

RESERCHES REGARDING THE IMPROOVEMENT AND THE MODERNIZATION OF THE PUBLIC PASSENGERS TRANSPORT IN THE PERIPHERAL AREA OF PITESTI

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Abstract: *The transport is an essential element in the most activities of our society. Therefore, it must be tackled with policy at all levels, from the overall (i.e. United Nations) to the City Councils. A major importance is solving the dilemma between the policies oriented to increase, which tends to generate more transport and the environmental policies, which require the reduction of emissions. These can be difficult to fulfil if technological development to reduce emissions are outweighed by the increase of transport.*

Public transport wants to improve continually his performance by meeting the citizen's need and expectations, through high quality of public transport by implementing, maintaining and improving an Integrated Management System: Quality, Environment, Health and Safety, Social Responsibility, information security etc.

Based on the analysis realized with the local authorities (in order to identify the transport request), on the field visits (in order to evaluate the condition of the roads) and on the discussions with SC Publitrans 2000 SA (in order to evaluate their technical possibilities and to identify the economical implications) we have made proposals that will be the preliminary conditions for the development of the metropolitan transport system:

– *The local public transport system (inside the metropolitan area) will have an unique character, including the payment system: the passenger will be able to us one or more than one route using a single ticket , even if the price will be different base on then zone in which the travel is realized and it will be limited in time;*

– *The main routes will follow the access points in Pitesti, linking Pitesti with the towns in the peripheral area/ metropolitan area and their length will be maximum 16 km (the maximum accepted value-for the most charged route Pitesti-Mioveni which is a „heavy public transport axe“);*

– *The minim accepted frequency on the main routes will be 4 trips/hour, that is a following limit of 15 minutes (it is a „psychological limit“ the traveller must accept for the transhipment from a district route to a local one and inverted);*

– *At the end outside the area/metropolitan area of the main routes will be arranges buss stations where the exchange of travellers between the two transport systems local and district will be accomplished;*

– *The district routes will not interfere with the local metropolitan transport network, the district routes being limited to the buss stations specially arranged outside the metropolitan area;*

– *The buss stations inside Pitesti will be used only in the purpose of the public inter-district transport and for the local public transport.*

Keywords: TRANSPORT, NETWORKS, SYSTEM, METHODS, PASSENGER

1. Introduction

Socio-economic development and industrial development of Pitesti has lent to the formation of a peripheral/ metropolitan zone in which Pitesti and the cities Mioveni and Stefanesti have become poles for the passenger transport.

Therefore, they have initiated the procedures in order to create a inter-communitarian association that should intercede for the development of a unique public passengers transport system consisting two components: a modern transport network with tire-tramway, that should link the three cities in the area and a transport network with urban busses, that should take into account also the adjacent communes in the peripheral area.

Development of the transport system, with unique and permanent character, is based on studies realized by the University of Pitesti for the Local Council of Pitesti and the District Council of Arges, study in which the evaluation of the passenger's fluxes has been / was the experimental part on which the projection of the transport network has been based on. .

On this purpose we have proposed the improvement and modernization of the passenger transport network in the Arges District by extending the public transport network in the nearby zone of Pitesti and the resizing the district transport system, the closeness of these two components being assured trough the judicial proposal of laying out some buss stations for the passengers transport

Together with the extension of the road network for the transport in the peripheral area by buss, given that the increasing demand for the "heavy passenger transport ax" Mioveni – Pitești –

Stefănești, it is proposed that these three cities should be / to be connected by a faster transport network .

In this way we can assure the compression of the district network's length and the growth of the economical efficiency for both components of the transport system –in the district and in the peripheral area.

Current situation regarding public passenger transport realized by regular services within this area is:

- In Pitesti it works a unitary system of local public transport system realized by S.C. Publitrans 2000. S.A. associated with S.C. Girexim Universal SA Pitești, with a fleet of 110 buses of medium capacity/ vehicle park containing 110 medium capacity busses (fig. 1.1). we can see that some of the transporting lines have line endings also in the neighbouring localities (Arpechim-in Bradu, Service in Stefanesti and Bascov in Bascov township), which is explained by the fact that they preserved some features of the old system of local urban transport and pre-urban / town and pre-town public system, which gives a unitary character to the urban and the peri-urban area of Pitesti.

- The passengers transport between Pitesti and the other cities is assured by district transport lines, but also by local transport lines at the townships level: some neighbouring communes (Bradu, Băbana and Bascov) have promoted their own local transport system. This fact does not correspond at all with the unitary transport system; known to be fundamental for the modernization of the public transport and for the growth increase its performances .

Thus, we can observe that, in this moment in the peripheral area previously defined there is, beside the local routes, a number of 85 routes (80 district routes) and 5 local routes of nearby townships (one in Bradu, two in Babana and two in Bascov).

The public transport network of Pitesti in presented in the chart 1.

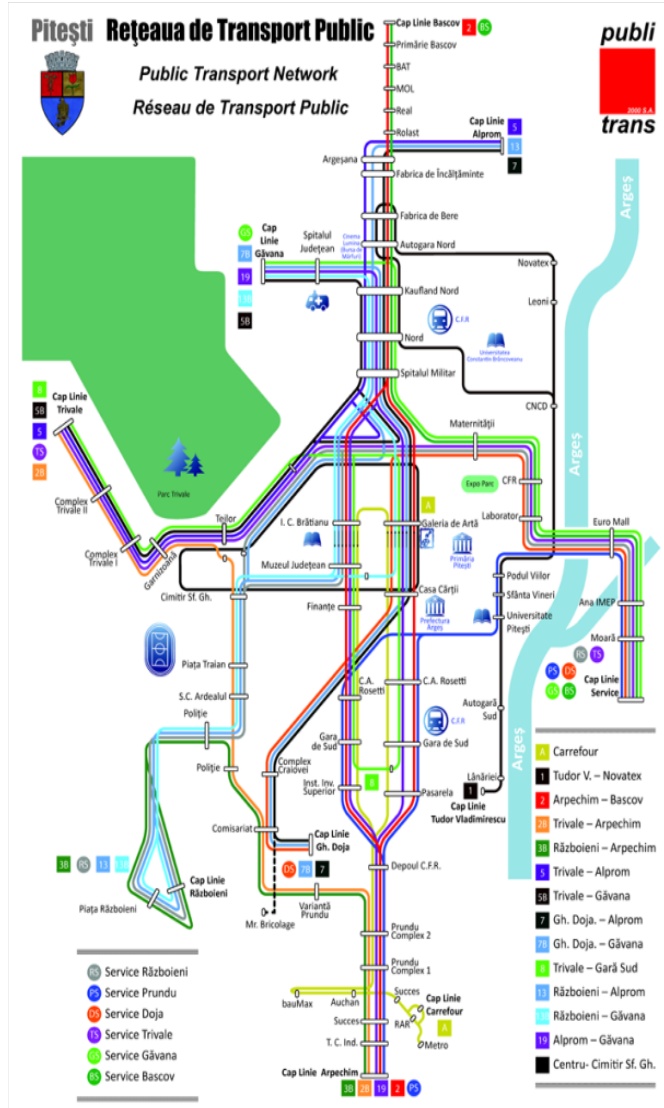


Fig. 1 The local public transport network in Pitesti.

2. The steps to follow for the development of public passenger transport network

In order to develop a public transport system, based on the contract [15] we have analysed the transport requirements at the peri-urban level and the technical possibilities of a gradual extension of the existing public transport network at the level of the entire area.

Based on the analysis realized with the local authorities (in order to identify the transport request), on the field visits (in order to evaluate the condition of the roads) and on the discussions with SC Publitrans. 2000 S.A. (in order to evaluate their technical possibilities and to identify the economical implications) we have made proposals that will be the preliminary conditions for the development of the metropolitan transport system:

1 – The local public transport system (inside the metropolitan area) will have an unitary character, including the payment system: the passenger will be able to travel on one or more than one route using a single ticket, even if the price will be different based on the zone in which the travel is realized and it will be limited in time;

2 – The main routes will follow the access points in Pitesti, linking Pitesti with the towns in the peripheral area/ metropolitan area and their length will be maximum 16 km (the maximum accepted value-for the most charged route Pitesti-Mioveni which is a „heavy public transport axe”);

3 – The minimum accepted frequency on the main routes will be 4 trips/hour, that is a following limit of 15 minutes (it is a “psychological limit” the traveller must accept for the transshipment from a district route to a local one and inverted);

4 – At the end outside the ... area/metropolitan area of the main routes will be arranged bus stations where the exchange of travellers between the two transport systems local and district will be accomplished;

5 – The district routes will not interfere with the local metropolitan transport network, the district routes being limited to the bus stations specially arranged outside the metropolitan area;

6 – The bus stations inside Pitesti will be used only in the purpose of the public inter-district transport and for the local public transport;

Moreover, given that the studies realized regarding the transport demand [15,16] have shown that on the route Pitesti-Mioveni the travellers flux is permanent and it has elevated values (almost 2000 travellers/day –fig. 2), it has been decided that it is necessary on this route to create the conditions of a faster transport line, and the analysis have brought to the necessity of the heavy transport flux from the Pitesti Mioveni route.

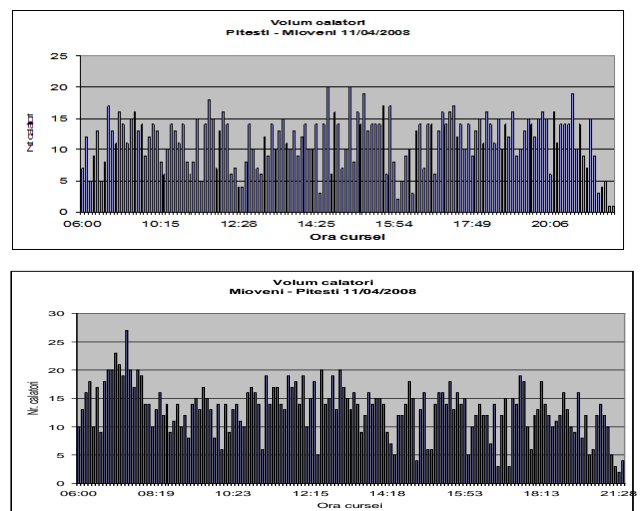


Fig. 2 The volume of passengers for the route Pitesti – Mioveni.

So, we have reached the proposal of building a new driveway between Pitesti and Mioveni and a bypass for Pitesti (see fig. 3), the new driveway will become a part of the national road DN 73 Pitesti Brasov, that will take over the heavy traffic between Pitesti and Mioveni, and the present national road between Pitesti and Mioveni will be declassified at the district level and it will be into the District Council administration.

In this way, on the route Pitesti Mioveni will exist only light traffic a modern and capable of performances fast transport line will be possible to be set-up.

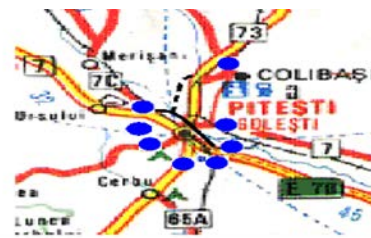


Fig. 3 The road arrangement in order to relocate the heavy traffic from the route Pitesti-Maracineni-Mioveni and the location for the 8 bus stations.

According to this imposed conditions, following a program through which have been taken into account the towns together with which Pitesti forms an inter-communitarian association, have been identified the transport request in the area and the access ways in the metropolitan area.

So, we have reached the conclusion that they can be taken into consideration 8 access ways in the suburbs and we have decided that on every one of them, outside the metropolitan area will be arranged a transshipment buss station for the two public transport systems- metropolitan and district (see fig. 3).

In Tab. 1 it is presented the correspondence between the 85 routes outside the metropolitan area and the 8 proposed routes, those last ones having the end in one of the 8 buss stations. In the last column is specified the length with which the district routes will be lessened once the limitation ant the transshipment buss station will be settled.

Table 1: Data regarding the correspondence between the routes at the level of the transshipment bus stations.

Type and no. route	Buss station/ town	Intermediary town	Buss station / town	Length of the route L_i km	Proposed peripheral route	Shrinking amount, S_i [km]
<i>district</i>						
24	Câmpulung	Stîlpeni	Pitești	53	<i>Pitești Sud - Mioveni</i>	16
34	Pitești Nord	Domnesti	Nucșoara	70		
35	Pitești Nord	Domnesti	Slatina	64		
36	Pitești Nord	Piscani	Domnești	42		
39	Pitești Nord	Mărăcine ni	Valea Mărului	20		
104	Pitești Sud	Mărăcine ni	Mioveni	17		
105	Pitești Sud	Mioveni	Țițești	18		
106	Mioveni		Titesti	13		
107	Pitești Sud	Mioveni	Coțești	23		
108	Mioveni		Coțești	9		
109	Pitești Sud	Mioveni	Domnești	50		
111	Pitești Targ	Mărăcine ni	Făget	16		
112	Pitești Sud	Mărăcine ni	Făget	16		
113	Pitești Sud	Mioveni	Vulturești	40		
114	Pitești Sud	Mioveni	Boteni	46		
115	Pitești Sud	Mărăcine ni	Micești	15		
116	Pitești Sud	Micești	Păuleasca	25		
117	Pitești Sud	Mărăcine ni	Valea Nandrei	20		
118	Pitești Sud	Mărăcine ni	Priseaca	33		
40	Pitești Nord	Merișani	Brădet	58		

Type and no. route	Buss station/ town	Intermediary town	Buss station / town	Length of the route L_i km	Proposed peripheral route	Shrinking amount, S_i [km]		
41	Pitești Nord	Merișani	Costești Vâlsan	35	<i>Nord - Bascov</i>			
42	Pitești Nord	Merișani	Vilsănești	40				
43	Pitești Nord	Mioveni	Berevoiești	57				
52	Pitești Nord	Bascov	Drăganu	15				
59	Bradetu	Malureni	Pitești	62				
66	Curtea de Argeș	Merișani	Bascov	32				
151	Pitești Sud	Bascov	Morărești	33	<i>Pitești Nord - Smeur a</i>	2		
44	Pitești Nord	Poiana Lacului	Sămara	25				
45	Pitești Nord	Vedea	Uda de Sus	50				
46	Pitești Nord	Vedea	Gorani	52				
47	Pitești Nord	Poiana Lacului	Săliște a	47				
48	Pitești Nord	Vedea	Dogari	61				
49	Pitești Nord	Morărești	Fedelesoiu	58				
50	Pitești	Poiana Lacului	Vedea	30				
51	Pitești Nord	Poiana Lacului	Cotmeana	43				
138	Pitești Sud	Poiana Lacului	Săpata de Jos	31				
84	Pitești Sud	Topoloveni	Suseni	41			<i>Pitești Sud - Ștefănești</i>	8
85	Pitești Sud	Topoloveni	Glimbocata	30				
86	Pitești Sud	Topoloveni	Boțești	45				
88	Pitești Sud	Topoloveni	Ne grești	40				
89	Pitești Sud	Topoloveni	Priboieni	29				
91	Pitești Sud	Topoloveni	Le ordeni	26				
92	Pitești Sud	IMEP	Ștefănești Sat	10				
93	Pitești Sud	Ștefănești	Izvorani	12				
94	Pitești	Ștefănești	Gara Golești	12				
97	Pitești Sud	Calinesti	Topolo	21				

Type and no. route	Buss station/ town	Intermediary town	Buss station / town	Length of the route L_i km	Proposed peripheral route	Shrinking amount, S_i [km]	Type and no. route	Buss station/ town	Intermediary town	Buss station / town	Length of the route L_i km	Proposed peripheral route	Shrinking amount, S_i [km]
			veni							eni			
98	Pitești Sud	Vranesti	Cirstieni	25			136	Pitești Sud	Lunca Corbului	Mîrghia	32		
99	Pitești Sud	Ștefănești	Vrănești	15			137	Pitești Sud	Lunca Corbului	Săpata de Sus	40		
100	Pitești Sud	Vranesti	Udeni	14			139	Pitești Sud	Mosoia	Hințești	11		
101	Pitești Sud	Ștefănești	Văleni Sat	14			140	Pitești Sud	Cerbu	Costești	24		
102	Pitești Sud	Valea Mare	Ștefănești	10			141	Pitești Sud	Costești	Goleasca	49		
103	Pitești Sud	Valea Mare	Enculești	10			142	Pitești Sud	Costești	Rîca	65		
110	Mioveni	Pitești	SI obozia	73			143	Pitești Sud	Costești	Purcăre ni	62		
123	Pitești Sud	Căteasca	Păt uleni	25			152	Pitești Sud	Trivale	Richițe le	25	<i>Pitești Nord - Trivale</i>	6
124	Pitești Sud	Căteasca	M avrodol u	35	<i>Pitești Sud - Zama Rece</i>	8	153	Pitești Sud	Trivale	Ciocăn ăi	6		
125	Pitești Sud	Căteasca	Cir eșu	27			<i>local</i>						
126	Pitești Sud	Cătanele	Oa rja	18			Brad u	Pitești Sud	Geamănă	Brad u	8	<i>Pitești Sud - Bradu</i>	11
130	Pitești Sud	Oarja	Ne grași	39			Baba na 1	Pitești Sud	Trivale	Slătioa re	15	Pitești Nord - Trivale	6
131	Pitești Sud	Căteasca	M ozacu	41			Baba na 2	Pitești Sud	Trivale	Băbana	20		
119	Pitești Sud	Țuțulești	Ro ciu	30			Basc ov 1	Pitești Nord	Bascov	Prislop	8	Pitești Nord - Bascov	3
120	Pitești Sud	Țuțulești	Gligan u de Sus	27			Basc ov 2	Pitești Nord	Bascov	Dobrog ostea	6		
121	Pitești Sud	Țuțulești	Șerbăn ești	23	<i>Pitești Sud - Bradu</i>	11							
122	Pitești Sud	Brad u	Țuțuleș ti	20									
127	Pitești Sud	Negrași	Ștefan cel Mare	60									
128	Pitești Sud	Negrași	Băbăro aga	51									
129	Pitești Sud	Cătanele	Ne grași	43									
132	Pitești Sud	Lunca Corbului	M ozăceni Vale	56									
132	Pitești Sud	Lunca Corbului	Mozăc eni Vale	56	<i>Pitești Sud - Albota</i>	9							
133	Pitești Sud	Albota	Mareș	29									
134	Pitești Sud	Costești	Curtea nca	49									
135	Pitești Sud	Costești	Strîmb	54									

Regarding the promotion program for those routes peripheral/metropolitan (that will became main routes of the public transport network) we should think about a gradual development of an unique local public transport system at the entire defined peripheral are (it will start with new routes or with the extension of the existing routes inside Pitești, then they will be included the local routes of the peripheral townships as the contract for the local operators will expire and it will be finalized this year when the contract for the district routes will expire and the network will be extended on the entire area);

Also, we must define an urban area at the level o Pitești and a peripheral area at the level of the other towns so that the taxing could be realized differentially: urban are, urban area-peripheral area, and peripheral area;

All the 8 routes will become main routes (the passengers fluxes will be brought together in the buss stations and they will be very large all day long), and regarding the three transport poles (Pitești, Mioveni and Stefanesti) , on the routes Pitești-Mioveni and Pitești-Stefanesti those fluxes will reach very large amounts, fact that will sustain the opportunity to develop a fast transport line Pitești-Mioveni-Stefanesti.

Taking into account the geographic and socio-economical conditions in the area, we can sustain the promotion of a modern

transport mean: the tire trolley, which cumulates the advantages of the buss and the trolley and eliminates all their disadvantages.

Based on the realized studies, we have established the program of the peripheral transport network extension at the entire metropolitan area (tab. 2) taken into account the legal restrictions, because most of these routes are now being used based on legal contracts: as local routes, in the peripheral towns or as district routes.

Table 2: Program of the metropolitan/peripheral public transport extensions.

Route	No. Of correspondent district routes (N _i)	Date of the integration into the metropolitan transport network
Pitești Sud - Mioveni	19	01.07.2011 (when the contract for the present district transport line Pitești - Mioveni will expire)
Pitești Nord - Bascov	10	01.05.2010 (when the contract for the present local transport line Bascov, Bascov - Dobrogestea and Bascov - Prislop will expire)
Pitești Nord - Smeura	9	01.07.2011 (when the contract for the present district transport line Pitești - Hîntești will expire)
Pitești Sud - Ștefănești	16	01.07.2011 (when the contract for the present district transport line Pitești - Ștefănești will expire)
Pitești Sud - Zama Rece	7	01.07.2011 (when the contract for the present district transport line Pitești - Oarja will expire)
Pitești Sud - Bradu	8	01.01.2009 (when the contract for the present local transport line Bradu, Pitești - Bradu will expire)
Pitești Sud - Albota	12	01.07.2011 (when the contract for the present district transport line Pitești - Mareș will expire)
Pitești Nord - Trivale	4	Any ime(there are already local routes with the ending in Trivale)

3. Conclusions-Appreciations regarding the opportunity of developing a fast transport line between Pitești -Mioveni and Ștefanesti

This thee town (Pitești, Mioveni and Ștefanesti) are part of the peripheral area and they have become, grace to their socio-economical development, into public transport poles. We can say that a "heavy axe" has been created between Pitești and the nearby towns Mioveni and Ștefanesti.

So, only by evaluation of the passengers fluxes on the old transport means on the route Pitești -Mioveni (the minibuses-considered to be unattractive because of the diminished level of comfort and security) - v. fig. 2 and 3, we have reached the conclusion that the daily volume of passengers is about 1800 passengers/day in the working days and half of it in holidays.

As following, we can appreciate that the daily passenger's volume, in the conditions of a modern public transport system between the three poles (Pitești, Mioveni and Ștefanesti) will have greater values, fact that sustains the opportunity of developing a fast transport line between Pitești - Mioveni - Ștefănești.

Taking into account the geographic and socio-economical conditions in the area, we can sustain the promotion of a modern transport mean: the tire trolley, which cumulates the advantages of the buss and the trolley and eliminates all their disadvantages.

Obviously in order to accomplish this purpose it is necessary the inter-communitarian association we mentioned before (between

Pitești, the township Maracineni and the towns Mioveni and Ștefanesti), in order to develop this public transport system that will allow the construction of the necessary infrastructure.

Hereinafter there are presented o series of considerations regarding this type of public transport, known as Translohr, designation that can be found in the name of the European constructor who has promoted this type of transport in the last few years.

Translohr is a new generation of urban trolleys with a reduced weight. A real mean to conquer the urban space and to profoundly change the city and his utilization way, this trolley offers a unique facility thanks to his manoeuvrability and his weight adjusted to the human needs.



Fig. 4 Translohr – the modern trolley.

This trolley presents all the characteristics of the modern trolley: permanent guidance, great transport capacity, double directionality (double driving cab), modulation, full descended floor (25cm), full internal communication, all this overtaking, thanks to the tire scrolling, the well known inconveniences of the trail scrolling: the heavy floor, the noise in bends, high installation costs and long implementation terms.

Translohr bring together the technical performances (reversible frames, the turning ray reduced to 10.5m, mechanical guidance system installed on a central rail, secured breaking system, simplified depot equipments) and discretion (silent and slender).

The modulation of Translohr components allows the utilization of many types of dimensions 18, 25, 32, 39 or 46 m according to the number of modules that are utilized.

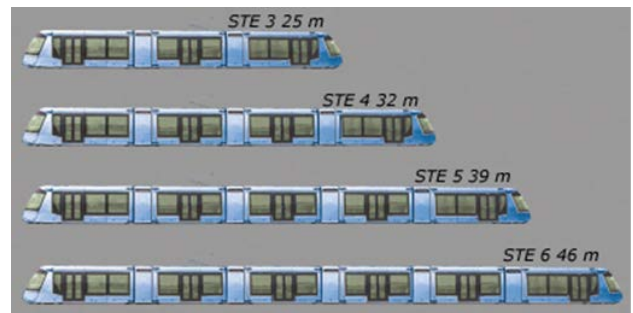


Fig. 5 Modulation of Translohr components.

The tire trolley assures a very small turning ray (10.5 m at the rail, no Mather the frame's type) fact that allows an easy implementation for the strait streets-that need small turns).

Equipped with a double cab at each one of the endings, the trolley's frames have double direction. This fact allows the exploitation without a turning zone at the end of the route end using depots with a single exit.

The ascending capacity is 13% thanks to the proper engine and to the superior adherence realized by the tires that assures with no problem the organization of the transport line on the superior terraces of the Arges inside Pitești.

The trolley's guidance is assured by two inclined at 45°bearings that penetrate a central rail.



Fig. 6 The trolley's guidance.

The low flat floor of Translohr allows the access at the level of the footpath (for a difference of 23 cm between the road and the footpath).

Translohr transport systems have been developed in six cities in the world:

- In France: Clermont-Ferrand (since November 2006) and Paris (Saint Denis-Sarcelles since 2011)

- in Italy: Padova (since March 2007), Aquila and Mestre-Venice (since 2010);

- In China: Tianjin-Teda (since the 10th of May 2007) and Shanghai Pudong;

In order to organize a unique transport system at the level of the peripheral area it is necessary the functioning of the inter-communitarian association, who will propose a developing program for the local public passengers transport by regular services.

The benefits of such a transport system for the entire community are real, the system being developed based on the present and future necessities for transport- fact that will assure it a permanent character.

Given the dynamic of the transport demand and the fast urban development, this transport system becomes must be implemented as flexible as possible. This characteristic will be assured by the transport by busses- the second component of the local public transport system.

In order to organize a unique transport system at the level of the peripheral area it is necessary the functioning of the inter-communitarian association, who will propose a developing program for the local public passengers transport by regular services.

Given the dynamic of the transport demand and the fast urban development, this transport system becomes must be implemented as flexible as possible. This characteristic will be assured by two ways:

- Trough a flexible transport program and a flexible transport capacity for both of the components (transport by buss and by tire trolley);

- Trough a flexible busses public transport network;

The benefits of such a transport system for the entire community are real, the system being developed based on the present and future necessities for transport- fact that will assure it a permanent character.

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