THE MÉTRO AND SURFACE PUBLIC TRANSPORT IN GREATER CAIRO, A FUTURE PRESPECTIVE

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1. INTRODUCTION

Greater Cairo (GC) one of the largest metropolitan areas in the world, is characterized by heavy population and very high population density per km^2. Furthermore, major job opportunities and shopping activities are not evenly distributed within its zoning system. These are rather concentrated in scattered locations and especially in its central area. Although the average family size in its different traffic zones is very high, 4.6 persons/household, its room occupancy is nearly 2 persons/room on average and its average family income is about 700 L.E. per annum, the standard of living of its inhabitants varies considerably (1). No. of cars in GC increases dramatically and in a trend that the street system and parking supply cannot cope with in an acceptable manner. The public transport system in the absence of a mass transit service is extremely overloaded. Due to radial routing of bus services as a result of the street network configuration a great number of buses appear daily in the city centre area. Hence, main arterials leading to the capital central area are heavily congested. The majority of GC residents depend on public transport followed by walk trips whereas the minority of trips occur on the private car and taxi. However, and due to the insufficient street network and parking supply the city streets in the downtown are always congested. Low occupancy rates of private transport modes and taxis add more problems in that respect of course. Public transport modes are mainly used in home based work trips which also apply to the use of the private car. Nevertheless, the use of taxi is heavier in the case of non-home based than those in the cases of HBW and home based other trips (1,2).

(1) These figures correspond to 1977 values.

The Egyptian government has been doing its atmost effort to reduce GC transport problems inspite of the limitations imposed by the national budget constraints. Such efforts include expanding transport infrastructure and adopting new policies for short, medium and long terms. The underground metro project is one of those projects that has gone underway for construction since Nov. 1981. This long awaited project will certainly have many effects on the Cairo setting and dwellers. The main objective of this paper is to identify these impacts and to try to quantify some of them in view of the available data set. It should be noted in advance that due to data and budget constraints some assumptions and approximations were made during quantification of the impact of the metro regional line on surface public transport. Hence, the analysis presented here is of a general nature. The importance of undertaking a wider investigation of this topic in the very near future is certainly waranted.

2. EXISTING TRANSPORT SYSTEM AND MODAL SPLIT

According to reference (2) the road network of GC consists of 4 main urban elevated freeways (one was completed 1979, one near complétaion and the other 2 are under construction), several major arterials, minor arterials, collector routes and local streets and alleys. The network area amounts to almost 17% of the area of GC. It should be noted, however, that the above percentage is based on intuitive judgement since no official figure exist. With the exception of the freeways, major arterials and some of the other street classes, the general condition of the paving has deteriorated. This is mainly due to lack of funds. Furthermore, 13 bridges exist that cross the Nile joining eastern and western parts of GC. A 14th major bridge is planned for 1987. The number of existing grade separation interchanges is 17 and there are other 8 under construction and 3 in the planning stage. The number of vehicles operating on the city street network is 320000 (4). The number of private car has increased dramatically since 1975. For example, the number of private cars in the governorate of Cairo alone increased by 40% between 1977 and 1979 (5). This happens even with the continuous efforts of the government to reduce it by e.g. increasing customs on exported cars and licencing fees. Such an increase in the No. of cars with the limited street network capacity creates the traffic congestion practiced in Cairo. In addition to increasing traffic congestion on city streets (6), the increase in nO. of cars puts a heavy burden on the existing limited parking supply. This is demonstrated in many parts of the capital and especially in the city center, where drivers are forced to illegal parking. For instance, illegal parking in the city center zones reached 60% of the total parking supply in 1979 (7).

Table 1 gives the numbers of public transport operating vehicles and lines (8). It appears from this Table that 6 different public transport modes existed in the survey year 1978. Existing bus service is mainly of a radial type originating and terminating in the city center. All public transport modes are owned and operated by the public sector. Furthermore, it may be interesting to note that no real increase in public trans-

port fares has taken place since 1950. The government therefore, pays huge subsidies in that sector. Accordingly, and in view of the economic situation, inspite of the great effort that is continuously being made by the existing two bus companies no real improvement in the level of service can be felt. The appearance of huge numbers of crowded buses on major and minor arterials together with the ever increasing numbers of cars has contributed to the deteriorated level of service of roads one experiences in GC.

For the visitor to Cairo private cars and taxis may attract his attention as they are the most widely used modes of travel. However, although Cairo streets are heavily congested with cars and taxis they came next to the public transport bus as far as the daily person trips are concerned (2). In 1971 a survey (13) showed that among all day trips 60% were done on public transport, 15% by taxis and private casrs and 25% on foot. The more recent surveys (8,9) showed also that among the 438400 morning peak motorized trips 55,9% occured on public transport and 44.1% on private modes and taxis. The public bus share of the above mentioned morning peak trips reached 185875 (42%) trips, the private car share was 71777 (16.4%) trips and the taxi share was 47972 (10.0%) trips. Statistics of the Cairo Public.

Table 1 : NUMBER OF LINES AND OPERATING VEHICLES OF DIFFERENT PUBLIC TRANSPORT MODES IN GREATER CAIRO, 1978 (8)

Public Transport Mode	Bus°	Tram °×	Trolley-bus °+	Rapid Tram (Metro) ×	Ferry °	Rail °
Number of lines	220	21	6	7	6	2
Number of operating vehicles	1439	156	74	45	18	28

+ Trolleybus service was eliminated in 1981

× Number of operating units : a tram unit consists of 2 cars, a metro unit consists of 4 cars and a train unit varies between 3 and 6 cars depending on time of day.

° Modes operated by Cairo Public Transport Authority

Transport Authority indicated that in 1980 the total number of daily trips on their modes reached some 3 million trips and that one third of these trips ended in the city centre for the sake of transfers only (14). This is of course a direct result of the radial routing of the bus service. Furthermore, the concentration of job opportunities and other major land uses in the city centre have led to the increased number of public and private transport trip ends in this sector. For instance, it was found that in 1978 (8) over 17% and 12% of GC and inner Cairo public transport trip ends occured in the city centre, respectively,. Relevant percentages for private transport were more than 20% of GC and over 30% of inner Cairo, respectively.

3. THE METRO PROJECT

In 1935 an Egyptian engineer (1) suggested constructing an elevated line to connect the 2 suburban railway lines Helwan/Cairo and Cairo/El-Marg. This is the same Regional Metro line which is under construction now. The cost at that time for constructing (2) this 4 kms. elevated link was under 1 million L.E. Now in 1980's figures the cost of constructing (2) the relevant 4 kms. tunnel has jumped to 192 (3) million L.E. ! The project has been discussed for years and years without a real attempt for implementation. In 1971 the French SOFRETU-RATP company made an extensive study including planning and engineering analysis. However, the government of Egypt has had many other priorities to take care of instead of this project. After 1974 the country started its pioneer peace process which ment that all the resources of Egypt are to be devoted for building the country. In 1980 the Ministry of Transport signed an agreement with France for building the first part of its Metro network. This is the Regional line. Implementation has started in November 1981 and work is scheduled for finalization in 1985 or 1986.

Figure 1 shows a paln of the line. The total length of the line is about 42.5 kms. The project consists of 3 stages as given below.

Stage 1 :

Up grading of the existing southern electrical suburban railway line from Helwan to Sayida Zainab, (see Fig.1).

(1) The late Dr. Sayed Abdel-Wahab, Vice Chairman of Egyptian Railways at that time.
(2) Includes stations and installations.
(3) 140 Million L.E. are covered by the French loan and 52 Million L.E. are covered by the government of Egypt.

Stage 2 :

Building an underground tunnel from Sayida Zainab to Ramsis Square, (see Fig.1), with a length of 4 kms.

Stage 3 :

Up grading and electrifying the northern suburban railway line between Ramsis Square and El-Marg, (see Fig. 1).

The second part of the project is to be completed in the 1990's with constructing the Urban Metro network. This network will be negotiated after operation of the Regional Line.

It can be seen from Fig. 1 that the Regional Metro will act as the backbone of public transport service in GC. This will certainly cause a dramatic change in the bus network. Mainly the existing radial routing of the bus service enging and starting in the city centre should vanish. Instead bus routes should be converted to a perpindicular manner with the Regional Metro Line. An attempt to quantify the impact of this line on surface public trempt service and demand is given in the following sections.

4.IMPACT OF THE REGIONAL METRO LINE ON SURFACE PUBLIC TRANSPORT

The main objective of this section is to determine the nature of effects that a regional metro line will have on surface public transport services in Greater Cairo in 1987, with special focus on impacts in the city center. The analysis mentioned here are summarized from an earlier paper by the authers (3) which can be consulted for further details.

Due to the contraints imposed on the analysis (3) the following restrictions were met :

1 - Only the street network was coded and stored on a magnetic tape. Therefore, some modifications and assumptions were made in order to make this network represent the public transport system as closely as possible;

2 - No public transport assignment package was available. Accordingly, the street network assignment package with an "all or nothing" minimum travel time algorithm without capacity constraint was used in assigning public transport trips. No informations was available about public transport transfer times ; hence some plausible assumptions were made to meet this data need. The outcome of the analysis was then subject to extensive manual alternation and correction (1,3).

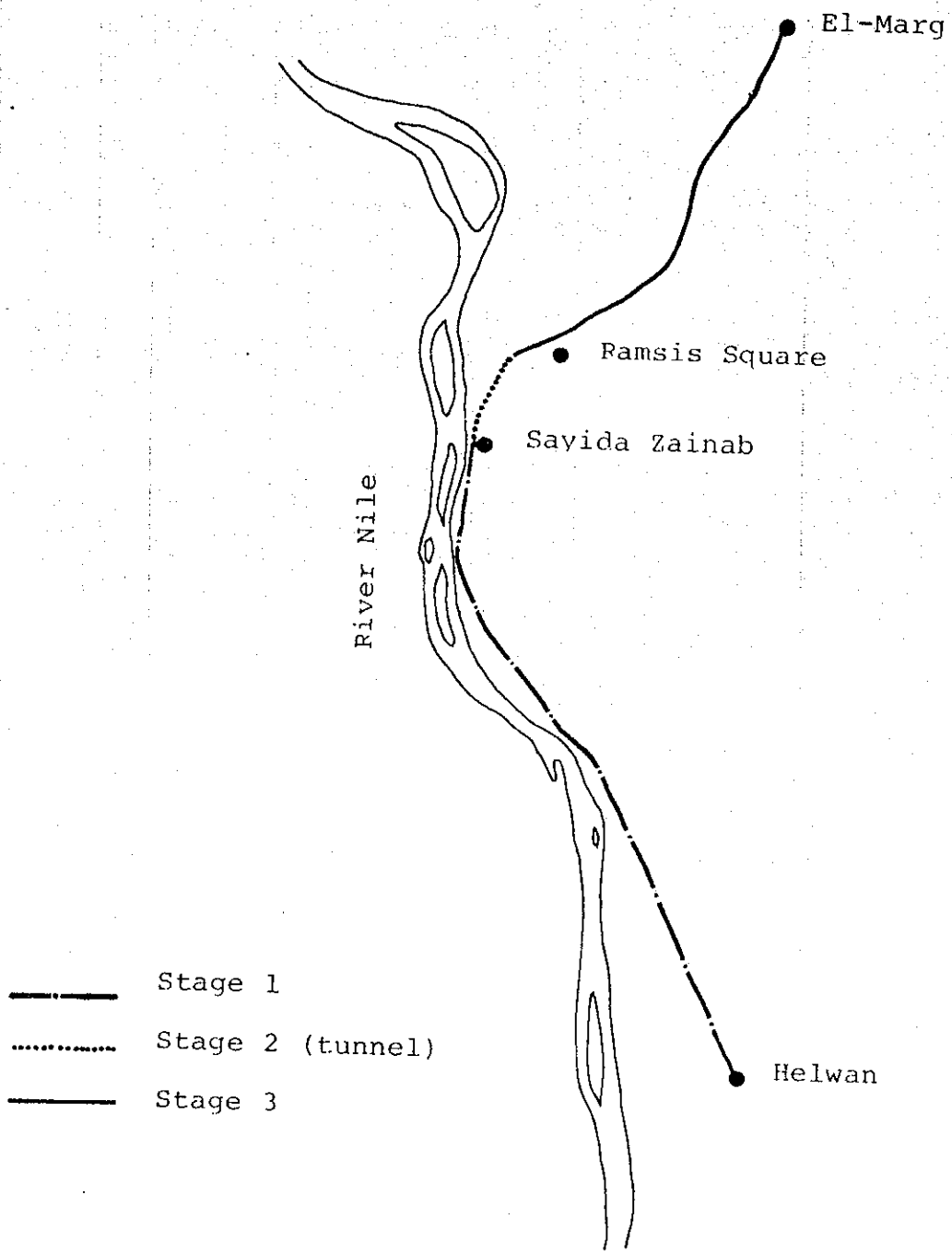


Fig. 1 The Regional Metro Line

4.1. Procedure Outline

The analysis procedure adopted in this study was conditioned on the objectives and limitations mentioned above. The main steps of this procedure are summarized in the flow chart give in Fig. 2. The year 1987, which is 1-2 years after the official year for opening the whole regional line to traffic, was designated as the horizon year for this analysis.

Based on the calibrated public transport trip generation models for Greater Cairo (1), 1987 zonal trip productions and attractions were calculated. The zonal trips were calculated for a period corresponding to that of the 1978 public transport survey (7 A.M. to 3 P.M. of a working day), (8).

The 1977 street network and the 1978 public transport network were available. However, only the 1977 street network was coded and stored on magnetic tape. To save time, it was decided to use this file after introducing the necessary adjustments to obtain a 1987 coded generalized public transport network. References (1 and 3) containts details of those adjustments.

The 1987 generalized public transport network took into consideration the future palns of Cairo Transit Authority (CTA). The following assumptions were made to code the 1987 network :

a. New nodes and links for the metro regional line (U.G.) were included as well as the extension of the tramway network at the periphery of Greater Cairo.

b. Metro average speed was assumed to be 35 km/hr.

C. In order to take the effect of the metro line on reducing journey time, link travel times were multiplied by reduction factors according to their distance from the U.G. line, (3).

Minimum travel time matrices were then obtained and the trip distribution program (1,3) was used to calibrate three trip distribution models, one model for each trip purpose (Home/work, Home/other purposes, Non-home based). This program resulted in three passenger trip matrices corresponding to 1987, one for each defined trip purpose. Since the matrices indicated non-directional person-trips for the nine hours between 7 A.M. and 4 P.M., it was necessary to apply three factors to obtain directional peakhour vehicle matrices. These factors were : directional factors,

Based on the 1978 public transport survey data, (8) these factors were produced and stored in computer files. Accordingly, the

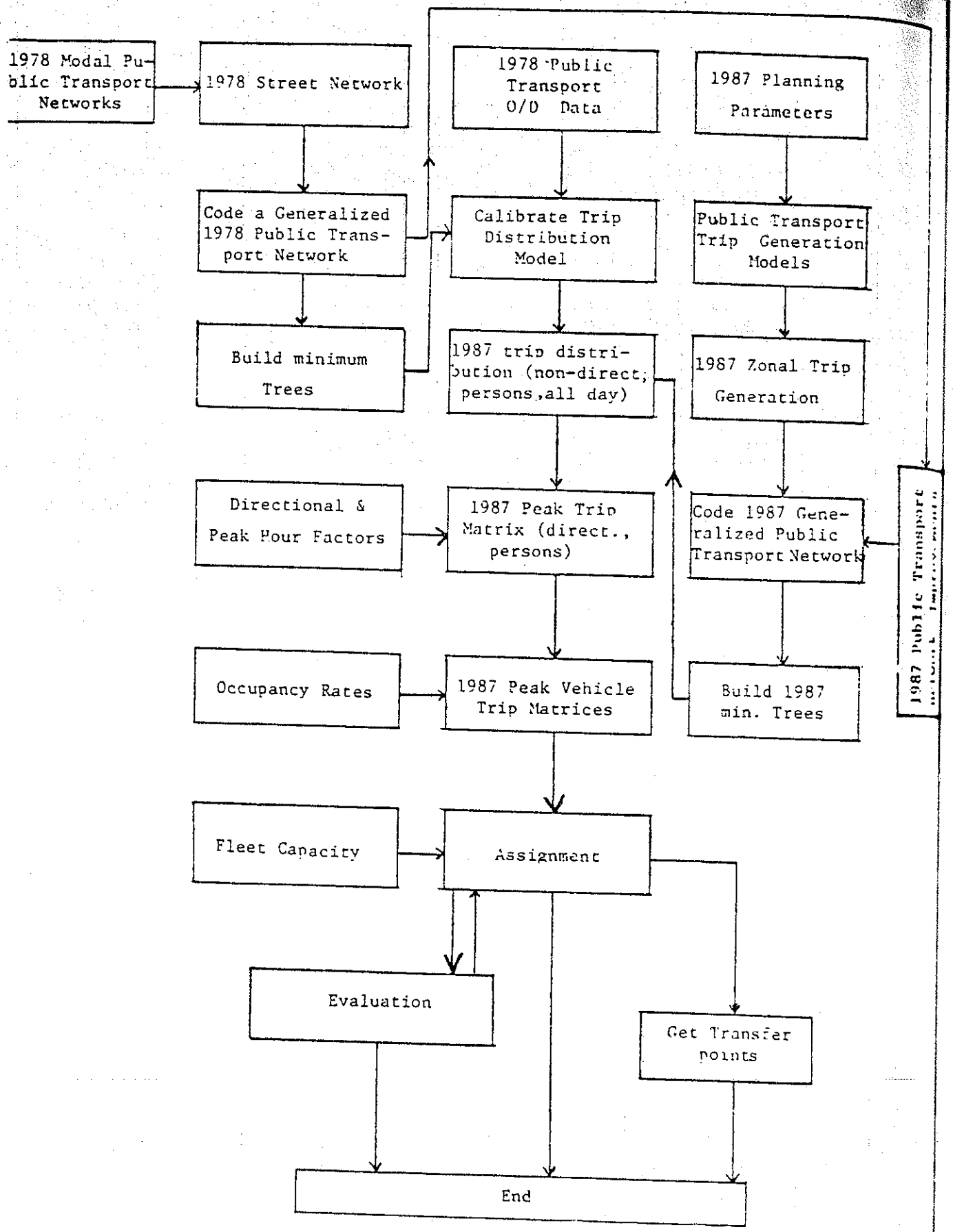


Fig. 2 Procedure Used to Analyse Effects of the Regional Metro Line on Surface Public Transport

required matrices produced in the format ready for assignment applications. The trip distribution exercise was repeated twice, first using 1987 travel times that corresponded to the "do nothing" (DN) alternative, and the second, using travel times with the "metro in operation" (MO) case.

With the result of the trip distribution process, assignment runs were made using the Cairo University computer package (1). An "all or nothing" method of assignment without capacity constraint was applied in the public transport runs. As a result of using the "all or nothing" assignment, it was found that some links were heavily loaded while other links had zero volume, an unrealistic condition. To correct such errors, a reassignment process was developed given a preference in loading to the metro line untill it reached its capacity. To achieve reliable results for the reassignment process, every mode was treated separatly (3). Then, a combination of all modes was studied to determine the configurations for new lines in Greater Cairo with the regional metro line operating. The following points explain the steps of the correction process :

1 - Correcting the loads on the links of the metro line :

The loads on links paralell to the metro links if any public transport mode were removed and reloaded on the corresponding links of the metro, taking into consideration the maximum capacity of the line (60,000 passengers/hour).

2 - Correcting the loads on the links of the other modes :

Considering the street capacities to carry bus passengers and also the fleet capacities of the tram and the metro of Heliopolis, the loads on all links of the Heliopolis metro, tram and buses were corrected by transferring loads from one mode to another (3).

4.2. Estimated impact of the Metro

As mentioned earlier, two cases of assignment of peak hour public transport person trips expected in 1987 were obtained :

1 - The "do nothing case, (DN).

2 - The "metro in operation" case (MO).

A comparison between the results of these two cases was made in order to assess the impact of the metro line on public transport service in Greater Cairo.

Table 2 gives the expected city centre bus trips in the 1987 morning peak in the DN and MO cases. It is clear from this table that the number of bus trips to and from the city centre is expected to be reduced dramatically (by about 70%) after implementating the regional metro line.

In other words, the present high volumes of passenger transfer trips that take place in the city centre will be markedly reduced.

Table 2 : Expected City Centre Bus Trips in the 1987 Morning Peak

	"DN" Case	"MO" Case	Difference	Change %
Entering	73426	20366	53060	- 72%
Leaving	74487	23264	51223	- 69%
Total	147913	43630	104283	- 70%

Accordingly, it is anticipated that the number of buses running in the city centre streets can be dramatically reduced. Figure 3 shows these estimated reductions for selected major streets in the city centre. On average, a 36% reduction in bus flows is expected to take place on the selected 11 streets shown in Fig. 3 during the 1987 morning peak. On some streets a massive reduction will occur, such as on Kasr El-Einy Street, where the reduction is estimated to be 98%.

Furhtermore, a great reduction in bus trip ends at the three major squares in the city centre are also expected. Fig. 4 and Table 3 show that reductions of 81%, 56% and 58% of peack hour trip ends by bus are estimated to take place at Tahrir, Ramsis and Attaba squares, respectively.

Table 3 : Bus Trip Ends in Major City Centre Squares

Squares	1987 Total Trip Ends		1987 Change	
	"DN" Case	"MO" Case	No.of Trips	%
Tahrir	52000	10000	42000	- 81%
Ramsis	42500	10375	32125	- 57%
Attaba	48750	20500	28250	- 58%
	143250	40875	103375	- 72%

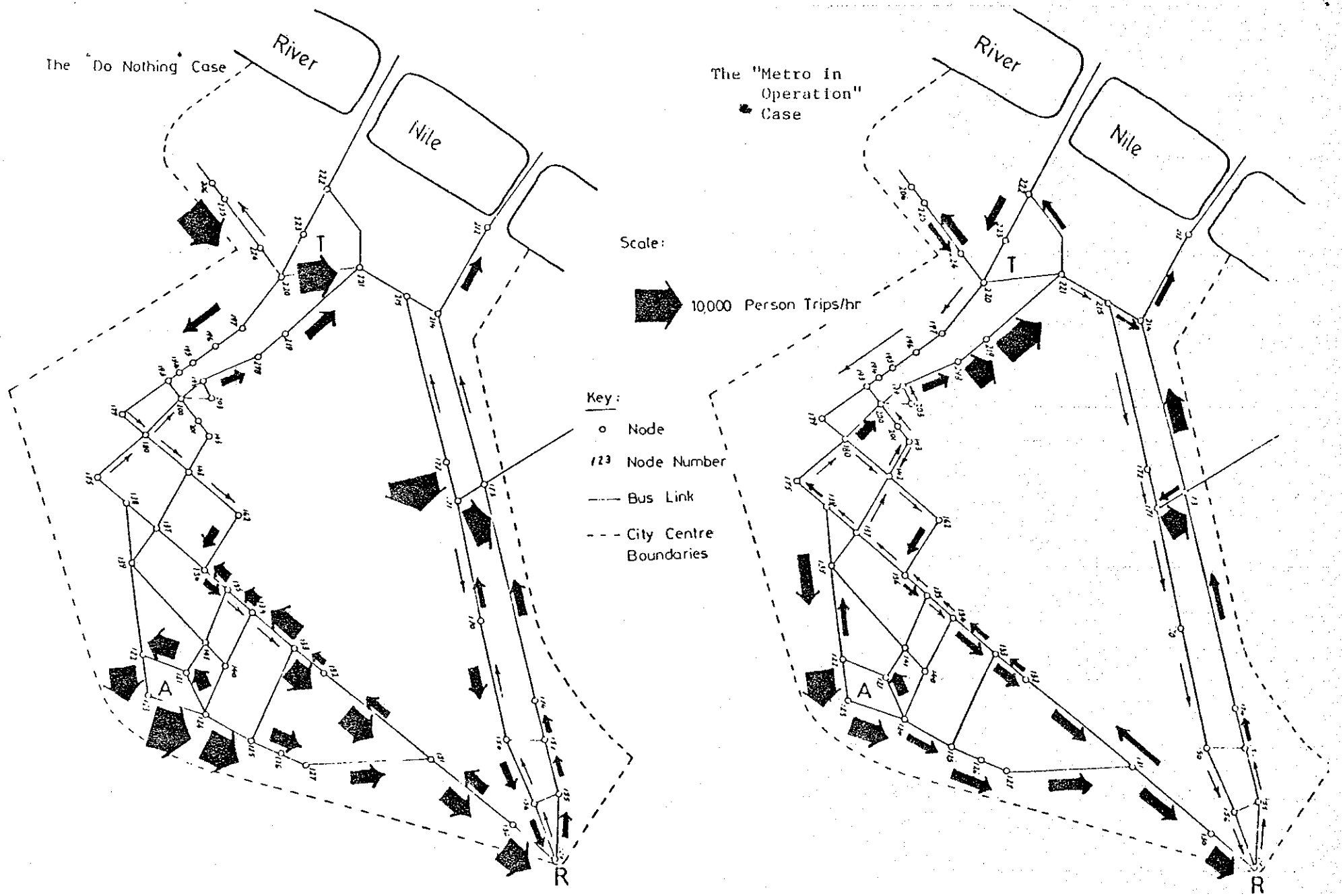
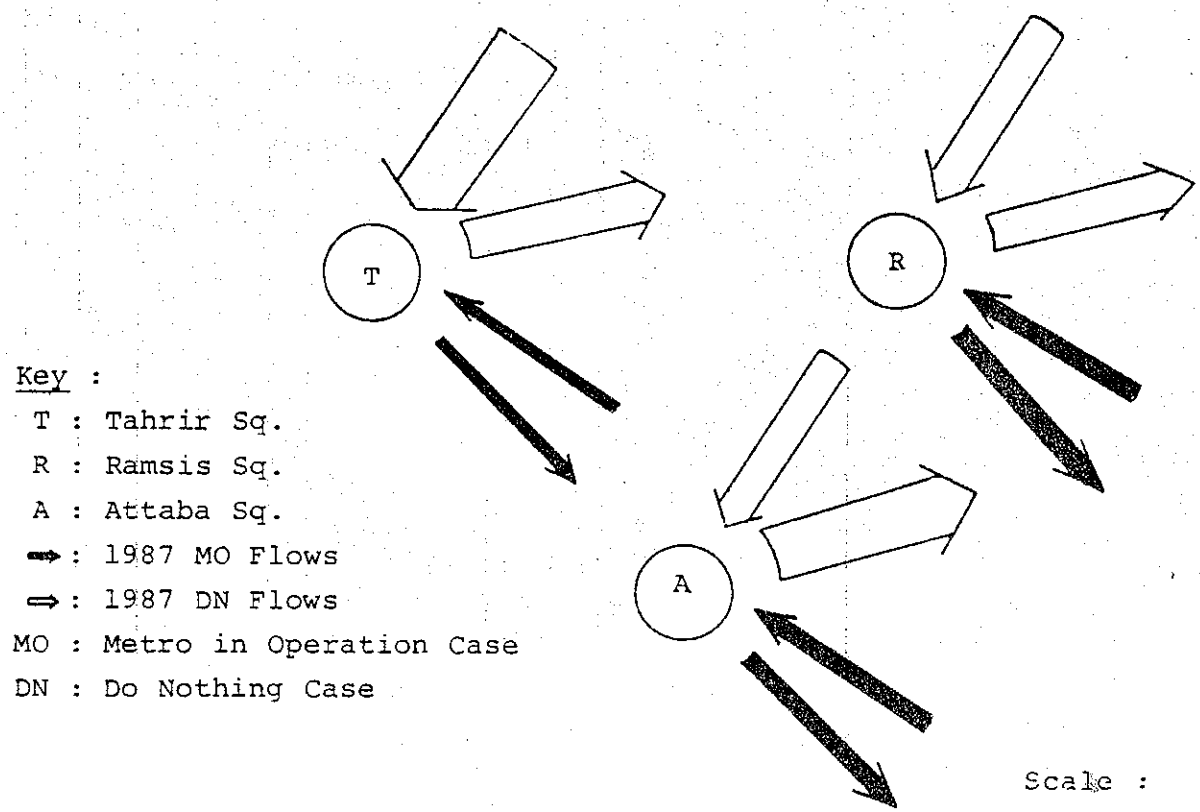


Fig 3 : Expected Impact of Regional Metro Line on Morning Peak Hour Bus Person Trips in Selected Major Streets of the City Centre in 1987



Key :

T : Tahrir Sq.

R : Ramsis Sq.

A : Attaba Sq.

➡ : 1987 MO Flows

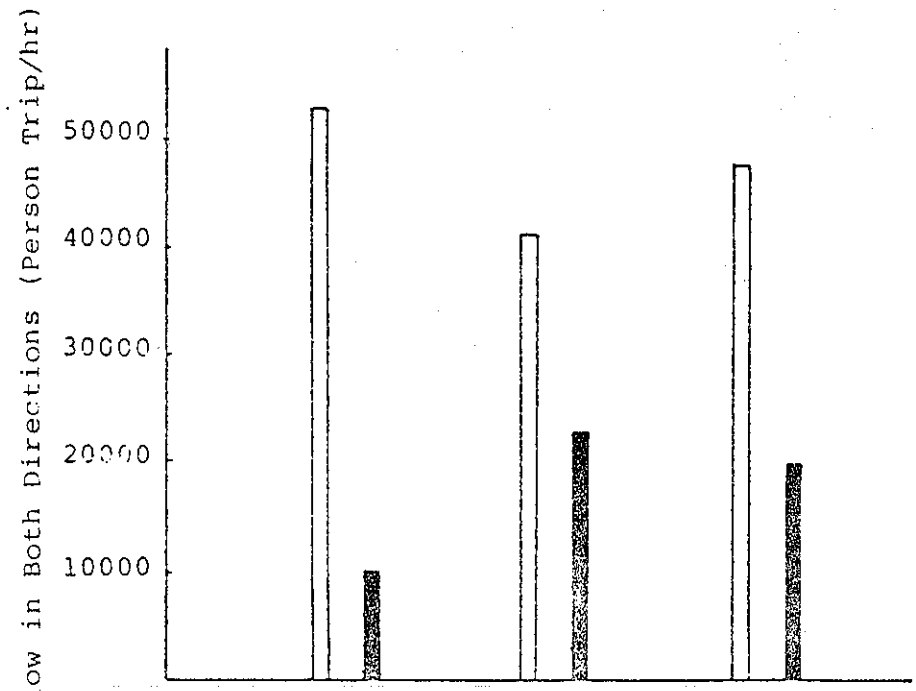
⇨ : 1987 DN Flows

MO : Metro in Operation Case

DN : Do Nothing Case

Scale :

1 cm ↔ 40,000 person trips/hr



Peak Hour (8-9 a.m.) Bus Person Trip Ends at Tahrir, Ramsis and Attaba Squares

Fig. 4 Expected Impact of the Regional Metro Line on Peak Hour Bus Trip Ends in Major City Center Squares in 1987

It is concluded that private and public transport operations in the city centre of Cairo are expected to be much improved after implementation of the underground in 1987. The endless chains of buses should largely vanish and, hence, traffic flow will become smoother. The large number of transfer trips is expected to be eleiminated, and so pedestrian/ vehicle conflits.

Another output of the assignment runs was the total number of 1987 peak hour passenger travel time for the "DN" and the "MO" alternatives. The results were as follows :

DN	143,046	Passenger-hours
MO	121,118	Passenger-hours

The difference of 21,928 passenger-hours in the peak hour is equivalent to annual savings of at least 30 million pounds using some sensible assumptions about traveler value of time.

Projected bus flows in Greater Cairo in 1987 were plotted as flow bands for the DN and the MO cases, showing the expected values of bus flows (passenger/hr) on bus routes in Greater Cairo. It appeared from these plots that most city streets will have low bus movements. However, some streets will experience heavy volumes, including Al-Ahram and the 26 July streets. These movements will be caused by the diversion of many trips to the metro route. This problem may be mitigated by introducing designated bus lane schemes or rerouting some lines to paralell streets.

Expected changes in public transport trip transferts were also calculated (15) which showed that the major transfers will be bus/metro and would take place at major metro stations along the regional line. The forecast transfers draw attention to the need for careful consideration of constructing metro stations of ample capacity with sufficient exists and entrances so as to avoid congestion inside the station and the station's vicinity.

4.3. General recommendations

Bearing in mind the main results briefly discussed in section 4.2 and in detail in references (3,15) some general recommendation are set out below.

1 - Reduce the number of bus lines that terminate at Tahrir, Ramsis, and Attaba Squares.

2 - Eliminate the Heliopolise line between El-Demerdash and Ramsis Square because all its passengers could use the regional metro line instead.

3- Due to the expected heavy transfer movements at stations along the regional metro route, it is important to take care in the design of the entrances to these stations and their connections to the surface transfer stations.

4- Increase and improve bus service that transport people between metro stations and different zones in the city. This of course, can be achieved by adopting efficient bus service planning methods (10), see also the example given in section 5 of this paper.

5- Introduce special bus lanes where appropriate, on streets that are expected to carry heavy volumes of bus trips (12000 passenger/hr and more) in 1987.

5. EXAMPLE OF REDESIGNING BUS ROUTES WITH THE METRO IN OPERATION

This section gives an example of the redesign of bus routes in one of the 7 public transport corridors of Cairo, namely Heliopolise Corridor (HC). This corridor is located in the north-east of Cairo and is served with Heliopolise metro and public transport buses within its boundaries. The number of traffic zones in the corridor is 35 out of the 120 zones of GC (8). As a result of the exercise given in section 4 a 1987 bus matrix was available for the MO case and was produced after deleting the regional metro, tram and Heliopolise metro maximum loads. In otherwords, this example used the bus matrix of 1987 after making full use of other rail public transport modes. The followed procedure for corridor bus reouting is briefly explained in section 5.1 and the results are discussed in section 5.2.

5.1. Procedure Outline

Detailed description of the adopted procedure for bus corridor analysis in general is given in references (10 and 11) and the details of the HC example are given in reference (15). A summary of this example is a follows.

Using the number of zonal trip productions as a criteria, the 35 zones of HC were ranked in decending order. The peak hour bus O/D matrix of the 1987 MO case corresponding to HC (i.e. 35 x 120 zones) was modified by eliminating the cells having values $\leq$ 50 trips as a threshold. The modefied matrix raw relevant to the HC zone having highest trip productions (Abbasia) was considered firstly. Using the 1987 road network and zoning (120 zones) maps, the above mentioned raw cells were marked on the map. Then, logical routes of buses were marked on the map accroding to preset criteria for bus routing (10,11). The feasibility of these preliminary routes was checked using some assumptions as the bus load profile, the maximum bus capacity and the maximum acceptable headway. Thus some adjustments on the preliminary routes were made before defining the final feasible routes that will serve this zone (Abbasia). The above procedure was repeated for each other zone of the HC one at a time according to the ranking list mentioned earlier.

5.2. Results

The main result of this exercise was that only 7 bus routes can effectively serve HC and link its zones to the remaining zones of GC in 1987. This is, however, conditioned with :

1- Using appropriate bus service planning methods
2- Operating the regional metro line to its maximum capacity
3- Making full use of the existing Heliopolis metro.

It is entresting to note that at the moment (1983) HC is linked to the rest of GC by about 40 bus routes.

6. THE FUTURE OF SURFACE PUBLIC TRANSPORT IN THE LIGHT OF THE REGIONAL METRO

The main outcome of this paper as it appears from the previous sections is the immidiate need for starting a comprehensive effort of redesigning surface public transport in GC in the light of the impact of the regional metro line which is due for comming into service within 2-3 years. In this effort the whole exercise described in sections 4 and 5 and in references (1,3 and 15) should be repeated in a more comprehensive way. The main guildlines for this effort are suggested as follows :

A- Overcome the limitations imposed on the previous analysis (1,3 and 15) and proceed to predict future public transport O/D matrices and assign these matrices to future public transport networks and modes.

B- In the assignment procedure make full use of existing infrastructure of the tram and Heliopolise metro systems by raising level of service and expansion of network where appropriate and feasible.

C- Make full use of the River Nile Ferry service which is very much under-used at the moment.

D- Redesign existing bus routes and service taking into consideration the following remarks :

   1- Minimazation of radial routes and services.
   2- Introducing new routes perpendicular to the regional metro line which should act as the backbone of public transport in GC.
   3- Introducing new routes to serve intra-movements in fringe areas of GC.
   4- Reallocation of the saved buses due to the impact of the metro to serve the new routes described in items 2 and 3 above.
   5- In redesigning the bus services efficient modern procedures should be followed as given, for example, in the pioneer work that was a part of the Cairo Urban Transport Project and published in references (10, 11, 16). These include corridor analysis, efficient bus allocation procedures, introduction of new direct and express services, bus monetoring system, etc.

6- Make careful scheduling of stages of implementation of the new bus routes and services to start by the opening of the regional metro line to service.

E- R-evaluation and re-structuring of the tarif policy and system in view of the new metro service. This should include, for example, rethinking of subsidising public transport and investigating the possibility of providing subsidies only for those social groups who realy need it.

It should be stressed, however, that undertaking the above outlined effort needs some prerequisites that aught to be taken into consideration. These are set out below.

A- Full participation of the operators of public transport services in GC in such effort. These include Cairo Transit Authority, the Metro Authority, Heliopolis Metro Company and the concerned Traffic Departments.

B- Making use of the research and experience gained in the developed world cities that have been operating successful metro and surface public transport systems.

C- Allawing enough time for the study well in advance before the metro service starts into operation.

Finally, the authers wish to emphasis that the main improtance of carrying out the above suggested study lies in the fact that without it full efficiency of GC's future public transport system cannot be achieved. In otherwords, if the regional metro line is opened to service without redesign of the existing surface public transport service its full impact in easying public transport problems will not be felt. This is to be considered bearing in mind the high hopes that Cairo dwellers put on this long awaited project in reducing the daily suffering they practice in trip-making.

7. ACKNOWLEDGEMENT

The work presented in this paper is based on some of the fruitful results of the hard and sincere work carried out during the Cairo University/MIT "Cairo Urban Transport Project". The project was sponsered by the USAID program in Egypt through the Cairo University/MIT Technology Planning Program . Thanks are also due to Mr. Tarek Hashim the System Analyst of the Cairo Urban Transport Project for his great help in computer analysis.

8- REFERENCES

1. "Cairo Urban Transport Project - Fianl Report", Part I-Vol III (Transport Planning Aids and Methods), MIT/CU, to be published jointly by MIT and Cairo University.

2. Huzayyin A.S. and El-Hawary, M. "Urban Travel Characteristics in Greater Cairo", Paper presented to the 3d World Conference on Transport Research, Hamburg - West Germany, April 1983.

3. El-Hawary, M. Abdel Barry, F. and Huzayyin, A.S., "Anticipated Impact of the Regional Underground Line on Public Transport Service in Greater Cairo", Journal of Egyptian Society of Engineers, to be published in 1984.

4. "Statistics of Central Traffic Agency", Central Traffic Agency, Minitry of the Interior, Cairo.

5. "Records of Cairo Traffic Department", Cairo Traffic Dept., Ministry of the Interior, 1979.

6. "El-Hawary, M., "Cairo Transport Problem - Case Study", Paper presented to the Conference on Transport and Traffic Planning in Urban Centres in Developing Countries", Cairo, April 1983.

7. Noureldin, M.S. "Survey of Parking Supply in Cairo CBD Area", Cairo Urban Transport Project, MIT/CU, Civil Eng. Dept., Cairo University, March 1979.

8. "Manual of Public Transport Survey - 1978", Cairo Urban Transport Project, Cairo University/MIT/Ministry of Transport, Cairo 1979.

9. "Cairo Traffic Surveys", Cairo Urban Transport Project, Cairo University/MIT/Ministry of Transport/Ministry of the Interior (Traffic Sector), Cairo, Nov. 1977.

10. Cairo Urban Transport Project, Bus Service Planning, TPP Report 82-1, Cairo University/MIT, May 1982.

11. El-Hawary, M. Abdel Barry, F., Esmail, T and Montaser, A., "Procedure to Identify New Direct Bus Services in Greater Cairo", Cairo Urban Transport Project, MIT/CU, Civil Eng. Dept., Cairo University, Jan. 1980.

12- El-Hawary, M., Abdel Barry, F. and Huzayyin, A.S., "Anticipated Impact of the Regional Underground Line on Public Transport Service in Greater Cairo", Internal Report, Cairo Urban Transport Project, MIT/CU, Civil Eng.Dept., Cairo University 1981.

13. "Greater Cairo Underground Study", SOFRETU-RPTP, Cairo, 1972.

14. "Records of Cairo Transit Authority", Cairo Transit Authority, Cairo, 1980

15. "Transport and Railways B. Sc. Project", Faculty of Engineering, Cairo University, July 1981, Unpublished.

16. Taha, A.B., "Bus Allocation Procedures and Its Application to Shoubra Corridor", M. Sc. theses, Dept. of Civil Eng., Cairo University, 1982, Unpublished.

DISCUSSION A L'OCCASION DES EXPOSÉS

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Les deux exposés sur les cas du métro du Caire et du métro léger de Tunis sont complémentaires dans la mesure où le premier éclaire les problèmes de coordination du réseau de surface (autobus) avec la mise en service du métro et le second s'attache aux problèmes d'interaction avec le réseau de voirie (circulation générale) qui ont remis en cause l'option du passage au sol du tramway dans le centre de Tunis : la conception et la mise en oeuvre des investissements lourds risquent alors d'être fragilisés par des interactions avec les autres éléments du système des transports et du système urbain qui ne sont guère maîtrisées dans le processus de planification et décision, c'est ce que suggèrent les débats.

- Un investissement lourd et structurel comme celui du métro du Caire (il est prévu qu'il transporte le sixième du trafic total des transports collectifs de l'agglomération) devra entraîner des changements de comportements radicaux : changements dans la structure du réseau de bus qui doit être conçue en complément du métro, avec des correspondances bus-métro plutôt que des lignes directes de bus... Ceci pose la question de la conception des itinéraires des lignes de bus, par rapport au critère de l'accessibilité à pied : quelle distance, quel temps sont admissibles à pied pour le rabattement aux stations, pour les correspondances ?

Le cas de Lagos, où un métro est également en construction, est cité à l'appui de l'énoncé de ce problème : les gens (les utilisateurs de transports en commun) ne veulent pas marcher sur des distances de plusieurs centaines de mètres, ce qui est un obstacle à la mise en place des stations de correspondance. Les systèmes parallèles informels risquent de tirer parti de ces difficultés d'aménagement pour récupérer une partie de la clientèle rebutée par des distances trop longues de correspondance... Le cas du Caire est différent dans la mesure où aucun système "informel" ne fonctionne, et où les distances d'accès aux stations d'autobus sont toujours inférieures à 500 mètres...

Il est fait remarquer par ailleurs que ce n'est pas seulement la distance de marche à pied qui peut rebuter mais aussi le temps d'attente des autobus qui risque d'être élevé et annuler, du point de vue de l'usager, les avantages de temps occasionnés par le métro. N'y aurait-il pas contradiction entre une fréquence de 90 secondes pour le métro et des fréquences pouvant aller jusqu'à 20 ou 30 minutes pour les bus en correspondance ?

La question de fond demeure : pourra-t-on modifier les comportements des usagers de façon aussi radicale ? Une réponse est proposée, dans la direction de campagne d'information des usagers, ou même de marketing : cette réponse est mentionnée pour les usagers du système, mais aussi de manière plus large pour l'opinion publique qu'il s'agit de convaincre de l'utilité de l'investissement.

- L'importance d'une campagne d'opinion publique véhiculée par les médias est illustrée par le cas de Tunis où le choix politique de l'investissement métro avec passage au sol dans le centre a été partiellement remis en cause à la suite d'une telle campagne : des aspects symboliques (l'Avenue Bourguiba, prestigieuse, ne peut pas être traversée par un tramway) ou fonctionnels (gêne à la circulation générale occasionnée par le tramway dans le centre-ville) ont été mis en avant, cachant sans doute aussi des intérêts immobiliers (propriétaires d'immeubles ou d'hôtels riverains du tracé craignant des moins-values sur leurs actifs).

Cette campagne, lancée à l'occasion d'une étude, peut être un peu tardive, sur les problèmes de circulation suscités par l'option tramway, révèle la faiblesse des techniciens face aux pouvoirs et intérêts en place dont la vision a évolué. La décision de 1980 d'un tramway au sol était politique, le renoncement à ce passage au sol est également éminemment politique : quelle est la logique de ces décisions ?

Le métro du Caire connaît des problèmes analogues mais de moindre ampleur, les options prises n'étant pas remises en cause : les travaux de construction sont compliqués (210 entreprises sont impliquées dans les réseaux à déplacer) et entraînent une gêne mal perçue par les médias et les entreprises (ou ministères) localisés au centre, ce qui peut renforcer les difficultés et les délais de ces travaux. Ceci pose donc la question de l'image de marque du projet et des moyens d'agir sur cette image auprès de l'opinion de manière à en faciliter l'acceptation par la population...