PROCEEDINGS OF INTERNATIONAL SYMPOSIUM ON CITY PLANNING 2007
pp.338-347

Comparative Study on Removal Project of Elevated Expressway Between Seoul and Tokyo

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The Cheong Gye Cheon Restoration Project in Seoul is famous for its bold planning concept and rather quick realization. The elevated expressway and trunk roads on the Cheong Gye Cheon have a heavy traffic volume in the heart of the metropolitan area. There were enormous problems such as structural deterioration, enormous cost for its repair or renewal and poisonous fumes generation in the underground space of the elevated expressway. The project proposal raised a lot of discussions and severe protests especially among shop owners and street vendors who were forced to move to other areas. However, the powerful leadership of the Mayor of Seoul City saw that the project was completed in a shorter period compared to recorded time periods in developed countries. The City Government had more than four thousand meetings for negotiations with citizens and opponents. Centralization of the administrative power surely contributed to its expeditious realization.

On the other hand, the removal project of the elevated expressway over the Nihonbashi in Tokyo is also proposed and many pros and cons have been expressed from every direction. The Cheong Gye Cheon Project was one of the triggers of this Nihonbashi project. Nihonbashi is located in the heart of the Tokyo Metropolitan Area and is designated as National Cultural Property. In addition, it is the origin point of the national road network system. The removal project of the elevated expressway has become a symbol of the new age in infrastructure planning and urban construction philosophy.

This paper studies the contemporary meanings of the Nihonbashi project compared to the case of the Cheong Gye Cheon and clarifies similarities and differences between both projects referring the characteristics of urban planning institutions of their countries.

Keywords: nature restoration, landscape, heat island, river side planning

1. Introduction

Nihonbashi is one of the most famous bridges in Japan for the reasons that it was located in the central area of Tokyo from the beginning of the Edo era; it was also the origin point of the road network system of Japan and the bridge itself is designated as national cultural property. However, this bridge has been covered by the elevated expressway, which was constructed in 1968 for the Tokyo Olympics (Fhoto-4,5). The transportation route was selected on the river because it did not need land acquisition, which lowered the construction cost. In recent years the removal of the elevated expressway has been proposed and the formal proposal was submitted to the Prime Minister of Japan in 2006. Now this project is considered as a symbol of the paradigm shift from the effective and cheap construction methodology to advanced construction methodology, considering higher quality and beautiful city construction.

In the project study, prior similar projects such as in Paris, Düsseldorf, Boston and Seoul were studied. Cheong Gye Cheon Restoration Project in Seoul is the most recent case example and is evaluated because it contributes to revitalizing the capital city. Korea and Japan have had a close relationship from ancient times and still have similarities in the many aspects as eastern Asian countries. The urban planning systems of both countries also have many similarities. This paper studies characteristics of both projects, clarifies similarities and differences between them presenting some problems and themes to be tackled hereafter especially in Tokyo.

2. Cheong Gye Cheon Restoration Project

Before removal of the elevated expressway the roads over or along Cheong Gye Cheon had a heavy traffic volume of around 100 to 120 thousand cars a day on the elevated expressway which had four lanes in total, and 60 thousand cars on ordinary roads at the ground level which had four lanes on each side. They had many serious problems such as aging of the structure, traffic noise/shaking and air pollution. Cheong Gye Cheon also had critical problems such as detecting toxic heavy metals and fear of explosion under the road. The area was divided by the heavy traffic road and experienced regional deterioration.

The project involved removing the elevated expressway and road covering the river. Then it could revive the natural river in the city center and provide places for relaxation for citizens. In order to realize these objectives the project included provision of river parks, restoration of historical heritages and making landscape arrangements that also light up in the night. These improvement projects are evaluated as they created a new tourist attraction spot and promoted the state of Seoul as a world city. (Fhoto-1,2,3)

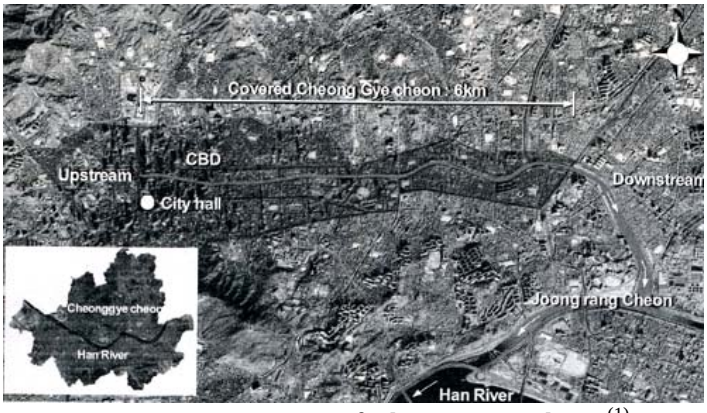


Figure-1 Location of Cheong Gye Cheon [(1)]

The election of City Mayor was held in 2002 and one of the main issues was revitalizing the deteriorating inner city especially the northern part of the Han-gang River, in which the Cheong Gye Cheon Restoration Project was the key issue. Mayor candidate Lee Myung-bak at that time raised the restoration project as one of the election pledges. He made pledges to remove the elevated expressway, which constituted a branch line from the ring road to the city hall of the length around 5.8km, and revive the old river (Figure-1).

After the city mayor election the new Mayor Lee Myung-bak proposed the first formal restoration plan. Commercial enterprises had strong objection campaigns against this project on the grounds that the proposed measures for alleviating influences on them were insufficient. Many street vendors who were forced to move to other places also strongly protested and went on a sit-in protest for three months. City Government reported that they had more than four thousand meetings for negotiations with citizens and opponents. The City Government attended meetings with commercial traders on the condition that they did not compensate for any loss and prolong the construction starting time set for January 2003. Compensation for losses was actually impossible because the supposed amount was too huge. There were about 60 thousand shops and 220 thousand employees in the planned area. After the negotiations they agreed reluctantly and moved to the surrounding area of the old baseball stadium near Dongdaemun and have been carrying on their street vendor business on a temporary basis. The necessary period for planning and negotiation is supposed to be longer in developed countries. But the powerful leadership of the ex-mayor of Seoul City surely realized the project in a shorter period. Centralization of the administrative power surely contributed for its quicker realization.

Fhoto-1 Restored Cheong Gye Cheon

Fhoto-2 Restored Cheong Gye Cheon

Fhoto-3 Restored Cheong Gye Cheon at night

Engineering works started on the first of July in 2003 and was completed on the first of October in 2005. The construction time was only two years and three months. It was amazing speed especially in view of the large scale of the project. The cost of the restoration project was 378 billion won in total, of which

70% was used for deconstruction and 30% for restoration of the river, planting and others. It is said that the Cheong Gye Cheon Restoration Project obtained public status so it could consume the public budget of Seoul Metropolitan Government through the election process.

Cheong Gye Cheon was restored as an artificial river, which uses water from the Han-Gang River and underground water. Although usage of advanced sewage treatment water was studied at first, water from the Han-gang River was used considering aquatic lives. The new flow was designed for a depth of more than 40cm, and the surface level of the water flow has five meters depth from ground level. Twenty-two bridges were constructed in which a stone bridge from the old age was restored. Each bridge was designed carefully and located at 300m intervals.

Improvement of the transportation system was also tackled to transform the public transportation as a primary mode and it started from January 2004. It included the introduction of exclusive bus lanes, improvement newly designed bus stops and IC card system for passenger's payment.

After the restoration project traffic volume on the roads along the river, which has two lanes on each side, decreased to around 20 thousand cars a day in total. Traffic congestion was one of the major anticipated problems at the planning stage. After the restoration project, it is concluded that this project does not produce a big traffic congestion problem. It is supposed that the major factor producing traffic jams was the north-south traffic flows.

The Cheong Gye Cheon restoration Project has been expected to contribute to improving air pollution, creating natural air stream and alleviating the heat island phenomena. According to the study result apparent phenomena have not been observed yet, although citizens living around the area actually feel a decrease in air-pollution substances.[2)]

Urban renewal projects are going on both sides along the river, which are planned to be mixed usages such as shopping malls, condominiums and the like in order to create the revitalizing core of the area. It is important tasks for City Government to realize human and environmental areas along the restored river through reviving projects without sacrifice to particular groups. There is also a significant assignment left for them to resolve problems of removed shop owners and street vendors.

3. Nihonbashi Restoration Project [(2)]

Nihonbashi was originally built in 1603, when the Edo Government was started. The basic point of five major road network of Japan was also located on Nihonbashi in 1604. Neighborhood area of Nihonbashi was developed as the center of culture and commerce since then. The present bridge was constructed in 1911 as an arched stone bridge, which has around 27m of width and around 49m of length, and was designated as a national cultural property in 1999.

Fhoto-4 Nihonbashi covered by the Elevated Expressway

In recent years many movements about Nihonbashi have been generated. For example "Conservation Society of Nihonbashi" was set up in 1968 by local citizens. "Revitalizing

Nihonbashi" was declared on October 12 in 1983 by citizens' groups. Minister of Land, Infrastructure and Transport said on March 14 in 2001 that "Nihonbashi is the face of the capital city, Tokyo, and the project should be tackled by the central government". Then the Ministry set up the "Committee for Studying Metropolitan Expressway in Central Tokyo" April 2001. "Advisory Committee for Studying Street and Landscape at Nihonbashi" was also set up in August 2003. An idea competition was held in 2004, at which many ideas were proposed from around the whole country.

Fhoto-5 Nihonbashi covered by the Elevated Expressway

Prime Minister said on December 12 in 2006. "Nihonbashi should be one of the most attractive areas in the world. With a dream let's open the sky over Nihonbashi. It should be started promptly although it can not be realized in a few years." Then "Council for Getting back Sky over Nihonbashi" consisting of four celebrities was set up in December 2006 and asked by the Prime Minister to study the Nihonbashi Restoring Project and make a proposal. Council had five meetings and submitted a final proposal to the Prime Minister in September 2006.

At first, Council Proposal reviews involving urban construction in Japan were of great importance for economic efficiency after the Second World War and the Metropolitan expressway hanging over Nihonbashi is a typical example. Although Japan has achieved economic affluence, urban construction policy should aspire for a beautiful, comfortable and safer city, which is appropriate for such a world city. It also inherits historical cultural assets and tries to achieve status as a high-grade city with dignity. It also studies precedent cases such as Paris in France, Düsseldorf in Germany and Boston in the USA, which reconstructed a trunk road such as to the underground space and created pedestrian malls and open spaces above the ground.

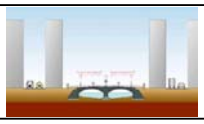
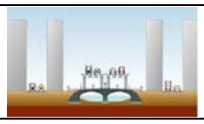
Transportation study is also done but it presupposes existing and predicted traffic flows and does not suppose transfer to public transportation or reforming goods distribution system. Traffic volume was 18 thousand cars a day in 2005 along four lanes in total and it is predicted to be 64 thousand cars a day in 2014 along six lanes in total.

Council Proposal also states necessity to set countermeasures against over the earthquake intensity of six, which is forecasted to occur in the near future. There are needs to create new open spaces, transfer people by boats on the river and support assistance activities during an emergency. Elevated expressway structures of precedent cases have been restructured after 40years of their construction. Metropolitan Expressway hanging over Nihonbashi also aged more than 40 years and many cracks can be detected in steel materials. The structures of the expressway road have deteriorated due to their heavy traffic loads including fatigue phenomenon. Quality of steel materials of the structure is low and they did not prepare for fatigue deterioration at that time.

Council proposes a transfer of the development rights from the area along the river to the surrounding blocks in order to create open spaces along the river shown by Table-1, where urban renewal will be preceded and expressway could be induced within the renewal buildings. These buildings should be used with mixed usage such as commercial, business and cultural

facilities. Part of the benefits from urban renewal will be refunded to transfer cost of the expressway. This project could be a milestone of revitalizing inner city River area, which creates a river park, cruising boat and revival of fishes by improving water quality.

Table-1 Studied Plans by the Council [3]

Just removing expressway		Maintaining expressway		Existing condition
Not constructing alternative road	Constructing alternative road along the river	Move expressway into renewal building	Move expressway into underground space	(Only reference)
				
○Lowest cost ●Difficult to create open space ●Heavy traffic congestion at surrounding roads ●Heavy traffic congestion at Metropolitan expressway	○ Lower cost compared to Plan D ○ Landscape improvement ●Needs long time for constructing road ●Difficult to create open space ●Traffic congestion at surrounding roads ●Traffic congestion at Metropolitan expressway	○ Lower cost compared to Plan D ○ Small impact on streets ●Difficult to create open space ●Inferior at landscape improvement compared to Plan D ●Low motivation for renewal projects	○ Feasible to create open space ○ Small impact on streets ○ Finest landscape ○ Promoting renewal projects ●Highest cost ●Needs long time for project	○ Lower cost compared to Plan D ○ Small impact on streets ●Difficult to create open space ●No improvement of landscape ●Low motivation for renewal projects
Plan A	Plan B	Plan C	Plan D	Plan E

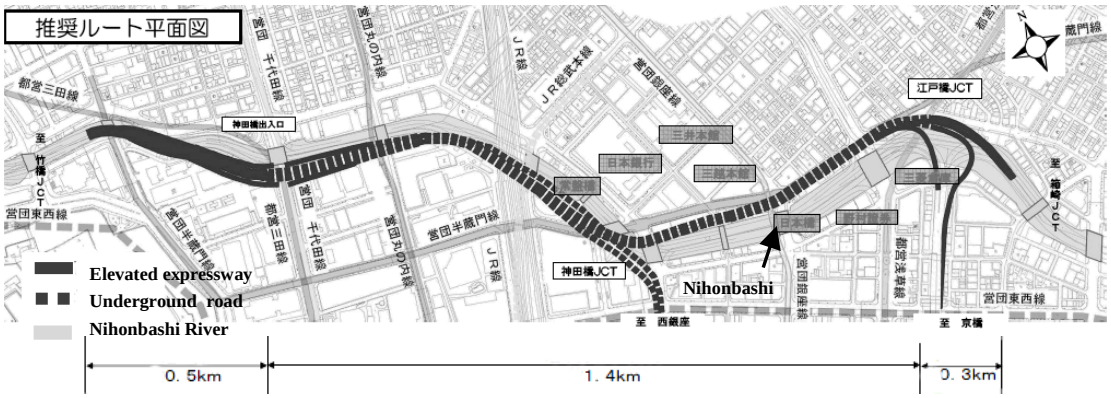


Figure-2 Route Plan Recommended by the Council [4]

As shown in Table-1 they studied five type plans for removing the elevated expressway, of which two types (A, B) are just removing the elevated expressway and the other three plans (C, D, E) involve the transfer of it. Plan A just removing is the cheapest option but it can not create new open spaces along the river and evokes serious traffic congestion in the Metropolitan area. Plan B removing expressway and create roads on the both side along the river is still insufficient to cope with existing heavy traffic. It is predicted that length of traffic congestion will be about 15 km and exit point one will be about one km.

Figure-3 Image of the Nihonbashi Restoration Project (Plan D) [5]

Plan C transferring expressway into the renewal buildings can maintain the expressway network although it needs a greater amount of transfer cost. Plan D transferring expressway to the underground can also maintain expressway network although it also needs a greater amount of cost. Plan D can achieve not only road network renewal but also revitalizing river, road space and urban renewal. Plan D has the largest ripple effects among these plans. The most dominant plan is transferring expressway to the shallow underground. In that case the length of underground is about 1.4 km and its adjacent part of above ground is about 0.8 km (figure-2).

Evaluation of the project is done from an economic scale. Effects are estimated that satisfaction of visitors is from 160 to 300 billion yen, increase of consumers' expenditure in surrounding area is from 970 to 1,700 billion yen and increase of real estate prices is from 820 to 1,400 billion yen. On the other hand, estimation of the expenditure for transferring expressway to underground is from 400 to 500 billion yen. If a part of increase caused by the project is refunded it will amount to 100 to 200 billion yen. As a result of this the net benefit of the Nihonbashi Restoration Project will be estimated from 1,400 to 2,600billion yen.

4. Comparative Analysis of Both Projects

Table-2 shows comparative feature of both project, which is based on reference 5, 6 and interviews to a person in charge of the Seoul City. The main purpose of the Nihonbashi Project is removal of the elevated expressway hanging over the bridge, on the other hand the Cheong Gye Cheon project aimed to restore the river itself. The difference in the purposes between both projects will bring some essential points. One of them is appealing power to the wider society. Restoration of the river, making attractive spaces for citizens and tourists and contributing for formulating sustainable society have glorious image and are appropriate themes to create new age. Ex-mayor Lee Myung-bak himself told that the Cheong Gye Cheon Project was the symbol for creating a sustainable society. [6] Although the Nihonbashi itself and neighborhood area have important meanings and roles for Tokyo as well as the Japanese people, the purpose and the planned contents are inferior in appealing power.

Table-2 Comparison of both projects

	Cheong Gye Cheon Project	Nihonbashi Project*
Start of idea	Some university professors started research activities for restoring in 1991 and "Society for Vitalizing Cheong Gye Cheon" was set up in 2000.	"Revitalizing Nihonbashi" was declared in 1983 by citizens' groups. Minister said 2001 "Nihonbashi project should be tackled by the central government".
Construction of roads	Lidding road from 1958 to 1978 and hanged elevated road from 1967 to 1976	Construction finished in 1963 for Tokyo Olympics
Project area	Total length is 5.84 km	Underground is about 1.4 km and on the ground is about 0.8 km in a case of Plan D
Project time	Two years and three months	Not yet determined
Total cost**	About 390 billion won (about 412 million US dollar)	About from 400 to 500 billion yen (about from 3,446 to 4,308 million US dollar)
Problems	Structural deterioration, environmental pollutions arising from heavy traffic and aerial deterioration	Landscape problems and lack of water front spaces
Purposes	Restoration nature, reforming Seoul environment oriented city, restoring history/culture and revitalizing northern Seoul	Removing elevated expressway over Nihonbashi and renewal of areas along the river
Transportation	Some portion of car traffic is converted to public transportation	Supposed maintaining existing traffic volume
Land acquisition	Do not need for the area is already publicly owned	Planned to acquire 3.4 ha and its cost is supposed about from 95 to 115 billion yen
Compensation	Do not pay any compensation although there were more than 60 thousand shops	Planned to acquire about 33 ha floor area and its cost is estimated as about 95 to 115 billion yen, and other compensations are needed

*Explaining of Plan D, Which is proposed as recommended.
**Currency exchange rates are 100 won to 0.1657 US dollar and 100 yen to 0.8616 US dollar on 14th March in 2007.

The Cheong Gye Cheon Project was mainly tackled by the Seoul City Government because the City Government constructed and maintained related roads. On the other hand roads are constructed and maintained by several public bodies in Japan. In general the central government is responsible to the national road network, prefecture governments to prefecture area level and municipalities to other roads. In metropolitan areas there is the public corporation of expressway, which is organized by the central government. So in the case of Nihonbashi the elevated expressway was constructed and maintained by Public Corporation of Metropolitan Expressway. The river spanned by Nihonbashi is managed by National Government. Then Metropolitan Government has little relationship with public spaces such as road and the river. Chu'ou Ward has no relationship even more. As the result of these circumstances is that the restoration project is defined as the responsibility of central government.

If the central government treats the case and bears the cost, it needs a reason for that at the national level and has to get a certain level of national consensus. The project realization needs strong leadership of responsible Ministry or Prime Minister. It means that the matter could be influenced by politics. However, the Prime Minister already changed in September 2006. As raising existing rate of the consumption tax is one of the major politic themes and decreasing of public expenditures are asked severely in recent years. Considering these circumstances the

Nihonbashi Restoration Project, which needs a good deal of public funding, is a very difficult theme to be tackled by the central government.

The cost of the Nihonbashi Project is much higher compared to the Cheong Gye Cheon Project. It is more than eight times the cost of the Cheong Gye Cheon Project and could be thought to increase in the future. If it is compared on the basis of per unit length it is more than 22 times the cost. This kind of high cost is derived from the fact that the Nihonbashi Project needs to transfer the expressway to an underground space and this involves land acquisition of both sides of the river, where many business buildings already occupied.

Council proposes that a part of development benefit should be refunded for the project cost. Institution for public reduction system of development benefit has not been established in Japan, although it was examined in past times. Reasons for not being established is not only opponents by the landowners and others but also difficulties to define benefits and its appropriate estimation. In Japan rights originated from the landownership are recognized widely in general. For example controls on land use are constrained by the description of Building Standard Law in which every condition on building activities should be the minimum level for public welfare. Considering these circumstances stated above it is natural to think that the introduction of public reduction system for this project is very difficult.

In recent years every urban policy is reviewed from the point of the relationship with the global environmental problems and contribution to formulating a sustainable society. Nihonbashi Project has not focused on those kinds of subjects. One of the environmental problems is heat-island phenomenon. Tokyo has been experiencing heavy rain falls in the central area and flooding disasters have occurred form time to time. This is supposed to be the result of heat-island phenomenon. Nihonbashi Restoration Project should be examined from this point of view.

5. Conclusion

Nihonbashi Project and Cheong Gye Cheon Project have similar aspects. Both projects are removing elevated expressway over the rivers and the projected areas are located in the heart of capital cities in the developed countries. However both projects have many essential differences. Purposes of these projects are different in relation to environment and sustainable society, which are thought to be compulsory for big projects creating future built environment. Cheong Gye Cheon Project had wide support for its environment-oriented concept. Nihonbashi Project should be reviewed from the point of environmental enhancement.

Cheong Gye Cheon Project has been tackled by the Metropolitan City Government. On the other hand the operating body of Nihonbashi Project is supposed to be the Central Government. Success of the Nihonbashi Project involves creating open spaces along the river and some urban renewal projects in surrounding areas. These kinds of projects include a lot of negotiations with each owner of building and land and urban planning matters for these are mainly responsible to the municipality level in Japan. In order to promote practical and concrete characteristics as a project Tokyo Metropolitan Government and Chu’ou Ward Government have to perform their appropriate roles.

Nihonbashi Project requires a huge amount of money compared to the Cheong Gye Cheon Project. This may increase the difficulty of feasibility of the project. A certain amount of the cost comes from maintaining the expressway system and existing traffic stream. In order to make this project a reality the Nihonbashi Project should be reviewed including transfer of

existing traffic to public transportation system and contribution to promotion of environmental standards.

Cheong Gye Cheon Project could be evaluated as successful at this stage although resolution of problems for shop owners and street vendors are yet to be resolved. Seoul City Government should tackle revitalizing surrounding area as a city center where can be appropriate for the capital city of a developed country. This task is not as easy as the Cheong Gye Cheon Project because it is a renewal project of the area where many urban activities are going on. On the other hand the Nihonbashi Project serves as a test of policy transformation from emphasis on efficiency and economy principle to humanity and environment oriented. It should be studied again from its essentiality although it needs some time to achieve desired outcomes.

Acknowledgements

I would like to thank Ms. Seonhae Baik of Seoul Development Institute, who kindly arranged my study trip in Seoul, Mr. Young Ha Jo of Cheong Gye Cheon Museum, who carefully explained the project and provided related materials and Mr. Kohta Kawasaki of UG Urban and Architecture Ltd., who made some comments on a draft paper.

Notes:

(1) This figure is cited from “Cheong Gye Cheon Restoration Project” by Mr. In-Keun Lee, which is compiled in reference 6).

(2) Detailed information about the Nihonbashi Restoration Project provided on the web page offered by “Society for Removal of Elevated Expressway over the Nihonbashi” although every documents are written in Japanese. (http://www.nihonbashi-michikaigi.jp/meeting.html)

(3) This figure is cited from the proposal by “Council for Getting back Sky over Nihonbashi”, and names as Plan A-E are used only for this paper.

(4) Ibid.

(5) Ibid.

(6) Lee Myung-bak made a speech at the International Symposium held at Tokyo University on November 8 in 2006. (http://csur.t.u-tokyo.ac.jp/seoul_061108/index-j.html#speech)

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