

**THE PULSAR EFFECT – Urban Planning and the pulsar effect :
Coping with peaks, troughs and repeats
in the demand cycle.**

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a paper for the parallel session 2 :
Flexible and Adaptable Infrastructure in a ‘Pulsar’ Context: Dream or Reality?

**TITLE : An optimization approach for the provision of road surfaces in
urban areas. (In the search of a methodology to design an optimum road
network surface for the *fluctuating* road traffic demands)**

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Outline

Optimization is a general methodology in the process of problem solving, primarily in the case of ***deciding to a project capacity*** for a ***fluctuating and undetermined demand***. Urban planning is a long run activity seeking for steady steadiness in a longer time span but also coping with short run optimization efforts. These efforts in various sectors may also act as tools for the implementation of long term planning goals. Transportation and traffic sector in urban means, may of course be considered as one of those items acting as implementation tools. But it inherits an important factor that is, unpredictability of demand. By looking at the urban spaces especially in developing countries, planners may easily grasp this evidence by perceiving the lack of efficient road surface in certain parts of the cities, whereas the surplus of unused and floating spaces in some other parts spared as roads.

- **Introduction**

Transportation networks in general but especially those in urban areas are ***highly facing with the problem of coping with peaks*** in the demand cycle which appears in hourly, daily, monthly and yearly basis. Particularly in the developing and third world countries due to the ***lack of efficient planning and management organisations besides high incremental urban population increase***, there exist a chaotic decision making process that is also influencing in turn, with of course negative effects, the decision making processes related to the urban road-based surface traffic. Although local political and management actors are usually talking about the scarcity of monetary resources one can easily see by looking at the ***unused road capacities, how haphazardly the implementations*** are realized and how expenditures are wasted during the ***constructions of urban road networks***. Same thing occur in the case of Turkey too. There fore after a worthwhile experience in local planning, transportation and traffic affairs, it was understood that a special emphasis should be given to short-term optimization studies which are also beneficial for longer-term strategies. But in order to avoid haphazard situations and outcomes it is also necessary to think on a methodology

to approach for combining solutions in urban transportation and traffic problems seeking both short and long-term objectives. This study is an outcome of such an effort and an attempt trying to build up a methodology for the optimization and achievement of the ***most effective use of existing road layout in urban areas***.

- **Role of Transport Option in Urban Planning and Management.**

Transportation studies for urban areas both in terms of urban planning and management, emerges in the picture by two specialised activities complementary for each other. First one is such activities called as ***traffic engineering and planning*** and the other is as it is well known, long term ***urban landuse and transport modelling*** depending upon strategic urban planning options. Besides trying to look at the very far future in terms of transport decisions in a city, planners and administrators of that city should also give a priority to rationalise and optimize the investments for existing road networks. Scarcity of resources, problem of resource allocation and obligations for defining the priorities, in addition to the high level of costs in transport and traffic infrastructure, should enforce the planners to help the decision makers getting more in consideration of optimum benefit and maximum return in such investments. This reality proves itself simply by looking at the existence of careless lane and width standards, undefined road sections, useless junctions, floating and undetermined traffic lanes and undefined road layouts, in short efficient use of existing road networks. The situation gets even more crucial due to the ***lack of organizational optimisation***.

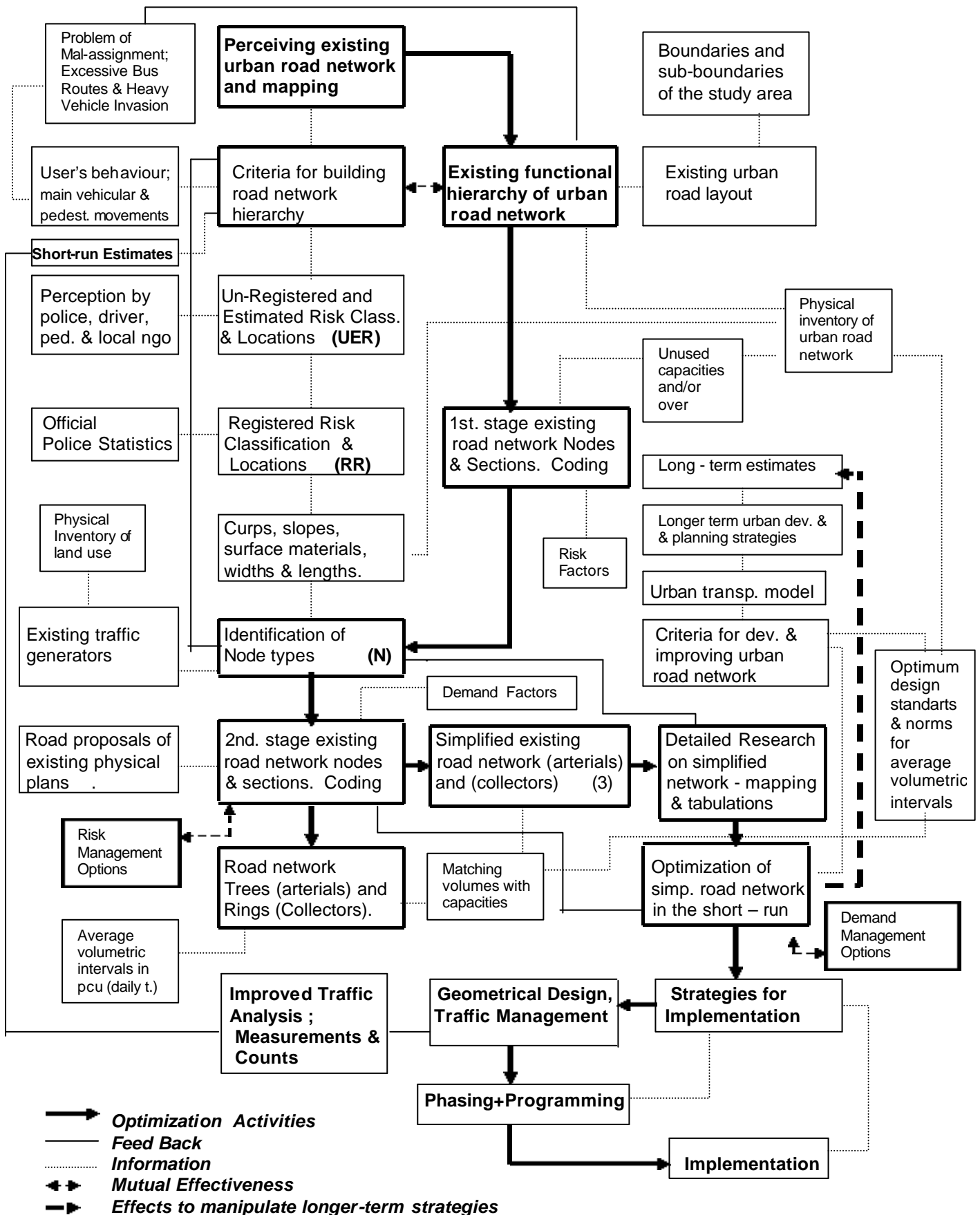
Efforts related to urban transportation problem solving should tackle, even in the short-run, with ***risk management and demand management option***. Risk factors may be counted as; sources of traffic accidents, delays, travel time, travel distance, fuel consumption, deterioration of equipments and parts (tires, vehicle pieces etc.), environmental effects and pollution. For the case of demand factors following can be mentioned; existing landuse structure, existing macro and micro traffic generators, road based public transport operators, higher ratios of heavy vehicles in traffic composition, car ownership ratios, dispersal of parking areas etc. There fore short-run optimization efforts in urban transport are expected to cover a system of risk and demand factors.

- **Proposed Methodology for Designing the Optimum Road Network for Urban Areas in the Short – Run.**

Following is a ***partial*** but a ***complementary approach*** within the frame work of urban planning and management, and an optimization study for building a well equipped and well organised road based transportation network using the existing road layout as a stepping stone. It aims to built up a methodology for local planning activities in association with a corporate study for urban planning and management, solving the problems in short-term but not conflicting with the ones in longer terms. Causing least amount of total expenditure, and the best use of existing road infrastructure, but still keeping the risks in reasonable level also by using the demand management options which brings to the users extra responsibilities and expences with regards to their demands from the urban transportation services. In building the frame work the intention is of course to use the techniques and methodologies of traffic engineering concepts also making the urban planners to get more procurement from those as a team member.

Proposed Methodology for Designing the Optimum Road Network for Urban Areas in the Short – Run.

(A Corporate Study for Urban Planning and Management)



- **Conclusions**

As it is already mentioned the approach tried to be explained is a partial one within the general frame work of urban planning. There fore it can also be taken into consideration according to the concepts of **project management**. Being subject to a project management problems, such studies can be also taken in different scales.

For example;

Scale of the project	Characteristic of Network
Optimization in Terms of Urban Macro – Form. (Wholes)	————— Road Network of Main Arterials & Collectors
Optimization in Terms of Various Urban Sub– Districts : (Sub-Wholes)	————— Road Network of Collectors & Service Roads

Proposal in this study related mainly to the macro scale optimizations and the network subject to analysis is taken as a simplified version consisting main arterials and collectors.

Planners and the managers of a local government should think that problem of PEAK is the main problem of an urban area in designing the road networks in all terms. By looking at a year around, and also by investigating several consequent years and comparing one after another, planners can make a judgement about a standard **total daily average** figure in defining the transportation and traffic demand on the roads. This is initially needed for short term optimisations. But that can also be a basic information for the long – term estimations. It is always wise to start with the today's problems. If the planners can not solve problem of present, how possible it is for them to tackle with problem of future? As specialists traffic planners and engineers are also making estimations and projections for the urban areas. And there fore why not to help and collaborate with them in order to prepare mutually dependent figures for the present and near future.

Main idea behind the proposal is to match total average cross-sectional traffic volumes with practical network capacities. There as a main design input, it is needed to decide on an accepted volumetric interval (e.g. daily or yearly volumes in two directions in p.c.u.), and optimum design standards and norms for the same accepted volumetric intervals. In addition to that, cost assumptions and cost estimations are also the collective concepts which are subject to investigations both by urban and traffic planners. There fore they must try to achieve minimum total costs in the short and long runs, of course by utilizing minimum risk considerations and demand management regularities.

All these efforts will of course make the planners to gain more initiatives for controlling and diverting the longer term variables in space. The short-term solutions also by having practical outcomes and show offs, end up with the increase of strength and the reliability of planning in practice.