

Chapter 8 Implementation/Action Program

CHAPTER 8 IMPLEMENTATION/ACTION PROGRAM

8.1 INSTITUTIONAL ARRANGEMENTS

8.1.1 Organizational Reform - Details Pertaining to Transport

(1) Past Experience and New Plan

The Vietnamese government has been implementing a drastic reform of the government organization since 1991. It is still in progress and further reform is expected in 1994. Figure 8.1.1 shows three forms of the Vietnamese government in the past, present, and the last is one expected to take shape in the near future.

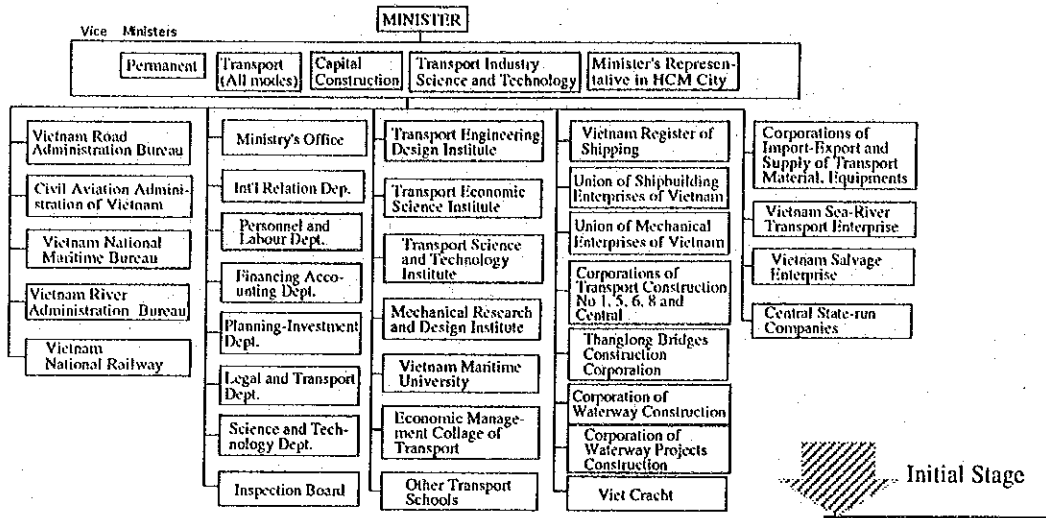
The initial form of MOTC organization was inherited from the previous regime of centralized economic management. This organization has discovered many deficiencies requiring remedy, in the course of adjusting its administrative structure into the most efficient and appropriate form for operating in a market economy.

MOTC's present organization as of November 1993, resulting from the first major revision carried out in 1992 to 1993, is shown in the middle of Fig. 8.1.1. The present structure aims at reducing and eliminating duplicated functions and management, and separating administrative function from the implementation function. Many units have been transformed into profit seeking entities, and have been made financially independent. In some cases, several previously separate entities have been combined into one. The most significant among these changes is the separation of the functions of communications and post from the transport sector.

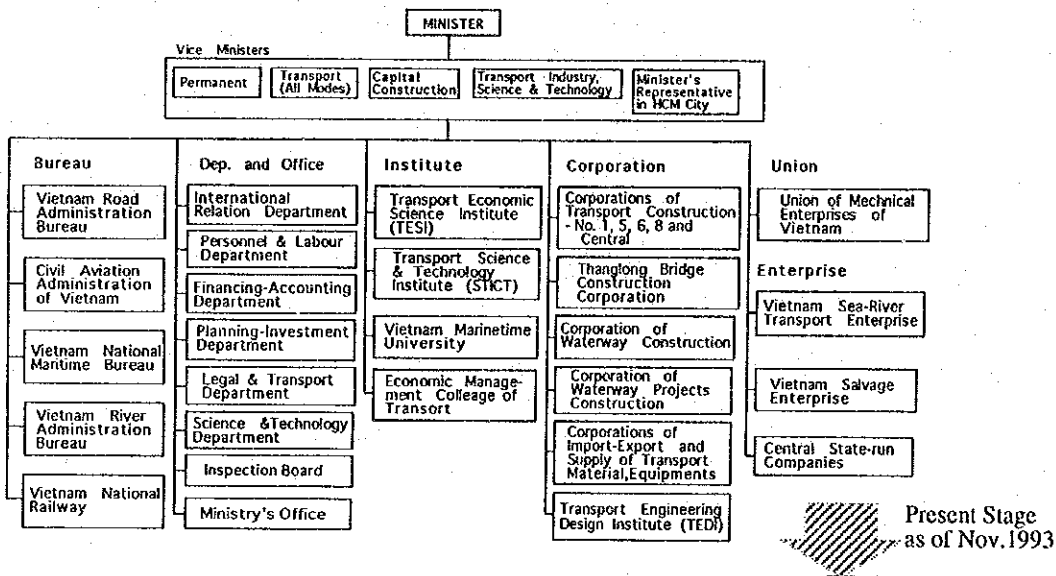
As second major revision is expected to be put into effect in the near future, maybe in 1994. Major aims of these further changes are to separate more clearly the functions of the government from those of the entities mentioned above, which are intended to pursue their own objectives in a manner similar to private firms. Another major aim is to separate much more clearly decision-making and implementation.

(2) Performance in the Past Reform

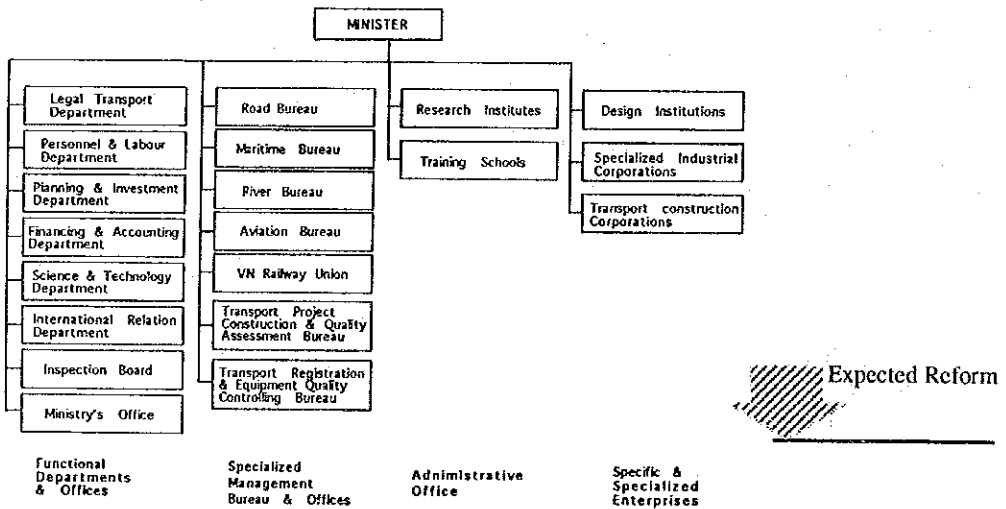
It is concluded that performance up to now in reform, has generally been good, been clearly embodied in the new government structure.



Initial Stage



Present Stage as of Nov. 1993



Expected Reform

Figure 8.1.1 Three Forms of Government Organization

However, it is essential to insure that one particular point is well coordinated in future reform efforts. That is;

- Establishment of clear guidelines for setting investment priorities and ranking of alternative project.

This is quite important to ensure that all projects are consistent with overall national strategies and objectives, and consistent with activities undertaken using the country's own resources. These guidelines would also be useful for each of the ministries or agencies to use in preparing project profiles and project lists for the approval of the SPC, in the process of drafting the annual budget plan.

The case of TESI is very typical of the situations where a commendable objective, privatization for the sake of efficiency, may be inappropriate if applied to services which have greater social value than the price they can command in the market place.

Formulation of investment guideline should be supported by strengthening of the planning sector in terms of the numbers of personnel, and also by acquiring the analytical tools of applied macro- and micro-economics which are the common base for management of economic policies. This can contribute to strengthening co-ordination among planning sectors in various government agencies. Especially coordination between the planning sections of each department and the SPC is indispensable. Both agencies are required to work in close relationship within the same development framework. In addition, this institutional strengthening program itself can be presented to donor countries for project funding, because its successful completion would equip the SPC to align all the ODA efforts with a well designed development policy. Otherwise, Vietnam faces a danger of the ODA program becoming donor-driven.

(3) Issues in Organizational Reform

- Miss-application of the privatization principle to the research and planning institute - TESI

It is indispensable for this research institute and the planning departments to guarantee the non-biased, long-term systematic research that provide basic data for policy formulation and for pricing of various transportation charges.

In this sense, TESI should be a part of the government and should be engaged in fundamental research in the transport economy. Such basic research would be priced very low in the free market but it is very valuable to support formulation of a rationale national transport policy. Privatization of this organization is a miss-application of an otherwise constructive principle.

- Inappropriate government task attached to the former government entity - TEDI

At present, TEDI is defined to be a private enterprise but plays a role of counterpart designated by the Vietnamese government in the case of international aid projects at the planning stage. Continuance of this kind of dual roles assigned to the previously government-owned but presently private companies should be gradually diminished. Speed of separation of the two different functions might be dependent on the number of engineers and other professionals remaining in government and servicing to the public planning tasks related to international aid project.

- Strengthening of the planning section in each department and agency in terms of administrative capacity

This proposal aims at establishing a clear-cut mid-term development plan and strengthening co-ordination among all of the planning section of various government agencies. With these guidelines, each government agency can compile its own project lists for execution or foreign aid funding, consistent with overall national development strategy. Donor countries can also easily align their efforts with an established Vietnamese national development direction.

- Establishment of planning co-ordination committee reporting to the SPC

This planning co-ordination committee should be concerned among the planning agencies of the government, and operate under supervision of the SPC. Aims are (1) to promote and induce further policy co-ordination among each government agency on matters specifically relating to project planning, (2) to lessen the SPC's burden by coordinating the projects of each agency by inter-ministry or inter-sector co-ordination prior to the SPC's co-ordination, and (3) to promote information exchange among agencies. With a free access to the various information bases of the several participation agencies, and sufficient capability to compile information on development plans, especially at the planning stage, overall the planning of individual projects can be well-designed and be well aligned to the national development plan.

- Expansion of SPC's administrative capacity

With the increasing number of projects funded by both the Vietnamese state and foreign official aid, it is said that the present SPC administrative capacity is reaching its limits. Some cases are reported in which formal procedures are omitted and the SPC's project screening was bypassed. This kind of short-cut sometimes mis-leads the development direction and skews national budget commitments from the most efficient national resource allocation. To avoid this short-cut procedure, the SPC's administrative capacity should be strengthened in terms of personnel.

8.1.2 Project Formulation Flow

(1) Project Formulation Flow

The presently-prescribed project formulation flow is shown in Figure 8.1.2.

There are four Government agencies involved in the management, implementation and co-ordination of investment in traffic infrastructure and ODA. Those are (1) the State Planning Committee (SPC), (2) the Department of Foreign Economic Relations within the Office of the Council of Ministers, (3) the State Committee for Science, and (4) the Ministry of Commerce.

The SPC now has the pre-eminent role while the role of others is diminishing. The SPC is responsible for the co-ordination of infrastructure investment in various fields and is responsible for the allocation of the state investment budget among projects. The SPC sets the priority of projects, with consultation of the relevant government agencies. In practice, all the proposals are evaluated and placed in order of priority by the SPC.

In the transportation sector, project formation has mainly been carried out on the basis of three sources: directional plans, feasibility studies and periodical reports on performance of transportation facilities.

There are two kinds of directional plans, medium-term and long-term. Both are made by the TESI based on transport demand projections. The directional plans of the TESI are in turn used as the starting points for feasibility studies by the TEDI, periodical reports by Unions of Transport Construction Enterprises and transportation project proposals formulated by the Department for Planning and Investment. The project proposal contains a concept of the project scale, its objectives, and the nature of its benefits. Then the project proposals are reviewed by the SPC. These reviews may require additional information from the project initiator as well as from relevant sections of the SPC itself. If the project is approved, the project then becomes a candidate for inclusion in the investment program of the government.

Transportation projects accepted as candidates at that stage will usually require further detailed design. This is usually performed by the TEDI, but sometimes the task of further project design is given to provincial transport design institutions, particularly in the case of small projects such as maintenance or rehabilitation of existing road transport facilities, or construction of low-category highways which are not beyond the technical capabilities of these institutions.

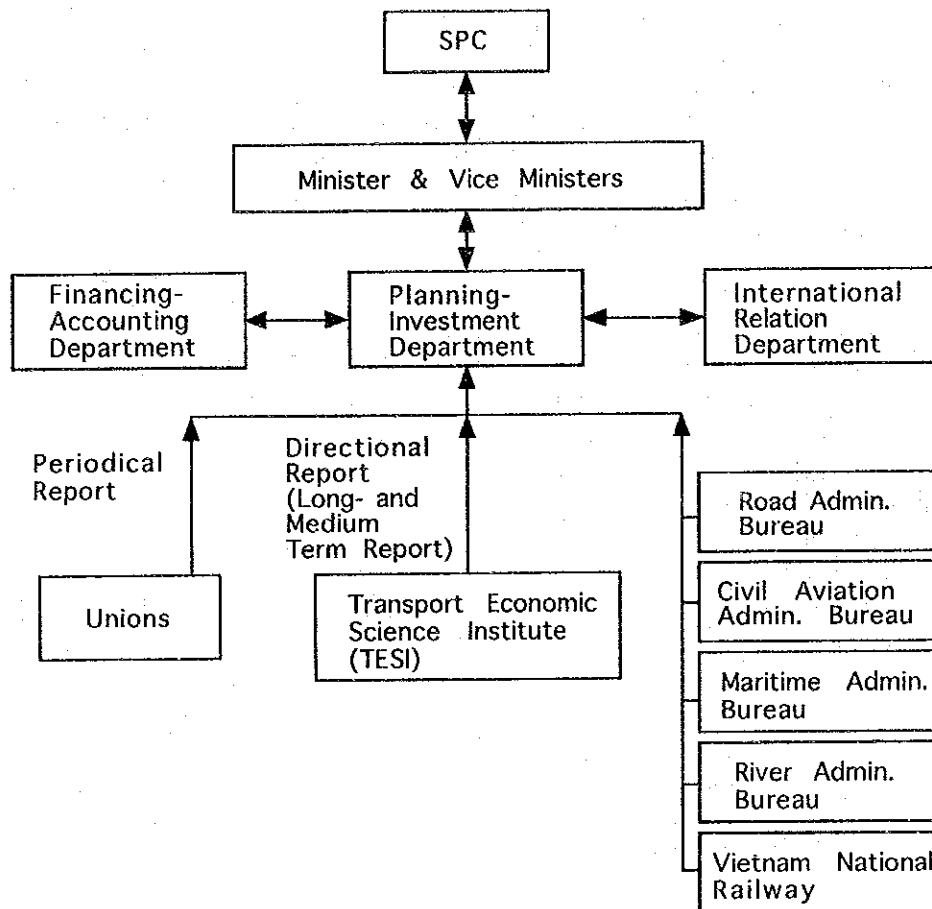


Figure 8.1.2 Procedure for Project Formulation in MOTC

Once the transportation project has been fully designed, it needs to be appraised before inclusion in a prospective project process. Transportation project appraisals are usually carried out by the designers themselves; that is by the TEDI or sometimes by provincial transport design institutions. In the former centrally planned economy, the government agencies placed an emphasis on financial appraisal to check availability of funds for the project costs, the calculation of which was based on the official prices. In recent years, standard methods of economic appraisal proposed by international agencies such as the World Bank and UNIDO have been introduced to Vietnam.

After appraisal, transportation projects need to be approved, first by the MOTC and finally by the SPC. Under a centrally planned system, the SPC was the central agency with responsibility for coordinating the economic activities of the Government. This involved the Five-Year and Annual

Plans for the whole national economy, as well as for each ministry and government agency within the economy. This powerful SPC set physical output targets for activities of ministries and agencies. This role has changed considerably following the economic reforms; the SPC is now responsible for planning of the Government's expenditures and for compiling of the work program for developing public sector investments and capital. The SPC now advises the Central Government on selection of projects for inclusion in the Government's program.

Recently, transportation projects funded by foreign-company investments or by international agencies are formulated and analyzed by the State Commission for Co-operation and Investment through its National Center for Project Evaluation.

Candidate projects which have been included in the Government's investment program next proceed to implementation stage. The implementation of transportation projects are financed from the Government's investment fund or foreign investment fund is channeled through banks. The construction and maintenance of transport facilities are carried out by Unions of Transport Construction Enterprises. Project implementation is carried out under the technical supervision of the TEDI or other transport design agencies, as well as and financial monitoring of the bank through which the project is funded. These supervision and monitoring functions are needed to ensure that transportation projects actually proceed as they were initially designed and approved.

The transportation project implementation capacity of the Unions is very poor in practice, because of the lack of finance and inadequate construction or maintenance technology. In many cases, they are trying to use equipment for which the manufacture of spare parts had been stopped a long time ago. In consequence, only 1,507 among 3,140 units (48 %) of the maintenance equipment fleet of the MOTC are operative.

(2) Effectiveness of Planning

The directional planning process itself is evaluated to be suffering from two deficiencies; planning methods and statistical data.

Deficiency in method is attributable to the non-macro-economic approach in present. Planning of each transportation mode is carried out independently without a due attention to other modal plans, and an inter-modal analysis of the transportation demand is completely lacking in this planning sequence. An additional need for improvement is that assumptions concerning various micro- and macro-economic indicators such as a performance of each mode, population growth, and economic growth were not clearly set, and consequently, the resulting forecasts cannot easily be adjusted for variance in the progress of over-all economic development.

Deficiency in statistical data was attributable to poor collection and compilation of relevant data, and availability of data for the transport planner was very limited. Securing reliability of planning results in itself was therefore beyond their capacity. Uncertainty of economic development further aggravated this situation, especially in the economic transition period Vietnam experienced in the last half of the 1980s and early 1990s.

Deficiency in planning was also attributable to the project evaluation method itself. Methods developed by international organizations such as UNIDO to select priority projects and to co-ordinate the individual projects in national planning, had not been adopted. In stead of those international standards, a simple payout-period method had been used for assessing financial performance, and emphasis in the feasibility study was placed on technical requirements and availability of funds.

Roles of each planning agencies are defined as follows;

State Planning Committee (SPC) plays a role of setting a target of integrated national transport policy based on the state development strategy and economic development plan, and is to execute a coordination of transport network plan and projects by mode. It is also to evaluate the preliminary plan of transport development plan prepared by the Planning and Investment Department (PID) and to give an approval on the budget allocation plan concerning the transportation projects.

Planning and Investment Department (PID) engages in planning and policy formulation concerning overall transportation network, and is to review and evaluate the master plan of each transport sector. It is also to attach a priority of each project and to formulate a preliminary plan of national transport development plan, and submit it to SPC.

Transport Economic and Science Institute engages in a fundamental research and study concerning transport network and charge system, and to provide data necessary for policy implementation and suggestion. It is also to engage in master plan study and/or feasibility study of the transport project.

Transport Engineering and Design Incorporation functions as a private company. It had executed a governmental constant service in a field of civil engineering and design, but this function should be transferred to other governmental organization as soon as possible.

(3) Issues in Project Formulation

- Strengthening of planning sections (TESI, SPC, and each department's planning section) in manpower and capability to conduct sufficient planning and communication with international donor agencies.

Under these circumstances, it is remarkable that the SPC had performed so well its heavy duties of project selection and obtaining foreign aid. However it is apparent that the SPC has to handle an ever-increasing number of projects as opportunities have opened to secure funding from the European countries and other market economy countries. It is judged that project handling capacity of the SPC has to be expanded.

In a process of project selection for foreign aid, clear guideline in investment priority and ranking is indispensable. This is sometimes incorporated mid-term development plan, or development strategy. In such strategy, all projects can be aligned with the national development direction, and consequently achieve the most efficient allocation of scarce resources. Here it is advocated that sufficient capability in development planning should be attached to the planning section of each department, and further policy co-ordination among the SPC and the planning sections of several departments should be encouraged.

This is important in order to eliminate duplicative implementation of similar projects by the different agencies, and to formulate supplementary projects indispensable to the proper implementation of big projects. Better inter-agency coordination will also contribute to forming a mid-term development plan. A new committee is required to conduct this kinds of information exchange and policy co-ordination at the planning stage.

These kinds of planning and project co-ordination can contribute to increase in project effectiveness of management and administration.

Furthermore, provision of various statistical data is indispensable for policy formulation, especially at the stage of planning. However present capabilities are inadequate both in data compilation and publication. Therefore the following is recommended:

- Continuous and quick compilation and publication of all the data concerning budgets of the state and departments, macro-economic statistics, actual prices of construction materials in the market, and project information.
- Data necessary for project planning should be free, especially for government agencies.
 - Instance of staff of the public sector selling data to which they can have access because of their positions in the government, may lead to biased formulation of the national plan in various fields.
- The capacity and capability in development planning, project appraisal and management in the relevant planning departments should be strengthened.
- The policy coordination function among the SPC and the planning section of relevant departments should be strengthened, including:

- Strengthening of organization sufficient to set clear guidelines on investment priority and ranking employing international project appraisal criteria.
- Strengthening the organization enough to align projects with the national development direction.

8.1.3 Action Program

- The research institute (TESI) should be a part of the government
- TEDI should be completely private: same engineers should be transferred to each department
- Strengthening of planning sections (TESI, SPC, each departments' planning section) in manpower and quality
- Strengthening of statistical data collection/compilation
 - Strengthening of statistical departments in numbers and quality of manpower
- Establishment of the following principles:
 - Statistical data is free of charge
 - Government staff shall not simultaneously hold other positions
- International criteria for project evaluation should be adopted.

8.2 BUDGET AND FINANCING

8.2.1 State Budget

(1) Trend in the Past

This section highlights the present budget situation describes measures to increase the budget revenue, and makes some suggestions on how to improve the present management situation.

State budgets for the period 1989 - 1993 are shown in Table 8.2.1. In each year, Vietnam recorded substantial deficits ranging from 2,772 billion dong in 1989 to 6,645 billion dong in 1993.

Table 8.2.2 shows the structure of state revenue sources. Revenue from domestic sources consists of "revenue from state enterprises" and "revenue from non-state enterprises". The former item accounted for 27.6 % of total revenue in 1993 and 30.3 % in 1994 (planned), a sharply showing decreasing share of the total. This reflects an increasing share of "revenue from non-state enterprises" as the privatization process progresses. Expanded revenue of non-state enterprises offered a good source of revenue for the state through tax payments. However, the number of tax items are still very limited.

Table 8.2.1 State Budget

(unit: billion Dong)

Items	1989	1990	1991	1992	1993
a. Current Revenue	3,899	6,153	9,731	16,920	29,895
b. Current Expenditure	5,045	7,062	9,946	17,105	36,590
c. Capital Account - Surplus/Deficit	-1,626	-2,124	-1,513	-3,660	-
d. Overall Surplus/Deficit	-2,772	-3,033	-1,728	-3,845	-6,695
Financing					
e. Domestic Borrowing	1,700	1,173	393	1,000	2,500
f. Foreign Grants	1,072	1,860	1,335	2,845	4,195

Source: "Key Indicators of Asia and Pacific Countries," Asian Development Bank, 1993

Table 8.2.2 Structure of the State Revenue

(unit: billion Dong)

Items	1993		1994	
	Total	(%)	Total	(%)
State Revenue	29,890	100.0	38,660	100.0
I. Tax and Fee	26,740	89.5	35,200	91.0
Revenue from State Enterprises				
1 Revenue from State-owned Company	8,200	27.6	11,700	30.3
Revenue from non-State Enterprises				
2 Revenue from JV Co. with Foreign Comp.	5,440	18.2	6,850	17.7
Of which, Oil-related Company	5,150	17.2	5,900	15.3
3 Import and Export Tax	5,000	17.0	8,500	22.0
4 Agriculture Land Use Tax	1,300	4.3	900	2.3
5 Commerce & Service Tax	2,820	9.4	4,150	10.7
6 Land Tax	140	0.5	160	0.4
7 Income Tax	180	0.6	240	0.6
8 Remittance from Abroad	110	0.4	100	0.3
9 Construction Lottery	570	1.9	700	1.8
10 Drivers' License Fee	150	0.5	200	0.5
11 Other Fees	1,420	4.7	800	2.1
12 Sales Revenue of Gov. Houses	400	1.3		
13 Others	950	3.2	900	2.3
II. Sales Revenue of Land Right			500	1.3
III. Foreign Grant Aid	1,230	4.1	960	2.5
IV. Redemption Revenue	1,920	6.4	2,000	5.2

Table 8.2.3 shows the state budget for construction in comparison with the total state budget, and construction expenditure for the transport sector. "Construction Expenditure" is diminishing its share from 38 % in 1989 to 26 % in 1993. State expenditure for construction in the transport sector came to a 5 % share in 1989 and 1 % in 1993. The trend of decrease in both these items caused rehabilitation and maintenance works to fall behind the requirements, and consequently aggravated the degradation of transport infrastructure all over the country.

The structure of expenditure for construction in the state budget, by sector, is shown in Figure 8.2.1. Investment for road construction repairment in the transport sector is still occurring large share.

(2) Government Efforts in the Past

Facing the remarkable magnitudes of state budget deficits, the Vietnamese government made a great effort and introduced a drastic improvement of the tax system. The new system revised the income tax rate and introduced a new land property tax. Tax collection activities were also strengthened.

However, a further increase of tax revenue is required to supply the budget required to rehabilitate and replace the devastated transport infrastructure such as bridges, roads, railways and ports. Even for the maintenance of the existing infrastructure, UNDP estimated that expenditure four times as high as at present is required (Report on the Economic of Vietnam, UNDP, 1990).

8.2.2 Measures to Increase the Investment Fund for the Transport Sector

(1) Specific Measures for Roads

The Vietnamese government faces a problems of how to increase tax revenue. Comparison with the systems of European countries and Japan can give some insight into this question. Measures worthwhile to consider include:

- Introduction of a usage specified tax for road rehabilitation and new construction
- Wider application of transport toll systems

The first of these two tax items consists of many sub-items such as oil and gasoline taxes, vehicle tax, vehicle weight tax etc. All of these taxes can be used for road rehabilitation and new construction. This method of budget supports for road infrastructure guarantees a stable and huge amount of revenue for the road infrastructure investment, and as motor vehicle usage increases, the amounts raised in this way can be quite substantial.

Table 8.2.3 GDP, State Budget and Investment to Transport Sector

(unit: billion Dong, current price)

	1989	1990	1991	1992	1993
1 State Budget Expenditure					
a. Total	5,045	7,062	9,946	17,105	36,590
2 Construction Expenditure of State Budget					
a. Total	1,920	2,704	4,504	6,103	9,540
(= 2a/1a)	38%	38%	45%	36%	26%
b. Transport Sector	252	442	753	660	449
(= 2b/1a)	5%	6%	8%	4%	1%
3 a. GDP	17,414	27,514	51,136	71,091	125,526
4 a. Budget Expenditure/GDP					
(=1a/3a)	29.0%	25.7%	19.5%	24.1%	29.1%
b. Construction Expend./GDP					
(= 2a/3a)	11.0%	9.8%	8.8%	8.6%	7.6%
c. Expenditure to Transport Sector/GDP					
(= 2b/3a)	1.4%	1.6%	1.5%	0.9%	0.4%

Sources;
 (1989 - 1992) of 1a; Key Indicators of Developing Asia and Pacific Countries, 1993, Asian Development Bank
 (1993) of 1a, 2a and 2b; Vietnam Economic Research Institute
 Note; 1) Estimated by interpolation

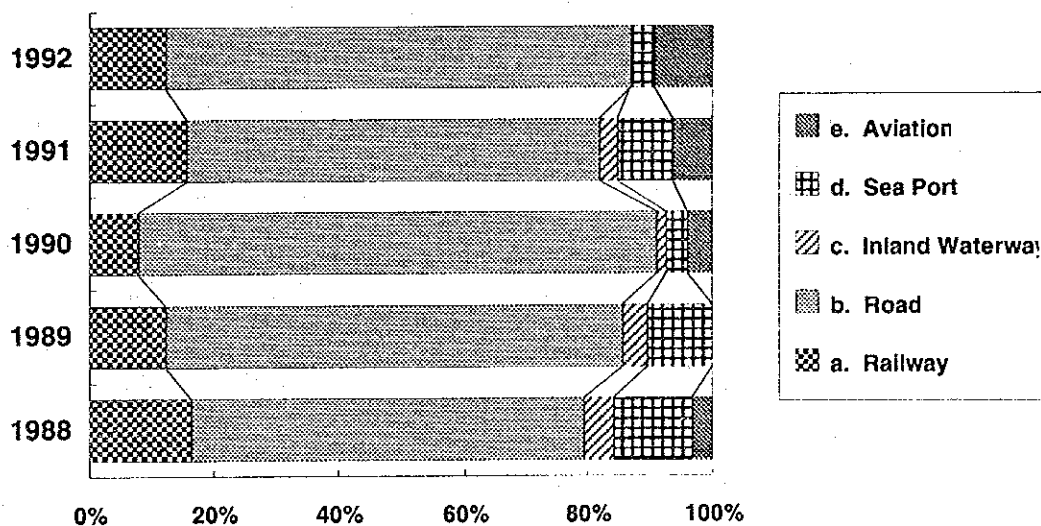


Figure 8.2.1 Investment Structure of Transport Sector by Mode

The above discussion gives grounds to suggest some measures to substantially increase state revenue, and guarantee the road-related budget.

a) Usage specified tax on gasoline

TESI estimated how much a new gasoline tax for road maintenance and construction can contribute to the road investment. Making a 100 % increase in the gasoline tax (import tax = 25 % of CIF price, business tax = 16 % of profit) amounts to 128 million US\$, equivalent to 60 % of the total road maintenance cost in 1992, as estimated by TESI. This figure is raised to 78 % of the road maintenance cost if 200 % of the present import tax is levied on the gasoline. These calculations demonstrate the potentially large impact of this tax system. However, the exact tax level to charge should be decided by a research in depth about the economic benefits the users can expect to receive. TESI should play a role in investigating this question.

b) Wider application of toll system

A toll is now imposed for the vehicles which go over the Thang Long Bridge in the northern part of Hanoi. Often this kind of revenue is supported to be used only for the rehabilitation of the bridge or road concerned. In some cases, the revenue is pooled for new construction projects of the same category of infrastructure. This can contribute to providing the maintenance cost, and also assure flexible usage of capital for this infrastructure elements especially when it is damaged.

TESI estimated how much the toll revenue can contribute to road investment. According to this estimation, toll revenue amounts to 1.0 million US\$/year.

With increase in the gasoline tax (= import tax + business tax), a large portion of the investment fund can be financed. This kind of new tax is justified by the principle that the users have to pay for the non-pecuniary benefit they can receive, and that the construction cost should be paid back by the users within the project life.

With good will from Vietnam's international cooperation partners, there is a golden rule in financial burden sharing which the government can probably rely on: that is to make maximum effort of the Vietnamese government in funding the projects, and the balance may be supplemented by foreign assistance. In following this principle, the following measures are recommended.

If those things are done, it should be possible to carry out all the projects suggested in the master plan, in accordance with the principle of project funding above.

- The share of the state budget for construction activities is required to be increased up to at least 30 % of the total state budget

MOTC has expended 27 % of the total state budget in 1986 and 24 % in 1989, showing a decreasing tendency in the period 1986 - 1989. Of this, the road sector accounted for about 60 % in 1988, ranging from 41 to 62 % during the period 1982 - 1988, while the railway sector has been diminishing its share from 31 % in 1986 to 16 % in 1988.

A target of 30 % of the state budget to be allocated for construction activities can be a reasonable level since the Government of Vietnam had maintained the construction share at 27 % of the total state budget in 1986 and the preceding years. Furthermore, the dynamic expansion of production activities in 1992 and 1993, the latter recording 10 % higher production compared with the previous year, can contribute to increasing the budget available. The Ministry of Finance has confidence in improving the budget share for construction to 30 % in the near future.

As for the experience in foreign countries, some lessons for Vietnam are indicated by the case of Japan, which infrastructure was devastated during World War II (1941 - 1945). Since the end of the War, the Japanese government injected 24.7 % of the national budget in 1945 - 1949 into the infrastructure sector, 30.0 % in 1950 - 1954, 37.2 % in the period 1955 - 1959, and 40.9 % in 1960 - 1964. Japanese experience suggests that the target of 30 % of state budget is actually a rather conservative target.

- Foreign assistance can be invited to compensate the shortage in budget funds for projects necessary to maintain and upgrade the infrastructure.

These are the elements of basic policy for project funding in Vietnam. Accepting an influx of foreign assistance, the Vietnamese government is required to pay due attention to its debt ratio and the government's capability for repayment.

For this purpose, the share of local funds in project finance is kept high. Some projects are carried out with a local fund accounting for 10 to 30 % of total project costs. This is done for projects of the World Bank, Asian Development Bank, and bilateral assistance of Taiwan.

Other major measures are listed below;

- The transfer (where appropriate) of a public to a private sector function through the use of BOT schemes
- The establishment of a reasonable public tariff structure (cost recovery component).

Registration of BOT (Build-Operation-Transfer) does not require so special organization. The same organization as that for the international bidding usually carries out this function. However, this should be delegated the power on the followings;

- (1) to provide data on traffic demand to applicants
- (2) to guarantee the right to decide the level of toll
- (3) to guarantee the preservation of property during the period of operation

BOT should be applicable to the projects that:

- (1) operator can charge the toll to its users, and
- (2) high return of investment can be guaranteed.

Otherwise it cannot attract private investors. This suggests that the project concerned has a high traffic demand and a high priority in implementation order.

It is a duty of the government to develop the transport infrastructure to meet the demand. The government should prepare a clear-cut target of infrastructure of transport, and prepare a guideline of fund allocation for each project. Role of private sector is to supplement the role of the government and execute a part of the government role based on the principle of market economy, which is characterized high return, by investing a huge amount of fund for the project.

(2) Expected Efforts to Increase Transport Investment

In investigating the level to which the government can be expected to increase its own burden for transport sector investment, three scenarios are set;

- Trend ; This case assumes that the transport sector investment increases at the pace which would maintain present share of the GDP.
- 3 % of GDP ; This case assumes that the share of transport sector investment in GDP will increase to 3 %. This figure of 3 % is set accruing to the Japanese experience soon after World War II.

This case assumes that 15 % of the incremental amount of the construction budget is allocated to the transport sector as a matter of priority. Part of this is financed by the gasoline tax and traffic charges.

The Vietnamese government is expected to increase its investment budget for the transport sector along with policy efforts to increase the total budget revenue. Table 8.2.4 shows an expected amount to be increased by the government' efforts and Fig. 8.2.2 illustrates this objection.

Table 8.2.4 Target of Transport Sector Budget

(unit; million US\$)

Transportation Sector Budget	Up to 2000	2001 - 2005	2006 - 2010	Total
1. State Budget for Whole Country (Trend based on 1994)	620	720	1,160	2,500
2. State Budget for Whole Country (with Gov. Efforts)	1,430	3,370	7,750	12,550
3. State Budget for North Part of Vietnam (37 % of Total)	529	1,247	2,868	4,644
Proposed Project Cost for North VN	1,682	1,616	1,900	5,198

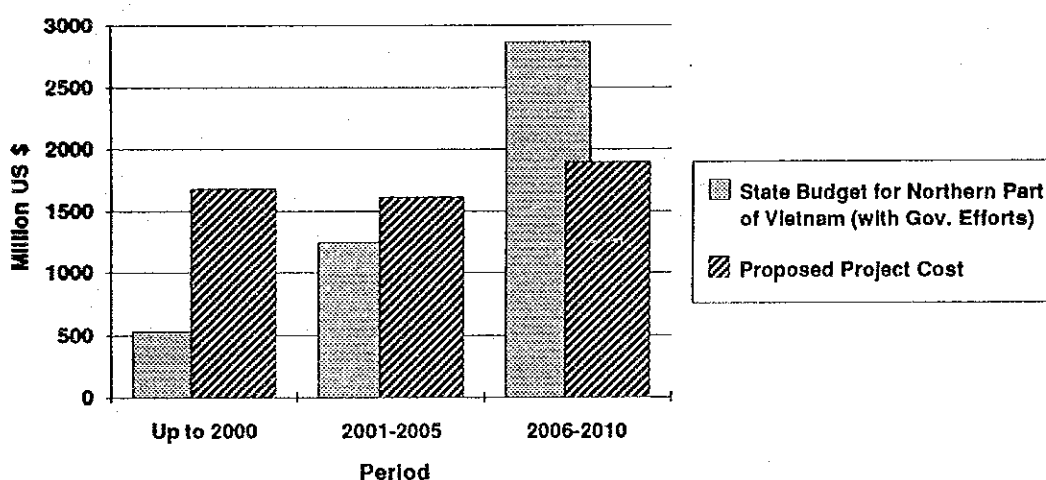


Figure 8.2.2 Required Budget and Government's Financing Capability

This expansion of transportation investment share in the State budget can be achieved by means of:

- 1) Introducing usage fixed tax on gasoline,
- 2) More wide application of toll system,
- 3) Priority allocation of investment budget to transportation section.

These figures are calculated

- 1) Share of transport sector investment in GDP in 1994 is set from 0.4 %, equal to the level in 1993.
- 2) Figures in "Trend" are forecasted by applying the investment share of transport sector in GDP in 1994 (= 0.4 %) to these rates to the GDP figure over the period up to the target year 2010, by multiplying GDP of every year.
- 3) Figures of "With Policy Efforts" assumes:
 - Share of transport sector investment in GDP in 1994 (= 0.4 %) will be raised up to 3 % in the year 2010, gaining a share by 0.16 % every year.
 - Growth rates of GDP are set 7 % up to the year 2000, and 10 % for the period 2001 - 2010.
 - Investment budget is dependent of the GDP.

Fig. 8.2.2 proves that the state budget can finance a large part of a required investment cost for the transport sector up to the year 2010, if the Government will adopt a priority allocation of its budget on the transport sector, and if it will work well.

However, at the initial year up to the year 2000, its financing capacity is far below the target. On the contrary, in the 2006 -2010, the former exceeds the latter and can convert the capital inflow to outflow to pay back the foreign capital.

Gap is indispensable to an initial dynamism especially 1994 - 2000 by facilitating a well planned transport infrastructure, and therefore assuring the foundations of economic activities.

- Required investment cost is shown in Table 8.2.5.

Minimum investment requirement amounts to 1,687 million US Dollars up to the year 2000, followed by 1,615 million US Dollars for the 2001 - 2005, and 1,880 million US Dollars. Total investment cost reaches at 5,182 million.

This imposes a heavy financial burden because of a relative small scale of budget, reflecting the urgent necessity on restoring a power of economic dynamism.

Table 8.2.5 Investment Cost of Proposed Projects (All)

(unit: million US\$)

Sector	up to 2000	2001 - 2005	2006 - 2010	Total
Road	1,098	1,174	1,331	3,603
Railway	214	236	412	862
Port and Sea Transport	314	185	136	635
Inland Waterway	56	21	21	98
Total	1,682	1,616	1,900	5,198

(3) Implementation Procedures Economize on Project Investment Expenditures

Financial resources are scarce; budget resources are very limited. In this situation, one of the most effective measures is to improve project formulation and administration so as to attain high efficiency in management of project work.

Introduction of competition has been promoted since the Doi Moi policy was introduced in Vietnam. It is one of the best principles to increase overall production and management efficiency. This is because competition to obtain the project contract can contribute to minimizing cost necessary to achieve a goal. For instance, achieving maximum efficiency in implementing an infrastructure project such as a road, means that it can be constructed at the least cost with most appropriate usage of resources, and under favorable conditions this outcome may be induced by competition.

Pre-requisites of fully attractive competition are;

- Existence of a number of contractors with sufficient technical capability and capital
- Fair bidding and bid evaluation procedures

It is considered that the first of these pre-requisite conditions is not yet fulfilled in Vietnam since the number of domestic contractors is rather limited, especially those with sufficient technology and capital to carry out the necessary work. Some possess few machines, and others have employed very old equipment. Also the second condition is not perfectly guaranteed. For some road construction projects, it is reported that assigned contractors are decided prior to bidding. Some of these customs are inherited from the previous centralized and non-competitive conditions, and others are attributable to the fact that those concerned are not familiar with cost-minimizing principles in the market economy.

Another important aspect of implementation is the capacity of Vietnamese agencies in implementing the projects. Their means are widely admitted to be very limited because of shortages in funds and technology headed to carry

out construction and maintenance. In addition, actual operational rates of equipment are reportedly low. This is attributable to the old age of the equipment and the fact that the producers had already stopped manufacturing the machines and their spare parts a long time ago. As a result, only 48 % of maintenance equipment is operational.

Some possible countermeasures are suggested below. All of these proposals are to be considered as alternatives, and some of them are mutually exclusive, meaning that they could not all be implemented at the same time.

- Construction segments of the project should be divided into short and small ones to make the participation of small companies easy.
- Formation of joint venture companies with foreign contractors should be encouraged until domestic contractors become sufficiently strong in terms of technology, administrative capacity, and management capital. This suggestion also aims at stimulating transfer of technology, and management know-how. It may as well give domestic firms access to a capital base large enough to carry out the construction projects.
- Loans with low interest for purchasing necessary equipment should be provided to the contractors if they take part in the construction projects. This is because many contractors employ very old equipment and cannot afford to pay in advance for new equipment.
- Quality control and supervision functions should be strengthened. With participation of a number of contractors, the function of quality control is indispensable.

All these counter-measures aim at improving the local contractors' capability to carry out the project, and also are intended to maintain the quality of final results. This is the most efficient usage of national resources such as capital, and materials.

8.2.3 Action Program

The main recommended components are:

- Priority budget allocation to transport investment
 - up to 3 % of GDP of the year 2010
- Introduction of a new usage specified tax for transport sector investment
- In case of implementation delay or incapability of the policies above, the gap can be financed by foreign donor countries.

APPENDIX

- 1. VNR Management Reform and Education/Training**
- 2. Inspection and Repair of Railway Bridges**
- 3. Plan for Capital of the Terminal and Berths**

APPENDIX 1: VNR MANAGEMENT REFORM AND EDUCATION/TRAINING

1. MANAGEMENT REFORM

1.1 REQUIREMENT FOR VNR MANAGEMENT REFORM

Business environment surrounding VNR has drastically been changing since the beginning of economic reform. VNR has been required to be an independent finance system. However, transport demand for passenger has been decreasing but cargo transport not decreasing. In spite of decreasing of total transport volume, income of VNR has kept even with previous year due to raising tariff. VNR has reduced necessary expenditure to hold income and expenditure in even. Consequently, VNR has reduced the number of passenger trains and it accelerates reduction of passenger and lost its basic functions.

VNR is required to develop their own management and marketing policy and strategies to cope with this severe economic and management situation now under the absence of top down instructions from the Government as used to be in the old regime. VNR needs to prepare a detailed program for this integration by taking account of market demand, competition with road transport, streamlining of existing railway systems, and availability of financial resources. This necessity could be conceptually acceptable to the VNR management, but it is also dubious if they can work out any business policy and strategies that were completely absent in old regime.

1.2 RESTRUCTURING OF VNR

To cope with the changing business environment in a market economy, VNR needs to restructure the whole railway system that were succeeded from the centrally planned system which attached a great importance to railways. The requirements for VNR restructuring would include:

- (a) streamlining of existing railway systems through withdrawal from unprofitable business and reduction of redundant employment;
- (b) rationalization of management and operation to reduce unnecessary expenditures through introduction of costing and management information systems and relocation of resources;
- (c) modernization of services which should be the future profit centers for VNR, for example, intercity and long distant passenger transport, international transport, bulky cargo transport, and commuter transport in Ha Noi.

The restructuring of VNR needs to be realized not through a discretionary judgment of VNR management but through a close consultation with market demand.

Decision making system of VNR is now a tendency to think lightly of or neglect market demand due to the lack of knowledge of modern marketing.

Management layers needs to be supported with the effective Management Information System (MIS). The restructuring of VNR to cope with changing market will entail a significant change to the existing management attitude and requirement of employees.

- (a) reduction of total employment with modernized management technology, for example, review of rules and regulations, train operation diagram and productivity;
- (b) change in staff from inefficient to efficient segments;
- (c) introduction of intensive system; and
- (d) increasing importance of training.

1.3 REQUIREMENT FOR VNR MANAGEMENT

Human resource, particularly managers, is the most critical factor for successful restructuring of VNR. Due to the familiarization with the centrally planned system for long time, however, it is probable that the current human resource might be a serious constraint to restructuring. Training of VNR management is essential for improvements, progress and innovation, instead of conservatives to be obedient to the traditional way of doing things.

First, VNR management needs to understand what is a market economy. A market economy is not an economy in which competing suppliers set their prices higher than costs to recover them and gain profits. Instead, a market economy is an economy in which market prices are determined through price cutting race among competitors who are striving to reduce their costs to defend margin of profits. The most powerful tool for above mentioned target is 'QC, Quality Control' or TQC, Total Quality Control'. Though the situation might not be directly applicable to railways, VNR management needs to clearly understand the principles of the market mechanism.

* Definition of QC in Japan is that QC is a production method which products commodities and services that users want with minimum cost.

Second, VNR management needs to change their attitude from passive traditional systems into the active pursuit for change. VNR, based on its own judgment, should develop their own markets by introducing services satisfactory to customers, on one hand while VNR should withdraw from market where road transport has absolute superiority over railways on other hand. VNR needs to develop a new management system that effectively contributes to enhance the total productivity of the organization. It is a challenge to VNR to develop such market and management systems that are common in advanced railways.

Third, VNR management needs to understand and be acquainted with leadership in an organization. Fundamental requirement for effective leadership is to clearly define the mission of an organization. A leader of an organization should develop and maintain the target of an organization, priority of actions and standards for achievement. A leader should create clear visions to absorb energy of the members of an organization. This seems to be quite deferent from the leadership required in the old regime.

Fourth, VNR management should be familiar with the modern management tools and know-how developed and executed in advanced countries. Managers should be capable of well integrating management resources of capital, technology and human resources for satisfying market demand. The management tools and know-how include:

Business policy, marketing, financial management, production and operation management, and human resources management.

These management tools and know-how have been developed in a market economy where companies are competing each other for customers satisfaction by best utilizing their limited resources.

Fifth, VNR manager should be well acquainted with foreign languages, particularly English, for meeting the immediate managerial needs and internationalization. Direct access to the theories and practices of advanced management technology will greatly contribute to change their way of thinking and learn the management tools and know-how.

2. DEVELOPMENT OF HUMAN RESOURCES MANAGEMENT

2.1 GENERAL FRAMEWORK OF HUMAN RESOURCES MANAGEMENT

Human resources are the most important and critical factor in the management. It is the human resources that reform management, develop new technology and introduce new products in the market. Technology and capitals can be moved from foreign countries to Vietnam through official development aid (ODA). However, a majority of human resources needs to be locally supplied, especially through existing employees. In the case of VNR's particular situation, human resources is by far important because of the urgent needs of restructuring for survival in a market economy. The companies that have developed and maintained a good human resources management system have shown a good business performance. They have paid full attention to human resources planning, employment of competent staff, offer of challenge jobs, and satisfaction of staff in term of self-attainment.

Dismantling of pyramidal structure in view of quickly respond to market demand will disperse decision making to lower levels of management. In such case, decision making needs to be managed not through top down instructions but through 'Management based on objectives'. With a view to develop VNR's

responsiveness to market, the management system of VNR should be decentralized through the strengthening of business units which focus on specific market segments.

As can be understood from the above, human resources management should be highlighted ever than before to be closely knitted with the total restructure of VNR. However, complete organizations and upgrading of human resources are time consuming process. VNR needs to develop a medium/long term employment policy. Under this policy, short term actions should be decided.

- (a) Rationalization: Focus on reduction of employment, staff relocation and orientation to a market economy.
- (b) Modernization: Focus on decentralization of decision making, adoption to a market economy and preparation for internationalization.
- (c) Internationalization: Focus on quality improvement, diversification of international transport services.

2.2 RESTRUCTURING OF HUMAN RESOURCE MANAGEMENT DEPARTMENT

The present positioning and roles of the human resource department including the training schools should be revised to comply with the objectives of the total restructuring of VNR. The current human resource department mainly deals with bureaucratic administration works of employment, wages and social affairs without any strategic missions for the future. However, the new missions of the department should be closely geared to the business policy of VNR in attracting capable new staff, cultivating their capacity, raising their moral, and best utilizing their capabilities, coupled with fulfilling another mission of rationalizing redundant employment.

A deputy general director needs to be assigned especially to the revised human resource management department and implementation of a new training school. This will enhance the position of the department in VNR and tract whole VNR toward restructuring with the cooperation of a new "Strategy Group" established in the head office of VNR. Almost reformation and projects are closely concerned with human and finance resources, therefore, the department will have a leadership to execute them with the coordination and adjustment for inter-departmental as well as inter-business unit.

Major function of the department should include:

- (a) job analyses and description;
- (b) recruitment, employment, assignment;
- (c) job rotation and career development;
- (d) education and training;
- (e) efficiency rating and promotion;
- (f) wage and incentive systems; and
- (g) reduction of employment.

These aspects need to be closely linked to each other for the purpose of total productivity improvement of employees. 'Education and training' are important to make employees familiar with the principle of a market economy as well as modern management tools and know-how, and make them acquainted with newly assigned jobs. 'Education and training' should be closely linked with 'career development, efficiency rating, and wages and incentive systems for the purpose of making the most of the output of 'education and training'.

3. EDUCATION AND TRAINING

3.1 GENERAL FRAMEWORK OF EDUCATION AND TRAINING

Positioning of the education and training system in an organization represents the degree of a company's determination how much importance is placed on the human resource development. In consideration of the urgency of restructuring VNR toward a market economy that is completely new to VNR, reformation of the human resource management, especially education and training, is one of the most important fields that the VNR should address. The positioning of the education and training system should include not only the place in the organization but also staff composition, budget allocation, training programs and facilities, and execution of education and training.

At this moment, the basic needs of VNR seem to be acquaintance with and understanding of principles of market economy as well as management tools and know-how used in the market economy which can be efficiently applied to the VNR restructuring. Strengthen of staff composition is an important issue to be addressed. It is likely beyond their capacity to develop the education and training programs that are truly compatible with the current requirement. Systematic input from the western world would be indispensable in this regard. VNR needs to establish a collaboration framework with foreign countries and experts based on bilateral or multi-lateral technical cooperation programs.

Vietnam Government has strengthened education and training. VNR's training has been supported by the Ministry of Education in finance. Excellent staff is allocated for education and training of VNR and many students have been dispatched for training. However, the quality of education and training is very low level due to insufficient teaching materials and poor training facilities. Moreover the lecturers of training school are not familiar for a market economy. This situation needs to be revised to secure uninterrupted upgrading of human resources. Primary effort should be made to secure assistance of foreign countries. On the other hand, VNR needs to increase investment in human resources to increase productivity.

Major field of education and training required are:

- (a) orientation to the principle for a market economy;
- (b) acquaintance with management tools and know-how in the market economy;

- (c) preparation for internationalization of VNR operations;
- (d) education and training to facilitate relocation of staff to new assignment; and
- (e) education and training to facilitate job switching from VNR to outside.

Under the circumstances, primary importance should be placed on the management training with a focus on (a) and (b) above, followed by (c).

3.2 VNR MANAGEMENT TRAINING PROGRAM

Among other things, lack of competent managers in a market economic sense is the most serious bottleneck against the restructuring toward a market economy. As stated earlier, managers in market economy are required to make quick decisions from time to time taking account of every factor including market demand, competitors, and possible actions the company can take. The managers of VNR are not only required to understand the principle of a market economy, but also needs to effectively fulfill their duties through complete familiarization of management tools and know-how in a modern management.

Conceptual understanding of these principles, and tolls and know-how would not be so difficult when high level of intelligence of VNR management is taken in account. However, it would be quite difficult and take several years to properly gear their perception and behavior with the new knowledge they have acquired.

3.3 TRAINING PROGRAM OF PRINCIPLES OF A MARKET ECONOMY

Main objective of this program is to familiarize the managers of VNR with the principles of a market economy and the general business policies. Education and training on the general business policies focus on the roles and responsibilities of managers in formulating corporate policy and strategies aiming at a long term prosperity in view of market demand, competitors, and own positioning in the market.

Contents of this training could be exemplified as follows:

- (a) to outline "a captain" who can effectively control the followers toward a target through his or her wide area of knowledge on business activities;
- (b) to outline "a captain" who can take leadership in guiding the followers through increasing entrusting of tasks to them;
- (c) to outline "a captain" who can develop the directions and objectives of business operations through deep foresight for the future; and
- (d) to outline "a captain" who can the tolls and know-how of the modern management with which managers should be fully acquainted.

This training program is particularly important for the top management of VNR so that they could have a basic knowledge of a market economy and general business policies.

Candidates of participants include high ranking staff in the head office and business units. Highly competent instructors need to be sought domestically and internationally. However, due attention should be paid to recruit instructors of Vietnamese parentage who well understand modern management or excellent interpreters who well understand a market economy. Japanese delegations have come Vietnam and held seminar on new management frequently and supplied text books on modern management in Vietnamese version. Such chances should be utilized to cultivated excellent instructors.

3.4 TRAINING PROGRAM OF MANAGEMENT TOOLS AND KNOW-HOW

Main objective of this training program is to make the managers of VNR understand the major construction of management tools and know-how adopted in market economy. This program includes:

- (a) "business policy" which further elaborate "the general business policies" delivered in above program;
- (b) "organizational behavior" in which managers learn how to promote the positive interactions between organization and human resources;
- (c) "marketing" which managers learn how to develop a marketing strategy based on clear understanding of market characteristics, competing companies and their own company;
- (d) "financial management" in which managers learn principles of accounting system, investment decision making, capital management and future raising;
- (e) "production and operation management" in which managers learn how to develop an efficient production system through the appropriate combination of labor, technology and investment;
- (f) "human resource management" in which managers learn how to motivate employees in improving their productivity; and
- (g) "management communication" in which managers learn how to best communicate with others for winning consent.

The coverage of this program is extensive and each topic is profound. The training program should be prepared for the general orientation of every topic in a first session with a view to providing overall outlook of the tools and know-how in a modern management. Further detailed programs for each topic need to be prepared for looking to the need of those who try to improve their capacity in daily operation. It should be in mind that the training program is not enough

for managers to make these tools and know-how operational in their activities. Self-culture coupled with on-the-job practices is essential for their mastering of respective topics.

3.5 TRAINING PROGRAM OF MANAGEMENT BEHAVIORAL CHANGE

Group discussion is efficient to change behavior toward a new framework and to understand market economy. Time of over a half of semester should be allocated for group discussions during in-house management training. There are several training programs in the form of group session in order to change management behavior:

- (a) Case study method;
- (b) In basket method;
- (c) Business game method;
- (d) Group discussion method;
- (e) Role playing method;

These programs, which are organized as group training program, provide an opportunity for participants to adjust or change their way of judgment and behavior through the understanding of oneself.

3.6 TRAINING PROGRAM FOR ENGLISH

Training of English language is essential for VNR management in terms of both facilitating other training programs and preparation for future integration with the international railways. Some type of facility should be developed to encourage learning English:

- (a) class room training in the VNR training school;
- (b) participation in outside English classes with the support of VNR; and
- (c) provision of English learning materials for self training.

JNR had published in the past "Foreign Railways News" in Japanese version that are abstracted and translated form foreign magazines. Interesting topics in foreign magazines were selected and were allocated for young engineers with some fee as a scholarship in order to encourage English study. This news were not only obliged young engineers to study English but were very valuable for managers to get information in abroad.

3.7 EXECUTION OF THE TRAINING PROGRAMS

The management training programs discussed in the above are important for VNR but they are not only for VNR. There are common features useful to any other Vietnamese organizations that are going to restructure from the old to a market economy. In order to diffuse the knowledge of training as well as to save training costs incurred to VNR, there might be a possibility to develop the

management training courses in cooperation with the Ministry of Transport and Communications.

The study enumerates several obstacles to successful management training. The following points would be especially worth of noting in case of VNR.

- (a) Timing of training: to consider not only what managers need to know but when they need to know it. Information and skills that are not used immediately deteriorate quickly.
- (b) Balance in training: no single key to becoming an effective manager. Every manager needs a spectrum of skills, from administrative abilities to technical knowledge. Management training must provide a balance if it is to produce well-rounded, capable managers.
- (c) Accountability: To establish some objective criteria to evaluate management training program and re-examine the program constantly.
- (d) Renewal of training: to be alert in regularly reviewing the relevance of adopted training courses, in-house courses in particular by asking why managers need the courses they are taking.

As stated above, once the management training programs are implemented, incessant improvement should be sought for better application to the current situation of VNR. This is particularly true for this type of training because they are quite new in character to support a transition to a market economy.

APPENDIX 2: INSPECTION AND REPAIR OF RAILWAY BRIDGES

1. INTRODUCTION

1.1 DETERIORATED BRIDGES

There are many bridges said to be "superannuated" in VNR and they have made speed restriction necessary in many places. However, "Superannuated" in this sense is apparently a catch-all term describing two different situations: bridges which are old in years and/or aged from the point of view of risk of fatigue failure, or one hand; and on the other, bridges suffering from lack of maintenance. In most cases actually "superannuated" is not the correct term, as age of bridges in VNR is rather young in relation to fatigue failure risks.

So, "deteriorated" (from insufficient maintenance and repair) should be used for most current bridge conditions. Bridges in VNR are deteriorated due to accumulated insufficient maintenance and repair. Speed restrictions have been decided by visual observation and the judgment of experts. The speed restrictions on many bridges have created large obstacle for marketing of VNR. Marketing and investments in a free market economy need to be implemented with modern management technology and theory. Therefore, maintenance and repair of bridges should be implemented not only by visual inspection and experience, but supported by scientific and technical data and manuals. Speed restrictions should be revised using modern technology developed in Japan.

1.2 LIMITED FINANCIAL RESOURCES FOR BRIDGE REHABILITATION

Rehabilitation of bridges is too great a burden for the budget of VNR, because there are many projects that have higher priority than bridge rehabilitation. "Safety" of train operations is the most important consideration for railways, but the restructuring of VNR management and operation systems are also important and urgent actions in order for the Vietnamese railways survive in a market economy. Safety is the first-ranked priority, but the survival of railways in a market economy is equally high in priority.

Investments for VNR need to be surveyed and studied from a viewpoint of economic and financial evaluation. As it is difficult to invest for bridge rehabilitation from the small financial resources of VNR, financial supports from the Government budget and from foreign loans are necessary for the bridge rehabilitation. A feasibility study or an economical evaluation is essential for political decision and foreign loan appraisal.

It should be borne in mind that financial resources for bridge rehabilitation will be far from meeting the demand of VNR in the near or even in the far future. Consequently, as it is existing bridges said to be dangerous would nevertheless continue to be used for several decades and more.

Since an economic evaluation and an operative definition of safety items are very difficult, in a market economy there is usually an inclination to postpone budgeting for bridge rehabilitation. Social, environmental and disaster prevention values as well as safety are usually described in a report as unmeasurable aspects of a project. If success is to be achieved in securing a sufficient budget for bridges which is necessary, the bridge department needs to arm itself with scientific and technical data and explanations. If a bridge rehabilitation project is evaluated with technical and scientific data and economic analysis, it will be easier to substantiate a favorable project evaluation for the benefit of the offices concerned with planning and finances in the Government.

Earlier this project-justification problem was also a headache of bridge engineers in Japan, so they had investigated and developed theories, standards, manuals, organizations and experience for bridge inspection and repair. As a result JNR could better estimate the necessary budget and priorities of bridge rehabilitation.

2. INSPECTION OF BRIDGES

2.1 GENERAL

In any case, some amount of budget should be allocated for the bridge rehabilitation, and then the limited budget for bridge needs to be used efficiently. However, no detailed technical inspection of bridges has been carried out even though that is essential for the rehabilitation program in VNR. VNR has no equipment or tools for technical inspection.

Modern inspection and maintenance procedures developed in the former Japanese National Railways would be very useful and helpful to establish a rehabilitation program in VNR. By these methods defects of bridges could be classified and rated numerically, so that even financial planners could understand the necessity and priority of each rehabilitation item easily.

It should be kept in mind that a steel bridge is easily repaired by replacing its parts or by patching.

2.2 CLASSIFICATION AND RATING OF DETERIORATED BRIDGE

Many railway structures of JNR were seriously damaged by the war of the 1940's and their repair was neglected for a long time due to the overdue recovery in national economy which was not complete until the 1960s. Under these severe

conditions, bridge engineers had investigated actual conditions and developed inspection and repair technology.

Main features of that system are as follows:

2.2.1 Classification of Defects

Defects of structure members are classified as follows:

Class AA: A structure where normal use is difficult and countermeasures have to be taken immediately.

examples:

- relaxation of rivets in more than 30 % of cases.
- axial crack on tension side.

Class A1: A structure whose condition does not affect safety at present, but operation safety may soon be degraded. Periodic observation is necessary.

examples:

- relaxation of rivets in less than 30 % of cases.
- axial crack on compression side

Class A2: A whose condition structure does not affect safety at present, but operational functions may be affected in the future. Periodic observation is necessary.

Class B: A structure with a defect which does not affect functions at present, but progress of the defect needs to be monitored.

Class C: A structure whose condition does not impair functions, but has one or more slight defects.

Class S: A structure which has no defect or only minor defects unrelated to function.

2.2.2 To Review Existing Steel Stress

Specified strength of steel that is applied in a design includes some additional or spare strength, including the following components: premium for manufacturing error (addition of 6 %), premium for concentrated force at rivet holes (25 %), extra force at the time of construction (10 %). When such premiums are not estimated individually, it will usually be sufficient if supplementary strength of approximately 45 % can be added to the original specified strength of steel. This concept is termed "maintenance limit stress".

JNR specified the tensile stress of steels of different vintages according to the maintenance limit principle as follows: (unit: kg/cm²)

Steel manufactured year	before 1912	before 1928	1929- 1950	1950- 1969	after 1970
Original specification	1,125	1,200	1,200	1,300	1,400
Maintenance limit stress	1,650	1,650	1,760	1,840	1,680*

* 1680; major share of bridges are welded

Real steel strength of existing bridges can be re-calculated using the corresponding maintenance limit stress. In this approach actual remaining strength of a bridge is re-calculated based on: remaining dimensions of structural members; current train loads; and the maintenance limit stress.

JNR used bridge beams imported from Europe and the USA in old times, just as VNR has done. Therefore, JNR may have many useful data on the character of the same old steel used in VNR bridge. When VNR reviews strength of bridges by "maintenance limit stress", its methods of estimating the strength of bridges will be upgraded by pencil and paper.

2.2.3 Fatigue Failure of Steel Members

Fatigue failure is an important factor take into account in predicting the residual life time of the structure. Steel stress is specified as a limited number of repeatedly alternating stresses. The number of times of alternating repeat is 2 million times in general.

Life time of a bridge is usually specified as about 50 - 70 years according to the depreciation rule, but it is actually decided technically, especially by fatigue failure limitation. In the case of Japan, a bridge on a line that carries 100 trains in a day reach will the repeating number of 2 million after 50 years. The life time of that bridge is therefore technically specified as 50 years. However, many such bridges have not been replaced yet, and are used now in Japanese and European railways. Periodically they are carefully inspected and maintained.

Train numbers in a day in VNR has been approximately 25 in the past and at present, so the life time of their bridges would be over 200 years (4 times the example above) based on fatigue failure. In this sense it can be said that bridge age in VNR is still rather young.

The term "Superannuated" is often used for bridge conditions in VNR, but it is not correct, rather "deteriorated" should be used to describe current bridge conditions. Bridges in VNR are not actually superannuated, but have been deteriorated due to accumulated effects of insufficient maintenance and repair in the past.

2.2.4 Rating of Soundness

Rating of soundness and safety is best shown by a "number" in order to decide safety level, priority for budgeting, and speed restriction. In the general

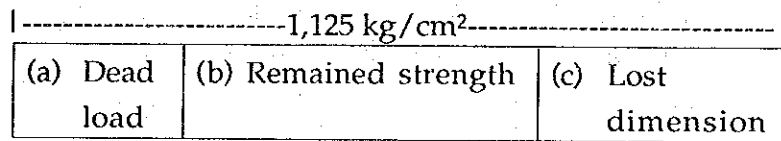
inspection, the degree of soundness is rated based on only the most significant and representative defect among many others.

JNR defined a rule for rating as follows:

Ratio of soundness (%) = $\frac{SR}{AS} \times 100$; or
 $\frac{(b)}{(d)}$ or $\frac{(e)}{(e)}$ x 100 in the following figure.

Variables in this formula are defined as follows:

SR: Strength by remaining dimension (after excluding corroded dimension). Original specified steel stress is applied in this calculation, for example, it is 1,125 kg/cm² for bridges manufactured before 1912



(c) dimension lost by corrosion or defects.

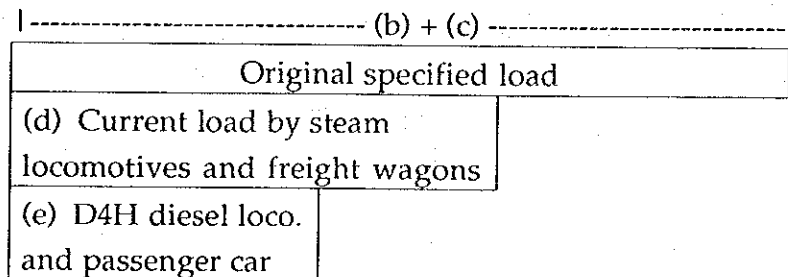
AS: Actual stress with current rolling stock load except impact generated by speed.

Since current load conditions are different from the original specification, soundness should be reviewed on the basis of current freight trains pulled by a heavy steam locomotive, and passenger trains pulled by light weighted D4H locomotive.

Load schemes for a bridge span in old times compared with the current actual trains are as follows:

- doubled headed steam locomotives of 56 ton + 56 ton = 112 ton in 1891.
- doubled headed steam locomotives of 76 ton + 76 ton = 152 ton in 1927
- a steam locomotive of 70 ton at present
- a D4H diesel locomotive of 26 ton or a passenger car of 50 ton at present.

This comparison can be represented graphically as follows:



2.2.5 Speed Restriction

Speed restriction is calculated by the impact of a running train at each speed, and maintenance limit stress. For example, bridge was constructed with original specified stress ((f) in the following figure). After that, this bridge has been reduced in dimension by corrosion or defects (g).

Actual stress of the existing dimension is calculated using the maintenance limit stress and the current train load including impact due to train speed.

(f) Original dimension by 1,125 kg/cm ²
(g) Existing dimension by 1,125 kg/cm ²
(h) Modified dimension by 1,650 kg/cm ²

As a result of this calculation, the relation between ratio of soundness and speed restriction is decided as follows:

A: bridge span 20 - 30 m, B: over 30 m. Light weight train is equivalent of a passenger train pulled by D4H.

Ratio of soundness (%)		60	62	64	66	68	70	72	74
Speed restriction km/h	A	25	35	45	50	55	60	65	75
Steam locomotive	B	20	25	30	35	40	50	55	65
Light weight train	A	40	50	55	65	70	80	85	95
	B	40	45	50	60	70	75	85	90

- Bridges that have ratio of soundness under 60 need to be repaired.
- Deflection by live load and native vibration needs to be measured to define.
- Track irregularity needs to be corrected, and structure needs to be maintained in good condition in order not to generate additional impact from track irregularity.

The lowest speed restriction due to deterioration in Japan is 20 - 40 km/h. Speed restriction at the Long Bien bridge is presently set at 15 km/h for steam locomotives of 70 tons in weight as well as for D4H locomotives of 26 tons, but differences in train weight could be reflected in different speed restrictions as mentioned above. It is a fact that a heavy steam locomotive has operated on Long Bien bridge for the last 20 years without serious damage to the bridge. This speed restriction should be revised by the theory and facts explained above.

Revision of speed restrictions could be executed with small money and some technical assistance from advanced railways of other countries. However, the beneficial effect of doing that, for the improved service which could firm be offered by VNR and its marketing, would be large. Especially this is so because

speed restriction on Long Bien bridge is a bottleneck for the train operation in the railways of the whole Northern part of Vietnam as well as in the Ha Noi urban transport project.

3. BRIDGE REHABILITATION PROJECTS

In bridge rehabilitation projects, attention should be paid to the following issues:

- (a) Bridges that are said to be dangerous may still have to be used for several coming decades due to an insufficient budget. The budget of VNR will become more tight year by year.
- (b) As bridge replacement, repair and rehabilitation works will continue over several coming decades, it is essential to implement as fast as possible the introduction of new technology, organizations for inspection and repair, cultivation of young engineers, upgrading of repair work capacity and training of bridge technicians are .
- (c) Inspection and calculation of existing strength of each bridge member should be implemented at first. Then, a long term bridge maintenance plan will be established. It should be taken into consideration at the time of planning, that the budget for bridges is limited.
- (d) Quantitative indicators as well as other scientific and technical data are essential in order to secure budgets for bridge rehabilitation in a market economy.

4. TARGETS AND STRATEGY OF THE BRIDGE DEPARTMENT

The following strategy and targets are recommended for the bridge department:

- (a) It is urgent to introduce modern bridge technology. This target will be implemented with assistance from advanced railways, and dispatching VNR's engineers for overseas training.
- (b) Since bridge rehabilitation works will continue for a long time, it is essential to cultivate young engineers of the next generation. Young engineers should study at colleges and institutes abroad. As there are many reports, textbooks, information, manuals and data available in Japanese versions, it is the best way in the long term view, to learn Japanese language at first and then study at a college or institute.
- (c) Modern bridge technology including inspection and repair will be transferred through "the Replacement of Long Bien Bridge" project, because, an inspection of Long Bien bridge should be executed at first. Inspection technology, standards for judgments, inspection equipment and countermeasures for repair of the bridge will be transferred to Vietnam at first.

- (d) Approximately 5 years will be spent for the survey of Long Bien bridge. This project can be viewed as a school of bridge engineering. Engineers living in Vietnam will learn new technology through experts from abroad. The program of young students studying abroad will be kept in pace with development of a domestic bridge engineering school.
- (e) Design and construction of a new Long Bien bridge should be implemented by Vietnamese themselves in order to take off as an industrial country; and
- (f) VNR should establish a program to find an assistance abroad for the Long Bien project.

5. LONG BIEN BRIDGE PROJECT

5.1 TECHNOLOGY TRANSFER IS THE FIRST PRIORITY

As explained above, almost-modern technology will be applied to a Long Bien bridge project in the course of implementation. When Vietnamese engineers absorb technology, technique and know-how carried into Vietnam by the project, rapid progress will be made in bridge technology, such as inspection technique, design capacity and manufacturing capacity. Technology and equipment carried in and absorbed will be applied for other bridges.

A Bridge Design and Inspection Institute should be established in Ha Noi in order not to lose again the technology which has been introduced. All technology, experts, data, textbooks, research equipment and machines, and computer software should be concentrated into the institute.

The objective given the first priority in the project is not replacement of the bridge structure itself, but introduction and absorption of bridge technology.

Long Bien Bridge is a civil engineering structure which is famous in the world, and also one of the greatest national symbols in Vietnam. When it is designed and constructed by Vietnamese themselves, a new Long Bien bridge will be memorized in the heart of Vietnamese as a mile-stone of their take-off toward an industrial country. The Tokaido shinkansen has been similarly memorized in Japan as a turning point toward the current development of Japan.

5.2 TECHNICAL ISSUES NEEDING TO BE STUDIED

5.2.1 Whether existing caisson piers can be used longer or not

Replacement costs of Long Bien bridge are assumed to be 60 million US\$ for the upper structure and 40 million US\$ for the lower structure. If the lower structure can not be used more, more construction cost needs to be added not only for a new lower structure, but also for the cost of approach track construction, a new Gia Lam station, and land acquisition in a dense housing area. Construction cost for the lower structure alone is equivalent to the present whole income of VNR in a year.

Therefore, a survey should be conducted at first to ascertain whether the existing caisson piers can be used longer or not. A cost-effective plan for Long Bien bridge replacement project cannot be established without any report on the soundness of these caisson piers.

As a caisson is a massive concrete structure, there might really be no problem in their bodies. A critical issue is bearing capacity of the ground at the foundation of a caisson. To check this a vertical well will be dig beside the pier and then the detailed ground condition can be checked. In the process Vietnamese engineers will learn many modern geological technologies, and modern equipment and machines for soil testing will be installed in an institute in Ha Noi. If bearing capacity of the foundations is insufficient, the possibility of injecting chemical grouting into the foundation bed of the pier needs to be studied. This grouting technology can also be applied for rehabilitation of tunnels.

5.2.2 Loading Scheme and Construction Gauge

A standard gauge track comes from the China border up to Gia Lam station. P.R. China railways have already scheduled in their timetable a plan to operate an international train from Beijing to Ha Noi. An international train should terminate at a central station, Ga Ha Noi, for the dignity of the nation.

Therefore, a construction gauge for an international rolling stock, and a loading scheme of the standard gauge (axle load 19 ton) should both be studied.

5.2.3 Repair of Long Bien Bridge

It will require over 10 years to study and construct a new bridge, because:

- There are many technical, social and economic issues to be surveyed, studied, discussed and resolved.
- Financial resources for projects will become very tight by around 2000, because there are many projects needing to be implemented urgently.
- Long Bien bridge should be designed and constructed by Vietnamese themselves, and preparation time is necessary.
- The construction term for a new bridge requires 3 - 5 years

Repair of the bridge is necessary at first, to use the current bridge longer according to the conclusions of inspection and countermeasures, as the inauguration of a new bridge will only come approximately in 2005. The repair should put emphasis on the improvement of speed restrictions.

5.2.4 Double Tracking

Double tracking is deemed to be necessary. As a new bridge will be used for a very long time, the bridge needs to be planned for double tracking. The approach track route in Ha Noi has to be studied. It is hoped that the original piers have

sufficient bearing capacity for double track weight accompanying the bicycle and pedestrian decks.

5.2.5 Replacement Works

Replacement work on an upper structure is generally executed without stopping train operation in Japan. There are many kinds of replacement methods experienced in Japan, and appropriate alternatives will be studied on each bridge span that is on the ground or water, of simple truss beam or cantilever truss beam construction. A window time (time to close train operation) of minimum 8 - 10 hours is necessary for replacement works. A longer window time is better and will be studied taking into account of social, technical and economic conditions.

5.2.6 Uplift of the Bridge

It is said that the level of the bridge needs to be uplifted by 3 m for navigation of the inland waterway. It is stated the necessity is actual, a new bridge needs to be constructed on a new route, and construction cost will increase. The necessity of a higher clearance height for vessels should be carefully surveyed, giving full thought to the following considerations: There is heavy siltation and erosion along the Red river. The average depth of the river is under 2 m during dry season. The future demand for inland waterway transport will be limited to transport of bulk cargo, such as coal and construction materials. Any general vessel that has a high mast would come rarely. A comparative value analysis is necessary.

5.2.7 Environmental Issues

Several spans of the bridge on the Ha Noi side are better to be constructed of concrete with ballasted track, in order to mitigate noise, but bearing capacity of the original piers might not be sufficient for the heavier dead load this method would imply. In that case one or two new piers will be constructed between the original piers.

Long Bien bridge is a historical civil engineering structure famous in the world and has a grand view. Nowadays a bridge is often designed based on the visual view as the first priority, safety the second and economy the third consideration. It is hoped that the new bridge here will have a grand view equivalent to the original appearance.

5.3 IMPLEMENTATION PROGRAM

5.3.1 Implementation Phases

The Long Bien bridge project would be divided into 2 phases.

Survey, technology transfer, study and discussion are to be implemented in the first phase by 2000, and detailed design and construction are to be executed in the second phase after 2000. Technology transfer, upgrading of technique, education

and training, and installation of research equipment should be concentrated in the 1st phase.

The 1st phase includes the following items:

(Short term target)

- Inspection of the bridge by experts from abroad;
- Testing of steel of the existing bridge including fatigue failure test;
- To make a plan to repair the bridge and execute it with the help of experts from abroad;
- To convene steering committees for social, economic, environmental and technical issues;
- To study social, economic, environmental and technical issues with assistance of experts from abroad;
- A feasibility study will be executed as an integrated conclusion of the above studies. The study will include construction cost, a construction program, and social and economic evaluations;

(Long term strategy)

- To establish a Bridge Design and Inspection Institute;
- To install geological and mechanical testing equipment and machines in that institute.
- To dispatch students abroad to study, and provide technicians with on-the-job-training (OJT) in all fields of bridge engineering.
- To cultivate current companies concerned with bridge engineering

2nd phase includes the following items:

- detailed design of a new Long Bien bridge
- construction of the bridge

5.3.2 Bridge Design and Inspection Institute

A Bridge Design and Inspection Institute needs to have the following departments:

- (a) Steel structure for railways and roads
- (b) Concrete structure for railways and roads

- (c) Lower structure
- (d) Geological survey
- (e) Inspection of structure, supervision of construction works and completion inspection

The institute needs to be equipped with the following equipment and machines:

- Inspection equipment for bridges similar and structures (displacement measuring instrument, strain gauge and recorder, accelerometer, transit and level).
- Material testing machines (compression testing machine, shearing force testing machine).
- Soil testing machine (CBR testing machine, 3 way compression testing machine, consolidation measuring instrument)

5.3.3 Overseas Training

(a) Advanced course

Students learn Japanese language for 6 months in Vietnam and 6 months in Japan, and then join a university for 4 years (for students who have finished a high school) or a graduate school for 2 years (students graduated from a university). It is also desirable to work and acquire on-the-job-training (OJT) at a bridge design institute and with consultants in Japan. During OJT salary will be supplied by the company joined.

A contract is necessary between a student and VNR, to ensure that a student should work at VNR for 5 - 10 years after coming home.

Most of the cost for study needs to be paid for by the Vietnam side except during the term of OJT.

(b) Technician course

Technicians learn Japanese language for 6 months in Vietnam and then go to a Japanese bridge institute, consultant or other companies.

There are several kinds of training courses in Japan; An example of how this could be arranged is as follows:

- a sponsoring company in Japan is necessary
- Study of Japanese language in Vietnam is paid for by the Vietnam side.
- Living allowance during OJT training for 3 - 6 months in Japan needs to be paid for by Vietnam or supported by a sponsoring company.

- After the training term, a trainee contracts for a job. Salary is supplied from the company to the trainee like a Japanese technician, according to his technical ability.
- The term of work in Japan is 1.5 times the training term (6 - 18 months)

A contract is necessary between the student and VNRs, that a trainee should work at VNR for 5 - 10 years after coming home.

APPENDIX 3: PLAN FOR CAPACITY OF THE TERMINAL AND BERTHS

1. PRESENT SITUATION IN HAI PHONG PORT

(The following data were obtained through the site survey in Hai Phong Port by JICA's study team for the Urgent Rehabilitation Plan of Hai Phong Port, July ~ August of 1993)

(1) Container Terminal

Chuave; (2 quayside cranes are used for container handling)
 $17 \text{ TEU/crane.hr.} \times 2 \text{ crane} \times 15 \text{ hrs.} \times 350 \text{ days} \times 0.8 \times 0.6$
 $= 85,700 \text{ TEU/year}$
 $= 680 \text{ thousand tons/year}$
here 0.8 ; efficiency of the terminal operation
0.6 ; berth occupancy ratio
1 TEU = 8 ton

Main Port; (1 quayside crane and 1 ship crane are used for container handling)
 $20 \text{ TEU/hr.} \times 15 \text{ hrs.} \times 350 \text{ days} \times 0.8 \times 0.6$
 $= 50,400 \text{ TEU/year}$
 $= 400 \text{ thousand tons/year}$
here 0.8 ; efficiency of the terminal operation
0.6 ; berth occupation ratio
1 TEU = 8 ton

(2) Conventional Cargo Terminal

Main Port
 $15 \text{ ton/gang.hr.} \times 3.5 \text{ gangs} \times 20 \text{ hrs./day} \times 350 \text{ days} \times 0.8 \times 0.6$
 $= 170 \text{ thousand tons/year}$

(3) Bulk Cargo Terminal

Main Port
 $30 \text{ ton/gang.hr.} \times 3.5 \text{ gangs} \times 20 \text{ hrs./day} \times 350 \text{ days} \times 0.8 \times 0.6$
 $= 350 \text{ thousand tons/year}$

(4) Terminal Capacity

Cargo volume (tons) handled in one berth in one year.

		'000 tons/year.berth
Container Terminal	present Main Port	400
	improved Main Port	650
	Chuave	650
Conventional Terminal	present Main Port	150
	improved Main Port	200
Bulk Terminal	present Main Port	300
	improved Main Port	350
	present Vat Cach	150
	improved Vat Cach	200

2. CAPACITY OF THE PRESENT HAI PHONG PORT

	berth	'000 tons/berth. year	'000 tons/year, total
(1) General Cargo			
- Vat Cach	3	150	450
- Main Port bulk	3	300	900
conventional	6	150	900
- Total	12		2,250
(2) Container Cargo			
- Main Port	2	400	800
- Chuave	2	650	1,300
- Total	4		2,100
(3) River Traffic			1,000
(4) Grand Total	16		5,350

3. CAPACITY OF THE IMPROVED HAI PHONG PORT

Improvement of Hai Phong Port

- renovation of 3 container terminals in Chuave

Construction of 2 new terminals in Chuave
renovation and improvement of the cargo handling equipment
improvement of the yard

	berth	'000 tons/berth. year	'000 tons/year, total
(1) General Cargo			
- Vat Cach	3	200	600
- Main Port bulk	3	350	1,050
conventional	5	200	1,000
- Total	11		2,650
(2) Container Cargo			
- Main Port	3	650	1,950
- Chuave existing	2	650	1,300
new	2	650	1,300
- Total	7		4,550
(3) River Traffic			1,000
(4) Grand Total	18		8,200

4. CARGO VOLUME EXCEEDING THE CAPACITY OF HAI PHONG PORT

(thousand tons)

	2000			2010		
	(1) demand	(2) capacity	(1)-(2) excess	(1) demand	(2) capacity	(1)-(2) excess
General Cargo	3,260	2,250	1,010	7,480	2,650	4,830
Containers	1,510	2,100	-	5,140	4,550	590
River Traffic	1,100	800	300	2,600	1,000	1,000
Total	5,870	5,150	1,310	15,220	8,200	7,020

Excess cargo is handled in Cai Lan Port, Quang Ninh Port and Cua Cam Port.

5. CARGO THROUGHPUT IN HAI PHONG PORT AND CAI LAN PORT

Hai Phong Port (thousand tons)

	1993	2000	2010
(1) General Cargo	1,610	2,300	2,700
(2) Container Cargo	402	1,500	4,500
(3) River Traffic	638	800	1,000
(4) Total	2,650	4,600	8,200

Cai Lan Port		(thousand tons)		
	1993	2000	2010	
(1) General Cargo	-	600	4,100	
(2) Container Cargo	-	-	600	
(3) River Traffic	-	400	1,600	
(4) Total	-	1,000	6,300	

Quang Ninh Port and Cua Cam Port ; 300 thousand tons in 2000
700 thousand tons in 2010

6 BERTH PLAN

Hai Phong Port in 2010

Type of Cargo	Depth m	Unit- Length m	Capacity Thousand Tons/Berth	Number of Berths	Total Length m	Total Capacity Thousand Tons
Bulk						
(Vat Cach)	-3.0		150	4	500	600
(Main P.)	-8.4	156	350	3	468	1,050
Conventional						
(Main P.)	-8.4	156	200	5	780	1,000
Subtotal				12	1,748	2,650
Container						
(Main P.)	-8.4	156	650	3	468	1,950
(Chuave)	-8.4	165	650	2	330	1,300
Subtotal				5	1,128	4,550
Grand Total				17	2,876	7,200

Cai Lan Port in 2010

Type of Cargo	Depth m	Unit- Length m	Capacity Thousand Tons/Berth	Number of Berths	Total Length m	Total Capacity Thousand Tons
Multi-Purpose	-12.0	240	600	2	480	1,200
Bulk	-10.0	185	400	5	925	2,000
	-9.0	165	300	5	825	1,500
Total				12	2,230	4,700

JICA