

THE METHOD TO APPRECIATE THE ACCESSIBILITY OF URBAN PUBLIC TRANSPORTATION IN SIGHIȘOARA

METODĂ DE APRECIERE A ACCESIBILITĂȚII TRANSPORTULUI PUBLIC URBAN ÎN SIGHIȘOARA

Carmen-Georgeta IONIȚĂ¹

Abstract: By the analysis presented in this study it has been established the way in which the public transportation in Sighișoara satisfies the needs of the population to travel, including the towns which are within its administration: Venchi, Soromiclea and Hetiur. The using of the congruent method of transportation (network) with the street route allows identifying the measure in which Sighișoara route of public transportation can be extended in the conditions imposed by the actual street routes.

Key-words: transport, network, congruent, route
Cuvinte cheie: transport, rețea, congruență, traseu

INTRODUCTION

The research is part of an impact study of public transportation in Sighișoara geographic environment, the latter presenting details about the local public transportation of Sighișoara. The main issues of the study concern the development of a local public system which tries to satisfy better the public and to create good conditions of travelling in the urban space of Sighișoara town. For this purpose, the application has been made to analyze the configuration of the important street and public transportation networks, the measurement of the index of congruence and settlement shows how Sighișoara is served or low served by the present public transportation network.

METHODOLOGY

The transportation network congruence with a street network is defined by taking into account the concordance between the two networks not coinciding themselves perfectly. As a result concerning the transport networks, the congruence refers to the identical (isomorphs) forms of the street network graphs with that of the transport forms. “So that we consider that a transport network is congruent with the street network when the two graphs associated to the networks are isomorphs (represent the same situation)” (Ghionea and Movileanu, 2004).

¹ Ph.D. Student, University of Bucharest, Doctoral School “Simion Mehedinți”

In 2004, the same authors defined the congruent coefficient as being “an indicator that permits the appreciation of a good service or a subservice of a zone by the public transport network”. According to them, the “C” index of congruence calculation can be determined by many methods. For the determination of the congruent index of a public transport network in Sighișoara with the important street network, the formula in figure 1 was used:

$$C = \frac{\text{number of exploited transport lines}}{\text{number of transport lines which will assure the congruence}}$$

Fig.1. The calculation formula of the index of congruence

Source: AGIR bulletin, number 3/2004

CASE STUDY

The criterion of choosing this way of calculating the index of congruence was the great length of the main local public transport routes (the route length = element that reflects the quality of the service). So, from the 7 routes, 5 have lengths between 6 and 15 km (table no. 1). By calculating the congruence index, a secondary route has been removed which overlaps completely over one of the main routes.

Table no. 1.

The length of routes in Sighișoara town, 2011

Route	Length (km)
Line 1: Branch-Ana Ipătescu and return	6.8
Line 2: Branch-Gara-Cornești and return	7.2
Line 4: Branch-Policlinică-Cornești and return	6.7
Line 5: Branch-Dimitrie Cantemir and return	5.7
Line 6: Branch-Viilor and return	6.3
Line 7: Branch-Târnavă-Dimitrie Cantemir	3.7
Line 9: Branch-Hetiur	14.8

For the determination of the major road network, there has been used the criteria set of the Ordinance no. 43/1997 on the legal status of roads, according to which category 1 of roads (main ones) *provides the major flows taking major national road direction crossing the direction of the main town on this road*, 2nd class roads (of connection) *provide the major flow between functional areas and residential ones* and the 3rd class roads (collectors) *take the traffic flows of functional areas and directs them to the connecting streets or highway*.

According to this classification, the major traffic route consists of two important routes (DN 13/E 60, DJ 106), and the main street network consists of 27 streets grouped in 8 segments. For an accurate determination of the congruence index a special attention is required, because the major traffic network does not have to be mistaken with the major street network, and for determining the number of traffic lines which might assure the congruence, the segments that include more streets in extension must be considered as only one way. For example, one of the public transportation routes in Sighișoara which overlaps perfectly on DN 13/ E60 segment (which crosses the city) consists of 5 street extensions (Mihai Viteazul, Consiliul Europei, Morii, Zaharia Boiu, Cornești), but according to the matching index calculation is considered as a single route.

The graphical representation of the congruence public transportation routes in Sighișoara with the street network overlaps the road system perfectly of the current major network, but also areas (with large concentrations of population) are still not covered by this service, although these are situated on the main streets (Fig. 2, a and b).

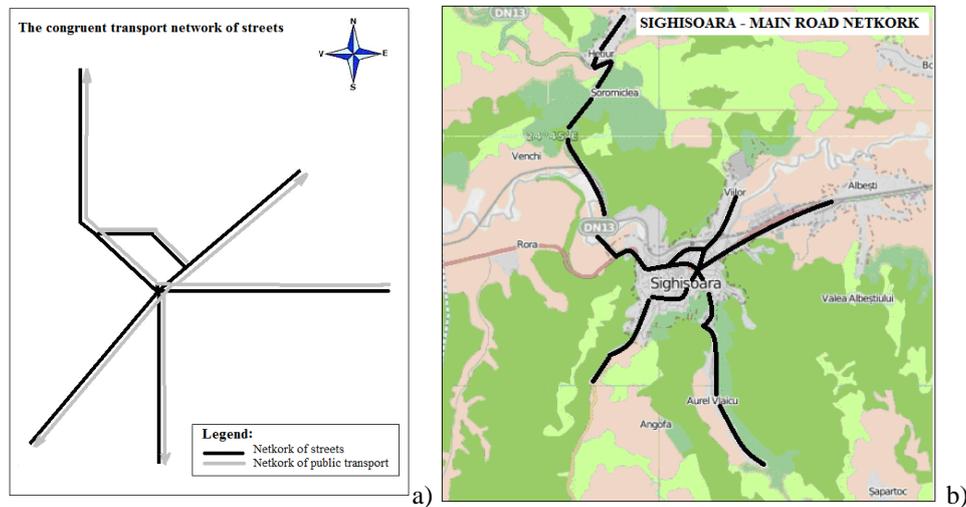


Fig.2. The local public transport network graph on the major traffic network in Sighișoara - a; The major street network in Sighișoara - b

Maps processed by Ionita C. G., 2011

Applying the formula in figure 1 to calculate the index of congruence of the main public transportation network of streets in Sighișoara, the recorded value was of 0.63.

$$C = \frac{7}{11} = 0.63$$

C - represents the congruence index

7 - represents the number of exploitation transport lines

12 - represents the number of transportation lines which assure the congruence

There must be mentioned that from the administrative point of view, Sighișoara town includes the Soromiclea and Venchi hamlets, to which Hetiur is added, in which the route of line 9 of public transportation overlaps the DC 50 communal road route (which crosses Hetiur on the entire length). The development of transportation must satisfy the travel needs of the local population in a higher degree, thus we consider that in the main street network there are also included the roads that cross the two hamlets, DC 59 in Venchi, which has 2.8 km and the main street (without any name) which crosses Soromiclea on a distance of 700 km. Taking into account these roads when determining the measure in which the recurrent network of transportation serves the town area, the value of the congruent index will be lower, respectively of 0.53, because the denominator of the fraction changes, such as:

$$C = \frac{7}{13} = 0.53$$

For a better interpretation of the results it is necessary to mention that the congruent index could have lower or higher values than 1: $C < 1$: indicates the serving of an area under the value of the network public transportation; $C = 1$: represents the ideal situation of equilibrium, in which the coverage of transport routes is optimal; $C > 1$: represents the over-serving of an area of the public transportation network (exceptional situation).

The results show that there is a bad service of the local public transportation network in Sighișoara due to some natural restrictive and anthropological factors. The first and most important restrictive factor in developing the street network, which constitutes the physical support of the traffic, is represented by the topographic specificity of the area. Because of the landform predominately of hills, the population settled along the valleys having a “pen” configuration- the main roads along which buildings were built go towards the centre of the city, being the only way to get around in Sighișoara. The hill relief hinders the street extension and the assurance of a straight connection between the residential and/or functional areas has been made by deviously routes.

The Târnavă Mare represents the second natural restrictive factor which divides the city and hinders the straight connections, and the 300 section of railway which crosses the city is considered an anthropological restrictive factor. From economical perspective, the Târnavă Mare and the section 300 of railway could be considered seemingly restrictions or limited factors because through some investments in infrastructure (bridges, passages, footbridges), the problem of straight connection and implicitly that of the extension of the street network would be solved.

CONCLUSIONS

In conclusion, for the planning of developing Sighișoara public transportation, the congruent method of public transportation network with the street network constitutes an useful instrument together with complex analyses that include the essential aspects which the transportation request, the possibilities of mobility and the costs of the network extension.

REFERENCES

GHIONEA F., MOVILEANU R. (2004), *The congruence of the transport network with the street network*, Bulletin AGIR (The General Association of the Engineers in Romania), Year IX, no. 3/2004, Bucharest.

NEGUT S. (1997), *The mathematical modeling in the human geography*, Scientific Ed., Bucharest.

POPA I. (2004), *The strategic management of transportation*, Economical Ed., Bucharest.

STOICA M. (2005), *The investment and the lasting development in transportation*, The University Ed., Bucharest.

*** *Ordinance no. 43/1997* concerning the juridical system of roads.