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XX SCIENTIFIC-EXPERT CONFERENCE ON RAILWAYS
RAILCON '22

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XX SCIENTIFIC-EXPERT CONFERENCE ON RAILWAYS
RAILCON '22

MONOGRAPH – TWENTY RAILCON CONFERENCES 1984-2022

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Abstract *– The first conference on railways in Niš was held in 1984 and up to now days it has been held biyearly – time span of 38 years where 20 conferences happened. The initial conferences aimed at the railway vehicles only: their design, structure and application and the participants were railway and industrial experts and university scientists. This railway conference eventually got the name RAILCON/ŽELKON. New scientific knowledge, globalization of the world market, and rapid technological development have caused changes in all areas of life. Accordingly, the railway conference was changing and adapting to current processes, as well. The topics of the conference became infrastructure, maintenance, quality, strategy, politics, future of the railways etc, while audience and participants of the conferences remained the same. This year's XX International Scientific-Expert Conference on Railways RAILCON '22 is a jubilee, milestone or a check point where has to be summarized what has happened in the previous period in fields of railway, university, industry and society thru the scope of the Želkon/Railcon Conference.*

Keywords – ŽELKON, RAILCON, Railway Conferences, Scientific-Expert Meeting, History.

1. INTRODUCTION

It has been 38 years since the first meeting on railway engineering held in Niš, and during that period, the railway has seen significant changes. New scientific knowledge, globalization of the world market, and rapid technological development have caused changes in all areas of life, including the railway industry, transport, and education. The initial railway conference - RAILCON has changed and adapt to current events/processes/trends, as well. However, RAILCON has preserved some tradition within.

The railway conference began as a Yugoslav gathering of experts and scientists dealing only with the railway vehicles. Over the past 38 years, it has transformed into a gathering of experts and scientist dealing with railways in all its aspects: traffic, politics, vehicles, infrastructure, maintenance, education etc.

The Monograph about twenty railway conferences which were held last 38 years is edited as part of the RAILCON conference 2022. The aim of this publication is to summarize and describe all railway meetings held in Niš during the previous conferences [1-9]. The authors of this monograph, and the rest of the past and present RAILCON organizers, did their best to preserve the memories of the events in which experts of various profiles showed exceptional interest and devotion to the railways.

2. THE FIRST MEETING: „CONFERENCE ON RAILWAY ENGINEERING"

The first meeting of railway experts and scientists was held on 2 and 3 of October 1984, in Niš with the title „Conference on Railway Engineering". It was organized by the Faculty of Mechanical Engineering in Niš and Mechanical Industry Niš, on the occasion of one hundred years of the railways in Serbia and hundred years of work of the Mechanical Industry Niš (MIN). The initiator of this meeting and the President of the Organizing Committee was professor Stojan Stojčić.

At the first Conference, 29 papers were presented with the participation of over 150 eminent experts of Yugoslav railways, from the domestic industry of rail stock, overhaulers, researchers from mechanical and electrical engineering faculties, and scientific research institutions. All papers from the Conference were published in the magazine „Železnice", No. 2, 1985.

One of the initiators and organizers of the first meeting Dragoslav Pajić, dipl. mech. eng, stated: „We considered for a long time what name to give to this meeting (consultations), and finally we decided to call it „Conference on Railway Engineering". We adopted this name, simply because there is a Department for railway engineering at the Faculty of Mechanical Engineering in Niš.

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However, it should be said that „engineering” primarily refers to rolling stock, including all those technical branches that, in addition to mechanical engineering, are involved in the issue of rolling stock: electrical engineering, electronics, technology etc. The term „railway” refers, not directly to the railway as an organization; it refers to manufacturers of railway stock, repairers, scientific research institutes, higher education institutions. It refers to all those branches which exist for the sake of the railways as well for the persons which cannot live without railways.”.

Fig. 1 Participants of the first „Conference on Railway Engineering”, held on 2 and 3 October, 1984 in Niš

Fig. 2 Details from the Želkon/Railcon Conferences

3. TWENTY CONFERENCES ON RAILWAYS – ŽELKON/RAILCON

After the first meeting (Fig. 1) the „tradition" was established that the next railway conferences will happen in October every second year in Niš. The main organizer was the Faculty of Mechanical Engineering in Niš.

The initial meeting was of a purely national character, with or without the participation of foreign authors. Over the years it has transformed into a railway conference with international participation. Since 2004, the name „railway conference" has been abbreviated to ŽELKON (in Serbian: železnička konferencija) or RAILCON (in English: railway conference). The full internationalization of the conference began in 2012, when the traditional conference on railways in Niš became an international scientific-expert conference on railways – RAILCON.

This year 2022, in accordance with tradition, the twentieth railway conference will be held under the name XX International Scientific-Expert Conference on Railways – RAILCON 22. However, all the traditional participants of the conference on railways, whatever the conference is called, remember the name initial name – ŽELKON.

The period of 38 years has given significant changes to the railways, education, universities, community and the ŽELKON. New scientific knowledge, globalization of the world market, and rapid technological development are the main causes of the changes of the railways. Therefore, they are the initiator of changes on railway conference as well.

The Table 1 shows the basic data of all twenty conferences, starting from the first Conference on Railway Engineering in 1984 until the twentieth International Scientific-Expert Conference on Railways RAILCON 22.

Trying to preserve the history of the railways in Serbia, parts of the ŽELKON conferences in 2004, 2006, 2008, and 2014 were the historical publications on rail transport in Serbia:

- „One hundred and twenty years of railways in Niš", by Nenad Govedarović and Zoran Bundalo, published in 2004;
- „Private narrow-gauge railways in Serbia 1881-2006", by Nenad Govedarović, published in 2006;
- „Tramways/Trams in Serbia 1892-2008", by Nenad Govedarović, published in 2008;
- „Railways of Southeast Serbia 1884-2014", by Nenad Govedarović, published in 2014.

These publications became a significant database of the various information on railways in the region.

4. CHANGES IN THE LAST FOUR DECADES

The origin and development of the Faculty of Mechanical Engineering in Niš are closely related to the Serbian Railways and the Mechanical Industry in Niš. This relation and this long-term cooperation gave birth to the conference on railways ŽELKON.

However, during time, the worlds market, industrial trends, railway technology and the society have changed. These changes induced rational (and irrational) changes of the universities, railways and industrial complex of the region.

4.1. Changes at the university

The system of traditional higher education in Serbia (Yugoslavia) was established during the mid twentieth century. Since the signing of the Bologna Declaration in 1999, many universities in Europe changed significantly. University of Niš, changed as well.

The main goal of the Bologna process was the establishment of a single European area of higher education. The reform of higher education in Serbia was implemented with the aim of ensuring more efficient and flexible studying adapted to European quality standards. The Law on Higher Education of the Republic of Serbia was adopted in 2005, and since then numerous changes have been implemented at the university. Forty years ago, all universities in Serbia were exclusively state-founded and there were only 6 of them. Each technical university, for example, had 3 to 16 study programs or Departments. Today there are 3092 accredited study programs within 246 accredited institutions (both state & private) in higher education in Serbia only.

Due to new scientific discoveries and the extreme rapid development of technique and technology, constant changes in the education system over time are necessary. The goals that were set for engineers, fifty years ago, were aimed at increasing productivity and product quality. But, today those goals are shifting towards requirements, for example, of energy efficiency and ecology, preserving the productivity, improving the quality, with low costs! In addition, we live in a time of rapid overall changes and there is a need to innovate professional knowledge: continuous learning throughout the entire life. The university should provide experts who are able to communicate, to constantly upgrade knowledge, to dedicate their professional skills to current topics, and use modern tools.

The university has experienced significant changes in terms of ownership structure, education models, and financing system in the last 40 years, as well.

Tab. 1 Basic data of all twenty conferences from 1984 to 2022

No.	Date of Event	Meeting Title	President of the Org. Com.	Number of…			
				Papers	Authors	countries	Participants
1.	02-03 /10/1984	SAVETOVANJE O ŽELEZNIČKOM MAŠINSTVU	Prof. dr Stojadin Stojičić	**29**	30	1	150
2.	02-03 /10/1986	JUGOSLOVENSKO SAVETOVANJE O ŽELEZNIČKOM MAŠINSTVU	Prof. dr Stojadin Stojičić	**34**	39	1	
3.	29-30 /09/1988	JUGOSLOVENSKO SAVETOVANJE O ŽELEZNIČKOM MAŠINSTVU	Prof. dr Stojadin Stojičić	**36**	50	2	
4.	04-05 /10/1990	NAUČNO-STRUČNI SKUP O ŽELEZNIČKOM MAŠISNTVU	Prof. dr Stojadin Stojičić	**21**	31	3	
5.	01-02 /10/1992	NAUČNO-STRUČNI SIMPOZIJUM O ŽELEZNIČKOM MAŠISNTVU	Prof. dr Ranđel Bogdanović	**46**	55	1	
6.	05/10/1994	Naučno-stručni simpozijum TEHNIKA ŽELEZNIČKIH VOZILA	Prof. dr Ranđel Bogdanović	**38**	48	1	
7.	01-02 /10/1996	Naučno-stručni simpozijum TEHNIKA ŽELEZNIČKIH VOZILA – ŽELEZNIČKO MAŠINSTVO	Prof. dr Ranđel Bogdanović	**49**	56	2	
8.	29-30 /10/1998	Naučno-stručni simpozijum TEHNIKA ŽELEZNIČKIH VOZILA – ŽELEZNIČKO MAŠINSTVO	Prof. dr Slavko Kepdžija	**47**	82	2	
9.	26-27 /10/2000	Naučno-stručni simpozijum TEHNIKA ŽELEZNIČKIH VOZILA	Doc. dr Radisav Vukadinović	**48**	78	3	
10.	24-25 /10/2002	Konferencija ŽELEZNIČKO MAŠINSTVO	Doc. dr Dušan Stamenković	**50**	82	4	161
11.	21-22 /10/2004	Naučno-stručna konferencija o železnici ŽELKON 04	Prof. dr Miroslav Đurđanović	**67**	117	8	220
12.	19-20 /10/2006	Naučno-stručna konferencija o železnici ŽELKON 06	Prof. dr Dušan Stamenković	**97**	174	8	280
13.	09-10 /10/2008	Naučno-stručna konferencija o železnici ŽELKON 08	Prof. dr Dušan Stamenković	**88**	162	10	190
14.	07-08 /10/2010	Naučno-stručna konferencija o železnici ŽELKON 10	Doc. dr Miloš Milošević	**93**	188	12	220
15.	04-05 /10/2012	XV International Scientific-Expert Conference on Railway RAILCON 12	Doc. dr Miloš Milošević	**88**	178	13	250
16.	09-10 /10/2014	XVI International Scientific-Expert Conference on Railway RAILCON 14	Prof. dr Miloš Milošević	**74**	153	10	220
17.	13-14 /10/2016	XVII International Scientific-Expert Conference on Railway RAILCON 16	Doc. dr Milan Banić	**71**	153	13	180
18.	11-12 /10/2018	XVIII International Scientific-Expert Conference on Railway RAILCON 18	Doc. dr Milan Banić	**74**	161	13	200
19.	15-16 /10/2020	XIX International Scientific-Expert Conference on Railway RAILCON 20	Doc. dr Aleksandar Miltenović	**54**	134	11	110
20.	13-14 /10/2022	XX International Scientific-Expert Conference on Railway RAILCON 22	Prof. dr Aleksandar Miltenović	**54**	126	12	

4.2. Changes in the railways of Serbia

In 1984, three independent railway companies (Belgrade, Novi Sad and Priština) operated on the territory of Serbia. In accordance with the that times law, together with other railway companies from the territory of Yugoslavia, they were united in the so-called The Association of Yugoslav Railways, which coordinated the process of creating timetables, adopted technical regulations and they were in charge of international railway cooperation.

Given the steady decline in the share of railways in the transport market, the process of restructuring Europe's railways was initiated forty years ago. The experiences of EU states and railways have shown that it is possible to put the railway sector on a sound (to the market oriented) basis through the restructuring process. The process of restructuring the railways in Serbia was started after 2000. This process includes the restructuring of the railway company, the

restructuring of the state administration in this area and the restructuring of the relationship between the state and the railway company, with the aim of enabling the railway company to operate in a market way.

The Law on Railways was adopted in 2005 and it defined the process of restructuring the railway sector. Then the Directorate for Railways was formed, the Strategy was adopted and the policy for the development of the transport sector in Serbia was adopted.

As part of the restructuring process of the Serbian Railways company, three independent companies were formed in 2015: Infrastructure of the Serbian Railways, which is the manager of the railway infrastructure, Serbia Cargo operator in the transport of goods and „Srbija Voz" operator in passenger transport. Today, a total of 23 railway carriers have licenses to carry out the transport of passengers, goods and transport for their own needs on the infrastructure of the Serbian Railways.

In order to see the business efficiency of the railways today and forty years ago, the table provides a comparative overview of certain data on the railways of Serbia in 1984 and 2020 [10,11].

Tab 2. Comparative data on business years 1984-2020

Comparative data	Business Year	
	1984.	2020.
Volume of passenger transport (put-km/pass-km)	3580×10^6	$159{,}5\times10^6$
volume of freight transport (nt-km/tonne-km)	$9{,}11\times10^9$	$2{,}61\times10^9$
No of employees	46777	10587

It can be clearly seen that in the last forty years there has been a significant decline in transport work on railways in Serbia.

The processes of transformation of the state railway into an independent privatized and traffic-market organized organization and the process of globalization of the railway vehicle industry contributed to this.

Relations in the transport market, the role and position of transport branches have changed significantly during the 20th century. The volume of traffic was constantly increasing, but the development of road and air traffic was significantly faster than the development of railways. Accordingly, their participation in the transportation of goods and passengers also changed. From the beginning, road transport was economically (market-wise) and privately organized and, therefore, very flexible. In contrast, the railway is burdened with numerous regulations/norms and is very difficult to orient technically. There are numerous differences between different railways: gauge, axle load, buffer pressure, profile (gauge), platform height, power supply, train braking system, clutch, etc. The railway industry is oriented towards specific customer requirements and small-scale production.

4.3. Changes in the railway industry of Serbia

In the last four decades, the world railway industry has experienced a process of concentration - several large international industrial systems have become the leading global providers of railway services. Thus, the competition was reduced and the possibility of smaller independent companies successfully performing on the world market was reduced, as well.

Significant capacities of the railway industry in the world were developed in the period from 1950 to 1980, when steam traction was replaced by diesel and electric drives. In that period, the production capacity of the domestic railway industry developed the most. The large demands of railways for vehicles encouraged manufacturers to expand their capacities. However, in the last three decades, the requirements have significantly decreased and this has caused the previously developed capacities to be underutilized. The domestic industry of railway vehicles developed its capacities primarily according to the needs of the Yugoslav railways as well as the large mining and metallurgical combines in the country.

The period from 1980 to 1990 is characterized by stagnation, even a slight decline in the social product. The disintegration of the SFRY, the destruction of war, the sanctions and the bombing of the NATO pact caused great damage and caused a deep disruption in economic flows and the development of railway traffic in Serbia. In this period, the traffic system in Serbia was isolated and the traffic services market narrowed. The decline in the volume of economic activities and the decrease in the standard of the population significantly reduced the demand for transport services and thus transport revenues. The condition of the infrastructure has deteriorated, the age structure and technical obsolescence of the means of transport has become even more pronounced. The large immobilization of transport capacities due to irregular maintenance is especially pronounced. The non-use of capacities led to their accelerated deterioration.

This state of the economy in the country, and especially the situation on the domestic railway market, reflected on the activity and state of the railway industry. Companies that overhauled and manufactured railway vehicles MIN Lokomotiva Niš, Şinvoz Zrenjanin, Bratstvo Subotica, MIN Vagonka Niš, Goša Smederevska palanka and Železvoz Smederevo significantly reduced their production. In addition to these enterprises, many enterprises of mechanical, electrical, metallurgical and other activities produced parts for railway vehicles. These

are MINEL Belgrade, EI Niš, Tigar Pirot, PPT Trstenik, „Livnica Požega”, „Livnica Kikinda”, FIAZ Prokuplje, Krušik Valjevo, Sever Subotica, Novkabel Novi Sad, FASO Vladimirci, MIN Skretnice, MIN Svrljig etc. It is estimated that the industry that was directly or indirectly related to rail vehicles in Serbia had around 25,000 employees at the beginning of the eighties. Unsuccessful privatization of these factories was carried out and many of them went bankrupt. The changes in the rail vehicle industry of Serbia in the last 40 years have, in short, been very unfavorable.

Today, of the previously mentioned factories, only MIN Lokomotiva Niš, Tatravagonka Bratstvo Subotica, Šinvoz Zrenjanin, ŽELVOZ Smederevo and GOŠA Smederevska Palanka operate with significantly smaller production capacities. Meanwhile, two new factories that deal with the production of parts for railway vehicles were built: SIEMENS MOBILITY Kragujevac, and MILANOVIĆ INDUSTRIES GROUP Kragujevac.

These are some of the circumstances in which the ŽELKON conferences were organized/held in the period from 1984 until nowdays.

5. CONCLUSION

The mission of the ŽELKON conference remains to gather scientists and experts from the region, monitor development/innovative projects and current railway regulations, analyze changes in developed railways and indicate the direction of further development of railways in Serbia and the region

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