSPORTATION AND ECONOMIC DEVELOPMENT .....	7
<i>Prof. Dr. H. Linneman</i>	
SOME ASPECTS OF THE CONSEQUENCES OF THE CHANGING WORLD TRANSPORT PATTERN FOR MARITIME TRANSPORT .....	11
<i>Prof. Dr. H. C. Kuiler</i>	
THE ROLE OF INFRASTRUCTURE IN REGIONAL AND SOCIO- ECONOMIC GROWTH OF DEVELOPING COUNTRIES .....	21
<i>Frans Kutsch Lojenga and Matwey Schut</i>	
ROAD AND RAIL TRANSPORT IN NIGERIA .....	41
<i>M. O. Filani</i>	
RAILWAYS IN DEVELOPING COUNTRIES .....	55
<i>Prof. Ir. B. van Bilderbeek</i>	
ADEQUACY OF INTRA-REGIONAL SHIPPING SERVICES .....	65
<i>Dr. H. J. Molenaar</i>	
ECONOMIC ASPECTS OF PORT PLANNING IN DEVELOPING COUNTRIES .....	79
<i>Drs. H. Bosch</i>	
AIR TRANSPORT IN DEVELOPING COUNTRIES .....	95
<i>A. J. Ganzeboom</i>	
EUROPARUBRIEK .....	103
<i>Mr. J. G. W. Simons</i>	

De verantwoordelijkheid voor de inhoud der artikelen berust bij de schrijvers.

Overneming van de inhoud of van gedeelten daarvan slechts toegestaan met schriftelijke toestemming van het N.V.I.

Voor advertenties wende men zich tot het:

Nederlands Vervoerswetenschappelijk Instituut  
Treubstraat 35  
2288 EH RIJSWIJK

Druk: Smiet-Offset B.V. – 2512 GB Den Haag

Betaling abonnementen aan adm. Nederlands Vervoerswetenschappelijk Instituut,  
Treubstraat 35, 2288 EH Rijswijk. Postrekening nr. 398.92.19.

Abonnementsprijs f 85,— per jaar (buitenland f 97,75).

Studenten-abonnement f 35,—. Losse nummers f 30,—.

## EDITORIAL

by  
*Prof. Drs. H. J. Noortman*

Transport is the backbone of a country with any level of development. If there is a poor transport system the development of a country will lag behind. The transport system also affects the functioning of the social, economic and political systems both in the developed as well as in the developing world.

The importance of transport is the reason that the World Bank has lent more for transport than for any other single purpose.

Why is transport so important? There is a group of countries, comprising virtually all of South Asia together with many countries in Africa south of the Sahara which have a growth in per capita terms of in fact zero over the last seven years. In these same poorest nations, there is a very large number of people whose condition is so desperate, as to be almost beyond our imagination. The facts are very real: disease, malnutrition, illiteracy and hopelessness are the components of their daily lives.

Annual income per person averages about \$ 75 and reaches at best \$ 100. It is estimated that the number of such "absolute poor" is 900 million.

What can transport do directly for this vast number, the 900 million? With some exceptions, they are not much involved in, or directly affected by, international trade. The mere opening of physical routes to them usually has little effect.

However lack of adequate internal transport facilities is a major problem. For instance agricultural inputs are delivered after the critical moment for their application is past. Inordinate amounts of time are consumed in the simplest tasks of gathering water and wood, and walking to work.

The role of transport in this part of the world can be a major one but a vast quantity of research has to be carried out.

Mr. C. R. Willoughby, director of the transportation department of the World Bank suggests four areas of very high priorities for transport research: \*)

1. The most serious problem is the issue of socioeconomic impact of a transport facility in the area it opens up or makes more accessible
2. The problem of reducing unit costs of investment. The most vital contribution that research can make to helping provide vehicular transport for the hundreds of millions of people still without significant access to it in Africa, Asia and Latin America is to help reduce costs

---

\*) A Development banker's view by C.R. Willoughby, World Conference on Transport Research, Rotterdam 1977.

3. The problem of looking broadly enough at possible system alternatives. An example is the way that transport discussion and planning still tend to be excessively modal in nature, without sufficient attention to what can be done by cooperation between modes: highways have sometimes needlessly duplicated railways, railway networks have been preserved at excessive scale, and the potential of coastal shipping has suffered from neglect.

The priority needs for research in this area are for analysing the broad system alternatives fifteen years ahead and helping strategic choices; studies of the problems of intermodal transfer points and expanded experimental work on congestion pricing.

4. The problem of operational efficiency in the use of transport investment once installed.

Disappointing operational efficiency, including maintenance operations as well as train operations, has probably been the most serious single factor in causing many railway projects to show less satisfactory economic results than expected. There is also increasing evidence that it also affects the trucking industry in developing countries, whether due to excessive regulation, fragmentation or lack of market organisation and of terminals.

Priority needs for research in this area seem to be on maintenance, particularly on convincing economic methods for analysing and demonstrating the amounts to be done and equally important ways of effectively organising and motivating those responsible for it; and on the problems confronting the trucking industry, so far little studied, in developing countries.

If one is to tackle the problems of the developing world the transport sector should have one of the highest priorities.

It is very encouraging to note that the Economic and Social Commission for Asia and the Pacific (ESCAP) on its consideration of activities in the field of general transport planning has published a note in the fall of last year entitled: "Promotion of Transport Research Activities in the ESCAP Region".

In this connection it is remarkable to note that the Advisory Council for Scientific Research in Developing Problems in the Netherlands in its recent report has put no priorities whatsoever on transport.

May this special issue of the journal help in putting emphasis on the strategic role transport has to play in the development work.

## TRANSPORTATION AND ECONOMIC DEVELOPMENT

by

*Prof. Dr. H. Linneman*  
*Free University, Amsterdam*

In the historical process of civilisation, profound changes have taken place in many areas of human activity. The most fundamental changes presumably have been those that took place in the minds and ideas of people; however, these changes are intimately linked to the degree of man's control over the physical world around him. Understanding of, and control over, the forces of nature have dramatically changed the way of life and the structure of societies – most obviously so in the highly industrialised countries.

Transportation is one of the fields in which spectacular changes have occurred, particularly over the last two centuries. In some instances, inventions and innovations in the field of transportation played a major or even leading role in the process of economic development; in other periods, technological progress in transportation was "only" part and parcel of a much wider process of technical and social change. As a result, the societies as we know them to-day in the highly industrialized part of the world could not exist and function without the large and refined transportation systems built up in the course of development.

In this short introductory article we want to make some general comments on the role of the transportation sector in the development process of the Third World countries – countries that are lagging behind in terms of the volume and value of production per head and hence in terms of income per head. To be sure, there is much more to be said about the specific situation of these countries than stating the mere fact that they are "lagging behind" in economic development; nevertheless, the objective of raising employment and income levels is a very crucial one in view of the poverty and social insecurity prevailing in most of the Third World countries. What is it that development economics has to say about the place of the transportation sector in the development process in these countries? In the limited space of a few pages, only a bird's eye view can be given.

In the early economic literature on the Third World development problem, e.g. in the university textbooks of the 1950s and the first half of the 1960s, the need to develop the transportation sector was emphasised fairly strongly. The main argument was – and still is – that improved and extended transportation facilities are required for enlarging the market and for integrating semi-isolated regions into a national economy. Transport services are most badly needed in rural areas where a subsistence economy still dominates. In their well-known study on subsistence agriculture, Clark and

Haswell wrote: "It cannot be emphasised too strongly that the first requisite for the improvement of the production of a subsistence economy is the provision of transport. Fertilizers, improved strains of seed, education and other objects are all of the greatest importance. But the need for transport is prior to all these." \*) It may be noted here in passing that these authors also present an interesting (partly historically oriented) survey of the costs involved in the different methods of transport in developing countries, from portage, wheelbarrow and pack animals to boats, railways and motor vehicles. For the modern reader, familiar only with to-day's transport equipment, this may serve as a useful reminder of the fact that also in the field of transportation simple and intermediate technologies do exist.

Apart from widening the market and integrating separated regions improved transport facilities may increase geographical specialisation in production, open up hitherto underpopulated areas, provide access to untapped natural resources, and in general promote increased exchange between rural regions, urban centres, and the rest of the world. In fact, the aspect of closer integration was important to most governments of newly independent states also for non-economic reasons: it constitutes an important element in the process of nation building; similarly, effective military control of the country requires a reasonably well-developed transportation network.

Thus, transportation figured rather prominent in earlier studies on the development problem – not only in more practical oriented country studies but also in development theory. Authors like Mandelbaum and Rosenstein-Rodan stressed the need for huge investments (the "Big Push") in the socio-economic infrastructure, of which a well-developed transportation network formed the hard core. The notions of indivisibility (the choice between large-scale investment or no investment at all) and of non-marketable output of transport projects received considerable attention. In Hirschman's theory of unbalanced growth \*\*) the choice between investment in Social Overhead Capital (such as transport facilities) and Directly Productive Activities is one of the central issues. Contrary to most other authors, Hirschman argues (in 1958) that investment in infrastructural facilities may have been overstressed, and that investment in Social Overhead Capital need not necessarily and in all circumstances precede investment in Directly Productive Activities. He concedes that to some extent investment in transportation is a rather "safe" investment in the sense that the risks involved are diversified inasmuch as the facilities provided are not of a very specific nature (a road can be used for transporting all sorts of commodities); nevertheless, in view of the scarcity of investment resources Hirschman would prefer a policy of moderate shortage of such capital intensive facilities as transportation.

---

\*) Colin Clark and Margaret Haswell, *The Economics of Subsistence Agriculture*, Macmillan, London 1964, p. 191.

\*\*) Albert O. Hirschman, *The Strategy of Economic Development*, Yale University Press, New Haven and London 1958, pp. 83-97.

Of course, the discussion in the development literature of the role of the transportation sector is not limited to such generalities as referred to above. One of the more specific problems that received a good deal of attention was the ex-ante evaluation of transport projects. Transport project evaluation is not at all an easy matter. Frequently, transport facilities cannot be marketed; and in case a price can be charged and collected, it is usually a government-controlled price only remotely related to the costs involved. Also, demand for transportation services is essentially derived demand, i.e. it depends on the demand for the commodities to be transported, as transportation has no use in itself except in the form of sightseeing.

All this implies that transport project evaluation should preferably be undertaken in the context of an economic model relating the project to the other sectors of activity and assessing its overall contribution to the macro-economic goals for the country or region concerned. Early contributions along these lines have come, amongst others, from development planners in the Netherlands; see e.g. articles by Tinbergen \*) and by Bos and Koyck \*\*). It has to be admitted, though, that in actual practice the usefulness of this approach remained very modest.

In the evaluation of transport projects, the use of simpler (but still complicated) cost-benefit analysis has been more widely adopted. Several well-known studies were written on this subject by staff members of the World Bank. The "American economic philosophy" prevailing in Bank circles made it focus on the financing of infrastructure projects rather than directly productive activities (which were seen as the domain of the private sector). Within the social overhead sector, transportation projects had a large share, and hence the need to develop appraisal techniques for such projects. It is obvious that the peculiar difficulties of tracing the overall developmental effects of a transport project remain, also in the case of using cost-benefit techniques.

The importance assigned in the development literature to the transportation sector is not evident any more in the publications of the last ten years or so. This might be due to an increased professional specialisation in the wide field of development studies, but as far as the present author can judge there are hardly any signs of "transport economics in developing countries" as a new (sub-)discipline. Rather, he is inclined to say that Adler's statement of ten years ago is still correct, or otherwise at most a slight overstatement: "The literature on transportation in developing countries is most inadequate and not a single publication deals comprehensively with sector and project planning"\*\*\*).

---

\*) J. Tinbergen, "The Appraisal of Road Construction: Two Calculation Schemes", *The Review of Economics and Statistics* 39 (1957), pp. 241-249.

\*\*\*) H.C. Bos and L.M. Koyck, "The Appraisal of Road Construction Projects: A Practical Example", *The Review of Economics and Statistics* 43 (1961), pp. 13-21.

\*\*\*\*) Hans A. Adler, *Sector and Project Planning in Transportation*, World Bank staff Occasional Paper No. 4, Johns Hopkins Press, Baltimore, 1967, p. 77.

It is true that a lot of interesting material is tucked away in transportation studies by consulting engineers, World Bank missions, and the like. However, accessibility to such studies is limited; moreover, one would wish to see what general lessons can be drawn from the accumulated experience built up to date and what methodological progress in sector and project evaluation has been made.

The apparent lack of interest in the transportation sector in the recent development literature notwithstanding, the improvement and expansion of this sector will remain an important issue in the countries of the Third World. Old problems still have to be solved, while new problems and questions emerge at the same time. How does the "new" energy situation at the world level affect transport, policies of individual developing countries, in view of this sector's heavy input requirements of energy? To what extent have transport policies eased (or perhaps severed) the development prospects for the rural population seriously lagging behind in income and employment opportunities? Is there in the longer run a place for a viable "informal" transport sector functioning side by side with a modern transport system? How could the reservoir of technical know-how on transportation existing in the developed countries best be tapped for the benefit of improved transport facilities (without necessarily imitating the West) in the poor countries? The questions outnumber the answers.

In the following pages more concrete issues are discussed, and specific answer will be given. Apart from the conglomerate "transport sector", individual modes of transport will also come to the fore, as well as the problems of some individual countries. The scattered observations on the transport sector presented here may serve as a reminder of some of the specific characteristics of this sector, and of the need to work out in greater depth than has been done thus far the theoretical and practical considerations that should guide the development of the transportation sector in Third World countries. In the recent past, many development economist seem to have lost sight of this important sector.

Possibly the following pages will inspire at least some of them to pay in future due attention to this presently somewhat neglected but nevertheless essential element in the development process — transportation.

# SOME ASPECTS OF THE CONSEQUENCES OF THE CHANGING WORLD TRANSPORT PATTERN FOR MARITIME TRANSPORT

*by*  
*Prof. Dr. H. C. Kuiler,*  
*Erasmus university, Rotterdam.*

## **Introduction**

Many young countries have entered the first phase of industrialisation. In terms of Rostow: the "take off" has taken place, some have already reached the phase of "technological maturity".

The consequence is a shift in the spatial distribution pattern of world production. For some products like textiles, etc. the shift is already rather significant (30-40%), for other products the percentage share in world production is smaller, but growing (5 - 15 %).

Under these influences the trade pattern is going to get another character: capital goods (general cargo) is going to the young countries, simple final products and products on the basis of subcontracting (general cargo) to the industrial poles. On the other hand the flows of oil to the industrial poles are stagnating (probably permanent), while a gasflow will come up. For dry bulk cargo the change in the spatial distribution of industries will have its effects: relatively less raw materials will be transported to the old industrial poles.

The consequences of this changing world transport pattern are already felt in the maritime process. Some aspects of these effects will be dealt with in this article.

## THE NATIONAL SHIPPING ENTERPRISE IN WORLD TRANSPORT

### 1. The western multinational shipping company

We start with a short summary of the development of loading and unloading in the different parts of the world.

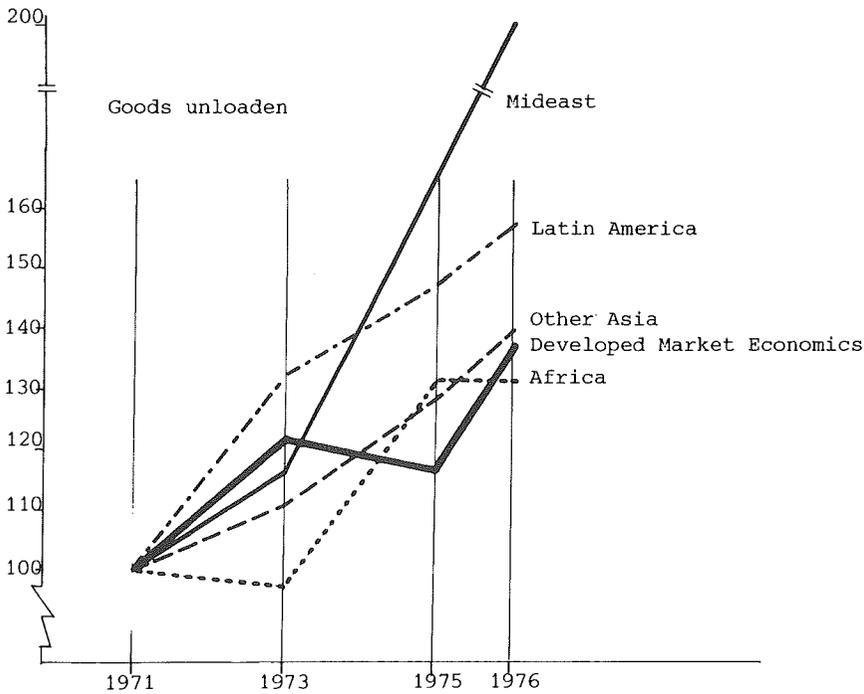
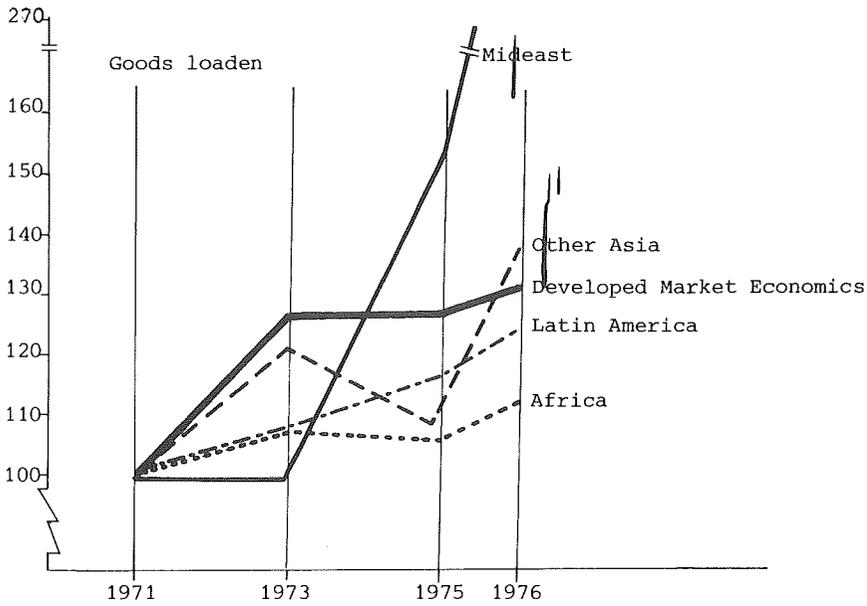
#### MARITIME DRY CARGO TRANSPORT

Area	MIO T				
	1950	1971	1973	1975	1976
<b>Developed Market Economies</b>	<b>L o a d i n g</b>				
	199	701	884	891	935
Africa	35	102	110	108	115
L. America	44	165	178	196	207
Other Asia	18	98	121	108	136
Middle East	3	9	9	14	34
<b>Central Planned Economies</b>	26	89	94	103	108
<b>Developed Market Economies</b>	<b>U n l o a d i n g</b>				
	246	885	1071	1025	1220
Africa	16	45	44	59	59
L. America	30	49	64	72	77
Other Asia	24	80	89	104	111
Middle East	3	24	28	43	48
<b>Central Planned Economies</b>	14	58	75	91	101

Source: United Nations.

This table shows us in a clear way that the developed market economies (the traditional and new industrial poles) dominated and still dominate the world transport pattern. The most important fact in the development of recent years is the growth of the quantities unloaded in the young countries. The importance of this development is clearly illustrated in the following graph:

GROWTH RATE DRY CARGO SINCE 1971



Furthermore the young countries are in recent decades confronted with many transport problems as a result of the strong growth of the flows of raw materials and energy to the industrial poles.

Historically world transport was more or less completely in the hands of enterprises of the developed market economies. And from a political point of view (colonial relations) and from an economic standpoint (know-how and financial means) this situation is explainable. In reality the western shipping enterprises were perhaps the first real multinational enterprises with transport activities in all parts of the world. These western shipping internationals had a private character: they tried to have profitability by offering shipping services in the international maritime field. Adriaansen in his study over multinationals comes to the conclusion that the propensity to invest by such companies is determined primarily by long term considerations. The market for the product and the profitability related with such a market for a number of years proved to be the most dominating factor. \*) In the field of shipping this means that only those routes and those ports of call were served which were considered as a possible contribution to the profitability of the private shipping enterprise. The motives for the choice of routes and ports of call were found in the trade pattern and the dynamic factors that determined that pattern.

The trade pattern was founded on the basis of comparative cost advantages and the mutual needs for the products of the trading countries. The traditional world trade had in this context as a basis the technological advantages of the industrial poles versus the low wages and the natural resources of other countries.

Serving this trade pattern the role of the western shipping enterprise was, however, not only a passive one. It also gave a contribution to the transfer of production, the industrial diffusion through the world economy. This diffusion takes place in the industrial fields by transporting capital goods to the young countries. A second step in this diffusion process is the propensity in young countries to enter also in the shipping business. Without restrictive shipping policies in young countries this diffusion process in shipping would have taken place within the multinational western shipping companies.

For a long period this process of diffusion in shipping has been hampered by the power of the western multinational shipping companies; they had a technological advantage, while the capital intensity was also a barrier for less wealthy countries to enter into this market. This power can be translated into economic strength, the possibility to take risks, to realise economies of scale, the possibility for high investments. An important element of their power was also to coordinate by a central management the worldwide activities of the shipping company.

---

\*) Adriaansen, Overheid en multinationale onderneming. 1978, blz. 55/56.

Research and development were also a positive result of this power. The elements and the results of this power were, however, not always very transparent, especially not in the case of shipping conferences.

The dependency of young countries, based on a historical situation, developed on the basis of private enterprise by western shipping companies, led in young countries to reactions. In the first place they felt as a result of the growing flow of transport, which often congested their ports, the possibility to enter also in shipping as a useful economic activity. In the second place they wanted with a view to their desirable economic developments to be a real partner in decisions concerning trade and shipping. In the modern international relations Guidelines (Chambers of Commerce, Paris 1972) or Codes of Conduct (U.N. 1976) were the institutional means to get a grip on shipping activities.

That in this field a certain form of institutionalisation was required followed from the fact that two different economic starting points were confronted.

As mentioned the western shipping internationals worked as private enterprises for profitability and in that way they had served satisfactory the world transport pattern on an economic sound basis for a long time. However, the economic principle on which the young countries want to base shipping activities is not that of profitability of a private enterprise but that of growth of national economy, the social profitability. This controversy between two principles, private profitability versus macro-economic purposes, can only be solved by governmental interference.

This fact stimulates also the institutionalisation. A code of Conduct can in such a case be a reasonable international instrument for institutionalisation, as it is "considered as a set of recommendations which are gradually evolved and which may be revised as experience or circumstances require" (U.N. 1976).

Between the western shipping multinationals and the shipping companies of young countries there does not alone exist a controversial attitude in economic purposes but also in management capacity, technological experience and the possibilities of the entry to the capital market. This gap has been widened during the 60s. Possibilities of economies of scale led to a practically complete renewal of the fleets of the western shipping companies (very large tankers, bulk carriers, container ships). For this renewal collaboration even between western shipping companies proved to be inevitable: the multinationals became bigger, using highly specialised management, started to control the shipping process with the aid of computers and offered integrated transport services. The shipping companies of the young countries were completely unable to follow this development.

However, this new situation, a result of the 2nd Transportation Revolution, had also its drawbacks. The next paragraph will be devoted to them. The new situation does not only have advantages and drawbacks, but the propensity to realise economies of scale cannot go on for ever. There are limits to the growth of the transport unit (par.3).

But time is going on and new developments, especially in the technical field, are leading to new innovations in which the advantages of two different transport techniques are going to be combined. Especially this development offers quite new possibilities for young countries in building up a maritime transport system (par. 4). The ro-ro-ship may be a very practical solution in this context (par. 5).

## **2. Consequences of the 2nd Transportation Revolution for western transport enterprises**

The 2nd Transportation Revolution has led to bigger transport units in hands of bigger transport enterprises. Both facts brought economies of scale.

Economies of scale may result in lower or relatively lower prices. This effect is accentuated when the volume of transport is stagnating. The high percentage of fixed costs leads to the tendency to use the available capacity even when only a price can be realised which covers the marginal costs plus a small surcharge. This is always more favourable than to use the capacity not at all. The profitability of the transport enterprises may come into danger, especially in a long period of depression. The risks of the investments have been very high.

A further aspect which has increased the investment risks was the restriction for the bigger unit to certain routes or in the case of specialisation to certain commodities. The spatial elasticity of the bigger unit is relatively small. Even in 1970 there were only 3 ports with export of iron ore which could receive bulkcarriers bigger than 100.000 dwt. There are also many natural restraints with regard to big units. When a certain trade is declining as a result of the changing world pattern or as the result of a depression the restricted possibilities are a handicap in using the capacity to the maximum.

These risks became evident in the 70s, because in the late 60s and the beginning of the 70s, the Kondratieff-effect was not generally accepted and economists predicted still growing production and transport. The result was that big units were delivered when the transport market was already in a declining position.

Another element which increased the risks of the investment was the attitude of shippers to transport. Growing volumes of transport and integration of transport in the production process (i.e. to avoid storage as much as possible) has led many big shippers to introduce transport for own account in their transport chains or to increase the percentage of transport for own account. Another way to integrate transport into the production process was the possibility of very long chartering (up to 15 years) or to establish affiliated transport enterprises.

Such enterprises brought, in a period of low transport volumes, their capacity into the free market at a price equal to marginal costs.

As a consequence the spot market for free transport enterprises is shrinking. In a smaller market small quantity fluctuations often result in heavy price fluctuations. These heavy price fluctuations offer often good chances but also bring very big risks.

In a period of growth the good chances attract shipowners which can dispose of a lot of capital. However, the units became bigger and bigger. The required capital became even too big for these wealthy men. Transport on own account by big production enterprises or captive transport in collaboration with shippers was the only solution. To restrict all these risks for free transport enterprises, transporting shippers had to alter their market attitude and conduct.

In the first place the transport enterprises tried to eliminate the risks mentioned by bringing the risks to the shipper and at the same time getting a guarantee for an optimal capacity use (long contracts with shippers). In the second place the transport enterprise had, at a later stage of the 2nd Transportation Revolution endeavored to spread risks by despecialisation (OBO, BORO, etc.) and if possible, according to the market form, attract large quantities of goods with a high price elasticity by small price differences.

In special cases the transport enterprise directed its attention to goods with a low price elasticity in order to get high prices for relatively smaller quantities (Mideast). Market analysis became one of the prerequisites for a successful transport enterprise, while at the same time capability and know-how of the managers had to be upgraded, just like the propensity to cooperate in greater units of enterprise of different nationalities in order to obtain entry to the capital market for their heavy investments. More foreign capital meant at the same time bigger financial risks of such enterprises.

All these factors do not work in the advantage of the developing countries to get an easy entry to the maritime market for liquid and dry bulk. Coming into that market was difficult for them, being in that market was too risky. The result is that western economies, just as before, possess in 1977 still 89 % of the bulk tonnage and even 95 % of the container tonnage.

But also in this bulk market there will be changes. In the general cargo trade such changes are already visible: the young countries control already 33 % of the tonnage.

### **3. The limits of growth**

During the sixties many types of ships became larger because they could realise important economies of scale. But there were limits: the tanker had a maximum of about 500.000 dwt, the bulkcarrier had a limit round 200.000 dwt and the new containership at about 30.000 dwt. When the depression set in, the dream of still bigger ships faded away. When a new growth begins, will the increase in ship size continue? There are many reasons to doubt this.

In the first place the annual quantity to be transported on a certain route of a certain group of commodities must be of a certain volume for use of big ships. Only in a big trade very large ships can be used, giving them the opportunity to be used the year round with a sufficient high load factor. This is the first criterium. We do not expect that the oilflow with a heavy concentration on a limited number of routes will grow very strongly in the near future. The transport flows of dry raw materials will be limited by the changing production pattern of the world, as sketched. Neither tankers, nor bulk carriers will in the future very much exceed the present limits of 500.000 resp. 200.000 dwt. The hampering effect to growth which came originally from the declining demand (depression) will more or less be continued during an economic revival as a result from the in the meantime intensified reconstruction of world production and trade.

A second limit may come from the value of the goods. Commodities of higher value require more careful handling and storage than raw materials transported in bulk. At the same time such commodities are transported in smaller quantities than raw materials. More capital goods to developing countries, more export from the countries of simple metal products, chemicals, processed forest products, etc. mean a smaller flow of higher value. As to the flows adapted type of ship (like the modern cargo liner, ro-ro or boro) will take over a lot of cargo from bulk carriers or specialised tankers.

In the third place limits to growth of shipsize are a result of handling-, storage- and port costs. Turn-round times in ports have to be as short as possible in order to get a high utilisation of a ship. But shorter port times often lead to higher handling and storage costs. When larger units lead to decreasing cost per ton mile at sea, a shorter port time often leads to increasing port costs. The optimum shipsize is then a result from these two cost elements, the optimum being higher for tankers, lower for bulk-carriers and containerships. On the other hand the new ro-ro and boro have the possibility of a further growth: their handling costs being very low, the storage costs can be lower by wheeled cargo or avoided by spreading it over a large area.

#### **4. Choice of a transport system for developing countries**

We have seen that it is very difficult for young countries to enter the bulktrade market as suppliers of tonnage. Multinational transport enterprises and large shippers of the western industrial poles dominate this market. The entry to the general cargo market has been much easier, often with second hand tonnage and under the umbrella of government aid and protection.

The developing country which is building up a maritime fleet of second hand conventional ships has to compensate high costs at sea by low port dues or high port dues by low handling costs.

The conventional linership seems to be a logical solution for these countries because handling in ports can be done by cheap labour, thus compensating the relatively high costs at sea in comparison with modern types.

Employment and formation of income are positively stimulated. In reality this is, however only one part of the story. In the industrial poles the conventional ship is also confronted with labour intensive handling. But now the labour costs are very high. The conventional ship has also a large turn-round time in port. More ships are then needed, which increases the need for capital. Expressed in LRMC \*) for port costs the conventional ship is expensive in relation to its modern counterpart.

Thus the conventional ship cannot be the ultimate solution for young countries. But the modern full-container ship is also not a good solution for the transport problem of the developing countries although the containers ask a lot of labour for consolidation and distribution. The investment in container ships and in the necessary port facilities are too high for young countries. Also the hinterland distribution of the containers requires an administrative process which is complicated and capital intensive. A balanced general cargo movement is also often lacking.

More possibilities and more flexibility especially in relation to the type of cargo is given by the Modern Cargo Liner. It can transport some bulk cargoes, conventional loadings, containers and has its own handling gear. Also the deepsea-ro-ro offers in recent years new and good possibilities. The port requirements are very low, the handling speed is high (short turn-round time), low port investments, larger port capacity without port investments. Handling of cargo can be done in the hinterland which promotes the distribution of income over a larger area. Port congestion is effectively solved by using the ro-ro-system.

More or less the same advantages can be realised by the barge carrier system. For the time-being the MCL and the Ro-Ro seem to be the winning horses.

For developing countries ownership and participation in these systems seems in coming years more likely than full-container systems.

Especially the latest developments in ro-ro which enables these ships to carry also some bulkload seems very promising, especially with a view to the type of cargo which young countries have to export and to import.

##### **5. The future of roll-on-roll-off ships**

Ro-ro-ships serve big trades in the Northsea and the Mediterranean and the Mid-East. The Caribbean, Central and Latin America and West Africa are new fields of operation. For return cargo the boro-type may have a useful application in developing countries.

---

\*) Long Run Marginal Costs.

Concerning the Mid-East it was expected that ro-ro was only useful to overcome port congestions, but now that the port clog has been largely cleared ro-ro proves to be still an useful instrument. Especially for the hinterland connection wheeled cargo has many advantages in developing countries.

The latest development is the use of ro-ro in deep sea trades. For developing countries wheeled cargo can be very attractive: no expensive infrastructure is necessary. Cargo handling is not restricted to the port area, a hinterland distribution in small quantities is possible without extra handling. The import of capital goods and the export of simple products of the first phase of industrialisation can best be done by trucks, eventually in combination with containers. Return cargo is of course an important element in ro-ro trades. The best chances for the most advanced developing countries are in the coming years. There are however difficulties with return cargo in less developed areas like Africa.

In such cases the boro may be a solution in transporting oil or bulk cargo in the holds and tanks beneath the main ro-ro deck on the return voyage. Forest products proved to be also a good ro-ro loading which can already compete on level terms with open hatch bulkcarriers (fast handling, minimal damage to cargo).

An important fact for the future use of ro-ro and boro, especially in trades to developing countries, is the increasing competitiveness by better space utilisation. These ships diminish the gap between industrial poles and developing countries as far as transport is concerned.

From 1970 to 1978 the number of ro-ro vessels in operation increased from 141 to 635 (from 0.6 mio dwt to 3.8 mio dwt) while 227 ships (2.2 mio dwt) were on order.

The type distribution was as follows:

short sea route vessels	739	1.3 mio dwt
car carriers	141	1.1 mio dwt
deep sea route vessels	70	1.3 mio dwt
pass./cargo vessels	45	0.1 mio dwt

Most important countries of registry were:

USA	16	France	10	UK	8
Sweden	7	USSR	4	Norway	3
Finland	2	Japan	1	Italy	1

Already 18 ships were registered in "other" countries, not being flag of convenience countries. This is an indication that already countries not belonging to the group of shipping countries are getting interested in this new type of ship.

# THE ROLE OF INFRASTRUCTURE IN REGIONAL AND SOCIOECONOMIC GROWTH OF DEVELOPING COUNTRIES

by

*Frans Kutsch Lojenga and Matwey Schut  
University of Technology, Delft.*

## 1. Infrastructure: A Basic Requirement.

Infrastructure \*) has always played a dominant role in the economic development of every country in the world and still does so today.

Infrastructure can be seen as the vascular system and skeleton of an economy. In the following, the emphasis will be put on the transportation elements of infrastructure.

The economic development all over the world and especially this development in the western world has coincided with the invention of and improvement of new transportation techniques and hence on with the necessary infrastructure for these techniques.

The introduction of steam in the first half of the 19<sup>th</sup> century meant a revolution in transport development. Steam driven ships and locomotives made it possible to transport heavy materials over long distances in a reasonable time. A similar and even more rapid development occurred with the invention of the petrol-engine and electro-engine at the end of that century. The speed increasing results of these inventions led to the bridging of greater distances. This development was even more spectacular and with big implications as a result of the growth in air travel after the first flight of the Wright-brothers in 1903, a development which has led to the wide-body planes powered by jet-engines we see today.

All these technological developments in transportation by road, rail, water, air and pipeline, were and still are of major importance for the economic development, a development which would not have been possible if the required infrastructure for these transportation techniques was not built. Roads, railways, sea and airports are the basic needs for the transportation of goods and people.

These technological developments in the different transportation modes in combination with, and often inspired by the technological inventions and progress in industry (compare for instance the Industrial Revolution) were the conditional elements for economic growth. The stimulating impact on trade of the transportation developments has resulted in a society based on labour division. This labour division through-

---

\*) Infrastructure can be seen as a collective noun including elements as the technical public transport and communication systems (road, rail, waterway, air, sea, ports), the drinking-water and energy systems, and so on.

hout the world would not have been possible without the transportation facilities and the necessary infrastructure going to these facilities.

In the birth place Europe, these new developed transport modes caused a radical change of the economic society in the 19<sup>th</sup> and the beginning of the 20<sup>th</sup> century. Exchange of goods between the different regions and countries of Europe and the New World, because of decreasing transportation costs, stimulated an excessive division of labour and caused a specialisation in industry. Traffic development brought about the enclosure of many isolated areas of the different countries. New markets were created and the since ages existing almost self-sufficient economy in many regions lessened because of this specialisation and because of the import and export of goods as a result of trading. And again all these trading activities would not have been possible without the existence of sufficient infrastructure upon which the transportation of goods and people is based.

## **2. New Infrastructure Projects: Marginal and Structural Effects.**

Looking at the map of the north western part of Europe at the end of the 19<sup>th</sup> century, it is striking but not unlogical to see that most of the more densely populated regions are located around places with a natural existing infrastructure (like different ports along the coast, the mouth of rivers) and where natural resources (like iron ore, coal, etc.) were found \*).

With the growing of trade as a result of the Industrial Revolution, the building of railways and roads between all the centres of economic activities and the agricultural areas surrounding those centres, it can be noticed that further industrialisation or, in broader sense, further economic development takes place along these infrastructure networks\*\*).

New settlements are often located along the main trade routes. More developed settlements are in most cases located in places where the different transport routes meet, or where the change of transportation modes takes place (compare for instance the development of the Port of Rotterdam). These locations serve also as potential areas for possible following industrial activities.

Especially the continuing development of infrastructure like roads, railways and sea-ports can be seen as the most important starting point of economic growth. This whole development, sooner or later similar in all the industrialised areas of the world, has led to the present dense infrastructure networks in the western world.

---

\*) Examples of these settlements are London (river Thames), Paris (Seine), Ruhr area in Germany (iron ore, coal, Rhine), Northern France (iron ore, coal), central England (iron ore, coal), etc.

\*\*) A good example is the development of the different towns and cities in the USA, along transport routes from the east coast to the west coast.

Because of the existing density of infrastructure in the industrialised world, new infrastructure projects will not have the stimulating impacts on regional economic development comparable with the creation of infrastructure in almost virgin areas at the beginning of this century.

The most important aim of new infrastructure projects in the western world nowadays will be to enlarge the existing capacity in order to avoid or to lessen traffic congestion.

New infrastructure projects will in general no longer be the starting points of new basic-industrial or other economic activities. Only a marginal improvement of the economy will be the result of these projects. Perhaps the distribution of traffic between different transport modes, the modal-split, will be affected, whereas the generation of new traffic will hardly occur.

The long period of economic development that has taken place in the so-called developed world following the Industrial Revolution is more or less comparable with the economic development that is nowadays taking place in many developing countries. The only and crucial restriction in this comparison is, however, that the duration of this development in the Third World is aimed to be much shorter.

The most important reason for this more rapid growth of economic activities is (among others like the discovery of natural resources, the decolonisation as a result of a strong willingness for independence) the already existence of many and various kinds of transportation modes.

In general it can be stated that there is a lack of dense infrastructure networks in developing countries. Just trunklines exist, connecting the most important centres of economic activity, centres often located near natural infrastructure junctions for instance near the sea or near rivers, or in the neighbourhood of places where natural resources are found.

Because of this lack of infrastructure and because of the existing situation that nearly all the economic activities of a developing country are concentrated in one or two major cities, new infrastructure projects (roads, railways, ports) will have important consequences for industrial development. New roads and railways will open new areas, areas that were formerly isolated, with a comparable spatial effect as in the Western World at the beginning of the 20<sup>th</sup> century may occur in the developing countries.

As opposed to the developed world, new infrastructure projects in developing countries do have a structural impact on the socioeconomic development pattern. Instead of a passive and correcting role of infrastructure, transportation projects for instance, and also industrial projects (in ports), accomplish an active function in the stimulation of economic development.

### **3. Infrastructure Projects as Instruments to obtain Economic Goals.**

Economic development in every country is based on three basic elements, elements which are closely related to each other and, seen in a certain time period, have a cycling and continuous character. These elements are policy, planning and implementation.

The policy of a country can be seen as a projected programme of different aspects of the society consisting of desired objectives and the means to achieve them.

In most developing countries the –in general – desired objectives (see Dasgupta, Sen and Marglin (1972)) are the aggregate consumption objective (the raising of the standard of living), income redistribution, the raising of the growth rate of national income, expansion of the employment level and the developing of self-reliance.

These objectives in addition to the in most developing countries existing situation of a nodal-economy (see below) often lead to a policy of regional decentralisation of economic activities.

In order to achieve the formulated objectives, planning is necessary, planning being the process or act of making and carrying out plans. In addition to policy, planning can be seen as the establishment of goals and procedures by means of creating different possible projects.

As the different formulated objectives can often be achieved in various ways and the means to achieve all the objectives are scarce – especially in the developing countries –, priorities in the objectives have to be made. In addition to the priorities also a choice between the different alternative projects has to be a result of the planning and policy process.

Once a project is chosen the implementation of that project has to take place. After the implementation phase, or better during that phase the planning and policy process has to continue, something that most countries (in the Third as well as in the industrialised world) often forget to do.

We have seen that infrastructure projects play a dominant role in the economic development process of developing countries mainly because of the structural and regional economic impacts that go with new infrastructure in those countries.

In a lot of countries in the Third World this productive function of infrastructure is not always recognised (see Klaassen (1978)). The revenues of infrastructure projects are often only after a long period perceptible while the initial investments in for instance transportation-infrastructure are very high.

Nevertheless in order to achieve the goal of regional decentralisation of economic activities the implementation of infrastructure between the existing and potential centres of economic activities is essential. For instance transportation networks connecting the existing major cities and the regions where natural resources are available,

which will in most cases bring about a spread of economic activities especially at the infrastructure junctions (industrial and trading activities) as well as along the main transportation routes (agricultural activities).

#### **4. The Need for Regional Planning in Developing Countries.**

##### *4.1. Introduction*

In almost all countries and especially in developing countries, regional inequalities exist in many forms, caused by different factors like the geographical situation, the presence of natural resources, climate, population densities, socioeconomic processes, etc. These regional inequalities, however, do not themselves constitute the need for the formulation of a regional policy. For that reason it is necessary to ask whether the inter- and intraregional inequalities cause problems, and, if they do, whether specific intervention is required for their solution (cf. Stilwell (1972)). First one shall have to demonstrate that these problems caused by regional inequalities are not self-correcting anyhow or at least in due course. In the second place one shall have to formulate some standards of equity and efficiency. Only then the government has a reason for intervention and a basis for the formulation of a regional policy which might be regarded as a spatial framework for national development. Political, economic and social objectives play always an important role in such a policy. This makes the policy and the planning process following the policy, rather complicated.

According to Friedmann (1966) it is not as much the political objectives but rather the phase of socioeconomic development which varies the appropriate emphasis in regional policy making. He distinguishes four phases: preindustrial, transitional, industrial and postindustrial. The preindustrial and transitional phases can be found in various ways in developing countries. In his view the preindustrial societies need to pay little attention to regional aspects but should emphasise improvements in education, health, agricultural organisation, transportation and transportation facilities. The transition from a rural to an industrial economy, beginning with the industrial take-off, makes regional policy and planning crucially important. The spatial organisation is being changed fundamentally in order to achieve the best benefits from the industrial growth (mainly) in growth centres.

In this course of development in every phase new problems occur which need intervention, for instance the problems of depressed areas or lagging regions. Apart from the fact that this distinction in development phases with corresponding policy measures of Friedmann is rather crude and rigid, one can recognise however, the changing character of the regional problem, making clear that regional policy must be adjusted to the different phases of development, and making also clear the need for planning the regional (and thus national) development process.

#### 4.2. *The Need for Regional Planning in Developing Countries.*

Generally speaking, regional planning aims at achieving a better distribution of activities and population over the national territory in order to accomplish a more or less balanced spatially spread national socioeconomic development. In this context there is reason to discuss the "special case" concerning the developing countries.

In the following brief discussion we shall distinguish between different exogeneous and endogeneous starting conditions for the developing countries.

Essential in the discussion of the exogeneous factors in reference to different development possibilities of the developing countries is the centre periphery relationship between developed and developing countries. The period of colonisation has led to a situation in which the developing countries are (still) strongly influenced and dominated by the developed countries. Moreover, quite a great deal of this industrial development of the what we now call developed countries has been made possible because of their relationship with the now underdeveloped countries and sometimes at the expense of these countries. The socioeconomic take-off of the developed countries started some 100 years ago and contributed to regional and national economic growth in which the now underdeveloped countries are still involved, i.e. in which they play a crucial role actually as underdeveloped countries.

This process implies that the present starting-point for the socioeconomic take-off in the developing countries is quite different from the situation which the developed countries faced at their very moment of take-off. Because of this aspect there is also doubt regarding to the above mentioned idea of phases of development of Friedmann. So many of the existing problems in developing countries today can be explained by the exogeneous determined factors. Mention should be made of the rapid population growth which causes severe housing, health and education problems. The spatial development is mainly determined on the relation with the developed countries i.e. the export of raw materials. This implies an urban and spatial development in one or a few very big cities mainly along the coastal area, leaving the rest of the country untouched and sometimes very primitive. Further consequences of this process are among others the migration from the rural areas to the already overcrowded city, a dualistic structure of the economy and the creation of a "soft state" as described by Myrdal (1970).

Next to these exogeneous factors there are also several endogeneous factors which may lead to stagnation and other related frictions. The geographical North-South division according to the economic contradistinction, reveals the differences in local circumstances, possibilities and potentials out of which the development process in the developing countries should start or being continued. One can think for instance of climatological differences, cultural patterns, the endowment with natural resources and so on.

The exogeneous and endogeneous factors together are responsible for the difference in starting-conditions and the specific development problems in developing countries. Regional planning, which aims at structural change plus regional economic growth, has to take into account this "special case" of the developing countries. New lines set up for the spatial development of the developing countries must be adjusted according to the "special case".

A pure translation of the theoretical concepts and practical experiences of regional economic growth patterns of developed countries to the present situation of the developing countries underestimates the importance of the above mentioned development conditions. The failure of so many development plans, however well defined or theoretically pushed, gives rise to the idea that the need for regional planning in developing countries is more than ever an urgent need.

#### 4.3. *Negative Effects of the Growth Pole Theory in Developing Countries*

In the past two decades regional planners and policy-makers in many countries, both developed and developing, have for a great deal relied on the growth pole theory of Francois Perroux or alternatives to this theory in order to set up a strategy promoting growth in backward or underdeveloped regions. This theory is based on the idea that a growth pole consists of economic elements, which are concentrated in a geographic area, and between which economic linkages exist stimulating this growth. Most growth poles have a so-called "motorial element", which has the most stimulating effect on the growth. These elements are very often infrastructure-elements or the existence of natural resources in an area. It now appears sometimes however that the growth pole and growth centre theories are being rejected because they have failed to do their job (Conroy (1973), Richardson (1975)).

Some countries turned already to alternative bases for their regional planning (for instance Chile, Bolivia, and Colombia). For a variety of reasons there now exist this doubt as to the applicability of growth pole and growth centre strategies in developed as well as in developing countries.

Several studies in developed countries give rise to the idea that the main weaknesses have been the failure to place the growth pole analysis into the context of a spatial development theory and the neglect of the critical time horizon (cf. Richardson (1975)).

Spread and backwash effects appeared to have asymmetrical impacts over space; net spillover effects do not result in the early years of implementation of the growth pole strategy and the necessity of planning with a long time horizon are some of the reasons that the planned area-wide development was not achieved.

In fact most planners appeared to overestimate the external economies of the pole (Hirschmann (1958)). Other studies come out with the same conclusions, namely that the spread effects are very often smaller than expected, or limited in geographi-

cal extent, or less than the backwash effects (cf. Gaile (1973), Gilbert (1975), Hansen (1975)). The increasingly diversified structure of the economy and the extensive spatial spread of innovations and economic development makes the development process in the advanced countries becoming less polarised and, consequently, less appropriate for growth pole strategies (see Lasuen (1969)).

The situation in the developing countries is – again – quite different from the western world. But also in the developing countries there exists a strong tendency to reject the growth pole theory as a basis for regional development planning, because of its negative impacts on the course of the development process.

Conroy (1973) has gathered a lot of information about the reasoning behind this negative attitude to the growth pole theory related to the Latin American situation. Without being detrimental to his conclusions, his description may also be interpreted for the situation in the Third World as a whole. Conroy divides the negative effects of growth pole and growth centre strategies in four broad categories: *ideological, theoretical, political and practical*.

The ideological considerations focus mainly on the fact that the reasoning behind the growth pole concept is in fact of an imperialistic origin, i.e. is meant to enlarge the capitalist centre-periphery structure of the world economy in which the developing countries are only allowed to play their roles as dominated and thus peripheral countries. Coraggio (1973) discusses quite extensively this view on polarised growth. He considers it a false development in which the national economies of underdeveloped countries are subordinated to a small number of dominating economies (e.g. USA, Japan, Western Europe).

In his view internal growth is only artificially and consistent with the world system of dominant poles which determine what kind of modern industrial development should be obtained in the developing world, always with the aid of foreign investment and of course profit transfers out of these developing countries.

Theoretical considerations for the negative judgement of the growth pole theory point mainly at the transferability of the theory from the highly industrialised developed countries to the less developed areas where substantially different patterns of organisation exist (see section 4.2.). In developing market economies which are little competitive and institutionally monopolistic, policies of polarisation will only accomplish further spatial concentration of industrial activities and population. In this situation the size of plants is very often larger than socially judged optimal. Moreover, the current pattern of industrial and population concentration in only a few big cities is in itself the most severe objection against a regional growth centre strategy. This current pattern is already a polarised development of an extreme form. The foregoing statement confirms also again the ideological-oriented objection of Coraggio. It is clear that a policy based on a theoretical concept that in practical situations already has brought about a negative effect on regional and socioeconomic development, is of little worth for planning purposes. The polarised growth process offers no prospect on a balanced spatial development and therefore growth centre strategies should be rejected.

Negative effects from a political and practical point of view are often of the same kind; they are problems of the implementation of the growth centre strategy. For instance, what features determine an appropriate centre for future polarised growth, what reactions can be expected in political sense from the population, the opposition and from the not-favoured areas of the country, how much money must be divided over how many regions, what activities come first, what kind of priorities must be set and how can this be done, etc.?

These questions and other related questions cannot be answered unless the planning authority has investigated the nature of the difficulties and obstacles which will come into existence in the development process. Gilbert (1975) has investigated the incidence of development in the vicinity of a growth centre and he draws two important conclusions from the results of his research.

The first is that among others, infrastructural improvements do not diffuse from growth centres beyond a limited area, and it does not matter whether the region is located in a rich or in a less-developed country. The second conclusion is that because of either the result of weak spread effects and/or substantial backwash effects the regions beyond the immediate vicinity of the growth centres receive little positive economic benefits. This does not imply that the poorer areas remain untouched by the activities and influences of the growth centre. It is rather the nature of that relationship with the growth centre which has as consequence the low level of development.

This failure to integrate the different areas of the nation, each with its own development potential, into a balanced national development, causes critical implications for regional planning authorities. A growth centre does not automatically induce regional and socioeconomic development. It can operate effectively only together with direct efforts improving the agricultural, social, economic and spatial conditions. With reference to the subject of this paper it is useful to point at the need for the integration of regional planning (which aims at structural change plus regional economic growth) and infrastructure planning (see also Peaker (1976)). The planned infrastructure facilities must be consistent with the structure of the development plan for all the relevant areas in the country. Therefore it is particularly important to integrate all relevant aspects of development at the regional level, because the success or failure of a region to develop is usually attributed not to one or a few single factors, but to complex groups of cause and effect relations which are mutual entangled (Hermansen (1972)).

Mention must be made of some other negative effects of concentration of economic activities (diseconomies of scale), namely higher rents (land), traffic-congestion (traffic but also energy), pollution (noise, air, water), different optima at different sizes, urbanisation of cities, unemployment, the psychological attractiveness of a city. Isard puts the problems in the following way:

"We are still thrown back on the simple statement that there are attracting and repelling forces for location in cities of different size".

## 5. Infrastructure Projects and Socioeconomic Development.

### 5.1. *Introduction*

As stated in section 1, infrastructure projects play an important role in the development process of a nation. It is not the narrow scope of economic growth but rather the regional, socioeconomic, cultural and political-administrative development that is important in this context. Development means that the different kinds of interactions between people, firms, markets, and government institutions will be affected both quantitative and qualitative. People, activities and regions are brought together somehow in altering contact patterns because of the regional and national development process. In structuring this development process of contact patterns, infrastructure projects play their crucial role as an intermediary factor which changes the basic conditions for regional and national development.

Infrastructure projects make possible for instance a better spatial division of labour and a more enlarged distribution of goods and services. However, it is also possible that negative effects are being induced, for instance an increasing tendency towards growth within the bigger urban regions which leaves the more remote areas behind with a smaller socioeconomic growth, forming a contradistinction between contact-intensive and contact-extensive regions (Thorngren (1970)). Therefore, regional planning and infrastructure planning should be integrated and attuned to each other in order to achieve a consistent set of regional and national development impacts.

### 5.2. *Examples of Infrastructure Projects in Developing Countries.*

Typical examples of new large-scale projects with an infrastructural character and growth-pole effects are rather scarce. A clustering of examples according to the kind of projects however is possible.

For instance, in some developing countries *new capital-cities* have been built or are in the planning-scheme. The reason for the creation of a new capital-city is often based on administrative and political considerations.

A more centrally situated capital facilitates a better understanding and a more adequate solution of specific development problems of the country. Other reasons may be to avoid an unbalanced spatial development of the country or to lessen the problem of overpopulation. Examples of new capital-cities are Brazil, Tanzania and South-Korea. Between 1956 and 1960 in Brazil a new capital has been built about 700 miles from the former capital city Rio de Janeiro, on a 1200 m high plateau in the inland. Nowadays, this city Brasilia is a major city with approximately 550.000 inhabitants and a substantial influence on its surrounding area, but not always in a positive way because of the concentration effect of the rapid growth of the city. In Tanzania the building of a new capital is partly in the planning-phase and partly in the building-phase.

The provincial town Dodoma, about 300 miles west of Dar-Es-Salaam (300.000 inhabitants) at the coast, is planned to become within 10 years the new capital (present number of inhabitants about 25.000). Other examples of countries where new capital-cities are being built are Malawi (new capital Lilongwe), Pakistan (Islamabad), India (New Delhi) and South-Korea (project in the first stages of planning).

Another example of large-scale infrastructure projects in developing countries is the building of complete *new-main(rail) roads*, which must open up large areas of the country and make connections with ports, industrial plants, finding places of natural resources and neighbour nations. Two examples may be mentioned. The first is the Trans-Amazon road through the jungle of Brazil, which is meant to enclose the regions with natural resources and to cause a new pattern of settlement along this road. There are of course substantial problems regarding energy, environment and socioeconomic development related to the project, but we shall not discuss them here. The second example is the well-known Tanzam-railroad between Tanzania and Zambia which has been built with the aid of the Chinese Peoples Republic.

The main function of this railroad is the transport of coal, copper and ore between Zambia and the harbour in Tanzania (Dar-Es-Salaam). Also here effects on the environment and the regional and socioeconomic pattern will be induced. Detailed information about this is still lacking.

Examples of large-scale *dams for hydro-electric power* generation and also meant to induce regional and national economic growth effects are the Aswan Dam in Egypt, the Inga Dam in Zaire, the Brokopondo Dam in Surinam and also the Kainji Dam in Nigeria (see Adeniyi (1976)).

In order to speed up the take-off of the national and regional economic development some developing countries have turned towards the building of industrial locations mostly combined with a harbour function. An example of such an industrial port location is Point Lisas in Trinidad where the efforts are directed to a new steel and aluminum industry with large economic effects (employment and the standard of living) (see Van der Wal (1978)).

A second example of this kind is Apoera in Surinam where bauxite exploitation, transportation infrastructure and an industrial port location at Apoera are combined in order to achieve regional and national socioeconomic benefits. This last example shall be discussed more in detail in the next section.

## 6. Infrastructure Projects and Socioeconomic Development in Surinam.

### 6.1. *Surinam: Concentration of Economic Activities in Paramaribo.*

Surinam, a country in the northern part of South America, is surrounded by Guyana, Brazil, French Guyana and the North Atlantic Ocean. In 1975 Surinam, about 2½ time the size of Sri Lanka, became independent after being a Dutch colony for more than 300 years. There are about 400.000 people living in Surinam, a number which has been higher, before 1975, but the independency has caused a substantial migration to the Netherlands. Most of the people live along the coast, especially in Paramaribo, the only big city at the mouth of the Surinam-river, where 50% of the entire population lives.

The most important economic activities in Paramaribo in terms of employment-supply, are those concerning government, trade and small industry. These activities are, in combination with the workchances and relative high wage-level in Paramaribo and also the amount of other provisions, the most important pull-factors, which have caused a lot of migration from the rural areas. Although especially in the government sector a lot of (not always productive) employment is created, the unemployment rate in Paramaribo is high (up to 30% according to unofficial sources). This is of course, among others (like the housing-situation) one of the negative effects of the concentration of socioeconomic activities.

Surinam is a country with many natural resources like minerals, hydroelectricity and also climatological conditions which guarantee a wide variety of agricultural products. Further, the mining of bauxite-ore and the bauxite-linked industries (alum and alumina) are important. 30% of the Gross Domestic Product is produced by the mining-industry an industry with an important export character (about 90% of the total export value) although not very labour-intensive (about 6% of the working-population) while government and trading-activities each produce about 25% of the G.D.P.

The influence of foreign countries on Surinam is very great. In 1973 about 20 foreign industries were located in Surinam, which meant that 66% of total investments and 66% of the total added value in Surinam was in foreign hands (Visser and Wassink (1979)).

These facts, together with the existing situation that import and export take 90-95% of the G.D.P., lead to the conclusion that Surinam is very dependent on foreign countries especially the United States and Canada, and also on Europe (the Netherlands).

Together with this foreign dependency, and the open character of the Surinam economy, a character that occurs in many developing\*) countries, it should be mentioned

\*) It should be noticed here that although Surinam is a developing country: the mean income per capita of the Netherlands/Surinam is 5/1-, there are countries in the Third World where the situation is even worse. Compare for instance the G.D.P. per capita for Surinam and some neighbouring countries (1977 in U.S.\$): Surinam-1980, Colombia-1615, Cuba-959, Jamaica-660 (Visser and Wassink (1979)).

that Surinam is very strongly influenced by the fluctuations of the world market price of bauxite. Mainly because of a decreasing tendency of these prices in the past few years, the Surinam balance of payments shows a deficit.

A short inventory of the situation in Surinam shows that the local government has to deal with the following problems (cf. Visser and Wassink (1979), Brandsma et al (1978)):

- Economic activities (government, trade, industry), are for a great deal located in the nodal-city Paramaribo, a city with a "hydrocephalus" character". The process of centralisation (of activities) is still going on (resulting in migration from rural areas) and leaves no or only minor possibilities for the socioeconomic development of other parts of Surinam, in spite of great potentials in the rural areas.
- A government structure which has created too much unproductive employment. This situation leaves no possibilities for the necessary decrease in government expenditure.
- A labour market which is neither quantitative nor qualitative in balance.
- On the one hand more or less big capital intensive industry (bauxite) with on the other hand a lot of small industrial and agricultural activities. The unbalanced economy of Surinam has often been compared with a so-called mono-culture.

The necessity of importing a lot of primary living products (food, etc.).

With these problems in mind, the government has formulated socioeconomic-policy goals, which are based on the principle of "Mobilizing the Own". The aim is to get an economic independence next to political independence. According to the Surinam government the goals are to be achieved by broadening the unilateral economic structure, importsubstitution, growth of domestic savings, creating an own know-how, growth of the domestic product, creation of employment by means of more labour-intensive production methods, and, to lessen economic centralisation of Paramaribo, a regional spread of economic activities, welfare and population.

## 6.2. *Apoera, a New Centre of Economic Activity in West-Surinam.*

Because of the emphasis the Surinam government has given to a regional decentralisation of economic activities in solving the problems mentioned above and the fact that new bauxite-ore has been found in Western-Surinam, in the Bakhuy's mountains (an area about 230 kms. south west of Paramaribo in the inland of Surinam), the development of this area of Surinam is one of the main pillars in the regional development plan.

The main goal in this regional and socioeconomic development plan is the creation of a new city in West Surinam: Apoera. Apoera is planned to function as a growth-

centre for the Western Surinam area, in which the bauxite-industry plays the most important role as the motorial-element. Apoera is located near the border with British Guyana, along the Corantijn river (which guarantees transportation possibilities), about 80 miles from the sea (see map). The original population existed of 600 Indians, whereas the planning aims at about 78.000 inhabitants in 1985. More realistic estimations however speak of about 35.000 inhabitants in that year. Until recently, the only activities in this area of Surinam consisted of timberfelling on a small-scale and the construction of secondary roads; for the rest it remained untouched.



Map 1. The study area in West-Surinam.

Because of the great potentials of the area, West-Surinam has been chosen to become the most important (after Paramaribo) concentration-region for regional and national economic reasons.

These potentials include inter alia:

- mining and the processing of bauxite (also iron-ore, fertiliser and cement)
- agriculture and cattle-breeding
- forestry and the processing of the timber products
- energy
- transportation.

In order to process the bauxite, large quantities of water is needed and for a further processing in aluminum a large supply of cheap electric energy is required. For this purpose a hydro-electric power station is planned at Kabalebo. As the bauxite-industry is considered the most important sector for inducing socioeconomic growth, this sector receives relatively and absolutely the most attention. The planned investments for the whole project amount up to about \$ 1,200,000, of which approximately one third is set aside for the Kabalebo-project.

Only a minor 8% has been appropriated for the railroad from the Bakhuy's Mountains to Apoera, the main transport-infrastructure element in the development plan of West-Surinam. The building of this railway, which was the starting project of the entire West-Surinam development plan, will probably be finished in 1979 including all other necessary provisions for a mass transportation of alum.

In the areas along this railway, new agricultural and forestry projects will be started which contribute to the economic growth of the region too.

### *6.3. Infrastructure: Direct Productive Versus Not Direct Productive.*

By the time Surinam became an independent republic, it was decided that the close relationship between Surinam and The Netherlands had to be continued. This conformity was not only based on historical grounds, but even more on the wish to enable Surinam to reach an economic independent status as soon as possible. For this purpose, Surinam and The Netherlands agreed on a two-fold financial aid program which obliged The Netherlands to a gift of Sf 3,3 billion (approx. U.S.\$ 2,3 billion) spread over the first 10 years after the independence, and to a guarantee-loan of Sf. 500 million (approx. U.S.\$ 350 million).

In order to take care of a fair spending of this large amount of money, a committee of Dutch and Surinam experts was called into being. This Committee (CONS) has agreed on a certain division of the development aid over various development projects. For this purpose, the development projects were labelled as (1) productive investments, (2) infrastructure investments, and (3) social-educational investments.

Each of these three investment categories receive a certain percentage of the financial aid, i.e. productive investments 50% , infrastructure investments 25% and social-educational investments also 25% .

In this division the infrastructure investments together with the social-educational investments are interpreted as not direct productive investments.

According to Klaassen (1978) this interpretation is far from correct. Because of the rather intensive interactions between the numerous individuals, households and businesses, and also because of its wide impact on regional growth, infrastructure plays an important role in this process of economic functioning and economic development. An adequate infrastructure of sufficient quality supports the prosperity. Clearly, in this view infrastructure investments should be conceived of as direct productive investments. Moreover, in developing countries like Surinam, infrastructure investments should be relatively high at the very beginning of the development process. A balanced development is impossible without a serious planning of infrastructure. Clearly, this infrastructure planning also has to be integrated with all other planning elements of the development plan. In the same manner the social-educational investments can be considered as direct productive investments at the time that due to the course of the development process, more emphasis is put on the individuals, the households and the development of a labour market with quantitatively and qualitatively sufficient labour.

In this sense, it seems not reasonable to use the improper division of direct and not-direct productive investments, which also means that the percentage-division in the Surinam-case is disputable. The different investment projects should all be considered as direct productive and receive full attention at the proper moment in the course of the implementation of the development plan.

The revenues of such investment projects like infrastructure come about mostly after a long period (see also subsection 4.3.) compared with other kinds of investment projects. However, the revenues do come about and they are certainly not to be underestimated. Infrastructure projects accomplish structural effects during a very long period and hence they are an essential productive element in the total development plan.

In the case of infrastructure investment projects one should realise that the cost comes always before the benefits. As infrastructure is the "motor" in regional development, a great deal of the total investment in infrastructure projects is justified.

#### 6.4. *Shortcomings and Problems.*

According to the plans, Apoera should become the second centre in Surinam where, on a national level, important economic activities take place and many jobs will be created. The plans for the hydro-electric power station at Kabalebo and for the aluminum-smelter are in a rather definite stage; however, the Apoera-railroad has

been planned and built in advance. Next to the reason of expensiveness, this railroad is strongly being criticised because of a bad or even a lack of integration of regional, socioeconomic and infrastructure planning.

Because of underestimation of essential elements (especially with regard to bauxite-export possibilities on the world market) and miscalculations for certain development potentials serious doubt has arisen with regard to the choice of Apoera as the centre for regional development in West-Surinam and also with regard to the Apoera-railroad itself. These doubts can be summarised as follows.

An essential problem in this area is the absence of a quantitative and qualitative sufficient supply of labour. Almost all labour has to be imported, whether from Paramaribo and other parts of the country, or from abroad (mostly the neighbouring country British Guyana). This problem implies the need for migration to the West-Surinam area.

Besides, the many imported labourers may cause a severe income leakage in the growth centre. The enthusiasm for migration from Paramaribo to Apoera (where the circumstances are still rather primitive) is very small, mainly because of the negative ideas people in Paramaribo have about the course of development in West-Surinam.

A second difficulty arises because of the planning-concept of the growth pole approach. This growth pole approach is among others based on the polarisation effects of the sectors present in the growth pole. For example, the technical polarisation is an important factor in a growth pole based on the bauxite industry. The growth induced by the bauxite industry will be greater in proportion as the linkages with other industries are greater. The process-linkages with the bauxite processing industries, however, occur only at the end of the production chain, namely those industries which use the aluminum as a raw material.

Therefore, the vertical integration in the bauxite industry leaves hardly any room for these process-linkages. Moreover, the service-linkages (delivery of machines, repair and maintenance), the marketing-linkages, the financial and commercial linkages are so small that hardly any other industries will be attracted. In this context it is also worthwhile to mention the disadvantageous development in demand and supply and hence in the price of bauxite and alum on the world market. An increasing supply from Africa and Australia recently has led to a decreasing price and makes the growth expectations for demand tend to be overestimated.

Especially in relation to the high transportation costs of the bauxite transport and the volume-decreasing processing, it might be more advantageous for Surinam to decide for a further processing of the bauxite in Surinam itself. If the investment-costs of the transportation infrastructure would have been accounted in the price of the bauxite, it would hardly be competitive on the world market. Regarding this situation, it seems very probable that the almost finished railroad will be used far below its capacity. This means that it would have been preferable to plan the processing part of the bauxite industry in the Bakhuis Mountains, implying that the railroad might be superfluous and that a (simple) metalled road would have been suffi-

cient for the transport of the less voluminous aluminum products and for other transportation uses.

Another problem to be mentioned again is the one-sided orientation towards the bauxite, leaving less possibilities (in terms of financial incentives) for agriculture, cattle-breeding and forestry. The dependence on bauxite remains great and tends even to be greater. For instance, the presently planned efforts for regional development can only be made with substantial aid of foreign capital, foreign know-how, foreign management and allowing profittransfers of the foreign companies. Not the own potentials are being used or stimulated, but rather these become subordinated to the multi-national and large-scale plans of the government and the foreign companies.

The mutual connection of elements of the development plan brings about problems too, because of the interest of so many other non-Surinam participants. The over-all view on the development progress may be troubled by entangled interests. Because of this, the implementation of the policy could be hampered and may possibly lead to a desintegration of the development plan. The usually long time horizon of the development plan makes it difficult to review accurately the progress, especially with regard to the infrastructure elements of the plan.

The regional development in West-Surinam could be described best as based on a lack of *phased planning*. This implies also that *integration* of the different development elements that are to be planned, is lacking. The Apoera-railroad is planned and built in advance; however, the related activities are hardly planned or not planned at all. Because of the more or less remote position of West-Surinam in its own country and also because of the remote position of Surinam within the South American continent and within the Caribbean area, planning of these other activities (housing, agriculture, all other related and non-related activities, etc.) should have been worked out much more in detail together with the other related planning elements.

## 7. Conclusion.

After all, the question arises of what can be learned of the present course of events in Surinam. Negative effects and mistakes should not be set aside, but rather be analysed to learn from them.

At the moment, for the specific situation in Surinam, some conclusions for the near future might be drawn and also some recommendations made. The railway from the Bakhuy's Mountains to Apoera is a given fact which cannot be cancelled anymore. Given this railway and in relation to this infrastructure, Surinam should apply itself on a very proper planning of other activities which can have a positive effect on the regional growth of West-Surinam.

It is even possible to decide to follow a fundamentally other course of development. For instance, the Surinam Government could decide to plan the entire bauxite production line (up to the processing of aluminum and aluminum products) in the Bakhuis Mountains region. And this decision could be justified to take even in 1979!

On the other hand, the development planning in Surinam could have been better turned to a proper regional development of the whole coastal area. This implies for instance less migration problems (because of the attractiveness of the coastal regions) and less problems of very expensive prestige projects like building a hydro-electric power plant in the middle of the jungle, and enclosing this jungle by means of a (rail)road. Also the dependence on one big industry might be avoided by a spatial and sectoral spread development. Emphasis should be put for instance on the integration of small-scale and medium-scale projects together with some large-scale projects in such a way that neither of these is dominating the others. Such a development plan really leads to more self-reliance and mobilisation of the own potentials. In this respect agriculture and cattle-breeding together with a proper managed forestry should be given more attention now and in the future.

Infrastructure remains also in this planning concept a basic requirement with direct productive impacts. An integrated approach of spatial, socioeconomic and infrastructure development (also with a cultural outline), based on a long time horizon in the planning, will have more chances for success.

## 8. References.

- Adeniyi, E. O., The Kainji Dam: An Exercise in Regional Development Planning, **Regional Studies**, vol. 10, 1976, pp. 233 - 243.
- Brandsma, W. et al, **ISP West-Suriname**, (4 volumes), Delft, University of Technology, Dept of Civil Engineering, Delft, 1978 (mimeographed).
- Conroy, M. E., Rejection of Growth Center Strategy in Latin American Regional Development Planning, **Land Economics**, vol. 49, no. 4, 1973, pp. 371 - 380.
- Coraggio, J. L., Towards a Revision of the Growth Pole Theory, **Viertel Jahresberichte**, no. 51 - 54, 1973, pp. 289 - 306.
- Dasgupta, P., A. Sen and S. Marglin, **Guidelines for Project Evaluation**, Project formulation and evaluation series, no. 2, UN IDO, Vienna, 1972.
- Friedmann, J., **Regional Development Policy: A Case-Study of Venezuela**, MIT-Press, Cambridge, Mass., 1966.
- Gaile, G. L., **Notes on the Concept of Spread**, University of California, Dept. of Geography, Los Angeles, 1973.
- Gilbert, A., A Note on the Incidence of Development in the Vicinity of a Growth Centre, **Regional Studies**, vol. 9, 1975, pp. 325 - 333.
- Hansen, N. M., An Evaluation of Growth-Center Theory and Practice, **Environment and Planning**, vol. 7, no. 7, 1975, pp. 821 - 832.
- Hermansen, T., Development Poles and Development Centres in National and Regional Development, A. R. Kuklinski (ed.), **Growth Poles and Growth Centres in Regional Development**, Mouton, The Hague, 1972, pp. 1 - 67.
- Hirschman, A. O., **The Strategy of Economic Development**, Yale University Press, New Haven, 1958.
- Klaassen, L. H., De Ontwikkelingshulp aan Suriname en de Indeling van Investeringsprojecten, **Economisch-Statistische Berichten**, no. 3144, 1-3-1978, pp. 212 - 214.
- Lasuen, J. R., On Growth Poles, **Urban Studies**, vol. 6, no. 2, 1969, pp. 137 - 161.
- Myrdal, G., **The Challenge of World Poverty**, Penguin Books, Harmondsworth, 1970.
- Peaker, A., New Primary Roads and Sub-Regional Economic Growth: further Results - a Comment, **Regional Studies**, vol. 10, 1976, pp. 11 - 13.
- Richardson, H. W., Growth Pole Spillovers: the Dynamics of Backwash and Spread, **Regional Studies**, vol. 10, 1976, pp. 1 - 9.
- Stilwell, F. J. B., **Regional Economic Policy**, MacMillan, London, 1972.
- Thorgren, B., How Do Contact Systems Affect Regional Development?, **Environment and Planning**, vol. 2, 1970, pp. 409 - 427.
- Visser, F., and G. Wassink, **Ontwikkeling Goederentransport West-Suriname**, Delft University of Technology, Dept. of Civil Engineering, Delft, 1979 (forthcoming).
- Wal, C. A. van der, **Industriehaven Point Lisas Trinidad**, (4 volumes), Delft, University of Technology, Dept. of Civil Engineering, Delft, 1978 (mimeographed).

# ROAD AND RAIL TRANSPORT IN NIGERIA

by

*M. O. Filani,*

*Senior Lecturer in Geography at the University of Ibadan,  
Ibadan, Nigeria.*

## **Introduction**

The objective of this paper is to examine road and rail transport development in Nigeria. The paper is divided into four main parts. The first section focuses attention on transport policy in Nigeria with particular reference to its implications for the development of road and rail; the second discusses capital investment in transport emphasizing the dominant share of both modes and also treats the issue of governmental control as related to them. The third part deals with the performance of rail and road showing the progressive decline of the former and the increasing dominance of the latter in the movement of goods and passengers while the fourth section looks at the development projects in both modes. The paper concludes with a general review of the role which road and rail transport have played and continue to play in the overall development of Nigeria's economy.

## **National Policy and Objectives in the Transport Sector**

There is as yet no specific policy on road and rail transport in Nigeria. However, since both constitute the major modes of transport in the country, the overall national policy and objectives of the transport sector can be said to be directed, to a large extent, to their development. In the Sessional Paper No. 1 of 1965, "Statement of Policy on Transport" the Federal Government of Nigeria spelled out in details for the first time the long term national goals of the transport sector. Also statements concerning the government objectives in the sector are contained in the past three National Development Plans \*) and the 1968 "Policy on Statutory Corporations and State-Owned Enterprises". In the 1965 White Paper four broad policy objectives stated are that:

- (a) the transport sector needs of the country should be met with the minimum expenditure of economic resources;
- (b) Nigeria must avoid excessive investment in transport whether in duplicating facilities or in excess capacity;

---

\*) 1962 - 68 First National Development Plan  
1970 - 74 Second National Development Plan  
1975 - 80 Third National Development Plan

- (c) investment in transport must be made with full consideration of alternative uses of resources in transport and other non-transport sectors such as education, health and defence; and that investments will be apportioned among (transport) agencies in accordance with their earning power but Nigeria's international obligations for airports, airlines and shipping will not be forgotten nor will the needs of less developed areas; and
- (d) it must be ensured that the country's transport services are fast, dependable, and up-to-date as well as economical.

The statement went further to stress the important issue of transport coordination which had been emphasized earlier in the 1962 - 68 First National Development Plan. The basic objective of that Plan was to expand and upgrade the transport infrastructure in such a way as to meet "the demands of the economy with minimum expenditure of resources" through modal coordination and rational investment decisions.

The 1968 "Policy on Statutory Corporations and Stateowned Enterprises" was particularly important to the Nigerian Railways. This is because the official statement recognised for the first time the important issue of the social services usually undertaken by such "public transport corporations" as the Nigerian Railways. Unfortunately, however, even though the need to cost such "uneconomic" social services was expressed, enough attention has not been paid to this aspect when evaluating the overall performance of the railways.

The above objectives of the transport sector fall within the general long term national goals which are characterised by attempts to mobilise all productive resources of the country in order to ensure rapid economic growth and to facilitate a more equitable distribution of the fruits of such growth. They also show government's awareness of the important role of the transport sector in fostering economic development. At the same time the objectives indicate the government's realisation of the dangers of over-investing in the transport sector at the expense of other competing sectors of the economy.

It is, thus, within the context of these objectives that one can examine the developments of road and rail subsectors of the country's transport system particularly with respect to the important issues of investment and control, modal coordination and planned projects. These issues are now taken up in the following sections.

### **Capital Investment**

In Nigeria the major modes of transport are road, rail, air, inland waterways and maritime transport. Of these, road and rail have always had the lion share of capital investment in the transport sector. This dominant share is justifiable to the extent that intermodal allocation of resources should satisfy not only the goal of producing transport services at minimum cost to society but also reflect equity considerations

in the sense of spending more on the modes that are easily available and accessible to the majority of the country's population. For example it could be a misallocation of resources for a developing country like Nigeria to devote more of its financial resources on air transport which for a long time would be available to no more than 10 per cent of the country's travelling population than road transport which is accessible to most classes of her people.

Of the ₦288 million \*) earmarked for the transport sector in the First National Development Plan (NDP), a total of ₦198.94 million or 69.1 per cent was allocated to both rail and road transport subsectors. Road alone took ₦150.6 million or 52.3 per cent while rail shared ₦48.34 million or 16.8 per cent. In the 1970-74 Second NDP, both modes got ₦376.3 million or 77.6 per cent of the total ₦485.2 million. Again road alone accounted for a total of ₦332.6 million or 68.6 per cent while rail took only ₦43.7 million or 9 per cent of the total. The high percentage allocation to the road subsector in the Plan was attributable to the amount of reconstruction works occasioned by the Nigerian Civil War of 1967/69. In the current 1975 - 80 Plan both modes also increased their share of the total investment to ₦6.2 billion or 85 per cent of the total ₦7.3 billion capital investment in the transport sector \*\*). About 73 per cent of this amount went to road development with rail transport taking the remaining 12 per cent (Tabel 1).

Some issues arise from the pattern of investment allocations. First, the share of the road subsector has consistently risen over the last two decades from a little over half of the total planned investment in the 1960s to about three quarters in the current plan period. On the other hand, the railways' share oscillated from 17 per cent in the First Plan, to 9 per cent in the Second and again rose to 12 per cent in the Third Plan.

These disproportionate shares of road and rail could be explained by several factors. The most important of these relates to the fact that the total kilometrage of the railway track had remained constant since 1964 while that of roads has more than doubled during the same period. By 1964, when the 604 kilometre Bornu railway extension was completed, Nigeria had a total of 3,505 kilometres of single track routes all of 1.067 metre gauge. Since then no new track has been built. On the other hand between 1951 and 1972 the country's road network developed considerably in terms of total length and quality. Within the 21 years, bituminous roads increased more than ten-fold from 1,782 to 18,109 kilometres while the total length was more than double from 44,414 kilometres in 1951 to 95,374 kilometres in 1972.

Also roads are more accessible to a greater proportion of the population than rail, hence on equity grounds, as argued earlier, there is some justification for governments' emphasis with regard to capital investment on this mode. Furthermore whereas

---

\*) ₦1.00 is equal to 1.53 U.S. dollar.

\*\*\*) As a result of the creation of seven additional states in February 1976, each of the 19 State governments has revised its programmes for the current plan period. The sum total of proposed investments in the transport sector particularly road has thus increased.

Table 1

**Capital Expenditure on Transport by  
Governments 1975 - 80 (N<sup>o</sup> million)**

Sub Sector	Government	Total Expenditure	% of Total
Roads	Federal	4,355,960	59.64
	All States	984,476	13.48
Railways	Federal	885,020	12.12
Civil Aviation	Federal	476,980	6.53
Nigeria Airways	Federal	50,950	0.69
Inland Waterways	Federal	47,541	0.65
Inland Waterways	All States	44,250	0.61
Maritime Services	Federal	13,730	0.19
Shipping	Federal	118,090	1.62
Ports	Federal	322,010	4.41
Govt. Coastal Agency	Federal	4,061	0.06
TOTAL	Federal	6,274,342	85.91
	All States	1,028,726	14.09
	All Governments	7,303,068	100.00

Source: Federal Republic of Nigeria, *Third National Development Plan, 1975 - 80*.  
Vol.1. Lagos, p. 200.

the construction of railways is the sole responsibility of the Federal Government all the three tiers of government – Federal, State and Local authorities – construct and maintain roads. Even several communities are known to have constructed rural roads in the first instance and later solicit for government take-over. Thus while a significant amount of money is spent on the construction of new roads and the maintenance of existing ones, capital investment on railways has been used mainly for maintenance of existing tracks, purchase of new locomotives and expenses on personnel services.

#### **Government Control**

The Railways in Nigeria are operated as a self-contained undertaking and are wholly owned by the Federal Government (Fed. Rep. of Nigeria, 1975). Before 1955 the railways were run as a government department. With the creation of the Nigerian Railway Corporation (NRC) in 1955, the railways became a commercial concern. The Corporation was given powers to manage and operate the railways and to direct and control the expansion and extension of the system. Although the Corporation was

expected to function on a commercial basis, it was also expected to perform some non-economic functions or social services.

The government exercises some measure of control over its pricing and investment policies. For example, its tariff and fare increases have to be approved by the Federal Ministry of Transport. The main rationale for this is that since the NRC, like other public corporations, performs both economic and non-economic functions, the government assumes a direct though partial responsibility for its operations.

On the other hand the road transport industry is in the hands of both foreign and indigenous large private companies and individual entrepreneurs. Government participation is concentrated largely on the construction and maintenance of roads and in the provision of regulatory and supervisory control.

The supervisory control involves "regulations for vehicle registration and licensing, standards for awarding drivers' licenses and measures for enforcing established technical and safety standards of streets and highways" (Filani and Osayimwese, 1974: 394). With respect to entry into the road transport industry there are no specific legal restrictions except in some urban transportation services. The immediate effect of the lack of control in the road transport industry is the extreme proliferation of road enterprises, creating room for inefficient organisation and operations. Also the free-for-all industry has led to ruinous competition among road entrepreneurs and excessive speeds on the part of drivers in order to beat other competitors; hence the even increasing road accidents. \*) The proliferation of road enterprises and the disorganised nature of the industry have also made it increasingly difficult for the governments to effectively enforce the required safety and technical standards. The fact that operations in the road transport industry are not legally controlled has had some adverse effects on the railways and this is treated fully in the next section.

### **Performance of Road and Rail**

It is fairly difficult to examine the performance of any enterprise without adequate data. The task is even more difficult when comparing the performance of rail and road transport in Nigeria since the required data for such an exercise are hard to come by. The Nigerian Railways, as a public corporation, keeps records of its freight and passenger movements and produces annual reports which are useful. For road transport no published statistics exist and there is a great difficulty in obtaining data about vehicles and their operators. The individuals who have dominated the road transport industry hardly keep any records and it is almost impossible to obtain with any degree of accuracy information relating to costs and revenue.

The only available records that can be used for comparing the performance of both modes are, therefore, those of the Nigerian Ports Authority which give information

---

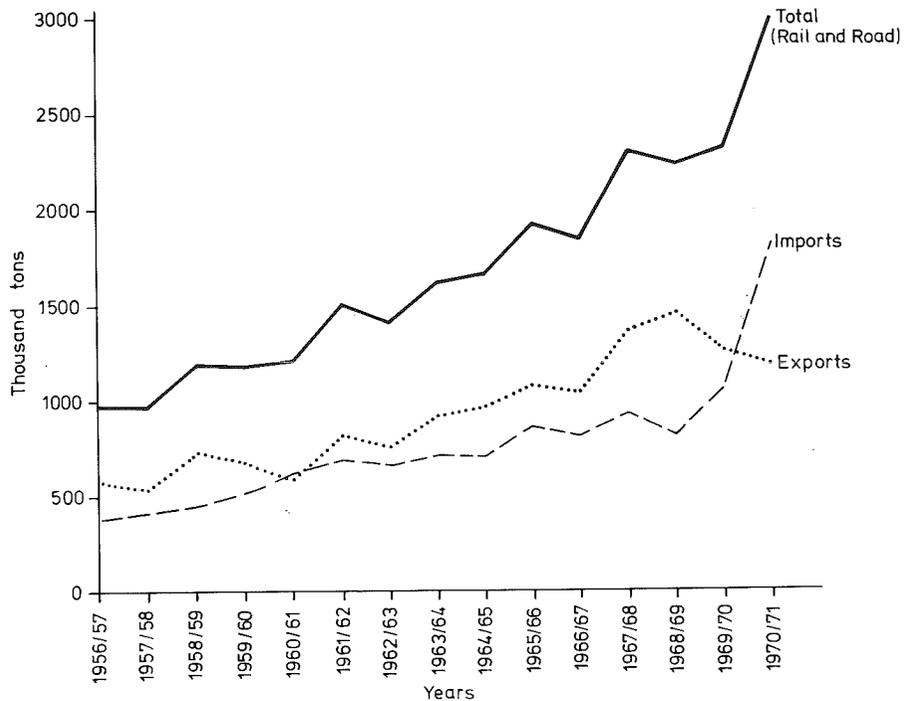
\*) The loss of life and limb on Nigerian roads has assumed an alarming rate in recent years. Between 1962 and 1972 mortality due to road accidents grew at a compound rate of 9.5 per cent per annum. Some State governments have found it necessary to create Road Traffic Safety Corps to check the excesses of drivers.

on export commodities delivered to the ports for evacuation and the amount of goods moved from the ports to the hinterlands by both road and rail.

Haulage by both modes increased phenomenally between 1956 and 1971. Total tonnage of goods (import/export) moved from and to Apapa port increased from 963,000 tons in 1956 to about 3 million tons in 1971. This shows an absolute increase of 210 per cent or a yearly increase of 14 per cent in fifteen years. Total exports hauled increased from 571,000 tons in 1956/57 to 1.2 million in 1970/71 while imports delivered to the hinterland rose from 392,000 tons in the former year to 1.8 million in the latter (Figure 1).

Figure 1.

**Total Import/Export Hauled by Road and Rail  
From and To Apapa – Lagos Port 1956/57 – 1970/71**

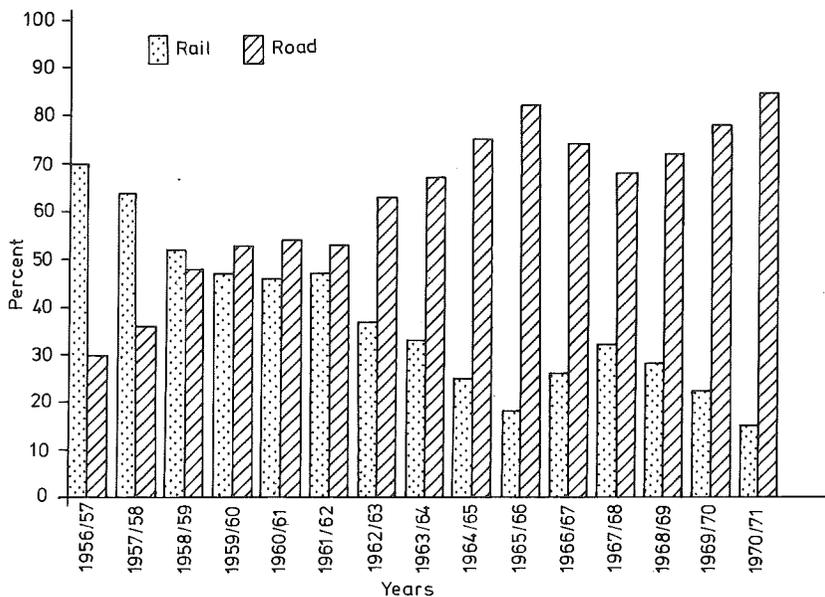


A comparison of the performance of both modes show that while the percentage share of the railways has been progressively declining, that of the road has been on the upsurge. For instance, rail which accounted for 70 per cent of all imports delivered in 1956/57 carried only 22 per cent in 1970/71.

On the other hand road which delivered only 30 per cent of the total in 1956/57 shared 78 per cent in 1970/71 (Figure 2).

Figure 2.

**Imports Delivered to the Hinterland from Apapa Port by Road and Rail 1956/57 – 1970/71.**



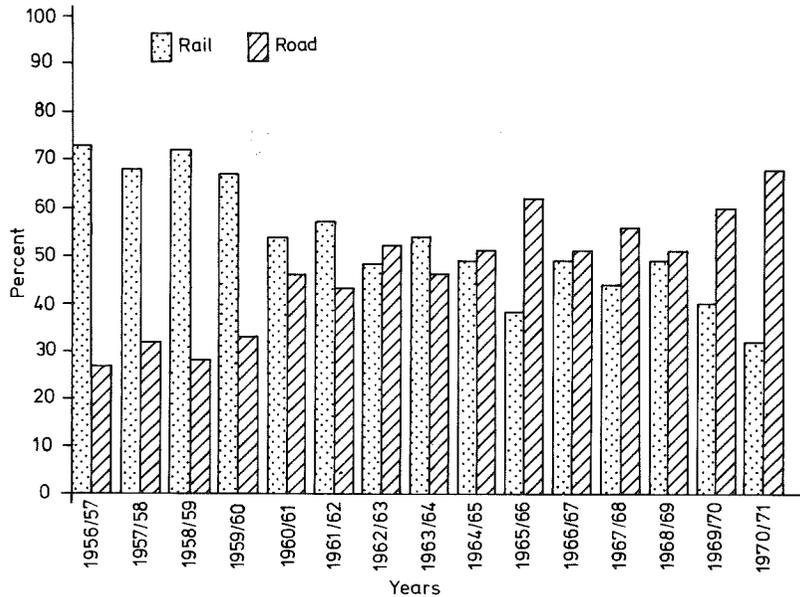
The situation with exports follows the same trend with rail's share dropping from 73 per cent in the earlier year to only 32 per cent in the latter while road's share increased from 27 per cent to 68 per cent in the corresponding years respectively (Figure 3).

These figures demonstrate the general pattern of the declining fortunes of the Nigerian Railways which have operated in deficit for the greater part of the last two decades. As stated in the 1975 - 80 Plan "the operating results of the Railways have steadily worsened from a ₦6.9 million deficit in 1965 - 66 to a ₦10.3 million deficit in 1969 - 70 and further to a ₦23.1 million deficit for 1973 - 74" (Fed. Rep. of Nigeria, 1975; 214).

Several factors account for the decline in railways performance over the years. Foremost among these are the considerable losses suffered through competition with road

Figure 3.

**Exports Delivered to Apapa Port from the Hinterland by Road and Rail 1956/57 – 1970/71.**



haulage. There has been a substantial improvement in the nation's road network and thus big trucks and more comfortable passenger buses are capturing more freight and passengers from the railways. The railways' losses have been exacerbated by the fact that most of the newly developed trunk roads are competitive rather than complementary to the rail system. Many of the roads are somewhat parallel with the rail lines including such important ones from Lagos to Jebba, Kaduna, Zaria and Kano; Jos to Maiduguri; Port-Harcourt to Enugu, Markurdi and Jos and a new construction from Benin to Okene and Kaduna. All these are trunk routes capable of achieving 110 Km.p.h.

There has also been a steady decline in the production and therefore the exportation of those commodities such as groundnuts, cotton, hides and skins and coal which used to constitute the bulk of freight moved by the railways. In addition, the increase in domestic processing and absorption of these crops by local industries has diverted their movement to the road haulers.

These problems have been further compounded by the deterioration of the railways' own goods transport services. The failure of the railways to compete with road transport is, therefore, partly attributable to "very long turn-round times of rolling stock and insufficiency of available motive power (and) the inability to provide adequate coordinated waggon movement control and scheduling over the entire system, with consequent failure to move empty waggons in time to the points where they are needed" (Fed. Rep. of Nigeria, 1975; 214).

This failure can itself be explained by the slowness of trains enroute. The train speed is considerably slow compared with that of the road. Since the railways were originally constructed principally for the evacuation of produce, the tracks followed mainly the line of "least resistance", winding round hills, avoiding valleys and rivers. The network consists of more than 1,600 curves between 4 and 10 degrees and there are more than 200 bridges throughout the entire rail system. Consequently permanent speed restrictions of between 16 and 55 Km.p.h. are common and some sections are so bad that train speed is limited to as low as 8 km.p.h. (Fed. Rep. of Nigeria, 1975; 216).

Another major factor which has not been duly recognized by the government and the critics of the Nigerian railways concerns the pricing policy of the Corporation and the effect of governmental control of its operations vis-a-vis the non-control of the road transport industry. The railways carry an heterogeneous variety of goods – raw materials and finished products, perishables, liquids, petroleum, vegetables, etc.

These goods are classified into 9 categories according to their relative ability to pay transportation costs. In other words, the railways' rates are based on "charging what the traffic will bear", because of the national (social) services which it is supposed to undertake by carrying low value goods over some fixed routes at rates which are far below the cost of service. The fares charged for such low value goods as coal and foodstuffs are subsidised by payments on high value goods. Even then these rates are still subject to governmental approval. On the other hand the rates charged by road transport are commonly determined by bargaining in relation to specific movement of traffic and "the governing factor is that by a combination of rate and load a profitable return is secured" (Oshosawo, 1973; 13).

Also since the road operator is not obligated to ply on fixed routes like the railways, he selects his traffic and area of operation in such a way as to perform only those services that give him profit. Thus the road operator charges according to the cost of service and even more especially in the rural areas where the consignee has very little or no choice (Filani and Richards, 1977). This freedom of operation therefore gives road haulers additional comparative advantage over the Nigerian railways. At present the competition from road haulers is such that the railways are increasingly being deprived of highvalue goods thereby diminishing its ability to carry low grade freight. Such a situation, if it continues, is likely to be detrimental to the country's overall economic development in the long run particularly since the cost of moving goods by

the railways is by far cheaper than that of the road. \*) Since transport coordination is one of the declared objectives of the government the issue of pricing and governmental control of the NRC warrants due attention and reconsideration.

From the above it is clear that both internal and external factors are responsible for the decline in the performance of the railways and the intensification of comparative advantage which roads have over it. It can, however, be argued that what is happening in Nigeria epitomises the historical pattern and the sequence of transport development in developing countries. As Hodder and Lee rightly noted that for a long time in these countries railways were "the major stimulus to economic development and symbol of colonial economic power over many areas" but that they are now "gradually being replaced and extended by less expensive and more flexible road networks" (Hodder and Lee, 1974; 150).

### **Development Projects**

Today in Nigeria there is a widespread concern for transport planning in the desire to promote rapid economic development. This concern is reflected by the fact that the transport sector has over the last two decades consumed between 20 and 25 per cent of the nation's total capital investment funds. The large investment in transport is based on the common assumption in developing countries that an enlarged transport system constitutes an essential pre-condition for economic take-off. The belief in this assumption by Nigerian planners is clearly illustrated in the Second NDP which stated that the main reason for the major government investment in transport "is that the development process depends to a very large extent on the efficiency of a country's transportation network" (Fed. Rep. of Nigeria, 1970; 179).

The development projects in both rail and road subsectors are, therefore, meant to fulfil some of the overall government objectives in the transport sector as stated earlier.

As for the railways the government's main objective in the current 1975 - 80 Plan period is "to improve the standards of railway service and operations, so that the Railways will be able to accommodate all traffic which it could carry at a lower cost than other modes of transport" (Fed. Rep. of Nigeria, 1975; 215).

Construction has already started on an entirely new road-bed and track system at the standard 1.435 metre gauge. The new track system is designed to eliminate most of the existing curves and "to enable trains achieve an average speed of about 60 kilometres an hour". About 320 kilometres are expected to be constructed annually with the hope that the whole system will be ready for use in the 1980s.

---

\*) Railway rate in Nigeria is about 1.14 kobo per-tonne-kilometre compared to that of road which is about 3.18 kobo per-tonne-km.

The Railway Corporation is also gradually fading out its steam units and replacing them with the more efficient diesel locomotives. Other projects include the acquisition of more rolling stock, improvement in communications and passenger facilities at stations together with the building of more staff quarters.

It is hoped that when all these projects are completed the railway capacity would be enhanced since it would be possible to operate at higher speeds with increased reliability, safety and efficiency, leading to a reduction in the unit costs of its operations. However, nothing seems to be forthcoming on the equally important issue of building a "new flexibility" into "railway operations and rates" which was mentioned in the Second Development Plan (Fed. Rep. of Nigeria, 1970; 182).

With respect to road transport, the Third NDP contains five general policy measures aimed at raising its standard, quality, safety and effectiveness. These are the take-over of selected state roads by the Federal Government; the importation of foreign construction firms in a bid to widen the supply base in the road construction industry; the development of the road construction industry to ensure on the job-training by private firms for Nigerian professionals and the establishment of training institutions for middle and lower level man-power; improvement and intensification of road safety measures through the enactment of uniform road traffic regulations, establishment of more traffic courts and inspection stations and the increase in public education on road safety including the establishment of driving schools with qualified staff; and the establishment of a high-powered maintenance organisation through the creation of 52 maintenance districts in different parts of the country.

Already the Federal Government has taken over 16,000 kilometres of former state roads, increasing its total road network share to 27,000 kilometres all over the country. This take-over is aimed at providing the nation with "a fairly dense mesh of primary arterial roads of first class quality which, with the railway system, will bear the vastly increased movement of goods and persons implied by the rapid growth rate envisaged for the economy" (Fed. Rep. of Nigeria, 1975; 204).

The state governments are also expected to take-over from local authorities many existing feeder roads which play an essential role in the nation's agricultural efforts. About 19,166 kilometres of secondary and feeder roads constitute the states' road development programme during the plan period.

The Plan is again silent on the important issue of governmental control of entry into the road transport industry. However, the 1978/79 Federal government budget contains some statements which may indicate the beginning of governmental action along this line. For instance road users would be expected to pay tolls on certain highways presumably to cover part of the sunk capital costs of roads or in financing their maintenance. The toll structure, the highways concerned and the method of collection are yet to be explicitly stated. Much more, however, is still needed in order to regulate the free-for-all nature of the road transport industry.

## Conclusion

Rail and road transport have helped to open up vast areas of Nigeria and stimulate both internal and international trade. They provided the initial major links and have since served as the structural framework around which the economy of the country has been spatially organised (Taffee *et al*, 1963).

Railways in particular played a significant role in the effective integration of the country for colonial exploitation. Cutting across all the major ecological zones, the railways imposed a new spatial integration on the country and thereby brought those areas producing such traditional export crops as cocoa, groundnuts, hides and skins within easy economic reach of Europe through the coast – to – interior route linkages. The resultant promotion of export trade helped to foster a highly monetised exchange economy which, pre-railway era, operated at a low scale.

Since the railways linked centres of production they inevitably led to the founding of new towns where none existed before and rejuvenated old ones that were fortunate to fall on the network. In the process of subsequent spatial adjustment some of the traditional urban centres of trade and craft industry which were not so fortunate as to fall on the new route system were almost paralysed having been deprived of their economic *raison d'être*. In the former case such cities as Enugu founded to ease the exploitation of the coal resources of Udi Hills, Kafanchan established at a meeting point of the east and west rail lines and Jos founded to facilitate exploitation of tin mines came into being. On the other hand such former traditionally and politically important cities, by-passed by the rail, as Oyo of the Old Yoruba Kingdom waned while Ibadan on the rail line developed, Sokoto declined while Kaduna assumed political and industrial leadership in the north. Other towns like Kano, Ilorin, Port Harcourt and Makurdi which lie on the rail lines attracted population and economic activities (Mabogunje, 1968).

The impact of roads on the process of social and economic development of Nigeria has been equally pronounced. Road transport exerts a spatial influence on the opening up of underdeveloped rural areas (Filani, 1976). Although road network first developed as a complementary system to the railways it has now assumed even greater importance than rail in the movement of both passengers and freight. Today road transport is the most widely used mode accounting for about two thirds of all commodities moved to and from all the country's seaports and handles up to 90 per cent of all other internal movements of goods and persons (Onakomaiya, 1977).

Road transport also affords substantial investment in employment opportunities not only in the maintenance of roads but also in the assembly, servicing and operation of vehicles and in the provision of supply facilities for fuel and lubricants (Filani, 1976).

With increasing population and the increased complexity and expansion of the nation's economic system, more pressure will be put on the transportation system particularly on rail and roads. Since transport demand is a "derived demand", the demand for transport services is bound to escalate as the economy grows and expands. Thus, more developmental efforts are still needed most especially in the areas of transport coordination, control and management of the transport industry for the overall development of the nation's economy.

## REFERENCES.

- Federal Republic of Nigeria (1962).  
**First National Development Plan, 1962 - 1968,**  
(Lagos, Federal Ministry of Information, pp. 69 - 82).
- Federal Republic of Nigeria (1968).  
**Policy on Statutory Corporations and State-owned Enterprise**  
(Lagos, Federal Ministry of Information).
- Federal Republic of Nigeria (1968).  
**Policy on Statutory Corporations and State-owned Enterprise**  
(Lagos, Federal Ministry of Information).
- Federal Republic of Nigeria (1970).  
**Second National Development Plan, 1970 - 74.**  
(Lagos, Federal Ministry of Information, pp. 179 - 207).
- Federal Republic of Nigeria (1975).  
**Third National Development Plan, 1975 - 80.**  
(Lagos, Federal Ministry of Information, pp. 199 - 228).
- Filani, M. O. (1976).  
"Transport and Communication" in Knight C. G. and Newman J. L. (eds)  
**Contemporary Africa; Geography and Change.**  
(New Jersey, Englewood Cliffs, Prentice - Hall Inc. pp. 342 - 355).
- Filani, M. O. and Osayimwese Iz. (1974).  
"The Organization of Transport Planning in Nigeria",  
**The Nigerian Journal of Economic and Social Studies,**  
Vol. 16, No. 3. pp. 387 - 402.
- Filani, M. O. and Richards, P. (1976).  
"Periodic Market Systems and Rural Development: The Ibarapa Case Study, Nigeria",  
**Savanna,**  
Vol. 5, No. 2. pp. 149 - 162.
- Hodder, B. W. and Lee R. (1974).  
**Economic Geography**  
(London, Methuen and Co. Ltd., Chapter 9).
- Mabogunje, A. L. (1968).  
**Urbanization in Nigeria**  
(London, University of London Press, pp. 142 - 149).
- Onakomaiya, S. O. (1977).  
**Highway Development in Nigeria: A Review of Policies and Programmes, 1900 - 1980.**  
(Ibadan, Nigerian Institute of Social and Economic Research).
- Oshosanwo, M. O. D. (1973).  
**Economics of Rail Transport.**  
(Lecture delivered at the Workshop on Third National Development Plan 1975 - 80, at the University of Ibadan).
- Taaffee E. J., Morrill, L. R. and Gould, P. (1963).  
"Transport Expansion in Underdeveloped Countries: A Comparative Analysis".  
**The Geographical Review**  
(Vol. LIII, pp. 503 - 529).

## RAILWAYS IN DEVELOPING COUNTRIES

by

*Prof. Ir. B. van Bilderbeek,  
University of Technology, Delft*

The role of the railways, their future, their position in the world of tomorrow have often been the subject of animated discussions and even heated arguments. For some time many experts and politicians felt that the railway was outmoded and that it soon would be replaced by the automobile, truck or plane. As evidence they pointed to the financial difficulties encountered by most railways as a sign of their growing inadaptability to the modern world. But the last decades have brought a gradual change in this trend of thought and the realisation that railways are still the answer for a number of specific transport problems.

In the present transportation market the railway still holds some important strong points over other transport modes, namely:

- The railway guidance offers the possibility of making up large capacity convoys, which permits the moving of big quantities at an economic use of space. Such convoys can be run at low costs because of the modest personal factor and the low energy consumption per traffic unit (ton kilometer - passenger kilometer).
- The rail guidance offers also a privilege in respect to automation, because rail traffic operates only in one dimension, while two are required for the highway and three for air traffic. Planning and controlling of traffic movements by electronic processors is therefore much easier to achieve than for road traffic, also because the place and destination of each unit is known at any moment (schedule). The system control can anticipate on expected delays and is, in case of unexpected delays, able to minimise the effect on other units.

This promotes the reliability and also the safety of the service, because the system control can prevent the effects of human faults to a great extend.

To cite the late Louis Armand, the former eminent secretary general of the International Union of Railways and member of the Academie Française:

”The society of the future will hardly accept a situation in which two men perform the tiring and dangerous job of driving a truck with 20 tons of cauliflowers from Brittany to Paris over a congested highway, while the driver of a diesel- or electric locomotive can transport 100 times as much, in the same period of time, and under conditions which are much less tiring and less dangerous for himself and for others”.

Surely the fact that many railways have been late in taking the consequences of their changed position in the transport market, has given rise to a negative outlook on rail-

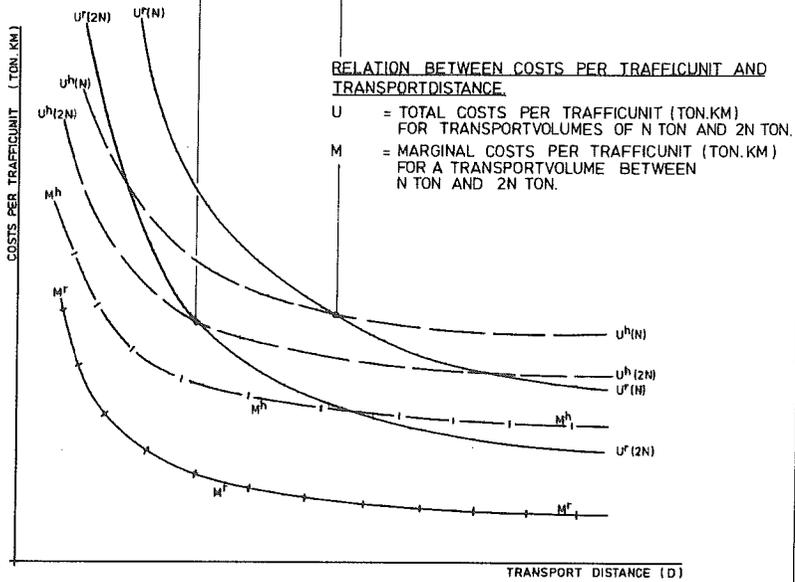
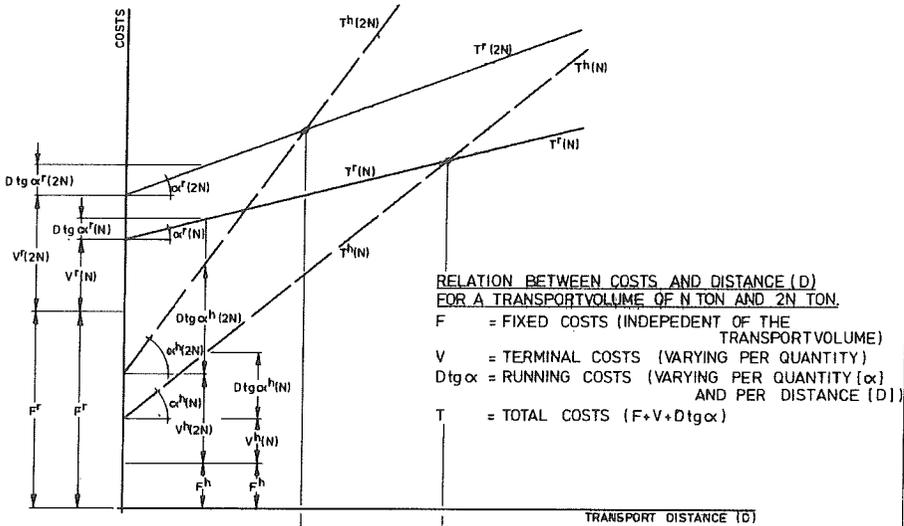
ways as a whole. Railwaymen and railway management often came only reluctantly to the acknowledgement that the competition of other transport modes has changed the former monopolistic status of the railways. Formerly a general carrier, they have now to be a selective carrier which has to concentrate on its strongest point which is mass transport over long distances. In this share of the market they can compete successfully because the disadvantage of their high fixed costs and the often high terminal costs, compared with other transport modes, can be compensated by the advantage of their low running costs.

The graphs on page 57 illustrate that with rising transport quantities and rising transport distances the railways come into a more favourable position with respect to the bus and the truck. It shows also that they can compete more successfully, when the terminal transshipment costs can be reduced by roadrail techniques like containers and piggy-back. The railway is in a better position still when it can handle door to door transport entirely by rail, thanks to private sidings, which connect installations such as mines, industries, harbours and commercial centres directly to the railway. For big hauls between such centres, "unit trains" can be used, running as one unit directly from origin to destination. By omitting the time- and cost consuming shunting on terminals and en route, these unit trains can be run at considerably reduced costs and at the same time provide an improved level of service for the client. On the other hand the railway is more at a disadvantage when its goods transport must be completed by terminal lorry delivery. In that case transport entirely by road is more economical than by rail for transport distances under 300 à 400 km, and even for much longer distances when small transport volumes are concerned.

For passenger transport the railways can compete on an economical base with road traffic and also with air traffic on distances between 200 and 800 km, but only on relations with such a large traffic demand that a service providing a high speed, frequency and comfort can be run. The success of the Shinkansen in Japan, also financial, is the most spectacular example hereof. For short distances the rail cannot compete with the private car, and also for the people dependent on public transport, the bus can offer a better and cheaper service. However, in very densely populated areas only rail transport can cope with the heavy short distance (commuter) traffic. The deficits of such services have to be accepted, because moving of passengers only by road would create an unacceptable situation from a socio-economic and environmental point of view.

In the developing countries, as in the Western world, the railways have contributed greatly to the opening up of the country. They were, in the beginning, often the only means of transportation for larger quantities of passengers and freight. In most developing countries the railways have been constructed as single track, narrow gauge lines with low axle loads and, in mountainous regions, sharp curves and steep gradients. Speed was not important and simple operation-techniques were sufficient to cope with the transport demand.

SCHEMATICAL COMPARISON OF THE COSTSTRUCTURE OF RAIL (r) VERSUS ROAD (h).



The rising of road transport therefore hit them even harder than in Western countries. They lost a considerable part of their freight transport, despite a steadily growing market, because they did not, or not sufficiently, concentrate their efforts on an improvement of long distance transport services. Therefore even in that market share they often could not, and cannot, compete with road transport, because the truckers offer a faster and more reliable service, for which the shippers are prepared to pay the higher tariff.

In the passenger traffic market the railways in developing countries encountered also heavy losses. The railways lost long distance traffic to the plane and short and medium distance traffic to the bus and to paratransit (the many kinds of intermediate forms between bus and private car), playing such an important role in these countries. Only in densely populated countries like India, there is such a big offer of passengers that the railways can provide a reasonable service at reasonable costs. In less populated countries passenger transport does not even cover marginal (avoidable) costs. In several of these countries the airlines carry already more passengers than the railways and, as the average travelling distance by air is much larger, the production in passenger km's by air is many times bigger than by rail.

The governments in developed countries strive for a cooperation and an efficient division of tasks between the different transport modes. They are prepared to bear the railways' deficit to enable them to fulfil their specific function in the socio-economic interest of the country.

In developing countries the governments have great difficulties in meeting the financial losses of the railways. These losses are often aggravated because the level of service permits insufficient transport to be attracted and the companies are burdened with a number of underused lines. Their financial constraints make the railways cut down on maintenance, which on its turn hampers an efficient operation and worsens the level of service.

This vicious circle tends to give the whole system a neglected and untidy appearance which effects the attractiveness for the clients. It effects also the morale of its personnel, because, when a railway does not keep up a high standard of maintenance and a well cared-for appearance, its personnel will be inclined to work with less care and with less ambition.

There are a lot of other than financial reasons for the deterioration of so many railways in developing countries.

- The most important one is no doubt that developing countries have a great number of urgent social and economic problems. They are faced with a fast increasing population and the primary need to raise its standard of living, health and education. Consequently they cannot give full attention and also not the means to sanitate the railways.

- Railways are a rather complicated industry to run. Especially single track railways, as occur in most developing countries, ask for a very careful planning, organisation, discipline and control. Firms running a bus- or truck business, generally with only a small number of vehicles, have a much easier job. This, taken together with the fact that these firms are difficult to submit to rules and regulations, explains why the railways often have been outplayed by road transport, even in cases where they could have been competitive.
- The railways in developing countries suffer from a shortage of well educated and trained middle management, which in Western countries forms the backbone for the accurate execution of the many functions which determine the quality, safety and efficiency of railway operation.
- In Western countries there is a long railway tradition, which means that for generations railway men have regarded their profession as one they take pride in to execute as perfectly as possible. In developing countries a railway tradition does not exist on such a scale and thereby have not the same sense of vocation.
- Political changes in developing countries often also bring about changes in the higher railway management, which of course does not foster a firm line in the railway policy.
- The railway organisation is often too much centralised and bureaucratic, with very little delegation of authority to lower echelons and divisional managers. Especially in a regional dispersed industry as a railway, this impedes the possibility for an alert reaction and deprives the local managers of interest and ambition in their work.

A factor also playing a part is surely that consultants from Western countries often have based their advises on a too Western outlook, with insufficient notion of the special situation of a developing country. Their study reports have stayed unused in the cupboard because they only gave a summing up of the necessary improvements, without indicating the way to reach these goals. Even if the consultants were also charged with the supervision of the construction of new or improved railway installations, the outcome was not always satisfactory, because the know-how to take full advantage of the new works was not properly carried over.

This does not apply in cases where railway installations were built in connection with newly set up reclamations of e.g. ore, coal or timber. In such cases the companies exploiting these resources have taken care to dispose of a fully qualified railway staff. Although these railways are of a special kind, carrying mainly one product, they show that, provided a good management, a railway in a developing country can be run as adequately as in a Western country, if the local staff is thoroughly selected and trained.

This underlines the basic philosophy of development aid as it is seen today. Namely that the best aid we can give the developing countries is to educate them in learning

how to solve their problems themselves. Or as so clearly expressed in the parable: "If you give a man a fish he can appease his hunger for a day, when you learn him how to fish he can appease his hunger every day".

It means that education and training of the men on the spot must have first priority in every development project. This forms the biggest difference for the ask of an expert in developing areas compared to working in a Western sphere, and also the biggest difficulty. It means that someone going to work in a developing country not only must have a good knowledge of his profession, but also an understanding for the possibilities and the mentality of the people to whom he has to transfer his knowledge. He has to shape his proposals in such a way that they are accepted as real and workable by the people on the spot.

A close contact with the local counterparts in the study team is therefore essential, as these contacts give the possibility to discover what measures will be feasible and what not. This not only applies to purely technical matters (intermediate technology), but still more to matters as transportation planning with strong social-, organisational- and political implications. Transportation plans have not only to be feasible in the technical sense, but above all from an organisational point of view, which brings about the biggest problems in developing countries.

This indicates a second important point of working in these countries, namely that a close cooperation with the counterparts is not only necessary in the planning stage, but also during the implementation and the analysing of the results. Only such a cooperation can promote the necessary education and training of the men on the spot, necessary to guarantee the realisation of the goals aimed at. This holds especially for organisationally more complicated affairs as the implementation of transportation plans and the operation of a railway.

It is therefore also indicated to start with plans of a simple and elementary nature, to make the local people receptive for a systematical approach.

Only after the counterparts have become familiar with the set-up and implementation of elementary techniques, it does make sense to introduce more complicated methods.

This last point brings about a problem of a psychological nature as the people in developing countries are often very keen on switching over directly to very advanced methods and techniques. To convince his counterparts of the undesirability of such an approach, without hurting their feelings, asks a lot of tact from the consultant.

The projects for rehabilitation of transportation facilities have in the past often been sectoral projects, dealing only with harbours, or roads, or railways.

Nowadays these projects are more and more based on integrated transportation studies, in order to determine the most appropriate distribution of transport over the different modes. This is also preferable from an educational point of view, because in

that way the railway people will get a better idea of the function of their system as a part of the total transport facilities in the country.

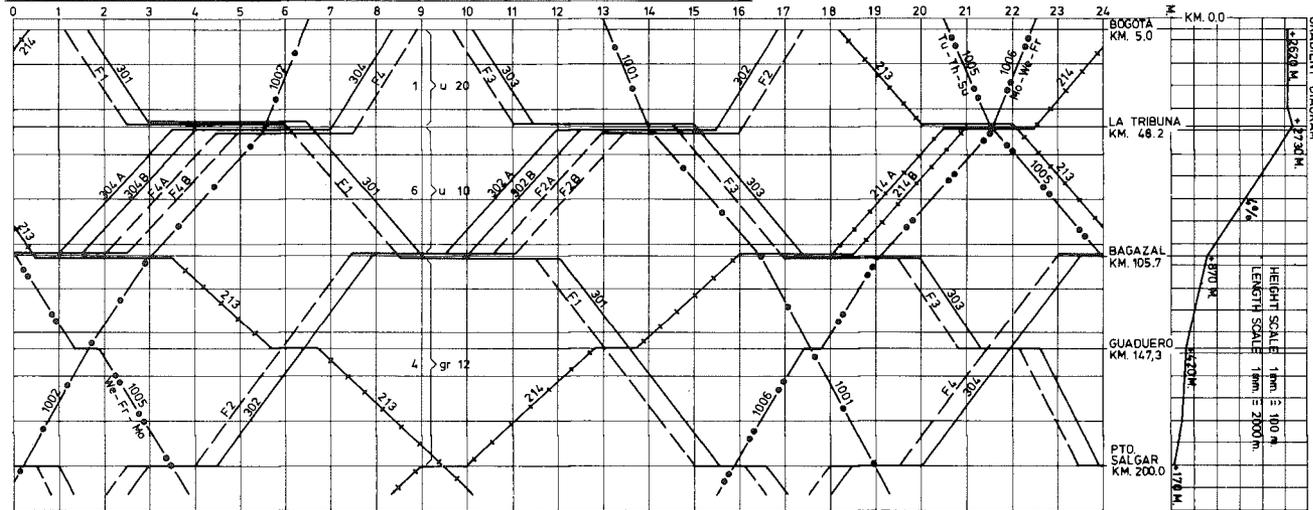
Such a study will demonstrate that in most cases only the main arteries of the railway network, carrying the long distance bulk transport, can fulfil an essential task. These main lines usually carry the greater part (e.g. 70 - 80 %) of the total rail transport on a small part (e.g. 25 - 35 %) of the total network length. An integral transportation study will demonstrate also that these main lines can only uphold their function in the future, when an efficient and reliable service can be guaranteed. This means that it is in the interest of the country and of the railways to concentrate their efforts first of all on the rehabilitation of these main lines. Such a rehabilitation has not only to include the technical equipment as infrastructure, rolling stock, etc., but also factors as education and training of the railway staff.

Technical rehabilitation alone, without ensuring the appropriate level of skill and management, will not lead to an actual improvement of the service. The problem is however, that the railway managers often want to introduce sophisticated equipment, like concrete sleepers, continuous welded rails and complicated locomotives. It is up to the consultant to convince the counterparts that such measures would be premature – that concrete sleepers and continuous welded rails, apart from the extra costs involved, will only give extra trouble as long as the track geometry and the ballasting are not ameliorated and the number of derailments has not been drastically reduced. If, as is often the case, a too big part of the present locomotive fleet is out of service for repair, the purchase of a new more complicated type will only aggravate this situation, as long as the present shortness of skilled labour and of spare parts has not been overcome.

An idea that keeps turning up in developing countries with narrow gauge railways, is the changing over to standard gauge track, perhaps because of the feeling that this would better their image. Anyhow, the argument that such a radical and costly affair would be necessary for raising the capacity of the system can not hold. There are much cheaper and far more effective ways to obtain a higher capacity, such as increasing the number of crossing stations, doubling of track at critical sections, improvement of signalling, etc. Nevertheless it seems that the Nigerian Railways have the intention to realise such a gaugewidening, contrary to the pertinent advice of consultants. On other systems the plans stay (fortunately) in the icebox, because of lack of funds.

Building of new lines and electrification of existing lines is also a topic favoured by many railway companies in developing countries. They produce elaborate studies showing that with optimistic prognoses such projects might be feasible in a further future. These studies, however, often only look into the gain for the railway company and ignore the losses that might be inflicted to other transport modes already serving the same relation – as possibly water transport and nearly always road trans-

**TRANSPORTATION STUDY IN THE AREA OF THE RIO MAGDALENA**



**TRAINSCHEDULE SCHEME FOR THE LINE BOGOTA - PUERTO SALGAR.**

DAILY CAPACITY BAGAZAL - LA TRIBUNA WITHOUT FACULTATIVE TRAINS:  $6 \times 450 = 2700$  TON BRUTO  $\approx 65-70\% \times 2700 = \pm 1800$  TON CARGO PER DAY.  
 DAILY CAPACITY BAGAZAL - LA TRIBUNA WITH FACULTATIVE TRAINS :  $10 \times 450 = 4500$  TON BRUTO  $\approx 65-70\% \times 4500 = \pm 3000$  TON CARGO PER DAY.

THE SCHEDULE IS NOT AIMED AT AN OPTIMUM USE OF ROLLING STOCK, BUT AT AN EASY SURVEYABLE AND CONTROLABLE SCHEME WITH 1/2 HOUR BETWEEN TRAINMOVEMENTS AT STATIONS AND AMPLE TIME BETWEEN TRAINS FOR TRACKMAINTENANCE WITH MECHANICAL EQUIPMENT.

port. For a sound judgement, also in these cases an integrated transportation study is necessary to show whether, from a national-economic point of view, the situation with or without a new railway line is the most profitable for the country.

Contrary to the efforts spent on projects as mentioned above, there is in general far too little attention for the fact that the performance and correct appearance of a railway depends largely on a careful planning and execution of operation and maintenance.

It is no easy job to persuade the colleagues in developing countries that for an effective maintenance, systematic programming is necessary, which has to be executed by an efficient organisation, disposing of trained personnel, adequate equipment and an able supervisory staff. It is to be hoped for, that the encouraging declarations in this direction at the Symposium of the Union of African Railways, held in Abidjan in August 1978, will also penetrate into other developing countries.

As to operating principles, the consultants have to emphasise that train schedules must allow for ample spare times, as long as delays caused by deficient track conditions and defects on rolling stock frequently occur. The scheduled crossing, overtaking and shunting of trains on the single track-lines should be concentrated on the main stations, which dispose of the equipment and the staff capable to handle these manoeuvres in an efficient way. This enables also to keep ample time between trains for track-maintenance with mechanical equipment, which gives much better results as ever can be obtained with manual labor.

An example of a train schedule based on these starting points is given on pag. 62. It was drawn up in cooperation with the counterparts in the framework of the "Transportation Study in the Area of the Rio Magdalena" in Columbia, made by the Netherlands Economic Institute in 1974. This schedule concerns a part of the mainline from the capital Bogotá to the harbour of Santa Marta, a distance of about 1000 km. The capacity of that line is determined by the section Bagazal-La Tribuna with a ruling gradient of 4 % (as shown in the schedule), and many curves with a radius of 80 meters. The freight-trains entering that section have to be split up in parts of 10 - 12 wagons with a maximum gross weight of 450 tons, pulled by 3 diesel-electric locomotives of 1050 Horsepower each, at a speed of 30 km per hour. It is an illustrative example of the big problems railways in developing countries are often faced with, especially on their older lines and in difficult terrain such as the Andes mountains in Columbia. Not only because of the alignment with steep gradients and sharp curves, but also because of geological conditions causing landslides, which tend to block the traffic for a shorter or longer period.

In view of the difficult physical conditions these railways are faced with, and the financial constraints they are submitted to, one comes to admire their endeavour to keep the traffic moving. A schedule as the one on page 8 giving ample spare times, with sufficient openings for trackwork between trains, is therefore designated in these

circumstances. As mentioned on the graph this schedule gives a maximum capacity in the ascending direction of  $\pm 3000$  tons of cargo per day or a million odd ton per year, about twice the quantity moved at present.

A further raising of the capacity can, if necessary, be obtained by installing Centralised Traffic Control (C.T.C.). On this point it is justified to use such an advanced technique, because it gives an optimum possibility to adapt the train operation to a temporary or lasting increase in the transport demand. In several developing countries such a C.T.C.-system is used with good results. The operation is very simple and for maintenance only a few specialised technicians are needed.

Many railways in developing countries are burdened with a number of underused lines. The consultants therefore will recommend to limit the expenditures for such lines to the very minimum, until a study of their present and future function in the transport network has been made. This is a delicate subject, because an eventual conclusion that such a line could better be closed, will often lead to emotional opposition from regional authorities.

As a very rough rule can be put that railway lines will not cover marginal costs for passenger traffic when they carry less than 0,3 - 0,4 million passenger kilometers, per route kilometer, per year (an average traffic density of  $\pm 1000$  passengers per day). It will be economically justified to keep such lines open for goods traffic alone, when they will carry at least 0,5 million ton km's of cargo, per route km, per year (an average transport density of  $\pm 1500$  tons per day). These figures will of course vary considerably according to the local situation.

For all secondary lines separate studies have to be made before a definite conclusion about their maintaining or closing can be taken. Such a conclusion will not only have to be based on economic criteria, but has to take into account also social and perhaps strategic factors — the availability of other public transport, etc.

If because of such factors alone, lines have to be kept open, the government will have to compensate the railways for the deficits involved. It is deplorable that such a compensation often is not given. It prevents the railways from becoming an economically sound undertaking, which can concentrate on the services for which it is most appropriate.

## ADEQUACY OF INTRA-REGIONAL SHIPPING SERVICES

Objectives, methodology and results of a study on intra-ASEAN \*) shipping.

by  
*Dr. H.J. Molenaar,*  
*Netherlands Maritime Institute, Rotterdam.*

### Background

Some years ago, around UNCTAD-IV at Nairobi, the promotion of foreign trade among developing countries, another means towards higher economic standards of living, started receiving special attention.

The level of trade between countries of the third world had generally remained low and this new move was a reaction to failures to score adequately on the front with the industrialised world.

Improvement of shipping services connecting countries of particular regions seemed overdue as far as the island countries of the South Pacific were concerned. A study project conceived for seven Pacific island territories in agreement with ESCAP \*\*), to supplement short-term operational assistance under Netherlands technical assistance programs, was laid-up for lack of political agreement on the regional shipping aims. However, on request of the countries of ASEAN, the project emerged as a big case study for this totally different region.

The ESCAP secretariat insisted on a project which in its methodology would be applicable to other subregions of ESCAP as well. \*\*\*).

Remoteness and lack of shipping services seemed far less pertinent in the new case. It concerns a densely populated region, 250 million, on the crossroads of heavy traffic lanes between Europe, Japan and Australia.

A closer look at the intra-regional trade, however, revealed a low level of exchanges, difficult to reconcile with these distinct features.

A closer look at the geographic structure shows the world's two biggest archipelagoes as part of a region where rapidly changing ocean shipping technologies and an inherent increasing scale of operations must pose new transport problems. A deterioration of the direct services pattern had been noticed for the Pacific and Caribbean Islands and had also given rise to an expert group in interisland and feeder services, convened by UNCTAD in 1977 to make recommendations on how to (re)open up island countries to world markets. The change of scenery in fact did offer a more challenging job.

---

\*) Association of Southeast Asian Nations.

\*\*) Economic and Social Commission for Asia and the Pacific.

\*\*\*) The project was funded by the Netherlands Government under the Technical Assistance programmes 1976 and 1977 to ESCAP.

## **Objectives**

The main objectives of the project were:

- (1) The design of an adequate structure of regular shipping services within the subregion of ASEAN. \*)
- (2) The development of a methodology which can be used in a different group of countries.
- (3) The identification of measures to ensure sound economical intra-regional shipping operations.
- (4) The transfer of know-how applied in the project to the region.

To derive the services structure sub (1) the costs to the trade resulting from the employment of alternative ship types and sizes had to be compared.

### **Laying the basis for the shipping study**

A major effort for the project team turned out to be the projection of the intra-regional trade flow pattern, requiring transport by sea in 1985. This work preceded the proper transport-economic approach. The new thrust behind ASEAN, reflected in preferential trading agreements, industrial complementarity agreements and package deals on 5 resource-based projects, caused statistical extrapolations even on aggregate levels to be of little value.

Besides, for the trade projections to be convertible into shipping service requirements, individual commodity flows, identifiable as bulk or "bulkable" and liner cargoes, were needed. Thirty different projections were therefore made and consolidated into port-to-port flow matrices of general cargo for regular services and bulk cargo for tramp ships or industrial carriers. In a number of routes cargo flow densities for typical bulk commodities were too small to warrant prompt allocation to this category. This had to be decided on after execution of the shipping-economic analyses.

The subject region is featured by traditionally very significant transshipment movements via Singapore. The prospective development thereof seemed to bear heavily on the services structure to be designed.

---

\*) Formally for the subregional grouping of the SEATAC (Southeast Asian Agency for Regional Transport and Communications Development) area which also comprises Vietnam, Laos, Kampuchea, but for technical reasons limited to these 5 countries.

In principle, worldwide trade forecasts of all potential transshipment cargoes to involve future intra-regional feeder or common carrier services seemed a prerequisite. This was both beyond the means and clearly not the intention. A practical approach consisted in:

- (a) translating the purely intra-regional trade plus traditional transshipments, as projected into ships and services
- (b) considering the possible impact on the most economic ship types and sizes thus derived of adding unknown volumes of extra-regional, notably of container cargo to the former intra flows.

At present, "common carrier" i.e. regular liner services for shippers at large and feeder services, collecting and distributing cargo on behalf of intercontinental shipping lines or consortia thereof, operate separately. The above approach was expected to reveal arguments in favour of or contra integration of both types of services.

#### **Methodology of the shipping study**

A review of the present shipping situation within the ASEAN-region had to be made to have guidance on the fleets, ship types and sizes employed and on the shipping policies adopted by member countries and freight charges quoted. However, the very aims of the project, foster trade through adequate transport, demanded optimum regional solutions to be derived, by taking distance from present restrictions on the freedom of participation and from present ships and employment patterns.

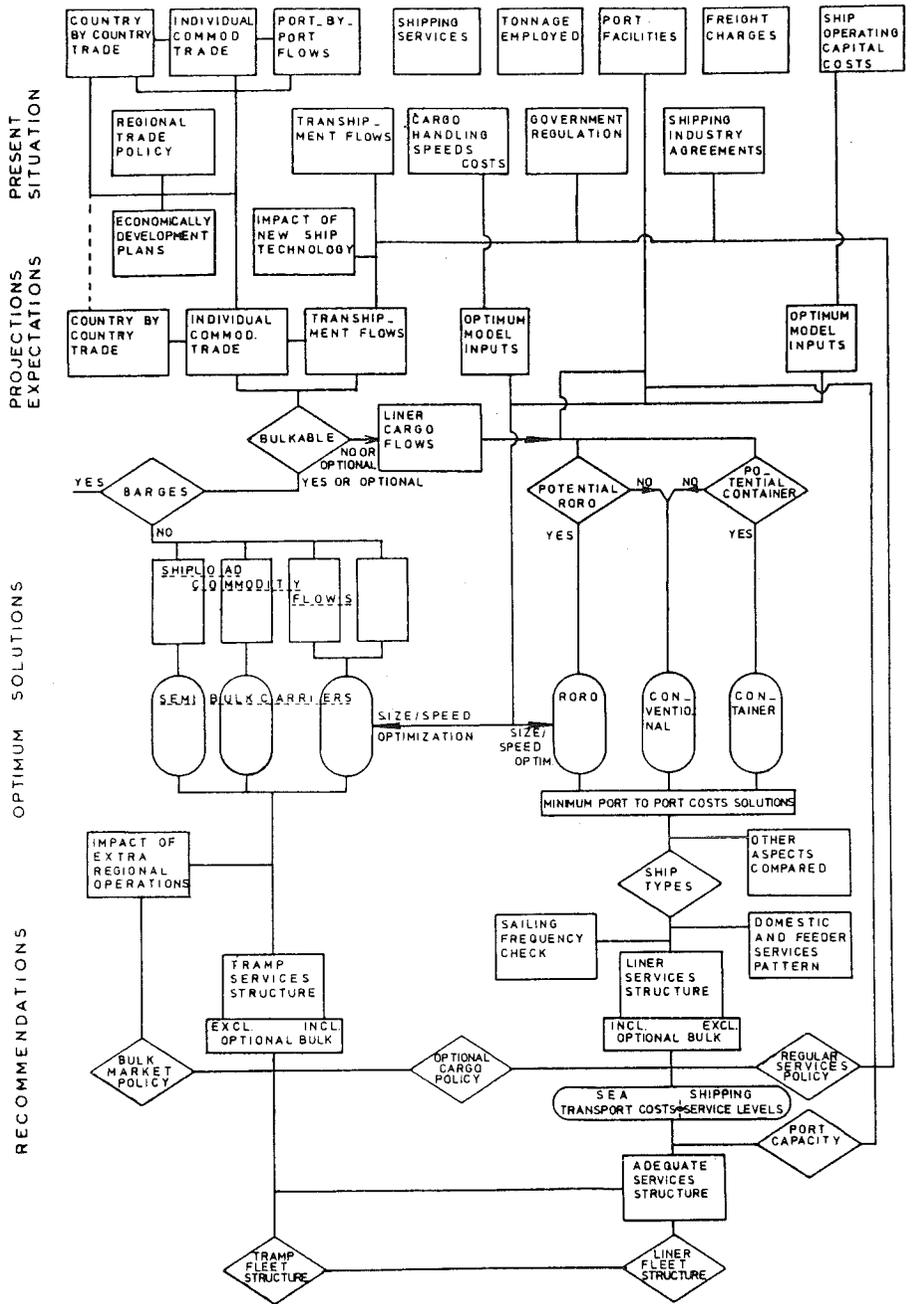
Explicitly or implicitly, shipping studies for the United Nations are expected to touch upon the level of freight rates. This level is too readily commented upon as being detrimental to the trade, as unduly high. In our project, not monopolistic pricing policies were expected to be pinpointed as causes for unnecessarily high transport costs, but rather the inadequacy of services or ships.

The difficult issue what would be the impact on trade of lower transport costs, solved itself in the form of the finding that present freight charges did appear inadequate to cover the operating costs of optimum Asian-built tonnage. Replacement of the rather aged tonnage now active in the trade by newbuildings on a 25 year depreciation basis was found impossible under these conditions.

The *project flow diagram* reproduced as figure 1 indicates the main steps that had to be taken. A main problem was implied in the use of the expression "adequate" in relation to the shipping services required and to be derived. The term is well-known from U.N. documents and conceals a host of aspects, mostly non quantifiable. ("quality of service" more specifically relates to these aspects).

FIGURE 1

PROJECT FLOW DIAGRAM



Still quantifiable and second in importance to the freight charges itself is frequency of shipment opportunities between port pairs, without transshipment operation.

Adequacy as a measure of merit for regional shipping services could be interpreted to denote the network of services maximising the volume of the trade. Extensive field investigations for all routes into the price and quality elasticity of transport could not be accommodated in the project.

In agreement with ESCAP the study undertook to give the cost implications of alternative service levels and comment thereon.

– *role of computerised procedures*

The project called for three types of optimisations:

1. of ship types
2. of ship sizes and speeds
3. of shipping routes.

Computerised tonnage allocation or routing procedures suggest themselves strongly, where the decision problems are characterised by many and/or frequent options with the freedom to select and where rational decisions require the processing of many data. The successful application of these procedures have so far been very few in shipping, notably by oil companies managing big fleets. Their role in liner shipping remained so small because of:

- a) lack of homogeneity of fleets and for that matter of interchangeability of vessels between routes
- b) need for continuity of service (goodwill) and resulting lack of freedom to adjust vessel schedules to bookings and immediate prospects.

In the present project, computer models were activated for the optimisations sub 1 and 2 but not for 3, despite favourable experiences obtained on a comparable, though more comprehensive interisland shipping study for Indonesia. The rejection was not *per se*, but in view of the rather limited traffic volume, number of ports and routing alternatives for intra-ASEAN trade.

The most intricate part of the study, both methodologically and materially, proved to be the selection of ship type for regular services. New and old ship types are not comparable on their sea leg costs, since shore operations and equipment differ. Only door-to-door cost comparisons would do, but are much too demanding in terms of input data.

A two phase approach was followed:

- (1) port-to-port costs were computed for 3 basic ship types – container-, roll-on roll-off and conventional –
- (2) the transport cost differences found, were commented upon in the light of estimates of the costs of utilising containers or ro-ro equipment and of the total cost differences in the loading and unloading operations.

This paved the way for a uniform computerised approach of lowest cost tramp and liner tonnage in relation to employment.

– *chicken-and-egg problem?*

For cargo flows to be converted into shipping services, the optimum tonnage should be known, size, type etc., bearing heavily on port time. Reversely seemed optimisation of ships only be called for in view of particular employment. The point has in fact frequently been made that one cannot optimise ships which are not destined for (a) specified trade(s) but built for general tramping.

The results reported below may serve to reflect this postulation. \*)

The ASEAN liner and tramp markets were defined by setting the minimum, average and maximum values of the parameters known to determine the economic result of operating ships:

1. voyage distances
2. (average) loss of time in weekends, nights
3. cargo handling speeds
4. load factors
5. building cost cum capital costs
6. operating cost, incl. fuel costs.

Factors 3, 5 and 6 have two components, one is the absolute level that applies to all ships, the other a relative level that indicates the influence of type/size/speed of ships.

The markets were tried out on paper by a series of vessels of different type and size as described in the graph of figure 2 in two ways:

---

\*) Owner preferences and ties with certain cargo sectors or even a stochastic market behaviour constitute no barrier to optimisation procedures.

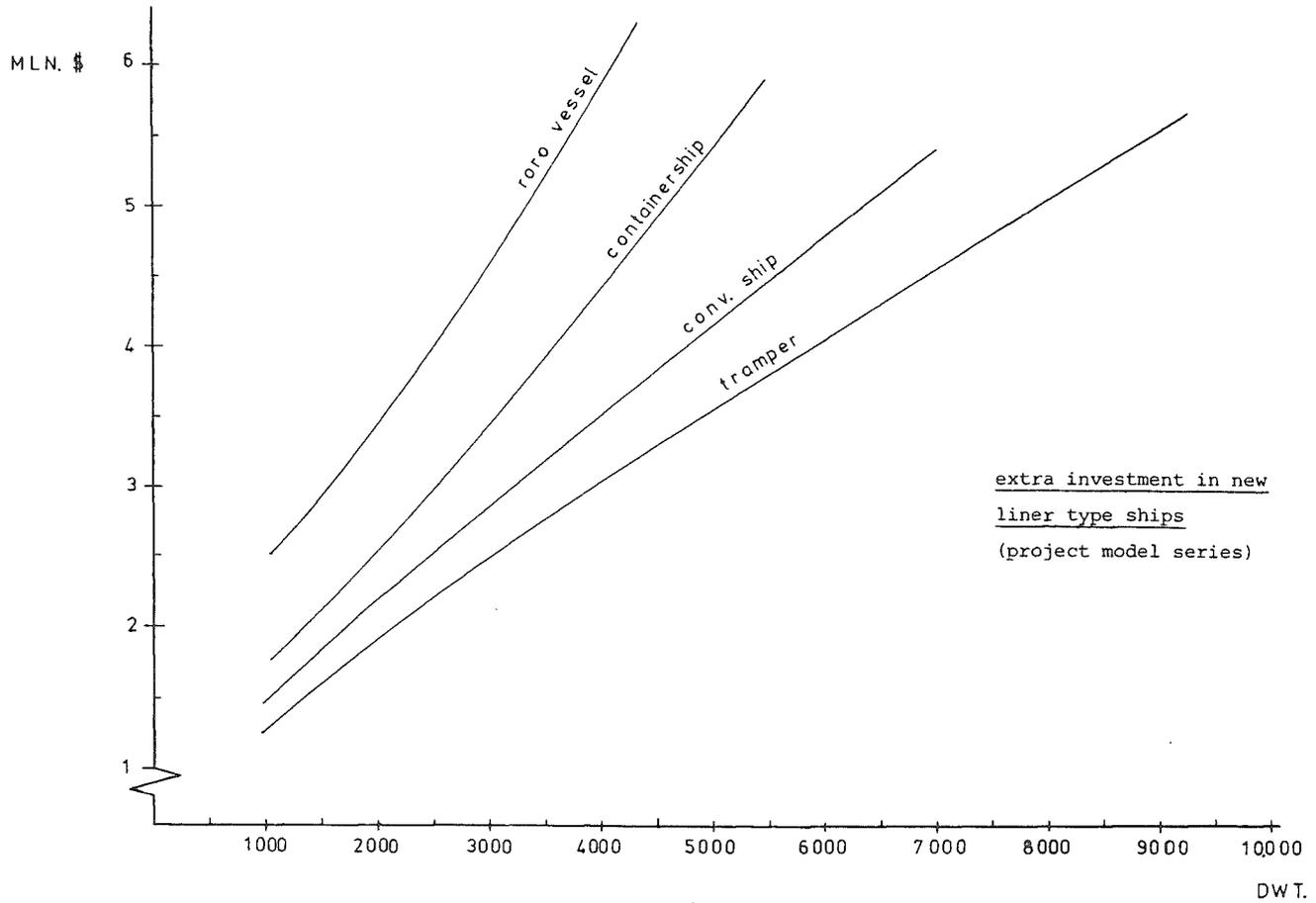


FIG. 2.

- by varying systematically important parameters
- by employing these ships in specified voyages/routes, representative for the market.

The project relied for the computation of port-to-port (or "free in-and-out") transport costs (excl. management, administration and profit) on the ship optimisation model "Seaship" developed and adjusted for the purpose at the department of Shipbuilding and Shipping of the Delft University of Technology.

## Results

### – *Ship types for intra-ASEAN regular services*

The results of the first phase – comparison of port-to-port costs – did justify a second phase analysis: container- and ro/ro ships produced costs which were US\$ 4 - 10 lower, up to 40 per cent of conventional f.i.o. costs.

However, improvement of the cargo working rates for conventional (break-bulk) handling from the low level current in a number of ports by 50 % up to the medium assumption (1985 !) would largely reduce the difference.

In industrialised countries with good road/rail infrastructure, the new ship types not only compensate their higher investment cost per ton of cargo carrying capacity with short port times, but find additional savings on stevedoring costs.

Low wage standards on the one hand, a limited door-to-door transport potential on the other, made us assume that "stuffing and stripping" cost for containers level out against conventional ship loading/unloading.

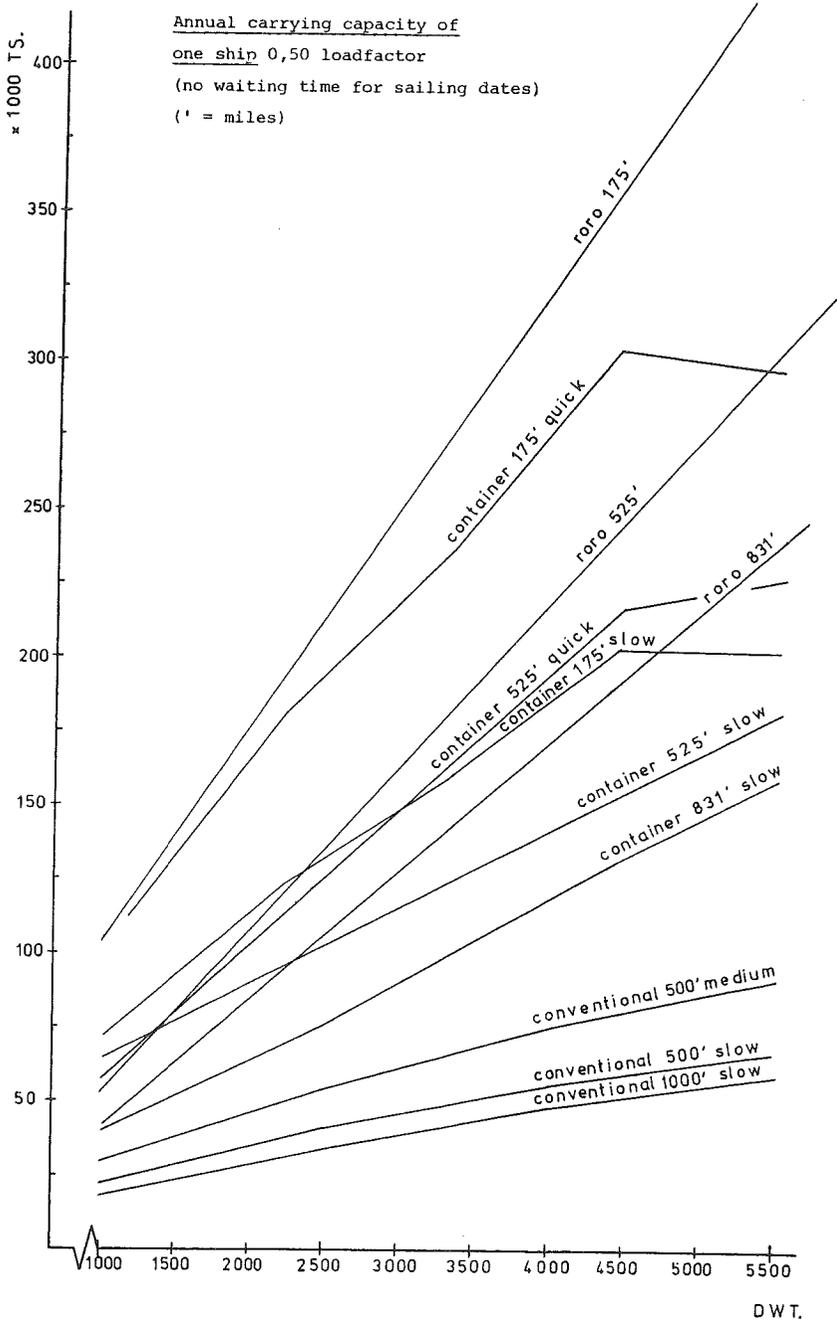
The costs of using containers were estimated at US\$ 2.5 - 4.0 per cargo ton, the costs of handling these containers on/off the ship at US\$ 10 - 14.

A rather negative conclusion on container services followed therefrom.

The margin on the sea leg costs to compensate cost extras elsewhere appeared too small. Container handling tariffs of special terminals cannot be paid back from just one of the two basic economic factors behind the technological revolution in liner shipping (ships' time, stevedoring costs). The economics of ro-ro appeared less unfavourable but capacity aspects more difficult.

Further consideration was given to the aspects of ships *a n n u a l c a r r y i n g c a p a c i t i e s* in 6 potential container or ro-ro routes. One-ship services appeared compatible with the continuation of "residual" services for a fair share of the market in most cases, whilst 2-ship services are highly recommendable from an operational point of view (vulnerability for ship breakdowns!).

FIGURE 3



*Figure 3:* brings out the tremendous increase of cargo volumes accommodatable by container and ro-ro services as compared to conventional ship service (slow, medium and quick refer to cargo handling speeds as assumed).

Because of this impact and the limitations on market shares that could be reserved for the new shipping techniques, the respective ships could not enter the market on their most economic size of 4,000 - 5,000 tons dwt. However, smaller 1,000 - 2,000 tons units would entail higher unit costs for the cargo and further reduce the margin to compensate extra equipment costs.

It was concluded that purely intra-ASEAN trade volumes and port handling could not justify the introduction of non-conventional liner ships.

Container ships do operate already on some of the routes between ASEAN-capitals, namely as feeders for intercontinental container consortia.

The respective cargo volume potential by far exceeds the domestic intra-ASEAN volumes.

Feeder services operate rigid schedules, planned to meet the ocean liners with minimum inconvenience for the cargo. From a shipping economics point of view, combining both cargo categories suggested itself to reap economies of scale and open up routes for most economic ship sizes (as determined by turn round times and ships' costs). The result has been commented upon above: the case remains very doubtful even for the densest routes.

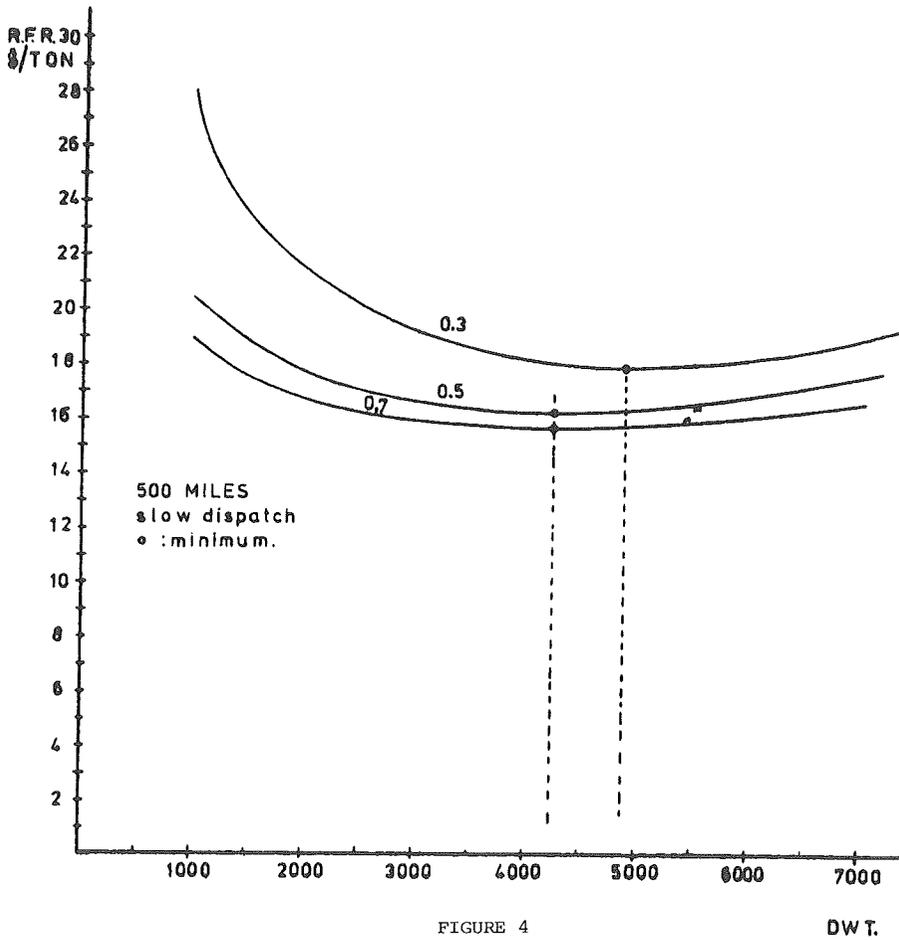
– *Optimum ship sizes and speeds for conventional liner ships*

Used as reference ship to pass judgement on the economics of container and ro/ro-services, the general cargo ship (with limited container capacity) has emerged as the most economic solution, a prolongation of the present system.

A significant deviation from the present would however be the introduction of these ships on their most economic size. One of the series of model variations carried through in relation to the ASEAN services market is reproduced in *figure 4* and points to vessels of over 4,000 tons, despite slow despatch assumption. Present tonnage centres around 2,000 tons. Lower load factors hardly impact the optimum (as long as applied to all sizes). Improved cargo handling speeds put up the lowest-costs size a few thousand tons, but the ton cost differences remain very small indeed. Within this broad tonnage range all sizes are equally good to the extent cargo volumes are adequate to also give the biggest ships the same space utilisation smaller ships would obtain.

The minimum standard adopted monthly and our trade volume forecast necessitated the inclusion of otherwise undersized cargo vessels in the recommended fleet structure.

Impact of load factor on optimum  
size of general cargo vessel



In fact, about a third of the routes designed either posed draft restriction problems, lack of cargo problems. An interesting theorem presented itself:

would it be better to

employ bigger vessels at a lower load factor

or smaller vessels at higher load factors.

The finding that load factors have no practical impact on the most economic size simplified this problem (see figure 4).

The conclusion drawn from a number of route case studies pointed to accepting lower load factors for bigger vessels. The 1,000 ton vessels, still in use, would be too costly even for very low-density routes.

– *Optimum size and speed for intra-ASEAN tramping*

The rationale of tramping is that by linking stretches over which cargoes move in multiport voyages, the ships on average carry cargo during more than half their time at sea (up to 65 % for bulk carriers, 75 % for combined carriers).

This matching of cargoes, however, enhances the risk of waiting times, whereas year-round operations may be blocked by seasonal patterns.

The prospective ASEAN bulk market was scanned on its tramping opportunities. But the most versatile solution to carry the bulk flows of rice, fertilizer, animal feedstuff, cement, namely one way full, one way empty, served basically to optimise the vessel.

Again, 4,000 - 7,000 tons emerged as the obvious tonnage range with 10,000 ton vessels as a border case, where internationally good despatch times would apply.

Separate analysis of 6 two-cargo voyages proved the most economic size to differ hardly from those for "shuttle operations".

As to service speed of the vessels, equally convenient conclusions derived. *Figure 5* shows the costs per ton of cargo to be rather insensitive to the actual horsepower installed over a fairly broad speed range.

For liner and tramp vessels alike, the best size turned out to be highly insensitive to the absolute building price level assumed for the ship series.

– *Liner services structure*

This part of the project ended up in the design of about 20 routes for regular liner services with a high degree of concentration in the north-south connections. Trade prospects as registered and derived by us barred the conception of an extensive

Optimum speed for 4000 tons  
tramp ship  
 (1500 miles quick despatch)

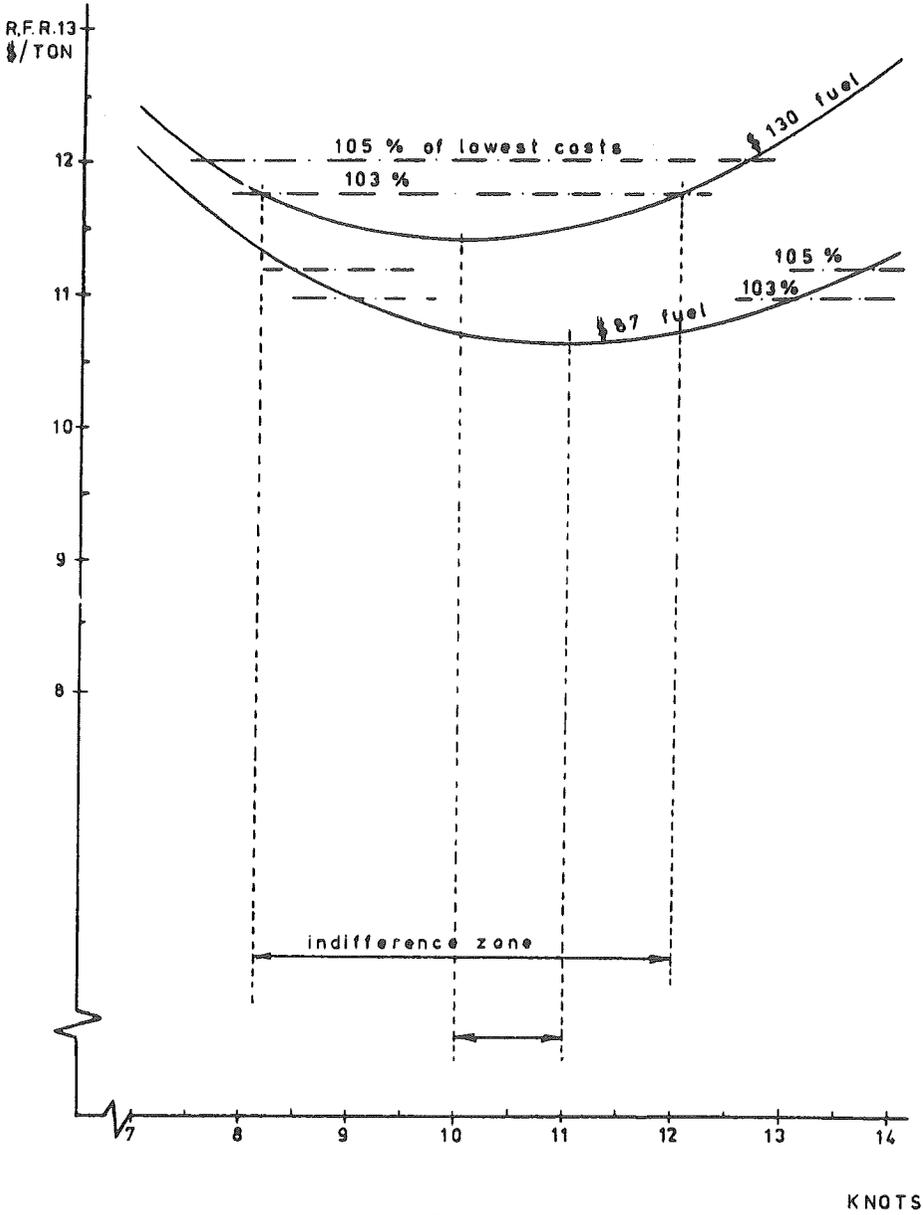


FIG. 5

KNOTS

multilateral network of services. This because of the lack of important commodity flows in some crucial links.

Second, because shipping economics dictate the design of two-port or three-port services, cargo volumes permitting, over the design of multiport routes, especially where cargo handling is slow.

This services structure does not deviate too much from the present situation. A few routes only would call for a change of the licensing systems and bilateral agreements now controlling the structure.

Part of the outcome explains itself from the surprisingly small change expected in the total volume of trade to use regular services.

# ECONOMIC ASPECTS OF PORT PLANNING IN DEVELOPING COUNTRIES

*by*  
*Drs. H. Bosch,*  
*Netherlands Economic Institute.*

## 1. INTRODUCTION

In its simplest form a port is a complex of facilities intended for loading and unloading of ships. Because usually the port itself is neither the origin nor the final destination of the cargo (or passengers), it is in most cases also the place where the cargo is changed from one mode of transport to another, e.g. from ships to lorries or the other way about or from one ship to another (transshipment). Apart from quays and cargo-handling equipment (cranes, fork-lifts), there are therefore, in most ports facilities for loading or unloading lorries and railway wagons. As the flows of goods that enter and leave a port cannot be exactly matched, it must be possible to form buffer stocks of cargo; most ports will, therefore, offer storage facilities. Other services, coming under the responsibility of the port authorities, could be the maintenance of a safe fairway and the provision of pilotage and bunkering facilities.

It may be clear from this brief, simplified (and too general) description that the port is a rather complex organisation with many technical, operational, administrative, and also economic aspects. It follows that port planning, and in particular keeping a port abreast of changing circumstances, is a many-sided and certainly not a one man's job; it requires a multi-disciplinary approach, with engineers, port operators, shipping experts, economists, and managers working closely together.

When the economics of port planning are discussed, two main elements come to the fore, viz.

- traffic projections, and
- the economic evaluation of port facilities.

Traffic projections in a port study are not essentially different from those in railway, road, or airport studies; they will, therefore, be dealt with briefly, emphasis being laid on those aspects which are particularly relevant in port studies. That will be done in Chapter 3. Chapter 4 is devoted to the economics of providing port facilities, with the emphasis on optimum berth planning. An important aspect is queueing analysis. The literature on queueing problems, dealing with the theory, but also with practical applications, is extensive. \*)

---

\*) Textbooks on "Operations Research" usually give a chapter on queueing and references for further reading.

Here we shall confine ourselves to the application of the theory in port studies and to the indication of its limitations. The main object is to show how queueing analysis can be integrated into the economic analysis of investments in port facilities.

Because it is easy to lose sight of the overall picture, first (in Chapter 2) a brief outline is given of the general set-up of a port study, showing specifically how the different disciplines fit into the whole.

Chapter 5 finally gives some concluding remarks.

## 2. A PORT STUDY IN OUTLINE

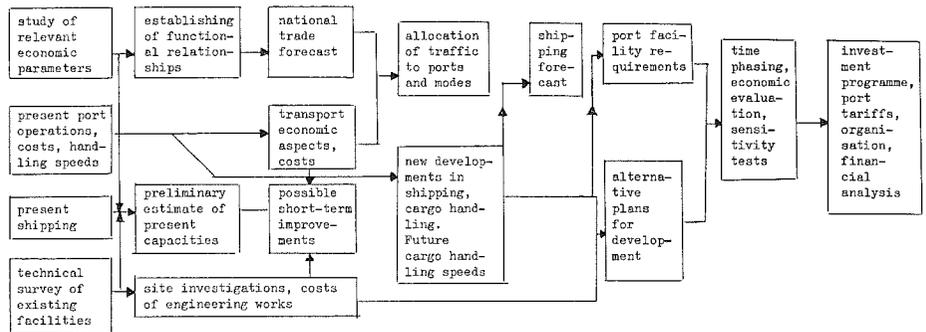
One way to carry out a port study is sketched in Figure 1. It may be observed from the activities listed that the port in question is expected to reach capacity soon and is in need of further development.

The study will start with a description and an evaluation of the present situation. Fixed and movable facilities will be surveyed to determine the state of repair, maintenance, and operating efficiency.

Cargo-handling characteristics (methods, speeds) will be described, an important datum being, of course, the type and quantity of cargo handled in recent years. Types and sizes of calling vessels must be assessed and, if statistics permit, the arrival and service time pattern will be analysed.

The inventory should lead to a tentative assessment of the port's present handling capacity; the analysis of the present situation could suggest short-term improvements. What is to be understood by short-term improvements is, of course, a matter of

**Figure 1. GENERAL SET-UP OF A PORT STUDY**



definition. What is meant here are measures that increase the port's efficiency without calling for new fixed facilities. The measures could involve the addition of mechanical equipment, improving the routing of cargo and the lay-out of the port, for instance by creating more open storage and adopting round-the-clock operation. The aim would be to make efficient (optimum) use of existing facilities. Some of the measures are obviously economically justified, others may require more study. Benefits will usually be in the nature of increased cargo-handling speeds and, consequently, decreased ships' time costs and possibly lower cargo-handling costs per ton of cargo. It goes without saying that all possibilities of increasing the port's throughput capacity with the existing facilities should be explored before expensive new construction is considered.

The purpose of the first phase of the economic study will be to describe trade in the recent past. Functional relationships that can be established between sea-borne trade and certain economic parameters (e.g. population and income growth) can be used for the projection of future developments. When the port under study is one of several competing ports in the country, the best approach to trade forecasting is to estimate first the total trade of the country and next to allocate it to the different ports.

For the design of possible new facilities the sizes and types of vessels expected in the future (general cargo, ro-ro, container, bulk) must be assessed. They will depend on the cargo flow (type, quantity, and origin/destination), and on more or less autonomous developments in the shipping industry.

Future cargo-handling methods and speeds, in the existing port as well as with new facilities, will have to be determined. To a certain extent speeds depend on the number and type (category) of handling equipment provided by the port; sometimes there is a range of options. The choice is to be made on the basis of overall costs. As will be explained later on, the *optimum* degree of mechanisation can be determined by minimising the total of ship's time and handling costs. It is important to use "shadow costs" (see next chapter) in order to take due account of unemployment in the country. The outcome of the analysis could point towards manual handling in one port (in a developing country with high unemployment) and modern cranes in another (country with high labour costs). The idea that a less advanced technique may be best in a particular country is, however, sometimes hard to sell.

The trade forecast combined with future cargo-handling speeds determines how many berths will be needed over time, given a certain degree of utilisation of facilities. \*) In some cases there are straightforward solutions to the question where and how to provide additional capacity, but usually in-depth engineering studies of alternative possibilities are required. If several solutions offer the same possibilities (the same benefits), the choice is a matter of comparing costs. Often the solutions are not comparable and separate cost-benefit analyses are then needed for the selection.

\*) The optimum utilisation is the subject of Chapter 4.

The port should be planned such that capacity matches trade as closely as possible, and to that end it is necessary to assess the optimum time phasing of construction (see Chapter 4). On the basis of the assessment an investment programme is drawn up; a financial analysis, demonstrating i.a. how financial returns are going to pay the investments, will conclude the port study.

### 3. INPUT DATA

#### 3.1. Introduction

Prior to starting the optimum berth-planning exercise, a considerable amount of preparatory work has to be done. Apart from the traffic forecast, the backbone of any port study, we need information on the cost of constructing new berths, of cargo-handling equipment, and of labour, and on the time cost of ships expected to call at the port. Usually the economist's task is to perform a national economic evaluation, involving the conversion of financial costs into national economic costs.

A comprehensive treatment of the subjects "trade forecasting" and "economic costing" is beyond the scope of this paper, which can only cover main issues.

#### 3.2. Trade forecasting

As already indicated above, the best way usually is to project total trade first and then allocate this trade to the different ports.

Before the work can start it has to be decided what information (and in what form) is needed for the purpose of planning. First there is the question of the cargo breakdown. The economist will want to classify the different commodities in a way that suits his analysis, grouping together commodities with similar economic properties. This will result in a classification which may look as follows:

- Exports:** — agricultural products
- industrial products
- minerals
- Imports:** — consumer goods
- raw materials
- capital goods

with a similar breakdown for domestic (sea-borne) trade. Though convenient from the point of view of forecasting, this classification will give insufficient information for the planning of the port. Consumer goods, for instance, may be bulk wheat, flour in bags, and vegetable oil in bulk, commodities with completely different handling characteristics; and a further breakdown will, therefore, be required. The number of commodities to be distinguished could easily mount up to 20 - 30.

For the design of berths and handling equipment it is important to know what type and size of ships are expected. The type will depend on the cargo (liquid or dry bulk, general cargo, containers, etc.), and the size of ships on the quantities to be carried, the transport distance and the draught at the ports of call. The larger the roundtrip distance, the more attractive it is to employ large carriers. In order to make a realistic shipping forecast, some indication of the overseas origin and destination of the cargo will therefore also be needed.

For the allocation of traffic to transport modes and ports information on the inland origin and destination is required as well, and an appropriate regional breakdown of the country will have to be formulated.

When the form in which the trade projections are preferably to be presented has been decided upon, the next step is to check the available statistical data to see whether this form can be maintained. The results of such investigations are often disappointing, and interviews with traders, shipping companies, etc., as well as a great deal of professional judgement, are needed to come up with a satisfactory picture of the quantity of cargo handled, and its origins and destinations.

For the analysis of past trade performance with a view to projecting future developments, two main approaches can be distinguished, viz. (1) trying to determine trends (relating trade to time) and (2) assessing functional (causal) relationships with certain economic parameters (trade-generating factors). As both methods, applied in isolation, can result in unrealistic outcomes, they have to be combined. Although such exercises are extremely useful, it must be recognised that even the best techniques of statistical estimation cannot take the place of working hard at acquiring an intimate knowledge of a country's economy and getting the feel of its possibilities and impossibilities.

Life may be somewhat easier for the forecaster when there is a national plan as well as a long-range perspective plan. It must be remembered, however, that plans often specify targets rather than predicting what will actually happen. It may be advisable to study a bit the country's planning history, finding out how far targets have been realised in the past, before using the plan as a basis for trade projections. Even if the plan seems overly optimistic, it can be of use for the forecaster, because it gives a, hopefully consistent, framework for projecting important parameters.

It will be clear that the method of forecasting will be different for different commodities. For export commodities some of the most important factors are knowledge of the world market, expected price developments, production potential in the country, and price elasticity of supply. For import commodities determining factors may be population, population growth, income and income distribution, local production of the commodity in question, and demand elasticities.

If forecasting is done commodity by commodity, inconsistencies between the individual projections can easily arise. One check is to assign money values to the different

commodities and so calculate the resulting development of the trade balance. A really satisfactory way to arrive at consistent forecasts would be to construct a trade-fore-casting model, but time is usually too limited to permit such elaborate exercises.

### 3.3. Trade allocation

When total sea-borne trade has been estimated, it has to be assigned to the different ports (if there are several competing ports). In most cases information on the distribution over inland transport modes is needed as well; in that case the trade needs also to be allocated to different transport modes (rail, road, water).

Sometimes rather crude methods to assign trade to ports can be relied upon. If, for instance, a port's share in trade has been constant over time for the various commodities and no specific developments in the regional economies and the transport infrastructure are expected, this share could be projected to remain unchanged. Usually, however, the regions of a country will show different growth rates, the transport infrastructure will develop further, and relative changes in the transport costs of different modes will occur.

A frequently observed phenomenon in this connection is that the share of road transport increases at the expense of rail, river and coastal transport. Under those circumstances there is no short cut to the allocation of trade to ports.

A satisfactory way to do it is to estimate separately the surpluses and deficits of each relevant commodity for the different regions of the country. A region that obviously belongs to the hinterland of a certain port whatever the changes in the transport infrastructure \*) , does not need to be considered separately for the purpose of port traffic allocation. It is the regions that lie on the borders of the hinterland that are important for that purpose, as they are apt to switch from one port to another.

Which port and which transport mode will be chosen for a particular commodity depends on the cost of transport, the speed, the risk of damage and pilferage, the frequency of service, etc. By quantifying all those factors and expressing them in cost per ton, a powerful tool is obtained which permits formulating the optimum traffic allocation, representing that mode choice and that routing of cargo which minimises total transport costs.

With more or less constant costs per ton of cargo the traffic allocation constitutes a typical linear-programming problem, with minimisation of total transport costs as the objective function.

---

\*) A region may lie in the vicinity of the port, or have transport connections with that port only.

For simple cases a manual solution is possible, but a computerised model is often a great help. Before being applied to the allocation of future trade, the model should be tested on the present situation, to find out how well the computer predicts the observed routing. For the test tariffs rather than costs should be used.

For the allocation of future trade national economic costs (see next section) should in principle be used in the exercise. In that case the resulting traffic allocation indicates how the routing ought to be and will be if tariffs give a good reflection of economic costs. Recommendations as to how to bring tariffs more in line with costs may be required.

### 3.4. Economic costs

As already said, economic costing is extensively treated in literature. The need for economic costing arises because market imperfections and distortions in the economy lead to prices which do not reflect the true costs to the economy and, consequently, cause sub-optimum allocation of resources. Project planning on the basis of real economic costs ("shadow prices") somewhat mitigates the effect of such incorrect prices. A couple of years ago "shadow pricing" in project evaluation was generally limited to the prices of labour, capital, and foreign currency, prices of commodities being corrected for internal money transfers (taxes and subsidies).

Further refinements, involving shadow pricing of all inputs and outputs, have been advocated for some years now. The latest development is to incorporate the desirable distribution of income in the economic analysis by giving different values to income accruing to different income classes. It will be clear that, unless the Government states clearly what the desirable income distribution in a country is, the new development introduces an arbitrary element into project evaluation. If in former years there was no unanimity with regard to, for instance, the "opportunity" costs of labour in a certain country, the new system must be expected to lead to even wider disagreement on certain shadow prices.

Apart from that it is clearly very inefficient to have every individual project evaluator establish shadow prices; the planning authority in each country and/or the international development banks are in a much better position to do it. Some countries already provide project evaluators with guidelines or some basic accounting factors for shadow pricing, but the situation is still far from satisfactory.

Another question is how important the use of shadow prices is. Would decisions be very different if evaluations were based on market prices? So far there has been little practical research in this field. The Planning Commission in Bangladesh followed the Little-Mirlees approach for some years, but abandoned it because the system was too difficult to apply at the lower planning levels and because it was found to make little difference anyhow. The latter observation seems to apply in most countries to port projects which concern extending the port by one or more berths.

The choice between capital-intensive and labour-intensive production is quite another matter, however. While there is little choice in techniques for the construction of fixed port facilities, for cargo handling the options range from totally manual to fully mechanised operation. It is clearly worthwhile investigating alternative ways of cargo handling and evaluating them with the help of shadow rates for capital and labour. The optimum degree of mechanisation is that degree for which the sum of ships' cost and cargo handling costs is lowest. If mechanisation leads to faster handling rates and thus to a saving in ships' time, ships' time costs must be taken into account as well. Ships are very expensive, and faster handling due to mechanisation may save so much in ships' time costs that total costs often go down even if the shadow rate of labour is very low.

Economic costing implies the application of economic principle. One such principle which is particularly important in traffic allocation is that of "sunk cost". From economic theory it is known that optimum allocation of resources requires prices to equal marginal cost. It is not otherwise with traffic allocation. The costs to be heeded in traffic allocation are the "avoidable" costs, such as operational costs, depreciation of, and interest on equipment which can be sold or used for other purposes, cost of maintenance of equipment and facilities to ensure that their operating efficiency is kept up, etc. The capital costs of existing berths in a port or an existing railway-line do not usually constitute a cost in the economic sense as these costs are unavoidable (sunk cost); they are incurred whether or not the facility is used. In plain language, application of the "sunk-cost" principle means that fixed facilities will be utilised to their capacity before new capacity need be built. In port studies the implication often is that extension of a port's capacity is not feasible for as long as competing ports are not working up to capacity. For that reason it is often impossible to study one port in isolation.

#### 4. OPTIMUM BERTH PLANNING

##### 4.1. Queueing analysis

When the traffic forecast (T) and future cargo handling speeds ( $H_s$ ) (in tons per ship-day) have been established, the number of berths (N) needed can be calculated as follows:

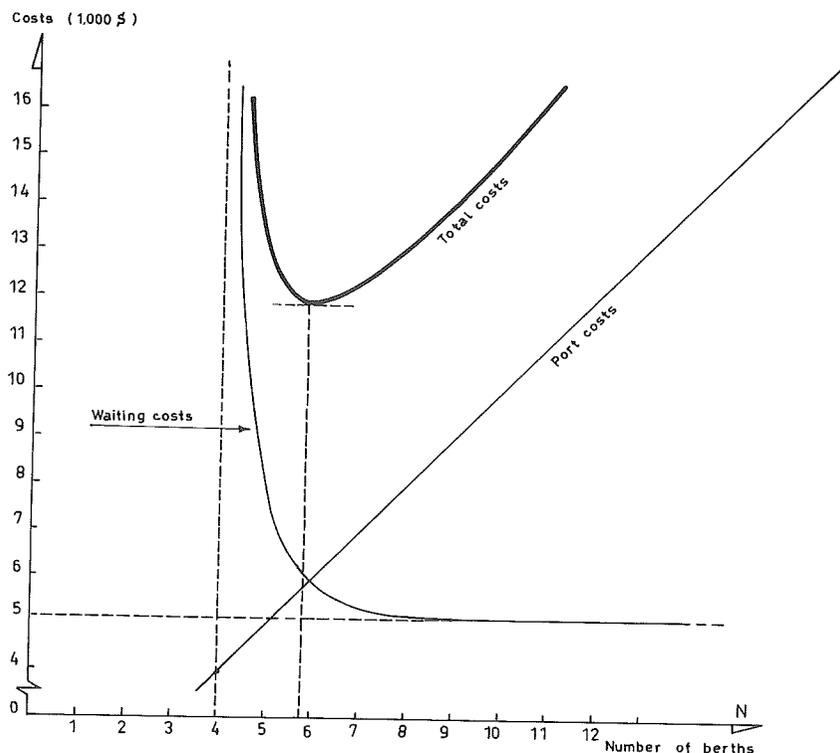
$$\frac{T}{H_s \times 365} = N$$

If the trade in a particular year is 730,000 tons and the handling speed is 500 tons per shipday, four berths could cope with the trade. The utilisation of the port would be 100 per cent, a perfect arrangement from the point of view of the port authority.

The situation is less attractive, however, for shipowners, because the possibility of finding a vacant berth is zero. Long waiting will occur unless perfect scheduling should be possible or, in the terminology of queueing theory, unless service and interarrival times were constant. In our example that would require all ships to have exactly the same load, say 10,000 tons, giving a service time of exactly 20 days and the interarrival time for ships services by the same berth to be also 20 days. The real world is very different. Ships have different sailing distances, the weather influences the sailing time, and delays may occur in other ports. Only in very special circumstances (for instance for a service between two ports) can arrivals be scheduled. Constant service times are unlikely as well, because ships differ in size, lot sizes vary, and delays (e.g. rain) occur often.

Four berths, in our example, thus would cause waiting of ships. Apparently there is a conflict of interests here. The port would like to see a high utilisation of facilities as this reduces the cost per ship served. Shipowners, on the other hand, want a low occupancy, because that reduces the probability of their ships having to wait for berth. This conflict of interests is schematically shown in Figure 2.

**Figure 2. PORT COSTS AND WAITING COSTS VARYING WITH THE NUMBER OF BERTHS**



The picture shows port costs \*) increasing with the number of berths available and ships' time costs decreasing progressively as more berths come available. Adding ships' cost and port costs together gives total cost, which reaches a minimum with 6 berths available, the *optimum* number. In numerical calculations the optimum is found where marginal costs (cost of adding one berth) equal marginal benefits (waiting costs avoided by adding one berth), a statement which will sound familiar to the reader with some background in economics.

The ingredients needed to calculate the optimum are, then:

- the annual cost of having an additional berth, that is a quay, handling equipment and storage facilities, all with capacities in agreement with the predicted cargo-handling speeds;
- the daily cost of ships in port. It will be necessary to take an average here;
- the expected number of waiting days in a year for different numbers of berths in operation.

As indicated above, the amount of waiting to be experienced depends, apart from berth occupancy of course, on the arrival and service time pattern. This can be measured for the present situation and expressed in frequency distributions. Usually statistics of arrival and departure times of ships are quite reliable, because ships have to pay for the time spent at berth.

For many ports the arrival and service time pattern has been investigated and for general cargo ports the conclusion has invariably been that the arrival pattern is random, following the well-known Poisson distribution. As an example, the following table shows the arrival pattern for the port of Chittagong, Bangladesh, taken from the most recent port study carried out by the Netherlands Economic Institute. \*\*)

#### Arrival pattern Chittagong, 1976

No. of ships arriving the same day	No. of days	% of total	Cumulative percentage	Poisson (cumulative)
0	62	16.9	100.0	100.0
1	112	30.6	83.1	81.9
2	108	29.5	52.5	51.0
3	50	13.7	23.0	24.5
4	26	7.1	9.3	9.5
5	5	1.4	2.2	3.0
6	2	0.5	0.8	0.8
7	1	0.3	0.3	0.2
Total	366	100.0		

Total number of arrivals 626

\*) In reality port costs would show a discontinuous line.

\*\*) Chittagong Port Entrance Study, Annex V, Draft Final Report, May 1978.

When the frequency distribution of service times is investigated, it is normally found that it approaches a negative exponential distribution of the form:

$$P(t) = e^{-st}$$

in which  $P(t)$  is the probability of a ship staying  $t$  days or longer, and  $s$  represents the average service speed (reciprocal of the average service time).

Whilst usually the arrival pattern shows an almost perfect fit with the theoretical Poisson curve, service times often deviate from the simple exponential distribution. Some authors \*) suggest using a more complex formula, viz.

$$P(t) = e^{-Kst} \sum_{N=0}^{K-1} (Kst)^N \cdot \frac{1}{N!}$$

in which  $K$  represents the number of different phases of service. There is a different curve for each value of  $K$  \*\*). Indeed, with ships more phases could be distinguished, such as mooring, opening hatches and rigging ship's gear, cargo handling, closing hatches, and unmooring.

Figure 3 gives a graphical presentation of the service-time pattern (in percentages) found for the port of Chittagong in 1976, together with theoretical distributions for different values of  $K$ .

It is clear that  $K=2$  gives a better fit than  $K=1$ . For service times exceeding the average (6 days) the  $K=3$  curve fits nicely.

The figure also gives the "curve" for  $K = \infty$ , which represents the situation of all service times being equal (constant service time).

If the distribution of service and inter-arrival times can be represented by a (relatively simple) mathematical expression like the Poisson formula and the exponential distribution, expected waiting can also be expressed mathematically \*\*\*). It then appears that waiting is a function of the berth occupancy ( $B$ ) and the number of berths ( $N$ ). For the application of the formula it is convenient to express waiting as a percentage of service time. With Poisson arrivals and a service time pattern following a negative exponential distribution ( $K=1$ ) the mathematical expression is:

$$T_w / T_s = \frac{(B \cdot N)^N}{N (1-B)^2 N!} \bigg/ \left( \frac{(B \cdot N)^N}{(1-B) N!} + \sum_{i=0}^{N-1} \frac{(B \cdot N)^i}{i!} \right)$$

in which:

$T_w$  = waiting time  
 $T_s$  = service time

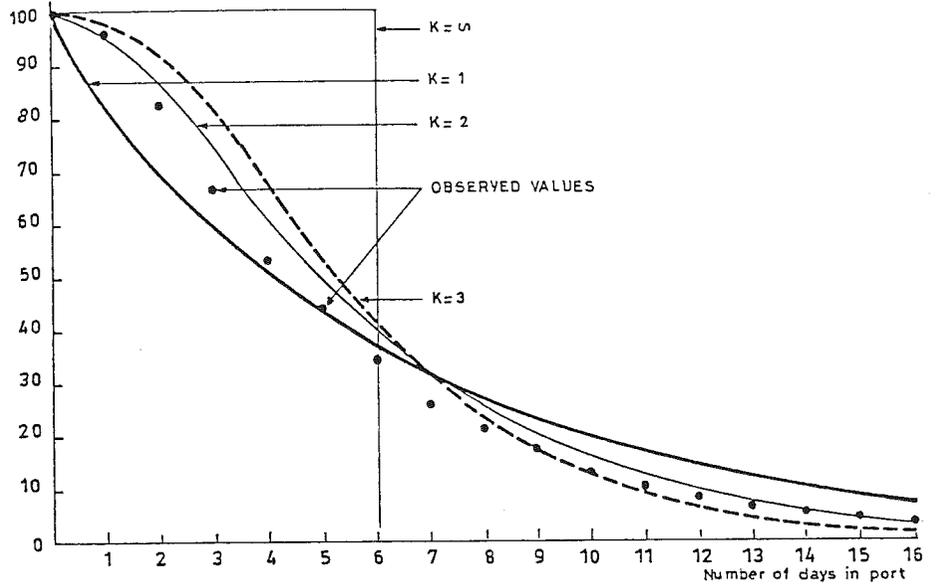
$B$  = berth occupancy (.5 = 50 per cent)  
 $N$  = number of berths

\*) See for instance J. D. Mettam, Forecasting delays to ships in port, The Dock and Harbour Authority, April 1967.

\*\*\*) In case of  $K=1$  the formula reduces to a simple exponential distribution.

\*\*\*\*) See for instance: P. M. Morse, Queues, Inventories and Maintenance, 1958.

Figure 3. SHIP SERVICE PATTERN CHITTAGONG, 1976



Coming back now to the example on page 87, we can estimate waiting time for different numbers of berths available, using the formula. If the idle cost of ships and the annual cost of an additional berth are known, we can also calculate the optimum number of berths. That is done below, on the assumption that berth costs are \$ 1 mln per year per berth, and average ship's cost \$ 3,500 per day.

Table 4.1. Calculation of optimum number of berths

N	Service time (days)	Berth occupancy B (%)	$T_w/T_s$ <sup>a)</sup> factor	Time in <sup>c)</sup> port (days)	Ships' costs (1,000\$)	Port costs (1,000\$)	Total costs (1,000\$)
4	1,460	100	∞	∞	∞	4,000	∞
5	1,460	80	0.554	2,269	7,942	5,000	12,942 <sup>b)</sup>
6	1,460	67	0.142	1,668	5,838	6,000	11,838
7	1,460	57	0.045	1,526	5,340	7,000	12,340
8	1,460	50	0.015	1,481	5,185	8,000	13,158
9	1,460	44	0.005	1,467	5,134	9,000	14,134
10	1,460	40	0.001	1,462	5,117	10,000	15,117

a) rounded    b) optimum    c) waiting + service time

The result is that total costs reach a minimum with 6 berths in operation. \*) The berth occupancy is 67 per cent and waiting amounts to 14 per cent of service time.

As was already suggested above, sometimes a service time pattern is found which is "better" than random, in the sense that it will produce less waiting than the formula would indicate. In the extreme case of constant service times (when  $K = \infty$ ), waiting is half that for  $K=1$ . \*\*) In practice, when a service time pattern is found which shows a tendency towards constant service times (as found for the port of Chittagong), the theoretical  $T_w/T_s$  factor is reduced somewhat, for instance by 25 per cent. Thus the optimum number of berths is reduced, but the effect is slight because of the steep slope of the waiting cost curve. In our example, if waiting were reduced by 25 per cent, the optimum number of berths would still be six.

Supposing that the port indeed possesses 6 berths, we can estimate in a similar way as above when a seventh berth will be needed. That is done in Table 4.2, where the assumption is made that the trade will grow by five per cent per year.

**Table 4.2. Timing of port capacity extension**

Year	Trade (1,000t)	Berth occupancy		$T_w/T_s$		Waiting cost savings (1,000\$)
		N=6	N=7	N=6	N=7	
1	730	67	57	0.146	0.044	522
2	767	70	60	0.187	0.059	685
3	805	74	63	0.259	0.077	1,023
4	845	77	66	0.333	0.101	1,369

When the annual costs of an additional berth amount to \$ 1 mln per year, the conclusion is that a seventh berth should be available in year 3, or in year 4 if waiting were 25 per cent lower than predicted.

In the same way it is possible to determine when an eighth, ninth etc. berth is to be built, given the trade forecast, and so to establish the optimum investment plan over time.

A complication arises when it is cheaper to build two (or more) berths simultaneously. Net present value calculations of the alternative construction schemes are then needed to find out what is the best course of action.

The amount of arithmetics needed to determine the optimum path of development is considerable and it would be useful if generalisations could be made regarding the optimum berth occupancies with different numbers of berths installed or, alternatively, regarding an acceptable level of ships' waiting in a port (waiting expressed as a

\*) See also Figure 2.

\*\*) See J. D. Mettam, Forecasting delays to ships in port.

percentage of service time). In port-study reports statements on the "maximum practical berth occupancy" are sometimes found, usually referring to "previous experience" or based on even less convincing reasoning. Occasionally it is stated that waiting should not exceed 10 per cent of service time. From the foregoing it will have become clear that general statements on optimum berth occupancy for different ports can only be made if port costs are similar (unlikely because of differences in natural conditions for one thing) and the average ship's costs are the same. The same applies to the "acceptable level of waiting", because this depends, *ceteris paribus*, on the number of berths. In our example the optimum berth occupancies and  $T_w/T_s$  values are:

<u>N</u>	<u>Optimum berth occupancy (%)</u>	<u><math>T_w/T_s</math></u>
1	58	1.38
2	63	0.66
4	70	0.36
6	74	0.26
9	77	0.18

The level of acceptable waiting clearly goes down with an increasing number of berths and it is impossible to give an acceptable level of waiting.

So much for the optimum number of berths. Another application of queuing analysis in port studies is the assessment of the optimum degree of mechanisation (if the cargo handling speed varies with that degree), or the number of equipment to be installed on a berth, such as container cranes. The trade-off calculations are then between additional equipment costs and total ships' time, because in those cases the service time varies as a function of equipment installed.

#### 4.2. Simulation

There is no doubt that queueing analysis is a powerful tool in port planning. It can be used in many cases and is relatively cheap to apply.

There are limitations, however, and to show these the assumptions explicitly or implicitly introduced above are listed again here:

- 1) The rate of arrival is a random function following the so-called Poisson distribution, with the arrival time of one ship not affecting that of any other;
- 2) Service times of vessels are independent of each other and follows a negative exponential distribution (Erlang  $K=1$  distribution);
- 3) Berths are identical (interchangeable), having, for instance, the same depth alongside and the same handling speed. \*)

---

\*) In the example we assumed a handling speed of 500 tons per shipday for old and new berths alike.

Quite often reality differs so much from the theoretical situation that the theory cannot be applied.

If assumptions 1) and 2) are violated it is sometimes possible to represent the process by another formula and to arrive at a waitingtime model that is mathematically tractable \*), or to apply some correction, as suggested above. When a port has separate berths for, say, ocean-going vessels and coasters and barges, coasters being allowed to use ocean berths, but not vice versa, there is no satisfactory way to apply queueing analysis. A similar problem arises when different berths (or ships) have different handling speeds. Then the only solution is to simulate the process (arrivals, service times), introducing the different handling speeds or different depths alongside berths into the simulation model. If time and resources stretch to building a computer model, various problems queueing theory cannot solve to satisfaction, can still be tackled. It is then possible, e.g., to deal with arrival and service patterns differing from those specified above and with berths which are interchangeable for one type of ships but not for another.

Different handling speeds for different ships and different berths can also be introduced. A special problem in this respect is lighterage (usually with handling speeds lower than those of dock-handling), often a realistic alternative for extending the port's capacity. \*\*) Simulation is also the most appropriate way to deal with the optimum size of storage, being determined by two flows (in and out), both of which may behave in a stochastic way.

In conclusion it may be said that simulation certainly is a method superior to queueing analysis. A disadvantage, however, is that building and testing the model is time consuming and costly and that appropriate facilities are not everywhere available.

## 5. SOME CONCLUDING REMARKS

It has emerged from the previous chapters that planning a port requires inputs from several disciplines. The basis of a planning exercise is the traffic forecast. If that part is weak, the whole analysis is weak no matter what planning techniques are applied. Trade-forecasting models can be useful, but it must be realised that it is impossible to predict all trade-determining variables (the political situation for instance), and generally there is reason to subject the trade forecast to a thorough sensitivity analysis. It is advisable to be reticent rather than too optimistic in trade projection, as it is often less costly to accelerate the execution of a development programme than to create overcapacity.

---

\*) Some results are given in: F. S. Hillier and G. J. Lieberman, Introduction to Operations Research.

\*\*) See: "The optimum port capacity" by Jan de Weille and Anandarup Ray, Journal of Transport Economics and Policy, September 1974, for a queueing-analysis solution.

Traffic allocation can be carried out on the basis of tariffs, the result being a mere prediction of what will happen if there are no changes in transport policy. Using economic costs in the allocation permits the inclusion of policy considerations, such as the desirability to use existing facilities and the labour force in an optimum way.

The services a port renders are not storable and this explains the low utilisation of small ports in particular (1 or 2 berths) in comparison to that of, say, a factory. A port authority anxious to avoid idle capacity will soon be confronted with an increasing queue of waiting ships. The philosophy behind optimum port planning is to try and reconcile the interests of the port and the port users, and the method is to minimise, over time, the total systems costs.

A problem is that the demand for port facilities fluctuates. Short run fluctuations often cannot be predicted, because of their stochastic behaviour. Queueing theory has developed some mathematical models which allow estimating the waiting costs of ships in different circumstances.

Queueing analysis can be used successfully in optimum berth planning if the assumptions underlying the theory are more or less in agreement with reality. If not, a computer simulation programme is the alternative.

## AIR TRANSPORT IN DEVELOPING COUNTRIES

by  
*A. J. Ganzeboom*  
*KLM, The Netherlands*

Almost every aspect of a country's economic and social development requires transport. In putting products on the market in that country and in the region, it promotes agricultural and industrial productivity and helps prevent political and economic isolation. Transportation plays a key role in obtaining raw materials and equipment and opens a country to forestry and mining.

Obviously, air transport holds its own alongside ground and water transport.

Third world countries do not have to take the traditional path in building up their transportation systems as the United States and Europe did. In many aspects, these systems developed simultaneously with the progress of transport technology. Third world countries now have the most modern transport possibilities at their disposal, limited only by the funds available and allocated.

Furthermore, aviation could possibly meet transport needs with relatively few infrastructural resources if there is no network of highways and railways. Building highways and a rail system requires high investment during the first 10 - 20 years of growth in countries with relatively thin long-distance traffic flows. Passenger air transport therefore could be substantially cheaper and more effective, in spite of the cost per ton-kilometer being higher.

Topography also plays an important role, since island states such as Japan, the Philippines, Indonesia and Greece could not be fully developed without aviation. The same holds true for very large or very long stretched countries.

It is questionable whether India would choose to build such an extensive rail network, which it inherited from its colonial period, if now confronted with this choice. In Nigeria, some 15 million passengers travel by train for an average of not even 50 kilometers. For longer distances there are not even 15,000 first class train passengers per year. However, in 1976 some 600,000 passengers flew an average of 500 kilometers on domestic services in Nigeria.

Topography and climate permitting, most developing countries would prefer aviation for passenger, mail and high-value cargo transport on longer distances, if not otherwise bound or influenced historically.

The advantage of passenger and mail transport by air is that it can be set up very selectively within a relatively short period of time without high infrastructural expenses. Specific needs determine the size of aircraft utilised. Indonesia's domestic air network, for instance, developed into one of the largest and best functioning air transport systems in Asia within a period of eight years.

In the 50's and 60's, the United Nations, ICAO and Worldbank sponsored air transport development plans for many third world countries, giving priority to domestic transport development. Afterwards, domestic air transport is expanded to regional transport and finally to intercontinental.

The plans recommended centralising the air network in the capital and perhaps centres of regional government, industry, trade and transport; these should be connected with the most important population centres in the provinces. The network could then be operated with suitable medium-sized twin-engined turbine or jet aircraft.

Remoter areas around provincial capitals and mining and forestry areas could be served by small aircraft (bush-flying), connecting with the central air network.

The number of airlines and of aircraft types should be limited to two or three because of high investment costs in aircraft, spare parts, maintenance and pilot training centres, not to forget the scarcity of management and technically schooled personnel. Obviously domestic air transport development should be considered simultaneously with that to neighboring countries (region). The type of aircraft used on domestic trunk routes can often also be used for regional flights or vice-versa.

Taking part in intercontinental long-distance aviation is no direct necessity for any country, with the possible exception of inexpensive air transport between a mother country and very large emigrant populations abroad. Even this could be entrusted to foreign scheduled or non-scheduled airlines, but cost and national sentiment do play a role.

Every country, region and world area requires different development and size of regional and intercontinental long-distance transport. This difference is partly due to the degree of commercial, industrial and tourist development of the specific country and of its region. The political choice, on which that country's economy and trade is based, also influences the development of its air transport.

For the most part, the development of regional and international air transport in countries whose economy is based on state socialism or on a very centralistic military regime, lag behind countries based on complete or largely free economy with much less direct government control.

Obviously, political and economic stability have great influence on the growth of air transport to and from other countries.

New states rarely entrust domestic transport to a foreign country. Almost always air transport between neighboring countries is operated by the two national airlines concerned. It is surprising that small countries such as Singapore, Hong Kong, Kuwait and Bahrein – all without domestic aviation – are able to participate on a relatively large scale in regional and intercontinental aviation. On the other hand, there are large, heavily populated countries, such as Peru, Brazil, Egypt and the Peoples' Republic of China which so far participate on a limited scale only.

South America's regional air transport is reasonably well developed, but its intercontinental aviation is limited compared to that of Asia.

Africa's regional air transport is less developed, excepting that of South Africa and Rhodesia. Intercontinental connections are largely limited to former colonial mother countries. This situation is partly because of the British establishment of three regional consortia after World War II — Central African Airways (Rhodesia and Nyasa—now disbanded for political reasons into nine different national airlines. The only consortium and multinational airline left in Africa is Air Afrique, supported by now disbanded for political reasons into nine different national airlines. The only consortium and multinational airline left in Africa is Air Afrique, supported by France. Cameroun left this consortium in 1971, whereas Gabon established its own airline in 1977.

The 45 independent states south of the Sahara have a total population of some 320 million people. 44 of these countries maintain their own airline, most of which operate intercontinentally to the disadvantage of domestic and regional traffic.

Air transport within Africa represents only two per cent of the total world ton-kilometer air traffic, 0.3 per cent for domestic traffic, 1.7 per cent for regional traffic. These figures include those of South Africa and Rhodesia. Intercontinental traffic in Africa represents four per cent of the world total.

#### **PROTECTIONISM IN AIR TRANSPORT DEVELOPMENT BETWEEN THE THIRD AND WESTERN WORLD**

In 1948 the International Civil Aviation Organization (ICAO) set down five basic freedoms for international aviation. Practically every country in the world belongs to this organisation and recognises at least the first and second freedoms of the air:

1. The right to use the air space above a country within the airways set up for this.
2. The right to use navigation aids, airports and landing aids of a country.
3. The right to carry traffic to another country.
4. The right to carry traffic from another country.
5. The right to participate in traffic between a second and third country.

The third, fourth and fifth are agreed upon bilaterally in treaty form.

Capacity regulation deviates from treaty to treaty. Some countries are more liberal about production capacity (flight frequency and aircraft type) than other countries, which may even be very restrictive about navigation and landing rights for technical reasons.

Usually the more economically strong countries in the West are the more liberal. Many state-socialistic and developing countries are less liberal, except for some countries which depend heavily on tourism, foreign trade and industry.

Countries are becoming more and more restrictive in order to protect the operations of their national airline(s). This amounts to concentrating on a few selected airports in the West and sharing capacity and traffic available on a basis of strict parity and reciprocity. These tendencies hinder the development of inexpensive long-distance flight operations and make it impossible to maintain higher frequency and regular long-distance operations between countries with limited potential, situated in different continents.

Low cost carriers from developing countries are capable of offering seats and cargo capacity to the West's large markets below the cost of those of the western airlines.

### **FLEET FINANCING**

Developing countries are directly confronted with the problem of financing their capacity: fleet, spare parts, hangars, workshops, handling equipment. Sometimes, the countries are able to finance this themselves. If the country is receiving considerable support from the West, Worldbank and IMF often have a deciding vote in setting the priorities.

International aid funds, often from the country which manufactures the aircraft, usually finance domestic and regional fleet for the poorest countries. This is a form of direct bilateral aid.

After the donor country has marketed and financed its aircraft, additional aircraft of the same type are often financed by the developing country itself.

Soft loans with ample grace periods represent another form of inexpensive financing. Various western countries act as intermediaries for low interest loans, otherwise unattainable for the developing country on the international money market. In the United States this is the Export-Import Bank, in England the Export Development Council, in the Netherlands IFO.

Lease-purchase, in which the airline pays for its fleet in some eight to twelve years to the leaser (bank or airline), is another possibility, usually at conditions not feasible on the open capital market.

Simple leasing is also another means of financing. As with lease-purchase, the lessors assume that the commitments can be met from the traffic revenues.

Japanese financing companies have recently started to offer lease-purchase aircraft to airlines in developed and half-developed countries. They buy aircraft in the United States in order to improve the unfavorable balance of trade and payment between the two countries.

The Japanese capital market and the strength of the Yen make it possible to compete favorably in the 2nd and 3rd world.

## OPERATING AN AIRLINE IN THE THIRD WORLD

Civil aviation is a very highly developed industry, requiring well-educated and trained staff in upper echelon and production positions. Literacy is a must, even for ground handling personnel.

Adequately manning management, operational and technical functions represents the biggest problem for airlines in developing countries. Obtaining the right people to do the jobs is often more difficult than the arrangements to finance fleet and other equipment. This problem is enlarged when participation in international flight operations is undertaken with the introduction of additional and more sophisticated aircraft types.

Upper management positions are often filled by political appointments; this may be due to a lack of sufficiently experienced management potential within the airline and to the general scarcity of personnel having a university degree.

In some cases rapid changes in an airline's top management are caused by government instability or dissatisfaction with the policy of the airline, which may also lack clarity. Obviously this undermines longrun operations, as well as the daily course of affairs.

In these countries, where the airlines generally are government sponsored, unclear relations between government, ministries involved and airline management may pose a second threat for effective operations.

For a government sponsored airline the ideal situation would be to operate independently within the framework of a carefully described transport task, in which capacity, revenue and cost targets are agreed upon.

The relation between national airline and controlling/supporting government offices (Civil Aviation Board, Airport Authorities, Foreign Affairs) should be set down carefully.

Management of a airline should preferably operate independently under the supervision of a board whose majority is made up of government officers and has representation from the banking, industrial and trade union world. When management is not able to operate independently enough, impractical situations can arise. Transport of government or military personnel is sometimes never reimbursed — or only years later. Aircraft purchase is sometimes insufficiently based on careful budgetting or planning. For example, a newly established airline in a developing country acquired a Boeing 747 and a DC-10. This required high investments in spare parts and engines per type, not to mention separate training of flight and maintenance personnel, which did not allow for the possibility of interchanging aircraft and personnel.

The drain of well-trained and experienced staff is another problem developing country airlines have to cope with. Flight and technical ground staff are often bought away after expensive company-paid training by other airlines or companies in their own country or a neighboring country. For example, there is considerable movement of well-trained and experienced airline personnel to the Gulf States.

If possible, a contract should be drawn up so that staff will continue to work for a number of years after their training. Legal ratification of this set-up would increase its effectiveness.

The new national airlines which were established after the disbanding of the Africa regional consortia, experienced difficult personnel problems, since most were used to working in a large scale organisation where duties were divided amongst more employees in the various countries. Smaller scale operations gave rise to tremendous management and staff problems.

When Bangladesh seceded from Pakistan, the newly established BIMAN airline was confronted with large gaps in its management staffing. Malaysian Airlines System has had a staff problem for some years after the 1970 split of Malaysia-Singapore Airlines into SIA and MAS.

Operating an airline in the third world successfully depends greatly on the availability and right choice of highest level management. This group should exhibit good leadership qualities and be supported by their government.

#### **CONTRACTING WORK**

During the initial establishment phase or later, after serious problems in day-to-day operations, young third world airlines often realise the necessity of farming out operations and/or technical maintenance work. The duration and extent of this contract work is again dependent on the degree of presence of management staff that is university or professionally educated.

The survey below indicates the scale, degree and branch of assistance to African airlines from western airlines.

## Leading carriers of Sub-Saharan Africa

Airline (founded)	Government/state participation % (and other %)	Outside assistance			
		G - General	T - Technical	F - Financial	E - Maintenance
Air Afrique (1961)	approx. 70*	E	-	KSSU Group (KLM, UTA, Swissair, SAS)	
Air Botswana (1972)	100	T	-	Zambia Airways	
Air Burundi (1971)	100	F	-	French Government	
Air Centrafrique (1966)	100	T	-	UTA, Air Afrique	
Air Comores (1977)	100	M,T	-	Air France	
Air Djibouti (1962)	36,33 (Air France 32.29)	M,T	-	Air France	
Air Gabon (1951)	approx. 50 (Air France 30) (Air Afrique 14.5)	E	-	Air Madagascar	
Air Guinée (1960)	100	M,T	-	Air France	
Air Ivoire (1960)	100	E,I	-	Air France, Boeing	
Air Liberia (1949)	100	G	-	USSR Government	
Air Madagascar (1962)	66.10 (Air France 30.18)	No data			
Air Malawi (1964)	100	M,T	-	BCal	
Air Mali (1960)	100	G	-	Air France	
Air Mauritania (1962)	60 (Air Afrique 20) (UTA 20)	G,E	-	BCal, British Airways	
Air Mauritius (1967)	42.5 (British Airways 15) (Air France 15) (Air India 10)	M,T	-	World Airways	
Air Niger (1966)	50.5 (SODETRAF 22.5) (Air Afrique 22.5)	M,T	-	Air France, UTA	
Air Rhodesia (1967)	100	E,I	-	Hughes Airwest	
Air Senegal (1971)	50 (Air Afrique 40)	G	-	British Airways, Air France, Air India	
Air Tanzania (1977)	100	G	-	Air France, UTA (through SODETRAF), Air Afrique	
Air Tchad (1966)	64 (UTA 36)	F,M,I	-	Finnish Government/Finnair Neth. Govt/KLM	
Air Togo (1965)	n/a	T	-	UTA	
Air Volta (1967)	66 (Air Afrique 17) (SODETRAF 17)	G	-	Air Afrique	
Air Zaïre (1961)	80 (other state and local interests 20)	G	-	Air Afrique, SODETRAF	
Angola Airlines - TAAG (1938)	51	E	-	Sabena, UTA, Aer Lingus	
Cameroon Airlines (1971)	70 (Air France 30)	I	-	Nigeria Airways	
DETA - Linhas Aereas de Mocambique (1936)	100	M,T,E	-	Air France	
Ethiopian Airlines (1945)	100	I	-	Aer Lingus	
Gambia Airways (1964)	60 (BCal ?)	E	-	SAA	
Ghana Airways (1958)	100	-			
Kenya Airways (1977)	100	G	-	BCal	
LAGE - Liness Aereas Guinea Ecuatorial (1970)	n/a (Iberia n/a)	T	-	Hughes Airwest	
Lesotho Airways (1971)	100	M,T	-	Aer Lingus	
Lina Congo (1961)	66	G	-	Iberia	
Nigeria Airways (1958)	100	-			
Sierra Leone Airways (1958)	51 (BCal 43)	G	-	SAA	
Somali Airlines (1964)	51 (Alitalia 49)	G	-	Air Zaïre	
South African Airways (1934)	100	M,I	-	Air India, KSSU	
Suidwes Lugdiens (1946)	-	E,I	-	Aer Lingus, KSSU	
Swazi Air (1965)	100	G	-	BCal	
Transkei Airways (1976)	100	G	-	Alitalia	
Transportes Aereos de Guinea-Bissau (1975)	100	-			
Transportes Aereos de Cabo Verde - TACV (1955)	100	G	-	SAA	
Uganda Airlines (1965)	100	G	-	SAA	
Zambia Airways (1967)	100	G	-	SAA	
		G	-	Portuguese Government	
		G	-	TAP and Portuguese Government	
		E	-	ATEL/Aer Lingus	
		E,T	-	Aer Lingus	

Notes n/a - not available; \* Air Afrique is owned jointly by SODETRAF (Société pour le Développement du Transport Aérien en Afrique) and the governments of the following states: Benin, Congo, Central African Empire, Ivory Coast, Upper Volta, Mauritania, Niger, Senegal and Chad.

This kind of assistance is now beginning to represent a substantial source of revenue for western airlines. Because of the need to farm out this work to technically established airlines, a degree of dependency on the West remains.

### **SETTING UP AIRCRAFT MAINTENANCE AND PILOT TRAINING CENTRES ON A REGIONAL BASIS IN THE THIRD WORLD**

Obviously, third world airlines will try to take over contracted services as quickly as possible – not only to terminate the dependency on western airlines, but also to diminish expenses in hard currency, and to increase job opportunities in their own country and the transfer of knowledge and experience.

During the first years, this will often not be possible – too few aircraft of one type (economy or scale), lack of properly trained and experienced staff and no financial means for setting up hangars, workshops, pilot training centres, etc.

Regional cooperation is a point of consideration. However, the recent nationalistic disbanding of regional consortia, the problem of interchangeability of work and, sometimes, the lack of confidence in the quality, is a delay factor in setting up regional aircraft maintenance and pilot training centres.

Establishment and growth of a modern air force with its inherent fleet maintenance and pilot training could be of substantial aid in making the step towards more independence of airlines in developing countries.

## EUROPARUBRIEK

*door Mr. J.G.W. Simons*

### DE EUROPESE VERVOERSINTEGRATIE, PERIODE 28 NOVEMBER 1978 TOT 15 FEBRUARI 1979

#### Ten Geleide.

Met genoegen is het verzoek van de redactie aanvaard om, zoals in het verleden geschiedde, wederom per kwartaal aandacht te besteden aan het verkeer en vervoer in de Europese integratie.

De jaarlijkse bijdrage in het vierde nummer van de hand van Mevr. Mr. Olga D. Gerbers zal overigens in deze rubriek blijven verschijnen; de kwartaaltekst zal zich meer tot feitelijkheden beperken, ofschoon uiteraard zo nu en dan niet aan enig commentaar kan worden ontkomen.

Gestart wordt met 28 november 1978, teneinde aan te sluiten bij het vorig nummer.

De rubriek bevat naast een algemene paragraaf, waarin de behandeling van de hoofdlijnen staat vermeld, een paragraaf infrastructuur, wegvervoer, binnenvaart, spoorvervoer, scheepvaart, luchtvaart en diversen.

De paragrafen bevatten allereerst besluiten, voorstellen en dergelijke, van de diverse instellingen en sluiten af met een overzicht van de parlementaire vragen, die op het desbetreffende terrein zijn gesteld, zonder overigens volledigheid te claimen.

Moge deze systematische weergave van gebeurtenissen op het vlak van de Europese vervoersintegratie — hoe bescheiden ook — bijdragen aan de verwezenlijking ervan.

#### Algemeen

Tijdens deze verslagperiode heeft vooral het Europese Parlement zich voorvechter van de vervoersintegratie getoond. Tijdens de vergadering van het Europese Parlement van 15 tot 19 januari is aan de hand van een verslag \*), namens de Commissie voor Regionaal Beleid, Ruimtelijke Ordening en Vervoer met als rapporteur de heer Seefeld, een resolutie over de stand en ontwikkeling van het gemeenschappelijk ver-

---

\*) Document 512/78 van 5-1-1979, PE 54.492/def., Europees Parlement, Zittingsdocumenten.

voerbeleid aanvaard. \*). Daarin gaat het Parlement zo ver dat het zich het recht voorbehoudt om onmiddellijk na de rechtstreekse verkiezingen na te gaan of een beroep tegen de Raad moet worden ingesteld wegens nalatigheid inzake het gemeenschappelijk vervoerbeleid.

Een dergelijke actie \*\*) heeft reeds in het verleden gespeeld, maar toen werd besloten om, in plaats van een klacht in te dienen, eerst een nieuw initiatief-verslag over de grondbeginselen van het vervoerbeleid op te stellen, hetgeen tot onderhavig verslag heeft geleid.

Daarin wordt geconstateerd, dat men het in het verleden niet eens is kunnen worden over de grondbeginselen van het vervoerbeleid. "Overlegprocedures vinden slechts met tegenzin plaats. Voorschriften op het gebied van concurrentie monden uit in een lakse controle op misbruik. Een harmonisatie van de specifieke belastingen op het vervoer (wegenbelasting en belasting op minerale oliën) is niet tot stand gekomen. De harmonisatie van het ingrijpen van de overheid heeft geen oplossing gebracht voor de oneigenlijke taken van de spoorwegen, noch de tekorten weggewerkt, echter in het kader van het vergelijkbaar maken van de jaarrekeningen slechts een grootscheepse algemene omboeking veroorzaakt. Over de onder de druk van verkeersrampen uitgevaardigde sociale wetgeving voor het wegvervoer lopen de meningen uiteen en deze wordt sedert enkele jaren eerder afgezwakt dan uitgebreid. Er bestaat geen gemeenschappelijk wegenbouwprogramma, alleen maar een raadplegingsprocedure, die tot dusver niet heeft gefunctioneerd en waarvan de herziene versie zich eerst nog moet bewijzen. Een stelsel voor de toerekening van de kosten van de weg werd niet ingevoerd. Er bestaat geen gemeenschappelijk prijsbeleid, afgezien dan van de successen van de EGKS (directe tarieven en vermindering van de uitzonderings- en steuntarieven), de vermindering van discriminaties in de spoorwegtarieven en een tegenstrijdig stelsel voor het internationale vervoer over de weg. Er bestaat geen capaciteitsbeleid, afgezien dan van het minimale communautaire contingent voor het internationale goederenvervoer over de weg. Een vrijere gemeenschappelijke vervoermarkt, die de kenmerken van een binnenlandse markt heeft, is niet in zicht, slechts enkele soorten van vervoer in de, in de nabijheid van grenzen gelegen gebieden en een aantal soorten bijzondere transporten, werden geliberaliseerd. De belangrijkste beslissing op het gebied van de technische harmonisatie, namelijk die met betrekking tot de maximale afmetingen en gewichten van motorvoertuigen, is niet genomen". "Bij het zeescheepvaart- en havenbeleid kent men slechts een overlegprocedure inzake de betrekkingen tussen de lidstaten en derde landen op het gebied van het zeevervoer, die eerst nog haar deugdelijkheid moet bewijzen, doch waarvan men vooral reeds kan zeggen dat zij, bij gebreke van een intern beleid van de Gemeenschap voor de scheepvaart en havens, geen grote resultaten kan hebben, aangezien het aan geloofwaardigheid ontbreekt. Daarnaast heeft de Gemeenschap een begin gemaakt met

---

\*) P.B. nr. C; 39/16 van 12/2/79.

\*\*) Document 202/76.

werkzaamheden betreffende de veiligheid op zee (in het bijzonder tankers) en de verdediging tegen de loyale concurrentie van de Oostbloklanden.

Op het gebied van de luchtvaart is de Gemeenschap tot dusver niet eens in staat gebleken om de Europese vliegtuigindustrie te helpen.

Ergo: er bestaat momenteel geen samenhangend gemeenschappelijk vervoerbeleid".

Vervolgens gaat de Europese Parlementaire Commissie in op de wijze, waarop het gemeenschappelijk vervoerbeleid kan worden ontwikkeld, waarbij zij er vooral op wijst dat zij "een opstelling ten gunste van kleine stappen van de hand wijst, omdat dit het gemeenschappelijk vervoerbeleid enghartig slechts als correctie op de bestaande vervoersregelingen in de lid-staten beschouwt en niet als doel een werkelijk gemeenschappelijk vervoerbeleid aanvaardt".

De gewenste stand van de integratie zou dié toestand moeten zijn, waarbij omstandigheden voorkomen die lijken op een binnenlandse markt.

"Het is daarom dringend noodzakelijk, gezien de dramatische gevaren, dat een actieprogramma voor het vervoerbeleid wordt opgesteld en bindend gemaakt voor de beslissende instanties".

Dit blokschema dient te worden gebaseerd op een systeemanalyse en een toelichting van het verband van de verschillende maatregelen. Het opstellen van dit blokschema van gemeenschappelijk vervoerbeleid is weliswaar de taak van de Commissie, doch het Parlement geeft in zijn verslag de grote lijnen van het blokschema aan.

Ten aanzien van het *wegvervoer* wordt als primair vraagstuk de kwestie van de afmetingen en gewichten gezien, daar het een hoeksteen vormt voor het *wegvervoer*beleid. Het daarna volgend probleem is logischerwijs het invoeren van een gemeenschappelijk toerekeningsstelsel voor de infrastructuur, overigens ingepast in een plan voor de coördinatie van alle takken van vervoer. Een volgende stap is dan een gemeenschappelijke heffing waaruit een harmonisatie van de motorrijtuigenbelasting, belasting op minerale oliën en tolgelden voortvloeit.

Voor wat betreft de *binnenscheepvaart* ziet het Parlement als eerste taak de vrijheidsbeginselen van de Acte van Mannheim uit te breiden tot de gehele Westeuropese binnenscheepvaart met aanpassing van de bepalingen van de Rijnregelingen aan de moderne tijd. Slechts dan is het mogelijk met een plan op langer termijn te komen voor een capaciteits- en prijsbeleid in de binnenscheepvaart. Een en ander is nauw vervlochten en zal slechts lukken, indien ook de concurrenten van de binnenscheepvaart volledig bijdragen aan de kosten van de weg. Bij de spoorwegen betekent dit: sanering van de financiën en stopzetten van de subsidiëring.

Bij de sanering van de *spoorwegen* constateert de Parlementaire Commissie een vrijwel volledige doch niet toegepaste wetgeving.

Slechts een internationale vervlechting van de spoorwegen kan een oplossing bieden wanneer het saneringsbeleid maar niet in kleine stukjes wordt gesplitst. Afstemmen

op de toerekening van de infrastructuur voor de andere takken van vervoer is eveneens noodzakelijk.

Ten aanzien van de *havens* wijst de Parlementaire Commissie er op dat in een Europees blokschema overeenstemming in een zeer vroeg stadium over een aantal grondbeginselen op het gebied van het zeehavenbeleid niet mag ontbreken, daar elk onderdeel van het vervoerbeleid belangrijke gevolgen heeft voor de concurrentie tussen de zeehavens.

Bij de *zeescheepvaart* wordt opgemerkt, dat het aanvaarden van een raadplegingsprocedure slechts geldt voor een beleid ten aanzien van derde landen en op de samenwerking in internationale organisaties, doch de kloof die tussen de lidstaten van de Gemeenschap nog bestaat, zal ook moeten worden overbrugd om in het zeevaartbeleid naar buiten geloofwaardig naar buiten te zijn.

Ten aanzien van het *luchtvervoer* zou de Gemeenschap een rationeel stelsel van luchtlijnen in Europa moeten ontwerpen en het geheel van de nationale luchtruimem moeten samenvoegen. Het laatste gedeelte van het bij de resolutie van het Europese Parlement als toelichting gevoegde verslag gaat over voorstellen ter verbetering van de werkwijze en de samenwerking van de instellingen van de Gemeenschap met betrekking tot het vervoerbeleid.

Daarbij stelt zij resumerend voor:

- het Directoraat-generaal Vervoer van de Commissie moet meer personeel krijgen.
- de Commissie moet zich op het gebied van vervoervraagstukken ook collegiaal krachtiger inzetten
- tussen het met vraagstukken op het gebied van vervoer belaste lid van de Commissie en de Ministers van Vervoer dient ook buiten de zittingen van de Raad een voortdurend, goed functionerend contact te worden onderhouden ("rode telefoon")
- bij nieuwe politieke stappen dient de Commissie, zorgvuldiger dan tot dusver, erop toe te zien, dat zij eerst het Parlement en vervolgens de pers mededelingen verstrekt
- de Raad dient de adviezen van het Parlement zorgvuldiger ter kennis te nemen. Om zulks te bereiken dienen deze in de Raad door de rapporteur of de voorzitter van de Parlementaire Commissie te worden ingediend en toegelicht
- in de werkgroep "vervoer" van het Comité van Permanente Vertegenwoordigers dienen de adviezen van het Europese Parlement te worden ingediend en toegelicht door een ambtenaar van het Parlement die door de Secretaris-Generaal zal moeten worden benoemd
- de Raad van Ministers van Vervoer dient vaker, ten minste vier maal per jaar, bijeen te komen
- het Comité van Permanente Vertegenwoordigers (werkgroep "vervoer") dient in het kader van een globale conceptie duidelijke richtlijnen te ontvangen en meer

- speelruimte te worden verleend voor het invoeren van onderhandelingen
- de ambtsperiode van de voorzitter van de Raad van Ministers van Vervoer (en de andere Raden van ressortministers) dient te worden verlengd tot een vol jaar.
  - de conceptie van voorstellen dient niet te worden opgedragen aan de werkgroep "vervoer" van het Comité van Permanente Vertegenwoordigers, doch de taak te blijven van de Commissie
  - de Raad moet niet alleen dan bijeenkomen, wanneer er ondertekeningsrijpe teksten klaar liggen, doch ook om op voorstel van de Commissie oriënterende besluiten te nemen
  - de Raad dient zijn eigen secretariaat op vervoergebied dermate uit te breiden dat daar geen knelpunten ontstaan
  - de werkzaamheden op het gebied van het vervoerbeleid van de Permanente Vertegenwoordigers dienen in meer dan een werkgroep sneller te worden verricht (bijvoorbeeld speciale werkgroepen voor a) zeescheepvaart, b) havens, c) luchtvervoer, d) belastingen op het vervoer en toerekening van de kosten van de infrastructuur, e) verkeersveiligheid, enz.)
  - na de rechtstreekse verkiezingen dient in het Europese Parlement weer een speciale Commissie voor het vervoer te worden opgericht
  - de bevoegde organen van de partijen, fracties en regeringen dienen ervoor te zorgen dat er in het Europese Parlement en in het Economisch en Sociaal Comité een voldoende aantal politici, respectievelijk deskundigen op het gebied van het vervoer aanwezig is
  - het Europese Parlement moet zich het recht voorbehouden op het gebied van het vervoer (en eventueel ook op andere gebieden) op grond van artikel 175 tegen de Raad een beroep wegens nalatigheid in te stellen.

Tot zover de samenvatting van dit initiatief van het Europese Parlement, dat de volle aandacht verdiend.

Het zou overigens misleidend zijn om in deze verslagperiode alleen het Parlement als actief op vervoersgebied te bestempelen.

Immers kort vóór (23 en 24 januari), alsmede kort ná (20 februari) de gestelde periode kwam de Raad van Vervoersministers van de Europese Gemeenschappen in vergadering bijeen en 13 juni wordt reeds genoemd als datum voor een tweede vergadering onder Frans voorzitterschap.

Zou dan toch het Parlement met acties, zoals bovenvermeld, in staat zijn de Raad tot grotere activiteit te dwingen?

### **Infrastructuur.**

De Europese Commissie heeft met verschillende onderzoekbureaus, onder andere het Nederlands Vervoerswetenschappelijk Instituut en het Battelle Institute te Frankfurt, contracten getekend voor het opstellen van een actieprogramma voor de

vervoerinfrastructuur \*). De vier studies betreffen een onderzoek naar de beste methode om de voordelen van belangrijke infrastructuurprojecten voor de Gemeenschap te onderkennen, de toekomstige behoeften op het gebied van het personen- en goederenvervoer over lange afstanden in de Gemeenschap te peilen, de verschillende methoden te onderzoeken om de bestaande infrastructuur maximaal te laten benutten en de mogelijkheden in de Gemeenschap van het nieuwe systeem van gecombineerd spoor/wegvervoer na te gaan.

Interessant is dat bij de eerstgenoemde studie als voorbeeld de weg- en spoorwegverbindingen tussen Engeland en Frankrijk worden genomen.

### **Parlementaire schriftelijke vragen.**

Een vraag (no. 836/78 \*\*) van de heer Inchauspé over de infrastructuur van het vervoer en de waterwegen ontlokt de Europese Commissie de uitspraak, dat zij overweegt binnenkort een voorlichtingsdocument over de rol van de Gemeenschap in de ontwikkeling van de infrastructuur te publiceren. Daarin zullen de beginselen en criteria worden vermeld, doch nog geen standpunt worden ingenomen aangaande afzonderlijke projecten.

Het gemeenschappelijk stelsel van heffingen op het gebruik van de verkeerswegen, waarop een vraag (no. 321/78 \*\*\*) van de heer Seefeld aan de Raad van de Europese Gemeenschappen betrekking heeft, wordt volgens deze Raad — althans wat de bestudering van het desbetreffende commissievoorstel betreft — hervat na definitieve aanneming van de eerste richtlijn inzake de aanpassing van de belastingen op bedrijfsvoertuigen.

De goederendoorvoer door Oostenrijk en Zwitserland, vraag (no. 555/78 \*\*\*\*) van de heer Schyns, doet de Europese Commissie stellen, dat het grootste deel van deze doorvoer afkomstig is uit of bestemd voor de lid-staten van de E.E.G. Deze doorvoer bedroef voor Zwitserland 9,7 miljoen ton en voor Oostenrijk 8,9 miljoen ton per spoor in het jaar 1977, terwijl over de weg in Zwitserland 363.000 ton en in Oostenrijk 14 miljoen ton in doorvoer passeerde.

Het Nederlandse Parlements lid, de heer Noteboom, bracht de Europese Commissie met zijn vraag over E-wegen in Europa (no. 520/78 \*\*\*\*\*) tot de ontboezeming, dat de E-wegen deel uitmaken van nationale systemen. Nu zij meestal ook nationaal van groot belang zijn, blijft de belangstelling voor de E-wegen in de nationale wegenprogramma's wel aanwezig; voor zover van communautair belang regarderden zij ook

---

\*) Agence Europe no. 2602 van 22/23-1-1979, bladzijde 11.

\*\*\*) P.B. no. C 33/11 van 6-2-1979.

\*\*\*\*) P.B. no. 267/9 van 10-11-1978.

\*\*\*\*\*) P.B. no. C 282/51 van 27-11-1978.

\*\*\*\*\*) P.B. no. C 287/14 van 13-11-1978.

de Commissie, die dergelijke projecten op de voet kan volgen via de beschikking van de Raad van 20 februari 1978, waarbij een overlegprocedure en een comité voor de infrastructuur is ingesteld \*).

### Wegvervoer.

Op 19 december 1978 nam de Raad de Richtlijn aan tot wijziging van Richtlijn 75/130/E.E.G., houdende vaststelling van gemeenschappelijke voorschriften voor bepaalde vormen van gecombineerd rail/wegvervoer van goederen tussen de lidstaten \*\*). Hierin wordt het permanent maken van de Richtlijn, alsmede het onder de regeling brengen van gecombineerd containervervoer en afneembare laadbakken zonder steunen, vastgelegd. Voor de achtergronden van de Richtlijn zij verwezen naar bladzijde 378 van het Tijdschrift, 14e jaargang, 1978.

In januari 1979 diende de Europese Commissie een voorstel in voor een beschikking van de Raad met betrekking tot wijziging van het Europese verdrag betreffende de bemanningen van voertuigen in het internationale goederenvervoer over de weg en de toetreding van de Europese gemeenschappen tot het verdrag \*\*\*). De Commissie stelt voor de desbetreffende lid-staten een gemeenschappelijke actie te laten ondernemen, teneinde enige bepalingen van het accoord aan te passen aan de E.E.G.-normen, betreffende de wekelijkse rusttijd, de dubbele bemanning en het gebruik van de tachograaf als controlemiddel. Deze wijzigingen bereiden de weg voor om de E.E.G. als zodanig tot het verdrag te laten toetreden.

Ook heeft de Commissie bij de Raad een voorstel ingediend voor een richtlijn betreffende het eigen vervoer over de weg tussen de lid-staten \*\*\*\*). Doel van de verordening is het eigen vervoer vrij te stellen van elk stelsel van contingentering en vervoersvergunningen, opdat de verlader een vrije keuze blijft houden van het vervoermiddel en soort vervoer, dat het beste beantwoordt aan zijn belangen en behoefte.

Het eigen vervoer is een van de mogelijkheden. Er wordt een definitie van het begrip eigen vervoer voorgesteld. Door middel van een aantal documenten, die op de wagen aanwezig moeten zijn, wordt het controleprobleem eigen vervoer/beroepsvervoer geregeld. De datum van inwerkingtreding is voorzien voor 1 januari 1980. Er is ook een nieuw voorstel uit voor een richtlijn van de Raad betreffende gewichten en andere kenmerken, anders dan afmetingen, voor vrachtauto's \*\*\*\*\*). Deze voorschriften zouden vanaf januari 1983 moeten gaan gelden. Zij hebben betrekking op voertuigen boven 3,5 ton totaal gewicht. Het motorvermogen zal, omgerekend, ten minste

\*) P.B. no. L 54 van 20-2-1978, bladzijde 16.

\*\*\*) P.B. no. L 5/33 van 9-1-1979.

\*\*\*\*) COM (78) 767 def. van 17-1-1979.

\*\*\*\*\*) COM (78) 772 def. van 31-1-1979.

\*\*\*\*\*) P.B. no. C 16/3 van 18-1-1979.

op 7 pk/ton moeten liggen. Het maximaal toegestane gewicht loopt van 17 ton bij een motorvoertuig met twee assen in een combinatie, tot 44 ton bij een 3-assig motorvoertuig met aanhanger of oplegger. De asbelasting mag de 10 ton niet overschrijden met uitzondering van de aangedreven as (11 ton).

In het Europese Parlement heeft de heer Seefeld het Europese rijbewijs beschreven als het symbool van het vermogen van de E.E.G. om aan de inwoners meer vrijheid te geven. Ondanks een uitspraak van november 1978 van het Europese Gerechtshof dat het niet tegen het E.E.G.-verdrag is, wanneer van iedere burger wordt verlangd in een andere lid-staat het aldaar geldende rijbewijs te behalen, voelen Europeanen dit toch strijdig met de geest van de Europese samenwerking.

De heer Bernard-Reymond heeft namens de Raad verzekerd, dat de uitspraak van het Gerechtshof geenszins de belangstelling van de Raad vermindert om tot een Europees rijbewijs te komen.

De heer Burke heeft voor de Europese Commissie erop gewezen, dat de eisen voor de uitgifte van een rijbewijs eerst zullen geharmoniseerd moeten zijn, wil men tot wederzijdse erkenning overgaan \*).

#### **Parlementaire schriftelijke vragen.**

Een tweetal vragen houdt zich met het vervoer van gevaarlijke stoffen over de weg bezig (no. 652/78 van de heer Seefeld \*\*) en no. 509/78 van de heer W. Müller \*\*\*). In haar antwoord stelt de Commissie, dat de internationale regeling aan de essentiële eisen voor de veiligheid voldoet. De Commissie ziet geen aanleiding de lid-staten aan te sporen de bepalingen van de Europese overeenkomst inzake het internationaal vervoer van gevaarlijke stoffen over de weg (A.D.R., in werking getreden in 1968) te wijzigen. Zeven lid-staten van de Gemeenschap zijn partij bij het verdrag, Ierland en Denemarken nog niet, doch zij leven de bepalingen in het algemeen na. De beantwoording van de vraag van de heer Müller geeft de bijzonderheden over de desbetreffende verzekeringsbepalingen in de diverse landen.

Tenslotte zij hier nog slechts aangestipt een vraag van de heer Cot (no. 631/78) \*\*\*\*) inzake de autotunnel van Fréjus (tussen Frankrijk en Italië) en een overzicht van de accijnzen en B.T.W. op de brandstof voor motorrijtuigen naar aanleiding van een desbetreffende vraag (no. 397/78) \*\*\*\*\*) van de heer Ryan.

---

\*) Agence Europe van 15-2-1979, bladzijde 9.  
\*\*) P.B. no. C 310/9 van 28-12-1978.  
\*\*\*) P.B. no. C 310/2 van 28-12-1978.  
\*\*\*\*) P.B. no. 287/22 van 30-11-1978.  
\*\*\*\*\*) P.B. no. C 5/3 van 8-1-1979.

## Binnenvaart.

In de binnenvaartsector voerde, wat betreft de Europese instellingen, het Parlement actie. Tijdens de december-zitting lukte het het Nederlandse Parlements lid Albers een resolutie \*) aangenomen te krijgen over de problemen bij de toerbeurtregeling Noord-Zuid voor schippers met de oproep aan de Europese Commissie om mede te werken aan het tot stand komen van onderhandelingen tussen de bevoegde autoriteiten en de bedrijfstak en haar goede diensten aan te bieden.

In de januari-vergadering moest de heer Albers constateren, dat de rol van de Commissie niet aan zijn verwachting had beantwoord. "Ik had in deze zaak een actievere rol van de Commissie verwacht, omdat nu eenmaal de particuliere binnenschippers — en dat is zo merkwaardig — juist om Europese oplossingen vragen" \*\*).

De Organisatie van Europese Schippers heeft, nadat de Raad en de Europese Commissie zich hierover reeds hadden uitgesproken, een verklaring uitgegeven, waarin zij zich uitsprekt voor een Europees vergunningenbeleid, teneinde de Westeuropese scheepvaart te behoeden voor een te grote concurrentie van de Oostblokvloten. De Raad heeft een wijziging van de Acte van Mannheim in haar zitting van 23 en 24 november goedgekeurd, terwijl de Europese Commissie op een schriftelijke vraag (no. 596/78) \*\*\*) van de heer Fuchs heeft geantwoord, dat de Europese Commissie zich bewust is van de prijzenslag die na de opening van het Rhein-Main-Donaukanaal tussen ondernemers van het westen en het oosten zou kunnen plaatsvinden. De Commissie beoogt een regeling die de vervoerders en verladers van de lid-staten niet zal schaden. Voor de tweede helft van 1979 heeft de Commissie op het punt van de toegang tot de markt van de binnenscheepvaart voorstellen voor een algemene reglementering aangekondigd \*\*\*\*).

## Parlementaire schriftelijke vragen.

De heer Albers dwong overigens de Commissie met een vraag (no. 695/78 \*\*\*\*\*) zich te uiten over de sanering in de tankscheepvaart. Daarbij kwam naar voren, dat de Commissie niet officieel in kennis is gesteld van de besprekingen over een internationale vrijwillige sloopactie. Een dergelijke actie, indien deze een vaste vorm aanneemt, zal zij wel onderzoeken op het punt van overeenstemming met de mededingingsregels.

\*) P.B. no. C 6/90 van 8-1-1979.

\*\*\*) Europa van morgen, no. 3, 93 jaargang, pagina 33.

\*\*\*\*) P.B. no. C 287/20 van 30-11-1978.

\*\*\*\*\*) Agence Europe van 15-2-1979, bladzijde 11.

\*\*\*\*\*) P.B. no. C 310/14 van 28-12-1978.

## Spoorwegen

De Europese Commissie diende een wijziging van haar voorstel betreffende de invoering van een boekhouding van de uitgaven voor de wegen in \*). Het betreft een technische aanpassing van de lijst van spoorwegen in Duitsland en Italië met de netten voor het openbaar verkeer, aangesloten op het hoofdnet.

Het Publicatieblad bevat verder de beschikking van de Commissie van 16 november 1978, houdende goedkeuring van bijzondere vervoertarieven van de Deutsche Bundesbahn ten gunste van de kolen- en staalproducerende ondernemingen in Saarland \*\*). Deze Als-Ob-tarieven, die indertijd in Nederland zoveel stof hebben doen opwaaien zijn wederom verlengd, nu tot 31 december 1983, onder voorwaarde, dat een afbouw van de steuntarieven zal plaatsvinden vanaf 1 januari 1981.

Zonder de door de Duitse regering gevraagde overbruggingsoplossing te binden aan de voltooiing van de kanalisatie van de Saar, meent de Europese Commissie toch de steuntarieven te moeten toestaan, aangezien zij een wezenlijk bestanddeel vormen van de door de huidige economische crisis vertraagde herstructurering en heraanpassing van de kolen- en staalindustrie. Gezien de uitingen van de Nederlandse Spoorwegen omtrent het herwinnen van het ertsvervoer naar het Saargebied, lijkt opwinning hierover in Nederland, zoals in het verleden, uitgesloten.

### Parlementaire schriftelijke vragen.

De spoorwegen mochten zich ook verheugen in een vraag (no. 597/78) \*\*\*) van de heer Seefeld, betreffende het communautair beleid op het gebied van de spoorwegen. In het antwoord omschrijft de Europese Commissie de belangen en de functies, die de instellingen van de Gemeenschap zien voor en toedichten aan de spoorwegen. De Commissie overweegt niet om maatregelen voor te stellen ter bevordering van een van bovenaf opgelegde verdeling van het vervoer. Dit ook niet, wanneer men rekening zou houden met het beleid in andere sectoren, zoals milieu, ruimtelijke ordening, energie en veiligheid. Wel zou in dit verband rekening kunnen worden gehouden met de aan het begrip "openbare dienst" verbonden verplichte dienstverrichtingen, die aan de spoorwegen kunnen worden opgelegd, teneinde zo met de overige economische en sociale sectoren rekening te houden. Een vraag (no. 453/78) \*\*\*\*) van de hand van de heer Calewart over spoorwegtarieven en de havens gaat nader in op de stelling van de Commissie, dat de zgn. Duitse Ausnahmetarieven niet strijdig zijn met het E.E.G.-verdrag. De Commissie antwoordt dat, nu zij de vrije mededinging — ook in het vervoer en in de zeehavens —

\*) P.B. no. C 22/3 van 25-1-1979.

\*\*\*) P.B. no. L 330/34 van 25-11-1978.

\*\*\*\*) P.B. no. C 28/6 van 31-1-1979.

\*\*\*\*\*) P.B. no. C 297/4 van 11-12-1978.

moet verdedigen, zij in deze sectoren bijzonder alert is. Zolang geen vervalsing optreedt, zijn gedifferentieerde tarieven, met het oog op de optimalisatie van hun ontvangsten, ook voor de spoorwegen, evenals bij hun concurrenten, toegestaan. Zo is het Europese containertarief dan ook gebaseerd op de concurrentie met de andere vervoertechnieken en niet op de mededingingssituatie van de zeehavens. De Europese Commissie gaat voort met het onderzoek naar de verenigbaarheid van deze tarieven met de overige bepalingen van het E.E.G.-verdrag, nu toetsing aan de Verordeningen no. 11/60 en no. 1017/68 al heeft plaatsgevonden.

### **Zeescheepvaart.**

Op 21 december werd formeel de richtlijn van de Raad inzake de minimum-eisen waaraan bepaalde tankers moeten voldoen bij het in- en uitvaren van de Gemeenschap-havens van kracht \*). Volgens deze richtlijn moeten de lid-staten voor 1 januari 1980 regelingen vastleggen om tankers voor olie, gas en chemische producten van 1.600 bruto register ton en meer, die de havens van de Gemeenschap binnenkomen of verlaten, ertoe te verplichten vooraf de havenautoriteiten op de hoogte te stellen van een aantal bijzonderheden over het schip, zoals aard van de lading, waarschijnlijke tijd van aankomst, en het bestaan van gebreken of incidenten die een belemmering vormen voor de normale veiligheid en manoeuvreerbaarheid van het schip. De tankers die in de territoriale wateren in de nabijheid van de aankomst- of vertrekhaven varen, zullen zo spoedig mogelijk radio-telefonisch in verbinding moeten treden met het aangegeven kuststation en het dichtstbijzijnde radarstation, terwijl de tankers ook gebruik moeten maken van loodsen.

Op 19 december is de beschikking van de Raad inzake het verzamelen van gegevens over de activiteiten van vervoerders, die deelnemen aan de lijnvaart in bepaalde vaargebieden, van kracht geworden \*\*). Voor een beschrijving van de inhoud wordt verwezen naar bladzijde 380 van het voorafgaande nummer. Hier zij slechts herhaald dat door de lid-staten in 1979 en 1980 gegevens over geëxploiteerde lijndiensten, vervoerde lading en informatie over de vrachttarieven worden verzameld voor het verkeer in de vaargebieden tussen de lid-staten en Oost-Afrika, respectievelijk Midden-Amerika.

In het Publicatieblad \*\*\*)) verscheen ook een voorstel van de Commissie voor een beschikking van de Raad voor het verplicht stellen van de controleprocedures voor schepen, die in resoluties van de Internationale Raadgevende Overheidsorganisatie voor de scheepvaart zijn vastgelegd.

\*) P.B. no. L 33/33 van 8-2-1979.

\*\*\*) P.B. no. L 5/31 van 9-1-1979.

\*\*\*)) P.B. no. C 284/3 van 28-11-1978.

Het gaat er om bepaalde controleprocedures, die momenteel slechts het karakter van een aanbeveling hebben, verplicht te maken. Indien door de Raad aangenomen, zullen de negen lid-staten de veiligheidsnormen van de schepen en de controlenormen inzake olielozing in zee, vervat in drie internationale overeenkomsten van de Internationale Raadgevende Overheidsorganisatie voor de Scheepvaart (IMCO), in het communautaire recht opnemen.

De Europese Commissie is zich ervan bewust dat de door haar voorgestelde maatregel op zich geen waarborg vormt voor een meer doeltreffende havencontrole op de naleving van de internationale normen. Daarom zal zij zo spoedig mogelijk nog andere maatregelen met betrekking tot de regelmaat van inspecties en de werkwijze voorstellen. Momenteel bestudeert de Commissie het vraagstuk van de haveninspecteurs: hun aantal is onvoldoende, althans in sommige lid-staten, voor de gewenste hoeveelheid inspecties en controles van buitenlandse schepen. Zolang de olie-opslagbedrijven niet over voldoende personeel beschikken om een inspectie van de methode van reiniging van de tanks op ieder schip te verrichten, bestaat het gevaar dat de juridische bepalingen, hoe adequaat deze ook zijn, te dikwijls een dode letter blijven.

Tijdens de plenaire zitting van het Europese Parlement hebben de leden de Raad gevraagd snel de Commissie-voorstellen inzake de veiligheid van de vaart, zowel wat betreft de navigatie als de olieverontreiniging aan te nemen.

De voorzitter van de Parlementaire Commissie, die zich onder meer met vervoer bezighoudt, heeft in zijn verslag een aantal maatregelen aanbevolen die, beginnende met een coördinerende actie om daadwerkelijk de internationale overeenkomst toe te passen, leidt tot een uitnodiging aan de Europese Commissie om een controlestelsel van de scheepvaart in communautaire wateren te onderzoeken, een begeleidingssysteem voor het vervoer van gevaarlijke goederen over zee voor te stellen, de mogelijkheid te bestuderen om op zeeschepen, zoals in de luchtvaart, een "zwarte doos" te plaatsen, tevens deel te nemen aan het onderzoek om met mechanische of bio-chemische middelen ongelukken met olie in zee te bestrijden en tenslotte een aantal vluchthavens aan te wijzen.

Namens de Europese Commissie heeft de heer Giolitti verzekerd, dat de E.E.G. nauw samenwerkt met de IMCO. Voor het eind van de maand juni zal de Commissie voorstellen indienen omtrent harmonisatie van de diverse methoden in de verschillende havens van de lid-staten, methoden die op dit moment nog te veel van elkaar verschillen.

#### **Parlementaire schriftelijke vragen.**

De nieuwe aansprakelijkheidsregels, de zgn. Hamburg-rules, welke door de scheepvaartconferentie van de Verenigde Naties zijn uitgewerkt om in de plaats te treden van de zgn. Hague-rules uit 1924, zijn volgens het antwoord van de Commissie op de

desbetreffende vraag van de heer Brosnan (no. 410/78) \*) bij de Commissie nog niet bekend. Zij beijvert zich om de desbetreffende documentatie te verzamelen en te bestuderen, maar andere taken hebben voorrang.

De heer Seefeld begeeft zich met een vraag over de goedkope vlag (no. 768/78 \*\*) ook op het gebied van de zeescheepvaart. De Commissie vermeldt in haar antwoord, dat onlangs opdracht is gegeven voor een studie omtrent het onder vreemde vlag varen van de handelsvloot van de lid-staten, een studie waarvan de resultaten in de loop van 1979 beschikbaar komen. Ook de veiliger route voor tankers in het Waddengebied was een schriftelijke vraag (no. 563/78 \*\*\*) waard en ontlokte bij de Commissie een uitgebreid antwoord. Naast het overzicht van de bestaande regelingen herinnert de Commissie er aan, dat de IMCO-regelingen voor het scheepvaartverkeer als zodanig geen bindende kracht hebben. De Raad zou krachtens artikel 84 lid 2 van het E.E.G.-verdrag dergelijke bepalingen wel kunnen aannemen en verwijst dan ook naar de richtlijn, aangenomen op 23 november 1978, over minimum-eisen, waaraan bepaalde tankschepen moeten voldoen bij het aandoen van de Europese havens. Bij vermeende bedreiging van een maritieme zone moeten de andere betrokken lid-staten daarvan in kennis worden gesteld.

Ook de heer Jahn betrok een vraag (no. 388/78 \*\*\*\*) op de veiligheid nu op enkele minimum-normen bij de koopvaardijvloot. De Commissie deelt in haar antwoord mee, dat zij als waarnemer aanwezig was op de plenaire slotzitting, waar een overeenkomst tussen verschillende zeevarende naties werd gesloten, ter nakoming van sommige minimum normen op de koopvaardijvloot. Deze overeenkomst is volgens de Commissie van onschatbare waarde voor de coördinatie. Daarom heeft de Commissie de Raad voorgesteld \*\*\*\*\*) om de overige lid-staten deel te laten uitmaken van de overeenkomst.

### Luchtvaart.

De Commissie voor de regionale politiek, ruimtelijke ordening en vervoer van het Europese Parlement heeft op 30 en 31 januari onder voorzitterschap van Lord Bruce of Donington een hoorzitting gehouden over de concurrentie in de luchtvaart \*\*\*\*\*). Daarbij waren naast de I.A.C.A. en I.A.T.A. ook Air France en British Caledonian Airways aanwezig. Op 23 februari zal ook de eigenaar van Skytrain, Freddy Laker, worden gehoord.

\*) P.B. no. C 282/22 van 27-11-1978.

\*\*) P.B. no. C 33/5 van 6-2-1979.

\*\*\*) P.B. no. C 32/5 van 5-2-1979.

\*\*\*\*) P.B. no. C 282/20 van 27-11-1978.

\*\*\*\*\*) Document COM (78) 319 def..

\*\*\*\*\*) Agence Europe van 3-2-1979, pagina 9.

Tijdens dezelfde vergadering is eveneens een advies over de verbetering van de luchtlijnen met Noord-Ierland van de hand van het Nederlandse Parlements lid Tolman, goedgekeurd.

#### **Diversen.**

*Vervoerstatistiek:* De heer Seefeld ondervraagt de Europese Commissie (vraag no. 769/68) \*) over de degradatie tot een bijzondere dienst van de voormalige afdeling vervoer van het Bureau van de Statistiek van de Europese Gemeenschappen. De Commissie deel allereerst mee, dat het werk binnen de Directoraten-Generaal wordt verdeeld, zoals en wanneer haar dat het wenselijkst lijkt. Dat zij daarbij het geachte parlements lid ervan verzekert, dat ondanks de beperkte personeelsbezetting aan alle verzoeken om statistische werkzaamheden zal worden voldaan, zoals dat tot dusverre is geschied, moet dan ook als het bekende "met een kluitje in het riet sturen" worden gezien.

*Zeehavenbeleid:* In haar antwoord op de vraag (no. 711/78) \*\*) van de heer Brosnan aan de Europese Commissie betreffende het zeehavenbeleid, schildert de Commissie eerst de geschiedenis vanaf 1972 inzake het ontwikkelen van een communautair zeehavenbeleid, waarbij zij uitspreekt, "dat ze hoopt in 1979 in samenwerking met de Werkgroep Zeehavens, klaar te komen met werkzaamheden, die onder meer betrekking hebben op het samenstellen van een lijst van mogelijke prioriteiten, welke naar het oordeel van de Werkgroep zouden moeten worden verleend aan initiatieven, die in de havensector dienen te worden genomen. Daarna zal een voltallige vergadering van de belangrijkste zeehavens van de Gemeenschap worden bijeen geroepen met de bedoeling een aanbeveling aan de Commissie betreffende het zeehavenbeleid van de E.E.G. op te stellen".

---

\*) P.B. no. C 33/6 van 6-2-1979.

\*\*) P.B. no. C 5/37 van 8-1-1979.