

ISSUES OF PERIODIC-TIMETABLE CONSTRUCTION ON THE FULLY LIBERALIZED RAILWAY MARKET

Ing. Vít Janoš, Ph.D., Ing. Karel Baudyš, Ph.D.

Czech Technical University in Prague, Faculty of Transportation Sciences, Czech Republic

Abstract: *In the Czech Republic, there is besides to public services on the railway fully liberal approach to infrastructure – Open Access without any restrictions. The Czech legislation is not enacted no protection of public railway service, and are not even clear rules for the assembly schedule. It is still more difficult to apply results of optimization problems in periodic timetable, because there are arising problems with the allocation of capacity and assigning train-routes in the timetable, that negatively affect the results of the optimization and structure of the IPT-junctions. The use of Open Access options was recently in the Czech Republic difficult to imagine and it was perceived as a marginal problem, but with the gradual completion of the upgraded transit corridors and opening up possibilities of fast rail services begin to expand commercial projects in rail and brings them new, in our environment yet unknown problems.*

KEYWORDS: RAILWAY TRANSPORT, PUBLIC TRAFFIC, RAILWAY TECHNOLOGY, TIMETABLE DESIGNING, PERIODIC TIMETABLE, OPEN-ACCESS, CAPACITY, LIBERALIZATION

1. Order of public rail services in the Czech Republic

Since 2005, rail transport in the Czech Republic regionalised, 14 regions is responsible for ordering regional rail transport, the Ministry of Transport is responsible for long-distance rail transport order.

Order of the Ministry of Transport is focused on the fixed interval connection between each regional capitals and other major residential areas in the Czech Republic.

Overall, in 2011 in the Czech Republic in the volume of procedures ordered 115 million train kilometres (train km) per year, of which there were:

- about 80 million train km regional transport
- about 35 million train km long-distance transport

Public transport services in the Czech Republic are characterized by the fact that they represent in general a performance for which the sum of revenues is not sufficient to cover costs associated with the services.

A feature of public rail services in the order of Ministry of Transport and the Regions is also the fact that it is an "open" system, which works across the network unified fare system, so there is time, space and tariff interconnection of services. A feature of the system is not "denial of passengers" (i.e., inability due to lack of transport capacity of lines), while no reservations required (no link between a ticket and particular train). It is natural that such a generally high quality parameters of public services cannot be met without compensation from public funds.

The total amount of payments from public funds went to compensation payments in rail passenger transport in 2011 amounted to CZK 12.2 billion (approximately EUR 500 million), which accounted for:

- CZK 4 billion - Ministry of Transport, order long-distance transport
- CZK 2.6 billion - Ministry of Transport, the contribution of regions to regional transport order
- CZK 5.6 billion - the total payment 14 regions, the order of regional transport

Revenue from passenger rail transportation (fare sales + other revenues) in 2012 totaled approximately 5.8 billion CZK.

The market for rail passenger services as an annual volume of approximately 18 billion CZK (approx. EUR 760 million).

2. The liberalization of the rail market in the Czech Republic

The current practice in the Czech Republic is still represented in rail passenger transport services by direct selecting. In 2009, all orderers signed 10-year contract to provide transport services on the railway with "national" train operating company (TOC) Czech Railways - the exception was a small amount of service performance, which contracted with other TOCs and contracts that are subject to previously concluded contracts. All 10-year contracts signed in 2009 were closed by direct select.

In the area of direct commission to be made groundbreaking contest to choose the TOC as the level of Ministry of Transport (2005 - trains on lines Pardubice - Liberec and Plzeň - Most) and the level of regions (Liberec region - 2007 - "Jizerská dráha", "Trilex" - together with the Ústecký region and transport association ZVON).

Despite the fact that the vast majority of contracts in passenger rail transport has been selected directly reported by the Czech Republic to support the liberalization of rail transport.

This declaration liberalization of passenger rail market has two specific implications:

- 1) timetable for market opening in long-distance transport, the opportunity to compete in selected contracts
- 2) liberal access to railway infrastructure - Open Access

2.1. Market opening in long distance transport

Market opening in long-distance rail transport should be a means to increase quality / price ratio in the Czech rail transport. Ministry of Transport expects the level of compensation, have now come into passenger rail services will be available in higher quality, or even in the higher range of service performance. A prerequisite is the case, it can maintain a stable long-term financing of the railway sector and there will be no significant changes in the amount of available financial performance.

Ministry of Transport last year published a schedule for market opening in long-distance rail transport ordered approved by the government, which has been in the Official Journal of the European Union notified first 5 packs performance. In March 2012 has already been published the specifications for the first competition.

The Ministry of Transport access is clear that the priority-driven process in which is preserved the networked public rail transport (in Czech and Central European scale) and will clearly set in advance in market access conditions, including rules on mutual recognition of travel documents and the use of station buildings.

2.2. Open-Access in the Czech Republic

In the Czech Republic but in addition to the above-mentioned access to public services, there is a fully liberal approach to infrastructure – Open Access, without any restriction. Each TOC may ask the infrastructure manager (IM) for capacity and IM (Railway Infrastructure Administration – RIA - SŽDC) will be required to allocate infrastructure capacity.

The first project in the Czech railway network, which had features of Open Access approach were the SC Pendolino trains between Prague and Ostrava. These SC-trains operate Czech Railways on their commercial risks, with mandatory reservation and limited passenger capacity and costs for transportation of these trains is significantly above the level of fares on trains, which are ordered and form a public service.

The second Open Access project are the Regiojet trains of Student Agency company running on the route Praha – Ostrava – Havířov (- Žilina). Again, these are trains to TOC commercial risk, with mandatory reservation (seat reservation is included in the ticket), with limited passenger capacity, but the price for the carriage of these trains is comparable to fares on trains, which are ordered and form a public service.

The third Open Access project is a LEO Express, i.e. Leo Express trains again on the route Praha - Ostrava. As in the case of Regiojet in this case, the connections to the commercial risk of the TOC will have to provide mandatory seat reservation will have a limited capacity for passengers.

In this battle TOCs, which in the European area of the railway is unprecedented, Ministry of Transport while trains terminated the order of "Express" at relation Praha - Ostrava, and even these trains and operate railway on their commercial risks, and these connections are still maintained the basic features of public services (i.e. uniform network fare, no need for reservations).

Less than one year of sharp competition between three different TOC's has been indicated, that commercial Open-Access services are very unstable in time. Changing time position of the trains, changing and different stops, variable and unstable number of connections etc., such services cannot be reasonably operationally integrated into the open transport system.

3. Interaction between public services and Open-Access Projects

The Czech legislation is not enacted no protection of public railway service, and not even a clear set of rules for the timetable designing. Among the biggest risks of unregulated Open Access include damage to public service both in terms of yields and the functionality.

3.1. Protection of public services

In the case of the Czech Republic can be shown that Open Access products don't pose a risk to public service when Open Access product:

- offers transportation service, which on the market of public services doesn't exist (e.g. in relation to the right where there is no pronounced spatial and temporal overlap with the public subscribed services)
- represents an above-standard services to the public (i.e. it is a "premium products" fundamentally different from public services, higher levels of different tariff)
- constitutes a separate market segment addressing a different group of passengers, than public services (e.g., EuroNight trains)

In other cases it happens that Open Access is a product of a greater or lesser degree is offered concurrently with the public service, which has a negative impact on the economy of public service. The negative impact is mainly due to the fact that all Open

Access products have a limited capacity, which is for the entire operating period offered as a constant. The problem of peak hours the Open Access products solve by refusing the passengers (seat reservations are available only with a bigger advance) or dynamic fare (the discount during off-peak hours). This leads to an increase the offer imbalance during peak and off-peak hours. By leaving passengers the public service primarily in off-peak hours, while during the peaks the passengers remain in a system (as a public service ambitions is no rejection of the passengers), worsens the use of terms and therefore the balance of costs and revenues - as part of income "leaves" with Open Access product, the cost of public services remain.

The pursuit of maximum load-factor leads to dramatic price wars between TOC's, so fares in selected cases (purchase well in advance, travelling in the off-peak hours) decreased by up to a third of the original value. This short-term passenger-friendly state but also leads to a decline in yields in the ordered transport, the declining profitability leads to a limitation of the scope of public services, despite the fact, that services of commercial TOC's do not substitute the ordered service.

This phenomenon is evident in the Czech Republic on the Praha - Ostrava line (or a significant part of the route between Praha and Olomouc). If the result of worsening economic balance would be the reduction of public services, then the passengers in public transport system are "injured", which Open Access products provides no benefit.

Another phenomenon that in the Czech Republic fully demonstrated, is the need to maintain profitable (or self-financed) segments in the ordered public transport. With the development of Open Access products is a response of the orderer, that (partially) "parallel" public service ceases to order - it is not a market for those sectors that require either minimal compensation, or are sometimes even profitable. This step starts to considerably worsen the balance of costs and revenues in the ordered service, increasing the amount of compensation a relative train km and begins to spiral spin reduction of public services which, although partially replaced, but that do not provide a complete substitute for the cancelled public services (connection ticket / train, limited capacity, different stop strategy, lack of guarantee of performance over time), there is actually an overall deterioration in public services, despite the fact that the selected market segments benefit from free competition.

3.1. Timetable designing

In the timetable construction is the interaction between public services and Open Access products undefined. When allocation of railway infrastructure capacity occurs, public services take priority over Open Access products. The very act of "capacity allocation" in Czech conditions only means, that the infrastructure manager declares the constructability of schedule - that is required to route the train will be in the timetable. Once capacity is allocated, the procedure of the timetable construction proceeds after train-category, so much of the public service finds himself suddenly in order for Open Access products.

Much of the ordered passenger transport in the CR is ordered in the mode of periodic timetable, where a large influence on the functionality of the system has just achieving the system travel time. If the train paths of regional- and interregional trains in periodic timetable are distorted by Open Access products, which fully complies with the rules applicable in the Czech Republic, so it can occur extending the travel time and the decay of the connecting links ordered transport services (when both these factors affect the amount of revenues) but in extreme cases can extend travel times such that an extension of the circulation of rolling stock - missing the turn in the end station (with an impact on the cost of public services).

Extensive commercial Open Access services without any regulation cause outside economic factors negatively in the operational level too. Frequent mutual trains overtaking, high

timetable heterogeneity, all this leads to a huge consumption of the capacity of railway infrastructure and to the negative effects on travel times in ordered services. In passenger transport decreases the timetable stability and it leads to a degradation of functionality of the periodic timetable. In freight transport arise the problem that on the exposed lines cannot be assigned the capacity for freight trains in peak hours. This situation is intolerable and is clearly the failure of the regulatory functions of the state.

4. Conclusion

The use of option Open Access was recently in the Czech Republic difficulty imaginable perceived as a marginal problem, in which the Czech legislators mistakenly assumed that there will never come. With the gradual completion of the railway transit corridors and opening up possibilities of fast rail services begin to expand commercial projects in rail and brings them new, in our environment yet unknown problems and risks for the functioning of public services and their sustainability over time.

This problem can occur anywhere, where time-competitive rail infrastructure with other transport modes exist, the IM picks low charges for its use, and together with this facts they are legislatively weak regulatory elements.

While a regular bus public services in the Czech Republic are protected (within the licensing procedure), the railway remains without protection, which together with the limited capacity of transport infrastructure results in a significant problem of public services on the railway. It is obvious that free and unregulated market of Open Access products is necessary to streamline and regulate so as to avoid direct damage to public services (both on the revenue side and on the cost side).

Among the major problems is, that this unstable system cannot be operationally optimized. Its time-variability also invalidates the results of the optimization steps in the ordered transport. Although from this system profit short-term the passengers in few lines, the public transport system as a whole is due this non-regulation devaluated.

It is also apparent that the exclusion of above-average yield of ordered relations services to the commercial sector Open Access products is significantly devastating impact on the scope and level of public services.

The Czech Republic under the protection of public services market will have to go the way of concessions and exclusive rights which to compete and only profitable sectors of the market (with its subsequent closure of the other candidates), as well as maintaining the exceptionally lucrative segments in the public service. It is clear that regulation of this process will quickly be feasible and also problematic with regard to the fact that private investors invest in the development of Open Access products, considerable resources. Control of Open Access in order to protect public services so will be certainly delicate issue.

Finally, it is necessary to separate the issue of Open Access, which is free competition in the market of transport services, from the issue of regulated competition, where competition takes place at the level of TOCs to obtain public contracts for public service. It would be a great pity that due to difficulties with Open Access products in the Czech Republic generally hated the environment, liberalization of public services in rail transport.

REFERENCES

1. Moos, P. - Bína, L. - Janoš, V. - Baudyš, K. - Skurovec, V. - et al.: Analysis and steps in the process of opening market of railway transport. [Výzkumná zpráva]. Praha: České vysoké učení technické v Praze, Fakulta dopravní, Ústav řídicí techniky a telematiky, 2011. 1582011. 45 s. (in Czech).
2. Janoš, V. - Baudyš, K.: Development of Periodic Timetable in the Czech Republic. In *Road and Rail infrastructure II*. Zagreb: University of Zagreb, 2012, p. 869-873. ISBN 978-953-6272-49-5
3. Janoš, V. - Baudyš, K.: SYSTEM DEVELOPMENT OF PUBLIC RAILWAY SERVICE AND OPEN ACCESS IN THE CZECH REPUBLIC. In *Symposium Proceedings EURO ŽEL 2012*. ŽILINA: ŽILINSKÁ UNIVERZITA, 2012, p. 135-141. ISBN 978-80-263-0242-1
4. Drábek, M.: Periodic freight train paths - non-discriminatory capacity allocation. In *Zborník príspevkov konferencie Horizonty železničnej dopravy 2012*. Žilina: Technical University of Žilina, 2012, díl 1, s. 120-125. ISBN 978-80-554-0571-1
5. Janoš, V. - Baudyš, K. - Vichita, F.: Financing the Public Transport in the Sphere of Regulated Competition. In *Sborník konference Euro Traffic 2006*. Praha: ABF a.s., 2006, s. 7. ISBN 80-86905-15-2. (in Czech)