

JAPAN-KOREA TUNNEL AND ITS OPPORTUNITIES

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Introduction

Japan has traditionally deepened with relationships its neighbours on the Asian Continent partially through the Korean Peninsula. The Japanese Islands located in the northeastern Pacific Ocean have thus developed many sea routes connecting them with the peninsula.

Since around 1940, technological research had started in an attempt to connect the peninsula with Japan by an undersea tunnel in order to further strengthen their cultural scientific economic and other relationship.

The research, however, was disrupted by the outbreak of the Second World War. Its research level was extremely low seeing from the current technological level. The copy of the early research, which I have, shows that there was already an idea of linking Tokyo via the Korean Peninsula, the Asian Continent and finally Europe via a Japan-Korea undersea tunnel.

Current Situations

The Japan-Korea Tunnel Research Institute, which I belong to, has been active at promoting cultural and personnel exchange between the two nations rather than actually constructing the Japan-Korea tunnel.

To describe my experience on tunnel construction briefly, I spent nearly 30

years in my career beginning root invention, planning and design of long undersea tunnel i. e. Seikan-Tunnel to the completion of construction. Completing the Seikan Tunnel, a big undersea tunnel connecting Aomori and Hakodate in the northern Japan, starting as a junior and senior and then high-ranking national railway official. I did everything I can to help complete the 53.85km-long undersea tunnel, then the world's longest, despite the bad geological conditions there.

My successful achievement with the world's longest tunnel made me to work for the Euro Tunnel, which established to construction, to use and maintenance of Channel tunnel. Actually I was invited as a senior technical adviser and worked until its completion for about 10 years there. The tunnel involving the two nations, namely United Kingdom and France, have taught me so much of various problems and good lessons.

Another difference from the Seikan Tunnel is that the Euro Tunnel was built using nongovernmental funds and private loans instead of public funds.

I believe that good natural conditions surrounding than Japanese tunnel were behind the success. Please check the difference between the two tunnels shown in the attached chart and list for further examinations. Based on the two charts, I want to describe some extremely important parts of the Japan-Korea tunnel (Table 1, 2).

Now characteristics of these three tunnels are quite clear, if not sufficiently. Let me give you further explanations in the latter part of my presentation.

Japan-Korea Tunnel

Seeing the diagram of the Korean Straits, there will be considerable human interaction between the Korean Peninsula and Japanese Islands with the city of Pusan as an intermediate point. There will be high-speed trains connecting Seoul and Sinkansen i. e. Japanese high speed railways network carrying passengers. Initial train services beyond that distance will be led by freight

trains.

This named Car trains are considered to be an ideal transportation for use not only in the tunnel but also on the surface. Car trains are among useful means of transportation for the Euro Tunnel without safety.

As for beyond this diagram, joint Japan-South Korea research efforts are needed to find further possibilities. We've already agreed on that with our Korean counterparts each others.

Economic Zone

As shown in the (Figure 1~4), the undersea tunnel's whole distance exceeds 200km. But it can be divided into three parts for construction; Kyushu-Iki, Iki-Tsushima, Tsushima-Korea.

Historically Korea has had so much cultural and other influence over Japan mainly through those small Japanese islands in the Tsushima Straits dividing the two nations. No more quite so easy to distinguish Japanese from Koreans as the two races have intermingled culturally and anthropologically. They will not take much time to get closer economically, in a move to realize something like a European economic sphere or North American economic organization.

Europe, now at a population of several 100 million, gives an ample example of how to get together and help each other. The Euro Tunnel has played a major role in bringing United Kingdom and France together and the rest of European Union.

Safety is the first and most important mechanism for any traffic facilities. Based on that specific, various designs and equipment are made. It is true in the case of the Euro Tunnel. Therefore, efforts are made to unify and standardize norms of United Kingdom and France.

The Seikan Tunnel didn't need a sort of coordination with another country. But it actually is far beyond domestic meaning and thus has a universal value.

However, remarkable difference is their source of money. While the Seikan

Tunnel was financed almost totally by Japanese government funds, the Euro Tunnel was privately financed. Actually a British company paid 50% and a French firm paid the remaining 50% in a move to establish Euro Tunnel Company. The company did almost everything to achieve the tunnel project. Euro Tunnel Co. itself had a capital of some 500 million pounds, and another 1.4 billion pounds were brought about for the project by a team of about 120 banks.

Like the Euro Tunnel making a closer Europe financially and beyond, a Japan-Korea Tunnel will surely realize a powerful Japan-Korea economic zone, helping to bring about a united Korea, much influencing northeastern regions of China and beyond, and thus hopefully ultimately forming a several 100 million-plus Asian economic sphere. It will probably become the axis of a possible widespread northeastern Asian economic zone bearing comparison with EU or NAFTA (North American Free Trade Agreement). The zone will also most likely swallow a Sea of Japan economic area that includes Siberia, Russia (Figure 5~7).

Tunnel

As you see the chart, the Japan-Korea Tunnel will be divided into three for construction. Each and every one of them needs thorough geological inspections, particularly on the part of South Korea. The tunnel will be made around 120-150m below sea level. If full-scale shield construction methods are adopted, a large sum of money is needed. If a route is created in the upper part of Miocene, then the cost will go down considerably. In this respect, the Seikan Tunnel utilized mainly a conventional mountains construction method even in the upper Miocene. If adopted the latest technological know-how, the construction cost will be minimized to something like from 1/3 to 1/10 cost of full-scale shield construction methods.

The longest undersea tunnel part would be between Tsushima Island and Koje-do (Island) estimated at about 60km. The tunnel could successfully be built there if dug with a low slope from both sides, selecting good soil. Some

20km-long tunnel was dug from one side in case of the Euro Tunnel.

Three tunnels are under consideration. In between two main traffic tunnels is a tunnel for maintenance, building materials, traffic of personnel, ambulances, fire engines and emergency vehicles as well as detectors for earthquakes, fires and spring water. All three tunnels are checked and controlled by an advanced central traffic control system (CTCS) with induction radio and car navigator. The main traffic tunnels on the both sides with one-way traffic accommodate passenger cars, freight cars and car trains which carry many cars. There will be connection parts from and to another tunnels from which recovery of malfunction and recovery of tunnel, rescues are done. The very best choice is always safety first and followed by exact transport.

The tunnels can be used for another purposes: 50cm-wide optical fibers; pipelines to carry gas, oil, and water; and transport by the capsule line drive of various powder bodies. Here too safety is the No.1 priority. Therefore, every spare is needed. The multipurpose application is indispensable to the high-speed, next-generation tunnel.

Effect and Future

This tunnel is extremely valuable for Japan and South Korea (and other nations involved) to strengthen their social, economic and cultural ties. In view of its effect, our Japan-Korea Tunnel Research Institute has recently agreed with its Korean counterparts to actively and fully promote the tunnel construction.

In fact, all the new plans and research have just began and nothing more than that. However, we've got to utilize this as a golden opportunity, and carry out full-scale research in a great harmony among the people and organizations involved with hope that the world will pay attention to and eventually support our plans.

Climate of both Japan and South Korea are so delicate because of their Far East Monsoon climate. The outcome will be so grave if and when authorities

could not cope with even a small change of nature properly immediately after its occurrence. Keeping in mind of this calm but often harsh climate, we should do everything we possibly can to construct this extraordinary tunnel. To do this successfully, we surely need many engineers and technicians of abundant experience and deep insight.

Table 1.

Table 2.

Figure 1.

Figure 2.

Figure 3.

Figure 4.

Figure 5.

Figure 6.

Figure 7.