INTRODUCTION OF THE PERIODIC TIMETABLE ON THE HUNGARIAN RAILWAY NETWORK – ETAPPE 1

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Summary: This paper describes the introduction of the regular interval timetable on the Hungarian railway network. The project for a new timetable was started in 2004, with a pilot project on suburban lines around Budapest. The project was such a great success, that a decision was on the extension of the system to cover the majority of the railway network. The first etappe started in 2006, in the eastern part of the country. The backbone of the system is the new InterCity-system, with hourly services between all major cities in the eastern part of the country. The paper presents the steps of the planning and the first results of the new system.

1. Introduction

The application of the periodic timetables for railways dates back to beginning of the 20th Century. The first railway periodic timetable was introduced by the Dutch Railways on the Rotterdam – Scheveningen line in 1908 [1]. Later the system was extended to whole Dutch network, and the first Integrated Periodic Timetable (ITF) [4] was born.

Starting from the 1980s, the ITF slowly became the de facto standard timetable structure for most Western European countries. The experiences pointed out that a properly designed and operated ITF system increases mobility and offers flexible, predictable and frequent services to the passengers. On the other hand, it also shows the bottlenecks and spare capacities of the network. Thus, while providing better services, the ITF can be a cost-saving solution for infrastructure operators.

2. The Hungarian pilot project

2.1. Background

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In the past ten years, the demands for more mobility and better quality public transportation significantly increased in Hungary. This is clearly indicated by the increasing number of cars and the fact that about 400.000 citizens left Budapest for the suburbs between 1995 and 2005, while the number of railway commuters did not change dramatically. Moreover, the overall number of railway passengers started to decrease from the mid-1990s.

In spite of these facts, the practices for railway passenger timetable planning remained the same. The annual timetable was always a copy of the previous year's timetable, with slight adjustments. The planning process was usually based on passenger complaints, without predefined strategic objectives. Throughout the years, this became one of the main factors of continuously deteriorating efficiency of railway passenger transport.

To make things worse, all attempts to reduce the loss of MÁV by cutting back services, failed. They resulted in loss of passengers and income, worsening resource utilisation, without significant cost saving. These experiences led to the conclusion that the railway-reform must start at the basis of all railway operations: the timetable.

2.2. ITF in Hungary

To improve competitiveness of the Hungarian railway, and increase efficiency, the ITF system was implemented as a pilot project on the Budapest – Vác – Szob and the Budapest – Veresegyház – Vác lines. As a result, the lines had a massive, 14% increase on passenger traffic. Many commuters had given up cars or coaches to travel by train, because of the reduced journey time and the increased service frequency [2] [3]. The success of the pilot project proved that the application of the ITF on the whole Hungarian transport network may help the railways to move out from the depression.

3. Extending the system to the whole network

At the end of 2005, a decision was made that the ITF system must be extended to the most of the Hungarian railway network. The main objective of the project was to reform completely the suburban traffic around Budapest, providing at least 30 minutes service frequency on the important mainlines, all day long. Since these lines carry mixed traffic, the suburban reform required the harmonisation of the inland long-distance and international services with the suburban services. Thus, a fully harmonised timetable had to be built up from scratch.

Due to the size of the project and considering the available resources, the timetable reform was planned to take shape in two steps. In the first step (called “etappe I”, or “ITF-Ost”), the ITF system was planned on eastern part of the country and the Budapest-Vienna line. However, the Ministry of Economy and Transport judged the first step to be too risky and financially unclear, and selected only the most important and busiest lines for the project (Fig.1.)

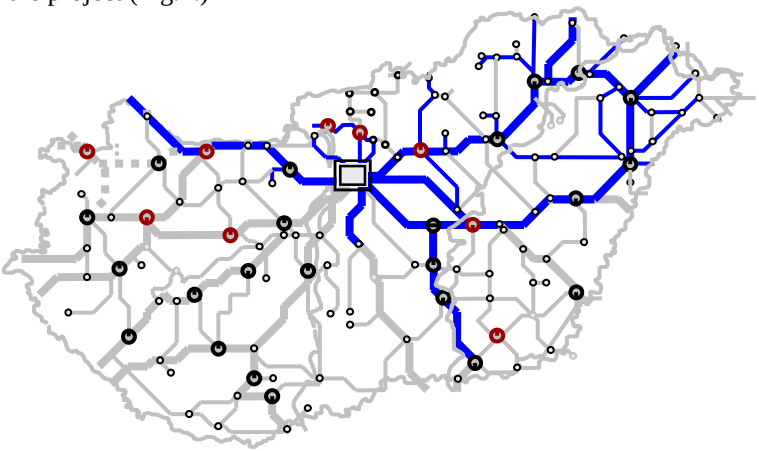

Fig.1. Lines included in the ITF etappe I. (marked with dark lines)

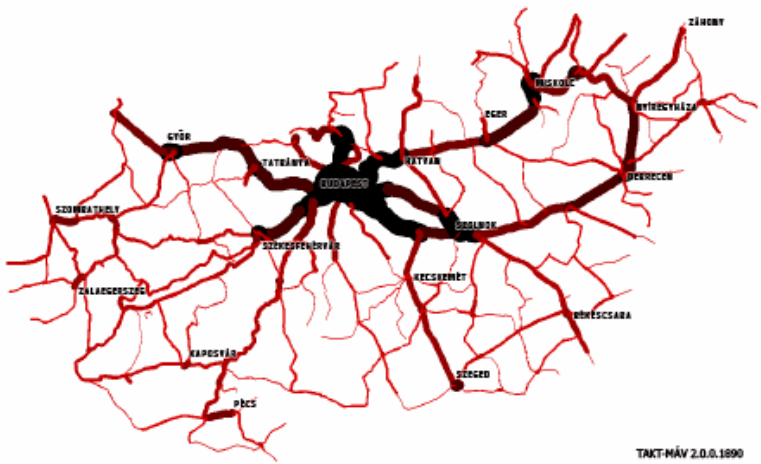

Fig.2. The ”Train-map”. The thickness of the lines correspond to the number of running trains.

The planning of the new timetable was based on the classic ITF principles [6] [7]. The system is based on strict periodicity, symmetry and optimal connections at the network nodes. On the “ITF-lines”, there are no more timetable “gaps” outside the peak hours. Trains are running in every 30 minutes on the busiest commuter lines, and in every hour (or in every second hour) on the other lines. Where it was possible, additional services were inserted into the timetable in the peak hours, without disturbing the basic system. The significant structural change of the “ITF-lines” required to modify the timetable of the connecting branch lines and bus routes as well, so the periodic timetable simply “spread” through the eastern part of the country.

On the ITF lines, the overall increase of train km was 22%, mainly caused by the new commuter services and long-distance trains (Fig.2)

4. New routes and train types

The new timetable structure required the introduction of new train routes and train types.

4.1. More and faster trains for commuters

Zoning structure [2] [3] was introduced on the three busiest commuter lines of Budapest. On four lines, the basic interval between the trains was decreased to 30 minutes in the inner circle around the city, with additional trains in the peak hours. The suburban services around other major cities in Eastern Hungary were also improved.

4.2. New InterCity network

The backbone of the timetable is the new InterCity network, which interconnects all major cities of Eastern Hungary (Fig.4).

Fig.4. The new intercity network

The new system is based on two routes:

- The two hourly circle-InterCity trains start from Budapest, go through Miskolc, Nyíregyháza, Debrecen and Cegléd, then return to Budapest.
- The hourly long-distance trains from Budapest to Szeged.

The two routes are connected at Cegléd, which became the most important network node in the system. This way the six cities have systematic connections at least in every two hours. The direct InterCity trains from Budapest to Miskolc and Nyíregyháza are also integrated into the system, providing hourly services from/to Budapest.

4.3. The „hybrid-train”

Due to technical limitations of the Budapest-Cegléd-Szeged line (mainly single track), it was not possible to provide hourly services and connections with running both InterCity and fast trains. To overcome this problem, the so-called “hybrid-train” was created. This is a mixture of the previous InterCity and fast trains, running in every hour, seven days of a week. The composition of the trains contains InterCity wagons with obligatory seat reservation, fast train type wagons without reservation, and a restaurant or a bicycle wagon.

5. Introduction of the new timetable

5.1. Communication

The introduction of the new timetable was supported with advertising and other forms of marketing. Giant posters, TV and radio advertisements, brochures, flyers were widely used. 300.000 simple timetable brochures were handed out to the passengers in the ticket offices and on the trains. A separate webpage - www.mav.hu/utemesmenetrend - has also been designed, dedicated entirely to the introduction of the new timetable and the up-to-date timetable-brochures in PDF format.

5.2. Passenger complaints

A total number of 1583 passenger complaints arrived in the first month of the introduction (December of 2006). Only 273 of these were

concerned about the timetable of the ITF lines. Considering the dramatic timetable change, and the fact that these lines carry about 50% of the passenger traffic in the country, this number is surprisingly low. Similarly to the previous years, the overall number of complaints dropped back to normal after two months.

5.3. Punctuality

The more trains, the completely new system and the low technical level of traffic control required close cooperation of all railway workers during the running in of the ITF. According to the expectations and the experiences with the pilot project [2], the start was not free of problems. The punctuality had fallen significantly after the introduction, and many fine tuning had to be applied in the turnrounds in the first weeks. After two months, the system became stable, and – despite the increased number of trains – the punctuality restored to normal level.

6. First results

6.1. Improving the efficiency

The new timetable was heavily based on better utilisation of the existing resources, especially the rolling stock. This was achieved with optimised (and sometimes shorter) turnrounds and reorganization of maintenance works.

Table 1. shows a comparison of the change of annual train km volume and the improvement of ticket inspector turnrounds on the ITF lines.

	Old timetable	New timetable
Annual train km	100%	122%
Train / ticket inspector (annually)	399	503
Train km / ticket inspector (annually)	27.329	33.606

Table 1. Improved efficiency of staff turnrounds on ITF-lines

6.2. Passenger statistics

After three months, enough data is available to make preliminary conclusions of the success of the new timetable. Fig.5. shows a comparison of the number of passengers on ITF and non-ITF lines. The first statistics show that the new timetable brought new passengers (about +7% in February) and helped to reverse the loss of passengers on the ITF-lines. On the other hand, the non-ITF lines suffered from dramatic loss in both

December and January (5% and 9%), which improved slightly in February. This is likely a side effect of the new timetable, since many non-ITF lines have better connections to the ITF lines.

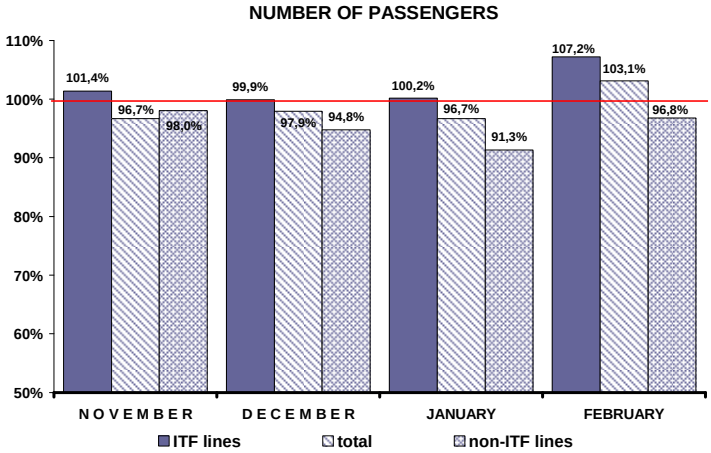

Fig.5. Comparison of the number of passengers on the ITF and the non-ITF lines after the introduction

6.3. Results of the passenger survey

To draw a clear picture of the passengers' satisfaction with the new timetable structure and the new "hybrid train", a comprehensive survey was made among 3500 passengers on the trains of the Budapest – Szeged route. The results of the survey proved the expectations: the vast majority of the passengers (93%) found the periodic timetable better (Fig. 6.)

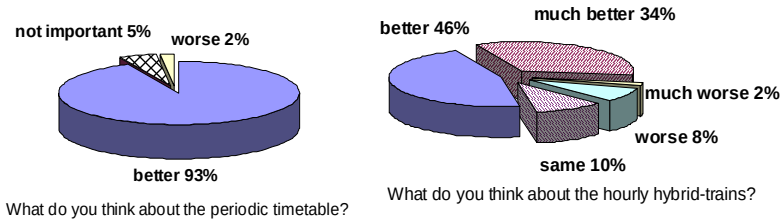

Fig.6. Results of the passenger survey

34% of the passengers rated the new, hourly hybrid-train service much better, and 46% better (Fig,6.). The structural change of the timetable

also influenced the mobility and the passenger habits: 20% of the passengers answered that since the introduction of the new timetable, they travel more frequently. About 3% of the passengers are “newcomers”, who changed from bus or car to train. On the whole, the total increase of the number of passengers on the Budapest – Szeged line reached 7% after three months. This is even better than the expectations.

7. Conclusions

Similarly to the successful periodic timetable pilot project, the extension of the ITF system to the eastern part of country also proved to be successful. Although the startup was not free of problems, the railway workers and the passengers quickly got used to the new system. The results of the first three months are promising, and indicate that the new timetable is attractive to the passengers, improves efficiency and helps to restore the image of the Hungarian State Railways.

There should be no question that the building up of the new public transportation system of the country must be continued, with the further extension of the ITF system on all transport modes.

8. References

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