
**ECONOMIC-GEOGRAPHICAL CHARACTERISTICS OF THE RAIL TRAFFIC IN
THE REPUBLIC OF MACEDONIA**

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Abstract: This article deals with the economic and geographic characteristics of the railway traffic in the Republic of Macedonia, which has a relatively long history of its development on the territory of today's Macedonia. The process of building starts from 1873 when the first railway was built in this country. The line was Thessaloniki-Skopje, and to this day, it is still experiencing different periods of development as a result of various socio-economic and political regimes, intertwined with the various conquests that this sub-region had, just as all other parts of the Balkan Peninsula.

The paper divides the historical development of railway traffic in Macedonia into three stages of development. The first stage (1873 - 1894), the second stage (1918 - 1936) and the third stage after WWII to date.

The article will also address issues like: geographic-communicative position, economic significance of rail traffic, historical development of railway traffic, rail corridors, railway traffic organization, railway infrastructure, passenger transport, transport of goods, prospects of rail traffic and in the end, possibilities of development of the railway traffic in Macedonia.

Keywords: railways, traffic, development, Macedonia, economic.

GEOGRAPHICAL - COMMUNICATIVE POSITION

The geographic position is a very important factor in the development of transport, especially of some of its types. As far as the geographic-communicative position is concerned, this country is almost in the midst of the Balkan Peninsula, in the southern part of Europe, extending between 40° 50' and 42° 20' north latitude, and between the meridian 20° 27' and 23° 05' east longitude. Facing these Balkan and European positions, Macedonia has a very good geographical position.

The appropriate geographic position, being near the Aegean Sea and the Adriatic Sea, have made it possible for some important international routes to meet. The most important communicative artery, probably all over Balkans passes through the Vardar valley pass. This artery in the south continues to Thessaloniki (Greece) and from there to the Aegean, while to the north, through the Morava and Danube valleys, it connects with Central Europe. So more concretely, along the Vardar valley, approximately north-south direction, passes the modern automotive highways and the electrified railroad, both of which are of an international character.

Apart from communicational connections through the Vardar valley, there are other links here, such as south, west, east and north. For example. In the northwest through the Lepenec River valley is connected to Kosovo, which crosses two main roads, one called the Adriatic highway, where through Prishtina and Podgorica, goes to the Adriatic Sea, as well as the very important railway in the relation: Skopje - FusheKosovo (Pristina - Kosovo) - Belgrade (Serbia). In the south with Greece, apart from the communicative arteries of the Vardar valley, there are others like that in Bitola and Dojran.

In the east of the country, bordered with Bulgaria, they lead three arteries through the river valleys of Kriva Reka, Bregalnica and Strumica (Deve Bair, Delcevo and Novo Selo). Thus, through communicative valleys other than Bulgaria, Macedonia also connects with Eastern European countries, Asia Minor and beyond. In the west, some ways lead to Republic of Albania: the Black Drin (Debar), through Ohrid Lake and Struga and Ohrid (St. Naum, Qafasan), through the Prespa Lake - the Prespa Valley (Stenje). In this direction, the main communitarian artery is Struga - Qafasan - Elbasan - Tirana - Durrës, where besides Albania, Macedonia also connects with Western Europe as it goes to the Adriatic Sea. In the future, it is expected that the geographic-communicative position will be efficiently acquired in the function of the development of the communication. From what has been seen above, it can be seen that the Republic of Macedonia, on the basis of the geographical position, is offered adequate facilities for multi-lingual relations with neighboring countries, both politically, economically and culturally.

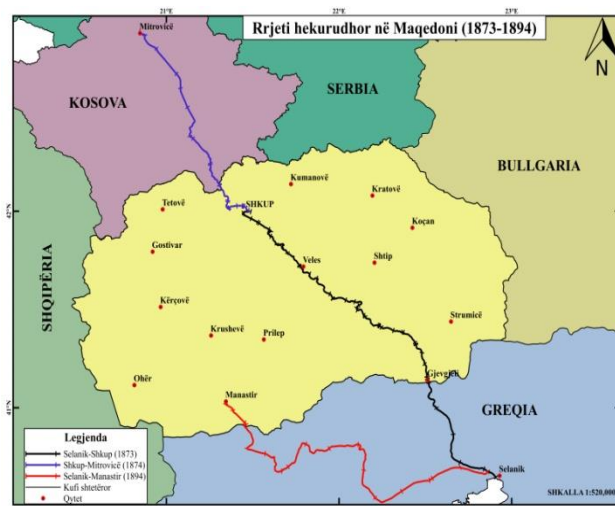


Fig.1 Railroad in Macedonia during 1873-1894

HISTORICAL DEVELOPMENT OF RAILWAY TRAFFIC IN MACEDONIA

We have divided the railway traffic development in Macedonia into three periods. The first period begins with the construction of the first railway in 1873 and continues until 1894. So, the first railway in Macedonia was built in 1873 in the line Thessaloniki-Skopje. With the release of this railroad in use, there has happened a revolutionary turn in the transport of passengers and goods. Before the construction of the railway, goods and people used to be carried by wagons and caravans, replacing them with the rail transport. A year later, the Skopje-Mitrovica railroad was built in 1874 in order to continue towards Sarajevo, but in vain, because there was another one built in the north, respectively from Belgrade to Vranje. This way the construction of the railway to Sarajevo failed, but was carried out just north towards Belgrade. In 1889, the Skopje-Vranje railway was built, which connected Macedonia with Central European countries, through Serbian railways. In 1894, the Thessaloniki-Bitola railway line was built, which is also a push for the socio-economic development of the country. This ends the first period of construction of the railway network in Macedonia.

The second period starts in 1918 and continues until 1936. By the end of WWI in 1919 the public railroad Skopje-Tetovo-Gostivar railroad has been released, which in 1920 continued for Kicevo, while in 1921 up to Ohrid and Struga. Similarly, in the same year, 1919, narrow-track railway was used in the Gradsko-Prilep-Bitola line. In 1931 the existing railway Bitola-Prilep was replaced by normal rails, while in 1936 it continued to the city of Veles.

Following WWII follows the third period of development of the railway traffic in Macedonia, mainly characterized by the modernization of the existing railway network. In 1952, the Skopje-Tetovo-Gostivar railway line, which continues to run for Kicevo, is also in use. In 1957, there were built normal railways on the Gradsko-Sopotnica line, and later on the railway Kumanovo-Belakovce, as part of the Skopje-Kumanovo railway (Панов, 2004).

This situation of the railway network in Macedonia continues today, with the main railway line being called the Kumanovo-Skopje-Gevgelija railway, which is modernized and electrified after connecting Athens with Belgrade via Skopje and beyond toward Central European countries.

RAILWAY CORRIDORS

There are two corridors in the territory of today's Macedonia, corridor 10 with north-south position and corridor 8, which is approximately east-west. In the perspective of Sofia-Skopje-Tetovo-Gostivar-Kicevo-Struga-Pogradec-Elbasan-Durrës is experiencing the fate of the authorship in the same relation, although something has been done, but in addition to the existing railways, nothing has been done. Corridor 10 has a length of 359 km or 51.3% of the overall rail network in Macedonia of 699 km. The railway corridor 10 runs through the 1435mm normal binary line in Tabanoc (border with Presevo-Serbia) - Skopje - Veles-Gevgelija (border with Greece).

ORGANIZATION OF RAILWAY TRANSPORT

The organization of railway traffic in Macedonia depends on the organization of transport and availability of technical-material capacities for the driving schedule. With the transport organization, the length and weight of each

train is determined, and it must be in the whole relation. It determines the number of trains according to the structure of transport and traffic, by train types and relations, as well as the driving schedule.

RAILWAY INFRASTRUCTURE

The state of the railway infrastructure is not at the appropriate technical level, with the exception of the relatively technically equipped Tabanovce-Gevgelija railway. The real needs for the maintenance of the existing rail network are 25 million dollars a year, which means that in the period 1992-1995 13 million dollars a year have been invested for this purpose, and 90 percent of these funds are spent on the salaries of employees in this kind of transport. At this time, the state did not compensate for these expenses at all, while the financial sectors of Macedonia's railways did not improve this activity. The railroad tracks of Macedonia on the same level with roads cross over to 290 countries. These road crossings pose a potential risk to traffic safety, while the level of security depends on the way they are secured. In the territory of Macedonia, road crossings are provided in these ways:

208 - crossings are provided through road signage;

12 - provided with mechanical protection and with special shield;

7 - provided with mechanical protection and road policeman;

30 - are provided with half-life automatic devices;

2 - are provided with 2 semi-retarder automatic devices;

31 - secured with unattended automatic devices

Again, safety in rail traffic is not at the right level because it influences a multitude of factors, the right look, citizen discipline, bends, the speed of train movement on the track and so on.

RAILWAYS

The total length of the railway line in Macedonia is 699 km of open railway, 226 km of railway stations and 102 km of industrial tracks. All railways have a normal track width of 1435 mm. Railways are of a public character, apart from industrial tracks.

From the overall length of the railroad to the country, 495km are trained for 80-100 km / h speeds, while the rest for less speed. Special sections of the railway are also equipped for a speed of 100-120 km / h, but due to the poor technical condition of other railroads, that speed is not allowed from 14.11.2015. On the Macedonian railroads, an electric train has been released by China, which can develop speeds up to 160 km / h but due to the poor quality of the railroad, it can move up to 120km/h (*Македонски железници, Годишен извештај, Скопје, 1995*). In the Macedonian railways it is necessary to repair 30-35 km of railroads, taking into account the time period of 20-25 years, proper repair has to be done, but in the period 1993/95 nothing has been done in this plan. There were 233 km of open railways electrified in the Tabanoc - Gevgelija railway line and 83 binary stations equipped with telecommunication equipment.

PASSENGER TRANSPORT BY RAIL

In the Republic of Macedonia, the transport of passengers with this type of transport is carried out through 92 locomotives (13 electric and 79 diesel engines) with 177 wagons (64 classic wagons, 74 wagons with motor, 18 wagons and 21 wagons per stretch), so that in the post-WWII period, from 1951 to 2011, there has been a drastic decline, a phenomenon that can be observed through table 1 below (*Јавно Претпријатие Македонски железници, Скопје, 1998*).

Table 1. Passenger transport with railway traffic in Macedonia in 1951-2011

| Years | 1951 | 1974 | 1991 | 2011 |
|---|-----------|-----------|-----------|-----------|
| Number of people who have used this kind of transport | 5.570.000 | 6.000.000 | 5.055.000 | 1.421.403 |

From the table above we note that from 1951 to 1974, the number of 5,557,000 passengers increased to 6,000,000 passengers, but then decreased to 5,055,000 in 1991, which in 2011 was only 1,421,403 travelers. This drastic drop in the number of trains by rail is due to the lack of maintenance of the railway network, the phenomenon we mentioned in this paper and the increase in competition for passenger transport (buses, cars).

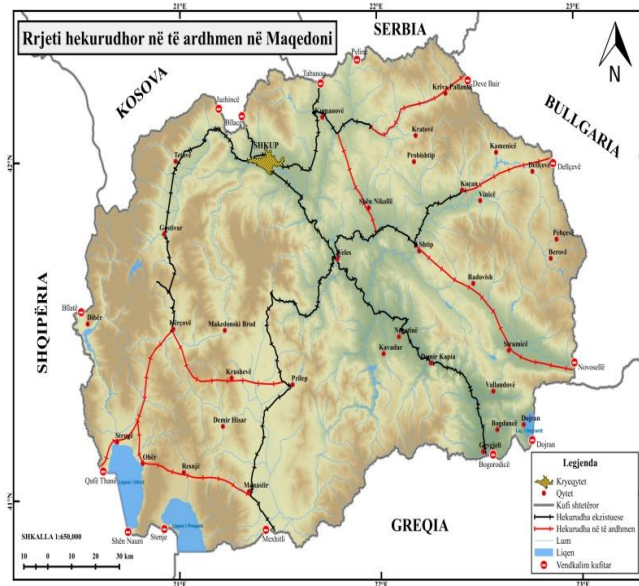


Figure 2: The railway network of Macedonia in perspective

TRANSPORT OF GOODS BY RAIL TRAFFIC

Transport of goods by rail is carried out with 2431 cargo wagons. In contrast to the passengers, the amount of goods carried with this type of communication is smaller compared to the same period of transport of passengers. This comparison can be presented through the table no. 2 below:

| Year | 1951 | 1974 | 1991 | 2011 |
|-------------------|-----------|-----------|-----------|-----------|
| Goods transported | 1.930.000 | 5.750.000 | 6.900.000 | 2 770 483 |

From the table 2 above, we notice that from 1951 of 1,930,000 million tons of goods we have a solid increase in 1974, 1991, respectively 5.750.000t. and 6,900,000 tons, while in 2011 we have a drastic decline of 2,770,483 tons. The problem is the same, a result of the development of infrastructure and automotive transport vehicles. The rail transport in this plan dominated until the 1960s, or rather until 1966, in which year the primate was taken by the road transport. Thus, the percentage of the transport by rail is constantly decreasing, and today this proportion is in the preponderance of road traffic, or in 1951 rail transport was 84%, while in 1991 it was about 45%.

THE RAILWAY TRAFFIC PERSPECTIVE

After the transition period, in the future it is expected that the economy of the Republic of Macedonia will be successful in its development, and in this direction is planned the development of the railway communication. In this regard, new railway lines in the country and with neighboring countries are foreseen to be built.

From the analyzes made it is known that the current situation of the railroad transport does not satisfy and does not meet the needs of the modern economy in a country that tends to develop and integrate into the European Union. For this reason, in the future, all railway lines should be reconstructed with new tracks, reinforced with two-line lines in the most important relationships, electrification of all railway lines and equipment of railway junctions with modern signals.

Some work on this plan has started according to the country's economic possibilities. In this plan special priority will be given to the main Vardar railway, above all, existing deficiencies will be emphasized in order to adapt to the high international traffic standards in question. It is also foreseen that the flow of the largest river, Vardar, from Thessaloniki (Greece) to Skopje will be navigable, where many accumulations will be built along the river, where many parts of this railroad will be relocated.

In addition to the central railway, special attention will be given to the adjustment and modernization of other railway parts in the country, especially those that lead to neighboring countries. The railway network in Macedonia is not yet fully formed, as many parts of the country are not related to the rail system, and in addition, there is no railway connection with Bulgaria and Albania. For this reason, in the future, railways within the territory of

Macedonia and other lines connecting with the neighboring countries, east with Bulgaria, in the west with Albania should be built. Meanwhile, in the east the railway should continue in the connection Bellakovc - Kriva Palanka - Gjushevo - Qustendil - Sofia - Istanbul. Or, in other words, the Republic of Macedonia will have exit to two strategic seas, in the east to the Black Sea, and the west to Adriatic.

The Macedonian government has planned that until 2023, railways between Macedonia and Albania will be built (Skenderi, 2009). The internal plan also foresees the construction of these railways: Kumanovo - Ovce Pole - Stip - Strumica - border points with Bulgaria, Kocani - Delcevo; Sopotnica - Kiçevo, Ohrid - Resen - Bitola etc. If this plan is implemented, the railway network in the country will have its final form, whereby all areas in the country will be given the same chance of economic development. In perspective, the number of locomotives is expected to increase both quantitatively and qualitatively. Gradually the old wagons will be replaced with new ones and so on. If the proper modernization of the railway transport is achieved, it will be able to influence the country's economic development in the future.

SUMMARY

The situation of the railways in Macedonia is not satisfactory considering the period of its existence. During the three stages of railway history in Macedonia, it could be said that very little or nothing has been done during all these years. However, the focus should not be on what hasn't been done but rather in what should be done. Strategic planning of the renovations and new constructions of railways is very much needed in order to expect positive and successful results in the improvement of importing and exporting of goods. Macedonia is a candidate country of the European Union, and the railways in the country are nowhere near the required standards. One of the serious plans of the government should definitely be re-organization, re-construction of already existing ones and the construction of new railways which will be helpful in the development of the economy of the country, and in making easier the public transport for all the citizens equally.

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