Problems in Railway Capacity Allocation in the Czech Republic

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Abstract: The aim of this paper is to present key actual rules for capacity allocation in Czech state-owned railway network. Problems in the allocation process are analyzed and legislative improvements for solving these problems are proposed and discussed.

Keywords: railway capacity; Integrated Periodic Timetable; ad-hoc regime

1. Introduction

In this paper, only key rules for railway capacity allocation for the annual timetable in the Czech Republic will be discussed. Two main problems will be stressed: priority in the train path allocation and conflict between Open Access (liberalization of railway market) and protection of public service.

2. Key Rules for Capacity Allocation

The first binding document for railway capacity allocation within the EU is Directive 2012/34/EU of the European Parliament and of the Council of 21 November 2012 establishing a single European railway area [3].

In the Czech Republic, railway sector is generally regulated by Railways Act (RA) - Zákon č. 266/1994 Sb., o dráhách [9]. The capacity allocation and railway traffic management on all railway networks in the Czech Republic is then regulated by Traffic Order of Railways (TOR) [5] - Vyhláška 173/1995 Sb., kterou se vydává dopravní řád dráh (a regulation issued by Czech Ministry of Transport). Further, each Infrastructure Manager (IM) issues his own regulation, which further specifies rules mentioned above. Vast majority of railway lines in the Czech Republic is owned and operated by SŽDC – Správa železniční dopravní cesty (Railway Infrastructure Administration). Thus, use of Traffic and Signalling Regulation SŽDC D1 is most common. SŽDC further specifies rules for capacity allocation in its annual Network Statement (such as [8]).

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3. **Open Access vs Public Service**

Directive 2012/34/EU [3] states in Article 10 that “railway undertakings shall be granted, under equitable, non-discriminatory and transparent conditions, the right to access to the railway infrastructure in all Member States for the purpose of operating all types of rail freight services.”, as well as “Railway undertakings shall be granted the right of access to railway infrastructure in all Member States for the purpose of operating an international passenger service.”. Freight and international passenger railway operation is hereby liberalized. However, Article 11 allows Member States to “limit the right of access provided for in Article 10 on services between a place of departure and a destination which are covered by one or more public service contracts which are in a accordance with Union law. Such limitation shall not have the effect of restricting the right to pick up passengers at any station located along the route of an international service and to set them down at another, including stations located in the same Member State, except where the exercise of that right would compromise the economic equilibrium of a public service contract.”

Whether economic equilibrium of a public service contract would be compromised or not is decided by regulatory body. In the Czech Republic, this is the Railway Authority (Drážní úřad). Such decision is made after a request from the orderer of this public service, or from the railway undertaking performing this public service, or IM, or any other interested competent authority.

4. **Priority of Train Categories**

Article 26 of the Directive 2012/34/EU [3] orders Member States to ensure the IM to be able to “market and make optimum effective use of the available infrastructure capacity”. The same rule appears in Paragraph 21 of the TOR [5], section 1.

If needed, “a charge which reflects the scarcity of capacity of the identifiable section of the infrastructure during periods of congestion” can be included into infrastructure charges by the IM (Article 31 of the Directive 2012/34/EU [3], paragraph 4).

“Where a situation requiring coordination arises, the infrastructure manager shall have the right, within reasonable limits, to propose infrastructure capacity that differs from that which was requested” (Article 46 ibidem, and analogous provision in Paragraph 34e of the RA [9]).

If such measures were not helpful, the IM has to declare particular section of infrastructure to be congested. This shall also be done for infrastructure which can be expected to suffer from insufficient capacity in the near future. Then, priority criteria, as previously published in Network Statement, come into force. The priority criteria shall take account of the importance of a service to society relative to any other service which will consequently be excluded (Article 47 of the Directive 2012/34/EU [3]).

Paragraph 50 of the TOR [5] orders following priority rules for construction of the annual timetable (i.e. regular capacity allocation):

a) international trains, whose train paths were agreed on international timetable conference,
b) domestic trains carrying passengers, baggage and mail,
c) freight trains carrying primarily goods and empty wagons,
d) working, locomotive and service trains.

In the case of conflicting capacity requirements, Paragraph 51 of the TOR [5] orders following priority rules:

a) train path agreed on international timetable conference,
b) higher transport volume in terms of more trains or higher volume of public transport service

c) longer time requested for operation

d) higher transport capacity of the train and wider range of services on board

e) connection of timetables of particular railway undertakings, also to another means of transport

If the requirements exceed available capacity, RA [9] states in Paragraph 34e, subsection 3, clear priority for the capacity allocation as follows:

a) passenger transport as a public service ordered by the state,
b) passenger transport as a public service ordered by the region,
c) combined transport,
d) transport as stated in the Network Statement.

For the same situation, Paragraph 21 of the TOR [5] orders priority rules based on evaluation of following criteria:

a) passenger or freight transport, depending on need of public transport service for particular area

b) the train is a part of international railway network, based on agreement of European railway undertakings

c) train is operated daily or seasonally, for long-distance or regional transport, regularly or if needed only,
d) scheduled train speed,

e) for freight transport: prevailing goods: marked transport in the state interest, live animals, perishable goods, export, import, transit, shipments with guaranteed transport time, block trains, bulk trains

If it is not possible to handle all submitted requests for allocation of free infrastructure capacity, SŽDC, based on chapter 4.4.1 of the 2017 Network Statement [8], has the right to prefer infrastructure capacity allocation to an applicant for operation of regular

a) public railway transport to ensure transport needs of the state,
b) public railway passenger transport to ensure transport service within the territory of the region,
c) combined transport,
d) rail transport in the extent of the framework agreement
e) regular international passenger transport,
f) regular international freight transport,
g) regular national passenger transport,
h) regular national freight transport,
i) other transport.

If it is still not possible to handle requests for capacity allocation while coordinating requests for preferential capacity allocation and consultations with applicants, the priority rules analogous to Paragraph 51 of the TOR [5] come into force.

5. Recommended Improvements

Stohler et al. [6] believe that competition and system optimization do not exclude each other. Based on experience especially in Switzerland and France, they propose a partially periodic train path catalogue. They also propose alternative capacity – for passenger service in peak hours and for freight trains in off-peak hours. In the case of conflicting requirements for train paths they propose priority for systematic (i.e. periodic) train paths. They do not recommend IM with a busy network to allocate train paths within bottom or top speed belt.

A system of symmetric (for both directions) and periodic pattern of mutually coordinated and, if possible, speed-bundled standard train paths (for standard trainsets that can be reasonably expected) ensure not only efficient capacity utilization. Another key feature is transparency – both for passengers (all-day regular service with or without transfer) and for railway undertakings. Such transparency avoids any discrimination, if satisfactory remaining capacity for atypical trains can be found as well. Some periodic train paths are tightly allocated for public service passenger trains that ensure network offer, based on Integrated Periodic Timetable (IPT). Another periodic train paths are allocated in peak times for public service and, if need be, all-day long for fully-commercial passenger trains. The commercial service trains should be interposed between public service trains, so that public service economical efficiency is not threatened directly. The ideal interposition results in a half-interval, but different stopping pattern in various section can disable this. Another desirable role of private railway undertakings is to win a tender for public service contract and operate within network timetable and tariff integration, without compulsory seat reservation for the whole train. Pre-arranged catalogue train paths are also very important, because of very heterogeneous demand for freight train paths, but quite homogeneous parameters of freight trainsets.

Any firm priority rules for the capacity allocation appear to be very delicate. The first priority should be given international long-distance trains, as agreed in European timetabling conference, but in coordination with rapid agglomeration trains (in Czech: Esko). Then, domestic periodic long-distance transport and long-distance freight train paths should be coordinated, regarding the train paths mentioned above, the operational concept based on IPT,
especially IPT-nodes and other transfer links, and European Rail Freight Corridors (RFCs) as stated in Regulation (EU) No 913/2010 [2], as well as domestic requirements for freight train paths. For such mutual coordination, framework approach proposed in the author’s doctoral thesis [1] is strongly recommended.

Another delicate question is a balance between non-discriminatory capacity allocation and protection of economy of the public service. The author proposes an interposition of periodic long-distance train paths of public service, and for commercial requirements, into half-interval. In peak hours, additional train paths can be added (either as a bundle of subsequent parallel train paths or as a further interposition) at the expense of freight railway. But, as a rule, even in the peak there should remain at least 1 pair of fast periodic freight train paths hourly. In off-peak hours, the capacity should be allocated to further freight trains instead of peak passenger services. Then, periodic regional services outside agglomerations should be scheduled. Finally, local freight, working, service and other train of lower priority should be scheduled. In the case of a scarce capacity, railway undertakings should be motivated by charging rules to couple their locomotives to some, even foreign, trains, instead of running locomotive trains – but not at the expense of runtimes of particular trains.

6. Discussion and Conclusion

It is obvious that pre-arranged (catalogue) train paths, or, at least, available time windows, cannot satisfy all capacity requirements of railway undertakings.

Some freight trains can be very fast (e.g. with allowed speed 120 km/h or more), with low mass. Another freight trains can have very low speed due to various technical reasons (e.g. 50 to 70 km/h) and low ratio of locomotive power to overall mass, which would result in very low acceleration from any stop.

For commercial passenger trains (long-distance transport as a rule), more similar train parameters can be awaited: allowed speed 140 to 160 km/h, and locomotive power at least 3 MW for electric traction. However, there can also occur diesel-powered trains with allowed speed 100 to 120 km/h. In such cases, railway undertakings strive to offer competitive travel times, and similar travel speed with “electric” trains can be achieved if number of intermediate stops is reduced (e.g. Arriva Express between Praha and Přerov).

Catalogue train paths can be used by a train – or not. Thus, any scheduled overtaking of slower (e.g. regional) train by “catalogue” train should be avoided if possible. The reason is simple: neither passengers nor railway undertaking want to wait few minutes in a station for overtaking by nothing. Of course, because of complexity of timetabling, the more realistic goal is minimization of such events.

As a conclusion, the author recommends rules for capacity allocation to be simplified, while symmetric partially periodic pattern and trains with typical parameters are preferred.
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