Vietnam

National Highway No.5 Improvement Project

Evaluator: Vietnam-Japan Joint Evaluation Team 2007[1]

On-site Survey: December 2007

1. Project Profile and Japan's ODA Loan

Project Site

National Highway No.5

1.1 Background

The National Highway No.5 (NH-5) links the capital city of Hanoi with the international port of Hai Phong in the east with a length of 106km. The highway plays the most important role in the road transportation system of northern Vietnam as a socio-economic artery joining the two cities. With the economic growth that started in the 1990s as a result of the reform, it was estimated that both cargo and passenger traffic volumes on the NH-5 would significantly increase in the near future.

On the other hand, the deterioration of regional and rural roads in Vietnam was a serious problem. Most of the roads in the northern part of the country had been built before 1954 and were much damaged by the Vietnam War. Under these circumstances, the improvement of the NH 5, the main arterial road in northern Vietnam, became necessary.

1.2 Objective

The objective of the project was to handle increasing traffic demand and to provide for a smoother and more efficient traffic flow in both passenger and cargo transport by improving the National Highway No. 5 (NH-5) directly linking Hanoi and Hai Phong, the largest international trade port in northern Vietnam, thereby contributing to the restoration of trade and industry and to the improvement of living standards in the northern part.

[1] The Vietnam-Japan Joint Evaluation Team 2007 consisted of the three Working Groups each of which evaluated different projects. This project was evaluated by the Highway No.5 Group joined by the following members: Do Duc Chinh (Highway No. 5 Project Management Unit (PMU5) of Ministry of Transport); Nguyen Thanh Huyen (PMU5); Nguyen Khanh Toan (Vietnam Road Administration); Nguyen Viet Dung (Transportation Safety PMU of Ministry of Transport); Nguyen Quoc Pham (Transportation Safety PMU); Phi Quang Trung (Transportation Safety PMU); Cao Thanh Phu (Ministry of Planning and Investment); Le Lam Dong (Transport Development and Strategy Institute); Nguyen Song Anh (independent consultant); Takako Haraguchi (International Development Associates Ltd).

Logical Framework Applied for Ex-Post Evaluation

Goal	1. Restoration of trade and industry in the northern part 2. Improvement of living standard in the northern part
Purpose	Handling of increasing traffic demand, and smoother and more efficient traffic flow in passenger and cargo transport
Outcomes	1. Increase in traffic volume 2. Reduction in travel time 3. Increase in travel speed 4. Reduction in traffic congestion
Outputs	1. Improvement of Sections of the NH-5 between km0 and km47 and between km62 and km106 as Class 1 road in the Vietnamese standard 2. Consulting services (engineering and management)
Inputs	Project Period: January 1994 – June 1998 (Plan) Project Cost: Total 27,379 million yen (Plan)

1.3 Borrower/Executing Agency

Government of the Socialist Republic of Vietnam/Ministry of Transport (MOT), Highway No.5 Project Management Unit (PMU 5)

1.4 Outline of Loan Agreement

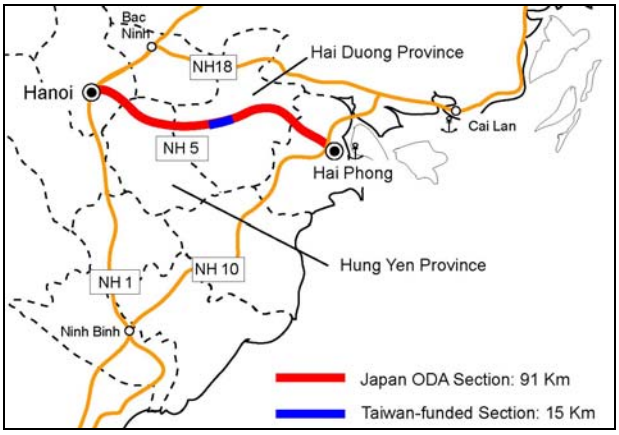
	Phase 1	Phase 2	Phase 3
Loan Amount / Disbursed Amount	8,782 Million Yen / 8,168 Million Yen	5,470 Million Yen / 5,281 Million Yen	6,709 Million Yen / 5,273 Million Yen
Date of Exchange of Notes / Date of Loan Agreement	January 28, 1994 / January 28, 1994	April 18, 1995 / April 18, 1995	March 29, 1996 / March 29, 1996
Terms and Conditions - Interest Rate - Repayment Period (Grace Period) - Procurement	 1.0% p.a. 30 years (10 years) General Untied	 1.8% p.a. 30 years (10 years) General Untied	 2.3% p.a. 30 years (10 years) General Untied
Final Disbursement Date	February 7, 2000	March 14, 2003	July 26, 2004
Main Contractor	Taisei Corporation, Taisei ROTEC Corporation. Fujita Corporation, NECCO, CIENCO 1. Sumitomo Const Co., Civil Engineering Co.		
Consulting Services	Engineering: Katahira and Engineers International, De Leuw Cather International, Tien Phat Co. Ltd. Management: UNICO International Corporation, CH2M Hill- UNICO Environmental Services Inc., CH2M Hill International Ltd.. Foreign Industrial Investment Consultants, KPMG Peat Marwick.		
Feasibility Study	1993 Government of Vietnam		

2. Results of Evaluation (Rating: B)

2.1 Relevance (Rating: a)

The project was planned and implemented in a way that was consistent with Vietnam's development policies/programs and needs both at the times of appraisal and ex-post evaluation. Therefore, the relevance of this project is very high.

Figure 2: National highway networks in the Red River Delta area of Northern Vietnam



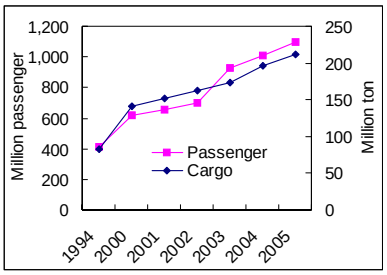
2.1.1 Consistency with Vietnamese Development Policies

The project objective is in the same direction as those of Vietnam's Socio-Economic Development Plans and road development strategies of both project appraisal and ex-post evaluation periods[2], as well as with the Comprehensive Poverty Reduction and Growth Strategy (2003). Throughout those plans/strategies, development of the national arterial road network is given a high priority for poverty reduction and economic development.

2.1.2 Consistency with Needs

High needs for development of the NH-5 are seen in the increasing traffic demand both at appraisal and ex-post evaluation.

Figure 1: Transportation volume of Vietnam



Source: GSO

First, road transportation demand in Vietnam in general is increasing. The total length of national road increased by 41% from 10,800km (1992) to 15,202km (2004). The annual growth rate of road transportation volume of the entire country is steadily increasing for both passenger and cargo (Figure 1).

Second, traffic volume on the NH-5 is increasing as well[3], and it is projected that the traffic may exceed the current capacity in five years. Therefore, a new express way (NH-5B) to connect Hanoi and Hai Phong is being planned[4].

Third, from the viewpoint of regional economic development, provinces and cities along the NH-5 (Hanoi, Hung Yen, Hai Duong and Hai Phong) are all promoting industrialization, and industrial complexes along the highway have been greatly increased both in number and

[2] Socio-Economic Development Plan for 2006-2010; Road Transport Strategic Directions of Vietnam Transport Development Strategy by 2020 (2004).
[3] See "2.3 Effectiveness" for actual figures of traffic volume on NH-5.
[4] The NH-5B project was at the pre-Feasibility Study stage as of December 2007. The project will be executed and operated by BOT.

investment amount[5].

Also, Ports of Hai Phong and Cai Lan have been developed with another JBIC financing to handle increasing cargo. Under such circumstances, the role of the NH-5 as a lifeline of logistics in northern Vietnam has become more important.

2.2 Efficiency (Rating: b)

While the actual project cost was lower than planned, the project period spent for the originally-planned outputs exceeded the plan by 60%. Therefore, the efficiency of the project can be evaluated as moderate.

2.2.1 Degree of Completion of Outputs

The originally-planned outputs are as follows and were completed as planned.

Original outputs that were actually completed:

- Package 1 (km0 – km47) – overlay and widening from two lanes to six lanes (km0 – km6)[6] or four lanes (km6 – km47) and construction of 4km of bypasses.
- Package 2 (km62 – km93) – widening to four lanes and construction of 7.5km of bypasses.
- Package 3 (km93 – km106) – surfacing and widening to six lanes and construction of 5km of bypasses.
- Rehabilitation of five medium-span bridges (30m or longer), 11 small bridges and two railway flyovers with 5.84km of approach road (included in the three packages mentioned above).

In addition to the above, the project planned and completed the following additional outputs using the balance of the loan.

Original output (six-lane section near Hanoi and bypass near Hai Phong)

Additional output (frontage road and pedestrian bridge)

Additional outputs that were actually completed:

- Improvement and upgrading of existing roads in Hai Phong City in order to improve the connectivity of the NH-5 to Hai Phong Port.

[5] See “2.4 Impact” for actual figures of industrial investment.
[6] At the appraisal of the Phase 3, the width was modified from the original four lanes to six lanes.

- Supplementary projects to follow recommendations from the JBIC study (1999), including (i) building and upgrading of frontage/provincial road (100km); (ii) construction of 27 bridges including three medium-span bridges; (iii) construction of an operation and maintenance office and procurement of road maintenance equipment; and (iv) installation of traffic safety facilities such as traffic lights.

The section not included in this project (total 15km between km47 and km62 including three bridges) was improved using a loan from Taiwan[7].

2.2.2 Project Duration

The planned duration of the project implementation was 53 months from January 1994 to June 1998[8]. However, the actual duration to complete the originally-planned outputs was 85 months from January 1994 to January 2002, or 160% of the plan. The supplementary projects to produce additional outputs were completed in 2005.

The delay was mainly caused by delays in land acquisition processes. The lengths of delays in land acquisition in the three construction packages were 27 months, 15 months and 38 months, respectively. As this project was the first project that involved large-scale land acquisition, the original scheduling was not realistic considering the capacity of leading organizations such as the PMU5 and local governments. Consequently, construction works and land acquisition were implemented simultaneously in some sections. This shortened the construction period but caused confusion in management. The engineering consultant gave suggestions to the PMU and provinces, and made technical modifications in some sections to recover construction schedule.

Besides land acquisition, the following factors related to project management affected the implementation period: (i) the PMU had to correct some contractors who assigned/procured different personnel/equipment from those proposed in the bidding document; (ii) since the PMU had never implemented such a big project before, they had to learn project management while they implemented the project.

2.3.3 Project Cost

While the originally-estimated total project cost was 27,379 million yen[9], the actual project cost turned out to be 22,343 million yen or 82% of the original estimation. The reasons for the cost under-run include: (i) efficient placement of orders due to competitive bidding; (ii) relatively high estimation of construction unit prices because this project was one of the first JBIC large-scale infrastructure projects in Vietnam; and (iii) the depreciation of the local currency.

2.3 Effectiveness (Rating: a)

The implementation of the project realized the expected outcomes mostly as planned. Therefore,

[7] See also Footnote 11 of "2.3 Effectiveness" for the information on the Taiwan project.

[8] The "planned duration" here is based on the schedule revised at the appraisal of Phase 3, not the one first prepared at the Phase 1 appraisal, because the Vietnamese evaluation team considers that the three Phases constitute the project as a whole. The appraisal of Phase 3 was conducted just after the detailed design stage and did not take the actual delays into consideration. Therefore, this idea about the planned duration would not distort the rating for the project period.

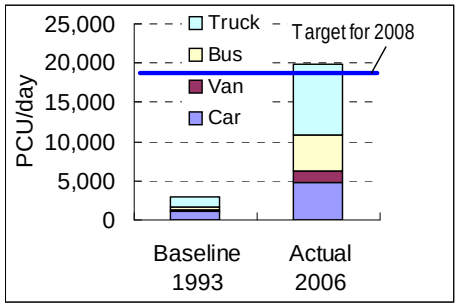
[9] Cost estimation made at the Phase 3 appraisal.

the effectiveness of the project is high.

2.3.1 Increase in Traffic Volume

Figure 3 and Table 1 show the baseline, target and actual figures of traffic volume on the NH-5. The actual traffic volume in 2006 was 10,920 vehicles per day or 19,781 PCU[10] per day, which is more than six times larger than the traffic volume in 1993 (2,912 PCU) and 103% of the target of the year 2008 (19,204 PCU). It should be noted that these figures count vehicles only: in addition to these, 59,486 motorcycles per day (equivalent to 17,846 PCU per day) were counted in 2006.

Figure 3: Traffic volume on NH-5



Source: VRA

Table 1: Traffic volume on NH-5 (unit: PCU/day)

	Car	Van	Bus	Truck	Vehicle Total
Baseline 1993 (km28)	1,034	291	281	1,306	2,912
Target 2008 (km28)	4,319	1,215	1,381	12,289	19,204
Actual 2006 (km9)	4,788	1,499	4,539	8,955	19,781
Target growth p.a.	10%	10%	11%	16%	13%
Actual growth p.a.	13%	13%	24%	16%	16%

Note: As the actual traffic counts on the same location as the baseline and the target (km28) were not available, the counts on the nearest available location (km9) were used. Both locations are on the way from Hanoi to the central area of Hung Yen Province.

Source: Baseline and targets are from TEDI; actual figures are from VRA.

2.3.2 Enhancement of Smooth Traffic

According to the executing agency, travel time between Hanoi and Hai Phong was shortened from five hours before the project to two hours after the project, and average travel speed was increased from 24-30km/h before the project to 50-60km/h after the project. Several cargo and passenger transporters interviewed for the ex-post evaluation provided similar comments. The evaluators also traveled through the NH-5 for the ex-post evaluation and confirmed the smooth traffic except the starting point in Hanoi City and sections near Hai Phong Port. In fact, it is very obvious that the project (i.e. widening of the carriageways, separation of motor vehicles and light traffic, and improvement of intersections with other arterial roads) greatly improved traffic efficiency of the NH-5, which used to be single- or double-lane road for mixed traffic of vehicles, bicycles and pedestrians.

Old (left) and new (right) NH-5

Besides this project, the smoother traffic was also attributed to other factors such as (i) construction of new road bridges by Taiwanese loan[11] and (ii)

[10] The following coefficients were applied to calculate Passenger Car Units (PCU): car=1.00; light truck=1.25; middle truck=2.25; heavy truck with 3 axles=3.00; heavy truck with more than 3 axles=4.00; mini bus=1.50; bus=3.00; simple truck with 3 wheels=1.25.

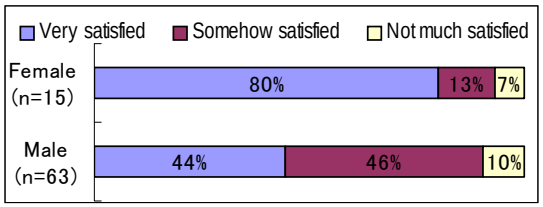
[11] The Taiwanese project widened the section from km47 to km62 and constructed three road bridges on that section. Before the project, the old bridges were used by both vehicles and trains, which caused the heaviest congestion on NH-5. The project was completed and opened for traffic in January 1997.

development of provincial road network with assistance from other donors.

2.3.3 Satisfaction of Beneficiaries

According to the satisfaction survey, residents along the NH-5 showed general satisfaction with the project: among 78 people surveyed, 93% of female respondents and 80% of male respondents expressed that they were "very satisfied" or "satisfied" the improved NH-5 (Figure 4). At the same time, a number of negative points were raised by them as shown in "2.4 Impact."

Figure 4: Satisfaction of residents along NH-5
(Unit: %)



Source: Beneficiary survey.

2.3.4 Economic Internal Rate of Return (EIRR)

In the project appraisal, EIRR of the project was calculated at 16.2%. The cost included the estimated project cost and operation and maintenance (O&M) cost, and the benefit included savings from reduction in vehicle operation cost (VOC) and travel time cost (TTC)[12]. In the ex-post evaluation, EIRR was re-calculated using the same cost and benefit items but applying actual figures, and the value turned out to be 20.45%[13].

The reasons for higher EIRR than planned might include: (i) different way of calculating VOC and TTC unit rates from those at the appraisal due to lack of information[14]; (ii) faster increase in traffic than the estimates of the appraisal; and (iii) lower project cost than planned.

2.4 Impact

The project supported industrialization of provinces along the NH-5 and thus contributed to economic development and poverty reduction of the northern areas, while causing negative changes such as inconvenience for nearby residents and traffic accidents.

2.4.1 Restoration of Trade and Industry in the Northern Part

Currently, economic growth of Vietnam is in a second boom following the first one after *doi moi* in the first half of the 1990s. The upward trend of the economies of provinces along the NH-5 in the 2000s can be seen in the following figures:

- GDP growth is faster than that of the entire country, especially in the industrial sector (Table 2);
- The number of enterprises has more than doubled (Table 3);
- In addition to the existing four industrial parks (IPs) in Hanoi and three in Hai Phong, new IPs were created along the NH-5 (three in Hun Yen and five in Hai Duong)[15];

[12] Project life was assumed to be 20 years.
[13] This calculation includes re-investment cost in the 11th year after project completion, when the lifetime of the road surface will expire. If the re-investment cost is excluded, as was in the calculation at the appraisal), the re-calculated value is 21.16%.
[14] Unit cost saving rate was adopted from JBIC/IDCJ (2003) Impact Assessment of Transport Infrastructure Projects in Northern Vietnam.
[15] The numbers include those under construction. Besides IPs, numerous industrial clusters have emerged along the

- Foreign direct investment (FDI) has increased in conjunction with the development of IPs (Figure 5);
- Accordingly, provincial tax revenues from enterprises also largely increased.

The improved NH-5 has supported such a trend by capacitating increased and smoother traffic[16]. This was confirmed by various types of stakeholders such as Provincial People's Committees, private companies, chambers of commerce and nearby residents interviewed in the beneficiary survey. For example, all of the respondent companies that started operation along the NH-5 after the project, including operators of newly-established industrial parks, said that the biggest reason for choosing the present location was a good accessibility via the NH-5 (see Box 1 for outline of the beneficiary survey).

Table 2: Annual GDP growth rate 2003-2006 (in 1994 constant price)

	Whole country	Hanoi	Hung Yen	Hai Duong	Hai Phong
Total	7.9%	11.7%	12.27%	11.7%	11.3%
Industry	**10.4%**	**13.8%**	**20.45%**	**13.3%**	**15.8%**
Agriculture	3.9%	-0.6%	4.49%	4.4%	3.2%
Services	7.6%	10.8%	15.17%	12.3%	8.7%

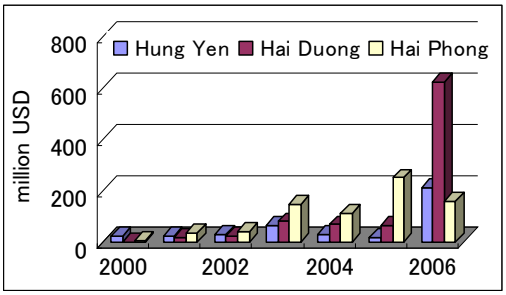
Note: Figure for Hung Yen is annual average growth of 2001-2005; figures for Hanoi are annual growth of 2004-2007.
Source: Provincial statistical yearbooks

Table 3: Number of enterprises

	2000	2004	Growth
Vietnam	42,288	91,755	117%
Hanoi	4,691	15,068	221%
Hung Yen	224	552	146%
Hai Duong	507	1,123	121%
Hai Phong	1,089	2,625	141%

Source: GSO

Figure 5: Registered capital of FDI



Source: Provincial statistical yearbooks

Existing industrial park along NH-5 (Hai Phong City)

New industrial park along NH-5 (Hai Duong Province)

Local resident who established a garment factory on his own for people whose farmland was taken for industrial use

Japanese FDI is the third largest as of 2006 and the largest in terms of accumulated capital since 1988. Recent Japanese FDI is more designated to northern Vietnam than to the central and the southern regions. According to JETRO, recent infrastructure development in the north,

NH-5. Most of enterprises in IPs and industrial clusters are engaged in light industry such as garment, food processing and small machinery and electric devices.

[16] Other promoting factors to industrial development than the NH-5 might include the development of legal framework such as the amendment of the Foreign Investment Law in 2000, the implementation of the Vietnam-US Trade Agreement in 2001 and the enactment of the Enterprise Law in 2002.

including the NH-5, has contributed much to such a trend. Currently approximately 120 Japanese enterprises operate in industrial parks in Hanoi, Hung Yen, Hai Duong or Hai Phong.

Market in Hai Phong selling products from

The positive impact of the project on the regional economy was reinforced by development of connecting transportation infrastructure such as other highways, local roads and Port of Hai Phong. Cargo handling at Hai Phong Port is rapidly increasing especially for export (Table 4). Also, new urban areas were created in the newly-constructed sections of the NH-5 in Hai Phong City, where there used to be villages before the project[17]. Hai Phong City opened new connecting roads in those sections.

Table 4: Cargo handling volume of Hai Phong Port
(Unit: thousand tons and % change from previous year)

All Major Ports	1995	2003	2004	2005	2006
Total	14,488	84,556 (484%)	95,060 (12%)	105,093 (11%)	119,874 (14%)
Export	3,737	20,313 (444%)	27,510 (35%)	33,042 (20%)	39,965 (21%)
Port of Hai Phong	1995	2003	2004	2005	2006
Total	4,515	12,733 (182%)	13,207 (4%)	14,043 (6%)	17,207 (23%)
Export	493	1,399 (184%)	1,543 (10%)	1,993 (29%)	2,698 (35%)

Note: % of Year 2003 is growth rate between 1995 and 2003.
Source: GSO, Vinamarine

The economic impact could be maximized if further development is also made in (i) legal and administrative environment for investment; and (ii) traffic management of NH-5. Regarding the first point, the Provincial Competitiveness Index (PCI) ranking[18] does not rank Hanoi, Hung Yen, Hai Duong and Hai Phong at very high despite the relatively well-developed transportation infrastructure.

As for the second point, the beneficiary survey revealed that the design and the way people use the improved NH-5 are sometimes not suitable for some stakeholders. “2.4.4 Negative Changes Brought by the Project” and Box 1 describe details of this issue.

2.4.2 Improvement of Distribution of Agricultural Products

As already mentioned, provinces along the NH-5 have promoted industrialization, and thus both agricultural land and the population engaged in agriculture have been decreasing. Nevertheless, Table 2 above indicates that in the 2000s, agricultural output values are increasing to a moderate degree.

In the beneficiary survey, both farmers and provincial officials pointed out that distribution of agricultural products have been enhanced and expanded by, for example, more middle-men now coming to villages, more products being sold to new food processing companies, and more

[17] Around Cho Hang Flyover – Dong Hai Interchange and Dinh Voh Port areas.
[18] PCI was initiated by a USAID-assisted project. Every province/city is indexed every year based on sub-indices such as entry costs, land access and security of tenure, transparency and access to information, time costs of regulatory compliance, informal charges, state-sector bias, informal charges, etc.

products being exported by road (to China) and by sea.

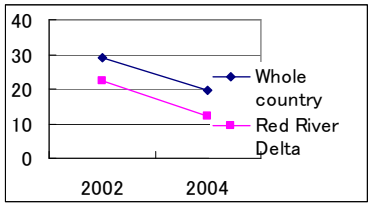
2.4.3 Improvement of Living Standards in the Northern Part

Poverty rates of the Red River Delta area, where provinces along the NH-5 are located, have decreased as well as that of the whole country (Figure 6). Also, per capita GDPs of those provinces have increased much faster than the national average (Table 5)[19].

Such poverty reduction effects could be due to economic development of the areas. After the project, newly-opened factories along the NH-5 employed many local residents who used to be farmers or migrant workers to central Vietnam. In 2006, in total 83,453 persons were employed in manufacturing sector in Hung Yen Province and 134,846 persons in Hai Duong Province[20].

Figure 6: General poverty rate

(Unit: %)



Source: GSO

Table 5: Per capita GDP

(Unit: thousand VND, %)

	Whole country	Red River Delta	Hanoi	Hung Yen	Hai Duong	Hai Phong
Year 2006	5,051	6,220	11,600	5,284	5,440	8,716
2000-2006 annual average growth	8.7%	15.2%	11.8%	18.4%	16.0%	15.5%

Source: Provincial Statistical Yearbooks

As the NH-5 is one of the key arterial roads of Vietnam, it is difficult to estimate the number of beneficiaries of the project. However, it could be said that more than 4,678 thousand persons, which is equivalent to the sum of the populations of Hung Yen Province, Hai Duong Province and Hai Phong City in 2006, might have benefited from better access to Hanoi and Hai Phong[21].

2.4.4 Negative Changes Brought by the Project

In the beneficiary survey, negative changes such as traffic accidents, difficulty in crossing the road and poor drainage were frequently pointed out by residents, companies and People's Committees.

Regarding the problem of traffic accidents, the JBIC conducted a study during the project implementation, and many of the recommendations from the study were materialized as additional outputs of the project[22] (see also "2.2 Efficiency"). Nevertheless, majority of respondents of the beneficiary survey said the accidents increased after the project due to speeding, irregular crossing or poor design of the road (e.g. improper fences, too narrow bicycle

[19] According to the impact study conducted by JBIC in 2003, in Hung Yen and Hai Duong Provinces, poverty rates decreased faster in districts along the NH-5 than other districts. Also, among provinces in the Red River Delta area, per capita GDP increased faster in provinces along the NH-5 than in other provinces.

[20] They account for 14% and 19% of labor population of Hung Yen and Hai Duong, respectively.

[21] The total population in the Red River Delta area is 18,286 thousand persons in 2006, and the whole population of the country is 84,156 thousand persons.

[22] The JBIC study was conducted in 1999 to identify and analyze deficiencies and problems of safety conditions on the NH-5 and to recommend countermeasures for enhancing the sustainability of the project. The recommendations from the study include: (i) improvement of management system; (ii) installation of traffic safety facilities; (iii) improvement of frontage road and crossing facilities; (iv) dissemination of traffic laws and regulations; (v) safety education and campaign; and (vi) improvement of law enforcement.

corridors, inconvenient pedestrian bridges, etc.). Table 6 also shows that the frequency of accidents on the NH-5 is higher than on other highways. According to the Vietnam Road Administration (VRA) in charge of operation and maintenance of national highways, speeding accounts for 93% of causes of accidents on the NH-5, while the rate was 60-70% on other highways[23]. One of the reasons why accidents on the NH-5 are still increasing might be that the changes in traffic on the NH-5 before and after the project were very big but residents have not yet fully adjusted their behavior to the changes.

Table 6: Number of traffic accidents

Number of accidents in the whole country							
	1994	2000	2001	2002	2003	2004	2005
Vietnam	13,118	22,486	25,040	27,134	19,852	16,911	14,141

Number of accidents per km of road					
	1999	2003	2004	2005	2006
NH-3	n.a.	2.4	2.1	1.8	1.8
NH-5	**2.4**	**3.4**	**3.6**	**4.2**	**4.2**
NH-10	n.a.	1.0	1.5	1.2	1.2
NH-18	n.a.	1.0	1.2	0.9	0.9

Source: JBIC Impact Study 2003 and NTSC

Poster on compulsory use of helmets

Recently, the National Traffic Safety Committee (NTSC) has taken several measures to enhance traffic safety on highways, including legislation on compulsory use of helmets for all motorcycles (from December 2007) and several traffic safety projects with external assistance[24].

Box 1: Overview of the beneficiary survey

The ex-post evaluation team conducted the following types of beneficiary survey in Hung Yen Province, Hai Duong Province and Hai Phong City.

1) Focus groups (FG) of residents. Five meetings participated in by a total of 94 residents. Each focus group took approximately 1.5-2.0 hours for the following three activities.

- Discussion on the key question, "how did the improved NH-5 change your life?"
  The facilitators (research assistants) asked each participant to write down any response to the key question on a piece of paper, and then to discuss it with other group members. All participants provided various answers, both positive and negative.
- Ranking (voting) on most important changes. The facilitators then asked each participant to vote on one, two or three most important "changes." The items that collected more votes than others include: better accessibility/mobility, more employment and income, more traffic accidents, difficulty in crossing the road and poor drainage.
- Satisfaction survey. The facilitators delivered a small piece of paper with only one question on a five-point scale, "How are you satisfied with the new NH-5?" The results are shown in Figure 4 above.

[23] On other highways than the NH-5, reckless driving accounts for 14-20% of the causes for accidents.
[24] On-going traffic safety projects include the World Bank- Vietnam Road Safety Project, JBIC Traffic Safety Improvement Project (JBIC loan) and JICA technical cooperation projects in Hanoi.

2) Semi-structured interviews (SSI) with companies -- Nine companies including two industrial park developers, two transporters and five manufacturers (garments, electrical circuits, LPG, plastic doors). For all new companies, this project was the biggest reason to start business in the present locations. Both new and old (i.e. those existed before the project) companies said the improved accessibility/mobility saved costs and increased revenues. However, all respondents pointed out many negative factors such as traffic accidents due to irregular crossing of roads by pedestrians, bicycles and motorcycles, traffic congestion around industrial parks due to insufficient frontage roads.

3) SSI with People's Committees of Hung Yen Province, Hai Duong Province and Hai Phong City. Vietnam Chamber of Commerce and Industry (VCCI) of Hai Phong was also interviewed. All interviewees acknowledged positive impacts of the project to local economy and poverty reduction. It was also emphasized that development of provincial road network would enhance the benefit of the project. Regarding negative factors, special concerns were expressed about traffic accidents. Recommendations were given such as construction of overpasses, improvement of center fences and awareness-raising of road users.

In conclusion, the evaluation team found the tools applied were more qualitative than quantitative but successful in grasping perceptions of beneficiaries precisely within shorter time than surveys to individual respondents.

2.4.4 Environmental Impact

At the appraisal stage, serious environmental issues such as noise were not foreseen in this project because the construction of bypasses to divert large communities was planned. During the implementation, not much attention was paid to environmental issues, either. Environmental impact assessment (EIA) was not conducted for this project as the feasibility study had been carried out before the enforcement of the EIA system in 1995.

However, some residents surveyed for the ex-post evaluation mentioned the problems of dust, noise and vibration as changes brought by the project. According to some recent environmental monitoring data from provincial governments, though comprehensive data were not available, the levels of hanging dust and noise exceed national standards at some locations along the NH-5[25]. Provincial governments are aware of these problems and have taken some measures such as planting trees along the road and locating newly-planned schools/ hospitals a little distant from the NH-5.

2.4.5 Impact of Land Acquisition and Resettlement

It was originally planned that approx. 1.75 million m^2 of land, where 6,628 households lived, was to be acquired for the project, and that 2,700 households were to be moved to resettlement sites developed by the project. In developing resettlement sites, installation of basic infrastructures such as roads, water supply, drainage and power distribution were also planned. Provincial governments, with districts and communes under them, were responsible for preparation and implementation of the land acquisition and resettlement action plan under the oversight by the PMU. However, no comprehensive record of implementation of those plans was available from those organizations.

As already mentioned, the land acquisition and resettlement processes were delayed. Also, there

[25] For example, monitoring data from Hung Yen Province show that hanging dust levels are 1.2 − 2.3 times higher than the national standard (TVCN 5937-1995) and noise level is higher than the standard of 75 dBA (TVCN 5949, 1995) at some junctions of the NH-5. Chemical indicators (CO2, NO2, SO2, etc) are lower than the standard (TVCN 593701995). In Hai Duong, noise levels are within the national standard. No measurement results are available about dust and chemical parameters.

were some disputes over compensation and inconvenience due to incomplete infrastructures of some resettlement sites until the very last stage of the construction work. In such confusing circumstances, the process and results of the plans were not properly recorded. A lack of similar experience in the past, the weak organizational arrangement without a distinct implementation unit in the provincial governments, and a lack of coordination between the main project and the land acquisition and resettlement processes led to the poor performance of the action plan and the failure of the PMU to keep up with the construction schedule.

At the implementation stage of the supplementary projects, however, the PMU and the provincial governments learned lessons from their first experience mentioned above, including the time consuming nature of the land acquisition and resettlement process and the need for careful planning and monitoring of the process in close coordination with the construction schedule. They also kept better records: for the construction of additional outputs, 10,060 people and 1,378 households were actually affected by land acquisition and resettlement, respectively. The process went more smoothly than in the original outputs.

On the site visits for the ex-post evaluation, no particular problems were observed at the resettlement sites, which were located near the center of townships.

2.4.6 Capacity Building of Engineers

During project implementation, a total of 42 engineers received overseas training (Japan, Thailand, Malaysia, Singapore) and many more were trained in Vietnam. Many new techniques were introduced to them through the project[26].

2.5 Sustainability (Rating: b)

While the budget allocation for operation and maintenance (O&M) is less than required and some damages are observed on the road surface, no problems are seen in the capacity of the executing agency and the O&M agency. Therefore, sustainability of the project is evaluated as moderate.

2.5.1 Executing Agency and Operation and Maintenance Agencies

2.5.1.1 O&M System

No urgent problems are seen in organizational structure for O&M of NH-5. As is the case with any road development/improvement project, the completed corridors and related facilities (such as signals, lighting, fences, frontage roads) of the NH-5 were handed over to the Vietnam Road Administration (VRA) of Ministry of Transport for O&M. The actual O&M works are the responsibility of the Company No. 240, a Regional Road Management Company (RRMC) under the supervision of the Regional Road Management Unit II (RRMU II) of the VRA.

Division of roles and decision-making flows are clear and based on government regulations.

[26] According to the PMU, new techniques include: (i) construction of stressed concrete bridge with large spans by balance cantilever bridge; (ii) construction of retaining walls with reinforcement; (iii) treatment of soft soil by Geatextle, wickdrain, loading to compress settlement; (iv) driving reinforcement concrete 20x20, (v) making hard layers on the soft soil; (vi) using technical wire with many layers to the treated high filling slope; (vii) construction of box beam by reinforcement concrete pretension; (viii) application of Geocomposit Membrabde method.

Every year, the Company No. 240 sends the VRA (RRMU II) a proposal of next year maintenance works based on their survey results. The VRA reviews the proposal and determines the maintenance plan.


Building of Company No. 240 (constructed as additional output of the project)

In more general, however, there is an argument that the non-existence of a road administration body which is responsible for overall road management covering investment planning, construction and O&M may cause a weakness in terms of acquiring a more efficient and effective O&M system[27].

2.5.1.2 O&M Technical Capacity

Numbers and technical skill levels of maintenance staff are sufficient. The Company No. 240 has 114 engineers and 250 full-time maintenance workers for surveying, planning and maintenance of the NH-5. The Company maintains a certain technical level of maintenance workers by recruiting only graduates from Road Technical School. According to the PMU, the number of O&M personnel is sufficient.

Sufficient training is provided to O&M staff. Some engineers of the Company No. 240 received training from the project contractor on operation of maintenance equipment. Maintenance workers of the Company No. 240 receive training from the Company on maintenance works, and their technical levels are evaluated in the 7-level labor grade. According to the Company No. 240, no problem is seen in technical level of maintenance staff.

No particular maintenance manuals except government regulation are used: the Company No. 240 only uses “Guidelines of road maintenance” – decisions and regulations issued from the MOT – which however is not regarded as problematic.

2.5.1.3 Financial Status for O&M

O&M budget are allocated from the Treasury to the VRA annually. The budget sources are government budget and toll revenue – the share was 7:3 in 2006. No separate budget source for O&M of roads been secured yet, despite a number of studies and recommendations on the establishment of the Road Fund.

Although the total O&M budget is increasing, the amount is not enough for all roads. According to the VRA, the actual spending on maintenance only meets 50-60% of requirements. According to the PMU, the rate is 70%.

[27] MPI, MOT of GoV and MOFA of GoJ (2006). Vietnam-Japan Joint Evaluation on the Japanese ODA Program for the Transport Infrastructure Development in the Red River Delta Area of the Socialist Republic of Vietnam: Final Report.

Table 7: Toll revenue and O&M expenditures related to NH-5

(Unit: million VND)

	2004	2005	2006
Toll fee collected from NH-5	**564,867**	**595,319**	**618,716**
Contributed to Government budget	407,710	432,894	467,674
O&M expenditures for NH-5	**10,308**	**10,549**	**28,998**
Management & regular repair	6,431	7,127	10,021
Maintenance	3,877	3,422	18,977

Note: According to MOF guidelines, 5% of fee collected is kept at VRA for modernization fund, 15% for fee collection activities, 80% to Treasury (all paid back to VRA for O&M)
Source: VRA

2.5.2 O&M Status

No serious problem is seen in contents and practice of maintenance plan. The routine maintenance plan is implemented, and spare parts are purchased on an annual basis with no particular problems reported. The maintenance equipment procured by the project is fully used[28]. However, according to the PMU, some deficiencies are not quickly repaired.

Maintenance works

Conditions of road surface and road facilities are generally good, but some damages were observed possibly due to overloaded trucks. Although the project sections are designed for up to 60-ton trucks, several informants mentioned that overloaded trucks, some of which even reach gross weight of 100 tons, pass through the NH-5 due to the recent trend of increase in size of cargo. However, data are not available on the actual degree of overloading because the weight of passing trucks is not regularly checked. According to the Company No. 240, corridors from Hai Phong to Hanoi are more damaged than the opposite lanes because most trucks from Hai Phong are fully loaded.

Road management software developed by the ADB and introduced to the VRA and its subordinates[29] has enhanced efficiency of surveying and reporting. The software is used for surveying, periodic reporting on road conditions, and making maintenance plans. The Company No. 240 has one operator for the software. According to an operator of another RRMU, data processing and reporting has become faster than before.

3. Conclusion, Lessons Learned and Recommendations

3.1 Conclusion

From the findings described above, this project can be evaluated as satisfactory.

3.2 Lessons Learned

3.2.1 Investment preparation and design

[28] On the date of interview with Company No. 240, the evaluators could not see any equipment because they were working in Hai Duong and elsewhere.

[29] Introduction of the software was also supported by the JBIC through a study in 2006 for the Transportation Sector Loan for National Road Network Improvement.

To enhance effectiveness and sustainability of a project to improve a highway of national and regional importance, transportation forecasting should be thoroughly conducted at F/S and design stages so that the road could accommodate future traffic and transportation demands, which are likely to be multiplied by the increase in business activities along the highway.

At the same time, to avoid negative impact on local residents, enough attention should be paid to impact of changes in the traffic conditions of the highway after the project to local transportation of the surrounding areas, and countermeasures to alleviate such an impact should be designed based on both present and forecasted local transportation patterns of the areas (e.g. pedestrian bridges at appropriate locations; frontage roads; underpasses; etc).

3.2.2 Land Acquisition and Resettlement

To improve the capacity of the local government, land acquisition and resettlement should be considered as a sub-project that is authorized to the provincial government as the project owner. This could enable the provincial government to take an initiative in establishing and managing a proper implementation unit, and accumulate experience there. Also, by clarifying the relation between the main project and the land acquisition and resettlement sub-project, the PMU of the main project could monitor and manage the process in a systematic and coherent manner.

3.2.3 Project Management

To enhance efficiency, project management must be careful about the quality and capacity of the contractors (technical and financial aspects), so that personnel and equipment with the same quality/ specification as proposed in the bidding document would be procured. Also, if the PMU has never implemented similar projects before, sufficient training in project management should be provided to cadres.

3.3 Recommendations

3.3.1 Traffic safety

The JBIC study in 1999 recommended traffic safety measures for the NH-5 such as construction of frontage roads and pedestrian bridges, and some of them were incorporated in the project as additional outputs. Nevertheless, indicators related to traffic accidents have not yet shown much improvement. To reduce traffic accidents, the VRA should arrange different level crossing roads and regularly propagandize traffic safety through all types of mass media. The VRA is appropriate for this task besides the NTSC and local authorities because the VRA is directly responsible for road management and thus understand reasons for accidents well. Also, to minimize damages to road surface by overloaded vehicles, heavy vehicles should be weighed and the weight limit enforcement should be strengthened.

3.3.2 Maintenance

The VRA should continue efforts to undertake proper maintenance work on the highway to ensure sustainability. In addition, the Government of Vietnam should continue considerations of having a separate budget for road maintenance (e.g. Road Fund).

Comparison of Original and Actual Scope

Item	Plan	Actual
1) Outputs (i) Improvement of roads and bridges on NH-5	- Overlay and widening from 2 lanes to 6 lanes (km0 – km6 and km93-km106) or 4 lanes (km6 – km47 and km62-93) - Construction of 3 bypasses: total 16.5km. - Rehabilitation of 5 medium-span bridges (30m or longer), 11 small bridges and 2 railway flyovers with 5.84km of approach road	Same as planned Same as planned Same as planned <u>Additional Outputs</u>: - Improvement and upgrading of existing roads in Hai Phong City - Supplementary Projects including (i) building and upgrading of frontage/ provincial road (100km); (ii) construction of 27 bridges including 3 medium-span bridges; (iii) construction of an operation and maintenance office and procurement of road maintenance equipment; and (iv) installation of traffic safety facilities such as traffic lights.
(ii) Consulting services	Engineering 2,496MM Management 98MM	Engineering 2,813MM Management 98MM
2) Project Period	January 1994 – June 1998	<u>For original outputs</u>: January 1994 – January 2002 <u>For additional outputs</u>: January 1994 - 2005
3) Project Cost Foreign Currency Local Currency Total ODA Loan Portion Exchange Rate	 9,092 Million Yen 18,287 Million Yen (1,828 Billion VND) 27,379 Million Yen 20,961 Million Yen 1 VND= 0.01Yen (As of 1995)	 8,057 Million Yen 14,286 Million Yen (1,587 Billion VND) 22,343 Million Yen 18,047 Million Yen 1 VND = 0.009Yen (Average during period from 1995 to 2005)