

Slovakia

Ex-Post Evaluation of Japanese ODA Loan Project
Motorway Construction Project (SLO-P1)

External Evaluator: Masami Tomita, Sanshu Engineering Consultant

0. Summary

This project aimed at the completion of the motorway network in the capital city and the reduction of traffic congestions in adjacent roads of the section targeted by the project, by constructing approximately 3km of a motorway in the capital city of Bratislava.

Relevance of this project is high, as the project is consistent with priority areas of Slovakia's development plans and Japan's ODA policy, and moreover development needs for the project are high. The current traffic volume of the project section largely exceeds the volume expected at the time of project appraisal, due to traffics induced by the project and shifted from adjacent city roads. Moreover, traffic congestion in adjacent city roads was largely reduced and beneficiaries also showed high level of satisfaction with this project, and thus, effectiveness and impact of the project are high. Sustainability of the project is also high, as no major problem has been observed in institutional, technical and financial aspects of the operation and maintenance (O&M) and current O&M status. On the other hand, efficiency of the project is low, as both actual project cost and period largely exceeded planned cost and period.

In light of the above, this project is evaluated to be satisfactory.

1. Project Description



Project Location



The Tunnel Constructed by the Project

1.1 Background

Located in the centre of Europe, Slovak economy had been highly dependent on trade with neighbouring countries and the country was expected to develop by contributing to an increase of overland transportations between and among East and West Europe through constructing

overland transportation infrastructures. However, the total length of motorway networks within the country was merely 198km out of 17,868km in total of national roads before the project implementation, and the motorway networks within the country had not been connected directly with neighbouring countries except for Czech Republic, and thus in 1993 the Government of Slovakia determined a policy that a development of the motorway networks within the country was urgently needed¹. Then in 1995 the government approved the motorway network development plan, which aimed at construction of 660 km of motorways in total consisting of 4 routes connecting with 5 neighbouring countries by 2005². The plan was the country's largest project requiring the total planned amount of 152 billion koruna (approximately 570 billion yen), and this project was implemented as part of the plan³.

The motorway section targeted by the project is part of the north-south cross-nation route (D2) which passes from Czech Republic to Austria and Hungary through Bratislava. The section passing from Bratislava to Austria and Hungary and another section connecting to the motorway D1 which leads to eastern Slovakia were constructed with assistance from the European Investment Bank (EIB)⁴. The motorway network in the project area had not been completed, because of the lack of skills and experiences of tunnel construction required in the area. On the other hand, this project was regarded as a highly important project in order to reduce traffic congestions in adjacent areas and achieve smooth transportations and efficient economic activities by completing the motorway network around the capital city⁵.

1.2 Project Outline

The objective of this project is to complete the motorway network around the capital city and reduce traffic congestions in adjacent roads by constructing the approximately 3 km section of a motorway in the western part of the capital city of Bratislava, thereby contributing to smooth commodity distribution and efficient economic activities in the region.

The project site is shown below.

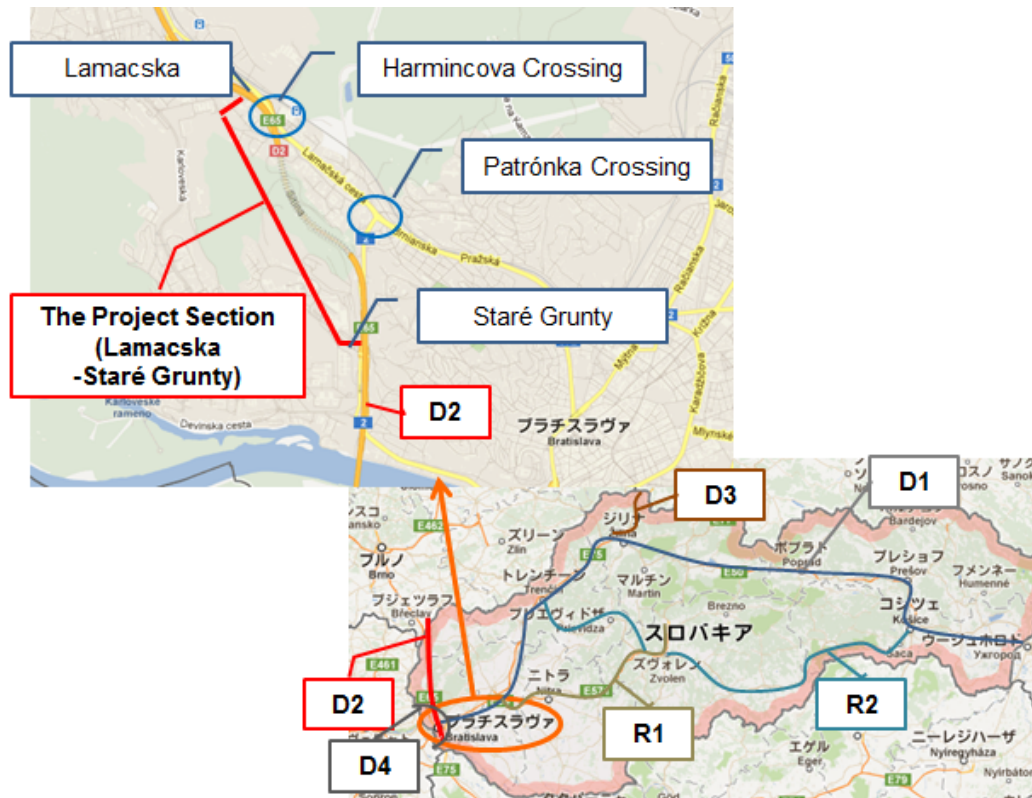
¹ Source: JICA appraisal document

² Source: same as above

³ Source: same as above

⁴ Source: same as above

⁵ Source: same as above



Source: edited based on Google map

Figure 1: Project Site

Loan Approved Amount/ Disbursed Amount	11,094million yen / 11,093million yen
Exchange of Notes Date/ Loan Agreement Signing Date	December, 1998 / February, 1999
Terms and Conditions	Interest Rate: 2.2% Repayment Period: 25years (Grace Period: 7years) Conditions for Procurement: General untied (for consulting service, interest rate: 0.75%, repayment period: 40years (grace period: 10years))
Borrower / Executing Agency	The Government of the Slovak Republic/ National Motorway Company
Final Disbursement Date	December, 2008
Main Contractor (Over 1 billion yen)	Skanska DS (Czech Republic) ・ Taisei Corporation (Japan) (JV)
Main Consultant (Over 100 million yen)	Construction Project Consultants (Japan)
Feasibility Studies, etc.	Feasibility Study (F/S), DOPRAVOPROJEKT,a.s., 1996
Related Projects	The south motorway section from the end of the project section to Austria/Hungary (17.8km) and the east motorway section (6.5km) were constructed with assistance from EIB

2. Outline of the Evaluation Study

2.1 External Evaluator

Masami Tomita, Sanshu Engineering Consultant

2.2 Duration of Evaluation Study

Duration of the Study: October, 2011 – September, 2012

Duration of the Field Study: January 9 – January 13, 2012 and May 17 – May 23, 2012

2.3 Constraints during the Evaluation Study

None

3. Results of the Evaluation (Overall Rating: B⁶)

3.1 Relevance (Rating: ③⁷)

3.1.1 Relevance with the Development Plan of Slovakia

At the time of project appraisal, construction of motorway networks was regarded as one of the most prioritized policies in the Development Program of Public Works Priorities until 2005, and in 1997 it was agreed among all the economic affairs ministers in the country that construction of the Lamacska - Staré Grunty section, which was targeted by the project, should be prioritized in the whole motorway network development plan⁸.

On the other hand, at the time of ex-post evaluation, construction of motorway networks is still regarded important in the Development Program of Public Works Priorities for 2008-2010, and completion of the routes D1, D3, R1 and R2 etc. are particularly regarded important⁹. Moreover, in the Plan of Proceeding of Preparation and Construction of Motorways and Expressways for 2011- 2014, the route D1 which connects the capital city of Bratislava and Kosice, a major city in eastern Slovakia, is regarded as the most important section to be completed, and the route D4, the completion of which aims at reduction of traffic congestions in Bratislava, is also regarded important, and development of motorway networks centring the capital city of Bratislava seems still important¹⁰. Furthermore, in the Operational Programme Transport 2007-2013, the routes D1, D2 (including the project section) and D3, which are part of the European transport corridors, and R1 and R2 etc. are given priorities¹¹. The total length of motorways and expressways in

⁶ A: Highly satisfactory, B: Satisfactory, C: Partially satisfactory, D: Unsatisfactory

⁷ ③: High, ②: Fair, ①: Low

⁸ Source: JICA appraisal document

⁹ Source: document provided by the Ministry of Transportation, Construction and Regional Development

¹⁰ Source: document provided by the Ministry of Transportation, Construction and Regional Development

¹¹ Source: Operational Programme Transport 2007-2013

Slovakia is 606km as of January 2011¹², and the total of 1,840km of the motorway networks is planned to be constructed in the long run¹³.

Therefore, construction of the motorway networks was/is prioritized in Slovakia's national plans and sector plans both at the time of project appraisal and ex-post evaluation, and thus relevance of this project remains high.

3.1.2 Relevance with the Development Needs of Slovakia

At the time of project appraisal, traffic conditions in Bratislava were rapidly worsened due to increased numbers of registered vehicles since 1990. At the time of ex-post evaluation, the numbers of registered vehicles in Bratislava have been largely increasing due to a progress of road networks development and improvement of living standards etc. The transition of the numbers of registered vehicles in Bratislava is shown below.

Table 1: The Numbers of Registered Vehicles in Bratislava

(Unit: vehicles)

	1990	1993	1996	2005	2008	2011
Passenger Cars	N/A	N/A	N/A	208,565	267,209	295,347
Large Vehicles	N/A	N/A	N/A	36,981	65,472	71,098
Total	123,817	149,570	170,959	245,546	332,681	366,445

Source: 1990-1996: JICA appraisal document, 2005-2011: document provided by the National Motorway Company (answer to the questionnaire)

At the time of project appraisal, in addition to the increase of the numbers of registered vehicles, the section of the motorway targeted by the project had been uncompleted and thus vehicles needed to get off the motorway, join the city road leading to the city centre and pass the crossing. Thus, there were chronic and heavy traffic congestions around the crossing (the Patrónka Crossing), and the traffic volume on the road around the crossing including both inbound and outbound traffics was approximately 46,600 vehicles per day (as of 1995), and the congestions heavily disturbed international transportation and regional economic activities¹⁴. On the other hand, at the time of ex-post evaluation, the annual average daily traffic on the project section (motorway) and adjacent city roads exceed the estimated volume in the project appraisal due to the large increase of registered vehicles and the city development etc.¹⁵, and the importance of the project section is very high for the purpose of the completion of D2 and reduction of traffic congestions in the area. Moreover, Slovak economy has been dependent on trade with neighbouring countries as

¹² Source: document provided by the National Motorway Company

¹³ Source: Operational Programme Transport 2007-2013

¹⁴ Source: JICA appraisal document

¹⁵ See "3.2 Effectiveness" for details

explained above, and there are many traffics leading to Prague and Bruno in Czech Republic using the motorways, and the only motorway leading to these cities is D2 at the time of ex-post evaluation, and hence the importance of the project which completed D2 is high from the perspective of smooth transportation. Therefore, the needs for the project remain high.

3.1.3 Relevance with Japan's ODA Policy

“The Official Development Assistance (ODA) Country Data Book” (2002) states that Japan has provided Slovakia with economic cooperation, focusing on democratization and market-oriented economic reforms in the country. And this project was to contribute to market-oriented economic reforms.

This project has been highly relevant with Slovakia's development plan, development needs, as well as Japan's ODA policy, therefore its relevance is high.

3.2 Effectiveness¹⁶ (Rating: ③)

3.2.1 Quantitative Effects (Operation and Effect Indicators)

3.2.1.1 Reduction of Traffic Congestions in Adjacent City Roads

Estimated and actual figures of annual average daily traffic (AADT) on the Lamacska - Staré Grunty section of city roads which are adjacent to the project section are shown below. The actual AADT on the city roads after the completion of the project exceeds the estimated volume in the project appraisal due to the increase of the numbers of registered vehicles in Bratislava and residential development in the city etc., as explained in “3.1.2 Relevance with the Development Needs of Slovakia”. However, part of the traffic volumes on the city roads were shifted to the motorway (the project section) and thus the volumes decreased by approximately 20% to 42% after the project completion (at the time of ex-post evaluation)¹⁷. Moreover, as the Lamacska - Staré Grunty section of city roads¹⁸ was heavily congested before the completion of the project section, local roads such as Karloveská street and Botanicka street that were adjacent to the project section were also used, and traffic volumes on these streets also decreased by approximately 17% to 19%

¹⁶ Sub-rating for Effectiveness is to be put with consideration of Impact

¹⁷ The traffic volume on the Harmincova – Patrónka section decreased by approximately 20% after the project completion (2010) compared with that of before the project (2007), and the volume on the Patrónka - Staré Grunty section decreased by approximately 42% after the project completion (2010) compared with that of before the project (2006).

¹⁸ Road categories in Slovakia consist of motorway/expressway, city road (first class road, second class road and third class road) and local road etc., and the road in question is categorized as the first class road.

after the project completion¹⁹. Therefore, it can be said that the project contributed to the reduction of traffic congestions on the city roads.

Table 2: Estimated and Actual Volumes of AADT on the City Roads

(Unit: vehicles/day)

Section	Appraisal (1995, actual)	Before Completion (2006, actual)	Before Completion (2007, actual)	After Completion (2010, estimated)	3 Years After Completion (2010, actual)
Harmincova - Patrónka	46,600	62,591	69,959	49,119	56,152
Patrónka - Staré Grunty	22,410	34,741	N/A	15,256	20,067
Total	69,010	97,332	N/A	64,375	76,219

Source: 1995 actual and 2010 estimated: F/S, 2006/2007/2010 actual: Slovak Road Administration (SSC)/ National Motorway Company/ the Mayor's Office of Bratislava

3.2.1.2 Traffic Volumes on the Project Section

Estimated and actual figures of AADT on the motorway section constructed by the project are shown below. The actual AADT on the project section after the completion of the project largely exceed the estimated volume in the project appraisal due to traffics induced by the completion of motorway D2 as well as the increase of the numbers of registered vehicles in Bratislava and residential development in the city etc. Taking into account the decrease of traffic volumes on the adjacent city roads after the project completion as explained above, a considerable amount of traffics seems to have been shifted from the city roads and local roads to the motorway (the project section) after the completion of D2.

Table 3: Estimated and Actual Volumes of AADT on the Motorway (the Project Section)

(Unit: vehicles/day)

Section	After Completion (2010, estimated)	1 Year After Completion (2008, actual)	2 Years After Completion (2009, actual)	3 Years After Completion (2010, actual)
Polianky - Tunnel Sitina	26,905	31,204	34,088	35,146
Tunnel Sitina		44,328	48,236	49,264
Tunnel Sitina - Mlýnská Dolina		37,665	41,825	43,382

Source: 2010 estimated: F/S, 2008/2009/2010 actual: National Motorway Company

Note: The project section consists of the first and second sections and part of the third section (the National Motorway Company conducts traffic counts in each of the above section).

¹⁹ Source: Slovak Road Administration (SSC)/ National Motorway Company/ the Mayor's Office of Bratislava

3.2.1.3 Reduction of Travelling Time

While the executing agency does not have data on travelling time, according to the interviews with the executing agency, there were chronic and heavy traffic congestions on the Lamacska - Staré Grunty section of city roads before the project implementation, and it required one to two hours to run the section during peak hours with extremely heavy congestions. On the other hand, the evaluator actually ran the section and measured time during the field survey in the ex-post evaluation, and it took approximately 5.5 to 7.5 minutes during peak hours (around 7:30 am – 8:00 am) on weekdays and it took approximately 5 minutes during off-peak hours on weekdays²⁰. According to the executing agency, before the project implementation vehicles from three different directions (including D2) converged to one road at the Harmincova Crossing heading to the Patrónka Crossing and there were many large vehicles such as trucks that turn right at the Patrónka Crossing, which caused heavy congestions at the crossing. The width of these city roads is relatively narrow and large vehicles need to slow down when they turn right, which seems another reason causing congestions. On the other hand, after the project implementation, vehicles that converge at the Harmincova Crossing diverge into two directions (the city road and the motorway) due to the completion of D2, and large vehicles mainly use the motorway (the project section), which has led to the significant reduction of the numbers of large vehicles that turn right at the Patrónka Crossing, which in turn largely reduced waiting time at the traffic light and drastically eased traffic congestions²¹. Thus this project seems to have largely contributed to the reduction of travelling time, however, when a question was asked in the beneficiary survey regarding a reduction of travelling time on the Lamacska - Staré Grunty section of city roads after the project, as explained in “3.2.2 Qualitative Effects”, 45% of respondents replied that the time shortened was 10 to 20 minutes and 25% replied that the time shortened was 5 to 10 minutes, and thus the average time shortened seems to be 5 to 20 minutes.

As for travelling time on the motorway section constructed by the project, while the executing agency does not have data, the evaluator actually ran the section and measured time during the field survey, and it took approximately 2.5 minutes during both peak hours (around 7:30 am) and off-peak hours on weekdays²².

²⁰ For peak hours, time measurement was conducted from the Harmincova Crossing at 7:30 am on January 12th, Thursday, to the point that crosses with Staré Grunty passing the Patrónka Crossing (Route 1: approximately 5.5 minutes) and for the opposite direction (from the point that crosses with Staré Grunty to the Harmincova Crossing passing the Patrónka Crossing) (Route 2: approximately 5.5 minutes). Time measurement was also conducted at 7:40 am on May 21st, Monday (Route 1: approximately 5.5 minutes and Route 2: approximately 7.5 minutes) and at 8:00 am on the same day (Route 1 and 2: approximately 5.5 minutes). For off-peak hours, time measurement was conducted at 2:00 pm on January 11th, Wednesday (Route 1 and 2: approximately 5 minutes).

²¹ Source: interviews with the executing agency

²² For peak hours, time measurement was conducted from the Harmincova Crossing at 7:20 am on January 12th,

3.2.1.4 Improvement of Velocity

While the executing agency does not have data on average velocity, according to the interviews with the executing agency, there were chronic and heavy traffic congestions on the Lamacska - Staré Grunty section of city roads before the project implementation, and the average velocity on the section was 5 to 10km/hour during peak hours with extremely heavy congestions. On the other hand, the maximum permissible speed on city roads at the time of ex-post evaluation is 70km/hour and the average velocity on the Lamacska - Staré Grunty section of city roads when the evaluator actually ran the section during the field survey was 60 to 70km/hour. As explained above, the large reduction of traffic congestions on the city roads by the project seems to have contributed to the improvement of average velocity.

As for the average velocity on the motorway section constructed by the project, while the executing agency does not have data, the maximum permissible speed on motorways is 90km/hour and that on tunnels is 80km/hour at the time of ex-post evaluation, and the average velocity on the project section when the evaluator actually ran the section during the field survey was approximately 80km/hour.

3.2.2 Qualitative Effects

One of qualitative effects realized by the project is the enhancement of the functionality of road network infrastructures due to the completion of motorway D2²³.

Moreover, the beneficiary survey was conducted in the ex-post evaluation²⁴. The overview of the results of the survey is shown below.

Thursday, to the point that crosses with Staré Grunty passing the Tunnel Sitina (Route 1: approximately 2.5 minutes) and for the opposite direction (from the point that crosses with Staré Grunty to the Harmincova Crossing passing the Tunnel Sitina) (Route 2: approximately 2.5 minutes). Time measurement was also conducted at 7:30 am on May 21st, Monday (Route 1 and 2: approximately 2.5 minutes). For off-peak hours, time measurement was conducted at 1:50 pm on January 11th, Wednesday (Route 1 and 2: approximately 2.5 minutes).

²³ See “3.3 Impact” for impacts realized by this.

²⁴ The beneficiary survey was conducted in the following manner. Time: February to March 2012, the number of samples: 101 in total (users of the motorway section constructed by the project and the city roads adjacent to the section: 84, residents: 8 and companies: 7 along the project section, people affected by land acquisition for the project: 2), method: questionnaire survey

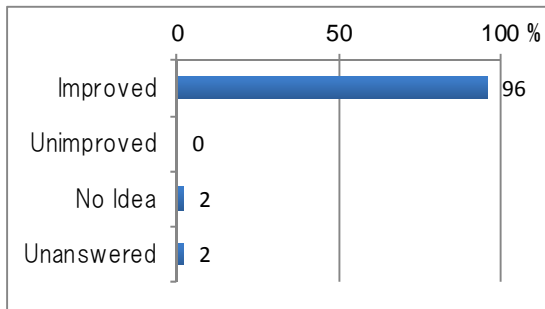


Figure 2: Traffic Congestions on the City Roads (from Harmincova to Staré Grunty) after the Project Completion

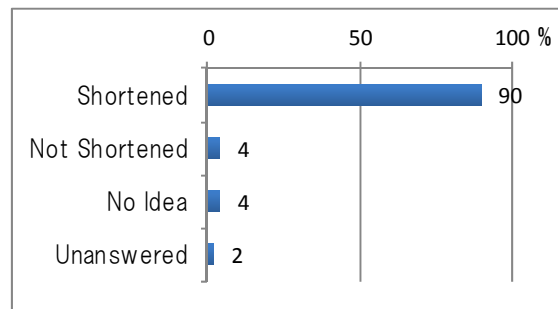


Figure 3: Traveling Time on the City Roads (from Harmincova to Staré Grunty) after the Project Completion

The number of samples: 84 road users + 15 residents and companies residing along the project section = 99 in total. Among the above, 26% replied that traffic congestions were substantially improved, 67% replied they were fairly improved, and 3% replied they were improved a little (4% unanswered).

The number of samples: 84 road users. Among the above, 45% replied that the shortened time was 10-20 minutes, 25% replied it was 5-10 minutes, 10% replied it was 20-30 minutes, 6% replied it was over 30 minutes, and 5% replied it was approximately 5 minutes (or less) (10% unanswered).

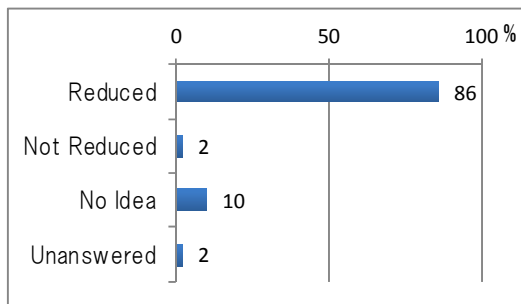


Figure 4: Travelling Cost on the City Roads (from Harmincova to Staré Grunty) after the Project Completion

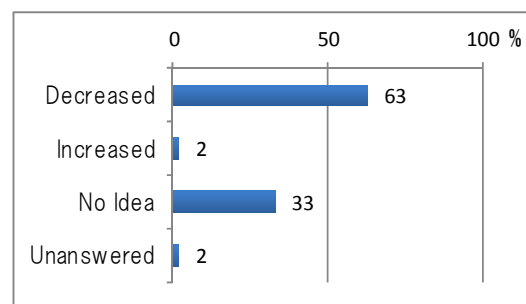


Figure 5: Numbers of Traffic Accidents on the City Roads (from Harmincova to Staré Grunty) after the Project Completion

The number of samples: 84 road users. Among the above, 12% replied that traveling cost was substantially reduced, 46% replied it was fairly reduced, and 31% replied it was reduced a little (11% unanswered).

The number of samples: 84 road users + 15 residents and companies residing along the project section = 99 in total.

In the beneficiary survey, over 90% of respondents replied that traffic congestions on the city roads were improved and travelling time was shortened, and over 80% replied that travelling cost was reduced after the project completion. The numbers of traffic accidents on the city roads seem to have been decreased following the improvement of traffic congestions after the project completion. Moreover, 98% of road users replied that they are satisfied with the motorway section constructed by the project, and they raised reasons such as comfort in driving, reduction of congestions at the Patrónka Crossing and easier access to foreign countries etc.

3.3 Impact

3.3.1 Intended Impacts

3.3.1.1 Contribution to Smooth Transportations and Efficient Economic Activities in the Region

(1) Results of the Beneficiary Survey

The result of the beneficiary survey on the accessibility to key places in daily life such as offices (work places), schools, hospitals, markets and shops etc. is shown on the right. Over 70% of respondents replied that the accessibility to key places in daily life has been improved through reduction of traffic congestions in Bratislava.

Moreover, among 8 residents and 7 companies residing along the motorway section constructed by the project, 60%

replied that local economic activities have increased after the project completion and they raised examples such as the increase of trading etc.

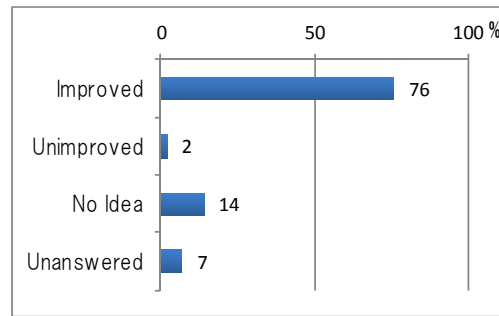


Figure 6: Accessibility to Key Places for Daily Life (Working Places/Offices, Schools, Hospitals, Markets and Shops etc.) after the Project Completion

The number of samples: 84 road users

(2) Transitional Changes in Volumes of Trans-Border Traffics via Motorway D2 (for reference)

Transitional changes in volumes of trans-border traffics through the motorway D2 including the section constructed by the project are shown below. The volumes of trans-border traffics have been increasing since the following year after the opening of the section constructed by the project (2008) except for the section II (Brodske - Breclav: the border with Czech Republic) in 2008. There seem to be various factors affecting the increase of trans-border traffics, and thus it is difficult to indicate to what extent this project contributed to such increase, however, the fact that travelling from and to neighbouring countries became easier due to the completion of D2 is considered as one of the factors contributing to the increase to a certain extent.

Table 4: Volumes of Trans-Border Traffics from and to Neighbouring Countries via Motorway D2

(Unit: vehicles/year)

Year	I. D2 : Cunovo-Rajka (border with Hungary)		II. D2 : Brodske-Breclav (border with Czech Republic)		III. D4 : Kittsee –Jarovce (border with Austria)	
	Total	Growth Rate	Total	Growth Rate	Total	Growth Rate
1999	893,811	-	4,516,440	-	432,217	-
2002	935,071	4.6%	4,359,000	-3.5%	194,580	-55.0%
2005	1,439,711	54.0%	6,662,000	52.8%	2,530,876	1,200.0%
2008	2,113,232	46.8%	4,615,240	-30.7%	2,989,825	18.1%
2011	3,166,532	49.8%	5,606,449	21.5%	5,101,166	70.6%

Source: document provided by National Motorway Company

- Note:
1. Traffic volumes of 1999-2007 (until 2004 for the section I only) are the actually counted volumes provided by the Customs Directorate, however, traffic volumes after 2008 are not available and thus the volumes after 2008 were calculated based on the traffic census (on AADT) conducted in 2005 and 2010 and database of toll collection etc.
 2. Traffic volumes provided by the Customs Directorate are the sum of volumes on motorways and lower category roads, and volumes on motorways only were calculated based on the traffic census conducted in 2005 and/or 2010 etc., and thus the table above seems to contain some margin of errors.
 3. The route D4 above is shown as a reference as it diverges from D2.
 4. D4 was opened to public in 1999, however, it had not been used much for a long time until the motorway section connecting Vienna and Budapest was completed in Austria. The large increase of traffic volumes in 2005 seems to be due to the opening of the Vienna and Budapest section.

3.3.2 Other Impacts

3.3.2.1 Impacts on the Region and Residents

Taisei Corporation was responsible for the portion of tunnel construction in this project and Skanska BS was involved in the construction work as a subcontractor. Technologies on road construction including tunnel construction were transferred from Japanese engineers to local staff during the project implementation²⁵. Moreover, over 500 local workers were employed during the peak time of the project, which led to the revitalization of the local economy²⁶.

3.3.2.2 Impacts on the natural environment

At the time of project appraisal, an environmental assessment was required for all motorway construction projects according to the domestic legislation of Slovakia (established in 1994), and the assessment report for this project was completed in 1996 and it was disclosed to public at the municipal office of Bratislava²⁷. The tunnel portion was located on a low hill and thus cutting through the hill instead of building a tunnel was technically possible, however, the project section needed to pass through part of lands of a

²⁵ Source: document provided by the executing agency and interviews with Skanska BS staff

²⁶ Source: document provided by the executing agency

²⁷ Source: JICA appraisal document

zoo and a national research institution, and thus the tunnel option was adopted in order to keep green areas belonging to these institutions²⁸. Moreover, a noise barrier wall was to be installed where a noise impact was assumed²⁹.

In the actual implementation of the project, a noise barrier wall (1,111 m in total) was constructed along Mlýnská Dolina as planned in the project appraisal, and results of environmental monitoring were reported to JICA through progress reports³⁰. Negative impact on environment was not reported in the beneficiary survey.

3.3.2.3 Land Acquisition and Resettlement

At the time of project appraisal, there was an entrance of the zoo at the exit of the tunnel planned by the project, and a basic agreement was reached with public institutions on land acquisitions including that the cost for relocation of necessary facilities would be covered by the city of Bratislava etc., and the project also required acquisition of private lands used for commercial purposes and the negotiations with landowners were planned to be initiated from October, 1998³¹. Resettlement was not planned, as there was no residential area in the areas covered by the project³².

On the other hand, two houses (96m² and 125m²), some part of a zoo, the Slovak Academy of Science, a gas station and a car repair factory etc. became subject to the land acquisition for the project implementation, and compensation fees were paid to those affected by the land acquisition, and rental housings were also provided by the city of Bratislava to the residents of these two resettled houses³³. Two people who were resettled due to the project cooperated for the beneficiary survey, and both of them are not satisfied with the resettled place or the amount of compensation fee (they claimed that while they used to live in houses with a garden before the resettlement, the current housing is small and that the amount of compensation paid is a lot less than the market value)³⁴. An interview was made with the executing agency regarding this point, and it explained that a valuation of lands and houses were conducted by experts of the Ministry of Justice in the land acquisition, and that while people affected by land acquisition could apply for arbitration if they were not satisfied with the conditions, there was not such claim or application in this project.

²⁸ Source: same as above

²⁹ Source: same as above

³⁰ Source: document provided by the executing agency and interviews with the executing agency

³¹ Source: JICA appraisal document

³² Source: same as above

³³ Source: interviews with the executing agency

³⁴ Source: the beneficiary survey

This project has largely achieved its objectives, therefore its effectiveness and impact are high.

3.4 Efficiency (Rating: ①)

3.4.1 Project Outputs

Outputs of the project (planned and actual) are shown below. Planned outputs written in the JICA appraisal document and presented below were taken from the F/S, and there are some differences between the plan and actual, as outputs were not planned in detail in the F/S. However, actual outputs are more or less consistent with planned outputs written in the building permit application document made in October 1999. As the F/S concentrates on examinations of plural options regarding routes of the motorway section to be constructed in the project, and lengths of motorway, tunnel and bridges etc. are not examined in detail for each option, and thus planned outputs should be set based on a building permit application document etc. which are made with a larger scale.

Table 5: Comparison of Outputs (Planned/ Actual)

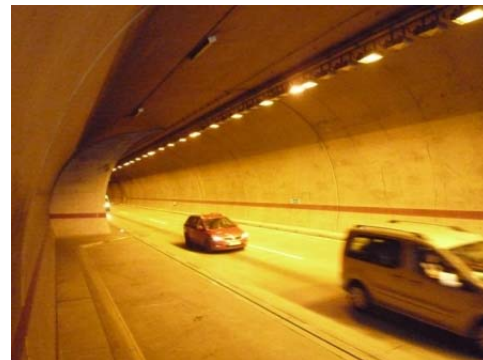
Item		Planned	Actual
Civil Works	Motorway Length	3,050m	3,658m
	Motorway Width	26.5m, 4 lanes	26.5m, 4 lanes
	Tunnel Length	1,355m each, 2 lanes in both directions	1,428m each, 2 lanes in both directions
	Bridges	7 sections, 801m in total	7 sections, 606m in total
	Other	Relocation of public facilities and the entrance of the zoo	Same as left
Consulting Service	Contents	Review of detailed design Procurement assistance Assistance for supervision of civil works Assistance for environmental monitoring etc.	Same as left
	Mans-Month	88M/M	128M/M

Source: planned: JICA appraisal document, actual: document provided by National Motorway Company

Note: lengths of the motorway, tunnel and bridges are the axis of the motorway, tunnel and bridges.



In front of the Tunnel



Inside of the Tunnel

3.4.2 Project Inputs

3.4.2.1 Project Cost

The planned project cost at the time of project appraisal was 14,792 million yen (foreign currency: 3,049 million yen, local currency: 11,743 million yen), of which Japan's ODA loan portion was 11,094 million yen³⁵. On the other hand, the actual project cost was 23,077 million yen (foreign currency: 15,302 million yen, local currency: 7,775 million yen)³⁶, of which Japan's ODA loan portion was 11,093 million yen, and it was significantly higher than planned (156% against the plan). The major reason for the actual project cost largely exceeding the planned cost was that types of soil in the areas where the tunnel was constructed turned out to be different from those identified in the geotechnical survey, which necessitated additional surveys and works. In addition, in tunnel construction additional cost was required for relocation of water and sewerage pipes and gas pipes etc. connected to the zoo and private lands in the neighbouring area, and in motorway construction additional works were required for installing guardrails, fences and traffic lights and changes of pavement surfaces etc., all of which led to the increase of project cost³⁷. The actual project cost has not been finalized yet, as arbitrations are carried out between the executing agency and the contractor.

3.4.2.2 Project Period

The planned project period at the time of project appraisal was 67 months in total from February 1999 to August 2004 (the completion of the project was defined as the end of consulting services)³⁸. On the other hand, the actual project period was 106 months in total from February 1999 to November 2007 (the end of consulting services)³⁹, and it was significantly longer than planned (158% against the plan). The motorway section constructed by the project was opened to traffic in June 2007 and all the civil works were completed in September 2007⁴⁰. Reasons for the actual project period largely exceeding the planned period was that a selection process of a consultant was delayed as the Slovak government was not accustomed to the procedures required in Japanese ODA loans, that a procedure to change the loan agreement (L/A) for changing disbursement methods between JICA and the Slovak government required a long time (this in turn delayed the process for

³⁵ Source: JICA appraisal document

³⁶ Calculated by multiplying the actual cost as of March 2012 by the average exchange rate of 1SKK=3.40JPY (the average exchange rate of the Japanese ODA loan disbursement period of February 15, 1999 – December 8, 2008), based on document provided by the National Motorway Company. The local currency portion includes payments by Slovak koruna only and payments by euro and Japanese yen are included in the foreign currency portion.

³⁷ Source: JICA internal documents and interviews with the executing agency

³⁸ Source: JICA appraisal document

³⁹ Source: document provided by the executing agency and interviews with the executing agency

⁴⁰ Source: document provided by the executing agency and interviews with the executing agency

contracting with a consultant), that acquisition of a building permit was delayed, that the tunnel design was required to be changed in accordance with a new fire protection law which was revised based on the changed EU standards following the tunnel accident occurred in Europe, that the tendering process for contractors was delayed and that additional geotechnical surveys and works were required for tunnel construction etc.⁴¹. It would have been difficult to predict these factors at the time of project appraisal, however, JICA should consult with an executing agency on risk management measures in advance if there is a risk of delay because the executing agency is unfamiliar with Japan's ODA loan procedures etc.

Table 6: Comparison of Planned and Actual Project Period

Content	Planned	Actual
Selection of Consultant	March 1999 - August 1999 (6 months)	September 1999 - April 2001 (20 months)
Detailed Design	March 1999 - October 1999 (8 months)	June 2001 - September 2001 (4 months)
Procurement of Civil Works	September 1999 - June 2000 (10 months)	December 2001 - March 2003 (16 months) Tunnel M&E contractor: May 2004 - May 2005 (13 months)
Civil Works	June 2000 - June 2004 (48 months)	March 2003 - September 2007 (55 months)
Consulting Service	September 1999 - August 2004 (60 months)	April 2001 - November 2007 (80 months)

Source: planned: JICA appraisal document, actual: document provided by the executing agency and interviews with the executing agency

3.4.3 Results of Calculations of Internal Rates of Return (IRR) (for reference)

(1) Financial Internal Rate of Return (FIRR)

FIRR was not calculated in the project appraisal, as the motorway section constructed by the project is not subject to tolls.

(2) Economic Internal Rate of Return (EIRR)

Results of EIRR calculation at the time of project appraisal and ex-post evaluation are shown below. EIRR at the time of ex-post evaluation exceeds that of project appraisal, as traffic volumes largely increased, despite of the actual project cost exceeding the planned cost.

⁴¹ Source: JICA internal documents and interviews with the executing agency

Table 7: Comparison of EIRR

Time of Calculation	Conditions for Calculation	Result
Project Appraisal (1999)	Cost: investment cost, operation and maintenance cost etc. Benefit: reduction of travelling cost, saving of travelling time, reduction of cost related to decreases of traffic accidents etc. Project life: 30 years	11.5%
Ex-Post Evaluation (2012)	Same as above	14.6%

Source: 1999: JICA appraisal document, 2012: document provided by National Motorway Company

Both project cost and project period were significantly exceeded the plan, therefore efficiency of the project is low.

3.5 Sustainability (Rating: ③)

3.5.1 Structural Aspects of Operation and Maintenance

At the time of ex-post evaluation, a state-owned company, the National Motorway Company is in charge of operation and maintenance (O&M)⁴², and the company has 13 maintenance centres nationwide which have the function of O&M of motorways⁴³. The total number of staff of the company is 1,307 as of January 2012, of which the number of staff in charge of O&M of the motorway section constructed by the project is 25⁴⁴. Maintenance of the facilities which require special technical skills such as monitoring cameras in the tunnel, a central control system and automatic traffic count system etc. is outsourced to private companies such as Eltodo and Nope etc.⁴⁵. Considering the length of the motorway section constructed by the project (approximately 3km) and actual O&M status in the field, a sufficient number of staff is assigned and no major problem is seen in the O&M system.

3.5.2 Technical Aspects of Operation and Maintenance

The breakdown of 25 staff who are in charge of O&M of the motorway section constructed by the project is the head of the maintenance unit, the head of the Tunnel Sitina unit, two engineers, 12 skilled operators and 9 operation staff⁴⁶. Training on O&M of the Tunnel Sitina was provided for all O&M staff in March 2007, and O&M of the tunnel is conducted according to the operation manual provided by Eltodo in June 2008⁴⁷.

⁴² At the time of project appraisal, the Slovak Road Administration (SSC) was to be in charge of O&M, however, the responsibility for O&M was transferred from SSC to the National Motorway Company due to the organizational change in 2004 (source: JICA internal document).

⁴³ Source: interviews with the executing agency

⁴⁴ Source: same as above

⁴⁵ Source: same as above

⁴⁶ Source: same as above

⁴⁷ Source: same as above

Considering the ratio of technical staff to the O&M staff in total, the fact that maintenance of the facilities which require special technical skills is outsourced to private companies and actual O&M status in the field, no major problem is seen in technical aspects of O&M.

3.5.3 Financial Aspects of Operation and Maintenance

Budget required for O&M of roads conducted by the National Motorway Company is covered mainly by toll revenues, sales revenues of toll stickers and government subsidies etc. At the time of ex-post evaluation, for vehicles up to 3.5t a toll sticker that is valid for certain period of time must be purchased and displayed on a car window on motorways. Prices of toll stickers are 10 euro + VAT 1.67 euro for a 10 days sticker, 14 euro + VAT 2.33 euro for a one month sticker, and 50 euro + VAT 8.33 euro for a one year sticker⁴⁸. A toll system was introduced in mid-2009 for vehicles with a total weight of 3.5t and more on motorways (and expressways) and first class roads (except for inside of the city of Bratislava) and a toll collection is outsourced to a private company called Skytoll⁴⁹. Toll rates are determined according to weights and emission classes of vehicles etc. and for example, a toll rate on a motorway for a truck with a total weight of 3.5t to 12t and the emission class of EURO 0-II is 0.093 euro (+VAT)/km⁵⁰.

The profit and loss statement of the National Motorway Company is shown below. Sales revenue mainly includes sales revenues of toll stickers, toll revenues, revenues from O&M of road sections that are under the jurisdiction of municipal governments and the Slovak Road Administration etc.⁵¹. Other operating revenue includes government subsidies, contract fines paid by contractors when they breach terms and conditions of a contract, compensation payment for damages made to properties owned by the National Motorway Company, and revenues from the Public-Private Partnership (PPP) projects etc.⁵². Government subsidies are allocated to certain items every year, and the amount of subsidy allocated for road maintenance was approximately 17 million euro in 2008, approximately 14 million euro in 2009 and approximately 17 million euro in 2010⁵³.

⁴⁸ Source: document provided by the executing agency

⁴⁹ Source: interviews with the executing agency

⁵⁰ Source: document provided by the executing agency

⁵¹ Source: interviews with the executing agency

⁵² Source: same as above

⁵³ Source: document provided by the executing agency. The total amount of government subsidies included in other operating revenue is approximately 30 to 40 million euro every year including investment related cost etc.

Table 8: Profit and Loss of the National Motorway Company

(Unit: Euro)

Item	2008	2009	2010
Sales revenue	81,308,547	80,343,411	184,646,689
Sales expense	▲38,474,167	▲42,959,414	▲140,955,863
Gross Profit	42,834,380	37,383,997	43,690,826
Personnel expense	▲19,288,709	▲21,011,664	▲25,427,547
Taxes and fees	▲984,085	▲765,467	▲587,396
Depreciation cost	▲55,073,193	▲65,687,106	▲71,310,590
Revenue and loss from sales of fixed assets and materials	▲1,338,499	1,911,925	▲475,293
Value adjustments to receivables	▲40,646	▲58,344,322	▲18,295,000
Other operating revenue	36,570,195	103,149,479	262,629,989
Other operating expenses	▲14,367,449	7,435,144	▲154,129,235
Operating profit	▲11,688,006	4,071,986	36,095,754
Non-operating profit	6,220,917	77,218	15,777
Non-operating expense ⁵⁴	▲23,622,178	▲16,013,918	▲10,261,053
Profit of the term before tax	▲29,089,267	▲11,864,714	25,850,478
Taxes	6,086,604	2,068,135	▲6,419,391
Profit of the term after tax	▲23,002,663	▲9,796,579	19,431,087

Source: calculated based on documents provided by the National Motorway Company

The maintenance cost of the Tunnel Sitina is shown below.

Table 9: Maintenance Cost of the Tunnel Sitina

(Unit: Euro)

	2009	2010	2011
Maintenance cost	785,777	817,024	697,380
Technical service cost	730,000	660,000	650,000
Total	1,515,777	1,477,024	1,347,380

Source: document provided by the National Motorway Company

As explained above, a toll system was introduced in mid-2009 for vehicles with a total weight of 3.5t and more on motorways (and expressways) and first class roads, which largely increased sales revenue of the National Motorway Company in 2010 compared with those of previous years, and the status of profit and loss of the company has been improved year by year. Profit of the term after tax is in surplus in 2010 and operating profit has been in surplus since 2009, and thus there seems to be no major problem regarding the financial status of the company. The maintenance cost of the tunnel constructed by the project is approximately 1.5 million euro per year (approximately 160 million yen) as presented above, and considering that the maintenance cost is covered by sales revenue of the company and government subsidy, and that maintenance of the motorway section constructed by the project is highly emphasized in the company, in order to avoid serious

⁵⁴ Non-operating expense includes interest expenses and exchange losses etc.

traffic congestions on the section due to traffic accidents etc., there seems to be no major problem in securing maintenance budget for the section.

3.5.4 Current Status of Operation and Maintenance

As daily maintenance, removal of garbage on roads, visual checks of street lights, road signs and technological equipment in the tunnel, and checks of the emergency cabin inside of the tunnel etc. are carried out⁵⁵. As monthly maintenance, cleaning of street lights and road signs, checking and repairing of road fences, checking of fire extinguishing equipment in the tunnel, checking and cleaning of escape ways in the tunnel etc. are carried out⁵⁶. Moreover, sweeping of carriageways with machines, cleaning of drainages, and repairing of technological equipment on roads and in the tunnel are carried out in every spring and autumn⁵⁷.

Site inspection of the motorway and the tunnel constructed by the project was conducted by the evaluator during the field study in ex-post evaluation, and both the motorway and the tunnel were maintained properly. There are many cameras in the Tunnel Sitina and they are monitored on displays in the maintenance centre for 24 hours, as there is large volume of traffics in the project section.

No major problems have been observed in the operation and maintenance system, therefore sustainability of the project effect is high.

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

This project aimed at the completion of the motorway network in the capital city and the reduction of traffic congestions in adjacent roads of the section targeted by the project, by constructing approximately 3km of a motorway in the capital city of Bratislava.

Relevance of this project is high, as the project is consistent with priority areas of Slovakia's development plans and Japan's ODA policy, and moreover development needs for the project are high. The current traffic volume of the project section largely exceeds the volume expected at the time of project appraisal due to traffics induced by the project and shifted from adjacent city roads. Moreover, traffic congestion in adjacent city roads was largely reduced and beneficiaries also showed high level of satisfaction with this project, and thus, effectiveness and impact of the project are high. Sustainability of the project is also high, as no major problem has been observed in institutional, technical and financial aspects of the operation and maintenance

⁵⁵ Source: interviews with the executing agency

⁵⁶ Source: same as above

⁵⁷ Source: interviews with the executing agency

(O&M) and current O&M status. On the other hand, efficiency of the project is low, as both actual project cost and period largely exceeded the planned cost and period.

In light of the above, this project is evaluated to be satisfactory.

4.2 Recommendations

4.2.1 Recommendations to the Executing Agency

None

4.2.2 Recommendations to JICA

None

4.3 Lessons Learned

During the project implementation, types of soil in the areas where the tunnel was constructed turned out to be different from those identified in the geotechnical survey, and additional surveys and works were required, due to which both the actual project cost and the project period exceeded the plan largely. Boring surveys seem to have been conducted at the entrance and exit of the tunnel only before the project implementation, however, possibilities to conduct more detailed geotechnical surveys including boring surveys should be carefully examined in order to avoid a large increase of project cost and period.

Comparison of the Original and Actual Scope of the Project

Item	Original	Actual
1. Project Outputs	<ul style="list-style-type: none"> • Motorway Length: 3,050m • Motorway Width: 26.5m, 4 lanes • Tunnel Length: 1,355m each, 2 lanes in both directions • Bridges: 7 sections, 801m in total • Relocation of public facilities and the entrance of the zoo 	<ul style="list-style-type: none"> • Motorway Length: 3,658m • Motorway Width: as planned • Tunnel Length: 1,428m each, 2 lanes in both directions • Bridges: 7 sections, 606m in total • As planned
2. Project Period	February 1999 – August 2004 (67 months)	February 1999 – November 2007 (106 months)
3. Project Cost		
Amount paid in Foreign currency	3,049million yen	15,302million yen
Amount paid in Local currency	11,743million yen (3,131million koruna)	7,775million yen (2,287million koruna)
Total	14,792million yen	23,077million yen
Japanese ODA loan portion	11,094million yen	11,093million yen
Exchange rate	1 koruna = 3.75yen (As of March 1998)	1 koruna = 3.40 yen (Average between February 1999 and December 2008)