

**Automobile's role
in the future of transportation system,
Tehran as an example**



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But first:

**THE MAJOR PROBLEMS OF
THE LARGE CITIES**

I- HOUSING

Housing is among the most important problems. There are two different alternatives regarding the human settlement planning in the large cities:

1-1- If no formula is devised to cope with this problem, the centre of the city and some city quarters will become slum areas or twilight zones.

1-2- If houses are built in a hurry and without adequate study, then the unplanned and uncontrolled development of some areas, especially in the suburbs, will create new problems

2- WORK

In the large cities there is a great variety of jobs and, therefore, all immigrants are able to find a job in any trade or discipline. It is true that this problem of immigrants is easily dealt with, but we should bear in mind that innumerable problems stem from this same availability of jobs in cities.

3- TRANSPORTATION

This is the main problem caused by the two points mentioned above and it will be discussed a little later.

4-DENSITY IN THE CITY CENTRE

The need of daily movements and the complexity of its socio-economical factors cause the density of the city centre. In this paper we put the focus on the movements of citizens, which causes these densities. Many studies have been concluded on the problem of the daily movements or transit movements of the citizens. These mass movements are categorized in many different ways such as:

- Commuting movements (i. e. home-work and work-home).
- Other movements (shopping, social activities, entertainment, etc.).

Since the human being and his freedom is the predominant aim and all movements are considered as necessary, it is the expected function of the urban transportation system to make sure that the daily movements of every citizen as a human being is made possible. The most important variable, obviously, is to provide a sustainable transportation system to cover the whole city.

THE GLOBAL SOLUTIONS

The advanced city planners and transportation researchers of today, worried about the future of the large cities (with population approaching 20 millions). Conducting extensive studies on the subject and taking a very futuristic approach to the problem, especially with regards to the problems arising from traffic and its ecological aspects they have devised some general plans.

The main solutions proposed for regional planning of the large cities, saving green spaces and providing a locally adapted transportation network in the large cities, are based on the following sustainable traffic concepts:

2-1- "Spread Texture

Using green and empty spaces, the city is stretched to have the lowest possible density without any "traffic knots". In order to build a city based on "spread texture" for 20 millions population, an area with a radius of 160 kilometres is required. Frank Lloyd Wright designed a city according to this specification. Also the major parts of Los Angeles has been developed on the basis of spread texture.

Suggested transportation system for such cities is based on the pre-requisites of using private cars (clean energy driven cars), and with the help of a network of commuting trains and local airlines to facilitate long distance transport.

2-2- "Galaxical" Texture

This is very similar to the "spread texture". It is composed of rather small urban units or "nucleus", where density is at its greatest in the centre of such units. The units are independent but not self-

sufficient; otherwise they would be transformed into Satellite centres”(see the solution No. 2-3). In the development of Stockholm, some features of the “galactical texture** is observed.

A network of three-dimensional multi-floored public connecting routes between the nucleuses provides the different movements. These inter-connections, local public transportation and other facilities give different alternatives to the movements, while within the units, private cars (clean energy driven cars), bicycles, and pedestrian movements would dominate.

2-3- Satellite Texture

The existing city will be surrounded with a “green belt” and outside this belt self-sufficient satellite towns (New Towns) are created. This method has been used for the extension and development of London and Moscow.

The designs of these city textures are also based on the use of public transport facilities, usually inter-city commuting trains.

2-4- Concentrated Texture

For the residential and working spaces of a population of 20 million a circle with a diameter of 16 kilometres is required. However, using modern technology, a cubic space with side of 5 kilometres equipped with horizontal and vertical lifts would accommodate same number of people. Of course, in such cities houses in open spaces for the weekends are in demand. Central parts of Manhattan, Paris, and Moscow, with all their tall and compact apartments (without exaggerated manifestations) would be concerned as concentrated texture.

2-5 Star-like Texture

The Central Nucleus of the city is left untouched and development is carried out with a medium concentration through the long radiuses (the main axes of traffic) and the green tongues (green area created in between parts), the radiuses are at times 80 kilometres in length. Along the radiuses the city extends, having the form of a linear city.

Any linear city has its own special centre or centres of activities along the radius. The radiuses with their different specialities together with the Central nucleus respond to all the city’s needs. The designers of Copenhagen had suggested the optimum development of the city would be through a star-like texture.

City traffic along the radiuses would be set up with a public transportation system. These radiuses would be connected to each other by circle routes through green tongues. Of course, public transportation systems in the circles too far off from the city centre would not be beneficial.

2-6- Circular Texture

This kind of city looks like a circular crown which contains a vast area and whose points of interest and busy spots are on the axes of the crown and the more we approach the crown from its axes the more concentrated it gets. This kind of city texture is in fact a “linear city*” and the only difference is that the axes of the city is not straight, but rather a circle.

The main connection routes in this kind of city texture are concentric circles and their subsidiary connecting routes pass through the centre of the crown, as its **axes**.

In Netherlands the following cities have originated as a circular texture: Harlem, Amsterdam, Utrecht, Rotterdam, and Hague. The recent development of San Francisco Bay could be justified by the same system.

From the traffic point of view this kind of city textures have been designed for the use of public transportation.

2-7- Free Texture

In this case, the city takes on the form of “multi-polar city”, which includes some advantages of the spread texture. The old centre of the city is devoted to a part of public service and other centres are set up in appropriate places at city extensions.

From the traffic point of view the free texture can use any kind of transportation means depending on the case in question.

Free texture is most common in today’s large cities called “megalopolis” and is often an unsustainable development due to cities sudden expansions caused by disasters like war, catastrophes, and other reasons of mass immigration.

TEHRAN'S TEXTURE

Unfortunately Tehran has become one of the largest cities, which is among the 7:th category. The Traffic Authorities have always been involved by implementing world experiences directly or indirectly as Traffic Solution, based on both of the strategies. Because of complication of problems (due to the concentration of over 10 millions inhabitants in a city without a minimum effective public transportation network) automobile (or simply) "Auto" has easily found its place at the first stage in the City Traffic and Transportation Network.

Today "Auto" plays two important roles for the households in Tehran, for their movements or mobility and for their economy. Most of the planning implemented to improve movements of "Auto" in Tehran has given negative impacts to the living environment, such as: air pollution, congestion, safety problem for pedestrians and cyclists, etc. There are also many socio-economical long term problems, which are rising up.

Up to now the Traffic Authorities have tried to invest in many separate plans, which mostly failed due to lack of deep studying and co-ordination with each other. Some of these efforts are:

- a- Traffic Restricted Zone, with its unique identity in Tehran, which is completely different, comparing with the similar succeeded ones.
- b- Electrical Bus, without any co-ordination with the existing and planing Public Transportation Network

Of course there are high appreciated but separate projects to remedy some parts of the traffic problem but not as a comprehensive plan with connections to each other. Some of the projects are: Subway system; highway network; bicycle routes; green areas; etc.

The facts show that even with such a high congestion, pollution and other problems due to the "Auto", the future of Tehran is unfortunately based on the same "Auto", and no other alternative seems to find its room in this perspective. This fact is simply confirmed by the progressive investments on the "Auto", such as:

- I- Increasing local automobile factories with high efficiency both in production and sales. (The automobiles are sold in advanced a few years before they are fabricated).
 - 2, New Highways are under construction to improve movement for the private Autos, both in and around the city.
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3- Multi-storey Parking places, to invite more Autos into the city.

4 Using the Traffic Restricted Zone more as a tool to increase the income rather than to minimize the number of Autos.

Basing our studies on the above said varieties of Transportation and Traffic Strategies, which are mostly opposite to each other, Tehran is destined to prepare itself to continue its permanent battle against the “Auto” impacts, surely without any success, which will be very dangerous regarding to the main factors of Living Environment.

For many years the traffic problem in Tehran has been under discussion. Many short term and long term plans have been studying and implementing. The studies were extended to the other town factors, but unfortunately, because of the increasing population, the problem continues to become worse and worse.

A SUMMARY OF
THE ACTIVITIES OF THE TEHRAN MUNICIPALITY
DURING THE PAST FIVE YEARS

Tehran the capital city of Iran, with a day time population of over 10 millions is the most populated city in the country and one of the largest cities in the world with the metropolitan area of over 2000 square kilometres. Tehran is the centre of the national government and of commercial, financial, cultural and educational activities in Iran. Urban expansion in Tehran resulted from high rate of population growth and rural-urban migration combined with strong tradition of centralization in the capital.

After Islamic Revolution in 1979 and due to the 8-years war with Iraq, the population increased to more than double, causing tremendous environmental and socio-economic problems for the city. Amongst these problems, air pollution is of major concern since the quality of air has deteriorated to a level which ranks Tehran among the worst polluted cities in the world.

Confronting with these problems, and responding to the need of improved living conditions, the Municipality of Tehran had to reorganize its administration in 1989. Here follows a brief description of the activities of the Municipality of Tehran during the past five years to achieve the above mentioned goals.

I. REARRANGEMENT OF THE ADMINISTRATIVE SYSTEM

- I-1. City Hall Organization
- I-2. Increasing Management Authority
- I-3. Establishing New Independent Organizations
- I-4 Promoting the Quality of Employed Staff
- I-5 Automation of Management Information Systems
- I-6 Enforcement of City Regulations

II. AIR POLLUTION CONTROL

- II-1. Establishment of Air Quality Control Company (AQCC)
 - II-2. Establishment of Traffic Control Company (TCC)
 - II-3. Establishment of Transportation and Traffic Organization (TTO)
 - II-4. Inspection and Maintenance (I&M) Program
 - II-5 Public Transportation
 - a. United Bus Company
 - b. Taxi Management and Supervision Organization
 - II-6. Traffic Restricted Zone
 - II-7 Alternative Fuels
 - II-8 Current and Future Projects for Air Pollution Control
 - a. Trend of Air Pollution in Tehran in the Past Decade
 - b. Effect of Tune-Up and Periodic Service on Emission Reduction of Gasoline-Powered Vehicles
 - c. Effect of 2-Stroke Oils and Emission of Motorcycles
 - d. Investigation of the Effect of Improvement Kit on the Reduction of Emission and Fuel Consumption in Paykan (domestically made car) Engine.
 - e. Monitoring Stations
 - f. Measurement of Pollution of Motorcycles in Tehran
 - g. Statistical Investigation of Motorcycles in Tehran
 - h. Effects of Tune-Up and Periodical Service on Emission Reduction from Motorcycles
 - II-9. International Co-operations
 - a. Tehran Transport Emission Reduction Project
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- b. Conversion of Diesel-fuelled Buses to CNG
- c. Co-operation with JICA (Japan International Co-operation Agency)

III. GREENING OF THE CITY

IV. SOLID WASTE MANAGEMENT

V. CULTURAL AND SOCIAL ACTIVITIES

VI. RELOCATION OF INDUSTRIES AND TRADE OCCUPATIONS

VII. PARTNERSHIP

As described in this summary , in the past five years it has been the general policy of the Municipality of Tehran to decentralize the activities, and to attract the public participation in the city management.

Establishment of several new organizations and companies, creation of several cultural, social and sports centres, relocation of industrial and trade activities with co-operation of their owners, publication of newspaper and establishment of radio station, are all in the direction of attraction of partnership of the people to the city affairs. Hoping that in the future with the public partnership, the city of Tehran will have a pleasant living environment.

“AUTOMOBILES ROLE IN THE TEHRAN TRANSPORTATION SYSTEM”

Tehran, a city which would be shortly ranked 8th in the world regarding its population, with so many acute problems caused by using the means of transportation, unfortunately in a wrong way (see how the private cars are used, Motorcycle problems, etc.) has a priority to be studied and its problems to be solved, in the first hand ecologically. Because of this, Tehran in future would act as an “environmental bomb” which can ruin all that the other countries are trying to build up. The statistics given at “the 1st Symposium of Healthy Cities” Dec. 14-16, 199 1 (Tehran) was really frightening, for Tehran itself and for the World.

In Tehran Auto is dominating the life style and whole of the activities. Any movement depends on the Auto. No activity has place in the daily lifes without Auto’s presence. Auto has the first role in the household’s movements and in the household’s economy. Air pollution, congestion, accidents, lack of safety, and many other problems in Tehran has its routes in the private Auto’s movements.

How can a city with so many acute and fundamental problems exist without endangering the world’s health. Indeed the Symposiums and their intentions show that the local authorities know about the urgency of this fact as a world wide problem. Responding to that they have tried to solve the problems by huge sums of investments. There are many obvious facts as follows:

- The local authorities are really willing to do their best (see Municipalities last investments and positive results, etc.). Therefor it is our duty to support them by providing know-how and sharing with them other global experiences.
- This global problem can not be solved by local experts, not even if the world’s high level experts sit and criticise them. We must all touch this acute world problem as our problem. It is not enough to send messages through the global conferences such as “Act local and Think global”. There is no limits for ecology.
- We must underline that: it is our globe’s problem and not their problem.

Tehran’s future begins today and tomorrow will be to late. Therefore I tried, and I am still trying, to give my information to the world’s environmental authorities through any possible means.

Proposed plan for the solution of the traffic problem

The proposal for a fundamental solution of the traffic problems has its origin in the economical, social and cultural aspects of a society. Nowadays there are also added the ecological aspects of traffic to these factors. In Tehran case my practically detailed proposed plan is as follows:

Public Transportation

As some of the authorities have mentioned, “*if Tehran Public Transportation Company owned a number of 4.500 new buses of the same manufacturing with the reserve parts enough for more than one year, the Company could give the optimum service to the passengers of Tehran and its suburbs*”. But as I have seen the facts, even to provide so many buses and other facilities (to this Company) does not change the situation.

There are fundamental problems to solve such as:

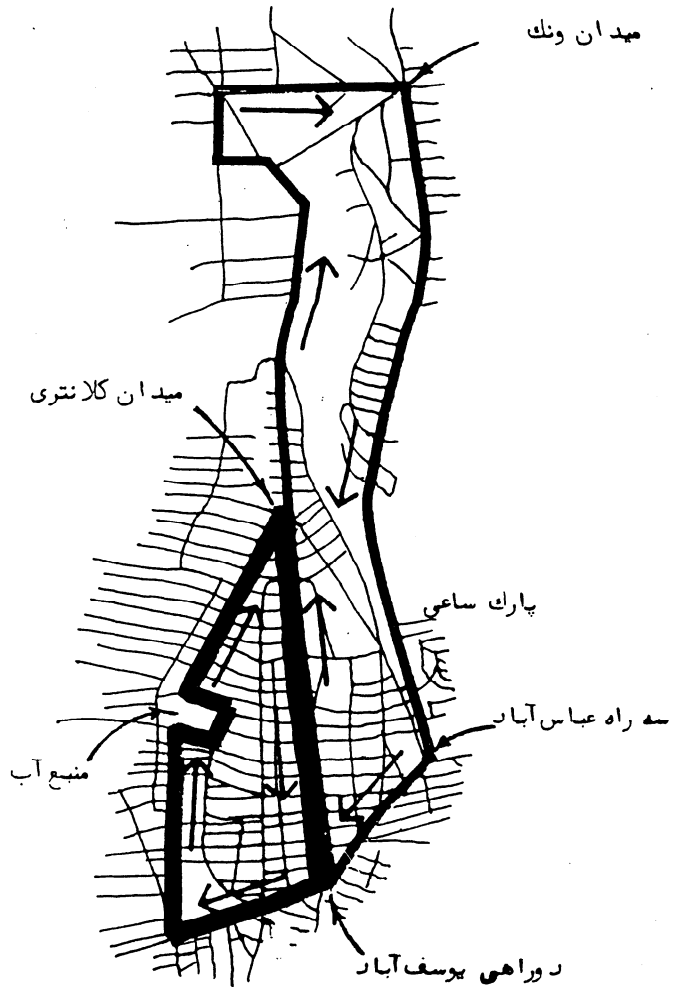
- Making a final decision about the strategical solution for the Tehran Traffic and its future.
- Solving the private traffic and giving an acceptable and practical alternative to the private drivers to avoid using Autos for commuting.
- Improving the Traffic Personnel education on all levels.
- Furnishing all Bus-Stops, providing clean buses, giving out time tables for buses, teaching the drivers to act politely, providing a practical ticket system, and providing adequate rest stations for the drivers to be able to drive the whole route without any preoccupation.
- Informing the drivers and passengers by mass-media about the existing public routes.

Next step is to buy new Environmentally friendly buses from the same manufacturing. Otherwise, not following the mentioned steps, any new bus can be destroyed entering into the existing network and after a while we reach the same situations as today.

During these strategical and fundamental decision makings the Subway System should be completed and new Electrical Bus routes should be studied and planned in relation to the whole Traffic Network. As it is shown in the enclosed sketches the combination of these separate systems and new systemization of Buses and Minibuses (as shown in the sketch) complete each other and provides a

سیستم دورانی (د-دار بسته)

ALTERNATIVE I - RING ROUTES OF LOCAL
NATURAL GAS MINIBUSES



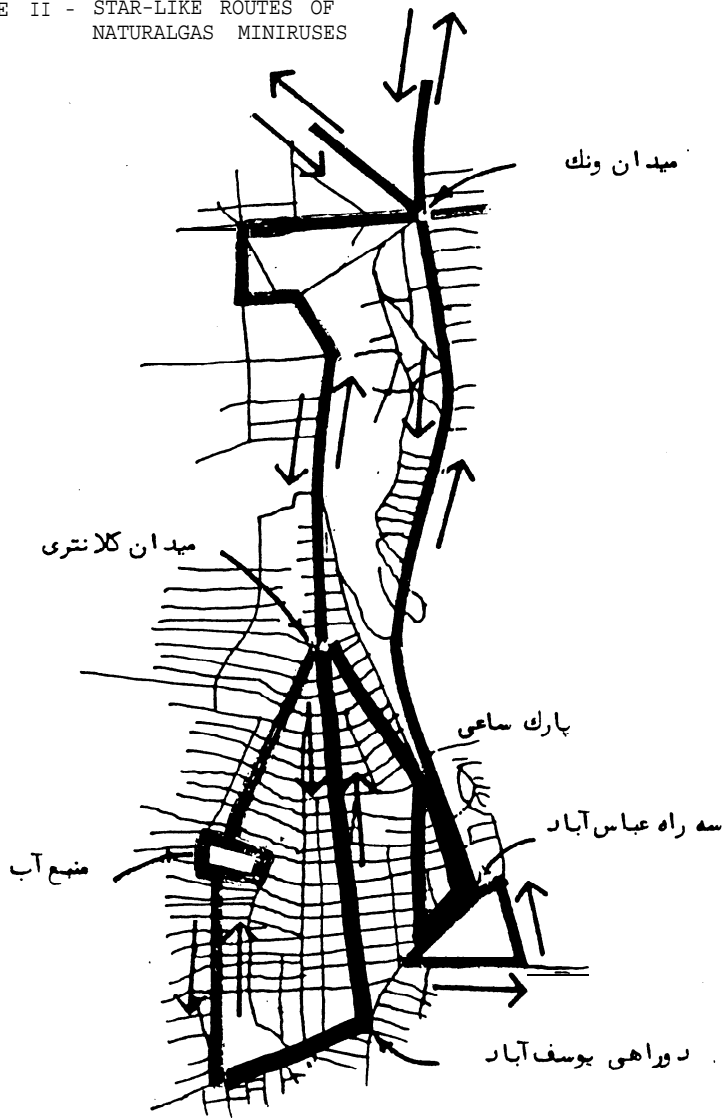
سیستم دورانی (مدار بسته) : دوراهی یوسف آباد - میدان کلانتري - میدان ونك - پارک ساعی - سه راه عباس آباد - دوراهی یوسف آباد

سیستم دورانی (مدار بسته) : دوراهی یوسف آباد - میدان فاطمی - خیابان کاج - منبع آب - میدان کلانتري - دوراهی یوسف آباد



سیستم نوسانی (ستاره‌ای)

ALTERNATIVE II - STAR-LIKE ROUTES OF
NATURAL GAS MINIRUSES



(ستاره‌ای): يوسف آباد

سیستم نوسانی



(ستاره‌ای): میدان ونك

سیستم نوسانی



flexible structure for the urban texture by such a perfect Public Transportation Network. Afterwards it will be possible to obtain:

- The new local public transportation by using the Electrical Loops of Buses and Natural Gas driven Loops of Minibuses.

- The communication between the different zones as the inter-district connections by Electrical Buses

- The main routes of the Tehran Public Transportation Network should be completed by the Subway Lines.

Once provided such a harmonized Public Transportation Network, it will be easily possible to start the “traffic calming” by surgical operations in the centres of each separate Traffic Zones to remedy the ecological aspects of Tehran Traffic. It depends on the position of each Traffic Zone and the acute need of surgery, but the local authority gives priority to one Traffic Zone or to the other one. It is obvious that the whole Traffic Zones of the Network need such surgical operation.

In this way the city will be divided preliminary in about 50 to 150 Traffic Zones depending on the division policies. In these Zones the surgical operations will not be so complicated as the whole city texture. Each Traffic Zone, or a combination of some neighbourhood Traffic Zones can be furnished by their local urban symbolic elements and characteristics.

These separate Traffic Zones can organize local NGOs (Non Governmental Organizations). The local citizens in each Zone would find opportunity to collaborate and give their contribution to their Zone, and many serious problems will be solved practically by NGOs initiative.

These local organizations will be supported by Municipality and together they will solve not only the Traffic Problems of their own Zones , but will also give their contribution to the city, city suburbs, and why not regional, national and even global. This way each Zone’s problem will be handled locally by NGOs and will not be accumulated and handed over to the authorities.

The suggested traffic surgery has the following prospective

- Setting one free from private car confinement and helping him obtain his true personality and his cultural and traditional live style.
- Being served by a balanced public transportation network all over the city, having no traffic congestion in any part of the city.
- Saving the city texture from “fragmentation” by highways and similar.
- In case some of the main passages are blocked for whatsoever reason there would not be break down in the system as a whole.
- Making it possible to use several routes to get to any destination.
- Decreasing the rush for private vehicles which are specifically meant for pendulum-like movements.
- Extending the green areas consistently over the city and facilitating it for pedestrian use, encouraging people to walk or to cycle.

By this surgery the Tehran citizen obtains his lost warm-heartedness and sincerity and Tehran starts a new life based on an environmental friendly, sustainable transportation network as the pioneer in the world.

Conclusion

The situation today shows that Tehran is acting as a ”Ecological Bomb”. It is not any more the local authorities fault alone if this "Environmental Bomb" explodes. It is time to support them globally to eliminate the future catastrophe.

They do not expect to exchange such technological experiences as a kindly assistance by international welfare organizations. The local authority in Tehran is financing, buying and taking part actively to avoid this certain disaster. They need up-to-date management-education, technical- education, traffic-education, Environmental-education, etc. to rehabilitate their administration staff. These education can be obtained by two simple ways:

- 1- Direct collaboration of expert Companies and NGOs in practical projects.

2- Providing Cultural contacts and educational possibilities for the local authorities.

Once they get these education, they can decide themselves to solve their problems by alternative solutions adapted to the local culture and based on sustainability, which has its origin in Iranian traditional and local culture.

Being ready with adequate NGOs, supported by local authorities and furnishing the city by the proposed 150 Local Networks and solving the local traffic and inter-zone traffic by Public Transportation System, it will be the start-time to eliminate the traffic problems, minimizing the number of private vehicles in the Traffic Network and beginning to think about the safety systems and the poor pedestrians, who have no place in the existing traffic situation.

In this case, the Traffic Restricted Zone (which is about 23 square kilometres) should change the character to be used as a “Free- Zone”, free to all environmental friendly vehicles. In such a city, the subway system acts as the arterial public transportation, the electrical bus-lines serve the Inter-Zones transportation of each Traffic Zones and finally the pedestrians and cyclists should enjoy the ecological pathways either in each separate zones or in the conjunction pathways between these zones as a general network adapted with the city texture.

This traffic network will not change fundamentally the existing transportation system, the transportation means are the same familiar buses, the network is easily extendible without any need of advanced technology, it seems a simple system, but at the same time it is a sustainable transportation network for a large city such as Tehran (over 10 million inhabitants), adapted to its local culture, local habits, local passengers, and at the same time it is environmentally friendly.
