



CETRA²⁰¹²

2nd International Conference on Road and Rail Infrastructure
7–9 May 2012, Dubrovnik, Croatia

Road and Rail Infrastructure II

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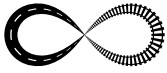
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DEVELOPMENT OF PERIODIC TIMETABLE IN THE CZECH REPUBLIC

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Abstract

This paper is focused on Timetable scheduling in railway transport in the Czech Republic. It brings comparison of commercial and periodic timetable, which is used in Czech Republic mostly for long–distance railway lines since 2003. In the Czech Republic an integrated periodic timetable (IPT) scheme was implemented in long–distance railway passenger transport, which is ordered by the Czech Ministry of Transport. A demand driven timetable structure was long typical for the Czech Republic. Trains were operated at times of supposed demand. Thus the 2004/05 timetable brought a huge amount of change, primarily in national long–distance lines now operated in a standardised manner. The network was gradually brought in line with a unified national scheme based on IPT–type oo–symmetry and IPT hubs were created. The way from 'demand' timetable to regular timetable scheme based on the 'Swiss Model of Integrativer Taktfahrplan' was in the Czech Republic not easy, and today, the whole system is still continuously developing. In terms of passenger numbers in publicly ordered long–distance traffic the success of the new timetable concept became apparent after two years: Increase in passenger numbers ranged from 10 to 40 per cent for the railway lines realigned according to the IPT scheme, and after four years it amounted to 20–120 per cent as compared with the base year. The enhanced system has offered more train kilometres and connections. Principle of Integrated Periodic Timetable is very easy, but to have efficient supply of train services is necessary to fulfil some requirements for whole transport system. The advantages, problems by implementing and also the result of implementing of this new supply in public transport system in Czech Republic are describe in this article.

Keywords: timetable, railway transport, periodic timetable, long distance traffic

1 Introduction

Timetable is a basic instrument for organizing railway transport. Though, it represents supply of connections in network for passengers. Generally, timetables can be divided into fixed (periodic) and commercial (non–periodic).

Commercial timetable is characterized by conducting trains in different intervals. Train departure and arrival times can better come up to exact passengers' demands for arrival/departure to/from particular trip source/target. In practice it is mostly long–term stable supply, which does not change for several years. Passengers use it rather because of persistence and partially bring their demands into line with it.

However, in lands with developing economy passenger demands are changing from particular times to temporal and spatial availability. Public transport, which should compete with individual transport, should offer frequent, fast connection, between all spots in network. Such supply can be created thanks to fixed (periodic) timetables. Temporal availability is guaranteed by appropriate period between trains. Spatial availability is guaranteed by suitable

ble coordination of train time positions (time slots) on tracks and in junctions. Every regular timetable has a symmetry axis. Trains run symmetrically in both ways around that axis and in case of an XX:00 axis they meet in hubs around the full hour. Based on Integrated Periodic Timetable (IPT), lines in particular area are interconnected so that there are realised optimal changing connections, i.e. without waiting times.

2 Present timetable planning in the Czech Republic

Majority of Czech trains are operated by Czech Railways. Some regional trains are operated by private transport companies.

Fast trains, EuroCity (EC), InterCity (IC), Expres (Ex) and Rychlík (R) trains (long-distance trains) are ordered as public transport service from Czech Ministry of Transport. This, as an orderer, decides about their timetable.

Regional trains are ordered as public transport service by regional authorities, who establish their timetable. Of course, their timetable has to be coordinated with timetable of long-distance trains. Regional authorities also discuss this problem with Ministry of Transport and transport companies, too.

There are some long-distance trains, which are not ordered by anyone, as they are operated on own entrepreneurial risk of Czech Railways or of private rail companies. These trains (category SuperCity – sc of Czech Railways, RegioJet of StudentAgency or LEO Express of Aakon Capital Group – in operation from 12/2012) operate between capital city Prague and greatest Moravian agglomeration of Ostrava, parallel to long-distance train lines ordered by Ministry of Transport.

3 Timetable development in the Czech Republic between 1983–2003

A demand driven timetable structure was long typical for the Czech Republic (former part of Czechoslovakia). Trains were operated at times of supposed demand. The 1983/84 timetable featured a first attempt at regularity: Regional passenger trains ('Os'-type trains) of the Praha–Kolín line ran at a 60/30 minutes interval with minor diversions (trains pulled by an engine are slower than electric multiple units). For years this timetable was continued there without modifying or extending it.

The 1993/94 timetable saw a degree of regularity for International trains. The traditional Vin-dobona and Hungaria express trains of the 'Eurotakt' line linking Hamburg and Berlin with Vienna and Budapest via Prague ran to a regular timetable by then. Thanks to that, symmetry by the '00 minute' first appeared in Czech timetable in 1994/95.

Beginning with the 1995/96 timetable regular interval timetable was extended to Prague suburban lines, for regional passenger (Os) trains of the Praha–Kralupy and Praha–Beneš-šov lines. One year later Os-trains of the Praha–Beroun line were included, and from the 1997/98 timetable, with Praha–Nymburk–Kolín the last double track line of the Prague suburban system was included. These local lines were island operations, not forming a consistent network with through-links via Prague combining two lines, interval length varied during the daytime and each line used a different symmetry axis.

The 2000/2001 timetable brought two major changes to the Czech Republic. First, the 'Eurotakt' trains were diverted to the Praha–Česká Třebová–Brno corridor line almost completely reconstructed and 20 minutes faster. Second, the 'Egronet' project was launched, reorganising regional cross-border traffic including the Zwickau/Plauen–Cheb–Marktredwitz and Zwickau–Kraslice–Sokolov Railway lines, it is operated partly by state railways, partly by private company Viamont (Kraslice–Sokolov). Egronet traffic is part of a full-fledged regular interval traffic with 00-symmetry and good connections in Bavaria as well as in Saxonia.

The Egronet network provided a good pattern and a stimulus for the reshaping of national regional transport. Two pilot projects were initiated to that end in the 2002/03 timetable

incorporating oo-symmetry, the first in the North-western Bohemian Region featuring the Roudnice–Ústí nad Labem–Děčín and Ústí nad Labem–Chomutov–Karlovy Vary–Cheb lines, the other one in the Ostrava area with the Ostrava–Opava, Přerov–Ostrava–Český Těšín–Mosty u Jablunkova, Ostrava–Havířov–Český Těšín and Ostrava–Frenštát pod Radhoštěm lines. Next to these regional projects, that year regular interval became dominant in national long-distance travel. The 2002/03 timetable season marks a break, it was the last year when the decision on timetable structures was the sole responsibility of state railways ČD.

4 Development of Periodic-Timetable-Network in the Czech Republic from 2003

The Ministry of Transport started to order long-distance traffic (Ex and R-type fast trains) from the 2003/04 timetable year. Also a regional structure of ownership by the 14 Bohemian and Moravian regions was created, extending to Sp and Os-type regional trains. Thus the 2004/05 timetable brought a huge amount of change, primarily in national long-distance lines now operated in a standardised manner. The network was gradually brought in line with a unified national scheme based on IPT-type oo-symmetry and IPT hubs were created. This first giant system leap was quite fiercely opposed within the railway organisation, the most prominent argument being that trains should continue to operate when most people need them rather than according to an 'unknown system' leading to many 'useless' connections next to a lack of capacity for freight transport. It took about five years for the entire organisation to embrace the idea of a comprehensive national IPT.

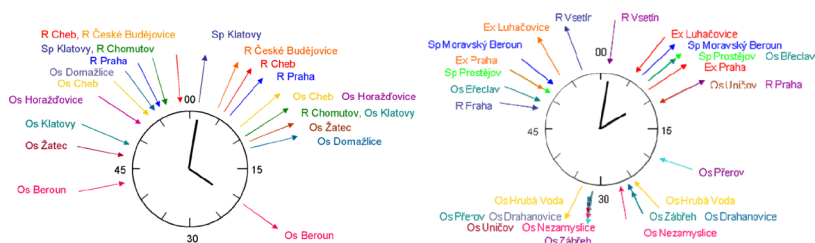


Figure 1 IPT-type junctions Plzeň (2006) and Olomouc (2009) in the Czech long-distance rail network

The regular interval concept not only created many new links and train services, it also terminated traditional direct links that did not fit the new scheme such as the Praha–Jeseník or Most–České Budějovice direct express train services. Sections that lost their long-distance trains were branched into the national long-distance network. Such changes partly explain opposition within the railway organisation. It was therefore avoided to advance too fast. The new concept was progressively introduced within a five-year period as follows:

- 2003/04 – drafting the new concept, first adaptations;
- 2004/05 – first big system change including an additional seven per cent of train kilometres;
- 2005/06 – further system adaptation without additional train kilometres;
- 2006/07 – further adaptation including an additional five per cent of train kilometres;
- 2007/08 – further adaptation including an additional 15 per cent of train kilometres; the Ministry of Transport from now orders the timetable of EuroCity and InterCity-type trains, EC supplements are abolished. ec and ic trains form the upper service level within the national timetable, therefore a unique tariff scheme for the entire system is established;
- 2008/09 – intervals made shorter on main lines, an additional twelve per cent of train kilometres;
- from 2009/10 onwards – stabilising and realigning the scheme.

In terms of passenger numbers in publicly ordered long-distance traffic the success of the new concept became apparent after two years: Increase in passenger numbers ranged from 10 to 40 per cent for the railway lines realigned according to the IPT scheme, and after four years it amounted to 20 to 120 per cent as compared with the base year. The most distinguished results were reported from the Praha–Ústí nad Labem line where a two-segment order of services with a consistent regular interval was established. The number of trains on this corridor line was almost doubled, instead of the initial two long-distance lines there are three lines representing a different policy of train stops serving almost six times as many passengers than four years ago – thousands of passengers daily who did not travel by rail before.

The role of the Ministry of Transport is limited to ordering long-distance public transport. Without such an order (without compensation payments) State Railways only operate their SuperCity (sc) type 'Pendolino' tilting trains between Prague and Ostrava. As regional transport now belongs to the regions, negotiations are necessary between the Ministry and the various regions. There is no such a thing in Czech Republic as an 'obligation of linkage' between regional and national systems, every owner is free to set their priorities. This explains why we can find within the Czech system many instances of excellent connections between regional and long-distance lines next to linkups that do not work well or do not exist at all.

Regional owners in favour of IPT-type timetables who have implemented a good set of linkups with long-distance lines are the Praha, Brno, Plzeň, Ústí nad Labem and Hradec Králové regions, and the situation is not bad in the Ostrava, Olomouc, Zlín and Liberec areas. To date no national transport planning scheme for regional transport has set the pace for development of the entire system. Each owner is responsible for their planning, including coordination with neighbouring regions and with the Ministry. Most regions have installed a transport and conceptual work coordinator. The Ministry for its part has established close relationships with Institut für Regional- und Fernverkehrsplanung (IRFP – Institute for Regional and Long-distance Transport Planning) in Dresden and České vysoké učení technické (ČVUT – Czech Technical University) in Praha.

Next to the problem of the reluctance of the entire railway organisation to adopt an 'IPT mindset', another set of problems is related to quality issues. The railway company uses old rolling stock for most long-distance services the daily circulation of which has been optimised through IPT. The comfort offered by current stock does not match twenty-first century expectations and the intense use of old stock puts additional strain upon them which can be detrimental to reliability and punctuality. Construction due to the developments of corridor lines also affects timeliness.

The regular interval timetable scheme has brought many new passengers to railways. If we want them to remain we cannot allow the pace of change to slow down. Following the first two essential steps of introducing regular timetable and integration of public transport modes, the biggest potential is with the development of rolling stock. Also more time and effort must be dedicated to annual timetable planning, including the simulation of bottlenecks and the creation of intervention scenarios for cases of disturbances or unforeseen events.

The present Czech regular interval timetable scheme cannot yet be regarded as final. Much remains to be achieved such as diminishing intervals on busy relations, introducing accelerated services on modernised lines and creating new hubs through infrastructure investments. The aim is to create an efficient system demonstrating to passengers that railways can be the backbone of an attractive, flexible alternative to private transport.

5 Current risks of further development

The further development and improvement of IPT in the Czech Republic will be only possible with IPT-harmonized infrastructure improvements. However, the crucial condition represents the ordering of long-distance trains based on the principle of controlled competition or franchises (exclusive rights) without applying of full open-access. The nowadays step by step implemented open access in long-distance transport associated with reducing of compensation leads now to reducing of ordered long-distance train performance unfortunately. This reduced compensation results in 6,5 per cent decreasing performance given in long-distance train kilometres for timetable year 2012.

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