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DEVELOPMENT POSSIBILITIES OF THE PORT OF RIJEKA AT THE BEGINNING OF THE NEW MILLENNIUM

ABSTRACT

The port of Rijeka, as part of the future system of the North Adriatic ports (Koper, Trieste, Rijeka) plays a significant role in freight transportation towards the Central European region. By constructing the Danube – Sava Canal from Vukovar to Šamac, by canalising the river Sava from Šamac to Sisak, and by good railway and road connections that will be realised in the first two to three decades of the third millennium the port of Rijeka will receive the key role in the development of the North Adriatic ports. High-quality railway and road connections between the port of Rijeka and Istria, Koper and Trieste, will provide major possibilities of rationalising the transportation process from the port of Rijeka towards the Danube region and the Central European countries.

KEY WORDS

the Rijeka port, development of the Rijeka port, the Danube – Sava Canal

1. INTRODUCTION

As a modern, independent country, belonging both to the Mediterranean and to Central Europe, the Republic of Croatia has for the first time in contemporary history of the Croatian people the opportunity to match her overall cultural and economic development to her own needs, i.e. the needs of the Croatian state and the Croatian people.

Regarding integration of the internal Croatian traffic system and its integration into the international traffic flows, as well as connection of the Pannonian and the Adriatic Croatian regions as well as connection of the Danube region and the Adriatic, the port of Rijeka has special significance (via Karlovac to Zagreb, i.e. from Zagreb to Budapest and the Croatian Danube regions).

Besides realising the greatest part of Croatian import and export activities through the port of Rijeka, it also represents the most important Croatian port for the transit of goods through the Croatian traffic sys-

tem. The transit through the Rijeka port is especially intensive towards Hungary, Slovakia, the Czech Republic, Austria, Slovenia and Bosnia and Herzegovina. When the overall political and economic relations settle down, the Rijeka port will be of extreme importance even for the SR Yugoslavia.

Modernisation of the railway line from Zagreb (Sisak) to Rijeka and the construction of the motorway from Karlovac to Rijeka, as well as the canalising of the river Sava from Šamac to Sisak, and the construction of the canal from Vukovar to Šamac, the port of Rijeka will become very significant for the flows of goods from the Danube region to the Adriatic. Her gravitation area will thus get expanded towards South and Central Germany and towards Bulgaria and Rumania.

2. GEO-TRAFFIC POSITION OF THE RIJEKA PORT

The geo-traffic position of the port of Rijeka has its special significance in the shortest natural barrier, Risnjak, which separates the port of Rijeka across the Kupa River valley from the Pannonian Croatia and the Pannonian Plain in general, where several countries and a number of big cities are located. These are Central and Eastern Croatia, whole Hungary, Northern Bosnia and Herzegovina, Vojvodina, parts of Slovenia, Austria, Slovakia and Rumania.

The port of Rijeka is located at the far North of the Adriatic, where the sea has entered most deeply into the European mainland. According to its geo-traffic position it represents a natural and most favourable access to the Adriatic Sea, to the whole Pannonian Plain and the wider European region.

Owing to this location, as part of the North Adriatic port system, the port of Rijeka is part of the traditional gravitational area of the Central European countries (Croatia, Hungary, the Czech Republic, Slovakia, Austria, Slovenia, Western Ukraine, South-

ern Poland and Southern Germany). This area covers about 600,000 km², and the number of inhabitants is about 70 million.

The essential comparative advantage of the North-Adriatic ports in relation to the competitive North Sea and Baltic ports for this gravitational area lies in the shortest sea connection of Central Europe with the Mediterranean as well as with the countries of Near and Far East via the Suez Canal.

Important elements of the geo-traffic position of the port of Rijeka include also physical characteristics of its location and the traffic connection with the hinterland.

Regarding its position in spacious, deep and maritime suitable Gulf of Kvarner, the port of Rijeka has very favourable conditions for its development. The development is also facilitated by the size of the port aquatorium, the sea depth and the coastal frontage.

Since modern transportation technologies require wide areas, the majority of the new port capacities were constructed outside the old port core in the town, so that the port plants today expand from the Raša across the Gulf of Bakar to Omišalj, including a coastline of almost 100 km in length.

The Rijeka port is connected to the hinterland by two railway lines, road connections and an oil pipeline. Railway traffic operates on the Rijeka-Zagreb and Rijeka-Ljubljana lines, which connect the port to the European railway network. Road traffic includes the routes toward Zagreb, Ljubljana and Dalmatia. The oil pipeline connects the port of Rijeka with the national refineries, Hungary and Yugoslavia.

The geographic and traffic position of Rijeka has determined the extremely maritime orientation of this city and has marked the economy of the whole region. It is here that the biggest national cargo port and an important passenger port developed, and Rijeka is the headquarters of the leading cargo and passenger ship operators, and a number of service-providing companies operate within the function of the port and the operators. Out of the total number of employees working in the transportation and communication business in the Primorsko-goranska County, the department of maritime transport and cargo handling activities employs about 50% of all the employees. Writing about the importance of the existence and development of the maritime economy Mirković said: "The economic significance of the maritime navigation is absolute, since services that it provides for the national economy cannot be provided by any other transportation branch. It was only the development of navigation that could create the basis for the big international work division and economically functional topographic distribution of the production power". Following these ideas of the academician M. Mirković and considering their effect within the national eco-

nomical and maritime policy, the following is highlighted:

1. the significance of the maritime traffic in the previous and future development of the economy of the City of Rijeka, Primorsko-goranska and Istarska Counties and the Republic of Croatia;
2. the role of Rijeka, Primorsko-goranska and Istarske Counties, i.e. of the Croatian North-Adriatic traffic route in operation and forming of the integral maritime, traffic and overall economic system of Croatia.

However, if the port of Rijeka is considered as part of the North-Adriatic competitive ports, Koper and Trieste-Monfalcone, one may see that these ports as well, to a minor extent, have similar geo-traffic advantages. The port of Rijeka has the marked advantage over the other ports regarding the depth of the sea on the approach to the port, i.e. in the possibility of accommodating even the largest of ships. However, it is well known that the port of Rijeka has much worse connections to the traffic network of roads and railways than the other mentioned ports and that it has extremely poor spatial possibilities of expanding on land, along with obsolete technology. Due to all this, and due to operation under war conditions, the reduction in traffic by more than a half from 1991 and 1995 is fully understandable.

Such condition is certainly a challenge to the Croatian state and her Government to find all the possibilities together with the Primorsko-goranska County and the city of Rijeka, in order to, along with an overall development, attract more powerfully the domestic and the foreign capital into the development of the port of Rijeka.

If capital owners estimate that they may realise higher profits by investing into the neighbouring competitive ports, then long-term stagnation of traffic in the port of Rijeka is certain. In order to avoid this, such conditions for development of the port of Rijeka should be provided, which will make the capital, especially the foreign capital find its way to it. Here the Government and its whole legal infrastructure play the key role, first of all with regard to the port and maritime property (conditions and deadlines of acquiring concession, etc.).

It should be noted that the name of the port of Rijeka is the synonym for the Croatian North-Adriatic ports from Bakar, across Rijeka, Raša and Pula to Umag. Only when the Istrian railway lines get linked across Rijeka with the rest of Croatia, will good assumptions be created for a single technical, technological and organisational, i.e. commercial and economic function of the Croatian North-Adriatic ports which are simply all called "the port of Rijeka".

Considered on a long-term basis, in the integrated Europe, when both Croatia and Slovenia get fully inte-

grated into the European Union, the interests of the European and world traffic system, with regard to its rationalisation and economic efficiency, will consider all the North-Adriatic ports, from Venice, across Trieste, Koper and Rijeka to Bakar and Krk, as a single port system.

The port of Rijeka, as well as the Gulf of Kvarner as a whole, have an extremely favourable position in connecting the Mediterranean, i.e. the Adriatic Sea with the Pannonian Plain. However, although very short, the traffic connection between Rijeka and Pokuplje, i.e. from Rijeka to Karlovac and Zagreb has not been studied and designed in the field regarding railway traffic, and in road traffic it has not been fully realised yet from the aspect of today's needs and possibilities. There are no direct railway links between Rijeka and the Croatian railway lines in Istria, nor is there a direct railway connection between the two biggest Croatian ports – Rijeka and Ploče.

This only confirms that the individual sections of the port of Rijeka are connected by means of Slovenian railway lines.

Although the greatest part of the port of Rijeka forms a part of the city of Rijeka, it does not have good connections to the network of state roads. Nor are certain parts of the port of Rijeka well connected with the road traffic.

The construction of the multipurpose navigable canal from Vukovar to Šamac the waterway between from Vukovar to Šamac will be shortened by more than 415 km, and from Šamac via Vukovar to Belgrade and further to the Black Sea by more than 80 km. Due to the improved quality of new waterways, the time and transportation costs decrease even more than the shortening of the distance would indicate.

The port of Rijeka is practically, in its most important central part, a component of the city core. Thus, the Port shares the destiny of the traffic in the city centre. The basic road connection of the city of Rijeka with the urban street network, and the major state roads is the Rijeka ring-road. The only section that has been constructed is the one from the Škurinje junction (with the motorway to Zagreb) westwards to the intersection with the tunnel Učka approach road. A minor part of this section has been designed as a dual-carriageway road, and in the greater length as a semi-motorway, i.e. single two-way carriageway.

The key external development factor of the port of Rijeka is the construction of the Rijeka ring-road from the Škurinje junction eastwards, that would, along with the construction of the main city road (GMC 105) from the Delta to the Rijeka ring-road, provide high-quality connection of the warehousing-industrial zone of Škrljevo with the city centre, i.e. the port of Rijeka.

The development of the port of Rijeka and its international competitiveness require gradual realisation of good road and railway connections, both with the North-Adriatic ports (Koper, Trieste, Venice), and with Ploče, Split, Šibenik, and Zadar. The future in European integrations will be insured for such solutions that provide maximum profit at minimum investments. This means that the ports will have to get interconnected and specialised in order to make the highest profit through an optimal ratio between costs (investments, exploitation and maintenance costs) and profit, with restrictions imposed by the regulations of the European Union, national state and local authorities.

3. THE DEVELOPMENT OF THE PORT OF RIJEKA UP TO NOW

The geo-traffic position of the port of Rijeka, regarding its closeness to the Central European and Central Danube European regions, is particularly favourable. By very favourable traffic corridors across Pokuplje behind Risnjak, the whole of the Gulf of Kvarner has come very close to Karlovac (the river Kupa), Zagreb and Sisak (the river Sava), and therefore also to the Pannonian Plain, that is the Danube region. This geographic natural characteristic has not been taken advantage of, especially since Rijeka, as a city and a port, i.e. the whole Gulf of Kvarner, lack good road and railway connections to Karlovac (i.e. Zagreb and the whole Pannonian Plain).

Thus, for example, a fact may be stressed that in the period from World War II until 1990, due to the construction of modern motorways and railway tracks (especially the big shunting yards) Central Europe, particularly Germany, Switzerland and Austria and a part of alpine France, established better connections across the Alps to Trieste and Genova i.e. the Padus Valley, than those by road and railway across the Kupa River valley (from Karlovac to the Gulf of Kvarner, i.e. Rijeka).

Unfortunately, the Croatian traffic interests in the period from the Kingdom of Serbs, Croats and Slovenes to the disintegration of SFRJ in 1991, were never regarded as priority. During the Austro-Hungarian Monarchy, Austria, and particularly Hungary, were connected with the world through the Croatian Adriatic, so that roads and railway lines were constructed from Vienna and Budapest via Zagreb to the Gulf of Kvarner.

Due to the domination of Serbs, the south Slavic entity had completely different strategic interests, so that the traffic corridor from Zagreb to the Gulf of Kvarner experienced a very slow development.

The port of Rijeka, the starting and ending station of the most vital traffic route in Croatia, is the main and biggest national cargo port (handling more than 70% of total traffic of all the Croatian ports and almost all of the transit traffic), and an important passenger port, especially in coastal connection of the Croatian Adriatic coast. In its historical development, the port of Rijeka experienced a number of political and economic changes with long-lasting effects on its operation and development. In spite of numerous difficulties and problem, the port of Rijeka developed a modern port system in the Gulf of Kvarner, consisting of dislocated specialised terminals which together form a functional whole.

During the 60s, after the construction of the new refinery in Urinj and the bulk cargo terminal in Bakar, the development of the port has been intensified. Until the end of the 60s, the total port traffic increased from 6 million tons of cargo to about 14 million tons. By the opening of the Adriatic oil pipeline at the end of the 70s, the traffic suddenly increased to about 20 million tons. This was followed in the 80s by stagnation and decrease of the port traffic, continuing thus up to the present day.

Until 1991, the development of the port of Rijeka within the former Yugoslavia, followed two directions. On the one hand, it may be regarded as successful, since it was during that period that the port of Rijeka developed into a modern port system. Investments were provided for the construction of new port infrastructure and suprastructure capacities, and the equipment for specialised handling of certain types of cargo was purchased. On the other hand however, it was also a period which had its negative side. Due to the absence of an adequate port policy, urging development of certain new ports (Bar, Koper, Ploče) and traffic routes, the development of the port of Rijeka and the respective traffic route did not receive due attention nor financial support. For instance, in the period from 1957 to 1983, when an attempt was made to establish and co-ordinate a modern port system of the former Yugoslavia, out of the overall funds invested in the construction and modernisation of ports, only 20% of the funds were invested in the port of Rijeka (Koper 30%, Bar 31.5%). Out of the overall invested funds over these 25 years, the port of Rijeka insured 60% of the funds from its own sources (Koper 19%, Bar 2%), which is an extremely adverse indicator and incomparable to the development and funding method of the ports in the developed maritime countries.

With the establishment of the Independent State of Croatia, Rijeka became the leading national port. At the time of war the port of Rijeka and the respective traffic route operated relatively regularly, taking over tasks from other Croatian ports that almost completely stopped their operation due to the war. The

North-Adriatic traffic route maintains the main part of the total national foreign trade exchange and the transit port traffic with the countries in the hinterland. However, in spite of the better location of the port of Rijeka compared to other ports of the Croatian port system, the operation of the port is burdened by numerous problems related to the environment and internal problems in business activities of the "Luka" company Rijeka, which resulted in decrease of port traffic.

Table 1 – Traffic in the port of Rijeka in the period between 1960 and 1997 (000 tons)

Year	Total traffic	Public handling
1960	4,055	4,055
1965	6,205	4,165
1970	10,349	5,359
1975	12,029	5,508
1980	20,437	7,644
1985	18,225	7,277
1990	20,131	5,796
1993	10,171	4,348
1994	10,660	3,554
1995	11,108	3,705
1996	9,208	2,309
1997	–	2,521

Note: total traffic includes also liquid cargo, and public handling includes only dry cargo handled at the port of Rijeka.

The mirror of success, possibilities and needs of a port is the movement of the port traffic. The fall in traffic at the port of Rijeka in the past indicates that the operation of the main Croatian port was marked by a number of changes, problems and negativities that affect the operation and restrict the development possibilities of the port. The problems which reflect the current situation occur from the macro-environment and the port cannot solve these independently. They result from within the port system itself, and adequate measures of business policy should be used to achieve rehabilitation with the aim of establishing a sound, well-organised and competitive port on the Croatian North-Adriatic traffic route.

3.1. Development of the port of Rijeka until 1990

The port of Rijeka is the biggest Croatian port. Both the port and the city of Rijeka have developed at the mouth of the river Rječina into the Gulf of Kvarner. The mountain between the Kvarner and the Kupa River valley is the narrowest in the Rijeka hinterland (40-50 km) but at the same time also the high-

est one (Gornje Jelenje 929 m a.s.l., Postojnska vrata 698 m a.s.l.). Through Mala, Srednja and Vela vrata (straits) the Gulf of Rijeka has a suitable exit to the open sea, as well as a natural protection provided by the Kvarner islands. The depth of the sea of 50-70 m allows access for even the biggest ships i.e. ships with deepest draught.

The name of Rijeka dates back to the 13th century, and the historical sources mention that the traffic of the port of Rijeka was very intense already in the 15th century, because of the booming trade between the Rijeka hinterland and the regions on the other side of the Adriatic Sea. Rijeka had its port at the mouth of the river Rječina, deeply indented into the mainland all the way to below the today's Trsat. Over time Rječina deposited more and more gravel, rocks and other alluvia thus burying the gulf, but a small corridor and access to sea have remained.

The beginning of a major development of the port of Rijeka can be related to the year 1719, when it was made a free port. In 1810 the "Lujzijana" road was constructed to Karlovac, and in 1873 the connection between Rijeka and Zagreb and Budapest has been established by railway lines. The land area of the port of Rijeka are obtained first of all by filling up the coast, and then building port industrial and railway facilities.

The port started to be built by filling up the area westwards from the Mrtvi kanal (Dead Channel). The new port of Rijeka was moved to a location in front of the city, and regarding construction method it belongs to artificial ports since no natural coast had been exploited.

The construction of two breakwaters (the Rijeka one in the length of 1,700 m and the Sušak one in the length of 420 m) resulted in the development of two ports (Rijeka, covering an area of 52 ha and Sušak or Porto Baros, covering an area of 6.5 ha). The mouth of the Rječina has been moved eastwards, and the old mouth (Mrtvi kanal) has been included in the Sušak port.

The second big phase in the development of the port and expansion of the city occurred after Rijeka, Istria and other Adriatic Croatian regions were integrated into Croatia, i.e. the then common state. Then Sušak and Rijeka became one city, and the port of Rijeka a unique port. The industry was moved from the city centre eastwards of Sušak, to the area between Kostrena and the Gulf of Bakar, i.e. to the area of the Gulf of Bakar over Škrljevo, Kukuljanovo and Cernika Primorski to Čavli.

The construction of the port is based on the following concept:

- in the eastern part of the city, between Mrtvi kanal (Dead Channel) and today's Riva Boduli (waterfront) a new area was set (filled up);

- extended from the Riva Boduli, at a moderate angle is the breakwater which lies in the east - west direction towards the open sea, almost parallel to the waterfront;
- in the newly formed port basin, piers are constructed perpendicular to the waterfront, with adequate equipment, quays, warehouses, railway tracks and cranes.

This basic concept of the port is further continued in the following activities:

- on the extended eastern waterfront of the Mrtvi kanal, parallel to the big breakwater, a smaller breakwater is being constructed which forms the today's Sušak port basin;
- between the eastern waterfront of the Mrtvi kanal and the new flow of the Rječina, an area of Delta is formed, and on the eastern side of the Rječina similarly an area called Brajdice was formed.

In the period from 1960 to 1980 a refinery with a paraffin oil port "TE-RIJEKA", a coke plant, bulk cargo port in Bakar were built. The oil port in Omišalj on the island of Krk was added to the port basin, as well as the port for timber and cattle traffic in Bršica, in the Gulf of Raša. This physical decentralisation of the port provided high-quality port premises for passenger transport, containers and general cargo. The construction of the bridge between the mainland and the island of Krk, the Kvarner group of islands have become substantially integrated into the potential area of the port of Rijeka.

An overview of the traffic increase in the port of Rijeka is given in Table 2.

Table 2 – Traffic of the port of Rijeka from 1875 to 1990

Year	Transit (t)	Total traffic (t)
1875	–	165,000
1913	–	2,097,000
1920	–	122,000
1939	–	1,522,000
1947	–	971,000
1950	1,000	2,383,000
1960	1,429,000	3,104,000
1970	3,424,000	10,349,000
1980	4,496,000	20,427,000
1990	3,441,000	20,131,000

There was a marked fall in traffic in the port of Rijeka during the first and second World Wars, as well as during the Croatian War of Independence i.e. the aggression of the Yugoslav Army and Serbia and

Table 3 – Traffic of the Rijeka port according to the main groups of goods

Goods	1960		1970		1980		1990	
	000 t	%	000 t	%	000 t	%	000 t	%
General cargo	1,061	26.2	2,133	20.6	1,664	8.2	1,641	8.1
Bulk cargo	2,156	53.2	2,889	27.9	5,230	25.6	3,908	19.6
Timber	152	3.7	337	3.3	480	2.3	247	1.2
Liquid cargo	685	16.9	4,990	48.2	13,063	63.9	14,335	71.2
Total	4,055	100.0	10,349	100.0	20,437	100.0	20,131	100.0

Montenegro against Croatia and Bosnia and Herzegovina.

The traffic on the railway line and in the port increased very fast at the beginning, and at the end of the century it amounted to about a million tons, and before World War I it reached the value of 2.1 million tons.

In the period between the World Wars, the development of the port and the access traffic routes was completely stopped, and the port traffic was drastically reduced, so that the maximum traffic realised in 1939 amounted to 1.5 mill. tons.

During World War II, the port was completely out of operation, and it had to be repaired and restored for operation in the post-war years.

After World War II the traffic at the port of Rijeka increased in a fast and intense manner. The total traffic of the port increased from a million tons in 1947 to 20.5 million in 1980, out of which 7.5 million tons referred to the dry cargo traffic of the port of Rijeka, and the rest is the traffic of the Rijeka oil refinery and the oil terminal in Omišalj. In 1990 the total traffic amounted to 20.1 mill. tons, and the traffic of the port of Rijeka 5.8 mill. tons. Major increase occurred in the share of transit traffic within the overall traffic of the Rijeka port.

An important item in the port traffic is the cargo transit. The period between 1960 and 1990 recognised the importance of the Rijeka port and the related traffic route as a favourable point of performing port activities for the Central European countries. In the transit traffic through the port of Rijeka the leading position belongs to Austria and the Czech Republic, with Hungary on the third place. In the traffic structure for all these countries the major part is bulk cargo with a share of about 80% in the overall transit.

During the years of the Croatian War of Independence, considerable efforts were made and success achieved in constructing the motorway from Rijeka towards Delnice and Kupjak. However, the replacement of the electric traction system towards Rijeka, partly completed by 1990, was discontinued. Also, the construction of the Rijeka ring-road from the junction

with the motorway towards Bakar, i.e. Bridge Mainland-Krk and Crikvenica, was stopped.

The fall in traffic growth in the port of Rijeka during the 80s resulted from the lagging behind in development of both the port of Rijeka and the traffic route from Kvarner to the Danube region and the Pannonian Plain. During this time the cargo was attracted to the adjacent ports in the North Adriatic, as well as by North Sea ports which attract cargo in the Central European region by reducing costs and through traffic and economic efficiency.

3.2. Development of the Port of Rijeka from 1991 to 2000

The aggression of the Yugoslav Army, Serbia and Montenegro on the Republic of Croatia and occupation of her central regions (from the suburb of Zadar and surroundings of Šibenik, suburbs of Karlovac, Sisak and Osijek, by means of the imposed ruling of the so-called Republic of Srpska Krajina (Serbian Border), from 1991 to 1995, i.e. up to the liberation activities undertaken by the Croatian armed forces (Croatian army and police) "Bljesak" and especially "Oluja" in May and August 1995), almost completely destroyed the Croatian traffic system.

Besides, it was only when the Croatian government got established (after UNTAES left at the beginning of 1998) that the Croatian part of the Danube region war reintegrated in the legal, economic and traffic aspect into the Republic of Croatia. Thus Croatia *de facto* as well became a country belonging to the Danube region. The port in Vukovar is once again a part of the Croatian traffic system.

At times of war and occupation of the Croatian territories, river traffic was almost completely paralysed, railway traffic towards Split (the Lička and Unska lines) and towards Slavonski Brod operated with great irregularities. Only the railway connections Zagreb – Rijeka and from Zagreb towards Hungary remained, as well as from Zagreb by the Podravska (the Drava region) line towards Osijek. The railway lines from Zagreb towards Sisak and Novska became dead-end tracks (almost as blind tracks).

The connections, both road and railway, from Eastern Croatia via Bosnia and Herzegovina to South Croatia have been closed down since 1991. Only all of the traffic connections towards the neighbouring Slovenia have continued to function normally.

Since at that time (1991-1997), the Croatian government, as well as the economy and society in general were concentrated on defending and liberating the occupied regions of the country, the substantial fall in traffic was inevitable, especially affecting the transit at the port of Rijeka. For illustration only, one section of the railway line Zagreb – Rijeka was just several kilometres away from the front-line.

The cargo from the port of Rijeka moved to other two North Adriatic ports (Koper and Trieste). At that time, the port of Koper proved to be a very aggressive competitor in taking over the cargo. The increase of traffic in the port of Koper was greater than the one at the port of Trieste and Rijeka. The port of Koper took over a great part of the port of Rijeka's market at the beginning of the Croatian War of Independence in 1991/92.

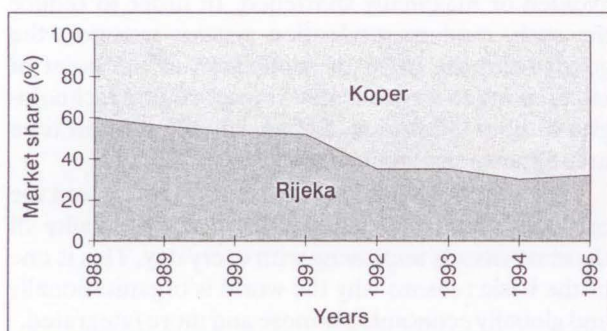


Figure 1 – Market shares of the ports of Koper and Rijeka

Already in the period before 1990, there had been essential, negative changes in the traffic structure of the main groups of goods. Once, the port of Rijeka had the attribute of a prominent liner port due to high share of general cargo in the overall traffic. However, the construction of new port facilities for bulk and liquid cargo, late integration in the world container flows and certain objective as well as subjective problems related to the port operation (inadequate surface connection with the hinterland, insufficiently developed port front and the unresolved issue regarding port construction funding in the traffic structure), have resulted in much greater share of liquid and bulk cargo. A certain level of port traffic was maintained in the port of Rijeka as the result of increase in traffic of the lower class tariffs, whereas there was a decrease in the traffic of higher value general cargo.

This shows, in fact, that the aggression on Croatia only accelerated the stagnation and slowing down of the development of the port of Rijeka.

At the time of war, the port of Rijeka and the related traffic routes, that escaped direct enemy attacks, operated relatively regularly, taking over the business activities of other Croatian ports that almost completely stopped their operation due to the war. In fact, the whole foreign trade exchange of the Republic of Croatia and the transit port traffic with the countries in the hinterland continued to operate through the North Adriatic traffic route.

In spite of the better position of Rijeka compared to other ports of the Croatian port system, at that time the operation of the port was burdened by many difficulties related to the environment, and these affected substantially the reduction in the port traffic.

Table 4 – Traffic of bulk cargo in the port of Rijeka in the overall cargo structure (000 tons)

Year	Total traffic	General cargo	Bulk cargo	Timber	Transit
1989	6,450	1,696	4,507	248	3,054
1990	5,796	1,641	3,908	247	3,441
1991	4,535	1,354	2,958	223	2,789
1992	4,547	1,083	3,314	149	1,746
1993	4,348	1,302	2,746	300	1,573
1994	3,555	1,124	2,108	323	1,357
1995	3,705	991	2,563	151	2,045
1996	2,309	683	1,488	138	1,083
1997	2,521	697	1,689	134	1,733

The data show that during the considered years the traffic at the port of Rijeka marked a heavy fall. The basic reason for such sudden fall of the overall traffic of the port of Rijeka is the reduction in the traffic of liquid cargo, due to the closing down of the Adriatic oil pipeline. There is also a drastic fall of other cargo classes.

Difficult conditions in the operation of the port of Rijeka over the recent years, first of all caused by the drastic fall of traffic, have had a negative influence on the realisation of the planned investments into the development and maintenance of the port infrastructure, suprastructure and mobile mechanisation.

Greater investments were realised only:

- in the construction of a refrigerated warehouse (cold storage plant) for tropical fruit of 3,000 tons capacity, put into operation in 1992,
- in the purchase of mobile mechanisation as substitute for a minor part of the old and obsolete equipment (forklift truck, autocrane, equipment for containers handling).

Of the planned and unrealised investments, the first one that should be mentioned is the purchase of a

container crane and construction of a new warehouse for soya at the grain terminal.

Nor were numerous planned works on repair and reconstruction of the existing facilities realised.

Negative consequences of such a situation are particularly visible in the oldest part of the port, the Rijeka-Sušak basin. Some quays are in a very bad condition and their repair should not be postponed any longer.

The average age of the quay cranes is 40, and being technically inadequate they need to be gradually replaced.

The port of Rijeka is a universal port with traffic today which includes almost all kinds of cargo: general, bulk and liquid.

The Rijeka port system operates within the Gulf of Kvarner at the following locations:

- Rijeka – conventional general cargo, grain terminals and phosphates and fruit terminal;
- Sušak – container terminal, conventional general cargo and timber;
- Bakar – bulk cargo terminal and Ro-Ro terminal;
- Raša – terminal for cattle and timber terminal;
- Škrljevo – back-up warehouse;
- Omišalj – oil terminal.

3.3. Reasons for and consequences of the traffic fall at the Rijeka port

There are two groups of basic reasons for the sharp fall in the traffic of the Rijeka port:

- aggressive war imposed by the Yugoslav Army, Serbia and Montenegro and occupation of a part of the Croatian territories from 1991 to 1995 i.e. until the beginning of 1998,
- stagnation and lagging behind in the development of the Rijeka port and the development of the Croatian traffic system, related to the internal connecting of the Pannonian Plain and the Adriatic, especially Zagreb and Rijeka.

It is namely in the 70s and 80s that the European ports in the north of Europe experienced intensive development, as well as the directly competitive ports of Koper, Trieste and Venice, and the ports of Ploče and Bar.

The development of multimodal, combined and integral transport, i.e. modern transport technologies in particular failed to be implemented in the period since the beginning of the 70s up to the present, thus marking a total stagnation in the development of the traffic system and the economy in general.

Due to the defensive war activities since 1991, there is a delay in the development of market orientation of the Croatian traffic system, especially the ports, trying to attract as much foreign, but also do-

mestic capital as possible, into the development of Croatian ports and also the railway traffic. The port of Rijeka is literally, together with the other North-Adriatic ports, a port of the Central European countries. In order to win its place among these directly competitive ports, the port of Rijeka has to start work on its development as well as the development of the road and railway network, so as to improve its integration into the Croatian and Central European traffic system. The deciding role belongs to the Croatian Government, as well as the Primorsko-goranska County and the City of Rijeka.

Considering that the Rijeka port system is physically dispersed and that it has been developing over a long period of time, growing together with the City in its most important section, and with a traffic system (railway and road) whose development is some 20-40 years late, it is no wonder that there are numerous "bottlenecks".

The modern concept of cargo transportation requires that the goods stay as short as possible in the transportation process, that the temporary storage is avoided or maximally shortened. In order to reduce the costs, modern production systems transport the goods from the point of production to the point of sales, owing to sophisticated transportation technologies without temporary storage with the shortest time in the transportation process.

The complex symbiosis of the information and the communication systems enables that the quality of these services is improving with every day. This is one of the basic reasons why the world is organisationally and globally economically more and more integrated.

Mere comparison of the available capacities at the Rijeka port and the performed transportation activities in one year may produce a wrong image.

A ship operator, as the port user, is especially interested in a short stay in the port, and in the fastest possible clearance of paperwork related to the given business, and the owner of the goods is interested in fastest possible and maximally reliable transport at a minimal price. Transportation costs would be the lowest if the goods were loaded directly from the ship into the wagons or trucks staying as short as possible on the route to the destination.

4. DEVELOPMENT POSSIBILITIES OF THE PORT OF RIJEKA IN THE DECADES TO COME

The current situation in the Rijeka port, considering piled up problems and adverse conditions of port operation, may be estimated as extremely difficult and warning. The possibilities of development of the Rijeka port in the atmosphere of the current circum-

stances may be realistically evaluated as moderate, especially over a long-term period. The times to come have to be used to stop the negative trends and to provide the port with the possible position regarding the competitive ports and economic traffic routes. Recognising the actual situation, studying the movement of cargo flows on the European traffic market, and comparing the operation of the port with the competitive ports, the realistic projection of the future port traffic may be based on a marked and sudden traffic increase. In the future mid- and long-term period, the Rijeka port needs to be defined and dimensioned as:

- a) the leading national port according to which the integral Croatian port system would be co-ordinated,
- b) one of the three equal North Adriatic ports, along with Trieste and Koper, sharing the same destiny in the common gravitational region,
- c) according to the European and world standards, it is a small-size port, located on the secondary European traffic route.

Table 5 – Traffic forecast for the port of Rijeka by the year 2015 (in 000 tons)

Year	Total traffic	Average growth rate (%)	Public handling	Average growth rate (%)
1994	10,600	–	3,554	–
2000	16,000	7.10	5,000	5.9
2005	21,500	6.09	7,000	7.0
2010	27,400	4.97	9,800	7.0
2015	31,500	2.83	12,500	5.0

The forecast of the traffic increase at the Rijeka port will depend mainly on the development itself of the Rijeka port, and on its integration into the traffic system of Croatia and the Central European countries as well as the Danube region. The international exchange and the growth of Croatian industry, as well as the industry of Central European transition countries by the year 2010 will increase by the rate of 6-7%. Only after 2010 will there come to a decrease in the average growth rate in the economy expressed in GDP (gross domestic product) which will amount to 5%.

The forecast traffic at the Rijeka port, shown in Table 9, could be substantially greater if there should come to a sudden development in the Croatian traffic system. By the year 2005 the construction of the new railway line Zagreb – Rijeka should be started and a connecting line from Rijeka to the Istrian railways should be constructed, and the Vukovar – Šamac canal constructed and opened to traffic. The new railway line Zagreb – Rijeka, as well as canalising of the river Sava from Šamac to Sisak should be completed by the

year 2015. With these assumptions, the traffic at the Rijeka port should grow in the period from 2010 to 2020 at a rate of at least 7%, so that public cargo handling in 2020 would amount to more than 17.5 million tons.

However, without these assumptions which require, as zero priorities, an urgent completion of replacing the electric traction with increase in the throughput capacity of the Zagreb – Rijeka railway line and the railway junction in Rijeka, along with the construction of the Rijeka ring-road from the Škurinje intersection towards the island of Krk and Crikvenica, and its linking with the Port (GMC-105, GMC-1049), it will be impossible to realise the presented forecasts of traffic growth. The zero priorities should be fully completed by the year 2002.

Taking into account the trend pattern on the world traffic market and the movement of the European cargo flows, it is not to be expected that the Rijeka port or the wider North Adriatic traffic route would belong to the main traffic routes of Europe in the next twenty years, and that they would equally compete with the West European and Black Sea ports. This means that no great increase in the port traffic is to be expected, nor should one get carried away by the idea that the forecasts of port traffic developed in the 70s and 80s, of 50 or 70 million tons of cargo in the Rijeka port system will get realised over that period of time.

Although complete reconstruction and adaptation of the Rijeka port according to modern passengers' requirements over the next ten-year period is impossible to achieve, permanent possibilities for developing the Rijeka port serving passenger transport need to be searched for and found. It is namely that the port of Rijeka, especially its central part intended for passengers is located in the very centre of the city. In close vicinity there are both the bus and railway stations.

In order to make the central part of the Rijeka port attractive to ferryboat lines towards the neighbouring Italian coast, and also towards Albania, Greece and Turkey, it would be necessary to develop this part into a modern passenger ferryboat port with modern passenger terminals for bus, railway and road traffic that would together form a complementary whole.

With the construction of the Rijeka ring-road, for better connection of the island of Krk, the airport on the island of Krk can make Rijeka port an extremely attractive port of departure and arrival for cruises on big passenger ships, as well as ferryboats when tourists (passengers) want to take their cars with them.

The most part of the industrial development of the Primorsko-goranska County and the Istrian County must be based on the development of traffic and tourism and of the complementary branches. In order to make this possible, it is necessary to develop the traffic

system and tourism in a balanced and gradual and complementary way.

In the next mid-term period, it may be assumed that, with the application of adequate measures, by different management at the port itself and correct attitude of the government towards the port, a radical turn in the operation of the Rijeka port will be achieved, thus insuring that it takes the place it deserves within the Croatian port system, and improves the relation toward the competitive ports of Trieste and Koper.

The development of port activities, regarding cargo handling and passenger serving, is the generator of the development of the whole industry of Rijeka and the county. This economic segment deserves full attention. This means, engagement of knowledge for efficient evaluation of the existing and planning of the future, and well-defined investment of funds in accordance with the feasibly planned traffic.

The gradual (stepwise) development is indicated by the function of realising current and long-term objectives. The harmony of physical, mobile and organisation and staff capacities is needed in order to achieve rational economy, i.e. to make profit.

The co-ordination of the Port of Rijeka with its integration into the traffic system of the City, County and Croatia, in all its elements, is a necessary requirement to the use of potential investors and the Croatian state. Lack of co-ordination should be avoided in the capacities of certain parts of the port-traffic system, in all the development phases both regarding time and space.

The long-term vision of the development of the Rijeka port is related to the long-term development strategy of the Croatian traffic system and to the role of the Croatian traffic system in the integration of the Central European region and the Danube region with the Mediterranean and the World.

The role of the Rijeka port needs to be comprehended on a long-term basis through the role that it will acquire within the framework of the European traffic corridors as one of the most important North Adriatic ports. On a long-term basis, and when Croatia becomes a EU member, the Croatian economy and its traffic system will formally become an integrated part of the traffic system of the European Union.

The long-term vision of the development of the Rijeka port will depend also on the role and significance of the transit traffic that Croatia, as a member, will attract or wish to attract.

The long-term vision of the development of the Rijeka port needs to be considered also in view of the construction of modern railway connections from Rijeka to Zagreb and from Rijeka to Istria, as well as regarding the construction of an Adriatic railway line.

Depending on the development of the Croatian traffic system and its integration into the Central European, Adriatic and Mediterranean traffic systems, i.e. depending on the development of the Croatian tourism, as one of the most attractive tourist destinations in Europe, the Port of Rijeka will also develop as the passenger transportation hub in the North Adriatic Croatia.

The physical concept of developing the port area of Rijeka, plans on a long-term basis the operation of the Rijeka traffic route at the following technological location units:

- The Rijeka-Sušak basin
 - a) Container terminal Brajdica in its final size;
 - b) Northern Brajdica as distributive centre, represents a transitional part between the port and the city;
 - c) Passenger port and nautical centre in the Port Baroš with supporting activities at the Delta;
 - d) General cargo terminal in the Rijeka basin;
 - e) Grain terminal (grain silos);
 - f) Zagreb quay as multipurpose terminal and timber terminal.
- The Bakar Basin
 - a) Bulk cargo terminal Podbok; as multipurpose terminal for bulk cargo (iron ore, coal, phosphates, etc.);
 - b) The area of "Goranin" as cargo handling point of the Free Trade Zone Škrljevo.
- The Raša Basin
 - a) Terminal for cattle, Bršica;
 - b) Ro-Ro terminal Bršica.

Thus, the physical layout of the development of the port area plans a concentration of general cargo, timber and grain in the western section of the port, a gradual conversion of the old port of Sušak and Delta into the passenger, tourist and promotional maritime facilities, concentration of bulk cargo in the Bakar basin, and re-establishment of the Raša basin for port capacities suitable for accommodation outside the densely populated areas.

Since the port area represents a maritime estate, which means public good which cannot be privatised nor any other actual claims made on any basis, the issue of industrial exploitation has been settled by means of concessions.

The European Union has considered on several occasions the idea of adopting guidelines on the European port policy. Thus, the proposal of the European port policy, developed by the European Parliament Transport Committee, based on a hands-off policy regarding port activities, contained the following guidelines:

- autonomy of port authorities,
- free competition between ports,

- covering of all costs by the port users,
- elimination of discrimination.

In 1993, the European Union issued a recommendation study, as working material, regarding port policy in the European Community, based on the following principles:

- availability and modernisation of port facilities;
- free and fair competition;
- integration of ports through common traffic policy;
- socially and ecologically friendly development.

It is very difficult to give a precise evaluation of the investment profitability. However, investments in the development of the traffic system, and especially in the development of the Rijeka port as the most significant Croatian port certainly have to be profitable under the following conditions:

- a) that phases are realised regarding time and space, which will eliminate "bottlenecks" and due to improved efficiency reduce the costs per unit of handled cargo,
- b) that the development of the Port of Rijeka is co-ordinated with the development of the traffic system of the City of Rijeka, Republic of Croatia and the Primorsko-goranska County.

The efficiency of investments and return on investments will certainly be related to the quality of transition. The influx of foreign capital into the Port, especially from the Central European countries, would mean a great probability that the Danube region - Adriatic cargo and vice versa will pass through the Port of Rijeka.

5. CONCLUSIONS

Evaluating all the advantages provided by the Port of Rijeka (its physical and potential traffic location in relation to Europe, traditional port orientation of the City of Rijeka itself, traffic (lack of) connections), it is necessary to draw attention to some other less obvious advantages.

The new legal regulations based on the European criteria of free trade competition are built in all the plans and programmes developed by the Rijeka port authorities.

The Republic of Croatia has defined itself in relation to the Port of Rijeka by including the Rijeka traffic route into the priorities, regarding construction of roads and reconstruction of the railway line, by insuring the funds for modernisation of port facilities and by investing additional efforts in attracting cargo.

The Rijeka port authorities have made all the necessary documents required for fast operationalisation of the investment projects.

When traffic flows that pass through Europe and the world today are considered, one can notice that re-

cently the trend of traffic growth in the main world ports is being solved by relocating a part of activities to some minor ports, thus keeping an approximately same volume of traffic in the centres.

The congestion of traffic routes is a characteristic of the West European countries, and this congestion will reflect itself on Croatia after completing the necessary infrastructure.

The objective of reasonable development programmes, when considering traffic, should not be the congestion of traffic routes, but moderate usage of natural conditions that enabled the construction of the Rijeka port, establishing of the traffic route which provides fastest connection between Central Europe with the sea, and thus also with the rest of the world.

In order to be able to consistently carry out the development plans of the Rijeka port, synchronised activities are needed in the development of the Rijeka port and of those parts of the traffic system in the Primorsko-goranska and Istarska Counties, as well as the City of Rijeka and the Republic of Croatia, which integrate the Port of Rijeka into the traffic system of Croatia, and this part of the European region.

With replacement of the railway electric traction system and upgrading of the throughput capacity of the Zagreb - Rijeka railway line, it is necessary to increase the transportation capacities of the Rijeka port by reconstruction of the Rijeka railway junction.

Further construction of the Rijeka Ring-road from the Orehovica intersection towards the industrial zone Škrljevo, Bakar and the island of Krk, along with the construction of the city main road from Delta at the mouth of the Rječina to the ring-road and tunnel ring-road of the Rijeka City centre, are necessary in order to integrate the Rijeka port into the traffic system of the state and county road connections.

Harmonised and complementary development of the Rijeka port with surrounding urban areas, especially the central parts of the City of Rijeka and Bakar, is also necessary from the organisational, technological, urban, traffic and ecological aspect.

Finally, it needs to be emphasised that the development programme of the Rijeka port is late, regarding the development of the port itself, and integrating of the Rijeka port into the traffic system of the Republic of Croatia, and thus also of Central Europe and the Danube region. It is especially late regarding two basic elements essential for further development of the Rijeka port: the extension of constructing the Rijeka ring-road from the Škurinje intersection towards Bakar, Krk, Crikvenica, as well as the connecting roads from the port to the ring-road (GMC 104 and GMC 105). There is also a delay in completing the replacement of the traction system on the railway section from Moravice to Rijeka.

For the Rijeka port, as a complex system in itself, and the most important hub of the Croatian traffic system, to catch up with the competitors in the neighbourhood (Koper – Trieste, Venice) and to share with them, based on its important comparative advantages, a substantial part of the increase in port cargo, the following needs to be determined immediately:

- the strategy development of the traffic system with exactly defined phases and approximately determined time of their realisation,
- the part of the strategy related to construction of new railway lines Zagreb-Rijeka and Rijeka-Istria needs to be a complementary part of the long-term development of the Rijeka port.
- it is necessary to develop very urgently precise time plans regarding further construction of the roads that connect the Rijeka port.

SAŽETAK

MOGUĆNOSTI RAZVITKA RIJEČKE LUKE POČETKOM NOVOG MILENIJA

Riječka luka, kao dio budućeg sustava sjeverno-jadranskih luka (Koper, Trst, Rijeka) ima znatnu ulogu u prijevozu roba prema srednjoeuropskom prostoru. Izgradnjom Kanala Dunav – Sava od Vukovara do Šamca, kanaliziranjem Save od Šamca do Siska, te kvalitetnim željezničkim i cestovnim vezama koje će se realizirati u prva dva do tri desetljeća trećeg tisućljeća Luka Rijeka dobiva ključnu ulogu u razvitku sjeverno-jadranskih luka. Kvalitetnim željezničkim i cestovnim vezama Luke Rijeka s Istrom, Koprom i Trstom ostvariti će se znatnije mogućnosti racionalizacije transportnog procesa od riječke luke prema Podunavlju i srednjoeuropskim zemljama.

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