Complementary relationship between tourism and traffic in the County of Krapina-Zagorje

Teodor Perić

FACULTY OF TRANSPORT SCIENCES, ZAGREB

Čedomir Ivaković

FACULTY OF TRANSPORT SCIENCES, ZAGREB

Savo Vojnović

POLICE ACADEMY, ZAGREB

Questo lavoro espone la relazione esistente tra la predisposizione nel territorio di Krapina-Zagorje di strutture al servizio del turismo ed il livello di sviluppo del traffico, vista l'interdipendenza esistente tra la crescita del turismo e quella del traffico.

Pur essendo l'attuale rete di trasporto, ossia la densità delle linee stradali e ferroviarie, relativamente ben distribuita, una maggiore cooperazione tra queste due modalità di trasporto è già stata intrapresa con l'obiettivo di intensificare l'integrazione tra la ferrovia e il traffico causato dal turismo domestico. Tale integrazione comporta, infatti, numerosi effetti positivi, tra cui il più importante al fine di uno sviluppo sostenibile del turismo, è quello ecologico.

Introduction

The Krapina-Zagorje County has, no doubt, justified and realistic ambitions for the development of tourism spanning a wide range of activities, which has also been confirmed in the Strategic Marketing Plan for Tourism, published in 1996 by the Institute of Tourism in Zagreb. Apart from the findings of this project and according to numerous other indications, this County, as few others in Croatia, has numerous natural, and even artificially created predisposition for further versatile development of continental tourism.

Due to the high level of complementary, i.e. causal relations, considering tourism will here include also the traffic function, without which the tourist destinations would be inaccessible, and the tourist activities impossible. Therefore, the main aim of this paper is to study the suitability and quantitative and qualitative values of the traffic, not only in the county but also in its gravitational surrounding, so as to meet the needs of ambitious tourism regarding services.

The aim is to use such research and the results to identify the most disadvantageous segments, i.e. "bottlenecks" of the traffic system, and by repairing and adjusting them to develop and improve tourism as much as possible.

Between the two mentioned activities, namely, the tourism and the traffic positive complementary relations can be established only if they are at a suitable quantitative and qualitative level, otherwise, a negative "circulus vitiosus" may be established, which could last until the cause is eliminated by adequate actions.

Considering the physical range of the studied matter, it should be mentioned that it does not include only the reference area of the considered county, but includes also the external surrounding, referring to the generating tourist market as well as traffic connectivity of the tourist demand and local tourist supply.

Regarding content, the subject of the study are the tourist potentials and their physical dispersion within the county, as well as the level of availability of traffic infrastructure in this area, as the basic presupposition of the availability of tourist services and potentials.

Within referential topics, the fact that tourism has certain adverse implications is regarded as a special problem. However, the bio-ecological attributes of the surrounding and the overall tourist ambient are preferred to the greatest possible extent. It is understandable that these requirements and preferences of tourism are difficult to achieve in the traffic sphere itself, which is the most sensitive link in the tourist chain, since traffic, at least in this area, depends exclusively on ecologically adverse sources of energy, i.e. fossil fuels.

Therefore, the issue of this article is not only how to achieve the high level of complementary in order to promote these activities, but, on the other hand, how to protect and preserve the quality of the environment as much as possible, and how to achieve a healthy bio-ecological system.

1 Tourist possibilities and ambitions of the Krapina-Zagorje County

Tourist ambitions of this county result from the real possibilities and evident natural predisposition for the development of tourism, and for making the living from tourism as a modern civilization phenomenon and multi-disciplinary economic activity. Therefore, this part considers first of all the most significant facilities of the tourist offer, structured according to the significance of tourist activity, and then its physical distribution within the county region.

1.1. The most significant facilities of tourist offer

It is well known that this county abounds in tourist facilities, some of which originate from various natural resources, and others from very rich cultural and historical heritage, though the new monuments and other places of interest should not be neglected either. The paper specifies the most important tourist facilities, at the same time considering the potential demand and users (Table 1).

The abundance and concentration of tourist facilities in the Krapina-Zagorje County is confirmed by the fact that there is on average at least one of the mentioned places of interest almost on every 19 km^2. On the other hand, the structure of

the potential users'demand indicates somewhat the adequacy of single carriers and types of traffic services, in order to meet the tourist requirements in the best possible way, at the same time meeting the criteria for sustainable environment, and recurrently for the traffic itself. However, the inter-connectivity of tourism and traffic is obvious from the physical distribution of the basic tourist facilities in the county, as well as in the evaluation of their potential tourist gravitation.

Basic tourist facilities	Potential demand, i.e. users
1. **Thermal-mineral springs - Spas:** Krapinske Stubičke Tuheljske Sutinske Šemničke	Interest in relaxation and recreation, single-day visitors, weekend cottage users, sport societies, symposia, conferences
2. **Cultural-historical heritage and places of interest** ***castles - Middle - Age burgs:*** Veliki Tabor, Oršić, Mihanović, Bežanec, Golubovec, Miljana, Lobor, Mirkovec, Gornja Bedekovčina, Oroslavlje Donje, Hellenbach, Gredice, Gorica, Klokovec, Bračak Poznanovec, ...	Tours and theme excursions, educational programs, symposia and conferences, sport training, transit passengers and groups
other places of interest: Etno-museum "Staro selo" Kumrovec The Krapina Man findings - Hušnjakovo near Krapina Gubec linden tree and "Zagorska hiža" as historical places of the Peasants' Revolt (Seljačke bune) The Augustinčić Gallery	Tours and theme excursions, educational programs, school excursions, transit passengers and single groups
3. **Religious buildings and institutions** Marija Bistrica, parish church - Vinogora, church of "Majka Božja Snježna" (the Holy Virgin of Snow) - Belec, church of "Majka Božja Jeruzalemska" (the Holy Virgin of Jerusalem) - Trški Vrh	Believers, pilgrims, transit passengers and tourists, special groups, etc.
4. **Mountains and mountain peaks** Nature Park "Medvednica", Ivančica - peak, "Strahinjčica, Kuna gora, Macelj - border, Nature Park "Hrvatsko zagorje", ...	Alpine clubs, scouts, hunters, other lovers of nature
5. **Rural tourism potentials** Wine Road Đurmanec - Pregrada, autochthonous Zagorje turkey, special rural products of this region, other domestic rural specialities	Apart from the increasing number of rural tourism fans, for short-term vacations, there are also transit tourists, alpine and scout groups, week-end visitors, etc.

Table 1: facilities and demand of tourist offer in the Krapina-Zagorje County

1.2. Physical distribution of the most important tourist potentials

In spite of the great average density of tourist resources and facilities in the region of the whole county, regarding individual districts, there is no general uniformity - there are districts which almost completely lack any places of interest. A much higher concentration of tourist facilities is in the western part of the County, left of the international main road E 59 or M 11 (Zagreb-Macelj-Maribor-Graz). This region includes, as can be seen on the map (Figure 1), apart from the well-known places of interest such as Krapinske and Tuheljske Spas, also many other potentials, e.g. castles, galleries, archaeological and historical and ethnographic museums as well as nature parks etc.

In contrast to this extreme concentration of tourist facilities in this part of the County there are also touristical passive districts, e.g. Kraljevec on Sutla, and Veliko Trgovište, confirming a certain lack of uniformity of tourism regarding districts.

In the region east from the main road there are much fewer tourist facilities, except for the thermal tourism in Stubièke, and to some extent in Sutinske and Šemničke Spas. Tourism is also related to religion, and concentrated in Marija Bistrica, and related to the historical heritage about the Peasants'Revolt, e.g. mainly concentrated in Gornja and Donja Stubica. In this region of the county (Figure 1), a greater number of di-

stricts lacking any major places of interest can be noticed, e.g. Konjščina, Budinščina and Zlatar, but they are suitable for the development of rural tourism, owing to, among other things, also the good road and railway connection to the wider area.
However, this part of the county has good prospects, since it abounds with unused potentials, such as e.g. Sutinske and Šemničke Spas, as well as some other that can be referred to as natural tourist infrastructure. Moreover, this region is, unlike the western part of the county, less burdened by industry (textile and metal industry plants), which dominate in Krapina, Zabok and Kumrovec, thus making it environmentally more suitable for tourism.
Regardless, therefore, of the possible objection due to the lack of uniformity in the dispersion per districts, the fact is that the whole county area provides numerous tourist facilities, which are in various phases of functional completeness, starting from the phase of potential resource and natural raw infrastructure, to the phase of functioning and final tourist offer. All these facilities, as after all the whole county, have a very favorable macro-location, both in relation to the domestic generating market, first of all Zagreb, and in relation to the international, first of all, Slovenian, Austrian, and German market.
The external physical connection by main roads does not suffice for the accessibility of the tourist locations. It also requires internal connections, meaning the county itself, in order to make even the most hidden tourist offer available to all the categories of tourist demands, requiring an adequate traffic infrastructure.

2 The level of development of the traffic infrastructure in the county region

The traffic infrastructure consists of all the steady objects which carry the transport units, i.e. occupy the territory within the county and in a wider region, which handle transport units, ensure their movement and the system of communications for their interconnection.
When considering the complex development, i.e. density of the road and railway network, apart from PT infrastructure, only these two branches are analyzed.
The emphasis on the complex development of infrastructure is justified so far as the term of the level of development means the modernization and quality, and then also other characteristics.
Talking about traffic infrastructure means talking about a fundamental and primary traffic component, because if the traffic and its infrastructure are adequately solved, then other segments and problems in this field are far easier and simpler to determine, which is especially true for the road traffic.

2.1 The level of development of the road traffic infrastructure

Considering the density of the overall road network, which includes the categorized and non-categorized roads, whose length in the county exceeds 2,500 km, the county has a relatively good (compared to Croatia) road infrastructure. On the other hand, considering the criteria regarding technical and exploitation equipment, and the general significance of roads classified in three categories (main, regional, and local roads), the length of which is about 700 km, then the condition is at a somewhat lower level, but still above the state average according to the major indicators.
The density of the categorized network, namely, measured according to the surface area of the territory, is greater in the county, 566 km per 1000 km^2 of the surface area, than on the territory of the Republic of Croatia, where the density is 510 km. In relation to the number of inhabitants, the density indicator is more favorable at the level of Croatia, and amounts to 6.1 km length per 100 inhabitants, and in the county region 4.7 km, showing at the same time that the population density in the county, with about 121 inhabitants per 1 km^2 of surface area, is significantly greater compared to the Croatian average of about 82 inhabitants per 1 km^2.
The quality of road infrastructure, regarding the level of asphalt-surfaces can also be regarded as high, since out of the total length of categorized roads (about 700 km) less than 10% have not been paved with asphalt (1995), but with road-metal layer. These are exclusively local roads and their length in the non-classified category is far greater.
According to the traffic and economic significance, as well as capacity and other quality characteristics, e.g. according to the topographic conditions and technical equipment, the top of the list belongs to the unmistakably international main road E-59 (M-11), which passes through the center of the county, from Macelj (state border with Slovenia) to the Zaprešić interchange. This road is known as the "Zagorje Motorway". Else, in the macro sense, it forms a part of the so-called European "Pyhrn Motorway" starting from Nurnberg, via Linz, Graz and Maribor to Zagreb, where it joins the routes towards the Adriatic and the Near East.
Due to this level of significance, it is only natural that it should be provided with adequate technical and exploitation features. Therefore it is currently being reconstructed in order to reach the level of a multi-lane motorway. At present, it has been completed from Zaprešić to Zabok, and the works are continuing further towards Krapina and Macelj.
The category of main roads includes three more roads that branch off from the European main road, namely: M-10.8 Đurmanec - Lupinjak (Slovenian border) - Rogatec - Rogaška Slatina - Celje, and M-11.1. Gubaševo - Tuhelj - Kumrovec continuing further as a regional road towards Slovenia. The third of the mentioned roads is M-3.1 Velika Ves - Golubovec - Varaždin, which connects inter-regionally the Krapina-Zagorje and Varaždin Counties with their wider surrounding, including the countries of the Central Danube region.
However, for the social, economic, and this includes also tourist development of the county the regional roads are also of great significance, and there are about a dozen of them. The most significant are the following:

1. 2120, Zaprešić Interchange - Začetje - Krapina - Đurmanec, passing through the corridor of the road E-59;
2. 2122, Zaprešić - Donja Pušča - Dubravica - Klanjec and

junction to the road M-11.1;
3. 2130, Krapina - Pregrada - Desinić - Miljana;
4. 2131, Valentinovo - Krapinske Toplice - Žeinci;
5. 2140, Zlatar - Zlatar Bistrica - Laz - Kašina - Sesvete;
6. 2243, Bedekovčina - Zlatar Bistrica - Donja Konjščina - Budinščina - Novi Marof

Among the numerous local roads, those that need to be mentioned are e.g. road 12147 Konjščina - Jertovec, as a junction to the international main road E-71 (M-12) Goričan - Zagreb - Rijeka, and the local road 12142 Zlatar - Belec - Budinščina , which closes the loop with the regional road 2243 and enriches the road network of the north-east part of the county.

The road network is presented in Figure 2, and the thickness of the lines indicates also the data on the traffic volume in condition units of average summer daily traffic in the year 1994, which will be discussed in more detail in item 3.

The presented road infrastructure leads to a conclusion that it is adequate more due to its distribution i.e. overall density, than its original development, i.e. level of modernization, having primarily in mind the great number of non-asphalted roads, mainly within the non-classified roads.

2.2. The level of development of the railway traffic infrastructure

It should be mentioned already at the beginning that the railway infrastructure lags far behind the road infrastructure according to all the relevant features. However, in this county it is lagging still less than at the level of the whole county. First of all, this is true for the density of the railway network, which e.g. in a total length of 102 km provides a density of 83 km of network per 1000 km^2 of surface area, whereas this indicator at the state level amounts to only 48 km, which is more than 50% less. In relation to the number of inhabitants, the density indicator in the county is 0.68 km of railway lines per 1000 inhabitants, and at the state level the length is 0.58 kn.

According to the technical and exploitation conditions and other quality indicators, the railway network of the county is far below the average level of the Croatian Railways. Thus, e.g. not one of the four railway lines in the county is electrified, and three railway lines, i.e. Zabok - Đurmanec, Zabok-Gornja Stubica and Savski Marof - Kumrovec are classified as secondary lines of lowest category. Axial loads on these lines amounts to 160 kn., and the maximum technical velocity is 40 km/h, which means that the exploitation, i.e. commercial speed is even lower.

The main railway line in the county, the so-called "Zagorje Main Line", which passes from Zaprešić, via Zabok and Konjščina to Varaždin provided significantly better technical and exploitational features: axial loads of 180 kn. and technical velocity ranging between 50 and 80 km/h.

The physical location of the railway network of certain lines is presented in Figure 1, showing that all the lines, except the one from Savski Marof to Kumrovec, are well laid regarding the population density, and social and economic potentials of the County. The Kumrovec line is the worst laid since it passes along the state border with Slovenia, i.e. the peripheral region of the County, thus narrowing its gravitational region rendering it less favorable.

One further feature of the railway infrastructure is the density of the official places along the railway lines, which are on average less than 3 km apart from one another, in the range of 1.8 to 6.8 km^1, thus ensuring the availability of railway traffic to passengers, and tourists, as well.

An adverse feature regarding the density of the road and railway networks need to be mentioned, too, and it is the reason for many level-crossings thus endangering the traffic safety, especially if not adequately protected or most safely regulated by de-leveling.

Therefore, the modernization of railway network, which is inevitable, should also include the regulation of railway-road crossings, as one of the significant conditions for the traffic safety and favorably influencing the tourism in the County.

3 The interrelation between tourism and traffic

The interrelationship between tourism and traffic is based on the fact that each tourist activity, primarily the tourist destination has to be accessible for the delivery of all the things that are needed to establish and develop tourism, and even more for the transfer of the tourist users, i.e. users of the tourist offer. On the other hand, all the activities related to tourism appear as users of the traffic infrastructure capacities and traffic activity, that would never be used to such an extent were it not for the tourism itself.

In case the extent of the inter-dependence of tourism and traffic needs to be measured, then it could be said that traffic is a "conditio sine qua non" for tourism, whereas tourism is one of the very significant traffic demand factors. Therefore, this interrelationship is further regarded in this sense, i.e. tourism is referred to as a fixed and traffic as a changing variable, i.e. the traffic is regarded as being in the function of tourism, considering this functional relationship separately per branches of road and railway traffic, and then regarding these branches as combined traffic.

3.1. Dependence of tourism on road traffic

As known, the road traffic is by far more dominant in the passenger transport than the railway traffic, which is also true in general regarding its engagement in the transport of tourists, which can be especially noticed in the County of Krapina-Zagorje.

There are several reasons for this, and the most important ones are:

- its known flexibility, and organizational versatility, regarding the possible methods of engagement,
- far more dense road infrastructure, providing accessibility to the furthest and most concealed tourist destinations and places of interest,
- road infrastructure is of an open type, allowing free traffic, both individual and organized mass traffic, along with a far greater freedom of movement, stopping and time-spending.

The adequate network density allows shorter trips, as well as access to certain destinations from several directions, thus

making it unimportant whether the major places of interest are located directly along the main roads or not. They are near other main roads or along regional routes, so that their connection with the central European main road E-59 is not questionable at all, which is to some extent also true for the main road E-71 Goričan - Sveti Ivan Zelina - Zagreb - Rijeka, which does not, however, pass through this County, but is, nevertheless, not so far as not to be compensated by the main link via Varaždin - by the road M-31 and several links from the east of the County.

Considering the external road connections of the County, the road distances to the County center Krapina from the bigger domestic and foreign towns are mentioned: Zagreb - 56 km; Sisak - 114 km; Varaždin - 52 km; Koprivnica - 100 km; Križevci - 89 km; Bjelovar - 120 km; Maribor - 54 km; Ljubljana - 133 km; Graz - 125 km; Vienna - 306 km; Budapest - 326 km; Bratislava - 365 km; Munich - 518 km;

The distances from the mentioned domestic towns to the main tourist destinations are even more favorable, since these destinations are, compared to Krapina, located mainly nearer at least by about 20 to 30 km.

It should be mainly pointed out that the major places of interest in the County have a very good connection to Zagreb, by several road routes, so that e.g. the south-eastern County destinations (Stubičke Toplice, Sutinske Toplice, Marija Bistrica) are accessible from three, even four directions, including also the road via Sljeme.

The significance of individual roads for the tourist traffic of the County can be best seen from the volume of the passenger traffic, i.e. traffic of passenger cars and buses, based on which the annual passenger traffic has been determined, presented in Table 2 for the years 1994 and 1996. The table shows only roads with greater volume of traffic, i.e. those which were included in the vehicle counting procedure, and those are all the main roads and the majority of regional roads, with several local roads as well.

The registered roads with the vehicle count, show that all the major tourist destinations are located along them, and the volume of the passenger traffic enables an approximate estimate about the intensity of the tourist traffic of a certain tourist locality.

The overall passenger traffic has been concluded from the average annual daily traffic (Cro.abbrev. PGDP) of passenger cars, by means of the average factor of 2.2 persons using one vehicle and PGDP of buses with an average of 30 passengers per bus. Comparing the two ways of passenger transport, there passenger car traffic is of a much greater volume, and this category also generates a much greater tourist traffic, than buses, which are more engaged in official transport of schoolchildren and workers, the social categories of the so-called monthly passengers.

It should also be noticed that the roads connecting well-known and touristically recognized destinations have the highest traffic volume. Such is e.g. the regional road Stubièke Toplice - Marija Bistrica, connecting the two very famous centers of different but complementary tourism.

This is also true of the road Gubaševo - Klanjec, which connects Tuheljske Toplice and Kumrovec, as the two most significant tourist destinations along this road, and of the main international road: Slovenian border - Krapina - Zaprešić Interchange, dominated by the transit traffic, both international and domestic.

The fact is, therefore, that the influences and the condition of the road traffic in this area can be viewed from two viewpoints, i.e. at the current modernised road network and viewed from the disadvantages and lack of the road infrastructure, especially the specific tourist one. From this viewpoint, the influence of the road traffic is emphasised, and regarding the high proportion of passenger cars, especially in tourism, even overemphasised, since they, in relation to the transportation efficiency overburden the road infrastructure, on the other hand degrading the environmental ecology. Therefore it is necessary, in order to rationalise the physical area, and to achieve a better ecological efficiency, to try by

Curr. no.	Count place (Road No.)	Section of the road providing vehicle count	Distance (km)	1994					1996					Index 1996/1994 (14/9)
				Passenger cars		Busses		Total of transp. pass./ann. (6+8)	Passenger cars		Busses		Total of transp. pass./ann. (11+13)	
				PGDP*	Pass. ann. (2.2)	PGDP*	Pass. ann. (30)		PGDP*	Pass. ann. (2.2)	PGDP*	Pass. ann. (30)		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	Macelj (M-11)0	Gr. Slov.-Krapina	21	2695	2165	140	1530	3695	3602	2890	133	1460	4350	117,7
2	Tuh.Topl. (M-11.1)	Gubaševo-Klanjec	14	3149	2530	74	810	3340	3926	3150	67	735	3885	116,3
3	Kuzminec (M-3.1)	V.Ves-Lepoglava	19	2089	1680	62	680	2360	2407	1930	46	505	2435	101,2
4	Đurmanec (M-10.8)	R2120-Gr. Slov.	6	1526	1225	105	1150	2375	1483	1190	83	910	2100	88,4
5	Začretje (R2120)	Bračak-Krapina	20	1497	1200	33	360	1560	2066	1660	28	305	1965	126,0
6	Dubravica (R2122)	Zaprešić-Klanjec	26	1809	1450	71	780	2230	2161	1735	92	1010	2745	123,1
7	Stub.Topl. (R2124)	St.Topl.-M.Bistr.	17	4447	3570	97	1060	4630	4838	3885	98	1070	4955	102,4
8	Desinić (R2130)	Pregrada-Desinić	8	2311	1860	116	1270	3130	3098	2490	138	1510	4000	127,8
9	Gubaševo (R2131)	Gubaševo-K.Topl.	9	1704	1370	71	780	2150	2098	1685	56	615	2300	107,0
10	Kašina (R2140)	Sesvete-M.Bistr.	26	2526	2030	153	1675	3705	2486	2000	156	1710	3710	100,1
11	Zlatar Bistr. (R2140)	M.Bistr.-Zl.Bistr.	6	2147	1720	105	1150	2870	1743	1400	95	1040	2440	85,0
12	Bedekov. (R2243,2145)	Bračak-Bedekovč.	6	3181	2555	62	680	3235	3867	3100	72	790	3890	120,2
13	Jertovec (L12147)	Konjščina-Komin	11	1113	890	42	460	1350	1013	815	23	250	1065	78,9

PGDP = Average annual daily vehicle traffical annually transported passengers - in 000

Source of data: Vehicle count on the roads in the Republic of Croatia for the years 1994 and 1996, Hrvatska uprava za ceste, "PROMETIS" d.o.o., Zagreb

Table 2: overwiew of the passenger road traffic on the roads in the Krapina-Zagorje county

using all the allowed instruments, to achieve a more favourable relation in the transportation proportion between the passenger cars and buses, which in fact means to reduce the passenger car traffic in favour of the bus traffic.

This would mean the introduction of traffic macro-organisation, thus influencing through social, political and tourist agencies the traffic subjects - professional carriers of bus transport, to stimulate in an appropriate way tourist travelling by means of mass transport, rather than individual passenger cars.

Regarding the environmental protection, measures could be undertaken to declare specially intensive tourist zones, i.e. relations, as ecologically protected zones, by limiting the use of road vehicles using conventional fuelling systems, in favour of alternative propelling forms, e.g. vegetable oil fuels, alcohol fuels, or the use of electrical-cars, which have the most favourable prospects on short relations of up to 100 km[2].

Considering the disadvantages in the road infrastructure, first of all a great part (about 1000 km)[3] of non-asphalted road network needs to be mentioned, which should be modernised, thus making numerous concealed tourist potentials easily accessible, meaning primarily the rural tourism resources. Apart from the up to now only identified wine road Đurmanec - Pregrada, there should be many more, which means providing availability of a versatile offer of rural tourism and natural beauties on a wider scale in the County.

This includes, of course, initiatives to construct and reconstruct the existing rural paths, to extend the bicycle lanes network, in order to give incentive to the development of ecologically healthy tourism using as a model some other regions and countries, such as e.g. Istria and Austria. With the construction of such an infrastructure network, the practical use of this form of tourism would mean organised delivery of proper bicycles by some bigger means of transport (special vans or railway) to certain points (railway stations), or bicycles could be rented to tourists at such points charging an appropriate amount.

The mentioned facts show the influence, i.e. the dependence of tourism on the road traffic in this County. It is so pronounced that it presents an indispensable factor, and by explicating various possibilities, also the obligations of the positive influence of road traffic have been included, fulfilling adequate measures, so that it would leave the least possible adverse effects on tourism, especially regarding ecology.

3.2. Integration of railway traffic in tourism

Unlike road traffic, the railway traffic is functionally much more difficult to integrate into tourism, since the railway network is far less dense, thus not being able to cover all the places and objectively unable to connect directly and to provide accessibility for the majority of tourist destinations. Moreover, the transport using the technically underdeveloped railway is slow, and the possibility of operational, exploitation adjustment is very limited, considering the known natural slowness of the railway system.

However, even railway in such a condition has its advantages, since, in the first place, it is more favourable with regard to the used energy than passenger cars by more than three times. This is also, among other things, reflected in the much greater environmental protection.

Considering the possibility of mass transport and other technical and exploitation features, including the above mentioned energy and ecological factors, the railway can be a much more rational and economic carrier, providing a significantly more acceptable transportation price than other methods of travelling, especially the passenger car individual transport.

The explicit presentation of the railway network is shown in the scheme in Figure 3, where the zone distances are indicated, from Zagreb, since the majority of the whole passenger traffic by railway runs on the relation to Zagreb, which is at the same time the biggest generator of tourist dynamics in the County. Figure 3 shows that the railway is directly accessible only towards few tourist places of interest, i.e. their destinations, and these are Krapina, Kumrovec, Stubičke toplice, and Donja and Gornja Stubica. Although they are at a small distance (about 50 km), the railway does not play a major role in providing tourist transportation service due to slow trains, so that a journey to these places takes between 60 to 90 minutes.

It should be mentioned that the total passenger transportation on these lines is significantly lower than on the road transport according to table 2, amounting to, e.g. in the year 1995, around about 120 thousand on the Savski Marof - Kumrovec railway line, up to 2 mill. on the Zaprešić - Varaždin line, which means that within such total traffic, the part that refers to tourism is much more humble.

However, increase of the train velocity and reduction of the travelling time by about 30%, which is planned by the year 2005 , would eliminate to a great extent the disadvantage of slow travelling, and, along with the improvement in organisation and comfort, the railway would become much more acceptable. As the mass carrier, it would be especially suitable for transport of younger tourist groups with various motives - school excursions, mountaineers, scouts, conferences and symposia participants, sports club members, ... who are less affected by transfer directly to the tourist destination, both in case of transfer from the railway station within the same town or transfer by additional road vehicle, i.e. combined transport.

As already mentioned, only a few destinations have direct accessibility on the existing railway network, so that in case of a greater engagement of the railway in tourist transportation, organised combined transport would be required, both in continuous, so-called regular, and in periodical - specific arrangement, when greater capacity and consistent organisation of a greater number of participants need to be ensured.

In any case, the railway has available the basic infrastructure network, and with certain reconstruction and adaptation it could be more active in offering tourist services in the County, which would result in positive social implications, regardless of whether it refers to direct or indirect accessibility by combined transport.

Integration of the railway into the tourism is stimulated in certain countries by offering some sort of historical attractions, counting on the nostalgic atmosphere of the old railway cars and engines, which is a special event in itself, and is most often used in Austria. There, they organise tourist-excursion trains, regularly from spring to autumn, from the well known mountain and lake excursion centres, under an intriguing motto "Die Erlebnissbahn" - the adventure train. Other names of trains are also symbolic: "Schafbergbahn". (travelling on a narrow gauge line to the 1780 m high Schafberg), then "Nostalgieangebot in Kärnten" (nostalgic offer in Kärnten), and "Donau Nostalgie Express", travelling along the Danube valley from Passau to Vienna) [4].

Austria offers also other modalities of railway integration in tourist activities, e.g. the possibility to rent a bicycle at certain railway stations, good possibilities of transporting your own bicycle in special baggage cars in certain trains, and good parking facilities and guarding of road vehicles and bicycles at major railway stations, and, finally, very stimulating benefits for travelling by train for groups of 2 to 5 persons (price reduction of up to 50%). All such measures are aimed at increasing the role of railway in the tourist transport, and on the other hand, reducing the excessive use of the road vehicles. Therefore, it is only logical that, according to Legambiente, an Italian institution for environmental protection, Austria tops the list of ten European Union countries, whereas Italy occupies the last, tenth place[5], in spite of the fact that it was an Italian firm who carried out the evaluation and classification.

Considering an increased concrete engagement of railways in the tourist activities in the Krapina-Zagorje County, it should be noted that, apart from the local railway stations that provide direct accessibility to tourist destinations, a wider network of stations for combined transport of tourists needs to be included, both the continuous (regular) or specific (charter), seasonal and similar lines. Taking into account the physical distribution of tourist destinations, and the road network and railway stations, the terminals for combined transport at the following stations seem plausible:

Clearly, the presented terminals of combined traffic between railway and road transport of tourists do not exhaust all the possible combinations, since this should be regarded as a dynamic process with constantly new and different possibilities.

Similar solutions, i.e. terminals, could be established for guarding and renting bicycles, providing clear topographic maps of cycling lanes. Prior to this, the lanes should be professionally designed and constructed through suitable and for tourists attractive landscape.

All the presented measures, regarding an increased engagement of railway in providing services to tourists in the County, have as their aim reduction of the road traffic, especially passenger cars, which, in spite of offering the greatest freedom and comfort, also exert the most adverse impact on the environment. Apart from the mentioned ecological reasons, favourable measures of such an orientation include also significant energy preservation and higher traffic safety due to a certain reduction in road traffic. Moreover, such a development scenario would return many passengers to the railway, meaning a huge step towards a better utilisation of the local lines capacities, that have been poorly used up to now, and thus providing a constructive economic mortgage for their modernisation, including an adequate prosperity of the County.

Conclusion

The explicated real possibilities and objective basic factors of this predisposition as well as the infrastructure of tourist activities in the Krapina-Zagorje County, are very closely interconnected with the condition of traffic and its possibilities to provide service support in the development of tourism. Both of these activities are currently at a sufficient level of development, so that they may be connected by complementary interrelations, which would otherwise need a better, i.e. higher level development.

This study of the complementary relationship has started from the premise that traffic is a dependent variable, i.e. that it is more in the function of tourism than vice versa, which is in

Ord. No.	The name of the Railway Station	Road with the no. and category to a certain tourist destination
1.	ZABOK	A) Zabok–Dubrovčan–Tuh. Toplice–Desinić R2139, M-11.1 B) Zabok–Vitnjakovec–Krap. Toplice–Valentinovo R2149, R2131 C) Zabok–Tuh. Toplice–Kumrovec–Miljana R2149, M-11.1, R2135
2.	KRAPINA	A) Krapina–Petrovsko–Pregrada–Miljana R2130, R2131 B) Krapina–V. Ves–Kr. Toplice–Tuh. Toplice M-11.1, R2136, R2120 C) Krapina–Radoboj–Mihovljan–Sutin. Toplice R2120, M-3.1, R2140
3.	ZLATAR BISTRICA	A) Zlatar Bistrica–Zlatar–Mače–Sutin. Toplice R2140, 12143 B) Zlatar Bistrica–Zlatar–Lobor R2140, 31408 C) Zlatar Bistrica–Zlatar–Belec R2140, 12142 D) Zlatar Bistrica–Marija Bistrica R2140
4.	VELIKA VES	Velika Ves–Krapinske Toplice R2136, R2131
5.	BEDEKOVČINA	Bedekovčina–Sutinske Toplice 31208
6.	KLANJEC	Klanjec–Pristava–Tuhelj–Trsteno 31609. 12133

Table 3: overwiew of the railway stations suitable for combined transport terminals

accordance with the fact that a certain tourist locality and its resources achieve a commercial and tourist value only when they are physically (regarding traffic) accessible.

Numerous and various tourist facilities and resources have been identified in the County, and according to their frequency or physical density they exceed any other comparative regions of continental tourism in Croatia. They have been systematised in this paper in five synthetic groups, considering the basic tourist features and characteristics, starting from the thermal mineral springs, i.e. Spas, to rural tourism, which, as the youngest form of tourism has very good predisposition in this region.

Every feature of tourist offer is connected to a possible, i.e. potential demand with identified concrete subjects - the potential users, which is important because of the understanding of the functional and tourist adequacy of the traffic infrastructure and the service functions of the overall traffic activities.

Regarding the macro-location of the Krapina-Zagorje County, and the physical dispersion of tourist localities within the County, on one hand, as well as the identified potential demand and overall traffic network (road and railway), on the other hand, it may be concluded that road traffic has a much greater and even crucial significance for the tourism in this County. The road network is well distributed, and has a physical density which is above average, more than 10% greater per square kilometre than the average of the Republic, whereas in relation to the number of inhabitants it is lower, due to the significantly higher population density in the County compared to the Republic average.

However, a significant disadvantage of the road network is that about 1000 km of non-classified local roads are not paved with asphalt, which makes a great part of the rural area in the County accessible only with great difficulties, urging for a faster modernisation.

The roads of higher categories, i.e. main and regional roads, have a high traffic volume, especially regarding passenger vehicles, with an obvious and excessive domination of passenger cars over buses, which cannot be regarded as rational, since passenger cars occupy far more space and ecologically degrade the environment compared to their transportation efficiency. This is also an indicator that road traffic has dominant significance in tourist transportation in the County, since tourists most often use passenger cars, which is especially true for the foreign tourists.

Railway is at present much less engaged in tourist traffic, since its network is far less dense and technically underdeveloped, providing a low quality service, both to the directly accessible tourist localities and to those which are further away from the nearest railway stations, which do not provide a consistent link and co-operation with the road transport for the local transfer.

It is precisely at these points that there is a possibility of establishing inter-branch co-operation, i.e. combined transport, but the railway needs to be modernised and to improve the variety and quality of its services, especially the speed of travelling, since, objectively, it has significant advantages appreciated in the modern circumstances. These are:

- less ecological degradation of the environment, which multiplies by aliquot reduction of the road traffic;
- more rational use of the propelling energy, and as a mass carrier of other factors as well;
- it provides higher traffic safety, which multiplies by the expected reduction in road traffic.

These and other advantages of the railway need to be promoted and used according to some foreign countries, especially Austria, regarding the possibilities of transportation and renting of certain tourist equipment (bicycles), as well as parking and guarding facilities of the additional road vehicles.

LITERATURE

1 Radnić, A., Telišman-Košuta, N. et al.: *Strateški marketinški plan turizma Krapinsko-zagorske županije*. Zagreb, 1996

2 Project of the organisation model of the passenger transport in the Krapina-Zagorje County. Institut prometa i veza, Zagreb, 1996

3 Publications of the Austrian State Railways: ÖBB - "Die Bahn im Griff", ab 1.01.1995. and 2.06. 1996.

4 Vehicle count on the roads in the Republic of Croatia in 1994 and 1996, Hrvatska uprava za ceste - Prometis d.o.o., Zagreb, 1997

5 Pechlanner, H.: *Strategija alpskog turizma u Južnom Tirolu*, Tourism, 1-2/97, Zagreb, 1997

6 "Dan planeta Zemlje", Environment, No. 69, April 1997, and "Gdje je stanje okoliša zadovoljavajuće " Environment , No. 72, August/September 1997, Druzo, Zagreb, 1997

7 Milanoviæ, Z.: *Elektroauto skora buduænost ili utopija*. Journal HAK, No. 34, Zagreb, July/August 1997

NOTE

[1] Project of the organisation model of the passenger transport in the County of Krapina-Zagorje, Institut prometa i veza, Zagreb, 1996, page 19.

[2] Milanović, Z.: Elektroauto: Skora budućnost ili utopija? HAK Journal, No. 34, Zagreb, July-August 1997, pages 42/43.

[3] Project of the organisation model of the passenger transport in the County of Krapina-Zagorje, Institut prometa i veza, Zagreb, May, 1996, page 31.

[4] Publications of the Austrian State Railways "ÖBB-Die Bahn im Griff ab 1.1.1995 and 2.6.1996".

[5] Taken from Fokus 23/1997 - Journal "Okoliš" No. 72, August/September 1997, Zagreb, page 53.