

1990 – 2020

30 years of successful work for railway engineers in Europe

2021

UNION REPORT

Editorial



Dear reader of our report,

We are living in strange times. At the time of writing this preface the Covid-19 virus is expanding at an alarming rate in what is in many countries the second wave. Major events have been postponed and some later cancelled altogether, the biggest railway exhibition InnoTrans being a good example. More or less confined to our homes, waiting for progress on vaccines and other relief, we are isolated in our social behaviour. Many of us have to reinvent our daily life as standard things like socializing, holidays or shopping suddenly have become a risky activity. Our interactive society has taken a massive impact and seems to be one hundred years back in time, the time of the so-called Spanish flu (which was not Spanish but was first detected in an army camp in Kentucky).

Covid-19 has also a big impact on our work, both a private person but also as a non-profit organisation. All (major) of the member organisations have been cancelled and there

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December 2020

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is no indication when these activities will restart as live activities. Many of our members have kicked off online seminars and meetings; this is a big difference with what happened hundred years ago. The online society is becoming part of our lives; in the future many of us will work from home most of the time but as railways are very physical entities our engineers will have to combine both. Preparing them for that way of exercising their profession is part of our task. It is there where the UEEIV will concentrate its activities for the time being as the current situation will probably continue for at least a year or so. Please let us know where we can be of help in supporting your organisation in this matter. The internet society is here to stay.

It is also a time to consider about how our activities can help railway engineers to use their expertise in the reduction of capital expenditure and operational cost of railway building and operation as the trend of the last decennia of ever increasing passenger numbers and freight tonnage has been broken. Current expectations only forecast 2020 to 2025 for the numbers to be back at pre-Covid levels. Long term vision and strategies are therefore needed. I expect the UEEIV to play a role there with your help.

I wish you a healthy future; keep safe.

MSc., MBA Frans Heijnen, President

30 years of UEEIV - origin and work

At the end of the 1980s, Europe was undergoing political upheaval. After the break-up of the Eastern bloc in 1989, the geopolitical situation in Europe changed radically. Many Eastern European countries peacefully abandoned socialist governance. But the railways also faced fundamental structural and economic changes, partly because of the need to separate operations from the network. This inevitably led to special challenges for railway engineers.

Josef Windsinger, Federal Chairman of the Verband Deutscher Eisenbahn-Ingenieure (VDEI), a thoroughbred railwayman and engineer, had a vision of how engineers could master this situation. VDEI's many years of experience gained from cooperation with the engineering associations of the Netherlands (WWV), Great Britain and Ireland (PWI), Austria (ÖVG) and Italy (CIFI) gave him the confidence that a large European umbrella organisation of railway engineers could successfully lobby the European Parliament (and later the Commission) and the UIC and thus influence the development of the railways in Europe.

With this vision he found support from the supporting members of the VDEI, particularly the companies Plasser & Theurer and Heitkamp.

The 19th International Track Construction Machinery and Equipment Exhibition of the VDEI in Zurich was then used as the occasion for the foundation of such a European association of associations. Sixty representatives from engineering associations, railway administrations, industry and research across 14 countries accepted the invitation to a boat trip on Lake Zurich on 8 May 1990..

After a presentation on the association's organisation and objectives and an intensive, basically approving debate, the representatives of the associations present decided to found an international association under the name 'Union of European Railway Engineer Associations - UEEIV'. By acclamation and unanimously, the VDEI and Dipl.-Ing. Windsinger were temporarily assigned the chairmanship and management.

Finally, the Assembly adopted a resolution to the Council of Ministers of the European Community, the European Parliament, the Eastern European Council for Mutual Economic Cooperation (CEMR) and the governments and railway administrations of 18 countries entitled: With New Railway Technologies - Modern Transport Systems in Europe

The responses received were very positive.

The 1st General Assembly meeting was held in Berlin on 6 June 1991. The first version of the Articles of Association was adopted and the Presidium and the members of the Board of Advisors were elected.

Presidium:

Ing. Nan Koorn	President	WWV-NL
Ing. Walter Raming	Vice President	ÖVG-AT
Dr.-Ing. Andrzej Semrau	Vice President	SITK-PL
n.n.	Vice President	PWI-UK
Dipl.-Ing. Reto Danuser	Treasurer	Gdl-CH
Dr.-Ing. Bernd Neumann	Secretary	VDEI-DE
Dipl.-Ing. Josef Windsinger	General Secretary	VDEI-DE



Fig. 1: Neumann, Koorn, Kerkapoly, Windsinger, Raming, Corazza, Danuser

Board of Advisors:

Dr. Werner Dollinger , Chairman Minister of Transport-DE	(retired)
Dr. Kurt Eichinger	Plasser&Theurer-AT
Prof. Dr.-Ing. Endre Kerkapoly	UVG-HU
Prof. Dr. Giuseppe R. Corazza	CIFI-IT
Prof. Dr. Roman Jaworski	ÖVG-AT
Karl Uhrig	Heitkamp-DE
Dipl.-Ing. Jean Bouley	UIC-FR

2nd International Congress in Berlin on 8 September 1992
with about 1000 engineers from 21 European countries and Asia, including high government and railway representatives.

'Efficient Railways in Europe'

The 2nd General Assembly meeting was embedded in this congress. It was decided that UEEIV should be registered as an association under German law in the register of associations at the local court of Frankfurt/Main. The registration was confirmed on 18 January 1994. The members of

the presidium were confirmed in their office and as third vice president Eng. John B. Pitts of PWI-UK was elected as third vice president.



Fig. 2: **Heinz Dürr**, Chairman of the Board of Management of DB and DR, at the opening of the exhibition

In the following years, the main focus of the work of the Presidium was the recruitment of full and supporting members in order to stabilise the work of the association, the beginning lobbying by contacting the European Parliament and the Commission via the Belgian member association URPIC, and the organisation of international congresses, symposia and conferences on transport and professional policy.

An early highlight of this work was certainly the participation in the project to restore the European rail connection between Kaliningrad and Berlin with 1435 mm gauge track. German companies took advantage of the contacts that the UEEIV had developed with the Russian Ministry of Railways and railway executives. Y-sleepers were installed for the first time in Eastern Europe on a 1.3 km long section. In May 1993, the connection was put into operation with worldwide attention.

In 1994, the board of directors decided to set up a working group to lay the foundations for defining the professional title 'railway engineer', which was unclear among experts. Prof. Dr. **Corazza** was entrusted with the leadership.



Fig. 3: Constituent meeting: Neumann, Corazza, Semrau

Years later, the idea was born out of this working group to award the title EURAIL-ING to the engineers meeting the definition by a certificate according to DIN EN 17024. This provides the engineers with an authorised proof of their qualifications. On the other hand, it can also facilitate their professional mobility in Europe. By the beginning of 2020, 449 engineers in 21 countries have been certified.

Fig. 4: Certificate EURAIL-ING



Later efforts to introduce a European professional card for railway engineers based on the certificate in accordance with Directive 2005/36/EC have so far been unsuccessful, as the legal prerequisites for this professional group have not yet been created.

UEEIV has gained international recognition through its international congresses and conferences, which are supplemented by exhibitions and excursions.

3rd congress from 19 to 21 April 1994 in Amsterdam/NL with about 2000 visitors from Europe and the USA:

"The European railways of the 21st century"

Chair of the session:

Vice President Dr.-Ing. **Andrzej Semrau**

Introductory address:

Etienne Schouppe, President GEB

4th congress from 03 to 05 November 1995 in Verona/IT with again more than 2000 visitors

"European railways in the transport system of the 21st century"

Chair of the session:

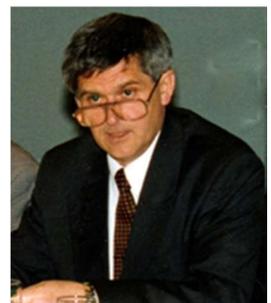
acting President Dr.-Ing. **Andrzej Semrau** (Fig. 5)

Introductory speeches:

Antonio L. Necci, President of UIC

Michel Walrave, Director General of UIC

Prof. **Ottokar Hahn**, EU Transport Commission;



International Railway Science Days - IWTEB'97 on 10 and 11 October 1997 at the TU Dresden/DE



Opening: DI **Josef Windsinger**, General Secretary UEEIV (Fig. 6)

Introductory speeches:

Dr. **Hans Joachim Meyer**, Minister of Science of the Free State of Saxony;

Hanns-Holger Lage, UIC Paris
DI **Dietmar Lübke**, DB AG Berlin
Dr. **Dionysos Jobst**, German Bundestag, Transport Committee

The organisation of the IWTEB was the successful attempt of UEEIV and VDEI to establish the internationally recognised "Transport Science Days - VWT", which took place from 1954 to 1989 at the Dresden University of Transportation "Friedrich List" - HfV in the Faculty of Transportation Sciences "Friedrich List" of the TU Dresden.

Since 1998 the series of events has been continued in a 2-year cycle, again under the old name VWT.

5th congress from 21 to 24 May 1998 in Strasbourg/FR with exhibition of track maintenance machines and 500 visitors

"RAIL 21" - European railways in the transport system of the 21st century



Chair of the session: President Dott.Ing. **Antonio Laganà** (Fig. 7)

Introductory speeches:

Günter Hanreich, Director Overland transport of the EU;
Hubert de Mesnil, French Ministry of Transport
Louis Gallois, President SNCF

6th Congress from 12 to 14 June 2001 in Strasbourg/FR with exhibition of track maintenance machines

Chair of the session: President Dipl.-Ing. **Claude Boutté**

Introductory speeches:

Miguel Corsini, President of the UIC;
Louis Gallois, President of the CER;
Herbert Steffen, President of UNIFE,
Rastislav Chovan Secretary General of the OSJD, **Loyola de Palacio**, Vice President of the European Commission

7th Congress from 8 to 10 June 2004 in Donostia-San Sebastián/ES

with 300 visitors from 25 countries



"The European railways - how to overcome borders"

Chair of the session: President Dipl.-Ing. **Heinrich Salzmann** (Fig. 8)

Introductory speeches:

Loyola de Palacio, Vice President of the European Commission
James Evans, Secretary General of EIM

Symposium at the Transport Committee TRAN of the European Parliament on 27 June 2006 in Brussels/BE

"Europe's Maglev Technology, A380 - Galileo - Transrapid"

Based on the certain knowledge that effective passenger and freight traffic can only be managed nationally and internationally through optimal coordination of all active modes of transport, the UEEIV has also been involved in the development of new, rail-guided technologies. Together with VDEI/DE and supported by the German system industry, the UEEIV organized the symposium.

At the 19th International Conference 'MAGLEV 2006' at the TU Dresden/DE, she gave a presentation on the possibilities and conditions for the use of Transrapid in Europe.

8th Congress from 7 to 8 March 2014 in Vienna/AT with 110 participants from 14 European countries:

"Do the railways need engineers?"



Chair of the session: President Prof. Dr.-Ing. **Klaus Rießberger** (Fig. 9)

Introductory speeches:
Dr. **Gerhard Troche**, EU Commission, DG Mobility and Transport

UEEIV has been listed in the Railway Directory, London, since 14 May 2001.

In 2004, the Presidium planned to create a know-how transfer platform for successful companies in the railway system, with the following focal points:

- Business management consulting in railway-relevant business issues and for fair competition
- Dealing with crucial questions in working groups and subsequently in seminars and company meetings
- Lobbying for fair and equitable competition

With the membership base anchored in many companies and institutions throughout Europe and the shared interest in the successful reinstallation of the railway in competition with other modes of transport as a clientele, interested companies were to be offered advice and assistance in business and legal matters. Strategies and solutions should be developed jointly for questions that are decisive for the railways. With this platform, the Presidium wanted to contribute to the success of the railway system and all companies and institutions involved in it. Despite a certain amount of interest from industry, the platform, which should have been operated on a voluntary basis for a longer period of time, could not be established.

Based on the certain knowledge that effective passenger and freight transport can only be managed nationally and internationally through optimal coordination of all active transport modes, UEEIV has also been involved in the development of new, rail-guided technologies. Together with VDEI and supported by the German system industry, it organised the symposium "Europe's Maglev Technology, A380 - Galileo - Transrapid" at the Transport Committee of the European Parliament in Brussels in June 2006. At the 19th International Conference 'MAGLEV 2006' at the TU Dresden UEEIV was represented with a lecture on the possibilities and conditions for the use of the Transrapid in Europe.

For many years, the Presidium informed its member associations and their members through a published REPORT about important events and decisions in the life of the association in the past year. This tradition, which had been interrupted for some time, was revived. Since 2017 the UNION REPORT is published again in a new layout.

In 2015, the 11th General Assembly meeting in Salzburg decided to expand the business field of personnel certification.

- Operators of complex on track maintenance and construction machines
This was in line with the manufacturers' wishes. By the beginning of 2020, 147 operators in 7 countries had been certified after successful examination.
- Railway Systems Engineer
This was triggered by the realisation of the railways and universities that they are increasingly lacking specialists/engineers, especially generalists with comprehensive systems knowledge.

Since then, the member associations have been organising special symposia on "Railway Systems Engineering" in their countries in close cooperation with the Presidium.

The next steps will be to adapt the organisational structure of personnel certification to the new tasks and to create the basis for the further training and certification procedure for systems engineers.

The Presidium elected by the 12th General Assembly meeting on 23 November 2018 in Frankfurt is composed of the following members:

President	Heijnen	Frans	VDEI/DE
Vice President	Galabov Dr. Mario		NGSRTE/BG
Vice President	Kehr	Manfred	VDEI/DE
Vice President	Knoll Dr. Bernhard		ÖVG/AT
Treasurer	Barbu	Vasile	AIFR/RO
Secretary	Wirth	Daniel	GdI/CH
Observer	Brogli Dr. Marco		CIFI/IT
Observer	Cholewa Dr. Andrzej		SITK/PL
Observer	Craciun	Orlando	AIFR/RO
Observer	Spoons	Richard	PWII/UK
Observer	Vukmirovic	Slobodan	ZID/RS

Roland Wermelinger, GdI/CH, was appointed as General Secretary.

A major concern of the Presidium is the professional and social promotion of young railway engineers. The "European Network of Young Railway Engineers" was established as a working body. It successfully began its work in 2019 on the occasion of the traditional DACH conference in Dornbirn/AT, which was organised by the three German-speaking member associations.

Dr. Bernd Neumann, VDEI

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From the Presidium

Priority topics discussed in the four sessions of 2020

General Assembly

- The meeting of the General Assembly 2020 prepared for Alben/BG had to be cancelled without replacement due to Coronavirus, together with the accompanying seminar "Systems Engineering" advertised by Vice President Galabov.
- The General Assembly's decisions due for the continuation of the work (such as the budget) can be made in correspondence.
- All members of the Presidium will continue their work beyond 2020.
- GS Wermelinger is preparing the General Assembly meeting for 2021, which will also take place in Alben/BG. As it may be necessary for this meeting to be held virtually, the rules and regulations will need to be revised beforehand.
- The General Assembly meeting for 2022 could take place during the 28th exhibition of the VDEI in Münster (31.5. to 02.06.).

Advisory Board

- On 23.1.2020 a meeting of the Board took place in Vienna, where two new members (Veit, Bolli) could be won.



The Advisory Board is now complete with five members:

Detlev Suchanek (Head)	PMC Rail/DE
Markus Bolli	SuprExa AG/CH
Johann Dumser	Plasser & Theurer/AT
Janusz Kućmin	Bombardier/PL
Peter Veit	TU Graz/AT

Staff certification

- Gruhn has been awarded a contract as Deputy of Staff Certification Body, the evaluation will take place in April 2021. The contract will be handled by the VDEI and invoiced to the UEEIV.
- The board of the DACH cooperation between SBB, DB and ÖBB will for the first time lay down rules for operator of track maintenance machines in their networks. If agreed, all

operators will then have to hold a certificate issued by UEEIV in cooperation with PMC Rail.

European Network of Young Railway Engineers

- A committee will be set up to run the network. Wermelinger will prepare a paper on "How can we move forward, what can we do next".
- 4 young engineers attended the "Systems Engineering" seminar at the invitation of ÖVG (see below for report).
- CIFI will support 3 young engineers to visit InnoTrans 2020. A meeting with other young engineers can be organised.
- Track Tec S.A./PL will award a prize for excellent diploma or doctoral theses to attract young engineers.

30th Anniversary

- The UEEIV was founded on 8 May 1990 in Zurich and is celebrating its 30th anniversary. The website carries information about this and that there will be no physical activities in 2020 due to the Coronavirus crisis.

- At the end of 2021, a celebratory event might be organised in Frankfurt, in which the active members together with other interested associations and companies could participate. Kehr and Knoll are responsible for looking into this.

- Neumann has written a chronicle for the website and the **UNION REPORT** which will also be published in the "EI" of the VDEI and in the association magazines of CIFI and NGRSTE.

Financial situation

- The financial situation of the UEEIV remains good. Almost all membership fees have been paid. The next Presidium meetings will be held virtually so that travel costs can be saved.

- Due to the withdrawal of corporate members, a loss of income of € 10,000 is expected for 2020. New corporate members need to be found.

- The costs for translating the REPORT are high. Therefore, it will only be produced in English in future. The contributions should be written in English if possible. Heijnen and Spoors will support their production.

- As a sign of cooperation in these serious times, the Presidium decided to reduce member associations and corporate members' fees to 50 % for 2021.

Coronavirus

- Due to the Coronavirus pandemic, no seminars and conferences can be planned and organised in the foreseeable future. This situation may continue well into 2021.

- CIFI is organising online seminars for its members with great success (more than 80 participants each).

- The VDEI had to cancel all of its Academy's face-to-face events until autumn 2020, when it successfully started hybrid or completely virtual events

Set of rules

- The Articles Committee (Wirth and Neumann) is updating the articles of association and preparing them for adoption by the Presidium.

- Kehr will begin the realignment of all processes with the Staff Certification Board. Once completed, the effects will be incorporated into the BR-Certification by the Articles Committee.

2nd International DACH Congress

- Wermelinger, together with the German Transport Science Association - DVWG, is preparing the congress

"Cross-border transport of the future - prospects for the DACH region", which is planned for October 2021 in Friedrichshafen/DE.

- Within the framework of the congress, young scientists will have the opportunity to participate in lecture slots in the main programme under the title "Fresh Ideas - DACH21".

Miscellaneous

- 2021 is to be the "European Year of Rail". The European Parliament and the Council of Europe have agreed to this. They want to promote rail transport in line with the goals of the European "Green Deal". The UEEIV could participate with activities.

- Vukmirovic reported on activities within Serbian Railways to start cooperation with the Chinese Railway Research Centre (CRRC) to find new developments in the railway sector.

- In 2020, the Presidium published a bi-monthly article on staff certification procedures and organisation in the technical journal "El Der Eisenbahningenieur". Kehr was the coordinator.

- Wermelinger will prepare an activity report to update the website.

Dr.-Ing. Bernd Neumann, VDEI



Kaufmann, Heijnen, Barbu, Cholewa, Neumann, Craciun, Broglio, Galabov, Spoors, Knoll, Wermelinger, Kehr, Wirth

"European Network of Young Railway Engineers"

The UEEIV's professional and social promotion of young railway engineers

The network successfully started its work in 2019 on the occasion of the DACH conference in Dornbirn/AT. At present, the Presidium is evaluating the measures taken so far and is clarifying the regulations for the future support of young engineers.

The Presidium calls on the Executive Boards of all member associations:

"Actively promote the network".

The aim should be for each to have their own internal structures for young engineers.

List of organisations and contact persons:

Name First name	Mail Organisation	Member-Association Function
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Kerman	senol.kerman@vdei.de	VDEI-DE
Senol	Junges Netzwerk Bahn	Chairman of Organ.
Kneschk	oliver.kneschk@deutschebahn.com	VDEI-DE
Oliver	Young Railway Professionals, Berlin Brandenburg	Chairman of Organ
Polterauer	florian.polterauer@plassertheurer.com	ÖVG-AT
Florian	Junge ÖVG	Chairman of Organ.
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Alessandro		
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David	Young Rail Professionals - YRP	Chairman of Organ.
Belz	belz@epts.eu	
Sebastian	European Platform of Transport Sciences - EPTS	Secretary General
Katsarova	popova.vanina@gmail.com	WTVV-BG
Vanina Ivanova	University of Architecture, Civil Engineering and Geodesy, Sofia	Chairman of Society
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Hannes		Secretary

The system of staff certification

The certification structure and mode of operation of the SCB - status and outlook

Introduction

Among other tasks, the UEEIV is intensively involved in the qualification of railway engineers and other railway personnel. Currently, two different certifications are being carried out. In the future, more are to be developed in the various disciplines of railway engineering. The market for qualified workers has developed a clear need in this area. The UEEIV sees it as its duty to meet the requirements and to further develop certification. Who, if not the community of the many railway engineer associations of Europe can support us here?

Need for qualified railway engineers

University degrees for engineers or skilled worker certificates for industrial workers are, just like master craftsman certificates or technician certificates, a kind of "certificate"

to enter a certain field of work. However, most labour markets are looking for skilled personnel who can prove their skills with certificates.

In the railway sector, there is still a lot of potential here.

Currently, the UEEIV certifies two groups of professionals:

- a) Engineers with above-average knowledge and skills as "European Railway Engineer - EURAIL-ING",
- b) Track and switch tamping machine operators who have successfully completed a special training course to become "Operator of Track Maintenance Machines".

The EURAIL-ING certificate confirms that higher education has been completed and evidence has been provided of experience in the operational environment of the railways. It further confirms that the person has more knowledge of railways than was acquired in the original

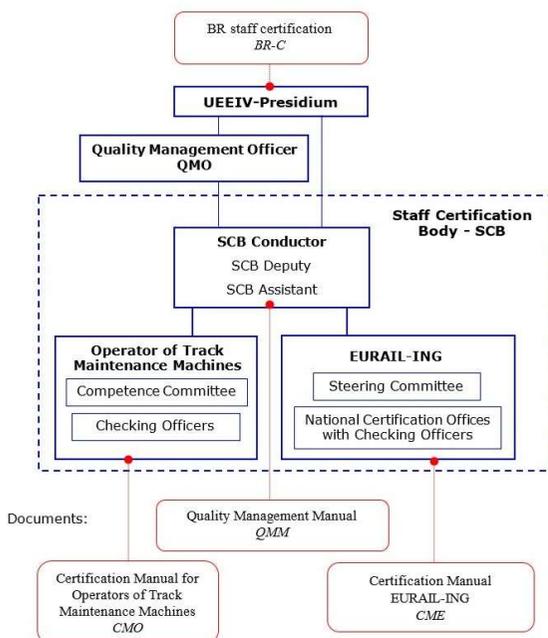
specialised training and that there is proficiency in at least one other European language in addition to the mother tongue. This is documented by presenting a number of documents (e.g. university certificates, job references, language certificates).

The other certification is that of Operator of Track Maintenance Machines. There are various (good and not so good) training courses on the market in which these machine operators are trained.

To set minimum requirements for the UEEIV personnel certification, the technical standards of the European Railways were used as a basis for the certification and an examination cycle was designed in which these requirements and corresponding knowledge are tested in a theoretical examination and practical observation.

Principles of certification

The current audit cycle is shown in the following diagram:



Certification is the responsibility of the Presidium. For this purpose, it uses a Staff certification body (SCB) at the headquarters of the UEEIV in Frankfurt. For the EURAIL-ING certification it is supported by national certification offices (NCO) at the member associations of the UEEIV.

The quality assurance of the processes is the responsibility of a Quality Management Officer (QMO).

The principles of certification are described in special rules of procedure BR-C.

The SCB is endowed with extensive rights and duties. It operates under the umbrella of the UEEIV and is therefore also subject to its rules and regulations - with the resulting responsibilities towards the Presidium. The audit process and audits, however, take place within the structure of the SCB independently of the Presidency.

Application

Applications for EURAIL-ING certification can be submitted to the NCOs of the member associations, to the SCB or via the E-Mail address certification@ueeiv.eu. The NCOs accept the applications, check for correctness of content, completeness and fulfilment of the requirements. This assessment is forwarded to the SCB with a recommendation.

After a successful examination, the Staff Certification Body (SCB) issues the certificate and hands it over to the applicant.

Applications for Operator of Track Maintenance Machines must always be submitted directly to the SCB.

Outlook

Certification as an Operator of Track Maintenance Machines is currently being optimised by updating the certification manual. The qualification is very well recognised on the market, so that there are already many applications for the new year.

The UEEIV was equally successful in certifying EURAIL-ING a few years ago. For this area, the certification manual is being fundamentally revised. The new orientation is very much based on the Europe-wide recognised certification of staff on the basis of DIN EN ISO/IEC 17024. The EURAIL-ING should thus be upgraded and correspond to a certification that is in line with the market.

In a next step, personnel in railways with particular expertise are to be certified.

First of all, railway system engineers are considered, as the procedure can be directly based on the certification manual EURAIL-ING. Such an assessment is currently missing on the market and a comparable certification from other bodies is not apparent.

Later on, further products are to be added in the two areas of railway engineering technology and railway operating mechanics, such as:

- a) Specialist assessor vehicle technology, track systems, etc.
- b) Functional training for machine operators, etc.

*Olaf Schotz-Knobloch, SCB Conductor
B. Gruhn, SCB Deputy, both VDEI*

ÖVG-Forum "Systems Engineering - overcoming interfaces"

1. System optimisation at the market, timetable, cost, maintenance and train path price interfaces

The Austrian Transport Science Association (ÖVG) organised this forum together with UEEIV on 23 January 2020 at ÖBB's headquarters in Vienna. The focus was on Systems Engineering in the railway sector as a suitable methodology for avoiding suboptimal individual areas that counteract a system optimum. After a basic introduction to the topic, the conference presented examples of successful system optimisations at the interfaces. These included market demand - target timetable - network development, investment - maintenance, construction under operation - vehicle - track - train path prices and cross-trade action planning.

Dipl.-Ing. Dr. techn. **Bernhard Knoll**, Vice President of UEEIV, gave a general introduction to the topic of Systems Engineering and particularly pointed out the small letter "s" at the end of the word 'Systems', which is the essential difference to the System engineer, who is an excellent expert in his particular field and can apply the methods of planning, design, development, etc. well. Systems engineering, in contrast, is a cross-disciplinary field. It focuses on the ways of thinking, methods, processes and procedures for linking the individual activities in a project. A knowledge of each of the disciplines involved - but not at the depth of a specialist engineer - is essential.

This distinction was expressed very well in the following presentations.

Technical and logistical interfaces already occur during project development in the EIA procedures or in the official approval procedure, the clarification of which is essential for obtaining a favourable building permit.

The construction management of complex railway projects requires close coordination between the various disciplines (construction, electrical, energy, telecommunications, IT, etc.) and permanent communication and coordination between the stakeholders. In projects, it is precisely this core task that is assigned to the systems engineer, naturally in very close coordination with the project management.

Decisive for the success of a project is always an early analysis of the system properties and a feasibility assessment. The selection of the appropriate development methodology

and technology is an essential contribution to risk management and to the estimation of the project budget and time frame. Since often the best technical solution does not represent the sole project success, a successful project is defined by the three important parameters time, budget and technology. DI **Dietmar Zierl**, ÖBB Infrastruktur AG, described this very clearly in his presentation, using the new Vienna Central Station and the S-Bahn in Salzburg as examples.

Fig. 1: Vienna Central Station



Source: ÖBB-Infrastruktur AG

Right from the very beginning of a project, considerations of later operational management and maintenance are further critical factors for successful project completion. Univ.-Prof. Dipl.-Ing. Dr. **Peter Veit**, Technical University of Graz, has been showing us this process of the life cycle of a system, which is essential for systems engineering, for many years. This process begins with the development of the system idea and ends with the decommissioning of the product. The development is influenced by budget and deadline requirements as well as by customers and the market - the operational phase by users and operators, environment, maintenance and operating resources. The decommissioning phase is also subject to certain applications and laws.

Dipl.-Ing. Dr. techn. **Walter Eckbauer**, Brenner Base Tunnel BBT SE, used the Brenner Base Tunnel as an example to give an insight into the particular requirements for the future maintenance of a megaproject. The functioning of the tunnel is defined in the early development phase, but the essential costs are not incurred until much later in operation, therefore the systems engineer is required to examine the later system behaviour also with regard to the operating, maintenance and disposal costs during the infrastructure design.

The high investment and maintenance costs in the railway infrastructure are offset by income from the use of the facilities. Assoc.-Prof. Dipl.-Ing. Dr. techn. **Stefan Marschnig**, Technical University of Graz, has tried to use the topic of balanced track access pricing as a way of optimising life cycle costs in the railway system. Following this approach, a few railways in Europe have already set their train path prices in line with the polluter-pays principle, others are on the way to doing so.

The conflict of objectives between train operation and infrastructure maintenance is increasingly being decided at the expense of the "driving" component due to rising construction volumes, as **Matthias Lehmann**, DB-Netz AG, pointed out to us very drastically. DB's capacity management was reassessed and presented as a strategic objective. The sustainable provision of an efficient infrastructure requires that necessary construction measures are carried out in such a way that the necessary operational capacities are available for customers (railway and transport companies) and can thus be used to the maximum.



Fig. 2: DB AG capacity management project

The impressive conclusion of the event in terms of systems engineering was provided by a presentation by **Judith Engel**, Flughafen Wien AG, who as the former project manager of Vienna Central Station changed the means of

transport from rail to air and now brings her experience to Vienna International Airport. This industry was one of the first to recognise the advantages of systems engineering at an early stage and has been consistently using it in the development of new aircraft models since the NASA space programmes in the 1960s/1970s.

In summary, once again the main features of Systems Engineering:

Systems Engineering is an interdisciplinary approach to support the realisation of projects. It focuses on the following:

- defining customer needs and the required functionality as early as possible in the development process,
- to document the requirements,
- then proceed with the system design and validation,
- to consider the whole life cycle, including the use of costs, timing, performance, training and support, evidence and certification, manufacture and disposal of the system.

We at UEEIV have set ourselves the goal of firmly establishing the topic of Systems Engineering in the railway sector as well. What has long been standard in the automotive, aviation and IT sectors should also find its way into the railways. For complex projects, it has long been time to bring one or more Systems Engineers on board who have an overview of the overall system and can develop the system architecture and the corresponding performance requirements together with representatives of the specialist disciplines in such a way that the project can be implemented within the specified cost and time frame with guaranteed life-cycle costs.

Dr. Bernhard Knoll, ÖVG

2. Young people are enthusiastic about Systems Engineering

Thanks to generous financial support from the UEEIV, four young engineers had the opportunity to participate in this top-class event. The conclusion of the young academic talents in the railway sector shows that Systems Engineering is welcomed as a methodical approach.

Mai Nguyen (M.Sc. Systems Engineering) and **Muammer Özdemir** (B.Sc. Informatics) from the Transportation Department of Expleo Germany GmbH as well as **Katja Krüger** (B.Sc. Civil Engineering) and **Christian Paul** (B.Sc. Electrical Engineering) from the Technical University of

Brandenburg (BTU) were selected for the UEEIV scholarship by the Presidium of the UEEIV. "The practice-oriented presentations with examples such as the Brenner base tunnel showed how important it is to use the systems engineering approach to manage the complexity of projects and communication and cooperation across the various areas," says Mai Nguyen, a recent engineer at Expleo, a renowned systems engineering service provider in the transportation industry. Her colleague Özdemir adds: "In addition to the

technical presentations, it was fascinating to have the opportunity to talk to responsible personalities of the international railway industry".

The two students Krüger and Paul were also grateful for the opportunity that UEEIV had offered them. For them, an important consequence of what they had heard was to focus and broaden their view on business and socio-economic factors in addition to the technical basics.

All were grateful for the opportunity to lay the first foundations as future systems engineers for their studies.



From left to right: Özdemir, Nguyen, Krüger and Paul with Frans Heijnen, President of UEEIV

Authors: Nguyen, Krüger, Özdemir, Paul

Bulgarian Youth Transport Forum 2020

Young people in transport - ideas, projects, innovations and implementation

Despite the difficult epidemiological situation in Bulgaria on 26.11.2020 was held the scientific and technical conference "Youth Transport Forum 2020".

The event was organized by the Scientific and Technical Union of Transport (WTVV), the Federation of Scientific and Technical Unions in Bulgaria, with the support of the Ministry of Transport, Information, Technology and Communications, universities, high schools and the Vocational School of Transport. The conference was held at the National House of Science and Technology in Sofia in compliance with strict anti-epidemiological measures.

It was opened by Eng. **Yasen Ishev** (Chairman of the Board of the WTVV), who welcomed the participants and



congratulated them on the celebration of 55 years since the establishment of the WTVV and 135 years since the establishment of the Bulgarian Engineering and Architectural Society, whose successor is the Federation of Scientific and Technical Unions.

A greeting from the UEEIV was given by Ass. Prof. Dr. Eng. **Mario Galabov**.

He spoke briefly about the initiatives of the UEEIV, related to system engineering, the establishment of an European Network of Young Railway



Engineers, the certification of European railway engineers (EURAIL-ING). He reminded that 2020 marks the 30th anniversary of the establishment of the UEEIV.

A welcome address was read on behalf of the Minister of Transport, Information Technology and Communications Mr. **Rosen Zhelyazkov**.

Reports were presented as follows:

- Development of the Sofia Metro - Prof. Dr. Eng. **Stoyan Bratov**;
- Level of comfort of the public transport - Eng. **Kostadin Trifonov** and Assoc. Prof. Dr. Eng. **Mirena Todorova**;
- Hydrogen cars - students from the Technical University of Sofia;
- Repair of roads by the method of cold recycling - Dr. Eng. **Marin Donchev**;
- Construction of a reinforced concrete bridge by the method of push-pull - Dr. Eng. **Borislav Strinski**;
- Specific features of graphene batteries - Dr. Eng. **Martin Zlatkov**;

- Modeling of missions of small satellites on Earth, two-component rocket engines, aviation simulator - students from the Technical University of Sofia.

In the second part of the conference were presented reports, related to the establishment of the Bulgarian

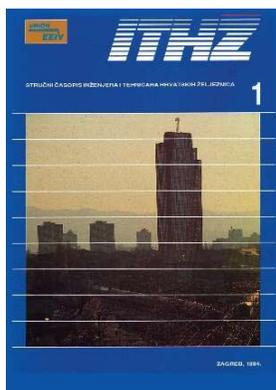
Engineering and Architectural Society, the past, history, development of its transformations, as well as the conviction of the WTVV.

Ass. Prof. Dr. Eng. Mario Galabov, NGS RTE

Marking the 25th anniversary of the HDŽI expert magazine

The Croatian Association of Railway Engineers marked the 25th anniversary of successful continuous publication of its expert magazine.

This magazine is the only one of this kind in Croatia, dedicated to railways and one of the most successful ones in the region. Starting from 1994, it was published under the name of "ITHŽ", and in 2002, it changed its name to its current "Željeznice 21" (Railways 21). In the period from 1994 to the present, a total of 85 issues have been published, up to four times a year.



The foundation of the professional association of engineers and technicians of Croatian Railways in 1992, and its inclusion in the Union of European Railway Engineer Associations (UEEIV) in the same year were big steps for Croatian railway experts in the newly formed state and in the newly established national railway company. Gathering railway engineers and forming the association structure went quickly, driven mainly by enthusiasm. All this enthusiasm and vision of a new railway system needed to get a platform for expression and full acknowledgement of railway engineers. The Association also needed a means of communication with its membership. It should not be forgotten that this was a time with no social networks or other means of electronic communication, therefore, the launch of a professional magazine had to perform multiple roles.

Reaching twenty-five full years of successful and regular publication of a magazine is a very important anniversary and the HDŽI is very proud to point out this fact. Such a long continuity in publication can be attributed primarily to how committed the magazine is to its mission, but also to the professionalism and acceptance of realistic conditions of the environment in which it exists. Such an approach has made it possible to successfully overcome all the Croatian railway system changes, on which its work also depended.

At the same time, the interaction between the magazine and the interested railway readership is crucial for its stable and continuous publication.

During its existence, the magazine has significantly contributed to strengthening the reputation of the HDŽI Association, expanding its activities and developing cooperation with railway companies, the railway industry and the academic community. The magazine became a platform for publishing professional and scientific papers by domestic and foreign railway experts and enabled professional recognition for all those who had the desire, ambition and abilities to do so. From the very beginning, the magazine has published papers dealing with current topics from all professional fields dedicated to railways.

In addition to having an educational character, the publications played a major role in promoting railway industry achievements. Numerous professional articles were published in the magazine on innovations, including those in the fields of railway vehicles, railway transport and railway infrastructure. It is precisely such articles that have encouraged authors from railway companies and industry to publish more and more, and the variety of professional articles has made the magazine very popular among readers. A carefully developed list of recipients of the magazine certainly contributed to this, but also the fact that it has always been free, including its distribution.

During the process of Croatia's accession to the European Union, the magazine continuously followed current professional railway topics, from pre-accession investments, through the inclusion of domestic lines in the TEN-T network and the application of European norms and regulations relating to railways, to the use of EU funds. Having in mind that the European railway sector has undergone a major reform in the last thirty years, experiences gained from international cooperation are very valuable. EU support for the modernization of the domestic railway system is reflected in cooperation with railway experts and the use of European Union funds. In doing so, the EU's strong intention to develop railways as a strategic branch of

transport has been confirmed repeatedly, and significant funds will be provided for this purpose in the upcoming period.

After having intensified investments in the domestic railway system, there is a noticeable increase in interest for our magazine, which has been recognized as a medium for presenting modern technological and technical solutions and practical experiences. The increased interest is also reflected in the presentation of projects fully or partially funded by EU funds, which aim to rebuild railway infrastructure and rolling stock in Croatia, which seen underinvestment for many years; after Croatia acceded to the European Union, an obligation to adapt and be included in the European railway system has arisen.

A part of the magazine is almost always intended for short articles and information about HDŽI activities, and this has played a very important role in familiarizing the internal readership and general public about the work of our association, especially at a time when there was no website, enabling the public to receive information about ongoing activities. It is especially worth mentioning that there were also thematic magazine issues, in which international conferences organized by the association were covered. Most of the conference presentations were published in these issues, so the magazine also provided marketing assistance for the companies that exhibited at the conferences.

Editing the magazine has always been a special challenge for all editors-in-chief and members of editorial boards for several reasons. Certainly, the most important one is that the magazine was edited by HDŽI members, who are engineers by profession, and previously had none or very little

experience in this line of work. Still, the engineering logic and inventiveness, as well as studying other European professional magazines and topics allowed them to create and publish their own magazine, adjusted to the possibilities and needs of the domestic railway system. It is this very ability of being familiar with the opportunities in the Croatian railway system and emphasizing current subjects faced by European railways that has made the magazine always interesting and a little ahead of its time.



Even today, HDŽI magazine has retained its great importance for the Croatian railway system, regardless of the global dissemination of information via the internet and numerous e-magazines on the global professional scene. The existence of a printed copy, which can be read and browsed

through, has been a great pleasure for many engineers employed by our railway. This is why the Company will try not to deprive readers of a printed copy. In the next period, the plan is to strengthen the magazine's cooperation with other magazines to expand the circle of contributors, increase the level of quality of published content, and continue cooperation with the UEEIV.

Dean Lalić, HDŽI

We mourn

DI Wolfgang Seehafer
Observer of the Presidium 1995 - 1998
Vice President 1998 - 2001

* 28.04.1937



† 13.12.2020

Calendar of events 2021

Status: 12.01.2021

15. Jan.	Internet (MS Teams)		65th Railway Technology Conference
22. - 23. Feb.	Internet (Livestream)		BIM in Infrastructure Transport & Energy 2021 Applications of BIM/IIM data models for railway, road and energy infrastructure in existing buildings, planning, construction and maintenance; Three parallel workshops on rail and road infrastructure and energy distribution networks
Feb./March	Video-Conference		Presidium meeting
15. – 20. May	Internet (Livestream)		2nd Cyber Security Conference Challenges for cyber security in security-critical infra-structures
Jun.	Albena/BG		Presidium and General assembly meeting
02. – 03. Sep.	Graz/AT		ÖVG-Annual meeting 2021
13. – 14. Sep.	Graz/AT		23rd International Conference of the Railway Technology Working Group (Track): "Predictive maintenance - from data to action"
22. Sep.	Hannover		21st Surveying Conference - for the most accurate track in the world
30. Sep. - 1. Oct.	Friedrichshafen/DE	 	2nd International DACH Congress "Cross-border transport of the future - prospects for the DACH region"

Calendar of events 2022

Due to Coronavirus, the following events are postponed from 2021 to 2022

31. May - 02. Jun	Münster/DE		28th iaf , the largest international exhibition for track technology http://www.iaf-messe.com/en/
20. – 32. Sept	Berlin/DE		InnoTrans 2022 , the leading international trade fair for transport technology https://www.innotrans.de/en/

For more information see:



www.ueeiv.eu



<https://www.vdei-akademie.de/themenfelder.html>

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