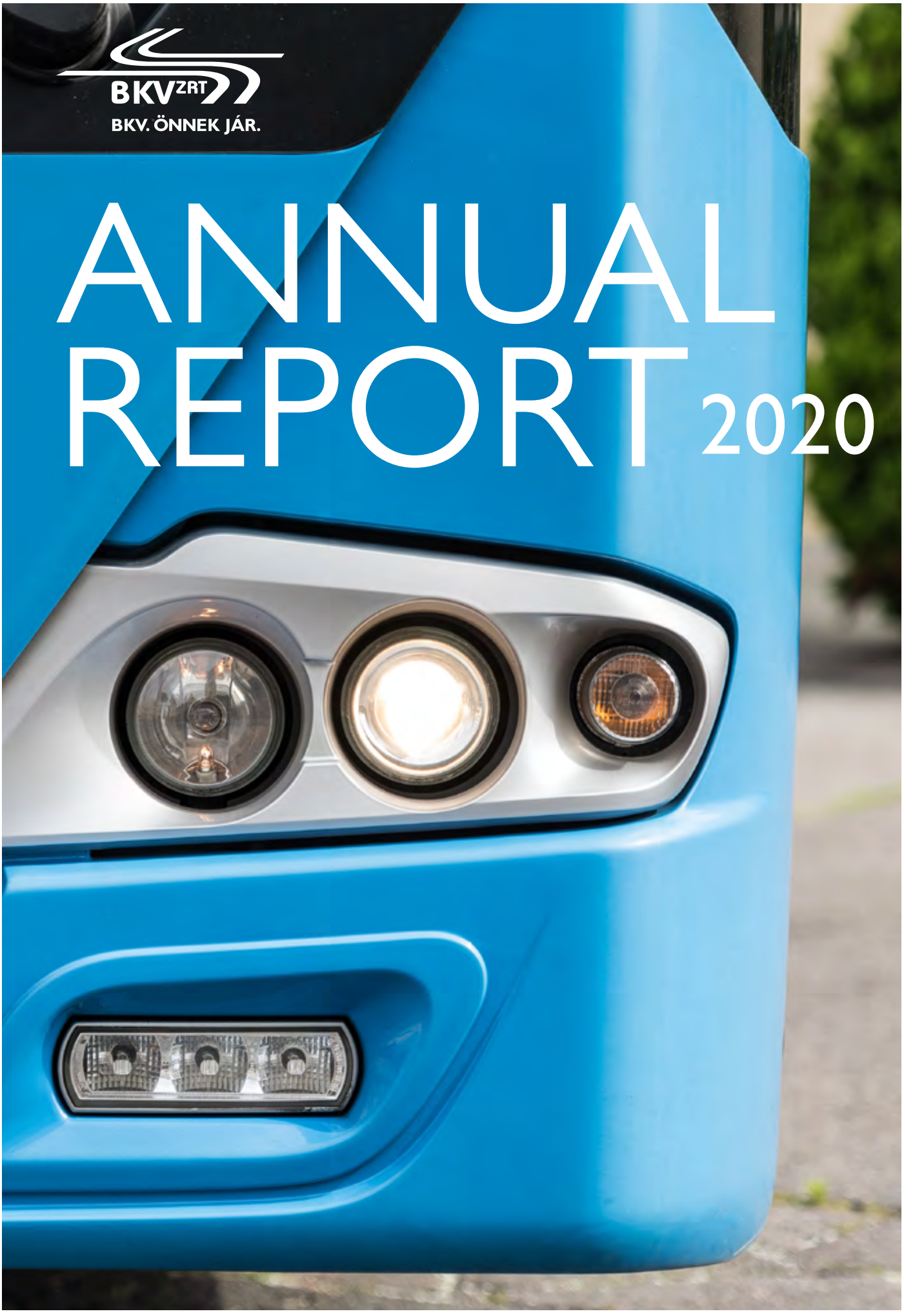
BKV ZRT

BKV. ÖNNEK JÁR.

ANNUAL REPORT 2020



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FOREWORD FROM THE CEO

First of all, I would like to express my gratitude to all the employees of BKV for contributing to the full performance of the tasks associated with the role of our Company in the public transport of Budapest, even in this situation that poses threats to our health.

As we know, 2020 was an extraordinary year, not only for the public transport of Budapest, but for the whole country. In the past 100 years, modern urban transport never had to adapt its operation to pandemics. The first wave of the coronavirus epidemic arrived in Hungary in March, and turned our lives upside down. Since then we have been wearing masks, and there have been other epidemic measures introduced in public transport. The employees of BKV gave evidence of their dedication, what is more, heroic persistence, but the supporting cooperation of passengers also contributed to the success of measures. Most of my colleagues worked in the front line throughout the year, as they were directly exposed to the danger of infection during their work, and they literally put their health to risk for doing their jobs. Naturally, in order to do our job in good order and according to the timetables, we needed not only the drivers, but all the people working in the background: the responsible, accurate and dedicated work of professionals responsible for traffic, technical, strategic, procurement, investment, legal, human, security, traffic security, economic, development and coordination tasks, for the metro renovation, internal audit and the provision of information.

My colleagues did their best, and this was visible in spectacular projects like the coordination of the M3 renovation - we opened the southern section to traffic, and with successful renegotiations, started the renovation of the section in the inner city - the purchase of new Mercedes buses or the opening of the first element of the interconnected tram network on the Pest side. In addition, in the spirit of sustainability, we supported innovative solutions, too: a bus depot with solar panels was built within Kelenföld bus garage. We had a legal success that we defended the Ferencváros depot: the lawsuit related to this property was closed. Our Company will continue to act with responsibility in every situation where the interests of the Company, its employees or passengers are violated, and will use every legal instrument to fight for the truth.

Much to our regret, although we worked with dedication in the second wave of the epidemic, too, we lost the majority of our passengers, and this may have a negative impact on the financing of our Company in the near future. Safety, the guiding theme of our services, today means more than transport security to our passengers. Disinfection - in which we tested and used new techniques - also laid unexpected financial burdens on us. Therefore, next year - in addition to the new waves of the epidemic - we have to expect financial difficulties related to operation, too. We will rely on the special support of our maintainer, the municipality, as well as the state at least as much as we pin our hopes on the vaccines, which could protect us from the dangers of infection. We trust that our dedicated work will be acknowledged at political level, too, as our work keeps the capital in motion.

This is all the more, true because the positive developments triggered by the epidemic include the increased social appreciation of our work, as nobody questions the fact that public transport in Budapest has to be maintained under any circumstances. At our Company, the economic crisis generated by the epidemic did not and will not bring about the termination of jobs - this in itself is a huge result nowadays. Our staff members have steady jobs and safe living even in this crisis period. Luckily, already at the beginning of the year, an agreement that is satisfactory for both parties was reached in the form of a 10 per cent wage increase. Our position in the labour market got only stronger during the epidemic, which is indicated by the surge in the number of people applying for driver trainings and jobs. This, of course, would not have been possible without our increasingly efficient recruitment communication.

In the meantime, in this extremely demanding year, we maintained the heritage of our past and our predecessors - although, in line with requirements, we had to close our museums in both waves of the epidemic. We organised fair commemorations for the 150-year jubilee of the Zugliget Chairlift and the 50-year jubilee of the metro service in Budapest.

We, at BKV, will continue to face the emergency situation with optimism, however, fully prepared, and continue to be committed to ensuring safe and high-standard public transport services.

Bolla Tibor
CEO

PUBLIC SERVICE CONTRACT

The Company performs the scheduled public passenger transport services based on the Public Service Contract concluded on 28 April 2012 and amended multiple times since then by BKV Zrt. and BKK Zrt.

In the framework of the Public Service Contract, BKK Zrt. orders the scheduled services specified per transport branches, stating the quality and quantity requirements as well as the detailed rules related to the public service, including the rules of providing consideration for the costs of the public service.

The Parties amended the Public Service Contract in December 2019, but only the end of the term of the contract was changed to 31 December 2020. This was actually the only way the contents of the Public Service Contract expiring on 30 April 2020 could be revised responsibly, in line with the renewed expectations and ensuring long-term cooperation. Thus, as of 1 January 2021, the new Public Service Contract will already be an agreement between BKV Zrt. and BKK Zrt. that reflects the requirements of modern public transport.

The customer expectations related to the year concerned and the related financing criteria are included in the Annual Agreement, which constitutes a part of the Public Service Contract. The provision of satisfactory quality service is encouraged by the quality requirements specified by BKK Zrt. and the application of incentives/sanctioning instruments related thereto. These include the Bonus/Malus penalties applicable in the SLA system (SLA = Service Level Agreement, quality level measurements system, and service level agreement), as well as the penalties which may be imposed on specific legal grounds and in case of non-compliant performance.

In 2020, the quality requirements identified by the customer did not change significantly. The SLA system includes the cancelled service indicator, the traffic safety (accident) indicator, the line punctuality and schedule compliance indicator, the indicator related to the technical, aesthetic, passenger comfort compliance of the vehicles and the stations, as well as the passenger information compliance indicator.

There were only minor clarifications about the penalty rules, too. Compared to the previous year - considering the payment obligations of the BKV Zrt. - both the SLA indicators (after HUF 47.9 million Malus, a Bonus of HUF 534.1 million), and the penalty system (after HUF 71.3 million, HUF 34.7 million), a significant improvement was observed.

In addition to the significant efforts in technical areas, quality performance was affected by multiple unexpected external factors. On the one hand, the coronavirus epidemic appeared in

Hungary, too, in 2020, as a result of which, BKK Zrt. suspended all the SLA controls on the vehicles from 16 March 2020 to 21 June. On the other hand, the notice from the Hungarian National Authority for Data Protection and Freedom of Information had a huge impact on penalties, as a result of which BKK Zrt. suspended all service controls with cameras.

Based on the above points, BKV Zrt. had receivables of HUF 499.3 million from BKK Zrt.

Our Company fulfilled its reporting obligation in accordance with the Public Service Contract. Through the preparation of the monthly, quarterly and annual public service reports, and the quarterly and annual Service Reports, as well as by answering the regular Client questions, BKV Zrt. accounted for the provision of the public service ordered and the economic aspect thereof.

INVESTMENTS, DEVELOPMENTS

Vehicle purchase, renovation and modernisation

Bus purchase, renovation

Following successful procurement procedures, in 2019 our Company signed contracts for the purchase of new solo and articulated Mercedes buses. The ordered 20 solo and 20 articulated buses arrived at the start of 2020. As the closing of an earlier warranty transaction, our Company received 1 additional solo bus, too, so passengers were able to take possession of as many as 41 new vehicles. The Government - based on the proposal of the Council for Metropolitan Public Developments - granted aid from the central budget of 2021 for the purchase of 17 solo and 17 articulated buses, related to the bus fleet replacement programme of BKV Zrt. Under the development agreement between the Municipality of Budapest and BKV Zrt., the Municipality of Budapest pre-financed the purchase of vehicles. In 2020, 17 new articulated diesel buses were purchased, the vehicles were put into circulation, and 17 new solo diesel buses will be purchased in 2021. From our own corporate investment funds, we placed orders for additional 15 solo buses, but the arrival of these vehicles - partly because of the coronavirus epidemic - was delayed until early 2021.

In order to remedy the problems related to midi buses, our Company purchased 5 used Ikarus E91 low-floor buses. Following a complete frame and mechanical renovation, these vehicles were put into service before the end of 2020.
For the gradual replacement of the vehicles that are in the worst condition and that pollute the environment most, we initiated the individual purchases of 5 used buses of different types, that would fit into the existing fleet. 2 solo and 2 articulated buses were purchased. The first vehicle was put into circulation in late 2020, and the remaining four vehicles started service in early 2021.

Tram vehicle modernisation

We continued the Tátra modernisation programme launched in 2014 and carried out by VJSZ Kft. 185 Tátra trams have been renewed since 2014, which were followed by additional 41 vehicles in 2020 in the due drive system modernisation and aesthetic renewal combined with an overhaul of type 'J'. By the end of the year, altogether 226 renovated and modernised vehicles transported passengers in the network of the capital. In 2020, in the case of some vehicles, the technical contents of modernisation were extended with the air-conditioning of driver compartments, and cameras were installed in the passenger compartments. Another novelty in the renovation in 2020 was that not only outdated vehicles received the necessary interventions, but the overhaul of vehicles modernised in the 2000s - that became due again - started, too, so the drive systems of vehicles were modernised, and that made them equivalent to the drive systems of vehicles renovated since 2014. This way, the vehicle fleet has become much more homogeneous.

The drive modernisation programme of KCsV-7 type trams equipped with Italian choppers and offering low availability indicators also continued. The modernisation of 3 vehicles was completed in 2020.

It was essential to continue the refurbishment of the TW6000 type trams, too. We renovated 5 trams until the end of the year.

The replacement of the already outdated Ganz ICS vehicle type for a more modern type that already exists in a large number and offers better passenger comfort would facilitate operation that is more economical and also, reduction of costs. From the vehicles of TW6100 type purchased several years ago, for the examination of the possibility of replacement, the refurbishment of one vehicle was completed on a trial basis - apart from renovation and homologation. The process included the installation of air-conditioning in passenger and driver compartments, the external and internal lighting system of the vehicle was replaced with a modern and energy-saving LED system, driver cabins were made completely closed, rear view mirrors were replaced by a camera system similar to that of the CAF trams, which provide surveillance of the board of the vehicle, too. The whole image of the passenger area received a design identical with the CAF and the modernised Tatra and KCsV-7 trams. Drop-down stairs were replaced by fixed stairs, and the doors were replaced by new types, but in harmony with the old doors.
Tram No. 1624 started its pilot run in the order specified by the authority. The pilot run with passengers is expected to start in March 2021.

Other tram vehicle lifetime prolonging renovation

The lifetime prolonging renovation of heritage vehicle No. 1622 was completed by VJSZ Kft.

Track renovations

Partial track renovation at Bosnyák tér, Zugló tram depot

To start and finish their daily service, the trams of Zugló Tram Depot use the Bosnyák tér junction – where due to the unfavourable track layout – their movement caused significant hindrance to the flow of tram- and road traffic. Due to increasing traffic demands and the poor condition of the tram depot turnouts it became necessary to reconstruct the courtyard tracks of Zugló Tram Depot and the traffic tracks of Bosnyák tér.

In 2019, the courtyard track system was rebuilt, while in 2020 the traffic tracks were reconstructed. In the course of the project 20 group switches, 2 group junctions, 920 tm of tracks and nearly 1700 rm of service cable were reconstructed, together with the related power supply, signalling device, water pipe replacement and other works. As a result of these works, driving in and out of the tram depot became more optimal than before, since the movement of the trams does not block the road traffic of the intersection any longer.

Track renovation in Nagyenyed utca

In Nagyenyed utca, the load on the tram tracks with a significant slope is further increased by the fact that buses also run on the tracks. On the track section between the turnout from Alkotás utca and the beginning of Böszörményi út, the track system got worn out, it has level and direction faults, and the road surface is also broken and damaged at these places. In the course of the renovation, instead of the existing RAFS superstructure, a modern grouted rail system will be created. Preparatory works were completed in 2020, the construction will take place in 2021.

Superstructure replacement on Grand Boulevard

The number of passengers using the Combino trams that run day and night on lines 4-6 is extremely high even by international standards, and the road traffic crossing the line is also heavy. Because of these factors, the tracks and the connected road surfaces wear out faster. Track renovation continued on the southern section of the Grand Boulevard, between Goldmann György tér and the affected section of Karinthy Frigyes út. In the course of this work, the tracks were re-built on a length of 588 tm, two group railroad switches and group crossings were replaced.

Replacement of crossover between Soroksári út and Pápay utca, establishment of triangle junction at Haller utca, track reconstruction at the section between Tinódi utca - Dandár utca

In the course of building the triangle junction at Haller utca (phase I of the interconnected tram network in Pest) a new pair of tracks was laid between Haller utca and Soroksári út in the direction of Northern Pest, and the existing connection to the south was also renewed. As a result, trams will be able to run in altogether six directions from this junction. Owing to this development, a completely new tram line can be created, which can offer an alternative route during the M3 metro line renovation, as it will be possible to reach the inner city from Nagyvárad tér without changing, and on the long term, the tram network of Budapest will be extended with a new service, increasing the scope of locations that can be reached without changing.

All the switches and crossings of the junction have been installed, the platforms and the new pillars for overhead cables have been set up. In relation to this project, the main collecting duct, the large diameter water pipes and other utilities have been replaced and renewed, and reinforced concrete protecting slabs have been built under the new tracks. The Municipality of Budapest provided special funds of HUF 1.8 billion for the implementation of this project.

In connection with this project, the tracks on the section between Tinódi utca and Dandár utca have been rebuilt on a length of 456 tm.

Preparations for track renovation required for the operation of CAF trams

One of the planned service areas of the new low-floor CAF trams to be put into service after their drawdown by BKK Zrt. as optional quantity is tram line 50. The safe operation of these vehicles requires the renovation of certain parts (switch zones) of the track network.

The plans for the renovation of the double track connection at Béke tér, the double track connection at the Határ út terminal and the single-track connection at Szarvas Csárda tér have been completed.

The materials required for the track renovation have been purchased. Construction works are scheduled for 2021.

Power supply tasks

Renovation of the Vécsey transformer

The Vécsey container transformer was installed in 1980, and in 1986 it was extended with a towing block in a separate building. Most of the equipment of the transformer were damaged by a stroke of lightning. Later some of the damaged equipment were repaired by BKV itself, using parts in stock, on a temporary basis. The units of more than 35 years of age have passed their planned lifetime, and the original parts manufactured in the GDR are not available any more. It has become necessary and inevitable to renovate both containers and to replace the whole equipment. Under the renovation, a new, second 10 kV power supply was established, the entire technology was replaced, including the row of 10 kV cells, the row of positive and negative 600 V cells, the auxiliary and towing transformers, the auxiliary distributors, the rectifiers, the protections and the remote controller.

Planning of the interconnection and extension of trolley bus networks

With the addition of overhead cable sections to the existing line network, new lines can be established, and new services can be launched. The plans for the establishment of a triangle junction at the Állatkerti út - M3 on-ramp, and the line sections of Kálvin tér - Baross utca - Mária utca (600 m) and Kálvária tér - Elnök utca - Népliget terminal (4000 m) were completed. The plans for the Kőbányai út - Liget tér route - Pongrác út (8200 m) are expected to be completed in 2021.

Telecommunication and signalling system

Tasks related to the M3 reconstruction

In addition to the expenses provided for the investments planned under the M3 project, other necessary tasks related to the M3 reconstruction affecting our Company also represent high values, and these tasks will be implemented by BKV Zrt. as its own investment.

- Renovation and transformation of ATC station box at Népliget
- Because of the track arrangement of the station modified during the reconstruction, it became necessary to modify the ATC box of the Népliget station, and to install new circuit cards.
- Renovation of ATC station boxes

- The M3 metro line uses an automatic train control system (ATC), the control units of which are arranged in 24 pieces of ATC boxes. Owing to the renovation of the ATC boxes, the safe operation of the system - that has been in use for 35 years - can be ensured for another 15 years at least. In 2020, the planned 6 pieces of ATC station boxes were renewed (Kőbánya-Kispest 2 pcs, Határ út 2 pcs, Ecseri út 1 pc, Pöttyös utca 1 pc).
- Delivery of ATC carpet
- The track construction works made it necessary to remove the ATC programme carpets along the tracks, and after the completion of the track construction works, they need to be re-installed and re-commissioned. After their removal, the programme carpets shrank, therefore they need to be replaced on the southern and middle construction sections. In 2020, programme carpets of 9453.3 rm were ordered and delivered.

SEL 700 switch power unit renovation on metro line M3

The 98 pieces of switch power units operating on metro line M3 have been in constant operation since their instalment. Their task is to set the railroad switches. The safe operation of power units is possible with regular renovations only, that takes place in 5-year cycles. In 2020, 20 pieces of switch power units were renovated.

Autostop renovation on metro line M3

The autostop train stopping units operating on metro line M3 have been in constant operation since their installation. Their task is to stop the unauthorised passing of trains when the light is red. The safe operation of autostop units is possible with regular renovations only, which takes place in 8-year cycles. In 2020, 25 pieces of autostop units were renovated.

Modernisation of train control on metro line M2 (software)

Because of the train collision accident on 5 December 2016 on metro line M2, it was necessary to modify the software of the train control system on the section between Örs vezér tér and Puskás Ferenc Stadion stations. The system designs were completed in 2019, and the new software was produced and delivered in 2020. Since November 2020, the new software has been controlling the traffic. The modernisation affected the ATC on-board units of 22 vehicles, as well as the ATC system of the trackside signalling equipment.

Other infrastructure investments

Other infrastructure investments

On metro line 3, parts for the escalators with low lifting height can be purchased with difficulty and only at a high cost and with a long purchasing time, which causes significant losses of service. The operation can be made more economical through the purchase and installation of new cost-efficient escalators, which comply with the current standards. Within the plan for 2020, for the Deák tér station of metro line M3, 3 escalators were purchased to be installed between the underpass and the transfer levels, and the removal of 2 old escalators started. In line with the M3 reconstruction, the new escalators are expected to be built in 2022.

Planning and preparation of the projects

Using the funds provided for the planning and preparation of documentations necessary for projects to be launched later, the following were completed:

- Plans for track reconstruction on line M1 (Hősök tere - Mexikói út),
- Plans for the reconstruction of the double-track connections at Határ út and Béke tér, and
- In the Kelenföld depot, plans for the provision of the conditions for operating the Tátra and other vehicle types.

Establishment of undercarriage washing station at the M2 vehicle facility

The washing of the undercarriage equipment and the boogies of Alstom vehicles is presently not solved. The cleaning of the units and the boogies is a technological requirement. The draining system of the washing equipment is not suitable for conducting the amount of water generated back to the waste water managing equipment. Under this investment, the transformation of the existing shaft and the establishment of the sewage collecting sump allowed for the setting up of a modern washing station instead of the outdated washing system. Construction works started in 2020 are expected to be completed in 2021. The implementation of this investment is included in the environment protection goals of the Company, too.

Interim investments necessary for operation

Using the funds provided for maintaining the technical condition of the buildings, structures and technological devices necessary for the operation, maintenance and repair of vehicles, as well as for the purchase of other devices, the following investments and purchases were realized during the year:

- Adblue additive filling station, as a condition of the operation of the new vehicles of Euro-VI environment protection category in the South Pest Division
- Setting up wall fountains at metro stations
- Establishment of entry system at the South Pest Bus Garage.

Installation of rail lubricating equipment (embedded rails)

In the course of track constructions and renovations, it is a constant and reoccurring issue that the noise and the vibration caused by railway traffic in urban environment should be reduced, and the speed of rail wear should be slowed down. The justified demand for the mitigation of noise and vibration is confirmed by the number of complaints submitted by affected citizens to our Company. One way of addressing this problem is the operation of rail lubricators requiring different energy supplies, installed along the tracks, for which the necessary power is supplied primarily from renewable sources (solar panels).

In 2020, such units were installed at the following places:

- Erzsébet királyné útja – Nagy Lajos király útja,
- Mexikói út – Erzsébet királyné útja,
- Lehel tér,
- Albertfalva kitérő reverse curves.

Purchase of machinery, technological devices

The replacement of the machines and technological devices necessary for the operation, maintenance and repair of the vehicles and the infrastructure must be ensured constantly. In 2020 a painting chamber was set up in the area of the Cinkota Division.

Renovations of buildings and structures

Investments planned from the funds provided for renovation of buildings and structures:

Renovation and extension of workers' hostel in the Hungária depot

- In the run-down and neglected rooftop area of the hostel, it is possible to create apartments with all modern comforts. The plans worked out in 2019 include the complete renovation of the roof covering and the related building structures, as well as the up-to-date implementation of the building engineering systems. Our Company won a grant of HUF 267 million in the tender called 'Establishment of workers' hostels', from the central labour market programme. The construction started in 2020 is expected to be finished by the end

of 2021, and, as a result, the workers' hostel will be extended with a modern and comfortable section with 40 rooms and service rooms, providing accommodation for 80 people.

- Renovation of the roof of the bus driver resting room at Széll Kálmán tér
- The slab structure of the upper floor of the building strongly leaks. Before the transformation of the bus drivers' resting rooms (because of their deteriorated technical condition), it was necessary to insulate the roof structure against water, and modernise the heat technology system of the building. In 2020, the draining of rainwater and also the water and heat insulation were solved on the total roof area - 300 m2 - of the building.
- Partial renovation of the workers' hostel at Méta utca (South Pest Division)
- In order to keep the workforce and improve working conditions, it was necessary to improve the living conditions in the hostel. During the partial renovation, the walls received new covering, new doors and plastic windows were built in, new floor covering was made in the corridor, and the electric network is now installed in a channel under the ceiling.

Environment protection investments

Our Company is committed to environment protection, a liveable environment and sustainable development. The following environment protection investments were completed:

- Renovation and modernisation of the emulsion dispenser equipment at the M3 vehicle facility in Kőér utca,
- Modernisation of the waste water treatment plant of the bus wash in the area of Kelenföld Division,

The application of renewable energy sources is of special importance for our Company. In line with that, in 2020 we built a solar panel system of 200 kW in the bus facility of the Kelenföld Division. We built two covered bus garages, on the roof of which altogether 648 pieces of panels, basically a small power plant was installed. The electricity generated by the solar panel system connected to the network of the facility is altogether 220 000 kWh/year, which covers 10% of the electricity demand of the facility.

The location of the project has a symbolic importance, as the Kelenföld Division hosts the zero emission, purely electric buses of our Company. With this development, our Kelenföld bus garage has become a 'green island', which not only ensures electric buses to passengers, but produces some of the electricity we need from renewable sources, replacing some of the fossil energy sources.

Information technology tasks:

One of the key objectives of the corporate IT system is to make the operation of the Company more efficient, and to distribute and use the resources in the proper way. The safe operation of the system and the required extension of the services call for continuous development. In 2020, the following tasks were added to the plan:

- Installation of a system to download the camera pictures of vehicles. In 2020, we continued the installation of the camera picture downloading system of the Combino trams, with phase II, which will be completed in 2021.
- Improvement of the SAP operation (purchase of supplementary licence). Building of the SAP BW/3HANA based data store, connection of certain business contents, and the implementation of the business report requirements of the Client have been completed.
- Extension of SBC capacity for wired sound infrastructure service. The task was completed until the end of 2020.

Measures to improve work conditions

In order to keep our workforce and improve their work conditions, our Company wished to purchase certain assets and carry out minor renovations in its facilities and office buildings. In 2020, the following investments were carried out:

- Renovation of terminal stations and staff waiting areas,
- Renovation and extension of staff rooms,
- Renewal of work areas and coverings,
- Replacement of doors and windows,
- Renewal of boiler house,
- Roof renovation at terminals and facilities,
- Measures to improve drivers' work conditions.

Priority projects

On 28 December 2018, BKV Zrt. signed a support contract in the amount of HUF 2.1 billion with the Ministry of Innovation and Technology for the renewal of the vehicle fleets of the Millenium Underground Railway and the cog-wheel railway. Compared to the contents of the support contract, our Company - considering the time requirements of design and construction works, and the reliance of related tasks on one another - initiated an extension in the implementation deadline, so the final deadline of implementation was modified to 30 September 2021.

The support project covers design tasks, the compilation of the documentation required for the collection of preliminary type licenses and tender documentation, and the purchase of equipment required for commissioning.

The feasibility study was completed in 2020, and the main design and the documents required for the application for the preliminary type licence were compiled and approved at company level.

The acquisition of assets required for the receipt of the new vehicles proceeds according to the schedule, some of them have already arrived, and we have signed the contracts for the delivery of pull-overs and under-floor wheel lathes, the manufacturing of which takes more time.

In 2021, after the delivery of public procurement documents regarding the design and production of specific vehicles, it will be possible to announce provisional public procurement procedures for the design of the prototypes of vehicles and the manufacturing of the whole series.

Danube cruiser boat service

The Naval Office operating within the frames of the Technical and Development Department operates the boats and ports owned by the BKV, and rents the related infrastructure elements. The operation contracts of boats expired in 2020, the preparations were done for the new contract. The scheduled boat service has been suspended since the outbreak of the pandemic in the spring of 2020, only the D14 ferry operates.

Boat renovation and modernisation

In 2020, the modernisation of the BKV-100 type Hungária and Várhegy boats and the transformation of the Szent Kristóf boat were completed.

Renovation of the security technology of dock facilities for the boat services

In 2020 we continued the renovation of the dock and riverbank infrastructure, and repaired the defects of the paving elements.

The floating structure of the scheduled boat port at Jászai Mari tér was renewed and modernised, so the pontoon, the entry bridge and their fixing to the riverbank were renewed. The corners of the pontoon on the berthing side received shock-adsorbent rollers, which minimize possible injuries between the boat and the pontoon.

BUS AND TROLLEY BUS OPERATION DIRECTORATE

Staff

As to the staff management of the Bus and Trolley Operation Directorate, multiple factors affecting each other had to be addressed so that this section would be able to perform its tasks fully under the changing operational- and labour market conditions. During 2020, staff number and employment were primarily influenced by the following two factors:

- The reconstruction of metro line M3 and the related replacement tasks, which increased the demand for bus and vehicle drivers in the capital at system level, to 100 vehicles in total, in relation to the metro replacement. The additional station replacement going in parallel with the renovation of the southern section, then the performance requirement of the total replacement of the middle section that is most critical from traffic point of view all increased the bus requirements by approximately 20 vehicles ain trolley bus lines, too, on the order of BKK.
- As a result of the spread of the coronavirus epidemic, the Hungarian Government announced an emergency situation as a measure to control the epidemic, on 11 March 2020. The various health protection measures and restrictions had a significant impact on the staff management of BKV Zrt., and on the every-day lives of our employees, too. In relation to the coronavirus epidemic, the measures taken for the protection of the health of employees (primarily drivers) and for the reduction of the number of contacts include the suspension of the first-door boarding system, the suspension of ticket sales by drivers, and the cordoning off of the driver cabins.

Owing to the efforts and actions in previous years and to the successful communication with workforce who lost their jobs because of the serious crisis in the tourism sector, the number of drivers got stabilised during the year. The continuously going recruitment campaign was given a new stimulus during the epidemic. The prospect of a predictable job attracted a lot of bus drivers - who had all the official examinations and licenses - to work for the BKV. In spite of that, the structure of the age tree of drivers looked unfavourable in 2020, too, as the ratio of people close to retirement is overrepresented among staff members, and this can only be managed

with a well-structured training and recruitment system on the medium and long term. All in all, we can say about year 2020 that the bus and trolley sections had enough capacities for their basic tasks and for the M3 replacement tasks, what is more, the number of overtime hours were less than in the previous years.

The situation and the increase of the number of vehicle maintenance staff is still made difficult by the heterogeneous type composition of the vehicle park. The fleet contains modern vehicle types with typically electronic, chip-controlled technical solutions, while there are vehicles - in larger number - that still operate with 'traditional' technical solutions. This way the technical skills and experiences required from maintenance staff are fairly diverse, therefore there are few professionals in the labour market who fully satisfy these expectations. As a result of the coronavirus epidemic, the number of applicants increased for maintenance jobs, too, but in volume, this was enough only to offset the number of people leaving.

The number of non-manual staff did not change. People working in non-manual jobs - where the specific task allowed for that - worked in home office for some time, and in various forms of rotations and on-call systems, depending on the current status of the epidemic.

Trainings:

The state of emergency period ended on 17 June 2020, and in line with the regulations in force during the 'epidemic readiness' that replaced the state of emergency:

- our D, TR, GKI and other official trainings started as planned from the end of June.
- in the OFA 'Driver training for employed people' programme, 29 people started the training on 15 December 2020.

Recruitment:

- Following the termination of the state of emergency, all the previously suspended advertisements, running on the company's own interfaces and on profession.hu, cvonline.hu and Facebook and Google re-started at the end of June.
- The advertisements guided the applicants to the BKV Career page, where they could find information on the status of admissions.
- Our advertisements were posted on creatives that are uniform within the Company: on the external and internal surfaces of the vehicles.

In order to keep the workforce, the wage agreement of 2020 was 10 per cent in average, which provided a good basis for keeping the drivers and the maintenance staff. It was possible to increase the weight of certain supplement elements related to direct work and performance, and, in order to keep key people, to express the employer's special appreciation. Similarly to earlier years, the actions of the Bus and Trolley Operation Directorate influencing work conditions received special attention in 2020, too.

Metro replacement

As the continuation of the reconstruction of metro line M3, the bus section was given substantial extra tasks in 2020 as well. The southern phase of metro replacement was going on in the first ten months of 2020 between Nagyvárad tér and Kőbánya-Kispest, and this was followed by the closing of the middle section.
In parallel with the renovation of the southern section of metro line M3, in the spring of 2020, the renovation of stations started in the inner-city section, so the stations were closed in two phases.

- On 7 March, renovations started at the stations of Ferenciek tere and Arany János utca. Here the replacement was solved by line extension.
- On 11 July, the Corvin-negyed and the Semmelweis Klinikák stations also became work areas.

The third, inner city phase of the M3 metro renovation started on 7 November 2020, with the complete closure of the line between Nagyvárad tér and Lehel tér. In addition to metro replacement buses, a number of alternative lines were launched or remained because of the southern phase, at the start of the 3rd phase of the renovation.

Rented vehicles

In 2020, for the extension of the number of low-floor vehicles and for the uninterrupted performance of the metro replacement tasks of our company, we continued the renting of the MAN Lion's City GL type low-floor articulated buses. This way the number of modern low-floor buses in the capital increased, and our Company facilitated the daily travels of passengers with

limited movements and young mothers with prams, and the air-conditioning units installed in the vehicles also contributed to increased travel comfort. Apart from the operation of already existing minibuses, our Company rented another Mercedes-Benz 515 Sprinter minibus to perform the popular on-demand service.

As the satisfaction of the supplier's obligation regarding the warranty repairs of the Mercedes-Benz Conecto solo buses purchased in 2015-2018, there was one Mercedes-Benz Citaro C2 modern low-floor solo 'replacement' bus at our Company.

Refurbishment of vehicles

According to international experiences and practice that can be considered as benchmarks in the road vehicle sector, the expected optimal lifetime for buses is 7 years, and 10 years for trolleys, after which a significant renewal is necessary, or the vehicle has to be replaced. The framework and the superstructure of buses in urban operation conditions - not forgetting about the quality problems of the road network in Budapest, either - are exposed to increased stress during daily operation, therefore their expected lifetime is 10-12 years, which can be extended by another 70-80% with targeted interventions and general renovations. Another important factor is that the significant stress generated by the provisional purchase numbers, as well as the extra kilometres, the operation time and the usage will result in faster deterioration in the technical condition of the vehicles.

The backbone of the operational vehicle fleet of BKV Zrt. and some groups of the recently purchased used buses have already reached the age and running performance where expensive comprehensive repairs are needed to avoid more frequent breakdowns, and this situation presents increased economic and technical challenges for the operating divisions. This trend will continue in the future, too, i.e. the used vehicle fleets purchased after one another will all need the medium repairs required for longer lifetime and predictable operation.

In 2020, the Bus and Trolley Bus Operation Directorate initiated the refurbishment or repair - as necessary - of 29 buses and trolley buses, with the involvement of 7 external partners. The works were performed with the following technical content:

Vehicle type	Maintenance of bodywork and other elements in 18 cases	Preven-tive type repair	Repair in technical workshop	Frame repair as necessary	Frame repair as necessary, replacement of articula-tion joint	Total
IK 280T (GVM)			1	2		**3**
IK 412	1			4		**5**
IK 412T			1			**1**
IK 435T			1			**1**
Merce-des-Benz O530 Citaro		2	2			**4**
Van Hool NEW AG300					4	**4**
Van Hool AG318		1				**1**
Volvo 7000			2			**2**
Volvo 7700		1				**1**
Volvo 7700A	7					**7**
Total	**8**	**4**	**7**	**6**	**4**	**29**

Renovation type services extended by external partner in the bus and trolley vehicle fleet in 2020

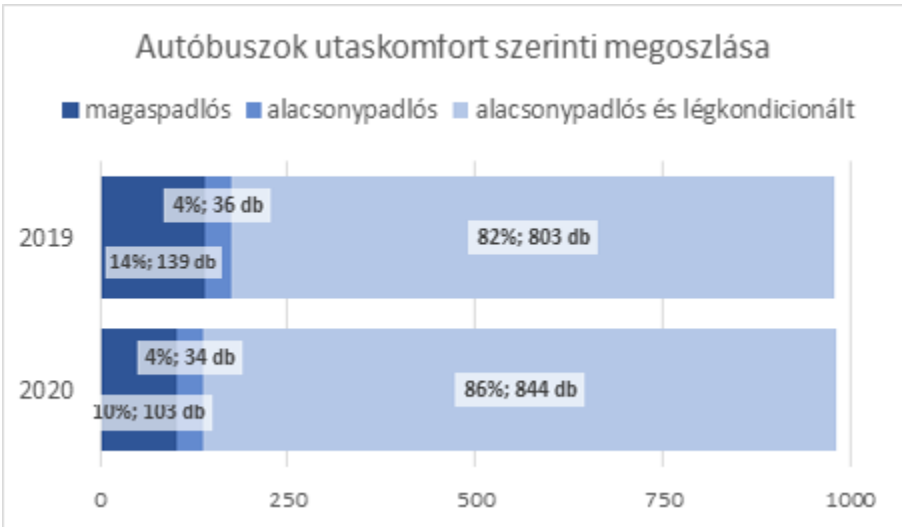
As a result of the described facts, and in the lack of purchases and investments that would facilitate the achievement of the optimal age tree of the operating vehicle fleet, it is necessary to increase the number of renovations for the sake of continuous operation.

Changes in the vehicle fleet

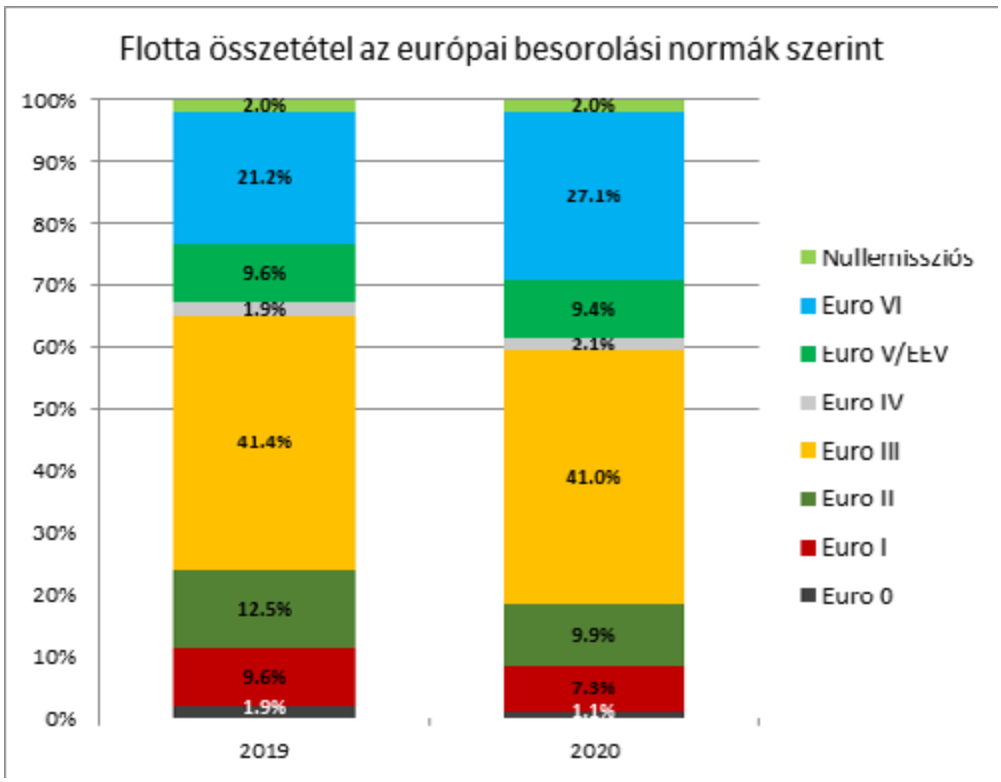
The average age of the bus fleet of the Bus and Trolley Operation Division dropped by 0.5 year within a year - mainly owing to the commissioning of the 58 new Mercedes-Benz Conecto NG vehicles. In the case of the trolley bus fleet, the same value increased by approximately 0.5 year, as only one newly manufactured vehicle was put into operation in 2020, while the three most outdated vehicles were scrapped. Consequently, the ratio of low-floor and air-conditioned vehicles is still only 42%.

Among buses, the ratio of low-floor vehicles increased from 86% to 90%, while the ratio of air-conditioned vehicles increased from 82% to 86% year. The improvement is due to the com-

missioning of the above-mentioned new Mercedes-Benz Conecto fleet, which allowed us to scrap the less modern and older vehicles of the fleet.



The commissioning of newly manufactured buses and the renting of modern vehicles resulted in an improvement in average vehicle age and passenger comfort, as well as in the reduction of harmful emissions by the bus fleet operated by BKV Zrt. The change is nicely illustrated by the diagram titled 'Fleet composition according to European classification standards' and the break-down of the bus fleet according to European harmful emission categories. We can observe that the ratio of the most polluting, Euro 0, Euro I, Euro II and Euro III vehicles dropped - excluding the zero emission category - for the benefit of the presently best, Euro VI category vehicles.



ACTIVITIES OF THE RAILWAY OPERATION DIRECTORATE IN 2020

In 2020, the Railway Operation Directorate (VÜI) was responsible for the operation of the tram, cog-wheel train, metro and Millennium Underground Railway (MFAV) public transport services. According to the Public Service Contract, for the continuous and safe provision of services, we carried out the maintenance and repair of the vehicles and the items of infrastructure ensuring the operation, and, if it was necessary, we contributed on the operator level to the preparation of investment projects concerning public transport, too. In addition to the contractual obligations, in the railway sectors (at the Railway Operation Directorate), pursuant to Act CLXXXIII of 2005 on Railway Transport, the National Railway Rules and other legal regulations, in the course of the use of railway buildings and vehicles, the licence holder must ensure – among others – the establishment and uninterrupted enforcement of proper rules of operation, the establishment of the conditions of safety of life, property and operation, the maintenance of the railway buildings and vehicles, keeping them in a condition fit for secure operation, and ensuring their technical supervision.

As a result of the proceeding conducted under the coordination and supervision of the Rail Safety Office, the Department of Railway Authority of the Ministry for Innovation and Technology issued the railway safety certificate and the railway safety licence in a resolution for BKV Zrt., for the performance of local passenger transport activities and the operation of urban track networks (for metro, road-rail tram, special railways, trolley overhead cables), and accepted the railway safety control system of BKV Zrt. The railway safety certificate and the railway safety licence are valid from 16 October 2020 to 15 June 2025. The Authority concluded that BKV Zrt. generally met the technical and operation requirements defined in regulations regarding the railway safety certificate, the safety licence, the safety control systems, the safety report and individual official proceedings, as well as the safety requirements regarding the personnel and the internal organisation operating the urban track network. Based on that, our Company continues to be suitable for the operation of the Millenium Underground Railway and the metro, the urban road-rail trams and the special urban railway track systems, and for the performance of passenger transport activities on them.

In addition to the obligations specified in the Public Service Contract, the railway sections have to satisfy laws and regulations regarding the operation of railway traffic, which have become stricter in the recent years. The mandatory introduction of quality assurance and environment protection systems required the involvement of significant additional resources, which - with the provision of unchanged resources - was feasible with the constant improvement of internal efficiency only. At the railway operation section, several management systems meeting the ISO standard have been used, from which, in the summer of 2020, the Environmental Management System (EMS) based on the ISO 14001 international standard was extended and certified, and this system extension meant the extension of the EMS introduced and operated for the existing M2 metro facility, for all the facilities of the Railway Operation Directorate. In parallel with that - based on the expectations of the Municipality - preparations were made for meeting the requirements of the Eco-Management and Audit Scheme (EMAS), and then the EMAS system that is based on the EMS was introduced and certified for the M4 metro and the Budafok tram depot at the end of 2020.

Among the large number of challenges faced in 2020, the most difficult task was the constant alignment with the continuously changing pandemic, according to the specific situations, but owing to the significant internal organisation work and the dedication of employees, this was successfully accomplished. Pursuant to the Pandemic Plan worked out by the Operative Board of the Company, our own protection processes managing the special features of individual areas were established for the railway sections. The VÜI Operation Department played an outstanding role in the defence processes, as they managed the protective equipment and disinfectants at corporate level (purchase, storage and distribution). In 2020, altogether 110 400 pairs of protective gloves, 185 718 pieces of protective masks and 99 546 pieces of hand sanitizers were distributed to the sections of the Company.

In spite of the more difficult conditions triggered by the pandemic, and using the experiences of our successful Professional Days of earlier years, the Railway Operation Directorate - in cooperation with the KTE - organised a scientific conference that was successfully held on 15 October 2020, in on-line mode under the name of City Rail 2020 Scientific Conference, where the more than 140 registered participants listened to the lectures of BKV speakers and other domestic and foreign experts.

Operational performance

According to the 2020 data, the railway passenger transport vehicle fleet (trams, cog-wheel railway, metro and MFAV) achieved 62.91% of the performance ordered from BKV Zrt., and this value is below the normal (almost 70%) level because of the lower performance caused by the M3 reconstruction. The tram and the metro sections ensured this with nearly 8 918 useful capacity-kilometres (cap. km) through more than 3.4 million rounds performed.

Although the number of trams decreases every year with the removal of the most worn out, low availability, technically outdated and oldest vehicles (sale, scrapping), transport demand kept growing, and this shows an improvement in efficiency - considering the fact that the volume of necessary resources and assets was determined by timetable performance expectations. As to the tram sector, in line with the service order of BKK Zrt., service quality increased substantially even when the low-floor trams - which represent 17% of the fleet - ran with a higher than average mileage (usually 90 to 100 thousand km/year), and thereby nearly 40% of the useful capacity-kilometre performance was provided by the Combino and CAF trams.

In addition to the public service activity, in 2020 the heritage trams provided nearly 600 hours of performance (typically on weekends), with the average monthly distribution of 50 hours.

One of the key indicators in the Public Service Contract is the cancelled departure indicator, which examines the ratio of the cancelled departures for reasons attributable to the activity of the service provider compared to the number of runs specified in the schedule. As to the tram section, the ratio of cancelled departures for technical reasons continuously improves, and according to the evaluation of BKK Zrt. - the transport organizer company - the tram branch achieved the '+0.8 Bonus' category in 2020.

Based on the data of 2020, the metro branch (metro and MFAV lines) achieved 31.15% of the total performance ordered from BKV Zrt. The almost 4.416 million capacity kilometres (cap. km) were achieved with more than 848.65 thousand performed trips, therefore 99.82% of the ordered performance in the branch was provided.

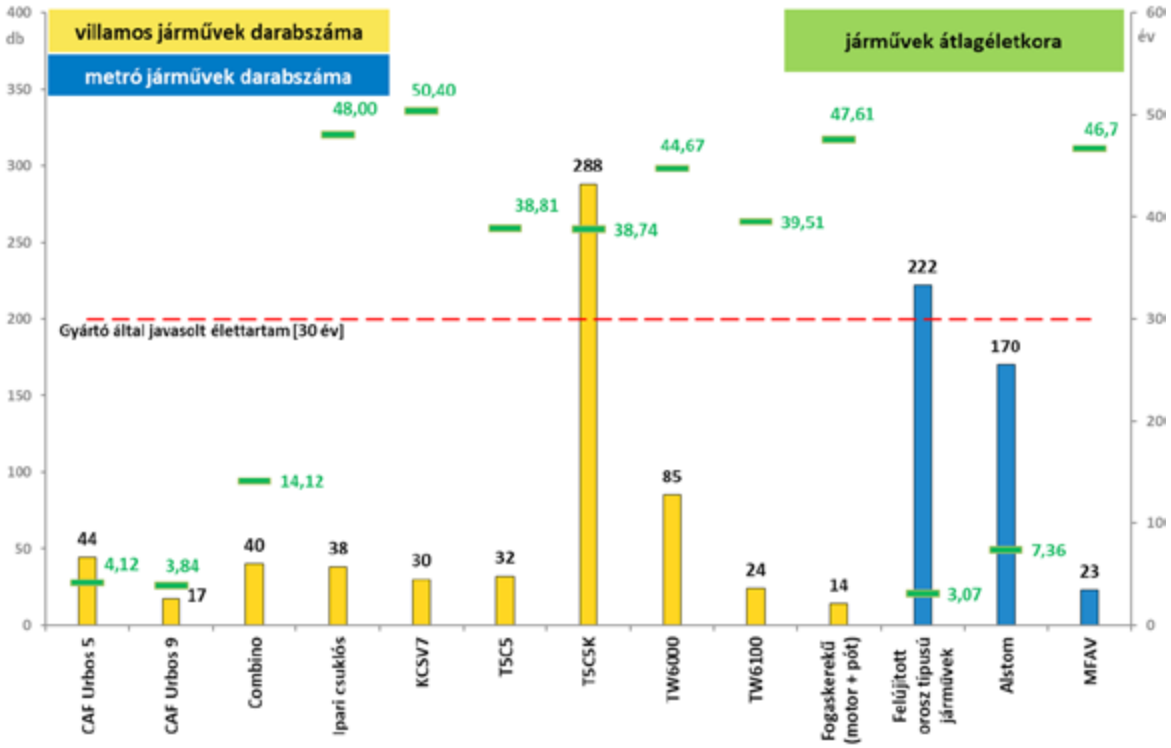
Based on the adherence to the timetable, the vehicle MEU and vehicle passenger information, the metro sector has a Bonus category, based on the passenger information at stations it has zero, and based on the station MEU and services cancelled for own fault it has a Malus category.

The development of the railway vehicle fleet

The closing number of railway passenger vehicles was 1 027 pieces in 2020, which included 12 types of vehicles. The tram branch operated nine types, while the metro branch operated three types.

The tram branch of our Company provides services on 32 tram lines with the total of 598 tram vehicles, while the passenger transport of the cog-wheel railways is performed with 14 cog-wheel vehicles (7 engines, 7 tow-cars).

Average age and piece number of railway passenger vehicles (year) *



* status of 31 December 2020

The vehicle fleet of the tram branch is rather versatile. Presently we have COMBINO and CAF trams in circulation - which fully meet present-day requirements, offer high passenger comfort, have low floor and no steps at their full length, and are air-conditioned -, as well

as older tram and cog-wheel tram vehicles that offer less comfort, but are totally reliable from the aspect of operational comfort.

In the case of tram vehicles, the entry into circulation of the new CAF vehicle fleet - which is operated by our Company - improved the technical level to some extent. The average age of tram passenger vehicles is 35.87 years, which figure - in spite of the positive changes - still exceeds the planned lifespan by 5.87years. As the CAF vehicles are owned by BKK Zrt., this vehicle replacement caused no significant change in the asset system of BKV Zrt. If the positive effect of the CAF trams is disregarded, the average age of trams belonging to the asset system of BKV Zrt. is 39.4 years, which exceeds the useful life by 9.4 years. The average age of the metro passenger transport vehicles is 5 years, and that of the MFAV vehicles if 46.7 years.

From the total 415 cars of the metro vehicle fleet, 23 custom-made articulated vehicles run on the MFAV line, in total 22 ALSTOM metro trains (with five cars) run on the M2 line, and on the M3 line - as a result of the completed refurbishment combined with drive modernisation - 37 modernised Russian metro trains (with 6 cars) from the 81 family are operated. Following the replacement and modernisation of vehicles, 3 EV-type trains remained in the fleet, which may subsequently fulfil heritage services therefore the original build of the vehicles and the restoration of the design, as well as the execution of the overhauls due have been completed. In addition, on the M4 metro line, passenger transport is carried out by 15 (consisting of 4 cars) ALSTOM metro trains.

As part of the 'Railway vehicle manufacturing action plan', there are preparations for the replacement of the cog-wheel and MFAV vehicles, and if that is implemented, the technical problems with these fleets will be eliminated, and the vehicle fleets for these lines will be ensured on the long term. As a result of a Government decision, the designing of the new vehicles is in progress, and once that is complete, their manufacturing may start.

As to the present railway vehicle conditions, we can say that the maintenance of the vehicles - in spite of the shortage of funds - is feasible with the help of professionals who have experiences of several years and special skills, and the demands of passengers can be fully satisfied in a way that they do not feel the impacts of the existing difficulties. The vehicles in service include the COMBINO and CAF trams and the ALSTOM metro vehi-

cles - which can be walked in their entire length and have air-conditioning - and the older trams, cog-wheel trains and MFAV vehicles, which provide less comfort than expected, but represent a completely appropriate transport safety level.

From the aspect of passenger comfort, the railway passenger vehicle fleet has improved a lot in recent years. By 2020 the ratio of low-floor vehicles (in terms of number of items) reached 52%, while the ratio of air-conditioned vehicles reached 26%.

In 2020, the fleet of railway vehicles increased by altogether 11 pieces of passenger vehicles, and a lot of activities were carried to facilitate the improvement of the technical condition of vehicles and the improvement of the level of service.

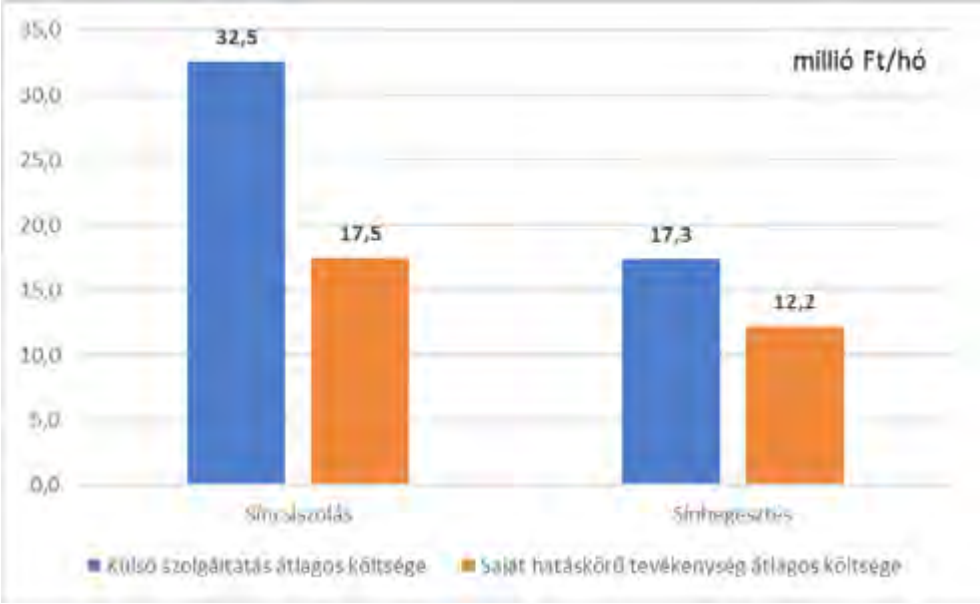
- 3 EV vehicles were withdrawn, they received a heritage status.
- 5 CAF9 and 9 CAF5 new trams were delivered.
- The overhaul combined with drive modernisation of 24 T5C5 (Tátra) type trams was completed, thus the quantity of modernised T5CSK trams, which are suitable for power back feeding, increased to 288 pieces (this is 90% of the Tátra vehicles).
- The overhaul of the 16 trams of type T5CSK is completed.
- The overhaul combined with drive modernisation of 3 KCSV7 type trams is completed.
- The overhaul of 5 TW6000 and 1 ICS trams was carried out.
- The 12-year overhaul of Combino trams continued.
- We started the air-conditioning of the driver cabins of Tátra trams, and installed passenger compartment monitoring cameras.
- As of 17 October 2020, the transport of bicycles was extended to all Tátra trams (services No 1, 12, 14, 17, 19, 28, 37, 37A, 41, 56, 56A, 59, 59A, 59B and 61).
- Christmas decoration of trams: instead of the earlier 1 UV tram, 4 decorated trams were running in the Christmas period. The TW6000, the Tátra and the KCSV7 trams ran according to their normal timetables, while the UV ran more frequently, requiring additional staff. The operation of the vehicles was planned in a way - in agreement with the BKK - that we could cover the largest possible area of the city, making these trams available to the highest possible number of passengers.
- Concerning the metro, the Alstom vehicles are reaching the mileages of 500 and 750 thousand km one after the other. In 2020, on line M2, 1 train and on line M4, 6 trains had overhauls of 500K, while the 750K overhaul was carried out for 7 trains from the trains running on line M2.

- In the case of the MFAV vehicles, 3 trains had overhauls, and 3 V3 vehicles were repaired in our own workshops.
- Among the metro vehicles, 67 cars had overhauls, and 39 had V3 level maintenance in 2020.
- The modernised multi-language passenger information system was completed in each of the 23 MFAV trains.
- In 2020, from the renewed 81. 2K type trains running on line M3, 23 trains had the warranty revisions before the end of the warranty period, and the first 20 trains reached the end of their warranty periods.

Development of the infrastructure instruments

Some of the elements of the infrastructure instruments had been renewed significantly in recent years as a result of the large projects. As a result, the % rate of the summarised technical condition of the asset system changed for the better. Maintenance activities carried out by ourselves further improved the conditions, and the track replacements and track grinding carried out over the past year also had positive impacts. In order to improve passenger comfort and reduce the noise effect, in 2020 we ground altogether 85 520 track meters of our railway network.

In addition to the favourable technical and environmental effects, the financial management of the Company was also positively influenced by the track grinding and track welding activity.



A 2020. évben elvégzett síncsiszolási és sínhegesztési tevékenységek költségei

All in all, we can say that we saved HUF 15 million / month in average with our own track grinding activity, and HUF 5.1 million / month in average with the track welding activity, and this means a total saving of HUF 241.2 million for the Company in a year.

Some of the infrastructural equipment and assets are in such condition that restrictions were implemented in 2020, too, due to the malfunctions that occurred. Exceptions to this are metro line M2 and the already renovated part of line M3 (where the reconstruction was completed recently), metro line M4, as well as tram lines developed using European Union funds.

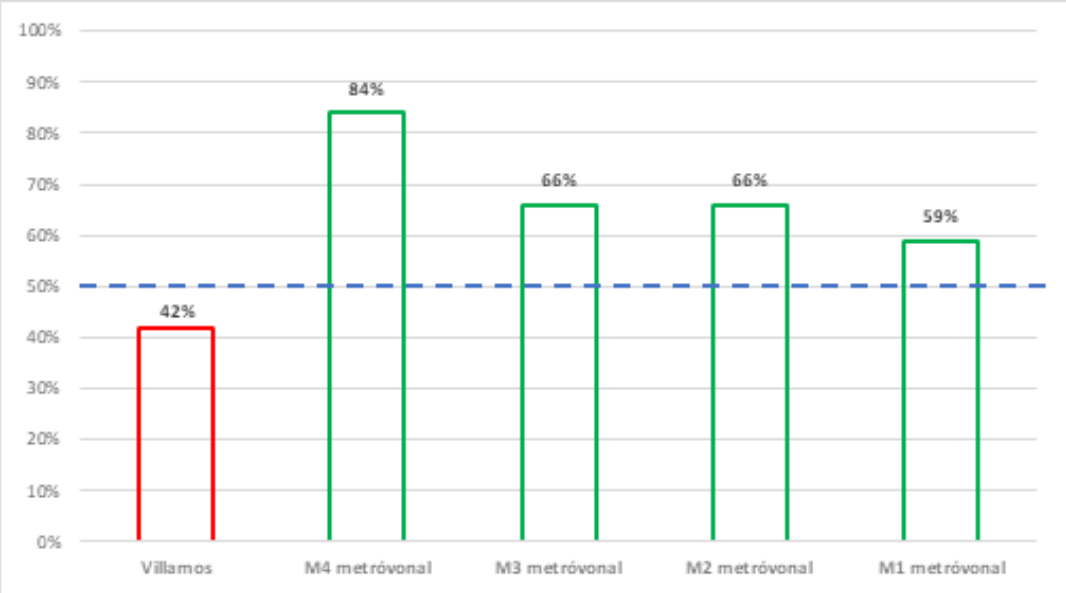
In the case of the tram branch, the aggregated technical condition of infrastructural equipment and assets was improved by the results of the major projects of recent years (development of the interconnected tram network in Pest, repair of the rack-bar and the tracks of the cog-wheel railway, making several tram stops step-free, continuation of the tram superstructure replacement project on the Grand Boulevard, track and electricity system renovations in depots). As a result of these the aggregated technical condition of the infrastructural equipment and assets is currently 42% in the case of the tram branch.

According to data of 31 December 2020, daily tram traffic is carried out on a track network that is 355.5 km long in total, and the power supply ensuring the movement of the vehicles is assisted by 39 transformers. The towing energy for trams and trolley buses is provided by overhead cables of 644 thousand rm and a towing cable network of 971 thousand rm. Naturally, in addition to the listed infrastructure elements, safe operation is assisted and ensured by other elements, too (signalling devices, line illumination units, mechanical equipment, escalators, ventilation systems etc.), the number of which exceeds several thousand pieces in total.

The renovation works completed within the infrastructural investments on metro line M3 have positive impacts on the technical condition as a whole. As a result of the continuation of the reconstruction the technical condition is expected to improve significantly even further during the next years. In addition, the methodology assessing the technical condition of the asset system has recently been re-worked, and a new methodology based on objective bases and supported by calculations of the proper level has been implemented.

As a result of the impacts listed, the 2020 technical condition of the infrastructure asset system is as follows:

The average technical condition of infrastructural equipment, assets *



* Status of 31 December 2020, (level of normal technical condition)

The infrastructure elements which belong to the railway business line constitute a rather wide range of assets in terms the type, number and condition of the elements. Their role is special, since these pieces of equipment make the railway traffic possible. In connection with the elements of this asset system, a number of activities were carried out in 2020 to facilitate the improvement of the technical condition of the fleet and the maintenance or the slight improvement of its standard.

Works affecting the tram infrastructure in 2020

The operation of the track system, with a length exceeding the distance between Budapest and Zagreb, and the related additional infrastructure elements, as well as the ten vehicle facilities that serve the vehicles present lots of tasks for the professionals, from which we can highlight the following for 2020:

- As part of the establishment of the interconnected network in Pest, we completed the construction of the reversing triangle in the Soroksári út - Haller utca junction and the reconstruction of the Soroksári út section of the related tram line 2, in the course of which the overhead cable, the cable and the power feedback network and the power supply of tram stops were also reconstructed.

- The reconstruction / superstructure replacement of another section of the tram tracks on the Grand Boulevard (Goldmann György tér - Irinyi József utca).
- On the line of the cog-wheel tram, track repair works were carried out in order to reduce traffic and operation safety risks. The works included the replacement of rack-bars, track rails, switches and the regulation of the track on other sections, in the spring at the Szent János Kórház and railroad switch No 1, and in autumn along the platforms of Városmajor.
- On Bécsi út, making Selmeczi utca and Szt. Margit Kórház stations step-free.
- Major repair of the rectifier in the Damjanich, Döbrentei and Dráva transformers, noise measuring at the Budafok and Száva transformers, and the establishment of the redundant communication network for the remote controlling of transformers.
- Extension of camera systems at terminals.
- Reconstruction of Bosnyák tér on tram line 3/62, partial track renovation and replacement of the external overhead cable network in the Zugló depot. The power supply of the facility is ensured by a new UR15 breaker.
- On tram line 2, at Vágóhíd utca - Tóth Kálmán utca, elimination of water pocket in a section of 300 sleepers, and track renovation between Haller utca and Boráros tér, at a length of 260 trm.
- On tram line 1, the repair of glued anchorages in the underpass of Salgótarjáni út and on the bridge over the Soroksári út.
- Replacement of overhead cable supporting columns.
- Repair and replacement of distribution boxes.
- Repair of switch heating at 55 railroad switches.
- Overhaul of curved tracks on the line of tram 14 in the junction of Lehel utca and Bulcsú utca, and at Béke tér, and on tram line 28/37, at Sírkert utca.
- On the line of tram 50, the overhaul of certain level crossings (Gulner Gyula utca, Gyöngyvirág utca, Áram utca, Kossuth tér).
- On the line of trams 17/56/61, in the junction of Karolina út - Villányi út, repair of level crossing at a length of 40 sleepers.
- On tram line 56/59/61, the repair of the level crossing of the Városmajor vehicle facility, and the replacement of tracks of 384 rm at Szilágyi Erzsébet fasor - Budagyöngye.
- At the Szabadság-híd section of tram 47/49, replacement of 4 pairs of dilatations.

Other measures

In the area of signalling devices, based on the TTP (science-based further operation protocol), we continued the part replacements and equipment overhauls started in 2019 (Közvágóhíd tram terminal, Népliget 1A supplementary line terminal, Lehel u. – Róbert Károly krt. switch adjustment).

By the beginning of 2020, the official approval of the volumes of the new 'Yellow Book' containing national and local regulations regarding tram tracks was completed. The Road Railway Infrastructure Design Guidelines, the P.1. I. and the P.1. II. volumes have been in force since 1 October 2019, and volume P.2. has been in force since 15 January 2020.

We used a measuring tram on one occasion - instead of the planned two occasions, because of a broken current collector - to map the condition of the infrastructure on the whole line network. As part of an investment, 8 pieces of rail lubricators were installed at Lehel tér, in the neighbourhood of Erzsébet királyné - Nagy Lajos király útja, Erzsébet királyné - Mexikói út and Albertfalva kitérő.

In the first half of the year, the renovation of the waiting room at the Közvágóhíd terminal was carried out in good order, and this meant a significant improvement in the work conditions of drivers and switch operators.

A card entry system was introduced at terminals.

Continuous cooperation and consultancy from traffic operation aspects regarding developments affecting the tram infrastructure (e.g.: implementation: Bosnyák tér, Haller reversing triangle, Bartók Béla út joint track use, Bécsi út platform construction; planning: Line 41, line 50, Bécsi út terminal, phase II of interconnected tram network in Buda, new bridge over the Danube).

Production of video materials for the training of drivers (modified drive-in and drive-out routes of line 2 from the Ferencváros depot through the Grand Boulevard).

Key traffic changes, transport restrictions affecting traffic operation

Apart from measures guaranteeing clean conditions and safety, the official requirements applied under normal conditions had to be satisfied adapted to the situation, and this required a lot of organisation work. The organisation and implementation of periodic trainings, practice sessions and medical examinations according to the terms of safety protocols (including social distancing) were complex tasks. In addition, staff members working in the front line - to ensure their outstanding dedication - received psychological support, too, so that service provision and operation could be fully maintained in these times fraught with danger.

The Metro Chief Engineer Command Book Provisions containing special measures because of the state of emergency were issued, and they focused on the increased protection of staff working in the front lines and in traffic control, and specified the order of procedures.

The pandemic situation forced the tram traffic branch to take special measures, too, which, among other things, affected the timetables of the spring, early summer, autumn and end of the year. During the period of the epidemic, the operation of trams was ensured without major shortages in staff (in spite of the fact that monthly schedules changed several times, in unpredictable way), and for the protection of the health of drivers, multiple measures were taken (provision of protective equipment, limited use of front doors on the TW6000 type, special information signs adjusted to the given situation, and the application of FUTÁR passenger information texts on board of the vehicles). Based on the proposal of the business line and in agreement with BKK, the timetables were also modified on lines 4-6, 1 and the interconnected lines of Buda (services 17, 19, 41, 47, 49, 56-56A-61), as well on service 2 and 24.

- In the spring/early summer period, the earlier introduction of school holiday timetables, less frequent services instead of the more frequent weekend and seasonal services, more frequent services in the period of maturity exams compared to normal timetables, the extension of the normal timetable period with two weeks at the start of summer school holidays (4 weeks on tramlines 1 and 4-6), and for the reduction of changes between drivers, resting times were provided in the form of pulling aside, in the case of certain services.
- In the autumn/end of year period, the extension of the morning peak hours, more frequent services on 1M, and the extension of the afternoon peak hours on several services, less frequent night service on line 6, and in the evening hours on lines 4-6 and 50.

Ensuring tram operation during track closures that strongly influence the provision of cars and the increased demands for putting the new low-floor CAF trams into service required significant changes in the timetables and in the work schedules of drivers, as well as the re-grouping of certain vehicle types among depots.

As part of the M3 metro reconstruction, related to the replacement of the southern section, tram 2 ran more frequently until 22 October 2020. For the replacement of the middle section starting on 7 November 2020, new tramlines, the one marked 1M between Bécsi út and Népliget (on weekdays) and the other marked 2M between Keleti pályaudvar and Jászai Mari tér were started.

At the start of the year, the official periodic examination questions of type and line studies were revised, and in parallel with that and in line with the technical development of vehicles, the review of operating rules and applied manuals started, and if necessary, they were modified.

Works affecting the metro infrastructure in 2020

Track maintenance works performed on the metro lines in 2020 served the purposes of ensuring traffic according to traffic security aspects, the prevention of the introduction of slow zones and the improvement of passenger comfort.

Test runs required on line M2 for the testing of the new train control system (ATC) software were carried out in November 2020. The testing was carried out with all the trains (22 pieces) of the line. In most cases, test trains ran as extra passenger trains not included in the timetable, and this was accounted as useful performance. Following the complete and successful tests, from 3 December 2020, on the surface section on the line, the restrictions in force since December 2016 were lifted (speed limit, mandatory manual driving), travel times were reduced in each period, and timetables ensuring more frequent services in peak periods were introduced.
The strategic objective of the M3 metro line infrastructure reconstruction is to improve the competitiveness of railway public transport in the capital, including metro line M3 (North-South) that forms part of the fast train network, compared to individual transport within and in the neighbourhood of the city, and to support and facilitate the cooperation and relationships among functional regions within the city at a high level. The complete infrastructure reconstruction of metro line M3 was in progress in 2020, too. The renovation was completed on the southern

section (between Nagyvárad tér and the Kispest stations) on 22 October 2020, and after the opening of the stations, the renovation of the deep middle - and oldest - section (between Lehel tér and Nagyvárad tér) started in November 2020.

Investments, developments, modernisations

For the reconstruction works on metro line M3, the section continuously provided the work trains required by the contractors, and in order to provide service on the northern and middle sections, which remained in operation, and from November 2020 to provide service on the northern and southern sections, the movements of exiting and entering trains was ensured in accordance with the construction phases, with the continuous availability of timetables, vehicle and driver schedules and related regulations and the necessary number of drivers.
Participation was continuous at negotiations regarding the M3 reconstruction, in commenting on the building engineering plans, in on-site visits and in the provision of technical supervision, and by carrying out the system tests that were the pre-conditions of pilot operations, the section contributed to the handover of the renovated M3 section between Nagyvárad tér and Kőbánya-Kispest stations.
For the energy supply required during the M3 reconstruction, we provided a mobile equipment and battery group transforming energy for the temporary supply to direct current consumers.
The station and tunnel reconstruction of the northern and southern sections were completed, now they are in the warranty period, and the Contractor repairs the non-rejected faults under the warranty, during or outside operating hours, this depends on the location of the fault, too.

Key data of reconstruction:

Description	Unit of quantity	Northern section	Southern section
railway tracks (depot, bow)	trm	11 578	10 258
railroad switches and junctions	pieces	11	25
towing cable network	rm	50 377	54 016
transformers	pieces	6	6

In the course of the reconstruction, electric power transmission and lighting distribution boxes have been renewed, as well as the lighting cable networks with their holding structures and fittings. The modern control and remote monitoring functions ensure the efficient operation of the mechanical and lighting equipment of stations. With the lamp bodies of new type applied for the passenger compartment and operational space lighting, not only the illumination values improved, but energy saving can be achieved on the long term.

On the M3 southern section, apart from the renovation of the interlocking device by the external contractor, we ourselves removed and then re-installed the external AVR (automatic train control system), as a job supplementing the construction of tracks. After the renovations and alterations, the interlocking devices and the AVR were put into operation after documented inspection and static and dynamic tests, and then the certification of these devices and the obtaining of the final use permit commenced.

- The transformation of the temporary interlocking device at Nagyvárad tér was also carried out by ourselves.
- The BBC remote controller was replaced in 2020, so now identical remote control devices of type EF 18 operate on the whole M3 line.
- Two additional lifts were built in in the areas of the Határ út and Népliget stations.
- At the M3 Deák Ferenc tér station, 3 pieces of escalators were replaced.
- The electric systems of the MÜVA devices were connected to the newly established electric network.
- The V7 distributors in the diesel machine houses at the Dózsa György út and Újpest-központ stations were modified on the basis of the new power supply system.
- The walking surface of the pedestrian overpass at the Kőbánya-Kispest station was renovated.

Major maintenance works/special events

- Replacement of the network devices (switch) of the IT transmission network of the M4 Passenger Protective Equipment (PPE).
- On the M3 line, the overhaul of the 20 pieces of switch power units was completed in 2020, and 25 autostops, all the operation consoles of the line were renewed.
- On the northern section of metro line M3, 11, and on the southern section, 23 group railroad switches were replaced. On the southern section, the railroad switch area of Kőbánya-Kispest and its substructure was modified to be an area covered by ballast.

- Establishment of M4 PLC network monitoring (KPU, NEP, RAK, BOC stations).
- On the IP network of metro line M2, replacement of Layer2 switches for a new generation.
- Partial renovation of the emergency calling system of metro line M1, card replacements.
- As part of the reduction of IT costs, 22 pieces of IP-based telephones were installed at the M1, M2 and M3 facilities, and at the Szabó Ervin tér in the M2 and M3 Central Traffic Control Management rooms.

Metro line M1

- On metro line M1, aesthetic and general repair works were completed, e.g. renovation and painting of stair-rails, replacement of damaged and broken glass surfaces, track grinding etc.
- On Vörösmarty tér – Bajcsy-Zsilinszky út and Hősök tere – Széchenyi fürdő line sections, altogether 1260 m curved tracks were replaced.

Metro line M2

- The batteries in the UPS devices of eight stations have been replaced.
- On the surface section of M2 line, in the pilot tracks, the regulation of 28 group railroad switches and 4200 rm of tracks was carried out.
- In the railroad switches of main lines, 129 pieces of sleepers were installed in concrete, and the tracks were ground by large machines on the main track, on altogether 900 trm.
- At five stations, according to the requirements, the mist fire extinguisher was repaired.

Metro line M3

- The collector wells at Dózsa György út and Népliget stations were cleaned, and their pressure tubes and fittings were repaired.
- At Újpest-központ station, the usability of the diesel device related to the civil defence system has been restored (control, UPS modernisation).
- 2.6 km of collector pipes were replaced between Népliget and Határ út stations.

M3 – Kőér utca facility:

- The escalator workshop was modernised, and two new waiting rooms were established.

- The batteries of 19 metro trains and 59 tram trains were renewed.
- In bows No I and II of the facility, 88 sleepers were replaced, and for the improvement of running safety and the increased lifetime of parts, altogether 41 pieces of deposit weldings were done.
- At Kőbánya-Kispest Station, on the sides of the railways (MÁV) and the expressway, the life-protecting fences were replaced.
- FŐTÁV Zrt. continued the heating modernisation at the M3 facility, it was completed and taken over in the Vehicle repair shop, the Vehicle maintenance unit, the Escalator, the Electric equipment and the Social buildings.

Metro line M4

- On the M4 metro line, as part of the maintenance works, both tracks were profiled by machine track grinding, and the tracks of 16 group railroad switches were ground.
- In Kelenföld railroad switch No 7, the switch power unit was replaced.

M4 - Kelenföld facility

- The anti-frost pipe heating of the liquid cooling primary pipeline of the Dispatcher House (Building K) was renovated and established for the sake of modernisation.

Other measures

In order to improve passenger comfort at stations, in 2020, as part of phase I of the 'Cool Budapest' project, at the stations of Újpest-központ, Újpest-városkapu, Gyöngyösi utca, Forgách utca, Göncz Árpád városközpont (earlier Árpád-híd), Dózsa György út, Lehel tér and Nagyvárad tér, altogether 14 pieces of drinking wells were installed and put into operation.

As part of the Budapest Restart programme, the licensing process related to the intended transportation of bicycles on metro line M4 has started, the risk assessment was sent to the Disaster Management Directorate of Budapest - through the BKK Zrt. - for comments.

In the Metró Museum, the telecommunication equipment used in the past was commissioned, the new visual and acoustic systems of the museum were established, and the related control software was developed in 2020.

Other activities and results

SAP and RFID activities

As a result of the examination of the Company's processes related to SAP, in 2020 several new transactions were developed in the SAP PM module which support and facilitate the everyday work of users and provide them with the possibility of accessing new databases to assist their decisions.

The objective of the RFID Pilot Project is a digital and automated maintenance administration that meets the expectations of our age. Presently, it manages the operations related to the devices of the MFAV, and at the Metro Track and Tunnel Maintenance Service, it is used for tasks related to railroad switch measuring.

Investment Support Project (BERTA)

Considering the number of investment requirements, their possible digitalisation, and the need for easier monitoring, a management decision was made to create an application that satisfies all these criteria. The software was produced in 2019 under the name of BERTA, and it was built into every-day work processes, and in 2020, all the investment demands were managed in this system, therefore it is possible for all participants to take more efficient actions.

Trainings

Dual programmes have become especially important by now, as it is necessary to employ workforce with special technical skills required for the Company. Students signing contracts under the dual programmes attend practical training in parallel with their studies in higher education, at railway operation areas, therefore they can be employed immediately after graduation, as they have proper grounding. With the agreement signed in January 2020 with the University of Debrecen, the students of four universities are employed, from which altogether 17 students are doing their internship at 13 areas.

Tram branch

In March and April the periodic official training programmes (syllabuses) and examination questions regarding type and line knowledge - that were transferred to the competence of BKV Zrt. at the start of the year - were revised and updated. As many as 2700 questions and their related a-b-c answer options were revised, re-phrased and extended. In March-June 2020, the production of altogether nine documents started, five of them had complex revisions, and for four of them new materials were compiled. The proposed modifications of (all other) training programmes managed centrally were submitted to the Railway Training Methodology Centre.

In the trainings in 2020, special focus was on the teaching of energy-efficient driving again, for which we prepared a training material that can be used by the railway profession technical teachers in the teaching of the most energy-efficient driving techniques of the various vehicle types.

In line with the pandemic and the measures prescribed in the related Government Decrees (e.g. restriction of number of people, on-line training), the training courses were suspended from the middle of March to the middle of June, and jointly with the Training Department, preparations started for the steady implementation of electronic remote (hereinafter: on-line) education and for creating the necessary conditions, so that trainings would be suspended for the shortest possible time only. Our key teachers attended a further training organised by an external partner (Training 360), where they learned the main methods of on-line teaching and the use of the related software that they started to use from May on a trial basis in the teaching of learner drivers and other employees. The key teachers keep this knowledge continuously up-to-date, and transfer it to other teachers at the Company. In the autumn period, as a result of the new restrictions introduced in the second wave of the epidemic - with the application of the prescribed health protection measures - the number of people present at the trainings at any point of time was significantly reduced, and the number of occasions was increased. Where it was possible, on-line education was maintained, and the railway profession teachers acquired a good routine in that. Under these conditions, in 2020 we started the training of 127 learner drivers (some of these trainings will be finished in 2021), and 55 people obtained a tram driving license.

For the examiners and the railway profession teachers of the Company and the drivers concerned, we organised training and examination about the traffic changes in two network junctions re-built during the year:

- Bosnyák tér (line 3 and Zugló depot service tracks),
- Haller utca / Soroksári út new reversing triangle (lines 2 and 24).

The mass training was conducted with a new experimental training method, the success of which was confirmed by the almost 96% success rate of the so-called preliminary examinations at the end of the trainings. According to the new training method, the simplified and extended texts of the company's traffic regulations regarding the modified track sections were recorded in multi-media training materials illustrated with moving diagrams. The teachers played these training films to drivers attending the programme, and after the transfer of the basic knowledge, teachers gave further explanations, additions, answered the employees' questions, and the drives filled in the closing test. The positive experiences with the use of the modern multi-media material can be used later is similar training materials.

Mass training about the new Kelenföld section of line 1, opened in the second half of 2019 was completed for the affected employee groups, and scheduled trainings about the continuously modernised Tátra fleet continued, as well as for the CAF vehicles coming in, for employees who have not passed type examinations yet.

In Száva Depot, a traffic information screen was installed, on which a series of slides updated on each working day is played for employees in infinite mode.

Metro branch

For the individual phases of the M3 reconstruction, the timetables, the vehicle and driver work schedules and the related regulations were continuously under production, and the required number of drivers were available.

In 2020, in seven driver training courses, altogether 37 drivers were trained, and non-passenger transport type trainings (EI, 16/02, TVG) were completed by 15 people.

Metro station dispatcher and underground platform guard courses were completed by 23 people, driver-station dispatcher courses were completed by 5 people, station inspector courses were completed by 27 people, and 48 people passed a simplified traffic exam.

Four training courses were delivered with mixed methodology (remote education and practical contact training).

Support area / Operation Division

Within the Operation Division, the traffic coordinator of the Traffic Supervision Service was responsible for organising, supervising and conducting all the official railway profession and corporate trainings, as well as the related required examinations at the related functional areas.

The pandemic situation and the compliance with government and corporate regulations caused some difficulties in the continuity and conducting of trainings, but the following trainings were started, under the above conditions:

- Complex, amphibious vehicle driver training - 4 people.
- Traffic dispatcher training I. – 5 new employees – 2 persons as switch operators, 3 persons as line fault service staff members - started their employment.
- Traffic dispatcher training II – 7 persons – employees with switch guard qualifications were re-trained to be traffic dispatchers.
- Accident scene investigator training - 1 person.
- Periodic trainings prescribed by the authorities were organised for 113 people, and 50 people passed the official periodic examinations.

Control systems

Operation of EMS in compliance with ISO 50001: Act LVII of 2015 on Energy-efficiency obliges large enterprises to have an energy audit carried out by an external party every four years, or to implement an energy management system (EMS) compliant with the ISO 50001 standard and certified by an external accredited company.
BKV Zrt. decided to implement the EMS, since through the operation of EMS BKV Zrt. can monitor its own energy-efficiency development continuously through a framework system in which all employees and energy consuming systems are involved to varying extents. The EMS has been operating as a certified system since 10 November 2016. In 2020, in spite of the difficulties

caused by the pandemic situation, audits were conducted on-line, and at the end of the year, the EMS went through a successful supervisory audit.
In 2020, apart from the EMS, a Quality Control System (MIR) compliant with the ISO 9001 standard works in the railway areas.
In the summer of 2020, the Environment Management System (EMS) compliant with the ISO 14001 international standard was extended and certified, and that meant the extension of the EMS - introduced years ago and in operation for years at the M2 facility - to all facilities of the Railway Operation Directorate. In the course of the extension, for the M4 metro and the Budafok tram facilities, the compliance with the requirements of the Environment Management and Audit System (EMAS) was also integrated into the system.

In 2020, the following audits were carried out for the facilities of the Railway Operation Directorate:

Irányítási Rendszer	Audit típus	Időpont	Érintett telephelyek
MIR	felügyeleti	2020.03.25-26.	M2 metró telephely
			ANGYALFÖLD kocsiszín
KIR	kiterjesztő	2020.06.23-26.	M2 metró telephely
			M4 metró telephely
			HUNGÁRIA kocsiszín
			BUDAFOK kocsiszín
EgIR	felügyeleti	2020.11.16-18.	SZÁVA kocsiszín
			KELENFÖLD kocsiszín
			M3 metró járműtelep
EMAS	tanúsító	2020.12.2-3.	BUDAFOK kocsiszín
			M4 metró járműtelep

External audits at facilities in 2020