



Exchange of experience (review)

EVALUATION OF ANKARA – ISTANBUL HIGH SPEED TRAIN PROJECT

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Abstract. Many countries have been carrying out some changes in their transportation policies for the sake of environmental and economical considerations. These circumstances have also affected Turkey to change the national transportation policies. In this study, transportation policies of Turkey have been investigated and, in this context, an important railway project of Ankara – Istanbul line has been analyzed. In evaluation, the present condition of the rail line, high speed train project is compared in terms of market study, technological and economical point of views. Finally, conclusions and suggestions are presented.

Keywords: transportation policies, railway transport, high speed train, market study, Turkey.

1. Introduction

During the last decades, Turkey has achieved substantial economic and industrial development. With a population of 71 million the country has 63 230 km of highways and 15 000 km of railways. Highway transportation accounts for 95 % of freight and passengers while the railways convey 4 % of the demand, and the remaining demand is equally shared by maritime and airways. Annually, 5 000 fatalities and 300 million dollars of property loss occur. 42 % of fatal accidents are resulted from accidents of heavy vehicles and buses that constitute approximately 20 % of the total traffic [1, 2].

The statistics show that the ratio of total freight and passenger transportation by railway systems is very low. According to the official data, within 2003 total passenger transportation was 5.87 billions passenger-km and total freight transportation was 8.6 billions ton-km which are much lower than the average values in most European countries [2].

During the early years of the Turkish Republic after 1923, transportation policies were mainly focused on railway. Before the Republic, there were slightly more than 4000 km of railways in Turkey. By adding another 4000 km railway within 20 years, this number had reached to approximately 8000 km of railways [1, 3–5]. However, after 1950s, “knitting the mother land with railway” policy was given up and highway era was started. In the progress of time, the balance between transportation systems has been changed to the advantage of highway. Starting from 1980s despite oppositions against planning and construction of motorways by dif-

ferent groups, nearly 2000 km of motorways were constructed until today mainly between major cities of the country (e.g. 700 km of Trans-European Motorway between Ankara and Edirne). Although the initial cost of railways is usually higher than that of highways, the total cost including maintenance and repair is much lower for railways. In addition to these, if environmental effects are taken into consideration, the disadvantages of highways become more evident [6, 7].

2. High speed rail (HSR) technology

Recently, many countries have constructed and are operating high speed rails. The pioneers of high-speed rail system were the Japanese and French who were among the first countries that could realize the problems of motor vehicles. With very dense city centers such as Tokyo, it was felt that the motor vehicles were not the way forward. They needed public mode of transportation that was fast, efficient and reliable [8].

There are various reasons for the acceptance and being common of high-speed rails. These trains are especially preferred among cities with dense population for their high speeds and transportation capacity. Japan is one of the best examples for these facts. A total of 23 000 passengers per hour are conveyed by HSR departing from Tokyo Station every six minutes [9]. In Europe and Asia, HSR is preferred over planes for the distance of 200 to 600 km. The low energy consumption for passenger distance per capita of HSR is an important advantage for preventing environmental pollution. The energy consumption of HSR per capita is less than half

of a passenger car and almost one-third of a plane. Safety is another factor for HSR to be favoured. There are very few recorded accidents related to HSR.

Despite these advantages of HSR, there are some shortcomings too. One of the disadvantages of HSR is that some additional substructures are needed. The initial and operational costs get higher in mountainous areas due to bridges or tunnels [4, 6]. Even with these difficulties, total cost of railways is still lower than that of freeways in view of the fact that they needed smaller land surface area. Another disadvantage of these systems is the noise caused by high speed and vibration. To overcome this problem, researches have been in progress.

3. Ankara – Istanbul rail line (present status)

Ankara, located in the Central Anatolia Region, is the capital city of Turkey, with a population of about 5 million. On the other hand, Istanbul is the biggest city of Turkey with a population of nearly 12 million. Due to their large population, there are many trips to and from these cities. Especially, travels between these two cities constitute the most crowded travel corridor in the country. Moreover, there are four city centers and many towns located on this rail line making the line more crowded. The present Ankara – Istanbul rail line has a total of 576 km, with double lines of 110 km. Although all sections of this line are electrified, the quality of the line is below standard. In addition to this, there are many narrow curves on this line making high speeds impossible.

3.1. Market Study and Demand Forecast

This line is the most important corridor for both freight and passenger transportation. Currently, there are 7 express trains traveling along this corridor. In addition to these trains, 3 trains are serving transit in this corridor. Between Ankara and Istanbul, nearly 11.8 million passengers per year were transported by all modes. The share of railway was 10 %, while that of highways and airways was 73 % and 17 %, respectively. Also, the share of railways in this corridor is around 3 % in freight transportation. In this corridor, 12.5 million passengers and 48 million tones of freight were transported by different modes of transportation in 2001. In that year, the share of highways among all transportation modes was 73 % for passengers and 9 % for goods. While railways conveyed 10 % of the passengers and 3 % of freight, airways had a share of 17 % for passenger transport. Unless the rail line in this corridor is rehabilitated or reconstructed the share of railways for passenger and freight transport will continue to decrease. It is expected that by completion of high speed train project, the share of railways would increase to 78 % in passenger transportation.

3.2. The Reasons Behind the High Speed Train Project

Parallel to developments in economy, industry and commerce, urbanization has been continuing in big cities like Istanbul and Ankara, and migration from rural areas to such urban centers has been accelerated.

Given these the need to improve transportation systems becomes imperative. Therefore, all transportation modes are seeking ways to increase their shares in the Ankara – Istanbul corridor which is the highest potential nationwide.

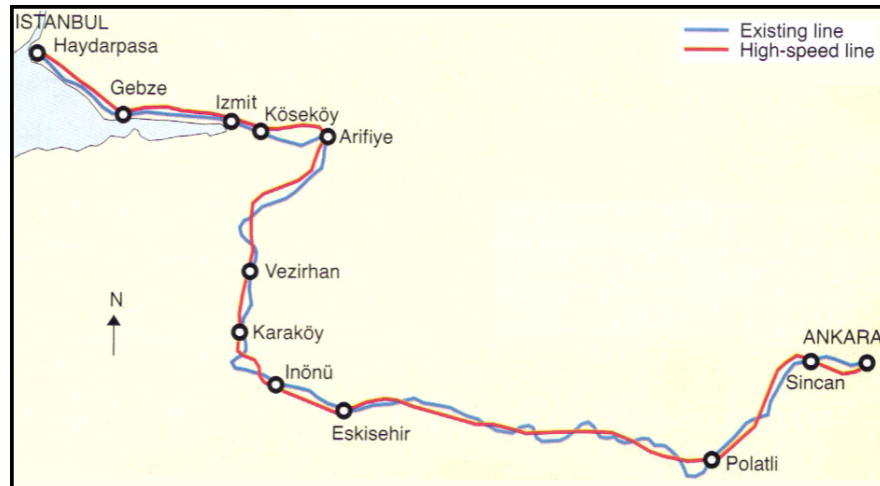
In the past, the railways have always lost their share in market due to lack of financial support to compete with other transportation systems, especially highway transportation. For example, by the completion of Bolu Tunnel which is an important part of the Istanbul – Ankara roadway project, there will be a reduction of one hour in travel time. Because of this the railway with its minimum 6.5 hours of travel time will have smaller chances of attracting passengers.

TCDD (Turkish Republic State Railways) is aiming to lessen the travel duration in this line and to increase its share in market and its competition power by improving the parameters that affect passenger potential, like safety and comfort. The high speed train project of Ankara – Istanbul railway line was started to realize these objectives.

4. Ankara – Istanbul high speed train project

The main purpose of the Ankara – Istanbul high speed train project is to decrease travel time to about 3 hours of safe, comfortable and rapid transportation. Initially this project started as “the rehabilitation project of the existing Ankara – Istanbul railway” in 1994. The rehabilitation project covered the rehabilitation of the existing line and construction of an additional new line parallel to the existing one. With its relatively low project cost, this project would be completed in two stages. The first stage would be constructed between Ankara – Eskisehir, with project duration of 34 months and cost of 459 million euros. As a result of upgrades in substructure and superstructure, the total travel distance would be shortened by 9 km. The second stage of the rehabilitation project was a rail line of 180 km between Eskisehir and Kosekoy near Kocaeli. By rehabilitation of this section, 25 km would be saved in total travel distance. The cost and duration of the project were estimated around 701 million euros and 36 months, respectively. By completion of the two stages of project, travel time between Ankara and Istanbul would be reduced from 6.5 hours to 3.5 hours by HSR at speed of 200 km/h.

In May 2005, the Turkish Government gave up the rehabilitation project of existing Ankara – Istanbul railway due to very old superstructures and low geometric standards. The newly proposed Ankara – Istanbul high speed train project replaced the above mentioned rehabilitation project. In this project, a new two-line for high speed trains will be constructed increasing the project speed from 200 to 250 km/h. The old line is left untouched for use of freight and other trains. With the high speed train project, the total length of the line will be reduced from 576 to 533 km (see Fig). The total travel time between the two cities will also decrease from 6.5 to 3 hours. The project is being built in two main phases. First, 251 km section from



The map of Ankara – Istanbul rail line corridor

Sincan to Inonu and second, 158 km from Inonu to Kosekoy. The remaining sections of Ankara – Sincan (24 km) and Kosekoy – Gebze (56 km) will be bidden to be completed in 2008. Being included in the Marmaray project the Gebze – Istanbul section of 44 km will be completed under this project [10].

The construction cost of the section between Sincan and Inonu is 747 million euros. By April 2006 about 63 % was completed and the remaining will be completed by the end of 2006. The section between Inonu and Kosekoy is 158 km, and will be completed in 2008. Because of 39 tunnels and 33 bridges and viaducts, the estimated cost of this section is about 1.27 billion dollars. The remaining sections from Ankara to Sincan, and from Kosekoy to Gebze are to be completed in 2008 as well. The latter is expected to cost 106 million euros. Meanwhile, 10 high-speed trains are being manufactured by CAF, Spain, to be used in this railway line. They consist of six cars with a capacity of 419 passengers, suitable for 250 km/h.

Turkey is planning to develop the technology for high speed train and light rail vehicles. In order to achieve this plan, an agreement was signed by Turkish State Railways (TCDD), Rothem-Hyundai, Korea and ASAS-Haco in March 2006.

5. Conclusions

Transportation policies of a country should not conflict with its benefits. As an example, although Turkey is a country surrounded by seas from three sides, the share of maritime in passenger and freight transportation is around 1 %. However, the preference of highways over other transportation modes has brought an understanding of the consequences of insisting on individual transportation instead of mass transportation.

In addition to economical and environmental losses of the country, this comprehension also includes traffic accidents causing 5 000 fatalities and property loss of 250–300 million dollars annually. Therefore, the transportation policies of Turkey should be revised and be based on transportation systems emphasizing mass transportation such as railways.

The policy changes in transportation should be supported by new efforts to improve railways and make them compatible with other transportation systems. The priority in these efforts should be given to high speed rail technologies. The new projects based on high speed rail technologies or rehabilitation projects of existing rail lines should be taken into agenda immediately. The Ankara – Istanbul high speed rail line project could be a pioneer of such efforts. With the completion of the Ankara – Istanbul high speed train project, the travel duration between two biggest cities of Turkey will be decreased and a safe, comfortable and rapid transportation mode will be provided. Additionally, efforts of integration to European Union High Speed Rail Network should be accelerated.

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