VAN HELDEN, HENDRIK J. — ARTICLES and Speeches (1964 - 1971)

VAN HELDEN

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Remarks All about roads, and rather interesting. Mr. Van Helden prepared this for Tokyo speech of one hour--then was cut to 15 minutes so had to cut speech; his secretary thinks he was able to use the entire speech in Bangkok at the Asian Economic Development Inst., but won't know until he returns in June.

Doris - Please send a copy of this to Mr. John Scott of The Bureau - Thanks
Also to me, please - Don Pryor

From Doris Eliason

I would like a copy, Doris, Agnes

Speech prepared by Mr Van Helden for Tokyo Apr. 20, 1964 Mr. Van Helden
+ Bangkok (International Road Federation)

Redone into Two Speeches

Mr. Chairman:

Ladies and Gentlemen:

Mr. Knapp, Vice-President of the Bank, was initially announced as the speaker on the topic which I will now discuss with you, namely availability of loans and credits for road construction and rehabilitation. For those of you who have come to Tokyo primarily to hear Mr. Knapp, it must be disappointing to discover that I am to take his place. This topic might occasionally relate to Bank policies, and of course he would be in a much better position than I am to represent and express the views and policies of the Bank, particularly when it would come to future policies. On the other hand, being connected with the more direct day-to-day problems in the field of transportation projects in general and road projects in particular, I may try to make up for my replacing Mr. Knapp by going in somewhat further detail on road financing aspects than he may have possibly been prepared to do.

I take it that all of you know that the World Bank and its affiliate IDA have been for a long time, and still are, very active in the field of financing road projects. To simplify matters, when I from now on mention the Bank and loans, I automatically include IDA and credits.

It is particularly pleasant for me to have the opportunity to address you here in Tokyo since the Bank has been quite active in road lending to Japan; we have participated in Japan's new expressways to an amount of over US$200 million for projects amounting to close to 1 billion. For those who are for one reason or other keen on statistics I will provide a few more. By the end of this month the Bank will have signed or completed negotiations for loans and credits in the field of transportation to an amount of close to US$3.0 billion, of which about 1.2 billion was for roads. We usually finance only the foreign currency component of our projects; financing also local currency cost, like here in Japan, is an exception. Assuming that this component averages about 40% on road projects, this means that so far the Bank has been involved in road projects amounting to about US$3 billion. Since your last meeting in Madrid an additional US$400 million will have been lent or negotiated by the end of this month for road projects in 16 different countries and we will have road projects in 36 countries all over the world. We have in the pipeline additional road projects in 15 countries to an amount of over US$200 million, and of these 15 countries, 11 are territories where the Bank has not yet made highway loans. Since we are already involved in the preparation of

road projects in these countries also, this brings the number of countries where we have highway experience in some form or other to 44.

Not only have we experience in so many countries, but the road projects we have financed range from maintenance programs only and simple feeder roads to some of the most expensive expressways presently built in the world here in Japan.

I do not mention all this to impress on you how good we are, and how much we know about road construction and road problems. To the contrary, having been involved in so many road projects under various conditions, has made us realize, on the one hand their contribution to the economic development of developing countries and how much more road construction is needed, but on the other hand it has taught us also modesty because we are still very much aware of the many problems we, and for that matter Governments and all others involved and interested in road transport development, are facing. Of all the transportation projects handled by the Bank for which I am more directly responsible, road projects are the most difficult to plan, to appraise and to execute. Staff and time spent on the appraisal and execution of road projects is more than double the staff and time spent on our railway and port projects

put together, notwithstanding we have lent as much for railways alone as for roads. Road projects have been causing, and continue to do so, most of our headaches for many reasons which I cannot go into in the relatively short period allowed to me, and therefore I will dutifully stick to the topic I am supposed to present to you and concentrate mainly on the aspects directly or indirectly related to foreign lending in general. If anybody would be particularly interested in other problems which are close to his activities I will be glad to participate later in discussions on these matters or to try answering any questions you may wish to raise.

There is, however, one particular problem which causes us, and I assume also other lending agencies, difficulties in the appraisal of projects. I raise it here because I feel that the International Road Federation may be able to do something about it. We know, of course, the various techniques to calculate the so-called economic return of the investment in road projects. However, to use these techniques, basic statistics of present traffic are a fundamental requirement. It is really surprising to find that reasonably reliable traffic data are just not available even in countries where road traffic has already developed to a considerable extent. It is most necessary that the developing countries start doing something about this deficiency,

and may be that the IRF could provide assistance in organizing a sound system of collecting and recording traffic data in the developing countries.

Although the Bank has been a very important source of financing for road projects, it is, of course, not the only one. Several other lending agencies have also been quite active in this particular field. There is the USAID, U.S. Export-Import Bank, the Inter-American Bank, the European Community through its Fond European de Developpement (FED), the French Fond d'aide et Cooperation (FAC) and ORCS for countries of the French Community, Colombo Plan, and various other countries which through their own foreign development agencies are active in the field of economic development in developing countries All these agencies have, of course, one major goal, namely to assist in the economic development of the developing countries, and therefore it is all to the good that so many agencies and countries are aware of this need and are operating in this field. It cannot be helped, however, that the ways and means to achieve this goal are different and that there may be somewhat different undertones in the activities of the various agencies. You may expect these undertones to vary from political aspects to the desire of supporting exporting suppliers, with varying degrees of emphasis. The fact that so many

agencies and countries are active in this field, which I want again to emphasize is all to the good, has, however, also created certain problems. We in the World Bank have experienced these problems in the past and the trend is for these problems to increase. We believe that we have reached the point where we should consider whether something should be done about it. I may summarize the most obvious problems as follows:

1) Since few agencies are either in a position or willing to finance the full cost of their road projects, contributions by local Governments to these road projects are needed and in fact desirable. This may lead to overstraining the financial ability of these countries, requiring possibly excessive contributions from their budgets to road construction.

2) Road maintenance organizations and budget allocations for road maintenance, usually already below standard in most developing countries, are becoming even more inadequate.

3) The administrative and technical skill needed for a sound organization and administration of highway departments and their activities become overburdened.

This problem is of course not limited to road problems alone. A drawback of bilateral aid in general is that the supplying countries do not have knowledge of what other countries are doing or intend to do. Not only that this causes the type of problems I have just mentioned, but it may also cause even more serious problems when it comes to repayment of the various loans, not all of which are on the most favorable terms. This is particularly true for supplier's credits which frequently carry high interest rates and rather short repayment schedules. This is one of the reasons that the Bank has always been, and still is, in favor of multilateral aid.

The Bank and some other lending agencies have therefore felt the need to arrive at some coordination between the activities on road projects of the various lending agencies, so as to ensure that they are not undermining and jeopardizing each other's projects, and to make sure that highway maintenance organizations be strengthened and budget allocations increased sufficiently to make up the already existing backlog and to cope with the increasing needs for maintenance of the extending road networks.

The Bank has taken the initiative to arrive at a so-called joint approach towards road programs and road projects in some Latin American countries and we may try to extend these efforts also to other parts of the world. We have just about completed loan negotiations for a Bank loan and IDA credit to Ecuador where we will finance a road maintenance and construction project jointly with USAID and the Inter-American Bank. In this case the project I am referring to still covers only about 40% of the total road investment planned for the next 5 years in Ecuador, but at least it is a first step. The four lending agencies have between them agreed on certain rather stiff conditions, particularly as to improvement of road maintenance, to make the project successful. Discussions have already taken place also with the Peruvian Government to have a similar approach for the whole road program for the next 5 to 10 years in that country where we intend to again cooperate with the same lending agencies and the Government. The idea is to first carry out and finance an overall road study and thereafter feasibility and final engineering studies for the country's road program. This should give a sound basis for first determining a realistic investment plan for roads and thereafter for establishing a

financing plan under which each of the various agencies and the Government will accept the responsibility of financing a share of the cost of the investment program. Such an investment and financing plan will particularly take into account the needs for a sound organization of the administration which is to carry out the program, again with particular emphasis on the needs of proper highway maintenance. We hope that following such a procedure may lead to more realistic and sound highway programs, and would avoid the difficulties resulting from shortage of funds which in the past has hampered the efficient execution of the separate projects financed by the various lending agencies.

The above procedure may, we hope, also lead to a better balanced overall investment program. After all, transportation is only a means for economic development and not a goal in itself. Therefore investment in transportation will not be fruitful unless also economic developments in other fields, particularly agriculture, take place. The joint approach first mentioned should enable a Government to judge whether its overall development program is well balanced and leaves sufficient financial room for the other necessary investments. It is our experience that whenever

no projects in other fields leading directly to economic development can be found, like for instance irrigation projects, industrial projects, etc., there appears always to be room on the map for some road project. I personally cannot help feeling that in some cases we lose sight of whether the road transport investment is well balanced in the framework of the overall investment needs.

The trend of concentrating on road projects can also be noticed in the African countries and we have already on a few occasions run into the problem that there is no room for Bank financing of road projects in these countries unless the Bank would be prepared to finance 100% of their cost, Government funds available for road maintenance and construction already being tied up for other road projects. Again this need not necessarily be detrimental provided that the road projects tying up the Government's finances are indeed of the highest priority in the overall development program of the country as a whole and of the road program in particular, and provided that adequate organization and funds for proper maintenance are available. But sometimes an uncoordinated approach in this field causes the various agencies to lose sight of these priorities and needs. In particular, providing funds for

maintenance equipment alone is not enough. Unless also arrangements are made for organization of a maintenance division, training, construction and equipment of workshops, easy availability of spare parts,etc., investments in equipment are largely wasted. We have experienced in some countries that within a year over 30% of the new equipment is idle, and then canabilizing starts.

There is one other aspect which I would like to elaborate on, namely the need for considering a country's overall transport system. Whereas it is generally recognized that the importance of, and need for, road transport is proportionally growing faster than the overall transport needs, and before this audience I would not dare to say anything else, this does not mean that the justification for road construction should be taken for granted under all circumstances. It is our opinion and experience that there is a growing need for coordination of transport development as a whole and the Bank has been active in sponsoring studies for this purpose. The growing importance of road transport does not necessarily mean that the time for railways has past. In many cases there is room for both provided their roles are properly coordinated. Although it is accepted by most railways that they will lose a certain amount

of traffic, particularly general goods, to road transport, there is no doubt that railways will continue and should continue to play an important role in the movement of low value bulk goods and large numbers of people. This loss of certain traffic need not necessarily be a loss to the railways; if railways have to move everything, stopping at every little village to pick up a few cars or sometimes even less than carloads, it might well be that it is more economical for the railways to get rid of this cumbersome type of traffic which frequently limits their line capacity. But when it comes to comparing the two alternatives on the basis of actual economic cost, there are two facts of life that cannot and should not be overlooked. The first is that in many countries railways happen to be already there and although on a sound accounting basis, charging proper depreciation, the cost per mile might be as high or higher than it could be provided by road transport, the latter solution may require new scarce capital for both construction and vehicles which at least for the time being would not yet be needed to the same extent for the railways. The second factor is that in a country with limited availability of foreign currency, consideration should be given to the question whether one or the other solution would require more or less foreign currency for

investment and in particular for operation. Road transport has undoubtedly its advantages, for instance that it can be developed more gradually by stage construction of the roads; one can start off with the construction of simple roads, possibly, unpaved, and improve them when traffic increases. The initial investment in the railway as far as roadbed and track is concerned is about the same whether one or 40 trains are run daily over the line. But on the other hand the railway investment, particularly the depreciation of roadbed, track and equipment cost, can be stretched over a much longer period of time and, in countries where both road vehicles and fuel have to be imported, we have experienced that the lower foreign currency required per ton/mile is an advantage of the railways. This may come as a shock to an audience which is particularly interested in road transport, but we have made various calculations which confirm the above statement. Let me give you some rough figures. In the case of a railway which pays its way, the total wage bill including pensions may amount to roughly say 50% to 60% of the total expenditures. If you add to this say 10% for domestic supplies, the foreign currency part of the railway cost is in the order of say 30% to 40%, mainly for depreciation and maintenance of equipment and for fuel. In a country where fuel, vehicles

and spare parts for road transport have to be imported, the only local cost is for labor. Analysing the operating cost of road vehicles shows that the wage bill is a much lower percentage, somewhere between 10% to 20%, than in the case of railways and thus the foreign currency component considerably higher. Of course this trend is changing and the manufacturing of road vehicles within developing countries is also increasing. But the same is true for Railways; in India the foreign currency component for the Railway investment program has declined to below 20% because of local manufacturing of locomotives, freightcars, etc. Whenever the planning of a road program in any given country is undertaken the foreign currency needs for purchasing and operating the vehicles should not be overlooked since, because of the much more rapid depreciation of road vehicles, providing and maintaining a vehicle fleet to make full use of the road network is a financial burden which should not be ignored.

To give you some idea about the order of magnitude involved, a rough calculation shows that in the U.S. for every dollar spent on construction and maintenance of roads, about 5 dollars is spent on purchasing and operating of motor vehicles. Few countries can as yet afford such a ratio but the burden

to invest in a motor vehicle fleet and operate and maintain it is fast increasing and may easily become quickly several times the cost of road construction and maintenance.

An advantage of road transport to Governments is that the capital needed for the vehicles is usually provided by private sources, whereas these latter sources are usually not available for providing capital for railway financing; in other words railway investment is usually proportionally a heavier burden on public funds than road transport. Unfortunately, financing of road vehicles does not lend itself very well for foreign lending agencies, firstly because of the relatively short lifetimes of the vehicles and secondly because the vehicles are passed on to a very large number of individual private owners all over the country. Therefore financing via the Government would be extremely difficult to carry out and control. But the Bank is presently considering to help India in developing local manufacturing of motor vehicles and spare parts.

Identifying and preparing proper road projects is also getting more difficult; the obvious road projects, usually for trunk roads, have been or are being taken care of. The time has now come that more attention should be

paid to secondary and farm-to-market roads to open up new agricultural areas and increase production so as to get the full benefit of the trunk roads. There is a trend in the Bank to put more emphasis on agricultural development and for this there is increased need for low-class roads. These roads are usually not the direct responsibility of the central Government; they are frequently constructed and maintained by a large number of local administrative agencies (provinces, municipalities, etc.) Therefore these local roads lend themselves not so easily for lending operations by the international institutions. For the latter it is easier to deal with one central Government which then should find ways and means to channel the funds to the lower administrative bodies. There is therefore a need in many countries to arrive at suitable administrative arrangements to channel either the Government's own or borrowed funds for feeder roads to these local agencies, who would then have also to make arrangements to pay for at least part of the cost of these roads. A first step would be the setting up in the central Government's Highway Department of construction and maintenance equipment pools which would be at the disposal of the lower administrations and this should be encouraged.

But shortage of funds and lack of administrative and technical skills on the provincial and municipal levels creates problems and poses possibly some limitation on the tempo in which lower class roads can be developed. The International Road Federation could possibly play an important role in this respect by encouraging and possibly sponsoring technical research for building simple low-cost roads, and maybe even for developing special vehicles for these roads.

It is my opinion, shared by many people working in the field of development financing, that when adequate administrative and technical skill is available in the developing countries, there will be no great problems to find financing for sound, economically justified projects. Fear of waste of taxpayers money is a limiting factor when it comes to foreign aid. I feel that the bottleneck is more in the human element rather than in availability of funds for financing. In this respect I may make reference to a recent article of the famous columnist Walter Lippman in which he stated that even the U.S. was about a century and a half ago an undeveloped area. He states that by 1913, the U.K. alone had already invested $4 billion in the U.S., and that on the basis of the same proportion of national income this would mean

a need of an annual capital flow of about $30 billion from the U.S. to the developing countries. At present there would just not be enough projects available for such a flow of capital, which presently amounts to about $8½ billion from the advanced to the economically backward world. I believe that the main difference is that the U.S. started to develop with European capital and imported manpower educated abroad with experience in the execution and managing of projects. The success of the Marshall Plan in Europe was also largely the result of having available in Europe all the administrative and technical skill needed to usefully use the Marshall funds. When I say that lack of administrative and technical skill in the developing world is a bottleneck I do not refer only to domestic manpower. Our experience shows that also in the advanced world there are just not enough able and dedicated people around willing to spend their time and efforts away from home under conditions which usually will be less favorable than they are used to. On the other hand, nationalistic pride and political pressures sometimes hamper making full use of the administrative and technical skill offered to the developing world.

As an engineer I am possibly not supposed to be very philosophical about the above problems. But having worked for about 10 years on development projects and having met with quite a bit of frustration in this work, becoming philosophical once in a while can hardly be avoided if one is to survive in this work. In this respect I would like to say that the developing countries need to recognize that they cannot improve their way of life with money alone, without changing historic economic and social conditions, and that for some time they will continue to need not only the inflow of capital but should use to the fullest extent offered the technical and above all the managerial and administrative skill of the advanced world. On the other hand the developed world should recognize the difficulties of the transition period of the developing countries and be patient. But providing capital, managerial skill and technical assistance will still not be successful if making profits is the only objective. Unless the providers of these needs put also their heart into the task of improving the standard of living of the backward world the results will be limited and frustrating.

If what I have said today contributes a little bit to make this audience think about these problems I would feel much rewarded.

Address at Annual Meeting of
International Road Federation, Tokyo, Japan,
April 20, 1964

Availability of Loans and Grants for Road Construction and Rehabilitation

HENDRIK J. VAN HELDEN
Chief, Transportation Division
Technical Operations Department
International Bank for Reconstruction and Development

Mr. Chairman, and Gentlemen:

I take it that all of you know that the World Bank and its affiliate IDA have been for a long time, and still are, very active in the field of financing road projects. To simplify matters, when I from now on mention the Bank and loans, I automatically include IDA and credits. Moreover, although the Bank has made road loans to advanced countries, e.g. for the expressways here in Japan, what I am going to say applies mainly to countries at an early stage of development.

By the end of this month the Bank will have signed, or completed negotiations with countries all over the world for loans in the field of transportation to an amount of close to US$3.0 billion, of which about 1.2 billion was for roads in 36 different countries. Since we usually finance foreign currency needs only averaging about 40% for road projects, this means that so far the Bank has been involved in road projects amounting to about US$3 billion. We are already involved also in the preparation of another 15 road projects, 11 of which are in for the Bank new territories. This brings the number of countries where we have highway experience in some form or other to 44.

Having been involved in so many road projects of all types under various conditions, has made us recognize their contribution to the economic development of developing countries. But also we are very much aware of the many problems we, and for that matter Governments and all others involved and

interested in road transport development, are facing. Of all transportation projects handled by the Bank road projects are the most difficult to plan, to appraise and to execute.

Although the Bank has been a very important source of financing for road projects, it is, of course, not the only one. Several other lending agencies have also been quite active in this particular field. There is the USAID, U.S. Export-Import Bank, the Inter-American Bank, the European Community through its Fond Europeen de Developpement (FED), the French Fond d'Aide et Cooperation (FAC) and ORCS for countries of the French Community, Colombo Plan, and various other countries which through their own foreign development agencies are active in the field of economic development in developing countries. All these agencies have, of course, one major goal, namely to assist in the economic development of the developing countries, and therefore it is all to the good that so many agencies and countries are aware of this need and are operating in this field. However, the large number of agencies working more or less independently has also created certain problems.

First, since few lending agencies are either in a position or willing to finance the full cost of their road projects, contributions by local Governments to these road projects are needed, and in fact desirable. This may lead to overstraining the financial ability of these countries, requiring possibly excessive contributions from their budgets to road construction.

Secondly, road maintenance organizations and budget allocations for road maintenance, usually already below standard in many developing countries, are becoming even more inadequate.

Thirdly, the already limited administrative and technical skill needed for a sound organization and administration of highway departments and their activities, become overburdened.

This problem is of course not limited to road problems alone. A drawback of bilateral aid in general is that the supplying countries do not have knowledge of what other countries are doing or intend to do. Not only that this causes the type of problems I have just mentioned, but it may also cause even more serious problems when it comes to repayment of the various loans, not all of which are on the most favorable terms. This is particularly true for supplier's credits which frequently carry high interest rates and rather short repayment schedules. This is one of the reasons that the Bank has always been, and still is, in favor of multilateral aid.

The Bank and some other lending agencies have therefore felt the need to arrive at some coordination of their activities on road projects.

The Bank has taken the initiative to arrive at what we call a joint approach towards road programs and road projects in some Latin American countries and we may try to extend these efforts also to other parts of the world. We have just about completed loan negotiations for a Bank loan and IDA credit to a Latin American country where we will finance a road maintenance and construction project jointly with USAID and the Inter-American Bank. The four lending agencies have with the Government agreed on increased taxes to finance road construction and on certain conditions for the improvement of road maintenance. Discussions have already taken place also with another Latin American Government to have a similar approach for the whole road program for the next 5 to 10 years in that country where we intend to again cooperate with the same lending agencies and the Government. We hope that following such a procedure may lead to more realistic and sound highway programs, and would avoid the difficulties resulting from shortage of funds which in the past has hampered the efficient execution of the separate projects financed by the various lending agencies. This joint approach should also enable a Government to better judge whether its overall development program is well balanced and leaves sufficient room for

financing other necessary investments. It is our experience that whenever no projects in other fields, leading directly to economic development can be found, like for instance irrigation projects, industrial projects, etc., there appears always to be room on the map for some road project, and we cannot help feeling that in some cases we lose sight of whether the road transport investment is well balanced in the framework of the overall investment needs.

It is also our opinion and experience that there is a growing need for coordination of transport development as a whole and the Bank has been active in sponsoring studies for this purpose. The growing importance of road transport does not necessarily mean that the time for railways has past. When it comes to comparing these two alternatives on the basis of actual economic cost, there are two facts of life that cannot be overlooked. The first is that in a number of countries railways happen to be already there and although the cost per ton/mile might be as high or even higher than it could be provided by road transport, the latter solution may require scarce new capital for both construction and vehicles which at least for the time being would not yet be needed to the same extent for the railways. The second factor is that in a country with limited availability of foreign currency, consideration should be given to the question whether one or the other solution would require more or less foreign currency not only for capital investment but also in particular for operation. Road transport has undoubtedly its advantages, for instance that it can be developed more gradually by stage construction of the roads. The initial investment in the railway as far as roadbed and track is concerned is about the same whether one or 40 trains are run daily over the line. But on the other hand the railway investment, particularly the depreciation of track and equipment cost, can be stretched over a much longer period of time and, in countries where both road vehicles and fuel have to be imported, the lower foreign currency required per ton/mile may be an advantage of the railways. In the case of a railway which pays its way, the total wage bill including pensions may

amount to roughly say 50% to 60% of the total expenditures. If you add to this say 10% for domestic supplies, the foreign currency part of the railway cost is in the order of say 30% to 40%, mainly for depreciation and maintenance of track and equipment and for fuel. In a country where fuel, vehicles and spare parts for road transport have to be imported, the only local cost is for labor. Analyzing the operating cost of road vehicles shows that the wage bill is a much lower percentage, somewhere between 10% to 20%, than in the case of railways and thus the foreign currency component considerably higher. These figures apply of course to countries which are in a relatively early stage of development; of course, manufacturing of road vehicles within developing countries is increasing, but the same trend exists for countries with important railnetworks; e.g. in India the foreign currency component for the Railway investment program has declined to below 20% because of local manufacturing of locomotives, freight cars, etc. No doubt, because of the much more rapid depreciation of road vehicles and higher fuel consumption per ton/mile, providing and maintaining a vehicle fleet to make full use of the road network is for some countries a foreign currency burden which should not be ignored.

In the U.S. for every dollar spent on construction and maintenance of roads, about 5 dollars is spent on purchasing and operating of motor vehicles. Few countries can as yet afford such a ratio but the burden to finance the expanding motor vehicle fleet, and operate and maintain it, is fast increasing and may easily become several times the cost of road construction and maintenance.

Unfortunately, direct financing of road vehicles does not lend itself very well for foreign lending agencies, firstly because of the relatively short lifetime of the vehicles and secondly because the vehicles are passed on to a very large number of individual private owners. Therefore foreign financing through Governments would be extremely difficult to administer and control. But the Bank is presently considering whether it may help a certain country through financing domestic manufacturing plants for motor vehicles and spare parts.

Identifying and preparing proper road projects is also getting more difficult; many obvious road projects for trunk roads, have been or are being taken care of, and the time has now come that more attention should be paid to secondary and farm-to-market roads, to open up new agricultural areas and increase production so as to get the full benefit of the trunk roads. There is a trend in the Bank to put more emphasis on agricultural development and for this there is increased need for low-class roads. These roads are usually not the direct responsibility of the central Government; they are frequently constructed and maintained by a large number of local administrative agencies (provinces, municipalities, etc.). Therefore these local roads lend themselves not so easily for lending operations by the international institutions. For the latter it is easier to deal with one central Government which then should find ways and means to channel the funds to the lower administrative bodies. There is therefore a need in many countries to arrive at suitable administrative arrangements to channel either the Government's own or borrowed funds for feeder roads to these local agencies, which would then have also to make arrangements to pay for at least part of the cost of these roads. In this connection I want to refer to the interesting paper on this subject presented this morning by the Mexican delegation. A first step could be the setting up, in the central Government's Highway Department, of construction and maintenance equipment pools which would be put at the disposal of the lower administrations. Such an arrangement has started in some countries and extension thereof should be encouraged.

But shortage of funds and administrative and technical skills on the provincial and municipal levels creates problems, and will possibly pose some limitation on the tempo in which lower class roads can be developed.

It is my personal opinion, shared by many people working in the field of development financing, that when adequate administrative and technical skill is available in the developing countries, there will be no great problems to find

financing for sound, economically justified projects. Fear of waste of taxpayers' money is a limiting factor when it comes to foreign aid. The bottleneck is frequently more in the human element rather than in availability of funds for financing. Also the U.S. started to develop with imported capital but it had also the benefit of imported manpower educated abroad, with experience in the execution and managing of development projects. The success of the Marshall Plan in Europe was also largely the result of having available in Europe all the administrative and technical skill needed to fruitfully use the Marshal funds. When I say that shortage of administrative and technical skill in the developing world is a bottleneck I do not refer only to domestic manpower. Our experience shows that also in the advanced world there are just not enough highly qualified and dedicated people around willing to spend their time and efforts away from home under conditions which in many cases will be less favorable than they are used to. On the other hand, understandable nationalistic tendencies and political pressures sometimes stand in the way of making full use of the administrative and technical skill offered by the advanced to the developing world.

Having worked for about 10 years on development projects and having met sometimes with quite a bit of frustration in this work, becoming philosophical once in a while can hardly be avoided if one is to survive in this work. In this respect I would like to say that the developing countries cannot improve their way of life with money alone, without changing historic economic and social conditions, and that for some time they will continue to need not only the inflow of capital but need to use also to the fullest extent offered the technical and above all the managerial and administrative skill of the advanced world. On the other hand the developed world should recognize the difficulties of the transition period of the developing countries and be patient. But providing capital, managerial and administrative skill and technical assistance will still not be successful, unless the providers of these needs put also their heart and soul into the task of improving the standard of living of the less developed world.

If what I have said today contributes a little bit to make this audience think about these problems I would feel much rewarded.

April 27 to 30, 1964

ASIAN DEVELOPMENT INSTITUTE

LECTURE BY H. J. VAN HELDEN

Ladies and Gentlemen:

I take it that all of you know that the World Bank and its affiliate IDA have been for a long time, and still are, very active in the field of financing road projects. To simplify matters, when I from now on mention the Bank and loans, I automatically include IDA and credits.

For those who are for one reason or other keen on statistics I will provide a few. By the end of this month the Bank will have signed or completed negotiations for loans and credits in the field of transportation to an amount of close to US$3.0 billion, of which about 1.2 billion was for roads. We usually finance only the foreign currency component of our projects; financing also local currency cost has been so far an exception. Assuming that this component averages about 40% on road projects, this means that so far the Bank has been involved in road projects amounting to about US$3 billion. An additional US$400 million will have been lent or negotiated by the end of this month for road projects in 16 different countries and we will have road projects in 36 countries all over the world. We have in the pipeline additional road projects in 15 countries to an amount of over US$200 million, and of these 15 countries, 11 are territories where the Bank has not yet made highway loans. Since we are already involved in the preparation of

road projects in these countries also, this brings the number of countries where we have highway experience in some form or other to 44.

Not only have we experience in so many countries, but the road projects we have financed range from maintenance programs only and simple feeder roads to some of the most expensive expressways presently built in the world, namely in Japan.

I do not mention all this to impress on you how good we are, and how much we know about road construction and road problems. To the contrary, having been involved in so many road projects under various conditions, has made us realize, on the one hand their contribution to the economic development of developing countries and how much more road construction is needed, but on the other hand it has taught us also modesty because we are still very much aware of the many problems we, and for that matter Governments and all others involved and interested in road transport development, are facing. Of all the transportation projects handled by the Bank for which I am more directly responsible, road projects are the most difficult to plan, to appraise and to execute. Staff and time spent on the appraisal and execution of road projects is more than double the staff and time spent on our railway and port projects

put together, notwithstanding we have lent as much for railways as for roads. Road projects have been causing, and continue to do so, most of our headaches for many reasons which I cannot go into in the relatively short period allowed to me, and therefore I will dutifully stick to the topic I am supposed to present to you and concentrate mainly on the aspects directly or indirectly related to foreign lending in general. If anybody would be particularly interested in other problems which are close to his activities I will be glad to participate later in discussions on these matters or to try answering any questions you may wish to raise.

There is one particular problem which causes us, and I assume also other lending agencies, difficulties in the appraisal of projects. We know, of course, the various techniques to calculate the so-called economic return of the investment in road projects. However, to use these techniques, basic statistics of present traffic are a fundamental requirement. It is really surprising to find that reasonably reliable traffic data are just not available even in countries where road traffic has already developed to a considerable extent. It is most necessary that the developing countries start doing something about this deficiency.

Although the Bank has been a very important source of financing for road projects, it is, of course, not the only one. Several other lending agencies have also been quite active in this particular field. There is the USAID, U.S. Export-Import Bank, the Inter-American Bank, the European Community through its Fond Europeen de Developpement (FED), the French Fond d'Aide et Cooperation (FAC) and ORCS for countries of the French Community, Colombo Plan, and various other countries which through their own foreign development agencies are active in the field of economic development in developing countries. All these agencies have, of course, one major goal, namely to assist in the economic development of the developing countries, and therefore it is all to the good that so many agencies and countries are aware of this need and are operating in this field. It cannot be helped, however, that the ways and means to achieve this goal are different and that there may be somewhat different undertones in the activities of the various agencies. You may expect these undertones to vary from political aspects to the desire of supporting exporting suppliers, with varying degrees of emphasis. The fact that so many

agencies and countries are active in this field, which I want again to emphasize is all to the good, has, however, also created certain problems. We in the World Bank have experienced these problems in the past and the trend is for these problems to increase. We believe that we have reached the point where we should consider whether something should be done about it. I may summarize the most obvious problems as follows:

1) Since few agencies are either in a position or willing to finance the full cost of their road projects, contributions by local Governments to these road projects are needed and in fact desirable. This may lead to overstraining the financial ability of these countries, requiring possibly excessive contributions from their budgets to road construction.

2) Road maintenance organizations and budget allocations for road maintenance, usually already below standard in most developing countries, are becoming even more inadequate.

3) The administrative and technical skill needed for a sound organization and administration of highway departments and their activities become overburdened.

This problem is of course not limited to road problems alone. A drawback of bilateral aid in general is that the supplying countries do not have knowledge of what other countries are doing or intend to do. Not only that this causes the type of problems I have just mentioned, but it may also cause even more serious problems when it comes to repayment of the various loans, not all of which are on the most favorable terms. This is particularly true for supplier's credits which frequently carry high interest rates and rather short repayment schedules. This is one of the reasons that the Bank has always been, and still is, in favor of multilateral aid.

The Bank and some other lending agencies have therefore felt the need to arrive at some coordination between the activities on road projects of the various lending agencies, so as to ensure that they are not undermining and jeopardizing each other's projects, and to make sure that highway maintenance organizations be strengthened and budget allocations increased sufficiently to make up the already existing backlog and to cope with the increasing needs for maintenance of the extending road networks.

The Bank has taken the initiative to arrive at a so-called joint approach towards road programs and road projects in some Latin American countries and we may try to extend these efforts also to other parts of the world. We have just about completed loan negotiations for a Bank loan and IDA credit to Ecuador where we will finance a road maintenance and construction project jointly with USAID and the Inter-American Bank. In this case the project I am referring to still covers only about 40% of the total road investment planned for the next 5 years in Ecuador, but at least it is a first step. The four lending agencies have between them agreed on certain rather stiff conditions, particularly as to improvement of road maintenance, to make the project successful. Discussions have already taken place also with the Peruvian Government to have a similar approach for the whole road program for the next 5 to 10 years in that country where we intend to again cooperate with the same lending agencies and the Government. The idea is to first carry out and finance an overall road study and thereafter feasibility and final engineering studies for the country's road program. This should give a sound basis for first determining a realistic investment plan for roads and thereafter for establishing a

financing plan under which each of the various agencies and the Government will accept the responsibility of financing a share of the cost of the investment program. Such an investment and financing plan will particularly take into account the needs for a sound organization of the administration which is to carry out the program, again with particular emphasis on the needs of proper highway maintenance. We hope that following such a procedure may lead to more realistic and sound highway programs, and would avoid the difficulties resulting from shortage of funds which in the past has hampered the efficient execution of the separate projects financed by the various lending agencies.

The above procedure may, we hope, also lead to a better balanced overall investment program. After all, transportation is only a means for economic development and not a goal in itself. Therefore investment in transportation will not be fruitful unless also economic developments in other fields, particularly agriculture, take place. The joint approach first mentioned should enable a Government to judge whether its overall development program is well balanced and leaves sufficient financial room for the other necessary investments. It is our experience that whenever

no projects in other fields leading directly to economic development can be found, like for instance irrigation projects, industrial projects, etc., there appears always to be room on the map for some road project. I personally cannot help feeling that in some cases we lose sight of whether the road transport investment is well balanced in the framework of the overall investment needs.

The trend of concentrating on road projects can also be noticed in the African countries and we have already on a few occasions run into the problem that there is no room for Bank financing of road projects in these countries unless the Bank would be prepared to finance 100% of their cost, Government funds available for road maintenance and construction already being tied up for other road projects. Again this need not necessarily be detrimental provided that the road projects tying up the Government's finances are indeed of the highest priority in the overall development program of the country as a whole and of the road program in particular, and provided that adequate organization and funds for proper maintenance are available. But sometimes an uncoordinated approach in this field causes the various agencies to lose sight of these priorities and needs. In particular, providing funds for

maintenance equipment alone is not enough. Unless also arrangements are made for organization of a maintenance division, training, construction and equipment of workshops, easy availability of spare parts, etc., investments in equipment are largely wasted. We have experienced in some countries that within a year over 30% of the new equipment is idle, and then cannibalizing starts.

There is one other aspect which I would like to elaborate on, namely the need for considering a country's overall transport system. Whereas it is generally recognized that the importance of, and need for, road transport is proportionally growing faster than the overall transport needs, this does not mean that the justification for road construction should be taken for granted under all circumstances. It is our opinion and experience that there is a growing need for coordination of transport development as a whole and the Bank has been active in sponsoring studies for this purpose. The growing importance of road transport does not necessarily mean that the time for railways has past. In many cases there is room for both provided their roles are properly coordinated. Although it is accepted by most railways that they will lose a certain amount

of traffic, particularly general goods, to road transport, there is no doubt that railways will continue and should continue to play an important role in the movement of low value bulk goods and large numbers of people. This loss of certain traffic need not necessarily be a loss to the railways; if railways have to move everything, stopping at every little village to pick up a few cars or sometimes even less than carloads, it might well be that it is more economical for the railways to get rid of this cumbersome type of traffic which frequently limits their line capacity. But when it comes to comparing the two alternatives on the basis of actual economic cost, there are two facts of life that cannot and should not be overlooked. The first is that in many countries railways happen to be already there and although on a sound accounting basis, charging proper depreciation, the cost per mile might be as high or higher than it could be provided by road transport, the latter solution may require new scarce capital for both construction and vehicles which at least for the time being would not yet be needed to the same extent for the railways. The second factor is that in a country with limited availability of foreign currency, consideration should be given to the question whether one or the other solution would require more or less foreign currency for

investment and in particular for operation. Road transport has undoubtedly its advantages, for instance that it can be developed more gradually by stage construction of the roads; one can start off with the construction of simple roads, possibly unpaved, and improve them when traffic increases. The initial investment in the railway as far as roadbed and track is concerned is about the same whether one or 40 trains are run daily over the line. But on the other hand the railway investment, particularly the depreciation of roadbed, track and equipment cost, can be stretched over a much longer period of time and, in countries where both road vehicles and fuel have to be imported, we have experienced that the lower foreign currency required per ton/mile is an advantage of the railways. Let me give you some rough figures. In the case of a railway which pays its way, the total wage bill including pensions may amount to roughly say 50% to 60% of the total expenditures. If you add to this say 10% for domestic supplies, the foreign currency part of the railway cost is in the order of say 30% to 40%, mainly for depreciation and maintenance of equipment and for fuel. In a country where fuel, vehicles

and spare parts for road transport have to be imported, the only local cost is for labor. Analysing the operating cost of road vehicles shows that the wage bill is a much lower percentage, somewhere between 10% to 20%, than in the case of railways and thus the foreign currency component considerably higher. Of course this trend is changing and the manufacturing of road vehicles within developing countries is also increasing. But the same is true for Railways; in India the foreign currency component for the Railway investment program has declined to below 20% because of local manufacturing of locomotives, freightcars, etc. Whenever the planning of a road program in any given country is undertaken the foreign currency needs for purchasing and operating the vehicles should not be overlooked since, because of the much more rapid depreciation of road vehicles, providing and maintaining a vehicle fleet to make full use of the road network is a financial burden which should not be ignored.

To give you some idea about the order of magnitude involved, a rough calculation shows that in the U.S. for every dollar spent on construction and maintenance of roads, about 5 dollars is spent on purchasing and operating of motor vehicles. Few countries can as yet afford such a ratio but the burden

to invest in a motor vehicle fleet and operate and maintain it is fast increasing and may easily become quickly several times the annual cost of road construction and maintenance.

An advantage of road transport to Governments is that the capital needed for the vehicles is usually provided by private sources, whereas these latter sources are usually not available for providing capital for railway financing; in other words railway investment is usually proportionally a heavier burden on public funds than road transport. Unfortunately, financing of road vehicles does not lend itself very well for foreign lending agencies, firstly because of the relatively short lifetimes of the vahicles and secondly because the vehicles are passed on to a very large number of individual private owners all over the country. Therefore financing via the Government would be extremely difficult to administer and control. But the Bank is presently considering to help India in developing local manufacturing of motor vehicles and spare parts.

Identifying and preparing proper road projects is also getting more difficult; the obvious road projects, usually for trunk roads, have been or are being taken care of. The time has now come that more attention should be

paid to secondary and farm-to-market roads to open up new agricultural areas and increase production so as to get the full benefit of the trunk roads. There is a trend in the Bank to put more emphasis on agricultural development and for this there is increased need for low-class roads. These roads are usually not the direct responsibility of the central Government; they are frequently constructed and maintained by a large number of local administrative agencies (provinces, municipalities, etc.) Therefore these local roads lend themselves not so easily for lending operations by the international institutions. For the latter it is easier to deal with one central Government which then should find ways and means to channel the funds to the lower administrative bodies. There is therefore a need in many countries to arrive at suitable administrative arrangements to channel either the Government's own or borrowed funds for feeder roads to these local agencies, who would then have also to make arrangements to pay for at least part of the cost of these roads. A first step would be the setting up in the central Government's Highway Department of construction and maintenance equipment pools which would be at the disposal of the lower administrations and this should be encouraged.

But shortage of funds and lack of administrative and technical skills on the provincial and municipal levels creates problems and poses possibly some limitation on the tempo in which lower class roads can be developed.

It is my opinion, shared by many people working in the field of development financing, that when adequate administrative and technical skill is available in the developing countries, there will be no great problems to find financing for sound, economically justified projects. Fear of waste of taxpayers money is a limiting factor when it comes to foreign aid. I feel that the bottleneck is more in the human element rather than in availability of funds for financing. In this respect I may make reference to a recent article of the famous columnist Walter Lippman in which he stated that even the U.S. was about a century and a half ago an undeveloped area. He states that by 1913, the U. K. alone had already invested $4 billion in the U.S., and that on the basis of the same proportion of national income this would mean

a need of an annual capital flow of about $30 billion from the U.S. to the developing countries. At present there would just not be enough projects available for such a flow of capital, which presently amounts to about $8½ billion from the advanced to the economically backward world. I believe that the main difference is that the U.S. started to develop with European capital and imported manpower educated abroad with experience in the execution and managing of projects. The success of the Marshall Plan in Europe was also largely the result of having available in Europe all the administrative and technical skill needed to usefully use the Marshall funds. When I say that lack of administrative and technical skill in the developing world is a bottleneck I do not refer only to domestic manpower. Our experience shows that also in the advanced world there are just not enough able and dedicated people around willing to spend their time and efforts away from home under conditions which usually will be less favorable than they are used to. On the other hand, nationalistic pride and political pressures sometimes hamper making full use of the administrative and technical skill offered to the developing world.

As an engineer I am possibly not supposed to be very philosophical about the above problems. But having worked for about 10 years on development projects and having met with quite a bit of frustration in this work, becoming philosophical once in a while can hardly be avoided if one is to survive in this work. In this respect I would like to say that the developing countries need to recognize that they cannot improve their way of life with money alone, without changing historic economic and social conditions, and that for some time they will continue to need not only the inflow of capital but should use to the fullest extent offered the technical and above all the managerial and administrative skill of the advanced world. On the other hand the developed world should recognize the difficulties of the transition period of the developing countries and be patient. But providing capital, managerial skill and technical assistance will still not be successful if making profits is the only objective. Unless the providers of these needs put also their heart into the task of improving the standard of living of the backward world the results will be limited and frustrating.

June 30, 1967

Mr. Robert E. Traut
Transport Section
Resources and Transport Division
United Nations
New York, New York

Dear Mr. Traut:

Reference is made to your letter dated June 23, 1967 with the transcript of what I said in the Seminar as a reaction to Mr. Masood Husain's paper and speech. If I had not already known quite well that I am a pretty bad speaker, then this transcript would have convinced me! But our Publications Department told me that even good speakers are flabbergasted when they see on paper their ad verbatim speeches; this is for me a great consolation.

In any event, I took the liberty to do some editing to make it at least understandable. Also added a few words, paragraphs and sentences to make the paper somewhat more self-contained.

If the paper is circulated only to those who attended the Seminar and thus have heard what I said anyway, then I give herewith the written permission to publish it, as requested in your letter.

With kind regards,

Yours sincerely,

H. J. van Helden

HJvanHelden:rsg

Attachment

cc: Mr. Graves ✓

Copy to Paris

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23 June 1967

JUN 27 1967

Projects Dept. Correspondence

ANS'D BY _____

DATE _____

Dear Mr. Van Helden:

We intend to publish, with your permission, the attached draft copy of the presentation you made at the United Nations Inter-Regional Seminar on Containerisation and Other Unitised Methods for the Intermodal Movement of Freight, held in London between 1 and 12 May 1967, as a supplementary paper to this Seminar.

During discussions on this subject in London, we promised to forward a draft copy of your statement to you for editing and your approval prior to its publication here in July or August this year. It would be greatly appreciated if we could receive, at your earliest convenience, a copy of the final version of this statement, including written permission to publish this material, provided due acknowledgement of the source is given.

We also hope to publish two more of your statements. These statements will be taken off the tape within a week and will be forwarded to you immediately for your consideration and approval.

Thank you very much for your assistance and co-operation. Kindest personal and my very best wishes.

Yours sincerely,

Robert E. Traut

Robert E. Traut
Transport Section
Resources and Transport Division

Mr. H. J. Van Helden
Senior Transport Advisor
International Bank for Reconstruction
and Development
1818 H. Street N.W.
Washington, D.C.

Mr. Chairman,

I don't say that I particularly want to take the floor, but I think I have to at this point. As the many other speakers before me, I also want to compliment Mr. Husain for his very comprehensive paper. I recognize his urge for detail which I have known for the many years that I have known Mr. Husain. I hope that you and Mr. Husain will forgive me, however, when I say that when I finished reading his paper, and even more so after listening to his enthusiastic presentation, I was somewhat scared. There are various reasons for this, and I will not go into all of them. But I hope you will understand that for me, as a representative of an international financing institution, one of the main questions resulting from his paper is: "Who is going to pay for all this?" I recognize that sooner or later the Bank will be called upon to finance at least part of the projects mentioned in the paper. I have been for many years responsible for transportation projects in the Bank. We have financed over 4 billion dollars in the transport sector alone, and I have been partly responsible for much of the money that went into these projects. Therefore, I hope you won't blame me if I feel some fear with respect to the financing problems resulting from the developments envisaged in Mr. Husain's paper.

The reason that the Bank has given me the special assignment to investigate the present developments in the field of containerization is that we feel the need to obtain a considered judgment to extrapolate the present events in the ocean trade between what are called "developed" countries, to the rest of the world where in many respects conditions are vastly different. I personally do not like the practice of distinguishing between "developing" countries and "developed" countries. If it is true (and unfortunately it is) that the gap between the poor and rich countries is widening, then this implies that the so-called developed countries are developing even faster than the so-called developing countries. This is

also illustrated in paragraphs 12 and 13 of Mr. Husain's paper, which show that in the six year period ending 1965, the value of imports to the developing countries in the Ecafe region has grown by 46%, whereas the value of exports increased by only 31% in the seven year period ending 1966. In 1966, import value exceeded export value by about 25% in the developing countries; for 1959 this figure was only 12%.

We in the Bank are in the business of trying to close this gap; and as I said before, although we recognize mistakes, we do our best. But one mistake we should never make is getting involved in projects which are basically not economically sound. After all, we have to raise our money in the world market on our own good standing, and we have been successful so far in this field because we have tried to finance projects which are economically sound and justified. This is of course even more needed where we operate as IDA, where we use taxpayers' money of Government budgets, and thus not raise our own money. I fully recognize, as an individual, (and I think also the Bank recognizes) that not always economic considerations alone can and should be the guide-lines for Government decisions and actions, and that there are other considerations as well. But the Bank cannot afford to be involved and guided by such other considerations. Of course, political considerations exist, they are a fact of life; but we as a banking institution have to use as our basis only economic considerations.

One other very great difference between the more developed or better the faster developing and the slower developing countries is that the first category can better afford to make mistakes. Much of their money comes from private enterprises; if they go broke, well that is too bad,

but the country survives. They operate with their own money. This is not so true in the developing countries. We have been talking here about shipping consortias; but many of us know that also other consortia than shipping consortia are presently operating. There are consortia of various countries which try to guide investments in certain developing countries into sound channels. Unfortunately, there are also consortia where countries have to come together, to roll over debts of some countries who have gotten into trouble. We as a Bank cannot afford to be one of these participants in the latter group of consortia; we may be willing to take the lead in organizing them, but we should not be a partner. So let's keep this difference in mind.

Whereas much information of shipping companies has been given to me confidentially, it is no secret that many shipping companies are scared about the present wild containerization developments. We have read the articles in papers and magazines where people involved use the words "container hysterics", "jumping on the band-wagon" and other similar expressions. It is undoubtedly true that some shipping lines are getting today involved in containerization, not on the basis of sound economic considerations alone, but because they feel that they have to because somebody else does it. It was, after all, the fact that a trucker went to sea which has triggered off all these reactions, and has caused a container revolution rather than evolution. I think that many shipping companies will be with us if we would manage some way or other to convert this revolution into an evolution, and get this container wave into calmer waters. We have all heard of plans from all over the world to extend containerization to other routes; but when I tried to pin down these shipping companies, many of these plans appear to be still plans, and the companies are taking a second look at what's going on. I certainly do not want to throw cold water on the Seminar which I recognize

as an extremely useful get-together of people who are involved, but no doubt the time has come both for the shipping companies and ports managements(and for that matter investment institutions) to take a close look, and to try to guide this development in a somewhat more orderly manner. Some of you may have seen not so long ago, in a paper the two-inch headlines "Cunard Can't Wait". Cunard was also making studies, but before the study was finished they already jumped on the band wagon of the Atlantic Container Lines consortium. Shipping companies know that some of them may get hurt badly. But I think one of the possible deterrents to slow down this wild revolution (where always some people get hurt, even the innocent) is possibly in the hands of the ports. Because as you have said, Mr. Chairman, the shipping companies are not that foolish to spend millions and even hundreds of millions of dollars for new investments in ships, if they are not sure that these ships can call at the ports where they really should. As I have said earlier in the Seminar, I feel that if in some way or another we could get all shipping lines and others involved in the business together in some kind of a shipping association along the lines of IATA for air transport, it would be in the interests of the ports and the shipping lines as well. And some of the latter may reach the point where they would welcome such a change of approach; after all they are giving up already part of their independence by forming consortia and even groups of consortia.

Another subject which has scared me somewhat in Mr. Husain's paper, is what I read about the plans for various countries not only with regard to port developments, but also with regard to shipping developments. We in the Bank have so far stayed away from financing shipping in developing countries for various reasons. One of them is that indirectly serving of the economic needs for shipping, can be found via the foreign shipping companies. Whereas no foreign companies will invest in the roads or the railways of a developing

country, foreign companies are willing to invest in aircraft and ships to meet the foreign trade needs of developing countries. Now I understand full well that many of these countries do not want to be completely dependent on the shipping companies of developed countries. But on the other hand, there are very few shipping companies in the world which make tremendous profits. Most shipping lines have been fighting an uphill struggle for many years. I say that not only as a representative or observer of the Bank, but I happen to come from a shipping family. As far as my recollection goes, it has never been a really profitable enterprise in the long run. As long as that is so, I feel that the fear of developing countries that they pay through the nose for shipping services is possibly somewhat exaggerated. Another consideration for the Bank not to get involved in shipping, has been that the savings in foreign currency are also frequently exaggerated. Very often the purchase of a ship is a foreign currency expenditure, and therefore depreciation and interest is also a foreign currency burden. The fuel they use for their own vessels may otherwise be sold to foreign ships. Crews need to be paid partly in foreign currency for expenditures abroad. We have analyzed it several times and even when a developing country reaches the point where it can largely provide domestically everything involved in shipping, there are usually many other projects where both the economic and financial return prove to be considerably higher than in the shipping business. Let me make here one specific comment to Mr. Husain's paper. He says somewhere that India is aiming for moving with its own ships 50% of its international trade. I have heard that figure before in many countries. I think that it is not always realized that 50% of total trade is in practice 100% of what is realistically achievable, because it would be a consistent assumption that every country would be entitled to shoot also for this 50%. But one country's exports are the same as another country's imports. Thus, if every country in

the world would achieve the 50% of total foreign trade, this is in reality 100% of what would be reasonably achievable. In the light thereof, I feel that aiming for a figure of 50% for the developing countries is aiming very high indeed, possibly too high. I have been in many countries of the world, Mr. Chairman, in more than 45 of them, some of them more and many less developed. I have looked into transport conditions, including shipping, and I still have to find the country, and the developing country in particular, where shipping is both financially and economically a good business. And, of course, when I read the figures about planned expansion of the fleets of various Ecafe countries between now and 1970 or 1972, these are huge figures if you put them in money. They could well exceed the capital needs for ports.

Finally, there are many points which I could elaborate on, but I want to restrict myself to the major problem, the financing. Of course, other financing institutions are in the business. Some of them possibly may or can be somewhat more lenient than the Bank, but in the long run I am sure that all of them will raise the same questions as we at some time will raise. Where Singapore is used as an example, it so happens that we negotiated a loan to Singapore several years ago. It was then shelved for some time until the relations between Singapore and Malaysia were straightened out. In the meantime we have agreed in principle that the Bank will agree to changing the project in such a way that the development of containerization would be taken into account. I am happy to say that the management of the Port of Singapore is also very much aware that they still do not know exactly what their position is going to be in the future with respect to container traffic, and how their needs will develop. It is my understanding that they now intend to execute the project in phases, a decision we are very much in agreement with.

Even last week we were still talking with Singapore's consultants and with the shipping companies involved. And it appeared that between them many things and uncertainties remain to be straightened out. It might well be that containerization should call for a different lay out of the port; we don't say so, but we think it should be investigated. Again my suggestion to the ports is: don't panic, you still have some cards in your hands. As I said earlier during the Seminar, it is far easier to build a ship than a new port. Construction of a ship may take less than a year, whereas building new port facilities is likely to take several years. The ports should also realize that if they run ahead, their bargaining position with regard to the shipping companies as to conditions for using the new facilities, gets weaker. Here again, a mutual understanding in advance is most advisable.

If I may, in conclusion, refer to one point which was made by one of the other speakers, the gentleman of the ILO. In principle I have indeed supported the idea of selecting a test port for a comprehensive container study. Whether that should be the worst port in an area, I am not so sure of. First of all, I may say that in the Bank we have quite a bit of experience with respect to technical assistance. We don't give money only; we often insist that technical assistance should be obtained before we go into certain projects. And whether we like it or not, Mr. Chairman, all of us know that this technical assistance has been much more successful in some countries than in others. We have provided a lot of technical assistance in various ports, and in some of them it went into one ear and out the other. You may even say that in many countries they have technical assistance running out of their ears. The need is not always so much the technical assistance as such; when I talk to the people in these countries they frequently know what's wrong. Very often what they want most is to have the weight carried by an international institution to get something done. The trouble is that the problems are frequently

in a different field, often political. Success depends on what the power and position is of a government, and that is very often where the problem is. But of course, we in the Bank cannot afford to invest in new port projects as long as the throughput per existing berth per year is somewhere in the order of 60,000 tons, whereas in other countries we have seen achievements of over 200,000 tons. There is no point in investing in the first country, as long as something is basically wrong with the operations. Therefore, although I in principle support Mr. Argiroffo's idea, I think picking the worst port in an area will possibly leave us with the same problems as we are already faced with today. These ports have usually already had a technical assistance programme. I think if we do anything along the lines as suggested, we should take a port where both the management and the government think progressively, but are faced with the problem that they really don't know how to go about it. Mr. McDowel suggested to take not one port but three ports where port conditions are different. In principle I agree, but from a practical point of view, I think that you will have already a very hard time to get a good team of consultants even for one port. The people who really know something about the future development of containerization are very few and far apart, and they are already so busy to keep track of what's going on in their own private or the government's business, that it will not be easy to take these people away and put them for many months on a team, whether sponsored by the U.N. or the World Bank or any private consulting firm. We have, of course, learned much from this Seminar and the inter-change of ideas. But also, I think it has become clear how many uncertainties are still involved in this container business. So if we could find at least one port where there is a positive approach and where the prospects of results are good, then we still have a hard

time to find the people for that one port. When that's done, then we can possibly branch out from there to other ports; of course in the long run many ports will have to face the problem and will need assistance. I have recently met many people involved in the container problems, but I still have to meet the man who knows it all and who could consider himself a fully qualified consultant. We all know something about it, but we would stick our necks out pretty far by saying we know enough to become a consultant, particularly when it comes to extrapolating present developments of the trade between "developed" countries, to what might happen in the future trade between "developed" and "developing" countries. I think this is even true for many of the good speakers we have heard here in this Seminar.

Thank you very much, Mr. Chairman.

Mr. H. Van Helden
given to the audience on July 18, 1968.

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THE ROLE OF THE CIVIL ENGINEER IN DEVELOPMENT PLANNING OVERSEAS

Since the organizers of the conference have asked me, as a staff member of the World Bank, to talk about the role of the civil engineer in development planning overseas, I take it that in this context "overseas" means the developing countries in which the World Bank Group is most active, in contrast with the so-called developed countries which for many of you is the home country.

As to the distinction between developed and developing countries, there is of course no clear dividing line, and the use of these words in my view has become somewhat artificial and confusing. There was a time after the war that we could rather freely distinguish between developed countries and undeveloped countries. In order to make the classification sound more pleasant, the word "undeveloped" was first changed into "under-developed", then to "less developed" and nowadays one speaks of the "developing" countries. The latter classification is clearly the most confusing and incorrect of all. It is well known that the developed or industrial countries are developing considerably faster than the developing countries. This causes one of the world's major problems; namely, that the gap in national production between the two categories is still widening. The per capita gross national income may vary from about US$ 50 annually in one of the poorer African countries to about US$ 1600 in France and about US$ 3500 in the United States. We also know that the per capita G.N.P. is a misleading figure, and does not necessarily reflect proportionately the level of standard of living.

In principal there should be no basic difference between development planning in the overseas countries and the home countries. I may explain briefly how the World Bank in general goes about its activities and then talk particularly about the role of the civil engineer in development planning, focusing on the typical differences between planning overseas and in the home countries. I may wind up by mentioning a few special problems the engineer working overseas is faced with.

In its dealings with member countries, the Bank sends out from time to time economic missions which evaluate a country's overall economic situation. It looks at the monetary situation and balance of payment position; import payments and export earnings, and the share of foreign currency earnings spent on foreign debt service; the budget and internal debt; private and public savings available for development investments; its economic planning practices and procedures, etc., etc. Obviously the above is the task of economists and monetary experts, and there is no direct role to be played by the civil engineer in this evaluation.

Attached to such a mission, however, are frequently some sector specialists, usually for agriculture, power, transportation, industry, and perhaps education, manpower, etc. These experts appraise the overall situation and specific problems in each of their specialized fields; the recent developments and present conditions, the potentials and future needs, the quality of organization, management and staff of the responsible agencies, their finances, etc.

The experts also look into the planning procedures and practices in each sector, and evaluate together with the general economists and the

monetary experts development programs to the extent these have been prepared. During this evaluation process it may be possible to identify at an early stage certain specific projects which at first glance seem to have great economic potential, and which lend themselves for financing by the World Bank Group. If the economic mission is the first one to a member country, or when these countries are large or have diverse economic potential, there may be more than one specialist for each sector. For instance, for the agricultural sector an agronomist, an irrigation expert and a livestock specialist may be attached; for the power sector a hydro dam expert if the country has potential therefor, and for the transportation sector there may be a highway expert, a railway specialist and a port expert. In addition, sector economists may also be included, for instance a transportation economist for the transport sector. Sector specialists try to obtain an overall picture of the situation in the particular sectors on the basis of written and oral information provided by Government officials, as well as from visits to farms, plants and facilities around the country. Before it leaves the country the economic mission discusses its preliminary views with Government officials, and upon its return to Bank headquarters a report is written on the economic situation and performance as a whole. A judgment is formed whether a country is credit-worthy and in need of borrowing; and if so, how much and for which sectors of the economy. The Bank also frequently offers its services to assist in improving planning procedures, and to the extent needed and justified, in having sector studies made covering all or part of the specialized sectors. The Bank does not use its own staff for these studies, which may take many months or even a few years. They are usually carried out with the help of consulting firms, and the Bank provides

its technical assistance by helping in organizing and writing terms of reference for the studies, by finding financing from international agencies to cover part of the cost, by assisting in the selection of consultants, and by providing general supervision of the studies. The most well known and active organization in this respect is the United Nations Development Program (UNDP), and the Bank frequently acts as Executing Agency for studies financed by this organization. In some cases the Bank may finance the smaller, less costly studies from its own resources.

In the Bank we attach great importance to these sector studies, particularly in recent years. Many of the more obvious projects have already been carried out, and the need for selecting less obvious projects makes it more and more important that the economic justification and priorities thereof be clearly established. Such sector studies set the stage for a national program of investment, placing individual projects in proper perspective in an overall long-term investment program, listing them in order of economic priority.

When it finally comes to the financing of a project identified and selected in the process briefly described above, we inform the Government what is needed to prepare a sound project for Bank financing. This last step is usually divided in two: first a feasibility study showing the economic soundness of the project on the basis of preliminary engineering and cost estimates, and thereafter the detailed engineering including detailed cost estimates, and the preparation of tender documents suitable for letting construction contracts on the basis of international competitive bidding. The Bank usually takes the position that for the preparation of the projects it is to finance,

the assistance of consultants is required unless a country has in the Bank's views the ability to do this with its own staff. When the project is ready for appraisal, usually when the detailed engineering has been completed, we send out an appraisal mission consisting of an engineer, a sector economist and, when needed for revenue earning projects, a financial analyst. This team writes a project appraisal report, on which a decision to make a loan is made.

Even then our task is not finished, since after negotiating the conditions of lending, the Bank follows closely the execution of the project. Engineers and, when needed, financial analysts visit the country from time to time to check upon the physical progress and the financial situation. To ensure proper use of the Bank's funds, payments from the loan account are made only in accordance with actual progress.

In this long process of planning, project preparation and execution, many civil engineers are involved; not only those in the Bank staff, but in larger numbers those working in Governments and in consulting firms. The largest number of civil engineers is involved in the detailed planning, preparation and execution of such civil works as irrigation dams and canals, power dams, large structures for thermal power plants, ports, roads, railways, etc. I will not elaborate on these activities since this task is not directly related to planning in the broader sense. A considerable but of course smaller number is, however, involved also in earlier planning activities, such as sector studies and preparing development plans. One may say that the number declines toward the earlier planning stages; on the other hand, one may also say that the required experience and qualifications are greater in these earlier phases of planning.

Let me illustrate this for a transportation sector study. The reason I select this sector is not only because it is my own field of expertise, but also because we have done in the Bank more and larger studies for transportation than for any of the other sectors in which the Bank is active. The need is particularly obvious for transportation as the various transport modes and their infrastructures are both competitive and complementary which makes coordination of the many projects essential. Growth of transport in a developing country is usually several times the economic growth. Moreover, it is usually in this field that direct Government obligations are largest; frequently some 20 to 30 percent of public investments for a development program is in the transportation sector. Finally, transportation is a sector in which a large number of civil engineers are active, and in which the difficulties are many.

A Bank economic mission to Brazil in 1964 included in its 21 member team, 6 transportation experts. Of these experts, two were transport economists, one a port expert, two were railway experts and one a highway specialist. Of these six, the railway experts and the highway specialist were civil engineers. It should be pointed out, however, that at that stage very little engineering had to be done, the emphasis largely being on reviewing existing development schemes and on operations and administration. The mission found that transportation conditions were very deficient, and contributed greatly to the runaway inflation in the country, both because of financial losses incurred by the Government in providing the transport infrastructure and transport operations, and because of the inadequacy of the various transport

modes to properly serve the economy. A transportation survey was suggested, and the Bank's help was asked for its organization and financing. For practical reasons the survey was divided in phases. The first phase which took about 22 months to complete, covered the highway systems in 4 of the 22 states, the Government-owned railways plus the railway owned by the state of Sao Paulo, port administration in general and operations in, and investment programs for the 3 main ports in detail, and coastal shipping. This phase was carried out by 4 consulting firms with a staff of some 85 experts, of which about 45 were civil engineers. The second phase now in progress includes the highway systems in 14 states and is carried out by six consulting firms with a 131 member staff including 73 civil engineers. The non-engineers are general economists, industrial economists, agricultural experts, transport economists, financial analysts and experts in the operation of the various transport modes, such as shipping experts, port operators, railway managers, etc. All foreign experts have at least one Brazilian counterpart with the same professional background. The foreign cost of the first phase was about US$3 million and of the second phase US$4.3 million. The above shows that the percentage of engineers in the transport survey is about 55%. The percentage of civil engineers increases proportionately for feasibility and final engineering studies which have already resulted from the survey. Also, the type of engineers changed from the all-round administrative-operational type in the Bank mission to typical engineering specialists in the later phases.

Another example of a transportation survey the Bank is presently responsible for is the one for Malaysia. This covers all the transport modes of the country. It is carried out by an association of two consulting firms,

with about 30 experts in the field. Of these, about half are engineers. The foreign cost of this study is US$800,000. The Brazilian study is the largest of about 45 overall transportation surveys the Bank has been or still is involved in under its technical assistance activities. This number does not include feasibility studies for specific projects.

What are now the typical problems the civil engineer working overseas is faced with? First of all he works in a country where investment funds in general and foreign currency in particular are scarce. This should be kept in mind from the broad planning stage to the phase of detailed engineering. This also requires some knowledge of and feel for economics, the lack of which, if I may say so,is often a weakness of many engineers, particularly civil engineers. Too many are inclined to practice engineering for the sake of engineering only, without considering the economic and financial implications resulting from their engineering products. This may be partly due to the fact that in the home countries many projects are started when bottle-necks already exist and thus the need is obvious. Many expressways or port expansion projects are started only when there is already serious congestion, and thus too late from an economic point of view. This is usually not the case in developing countries where many projects are undertaken to tap hitherto unused resources. Such projects initially may well have an over-capacity, and it is hoped that they will stimulate the economy sufficiently to justify their construction. This requires a considerable amount of judgment and crystal ball gazing. To this needs to be added, however, a careful quantitative analysis of the economic justification of the projects. Developing countries cannot afford mistakes, and even less so if foreign funds directly or indirectly provided or supported by taxpayers in other countries are to be used.

As a result there must be much emphasis on the economic evaluation of the project at the planning stage, and this is clearly reflected in the composition of the Bank's staff. For instance, in the Transportation Division we have some 60 staff members of which about one-half are engineers (nearly all civil engineers), one-third are transport economists and one-sixth financial analysts. For the civil engineer working overseas it proves most useful if he has at least a minimum knowledge and appreciation of economic concepts such as opportunity cost of funds reflecting the scarcity thereof, shadow rates of exchange of foreign currencies reflecting possible distortions, shadow cost of labor reflecting underemployment, etc. These and other economic factors play an important role in determining the economic feasibility of a project, in the comparison of alternative technical solutions therefor, and in their execution, when the advantages and disadvantages of a larger or smaller degree of mechanization has to be considered. It is the task of the transport economist and the civil engineer together to determine the economic rate of return or the cost-benefit ratio of a project. Whereas it is largely the responsibility of the transport economist to estimate the economic benefits, it is the task of the civil engineer to estimate at an early stage as accurately as possible the cost of a project. All civil engineers know that it is already difficult to arrive at reliable cost estimates in their home country where there is ample opportunity for comparisons with similar projects, and for discussions with specialist colleagues. The civil engineer working overseas does not have the support of such specialized experience and is much more on his own. He does not have many opportunities to compare unit prices with similar projects in the same country, and output of labor and equipment in

developing countries are frequently unknown and much more difficult to estimate. This problem is very important indeed for development planners, who have to put an estimated price tag on projects at a stage when preliminary or detailed engineering has not even started.

The consulting engineer working overseas should try to use, to the largest possible extent, local materials and products, and therefore may be confronted with materials he is not familiar with, or which may have a lower quality standard than he would consider acceptable in his home country. Because of the shortage of skilled labor structures should preferably be simple, rather than sophisticated technical solutions which might be cheaper but with which available local staff and labor are not familiar. Specifications should be more flexible, and tolerances for acceptance should be broader than in the developed countries.

A major problem frequently facing the planning engineer are incomplete, unreliable, or even non-existing statistics and basic data. Without good statistics, good planning becomes very difficult, and requires imagination and improvisation.

Finally, what should be the qualifications of the civil engineer working overseas, either active in development planning or engineering in the narrower sense? First of all he should be more competent in his particular field than domestic civil engineers in the agency for which the foreign expert has to work. This is usually not much of a problem for projects which are carried out only occasionally, such as large dams or port projects, since few developing countries can afford to use their limited number of engineers in maintaining a permanent professional staff for such occasional projects.

This is quite different for the highway field. More and more developing countries are gradually increasing the numbers of their highway engineers educated abroad, and with few exceptions these countries have some form of a highway department as road construction and maintenance are a continuing activity in all countries. Many of these domestic engineers have already a considerable theoretical knowledge, and it is the expertise in specific fields and, most important, experience which have to be imported from abroad. It is particularly experience which is frequently still lacking even when a considerable degree of competence may already be available. Another general deficiency of professionals in developing countries is the lack of managerial and organizational skill; they may know what needs to be done but they do not know, and lack experience in, how to do it. Many developing countries have been over-analyzed and over-studied, and suffer from too many shelved reports. What is frequently needed is a team of "do-ers" rather than more studies.

As projects in developing countries need financial assistance from abroad, there is more than the average need for extensive reports to satisfy those who are responsible for approving and providing the funds that a specific project is well justified. For this reason preparing good reports is important. It must be said that unfortunately few engineers are also good report writers. Therefore, ability to present a project well by good report writing is an important asset, particularly for the higher level engineers.

I mentioned earlier that the engineer working overseas should have a basic knowledge of economics, an ability to improvise, and to use what are for him unusual materials. His designs and working methods should take into account the prevailing shortage of particular skills.

A very important requirement as to qualifications, however, has little to do with engineering ability but is a matter of character qualifications. I do not refer only to willingness to sacrifice by living under frequently less comfortable conditions in a foreign environment, away from friends and relatives; such sacrifices are usually compensated for by higher pay and other remunerations. I refer to the ability to work with other people as a team, particularly with those of the country he is working in, and to accept that they have a different outlook on life. This also applies to a considerable extent to his family. He should continually realize that if administrations in developing countries were as good and as efficient as in his home country, there would be no need for him to be there in the first place. He also has to keep in mind that an important part of his function is to provide training, so as to make himself superfluous as soon as possible. The indispensable character qualities for the civil engineer working overseas are tact, patience, flexibility and inspiring drive. It may interest you that in my home country, the Netherlands, the Dutch Bureau for Technical Assistance submits candidates for expert services abroad to psychological tests, so as to ensure that he has such essential character qualifications in addition to his professional qualifications.

The most important qualification, however, is a certain amount of idealistic urge to help the less fortunate people of the developing countries to improve their standard of living, and to help humanity in reducing the still widening gap in national production between his own and other countries.

Without at least a minimum of such idealistic urge the civil engineer cannot make a contribution to this cause or draw from his work the satisfaction that it should provide.

H. J. van Helden
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Civil Engineering and Changing Transportation Concepts in Developing Countries

The topic to which I am to address myself is somewhat ambiguous because it presumes a difference between civil engineering for transportation facilities in developing countries and in developed countries. If civil engineering is considered in the traditional sense of design and construction, this is only true to a limited extent. Even in its broader context, which includes planning aspects, there is still no sharp dividing line in principles between developed and developing countries. Many of the differences in transport problems and conditions are matters of degree. An added factor which makes generalization dangerous is that conditions in developing countries in various parts of the world vary greatly. In Africa and large parts of Latin America, for example, population densities are low, particularly away from the ocean seaboards. This involves long distances between population centers to which historically for economic and political reasons access was often first made by railways. The roads which have been built are frequently under-utilized and a major problem is to find an economic compromise between cost and design standards. In Asia, with its high population densities and large volumes of animal and human traffic, the problems are very much different. Here, improvement and expansion of capacity of already existing road, rail and water transport facilities is often the main issue, though there is of course also a rural road problem. Unlike the other continents, Africa has as many as 14 land-locked countries with their own special transit problems of gaining access to the sea..

There is a clear distinction between global, regional and domestic transport needs and problems; particularly global transport poses the problem for developing countries to adjust themselves to changing trends in the developed world.

Finally, the stage of economic development varies greatly between the developing countries. This not only affects transport needs but influences what they can do with their own resources, particularly human skills. The problem, therefore, in a general paper such as this is that there is only a very low common denominator as to transportation trends in developing countries.

I assume it to be self-evident that transport planning in developing countries requires an increasing awareness of the possible impact that technological, economic and social changes may have on future traffic requirements and patterns. A civil engineer can no longer limit himself to obvious and immediate needs, e.g. building a railroad to transport ore from a mine. He must try to anticipate future economic and technological developments both in the transport and other sectors of the economy. This need for foresight and by implication, flexibility is accentuated by the long physical life of the transport infrastructure built by civil engineers. Economic obsolescence is increasingly preceeding physical obsolescense.

Transportation is not an economic goal in itself. It is a "service" which eventually, has to be sold like any other service to achieve the ultimate goal of raising the levels of economic activity and social welfare. Agriculture, mining, industry and trade are the revenue or income earning activities to which transportation is a cost. Except for tourist travel, passenger transport is a cost both to the businessman and the commuter. For goods transport it is sometimes a major cost factor in bringing products from the producer to the consumer There is growing evidence, however, in many developing countries that the real constraints on growth are not always transport costs, but institutional difficulties, operational inefficiencies and policy measures. This is not to deny the importance of transportation. Its potential importance to the economy can be seen from two facts in the U.S. where now one out of every seven workers is employed in transport or transport-related industries, and 20% of GNP is directly or indirectly derived from the transport sector. In developing countries new investments in transport facilities and equipment usually range between 25 and 35% of total investments. Since these are not only large absolute amounts which mean foregoing other economic and social priorities but also consume extremely scarce foreign exchange resources, it is both the task and duty of any civil engineer, particularly those involved in the planning, designing and construction of transport infrastructure, to use local resources as much as possible so that the cost of moving goods and people is as low as possible.

Transport planning anywhere requires difficult assessing of future needs, but it is even more difficult in developing countries than in developed countries, where established trends are known or can be more readily identified. Between the two categories of countries is the important difference that what are now called developed countries developed largely from within; technological advances took place over an extended period when people were ripe for them and recognized their needs. In the present developing countries changes are largely introduced from the outside. One danger of this is that the developed world attempts to impose on the developing countries what the foreign developers think they should have, rather than trying to assess what the actual needs are. An example of this paternalism is that in many developing countries the school curriculum is still a virtual copy of that followed in the old world rather than a reflection of the country's immediate and basic educational needs. This danger is further aggravated by sales pressures, which have been made so much easier by improved international air transport and resulted in supplies of equipment and consumer goods into the developing world where they cannot be adequately serviced or are not yet needed, and even worse, cannot be afforded.

My topic has two clearly distinct aspects. The first is the changes in the transport industry itself, as a result of new technologies and concepts. The invention of the internal combustion engine which led to the development of the automobile (and which may yet lead to total paralysis of movement in certain metropolitan areas) had a tremendous impact on what used to be the main carrier, the railways. The development of aviation is rapidly changing transport volumes and patterns. The progress made in development of air-cushion ships

and vehicles, or magnetic suspension vehicles with linear motor propulsion now being explored by the Japanese, may again cause a change in sea and land transport vehicles and facilities. Although less spectacular, we know that containerization is changing the entire concept of transport operations.

The second aspect is the changes in transport demands. Passenger transport demand changes result from changes in social habits, increased affluence and a variety of intangible factors. Changes in the transport of goods result from a general expansion in economic activity as well as technological developments in sectors which transport services. A good example is fuel transport for the production of electrical energy. Initially, power plants were built close to consumption centers and required the transporting of coal over long distances. Volumes increased with the growth of power consumption, but larger transformers and heavier conductors made it possible to greatly increase the voltage in distribution systems, allowing power production to move away from consumption centers and closer to fuel sources. This has greatly changed the traffic pattern of coal and fuel oil. The transport of oil and gas through pipelines has also greatly affected traffic patterns and volumes. Pipelines carry about 20% of total ton miles in the US, equal to total truck ton miles and half the railway ton miles. Nuclear power is now coming of age; 16 nuclear power plants are in operation in the US at this writing, and another 98 are being built or are in the active design stage. Needless to say, these developments, which may also be expected to take place elsewhere, will again have a tremendous impact on fuel transport volumes and patterns. If smaller scale nuclear power plants requiring minimal fuel volumes become feasible, the processing of ores on mining sites may become economic, which would greatly reduce transport volumes of ores. The arrival of mammoth tankers is making new shore facilities to accommodate what a few years ago were considered large oil tankers already obsolete upon completion; the building of super tankers has been further accelerated by non-technical events such as the closing of the Suez Canal.

But less spectacular developments have also affected traffic volumes and patterns. The introduction of refrigerated ships allowed world wide transport of meat and fruits; the trends towards increased consumption of canned and frozen food and juices enables fresh but voluminous vegetables and fruits to be shipped over short distances to processing plants and, after wwaste has been eliminated, the outputs moved from plants to markets are much smaller than inputs Instead of shipping wine in bottles or barrels, pipelines carry wine to shipside to be moved in bulk.

But most important is the interaction between technological changes in transport facilities and changes in traffic demands. The most obvious example is the development of air transport. The number of air passengers taken away from other transport modes amount to only a fraction of the number of passengers filling aircraft today; most would not travel at all if there was no aviation. In the 1957-1967 period, the numbers of passengers crossing the Atlantic by sea reduced from one to half a million, whereas crossings by air increased from one to five and a half million. Only part of today's air freight was diverted from land and sea to air transport; much air freight has been created by aviation itself and consists of traffic which otherwise would not move at all; fresh

fruit, vegetables and flowers grown in Africa are now sold in Europe, and shrimps from Panama are flown to North American markets. In general, international trade has grown tremendously as a result of technological developments and evolutions in the transport sector. The evolution of transport concepts, such as containerization which resulted from a need for improved efficiency to reduce costs, promises even further increases.

It is particularly in the field of international transport that changes of transport concepts in developed countries pose great problems for the developing countries. Containerization is an obvious example. Whereas the need for, and economy of, port container facilities is obvious in the developed world, port authorities in most developing countries still have little idea as to when containers will also reach their ports, and if so, whether a port will be a pivot or feeder port. This uncertainty affects not only port planning, but also the connections with the hinterland. LASH transport is now becoming a reality, making port planning even more difficult. Containerization may be very much to the advantage of shipowners, manufacturers and exporters in industrialized countries, by providing them with new markets. It does not necessarily follow, however, that it is also to the advantage of the developing countries where growing unemployment is a major problem which labor savings in ports are not helping solve. Moreover, the lower freight cost of imports may make competition even more difficult for new and small-scale manufacturing in developing countries and equalization of freight rates resulting from the introduction of "freight all kind" (FAK) tariffs for containerized cargo may cause an increase in freight rates for exports from developing countries. On the other hand, the concept of container transport would appear particularly attractive to land-locked countries, but these have no control over the actions of port authorities or road builders in neighboring countries.

A major problems for the civil engineer is that broadly speaking, he is not the forerunner in technological change in transport; he is called upon to provide the supporting infrastructure for changes and inventions taking place in other engineering disciplines. When Henry Ford began mass production of the automobile, the civil engineer had to plan, design and construct the roads for these vehicles. Few foresaw at the time today's vehicle numbers and truck dimensions to be accommodated by twelve-lane highways and complicated interchanges. The increased draft of ocean-going vessels, and now even more so, container vessels have made berths in ports economically obsolete well before they were physically worn out. Airports are continuously in the process of expanding, and strengthening and lengthening runways. Yet significant research is going into vertical take-off possibilities. In the competitive battle between rail and road, rail transport is hampered by the long physical life of its infrastructure and equipment. The greater flexibility of road transport, resulting from the much shorter life of road vehicles and the possibility of constructing roads in stages, is a tremendous advantage. There is, in my view, an urgent need for much closer cooperation between the civil engineers and the engineers of other disciplines. This is even more necessary since capital has become much more expensive, in particular for developing countries where financial resources are extremely scarce. It is sad but true that many technological

advances in transportation have resulted from military needs, where cost did not play a role, rather than from research aimed at improving living conditions in developing countries, where cost is of great importance.

The World Bank and the UK Road Research Laboratory are presently cooperating in research to arrive at economically optimum standards for low class farm-to-market roads in Africa; alternative design standards for varying axle loads will be studied, maintenance cost to be taken into account. This study is a step in the right direction, but unfortunately, its terms of reference could not be broadened to include vehicle design aspects. In many higher income countries even today much farm-to-market transport is still animal-carried; yet in Africa one sees numerous proposals for the building of such roads to standards suitable for regular trucks. Whereas the tsetse fly and other diseases limit the scope of animal transport in Africa, this does not necessarily mean that the change from carrying goods on the head to truck transport must be made in one big step. In the US there are 16 manufacturers of so-called "all terrain vehicles" (ATVs). So far they are little more than toys rather than commercial vehicles, but they appear to have promising potential. In Africa there would seem to be regions which may have potential for the air-cushion truck, if it has any potential at all. Savings in driver cost by using large vehicles or trucks and trailers apply to only a limited extent in areas with high and still growing unemployment figures, which would justify using low "shadow" labor costs in economic calculations. I do not express an opinion on what would be the most economic solution for farm-to-market transport for large regions in Africa; all I am saying is that it would be preferable to study the problem as a whole, taking into account both road and vehicle aspects. In certain parts of the world where there is surplus labor and the economic value of time savings are still low, ferries would appear to be economically justified for a much larger number of vehicles than would be the case in developed countries, where ferries have been and continue to be used for much greater transport volumes than now are claimed to justify bridges in developing countries. Because of scarce resources, the opportunity cost of capital in developing countries is much higher than the actual interest paid, and it is imperative that all efforts be made to use these scarce resources for optimum economic benefits. Whereas in developed countries competition between transport modes is generally beneficial, it should be kept in mind that competition implies spare capacity of the competing modes. In countries where even simple roads and single-lane railways have initially large spare capacities, the price for the advantages of competition may in some instances be too high. For this reason, the World Bank strongly emphasizes the need for proper transport coordination, including the use of mathematical models and computer techniques for transport system analysis. Our experience has shown that there are important advantages in a close cooperation between the civil engineers and other engineering and economic disciplines in developing these models.

Developing countries, however, have some advantages over the developed world. They are in a position to bypass certain conventional transport modes, and to avoid mistakes incurred by those now helping them to develop. They have much fewer investments already tied up in existing facilities and are in a more favorable position to apply new technologies and planning concepts. Possibly the most important is the opportunity to better controlland use in national,

regional and urban planning. It is being increasingly recognized that unbridled and unregulated growth of metropolitan areas has large and sometimes unforeseen economic and social costs, and that a more even population distribution is desirable. The population movement from rural to urban areas appears an almost intractable problem and certainly one not capable of any short run solution. In many developing countries the growth of the large metropolitan areas is still very much faster than that of the country as a whole, and in contrast to the situation in developed countries where this trend is gradually slowing down. In a quarter to one half of the population may be concentrated in one metropolitan city. The economic and financial losses due to congestion in cities such as Calcutta, Buenos Aires, Sao Paolo and many other large cities can hardly be overestimated. Much could be done to create a larger number of very livable smaller cities, more evenly spread over a country, but to achieve this is often politically difficult and requires foresight on the part of Government. Although transportation planning is only one of many factors in better city, regional and national planning, it is in this field that the civil engineer can play an active role, which goes well beyond the design and construction of civil works. The World Bank has established a separate division for urban planning and transportation, to deal with such problems and related projects. Particularly in the developing countries, where the field is still open, close cooperation between the civil engineer, other engineering disciplines and those responsible for planning, in the broadest sense of the word, is very important and could be most rewarding. To obtain the best results, the engineer needs to focus continuously not only on what he is doing, but why he is doing it.

Possibly the greatest problem, common to all developing countries, is the shortage of skill and experience in planning, designing, constructing, operating and managing transport facilities and systems. Whereas capital scarcity can be partly overcome by borrowing from bilateral and international lending institutions, such as the World Bank Group, filling the gap in the above skills is a much more difficult problem to solve. In developing countries, employing expatriates in managerial and executive positions is often no longer acceptable, but to fill these ranks with experienced indigenous staff will take time. Training and education programs are useful, but do not solve the problem. What is needed is technical assistance in an advisory capacity, and it is in this field that the civil engineer can play an important role. This leads me to reiterate the views I expressed on this subject a few years ago at the previous conference on Civil Engineering Problems Overseas. At that occasion I made the statement, still valid today, that to do this well requires qualifications which have little to do with engineering ability, but are a matter of character qualifications. I do not refer only to willingness to sacrifice by living under sometimes less comfortable conditions in a foreign environment, away from friends and relatives; such sacrifices are usually compensated for by higher pay and other advantages. I refer to the ability to work with other people as a team, particularly with those of the country the engineer is working in, and to accept that they have a different outlook on life. This also applies to a considerable extent to his family. He should continually realize that if administrations in developing countries were as good and as efficient as in his home country, there would be no need for him to be there in the first place. He also has to keep in mind that an important part of his function is to provide training, so as to make himself

superfluous as soon as possible. The indispensable character qualities for the civil engineer working overseas are tact, patience, flexibility and inspiring drive. The most important qualification, however, is a certain amount of idealistic urge to help the less fortunate people of the developing countries to improve their standard of living, and to help humanity in reducing the still widening gap in national production between his own and other countries. Without at least a minimum of such idealistic urge the civil engineer cannot make a contribution to this cause or draw from his work the satisfaction that it should provide.

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