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Suggested Solutions for Traffic Congestion in Greater Cairo

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Abstract

Traffic congestion in Egypt has many causes: fuel subsidies result in cheap petrol and diesel, which in turn result in more private cars on the streets, meanwhile the lack of parking areas results in cars having to turn back or park incorrectly on the streets prompting further traffic jams. Although the number of metro commuters is high, the metro only reaches a limited number of places in the city. Also, public transport buses are few in number and outdated, thus prompting people to use other buses and taxis to get by. However the latter generally need to be cleaner, safer and be able to better load and unload passengers. There are also few areas for pedestrians to cross the streets and street peddlers often occupy these areas and the sidewalks, making things worse. Moreover, there are many problems related to the construction of roads where there are few street lights, stop signs and crossroads; people also find awful corners and U-turns that are either very sharp turns or are very narrow thus not allowing drivers to make smooth U-turns. Drivers also behave badly and irresponsibly added to the poor implementation of traffic laws, which causes the public to undermine traffic regulations. Economic costs incurred due to traffic congestion in Cairo may reach almost a 4% loss from the Egypt's annual gross domestic product (GDP). Not only are these economic costs limited to an increase in the amount of time taken to get from one place to another, but also include a rise in costs due to excessive fuel consumption as well as having negative effects on people's health due to air pollution, accidents and economic production effects.

Combined, the economic cost resulting from traffic congestion reaches about 4% of Egypt's GDP; in other words, Egypt suffers a loss of nearly EGP 50 billion every year due to traffic congestion.

Keywords: traffic knots, monorail, park and ride

1. Introduction

Major cities and countries around the world pay a hefty price due to traffic congestion; however, the costs Cairo incurs have reached very high levels of around 4% of the country's GDP, The world's attempts to solve the problem of complex traffic congestion focus on two main solutions, and they are:

a. Improving public transport.

b. Increasing the cost of using private vehicles.

There is no doubt that the planning of many cities in Egypt, if not all, did not take into consideration public transport systems as an effective system during the planning stage of these cities. The same applies to studies in this field; however, we find that many developed countries around the world have planning transport systems amidst their priorities. This becomes clearer during the stage signaling the beginning of the growth and development of these cities "Transport and the environment 2004".

Owing to the lack of clarity surrounding the role of transport and to having no fixed planning scheme in an urban planning system for our Egyptian cities, such cities have begun suffering from serious and continually growing problems. This research paper will tackle the problems resulting from the absence of a transport scheme and what this reflects on the performance of the transport system and on the environment. It will also discuss some solutions that can help improve the performance of the transport network, in addition to results and recommendations that can support the important role of transport in urban planning and the integration thereof "Transport and the environment 2004".

This research is based on three main and important ideas, namely:

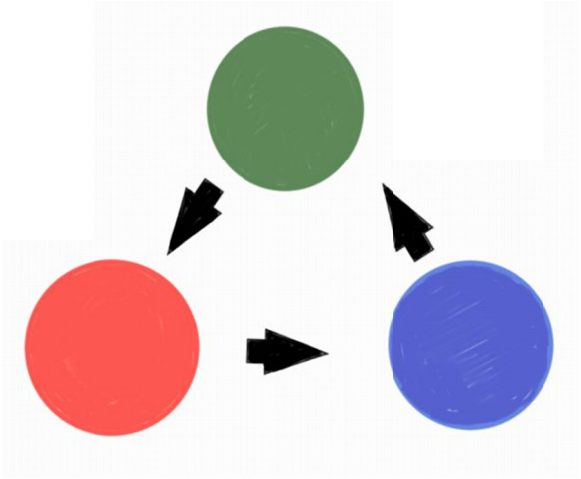


Figure 1. Diagram showing the relationship between the three main ideas (author's illustration)

2. Traffic Congestion Problems in Greater Cairo

First: Main Problems

a. Increase in ownership of cars
b. Mismanagement of traffic
c. No application of traffic laws
d. Unsuitable means of transport
e. Great rise in population
f. Expansion of cities and the unsuitable use of land

Second: Incidental Problems:

a. Traffic jams
b. Increased rate of road accidents

2.1 Problem of Public Transport

The lack of resources and poor public transport has forced people to resort to using private vehicles, as is the case in many third world countries, to walking or to using other means of transport such motorcycles or animals, in addition increasing the number working hours in many developing countries has led to an increase in rush hours or peak hours "Sustainable transport planning 2003".

2.2 Complex Street Network

Street Networks in Modern Cities Have Witnessed the Following Phenomena "Sustainable transport planning 2003".

a. Complex networks of highways, public roads, and complex intersections, which result in an increase in the number of times a car stops and restarts; this raises the level of noise coming from these cars.
b. The penetration of highway networks and railways in cities, especially in residential areas for distances exceeding 7 km in some Egyptian cities; this causes noise and environmental pollution.
c. Not allocating lanes for pedestrians and bicycles in cities, which results in a clash between pedestrians, cyclists, and cars, thus hindering the flow of traffic; in addition the increased use of car horns increases the level of noise.
d. The increase in the size of cities has led to an increase in distances to get services, thus raising the rates for using cars and accordingly to additional consumption of energy and fuel along with an increase in noise, congestion, air and water pollution and a rise in temperature.

2.3 Collective Passenger Transport Parking Lots "Improving Professional Performance 2003"

a. Unregulated congestion causes vehicles in these parking lots to park at random.

b. These parking lots attract street peddlers, causing additional congestion.

c. Piling trash due to crowds at these collective passenger transport parking lots.

d. Increased opportunities for the sexual harassment of girls and women at t hese parking lots due to the presence of many youths.

Figure 2. Image of collective passenger vehicles' parking lot and peddlers' carts surrounding them

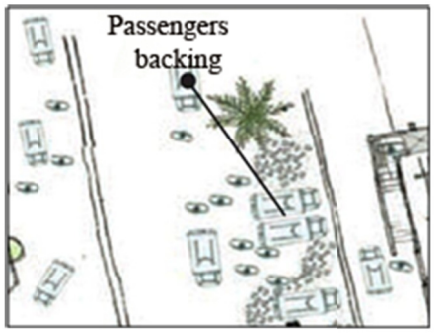


Figure 3. Random place for collective passenger transport in Al-Salam City

Figure 4. Image depicting the phenomenon of collective passenger vehicle parking lots and their randomness

Figure 5. Image showing vehicles used as means of transport in some neighborhoods

3. Achieving the Concept of Sustained Transport by Decreasing the Rate of Energy Consumption

Transport is one of the most important direct and effective factors in energy rates. Energy consumption in the transport sector rose from 14% in the early 1980s to 30% of the total consumption in all other sectors at present. This rise is due to the government's implementation of an economic development plan "Improving Professional Performance 2003".

Means of Transport in Egypt Mainly Depend on:

a. Use of all kinds of liquid fuel, representing 98% of the total consumption.

b. Use of pressurized natural gas, representing 2% of total consumption.

c. Use of electricity as fuel on a limited scale in operating underground metro lines in Greater Cairo, in addition to operating the tram (regular metro) in Cairo and Alexandria.

4. Facts and Figures Describing the Size of Demand on Transport and the Rates of Energy Consumption

a. Diagram no. (11) shows a steady increase in the number of cars. The diagram shows a surge in the number of cars reaching 7 million by 2022. Smooth traffic flow cannot be achieved with such a Figure, unless there is a redistribution of population and the planning of several new and independent cities.

b. Relative distribution of the kinds of cars. It is clear that the number of private cars holds the largest share, a 50% share, which must be reduced by increasing the number of public transport buses, maintaining the quality of these vehicles, and limiting the ownership of private vehicles.

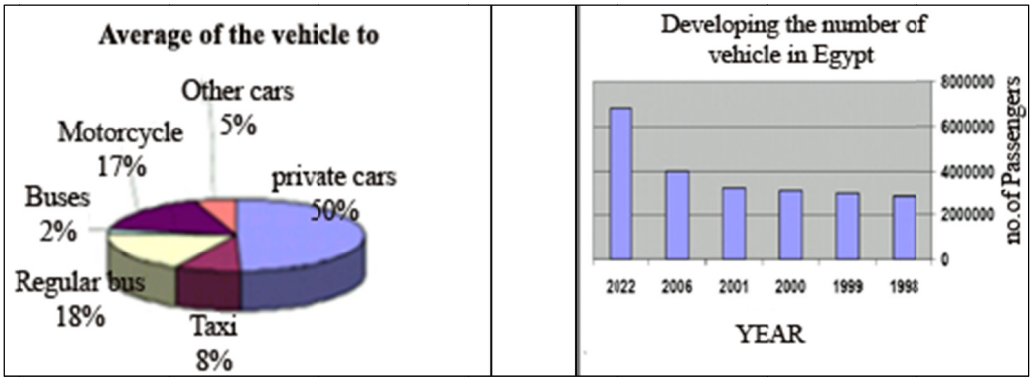


Figure 6. Charts showing increase in number vehicles

4.1 Petrol (Fuel) Consumption in the Transport Sector

The continuous increase in energy consumption in the transport sector, shown in diagram no. (13), indicates the importance of policies and procedures to limit this gradual increase in the consumption of liquid fuel in particular, which has many negative effects on the national economy, in addition to the previously mentioned negative impacts "Experience in Reconciling between Urban Planning 2003".

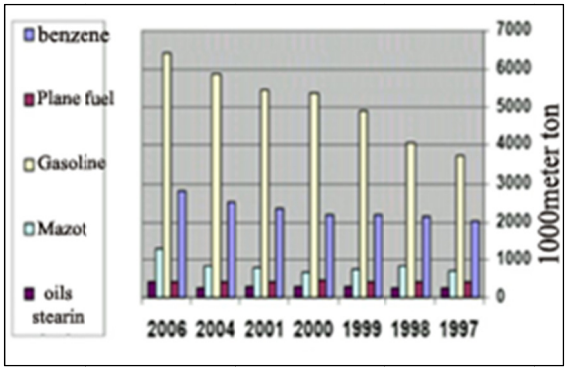


Figure 7. Chart shows annual consumption of various kinds of fuel

4.2 Mechanisms for the Rationalization of Energy in the Transport of Individuals "Experience in Reconciling between Urban Planning 2003"

a. Encouraging collective passenger transport and banning the use of private cars in the downtown areas of major cities. Reducing the number of private car trips by 10% can save up to 160,000 tons of fuel annually.

b. Encouraging collective passenger transport from new cities to Cairo using special buses.

c. Regulating and improving traffic in major cities to increase the flow of traffic, as each increase in speed by 1 km/hour reduces fuel consumption by almost 3%.

d. Replacement of old taxis (as fuel consumption in new cars is 25% less than that of cars manufactured before 1980).

4.3 Lack of Co-ordination Amongst the Various Means of Transport

Lack of co-ordination amongst the various means of transport is one of the most important problems, if not the main problem, as it requires defining service ranges for each means of transport across a city and the main roads and to reach the heart of residential areas. It also requires setting up an integrated plan to determine the levels of

public and private transport and creating an independent scheme for each, in addition to suggesting new solutions to help solve the crisis "Experience in Reconciling between Urban Planning 2003".

4.4 Respondents Using Public Transport and Their Monthly Spending on Them

86% of respondents use public transport; some depend on them entirely, while others use public transport alongside other means of transport.

By surveying public transport users about their monthly spending on transport, results reveal the following:

- 24% spend less than EGP 50.
- 18% spend EGP 50-100.
- 11% spend EGP 100-150.
- 8% spend EGP 150-200.
- 13% spend more than EGP 200.

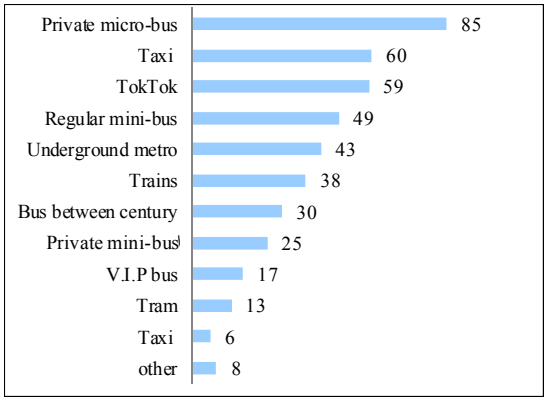


Figure 8. Charts show percentage of public

4.5 Respondents' Satisfaction with Public Transport

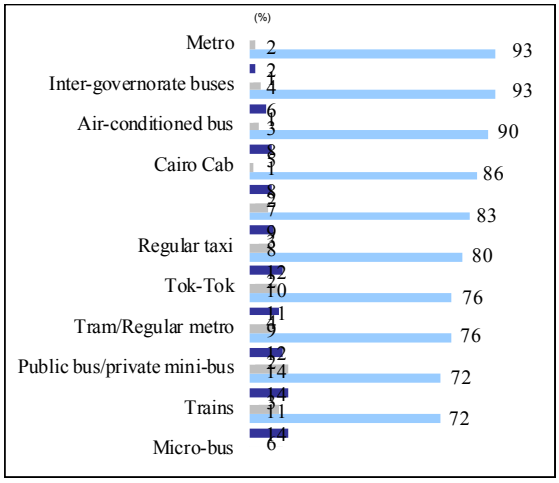
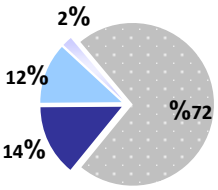
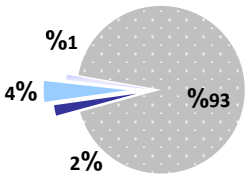
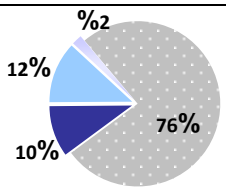
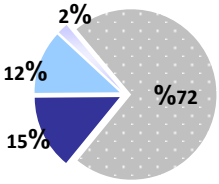
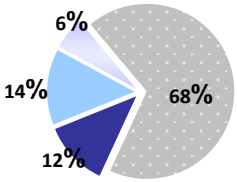
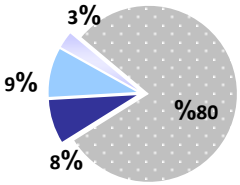


Figure 9. Diagram showing respondents' satisfaction with public transport

As for the respondents' satisfaction with the means of public transport they use, survey results show that the underground metro and inter-governorate buses are the means of transport with the highest satisfaction ratings (93% for each), whereas the micro-bus was the least satisfactory means of transport, according to the respondents (68%) "Environmental Impacts 2007".

Table 1. showing types of vehicles used in Greater Cairo, opinions about them and number of users (Experience in Reconciling between Urban Planning 2003)

Respondents' Assessment of Public Means of Transport *"Environmental Impacts 2007".*	**User Percentage** Interceptor Desist Un-Interceptor	**Vehicle**	**Name of Means of Transport**
- 49% of respondents using public transport use public buses/regular mini-buses as a means of transport - 72% of respondents were satisfied with it as a means of transport - 50% of respondents said that the service has improved compared to the previous year - 40% of respondents pointed out that traffic jams were the main problem that people using public transport suffered from			Regular -bus
- 43% of respondents using public transport use the underground metro as their means of transport - 93% of respondents were satisfied with the metro as their means of transport - More than half of the respondents (54%) believe that the service has improved compared to the year before - More than a quarter of respondents (28%) pointed out that traffic jams were the main problem they faced			Metro/Subway/ Underground metro
- 59% of respondents using public transport use the tram - 72% of them were satisfied with the tram - 50% of them believe that the service has improved compared with the year before - 40% of respondents pointed out that traffic jams were the main problem they faced			Heliopolis Tram
- 49% of respondents using public transport use public buses/private mini-buses as their means of transport - 72% of respondents were satisfied with it - 50% of respondents said that the service has improved compared to the previous year - 40% of respondents pointed out that traffic jams were the main problem that people using public transport buses/private mini-buses suffered from			Private mini-bus
- 85% of respondents use the private micro-bus as their means of transport - 68% were satisfied with it as a means of transport - 41% pointed out that there was no difference in the service quality compared to the year before - 24% believe that traffic jams were the main problem they faced. 17% of respondents said that increased fare and absence of a fixed fare were among the problems. Drivers' abusive behaviour was among the main problems (15%)			Private micro-bus
- 60% of respondents said that they use the regular taxi as their means of transport - 80% were satisfied with it as a means of transport - 43% pointed out that there was no difference in the quality of service compared to the year before - The respondents said that greedy drivers and increased fares were the main problems they faced			Taxi
No problems were mentioned. It is more of a means of entertainment rather than a means of transport.	A percentage exists but is not specified here		River Bus

5. Problems Respondents Face When Using Public Transport

As for the problems faced by public transport users, for each means of transport separately, results of the survey show that traffic jams were one of the most important problems confronted by respondents in microbuses, public transport buses, regular mini-buses, the metro, special mini-buses (affiliated to co-operative societies) and trains" Environmental Impacts 2007".

Table 2. Table Showing Problems of Various Means of Transport

Means of Public Transport	Most Important Problem	Percentage
Microbus	Crowded	24
Regular taxi	Greedy drivers, fare increase	30
Tok Tok	Presence of under-aged drivers	17
Public transport buses/Regular mini-bus	Crowded	40
Metro	Crowded	28
Inter-governorate buses	Broke down often, worn out	9
Cairo Cab	Fare increase	20
Special mini-bus (affiliated to co-operative societies)	Crowded	17
Air-conditioned bus	Air-conditioning didn't work most of the time	10
Tram/Regular Metro	Worn out, unavailability, not on schedule	10
Trains	Crowded	22

5.1 Propose New Solutions to Solve the Problems

The above mentioned points, as explained by the researcher, reveal the failure of the traffic system due to the failure of public transport systems and to their inability to meet the public's needs, thus, resulting in people resorting to private vehicles. Accordingly, this has aggravated the daily problem of traffic. That is why the researcher proposes some solutions, the most important of which is supporting the collective passenger transport network with new technologies by creating a modern transport network such as: the monorail, and park systems such as park and ride.

6. Monorail

Monorail for transportation of people and light freight is characterized by the combination of the two words, "mono" (one) and "rail", meaning a transportation system that is supported and stabilized along a single rail, which commonly is called a beam way for an elevated system. A monorail beam way is usually not more than half the width of the vehicle, which means a monorail vehicle, for safety reasons, therefore has to be internally stabilized to prevent lateral overturning of the vehicle. Because of the narrow beam way, the economics and environmental impact by monorail guide ways systems are much less when compared to light or heavy rail, which applies a wider, more expensive guide way that has limited flexibility.

6.1 Monorails Can Be Classified Under 3 Basic Types

a. Monorails that are suspended under a beam way

They are all elevated types, and because of necessary traffic clearance under the vehicle, has the largest aerial requirement in monorail comparisons. The beam way is above the vehicle and propulsion motors and bogies are on top of the vehicles. An example is the Wuppertal Monorail in Germany. This is perhaps one of the oldest of all monorails and is still in operation (Svensson, 2007).

Figure 10. Wuppertal Monorail

Source: Einar Svensson 2007, Definition and Description of Monorail.

b. Monorails that envelope and straddle a beam way

A typical and most applied monorail worldwide is the Alweg Monorail Concept, which envelopes and straddles a narrow deep beamway. The Alweg vehicle is supported by 2 bogies, each having load bearing wheels on the top of the beam, and is guided by 2 rows of stabilizing wheels along each side of the beam way. In this concept the beam way is an essential part of the vehicle system either when elevated or at surface (Illustrations 2 and 3). Switching of the Alweg is complicated and involves flexing the massive beamway. The first full size Alweg system was installed in Turin, Italy, 1956, then in Seattle, USA 1962 and several in Japan later (Svensson 2007).

Figure 11. Alweg Monorail on an Elevated Guideway

Source: Einar Svensson 2007, Definition and Description of Monorail.

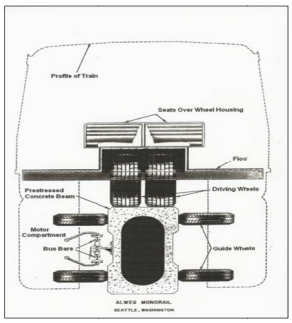


Figure 12. Alweg Monorail Cross Section

Source: Einar Svensson 2007, Definition and Description of Monorail.

c. Monorails that run on top of a beam way or a slab at surface

A typical one is the new monorail technology trade named Urbanity®, which has a unique central guide rail on top of the beam way that prevents uplift and derailment of the vehicle. There is extensive information on this new monorail technology on the website "urbanaut.com". The Urbanity needs only a concrete runway slab at surface and is approximately half the size and weight of the Alwen. Urbanity® has the smallest and least costly

cross-section area requirement in capacity comparison of any comparable elevated surface or subsurface transit. Switching of the Urbanity® is done by simply flexing the central rail (Svensson, 2007).

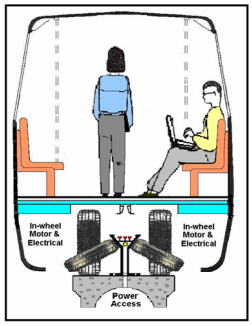


Figure 13. Urbanaut® Monorail Cross Section (Svensson, 2007)

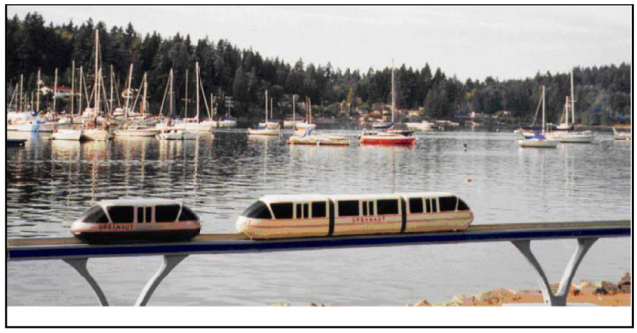


Figure 14. Urbanaut® Monorail on an Elevated Guideway (Svensson, 2007)

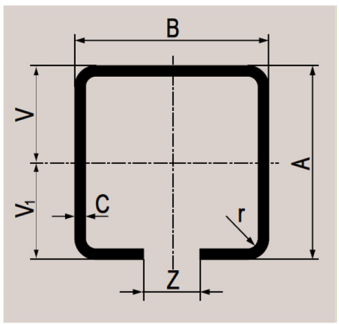
6.2 Types of Monorails

The special cold rolled monorail tracks are available in 4 sizes; each is indicated by the Figures:

230.000, 240.000, 250.000 and 260.000. The standard lengths are 6 m. Intermediate lengths are also available. In a monorail project all tracks are cut to the exact dimensions. (www.RAILTECHNIEK VANHERWIJNEN BV.com, Monorail systems, 2012) .

Table 3. Monorail track standard dimensions

	sizes A x B x C mm	weight kg/m	S cm^2	Ix cm^4	V_1 cm	V cm	$\frac{Ix}{V}$ cm^3	Z mm	r mm
230.000	66 x 62 x 3	4.98	6.38	36	3.60	3.00	10.0	20	4
240.000	74 x 74 x 4	7.67	9.84	72.5	4.01	3.40	18.0	22	4
250.000	100 x 80 x 5	11.55	14.80	186	5.39	4.61	34.5	26	6
260.000	120 x 110 x 7	26.78	20.89	501	5.6	6.4	78	28	9



Source: Monorail systems, RAILTECHNIEK VAN HERWIJNEN BV.

6.3 Perceptions of Monorail as Public Transport

The Las Vegas Monorail pulling into the Las Vegas Convention Center Station From 1950 to 1980 the monorail concept may have suffered, as with all public transport systems, from competition with the automobile. Monorails in particular may have suffered from the reluctance of public transit authorities to invest in the perceived high cost of un-proven monorails when faced with cheaper mature alternatives. There were also many competing monorail technologies, splitting their case further.

This high cost perception was challenged most-notably in 1963, when the ALWEG consortium proposed to finance the construction of a major monorail system in Los Angeles, in return for the right of operation. This was turned down by the city authorities in favor of no system at all, and the later subway system has faced criticism as it has yet to reach the scale of the proposed monorail.

Several monorails initially conceived as transport systems survive today on revenues generated from tourism usage, benefiting from the unique views offered from the largely elevated monorail.

Figure 15. Detailed photos shows how the monorail rested on its bridge and how it works

6.4 The Cost of Monorails

According to Svensson 2007 it cannot be certain to determine a fixed cost for the monorail and because there are many factors that affect the price of monorail as:

a. The total length of the system: in many cases can reduce costs greater than the length of the system

b. Topography: Flat terrain or contain highlands? Are there many roads and rivers that must be crossed?

c. Location:

(1) What is the possibility of access to construction equipment?

(2) Will there be overcrowded transportation or other barriers to do construction work?

d. Utilities: Transfer of water sources and electricity and telephone lines and other can be a significant influence on the increased costs.

e. Earth:

f. What is the amount of land that must be purchased?

g. Traveler requirements: What is the size and number of trucks needed?

h. Speed: What are the requirements for the system's speed? Are there long enough distances between Stations in the way that allows obtaining greater speed?

i. Number of stations: each additional station adds further to the cost.

j. Construction: Are the factors required the presence of tunnels, bridges and overcome the re-construction and urban construction?

k. Geotechnical conditions: What are the conditions of the surface secondary? It could represent a major impact on the cost of the institution.

6.5 Implementation and Availability of Energy in Egypt

a. The first project

Preceded the study of the work of the Monorail line that links Cairo and Sixth of October City new Malaysian company assess Train "Monorail" highway between Cairo and 6th of October “Monorail train in Malaysia - Cairo - Egypt News”.

Figure 16. A picture shows the monorail in Malaysia

Dr. Ibrahim Ashmawi, Assistant Minister of Investment and Chairman of the Center to prepare leaders that his visit to Malaysia resulted in the approval of the "Scomi Malaysian" group to establish a project train monorail rapid passes quickly in the heart of the desert in collaboration with the Ministry of Transport to link the provinces of Giza and 6 October and this project will help to Save time .

And indicated that the Scomi Group of Malaysia and that aimed to create a project like This is the biggest company operating trains and monorail. The Cost of such a project is estimated at 4 billion dollars and stopped studies such as this project in 2006 for unknown conditions.

b. The second project

It has been implemented already is Monorail project at Cairo Airport:

Project engineers have finished the automatic train Cairo Airport, First installation Cart connects the three terminals on Wednesday, to dribble installation of two others, and begin their employment experimentally Saturday.

"He said the pilot Hassan Rashed Prime Cairo Airport Company, that the draft train robot Add honorable Cairo airport, aims to serve passengers, and connecting train between the three buildings at the airport and parking multi-story and mall in 5 minutes, pointing out that it works without a driver and managed electronically".

Figure 17. A picture shows one of the stages of constructing the monorail at Cairo International Airport

6.6 A Comparison Between the Monorail and the Subway (Metro)

We have noticed that Metro becomes the magical solution!! because it proved its success in Egypt but, Here, we have to ask a real question "Is the Metro the best solution to all the traffic problems?" Can we accept any new things? Or because this solution will cost time, effort, money in addition to the possible dangers?

Table 4. Table showing comparison between the monorail and the subway

Points of comparison	***Monorail***	***Underground***
Number of vehicles	*From 1-4 vehicles*	*Up to 10 vehicles*
The engine force	*Electricity*	*Electricity*
Its effect on the environment	*Eco friendly*	*Eco-friendly*
Speed	*80*	*80*
The number of passengers/ the need for driver/ cost	*Can be with or without a driver* *It costs less than the underground by 70%*	*There must be a driver*
The need of infrastructure maps	*Does not require complex maps in comparison with the metro maps(such as bridges studies)*	*Require detailed maps of the infrastructure (electricity-exchange-water-…)*
The need to transport infrastructure paths	*Easy to deal with the existing infrastructure paths only in the places*	*Must switch tracks infrastructure to maintain the path of the underground*
The impact of construction work on traffic	*Affect a limited impact that is not compared with the impact of traffic problems that occur when you create metro and it can be surpassed in short times*	*Causes a negative impact on traffic mechanisms and individuals and causes problems and traffic jams*
The need for specialized technical work	Needs advanced techniques to a limited extent	*Requires high technologies in drilling and soil injection by concrete and it also needs high humidity isolation techniques*
The ease of implementation	*It is easily implemented*	*Implementation of the metro work is considered one of the most difficult construction work*
The speed of implementation	*Its implementation is easy and fast*	*Requires a lot of time*
The study period impact and the implementation on the general movement	*Needs a short period of study and its dealing within the general movement is simple*	*Needs a large study period and must stop the movement when studying*

7. Park and Ride

7.1 Standard Definitions

Park and Ride have been defined simply as any passenger “intermodal transfer facility”. However, in Great Britain the term implies transfer from private to public mode. Commonly these modes are car and bus or rail. In the case of rail, park and ride typically accounts for around a third of all trips. However other high-volume public transports modes such as tram and light rapid transit are sometimes used “Review of Park and Ride 2008”.

Park-and-ride facilities have existed in one form or another for over 25 years. Early public investment in park-and-ride lots in most American urban are as began in the early a mid1970s, in response to increasing global oil prices and a renewed interest in mass transit. Thus the park-and-ride concept is not new to many are as of North America, and Much has been learned within the industry over the past 25 years .As with other transit Facilities and modes, the industry’s current planning and design knowledge base has Evolved from a combination of positive and negative experiences with the technology “Review of Park and Ride 2008”.

7.2 Classifying the Park-and-Ride Lot

Park-and-ride lots can be classified as intermodal transfer facilities. They provide A Staging location for travelers to transfer between the auto mode and transit or between the Single occupant vehicle (SOV) and other higher occupancy vehicle (HOV or carpools) modes With planning and fore thought, park-and-ride lots can

serve a much wider array of intermodal Transfers, there by increasing the activity at the park-and-ride facility, and better integrating It with the surrounding community. Other modes potentially supported by a park-and-ride Facility include: pedestrian, bicycle, Para transit, car pool and van pool, intercity bus transit Airport service, intercity rail, and other modes, based on the location and opportunities available "Review of Park and Ride 2008".

7.3 Park-and-Ride System Planning Process

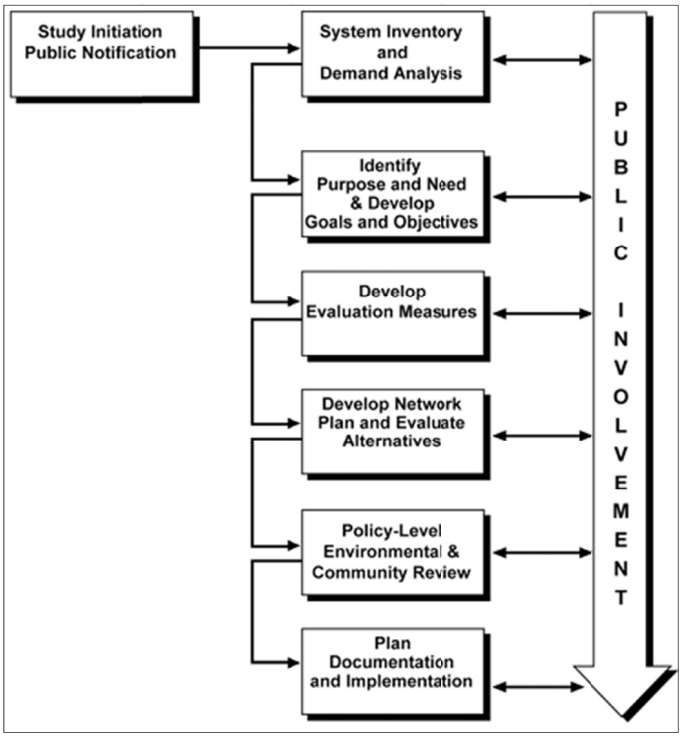


Figure 18. Diagram of Park and Ride systems

An important factor in the system planning process is realizing that considerable work may already have been completed within a region towards developing a regional park-and-ride system, either as part of an ongoing regional transportation plan o through the natural Growth process of the local transit agency. In either case, this completed work should be inventoried and a definition of the existing state of the system be developed, at a minimum "Review of Park and Ride 2008".

The inventory should include

a. Identification of existing facilities
b. Identification of site owner ship by facility
c. Listing of transit and non-transit services provided along with responsible agency.
d. Listing of capital amenities provided (e.g., shelters, schedule kiosks, benches, on-site retail vendors, and security devices)
e. Identification of access attributes of each facility with respect to high occupancy Vehicle and/or freeway networks
f. Inventory of spaces provided and utilization and turnover rate, including on-street Parking related to on-site transit operations, types of spaces provided (long-term, short-term, drop-and-ride), costs, …etc.

The system inventory should be keyed to a geographic information system or Referenced to a map so that it can be used to develop a picture of the existing park-and-ride Network. Existing and planned transit routes and services should be over laid on to this Graphical representation of the system plan to develop a context for placing new facilities or expanding those already in existences.

7.4 Reducing Implementation Costs and Financial Risk

Reducing cost impacts and financial risks of operation to the implementing Agency. Maintaining high user demand, along with an active attempt to improve community Integration of the proposed facility, will contribute significantly to a site's ability to provide Minimal cost impacts and reduce the financial risk to the agency. Although no site can Provide a fail-safe investment for the implementing agency, the transportation planner can Reduce the threat of financial risk by planning a facility that is well served by transit, Accepted and supported by the community ,and one which relates well to the surrounding environment "Review of Park and Ride 2008".

Common Barriers to Pedestrians & Non-Motorized Access to Be Avoided or Mitigated

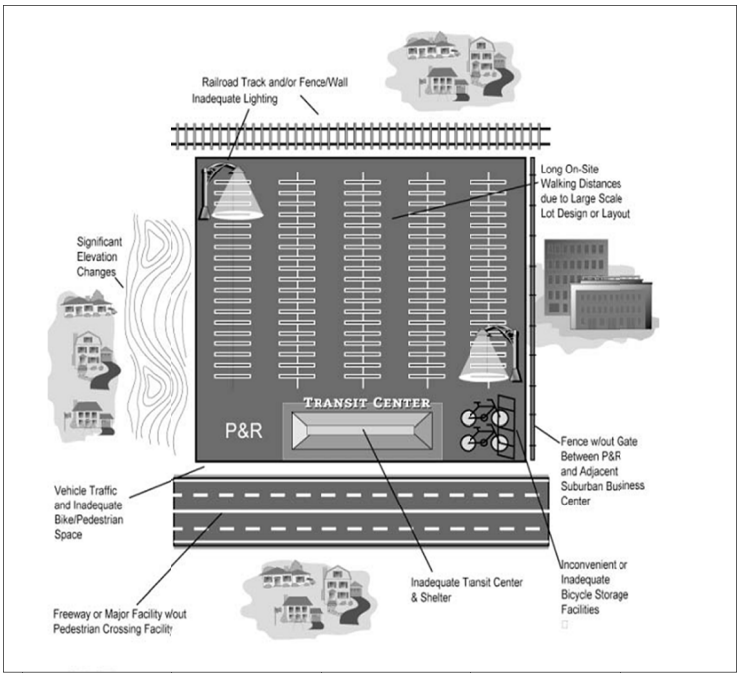


Figure 19. Diagram shows internal distribution in Park and Ride

8. The Proposed Study Is El-Nasr Road

This road suffers from traffic knots during peak hours at points of intersection with Makram Ebeid Street, El-Nozha Street and Abbas El-Akkad Street. This causes cessation of traffic at these points throughout the day as this area has both commercial and entertainment buildings, including many malls, shops, and cafeterias, thus it attracts people of different ages and social levels and has become the main entertainment destination for many of Cairo's residents.

8.1 Location

The location of this area is one of its greatest advantages as it attracts the residents from Nasr City, Heliopolis, and the suburbs through El-Nozha Street, in addition to downtown residents. This is because it lies on El-Nasr Road which is the objective of this study, and which connects the heart of Cairo with the new cities. The location also draws residents of the new urban communities through El-Suez Road.

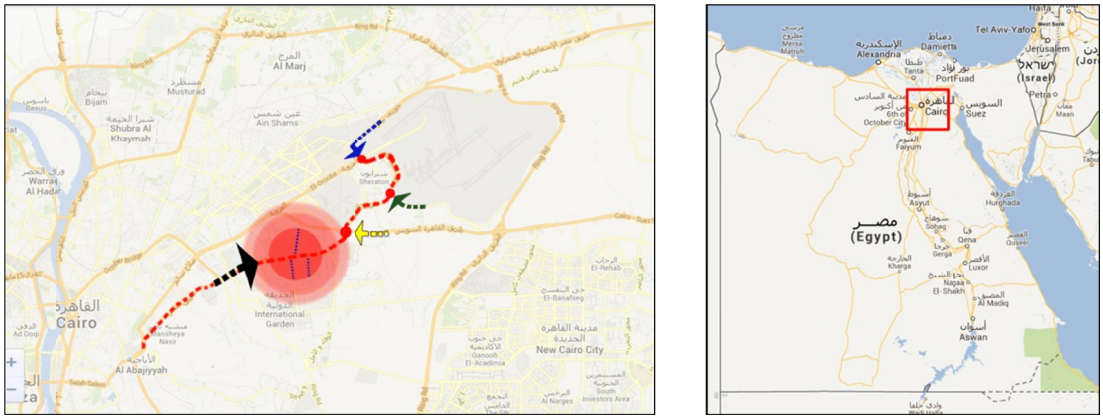


Figure 20. The location of the road in the study in relation to Egypt's map

This attraction of a large portion of the population to this area has caused traffic jams, which in turn caused the road to lose its advantage as a highway connecting other highways coming from coastal cities and new cities to downtown Cairo.

Some authorities have proposed solutions such as building bridges above or tunnels beneath the crowded areas to diffuse the jams and connect these crowded areas with their intended destinations in order to maintain the flow of traffic and to avoid temporary or permanent congestion and bottlenecks.

8.2 Main Problems of the Area

a. The increasing numbers of cars that pass through the area.

b. Parking problem: Absence of parking lots, which result in the alignment of cars on either side of the road.

c. Collective bus stops for loading and unloading passengers along the road have led to the obstruction of the road and to crowding.

d. Drivers' bad habits.

Figure 21. Pictures showing traffic congestion in El-Nasr Road during peak times

9. Suggested Solutions and Recommendations

9.1 The Proposed Plan Serves Different Kinds of Users

Car owners:

a. Building a several-story parking lot in the suggested area to accommodate a large number of cars, in addition to applying the park-and-ride concept (explained above), where the visitor, during the peak time, changes from the individual system to the group system.

b. Creating a network of buses, with a special level of service suitable for the social group of the park-and-ride area, to reach other suggested points (stations) for loading and unloading (passengers).

c. The lines have to be special to accommodate the suggested areas (abovementioned commercial streets).

Figure 22. Proposed plan to solve the traffic solution in Nasser city

Pedestrians: Solving the problem of buses (micro-buses) and replacing them with a network of modern monorail, which will solve a big part of the problem, as the monorail is characterized by:

a. Moving at a very high speed between the different stations thus saving time.

b. Using the same urban space for the points for loading and unloading suggested for the buses of the park-and-ride system.

c. In the main street, the collected monorail lines are used and a special car is assigned to each independent commercial street.

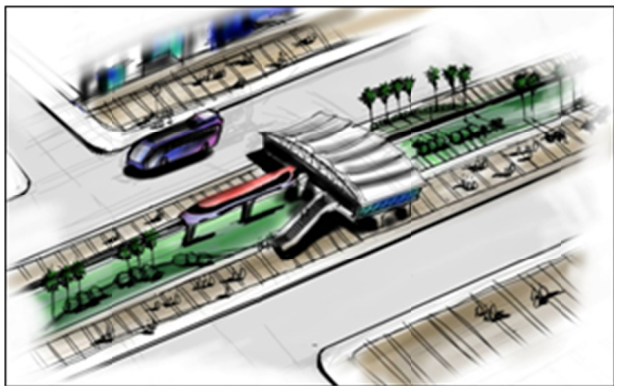


Figure 23. Visualization of a commercial street showing the monorail in the centre and a suggested point of loading and unloading

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